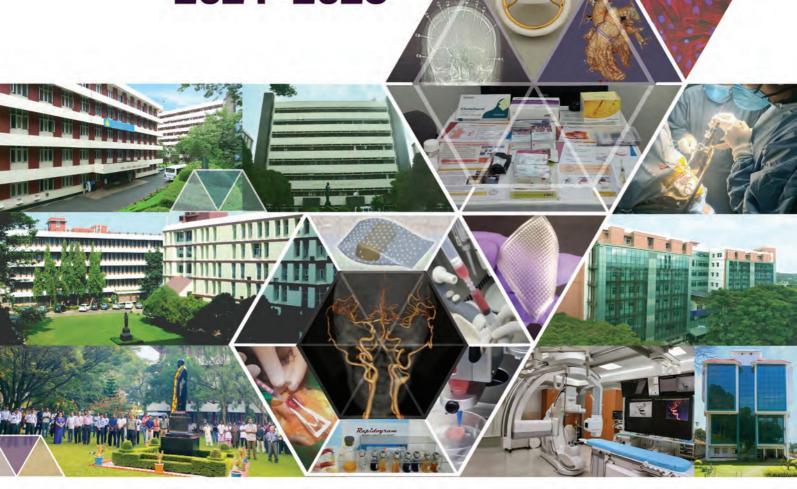


Annual Report

2024 - 2025



Sree Chitra Tirunal Institute for Medical Sciences and Technology

Thiruvananthapuram, Kerala, India - 695011



SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY

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ANNUAL REPORT

2024–25

Annual Report 2024-25

Sree Chitra Tirunal Institute for Medical Sciences and Technology
Trivandrum

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····· History ·····

The origins of the Institute date back to 1973 when the Royal Family of Travancore gifted a multi–storey building, for the people of the region, and the Government of Kerala resolved to develop the gift as the Sree Chitra Tirunal Medical Centre for medical specialties. Sri P N Haksar, the then Deputy Chairman of the Planning Commission, inaugurated the Sree Chitra Tirunal Medical Centre in 1976, and patient services got under way. The Biomedical Technology Wing followed soon at the Satelmond Palace, an exquisite gift of the Royal family, located 11 km away from the Hospital Wing. The Vision of the first Director, Professor M S Valiathan, transformed the Centre into a unique institution that blends the practice of modern medicine with relevant research and technology within the same institutional framework.

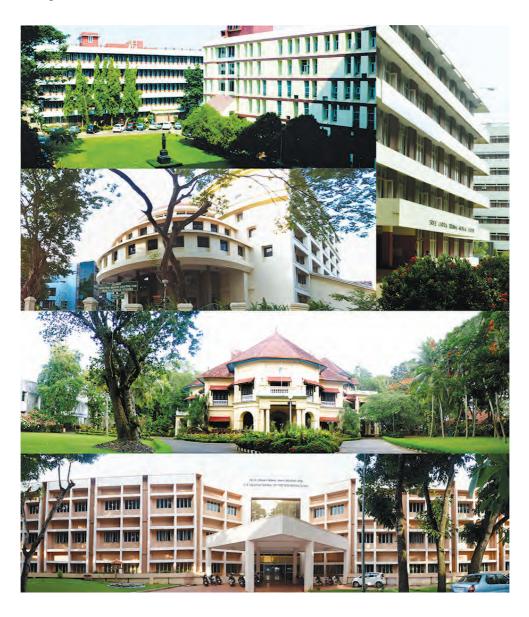
The concept of amalgamating medical sciences and technology within a single institutional framework was regarded sufficiently important by the Government of India to declare the Centre an Institute of National Importance under the Department of Science and Technology by an Act of Parliament in 1980, and name it as Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum. Dr Manmohan Singh, the then Hon'ble Finance Minister, Government of India, laid the foundation stone for the third dimension of the Institute, the Achutha Menon Centre for Health Science Studies (AMCHSS), on June 15, 1992. AMCHSS was dedicated to the nation by Dr Murali Manohar Joshi, the then Hon'ble Minister of Science and Technology and Human Resource Development, Government of India, on January 30, 2000.

···· Our Mission ····

- Promote research and development in biomedical engineering and technology
- Deliver high quality patient care in selected specialties and sub–specialties
- Develop innovative postgraduate training programs in advanced medical specialties and biomedical engineering and technology
- Participate in public health reforms through research, training and interventions

..... Our Vision

• Become a global leader in affordable medical devices development, high quality patient care and health science studies





SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY Trivandrum - 695011, INDIA (An Institute of National Importance under the Department of Science and Technology, Government of India)

President's Message



Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum (SCTIMST) an Institute of National Importance, is known for its commitment in providing quality healthcare, specialized postgraduate and doctoral education, and is engaged in cutting-edge biomedical technology research and development. The mission of SCTIMST is the commitment to excellence in medical education, research, and patient care. I am pleased to report that we have continued to uphold these values with unwavering dedication. The institute's mandate is to engage in, and promote, innovation and excellence in different specialties in medical sciences and technology. With the faculty members and scientists from multidisciplinary expertise and dedicated supporting staff, the institute achieved progress in the fields of Medicine, Science, Technology and Public Health.

I congratulate SCTIMST's doctors, scientists engineers and other fraternity, as well as their industrial partners, for their constant efforts in patient care and medical device development, to make India self-reliant confirming to the Prime minister's clarion call to achieve the target of "Viksit Bharat @2047". Not only will self-reliance in this sector decrease our importdependence and improve our economy, it will create jobs, bring a spirit of pride and entrepreneurship, and improve the quality of health care in the country. The successful translation of our research into technology is a testament to our mission of bridging the gap between science and patient care.

As we look ahead, we should remain focused on our goals while embracing the challenges that lie before us. I urge every staff member and student at the institute to continue their unwavering dedication to excellence, collaboration, and compassion. I encourage the institute to explore new avenues of research, strengthen its partnerships with academic institutions and industry, and expand its outreach to the under-served communities. Together we can forge new paths in medical science and technology that will not only elevate our institute but also improve the lives of countless individuals across the nation.

I appreciate and thank every staff member and student at the institute for their hard work and commitment. Let us continue to inspire each other and strive for excellence in every endeavor.

Shri Kris S. Gopalakrishnan

Gopall_

President of SCTIMST



SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY Trivandrum - 695011, INDIA (An Institute of National Importance under the Department of Science and Technology, Government of India)

Director's Message



It is indeed a privilege and honour for me to be writing a message for the annual report of SCTIMST.

Sree Chitra Tirunal Institute for Medical Sciences and Technology Trivandrum has made significant strides in various focus areas, namely, medical devices development, applied biology and biomaterial development, human resource development in cardiac and neurosciences, advanced patient care in clinical super-specialties and sub-specialties, and public health. The institute has developed several indigenous medical devices that cater to cardiac, neurological, orthopaedic disorders and to diagnostic and rehabilitative aspects.

First of all, I would like to pay homage to three great men on whose shoulders our institute stands. Prof MS Valiathan, an eminent cardiovascular and thoracic surgeon and founding Director of the Institute for 15 years, whose untiring efforts

have led to the eminence of the institute not only in the field of health but also in biomedical device development, left for his heavenly abode on 17th July 2024. Prof Rajagopala Chidambaram Physicist, who was a key figure in developing India's nuclear capabilities and our institute's President for 12 years, leftus on January 4th, 2025. Prof Richard A. Cash, senior lecturer at the Harvard School of Public Health, USA, who saved millions through the introduction of oral rehadration therapy, who helped in establishing the Centre of Public Health in the institute, departed on October 22nd, 2024. On behalf of the Sree Chitra fraternity, I have the honor and privilege to state that the eminence of our institute and the legacy it commands, is mainly due to the vision and resilience of these three individuals.

The institute with an NIRF rank of 13 in the year 2024-2025, has been offering high-quality educational programs in medical sciences and technology. The institute continues to be a popular destination for super-specialty courses leading to DM or MCh Degrees in Cardiac and Neurosciences. This is also one of the few institutions that offer post-doctoral fellowship programs in subspecialty areas of Cardiac and Neurosciences. In addition, the Institute offers Masters and PhD courses in Medical, Biomedical and Health Sciences and, Diploma and PG Diploma courses in related areas as well as dual degree programs (DM/MCh with PhD).

Several significant achievements of the institute were possible in the financial year 2024- 2025. More than 9000 patients have received treatment under the Aayushman Bharat Benevolent Scheme under the Government of India since April 2022. The Indian Council of Medical Research (ICMR) has designated our institute as an ICMR Collaborating Centre of Excellence in recognition of the commendable achievements related to Biomedical Research in Heart Failure. A Centre of Excellence in Minimally Invasive Cardio-Vascular Implantable Devices has been recommended for funding from the Department of Biotechnology, Government of India. The state-of-the-art heart failure biobank, the first in the country, now holds about 2500 bio-samples with annotated clinical data. The Vascular Surgery division of the Cardiovascular and Thoracic Surgery Department was designated the Best National level Teaching Institute for Vascular Surgery for 2 consecutive years. The first antimicrobial stewardship policy of the institute was established.

Day Care Ward, Fontan Clinic, Heart-in-Pregnancy clinic and Genetic Neuromuscular Clinic have been started. The work on stroke, epilepsy, movement disorders, nerve and muscle, dementia, cerebral revascularization, neuro-oncology, endovascular neurological and cardiac interventions and, management of arrhythmia and heart failure, skull base surgery, adult and paediatric cardiac

intervention and surgery, intensive care, basic science research, regional anaesthesia and pain management, is lauded internationally.

CSR funds have been obtained to enhance the activity of the pain clinic under the Department of Anaesthesia, for managing joint disorders under transfusion medicine, for procuring two ambulances, and to provide financial help to patients in the Centre for Excellence in Movement disorders.

Among the much-needed infrastructure development, a new biplane Digital Subtraction Angiogram facility for neuro-intervention has been established. Advanced three-dimensional echocardiography machines with transoesophageal capabilities, anaesthesia machines and ventilators, visual perimetry equipment, operating microscope, equipment for the biomedical wing, and a new 37-seater bus to ply between the different wings of the institute, have been procured.

SCTIMST has expanded the patient care facilities with the inauguration of a new nine-floor hospital block under the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY), supported by the Government of India. The PMSSY complex at the Medical Wing of Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) was inaugurated on 20th February 2025 by Dr. JP Nadda, Honorable Union Cabinet Minister of Health and Family Welfare, and Dr. Jitendra Singh, Honorable Union Minister of State for Science and Technology, in the presence of Mr. Suresh Gopi, Hon. Minister of State of Petroleum and Natural Gas, Dr Veena George, Hon. Health Minister of Kerala, Mr V Muraleedharan, Former Hon. Minister of External Affairs and Parliamentary Affairs, Dr Shashi Tharoor, Hon. MP, Dr. VK Saraswat, Hon. Member, NITI Aayog, Dr Abhay Karandikar, Hon. Secretary Department of Science and Technology and other dignitaries. This was funded under PMSSY with joint support from the Ministry of Health & Family Welfare (₹120 crores) and the Department of Science & Technology (₹110 crores). The 270,000 sq. ft., centrally air-conditioned hospital complex has 170 beds, including 130 ICU beds and 40 pay wards, which is equipped with advanced facilities such as nine ultra-modern operating theatres, MRI and CT scan units, Cath labs, sleep study and echocardiography facility, and other state-of-the-art neuro-cardiac care services. Outpatient services in Neurosurgery, Cardiology, and CVTS-Vascular Surgery began on 1st April 2025, with other services will be launched in phases. The multi-level parking, the four-floor service block and the lift and connecting corridor are fully functional. With additional amenities like wellness centers, counselling rooms, cafeteria, and a fully automated multilevel car parking facility for 116 cars, the new building represents a milestone in delivering world-class, patient-centered healthcare services.

The institute successfully performed its first orthotopic heart transplantation on a 13-yearold girl with end-stage dilated cardiomyopathy. The donor heart, allocated by K-SOTTO, came from a school teacher who succumbed to a ruptured intracranial aneurysm. The complex procedure was carried out by a multidisciplinary team from Cardiovascular and Thoracic Surgery, Cardiology, and Cardiac Anaesthesia, supported by transplant coordinators, residents, perfusionists, nursing, technical, and support staff. Kerala Police facilitated rapid transport through a green corridor.

The institute is grateful to the Hon'ble Minister for Science and Technology, Hon'ble Institute President, esteemed members of Institute Body and Governing Body, Hon'ble Secretary and all members of the Department of Science and Technology (DST) for taking up full responsibility for the pension of all our non-academic employees and of 70% funds of our group-A academic employees; and, for approving gratuity for all our employees under the new pension scheme. These requests had been pending for several years. The institute isgrateful to the DST for approving the support of one international conference for all our faculty members per annum from institutional earnings. Based on the Governing and Institute Body decision, headed by our Honourable President, all selection and promotional interviews are now being conducted twice a year so that it has been possible to avoid loss of service benefits to the faculty and staff members.

The institute has granted 25 Indian patents, five foreign patents, 12 Indian patents; and 10 design registrations were also filed during the year 2024-25. We have also initiated a threeyear collaboration with the World Health Organisation to disseminate indigenously developed biomedical devices across other developing nations. Continued accreditation by COFRAC was granted successfully for our biological testing facility; and, National Accreditation Board for Testing Calibration Laboratories (NABL) accreditation was also obtained for our testing laboratories in the Biomedical Technology Wing.

The institute signed several memoranda of understanding with several industries, research organizations, and colleges to foster mutually beneficial interactions, technology development, and transfer. These, in a sense, enhanced research capabilities and broadened the impact of the institute on society. Several non-disclosure agreements were signed with research groups and institutions for collaborative research and joint technology development. Public health initiatives include several innovative field initiatives in the tribal areas of Wayanad.

I am grateful to the Department of Science and Technology for starting the second phase of Technology Research Centre (TRC), which will help the faculty of the institute capitalize on the knowledge gained in the first phase. SCTIMST-TIMed, the Technology Business Incubator for Medical Devices and Biomaterials, set up

to foster innovation and entrepreneurship in medical technologies, continued to support 25 start-up companies. The oral scan cancer screening device from Sascan Meditech Pvt Ltd won the best start-up company national award for two consecutive years. The computer section made several important software programs for patient care and the division of clinical engineering ensured that there was no pending maintenance contract in the hospital wing.

Several new academic initiatives have also been undertaken. In 2024, 148 students were admitted across various programs, bringing the total student strength to 380. In addition, 349 external students undertook observership, internships, or project work during the year.

Faculty and researchers maintained a high level of academic productivity, publishing 290 articles with a cumulative impact factor (IF) of 1262.9 (average IF 4.5). They also participated in 292 national and 93 international conferences.

Extra-curricular activities form an integral part of the institutional initiatives and an annual sports day for all cadres of the entire institute was organised.

The institute magazines, "Chitralekha" and "Chitradhwani"; the scientific journal "Opinions in Medical Science, Technology and Health'; and, "Samvaad", our web lectures by eminent academicians, are continuing. An Alumni Wall named "Down the memory lane" containing photographs of all the graduates who have passed out of the hallowed portals of SCTIMST was inaugurated. The 'Academic Fest' conducted on all working Saturdays is paving the way for more scientific interactions between scientists/engineers at the BMT wing, as well as clinicians and faculty addressing public health at the hospital wing.

Throughout the year, we have gone through numerous challenges and opportunities, emerging stronger and more united in our mission. Our research initiatives and innovative projects led by our faculty and researchers have not only enhanced our reputation but have also contributed substantially to the global medical community. I commend our teams for their creativity, resilience, and unwavering pursuit of knowledge.

In addition to our research achievements, our diagnostic and therapeutic practices resulted in enhanced outcomes and fostered a culture of safety and quality. Our multidisciplinary approach has encouraged collaboration among departments, resulting in holistic care tailored to the diverse needs of our patients. I want to take a moment to acknowledge the tireless efforts of our healthcare and public health professionals and related supporting fraternity and the student community, who work daily to ensure that our patients receive the highest standards of care.

I would like to extend my heartfelt appreciation to our administrative staff and support teams, whose behind-the-scenes efforts are crucial to our success. Their dedication ensures that our institution runs smoothly and effectively, enabling the researchers and healthcare providers to excel in their roles. Due to their efforts, enhancement of computer facility and digitalisation of administrative and financial processes took place. The procurement through governmental agencies was considerably rationalised and streamlined.

I also place on record with a deep sense of gratitude the unwavering support that I received from Honourable President, Shri Kris Gopalakrishnan, Honourable members of our Governing and Institute bodies and other statutory bodies in guiding and supporting us. I am also deeply grateful to the Honourable Minister Science and Technology, Government of India, Dr Jitendra Singh; the two consecutive Secretaries, Department of Science and Technology, Dr. S Chandrashekhar and Dr. A. Karandikar; Financial Advisor, Department of Science and Technology, Mr. Vishvajit Sahay; Head of Autonomous Institutions Division, Dr. Manoranjan Mohanty, and all members of the Department of Science and Technology, for their help and guidance. I am also grateful to the Government of Kerala for creating and nurturing a scientific ecosystem in which institutions, such as SCTIMST, thrive and work in close collaboration.

I appreciate and thank every staff member and student of this prestigious institute who were committed and aligned themselves to the vision and mission of the institute. Together we can continue to make a profound impact in the field of medical science and technology. Let uscarry forward the momentum that we have built and strive for even greater achievements in the coming years.

To conclude, let me share with you some 'food for thought' based on the wordings of two illustrious personalities:

First, after spending several days in the hospital due to a serious illness, while recuperating, Pope Francis, spoke these beautiful lines:

"The walls of hospitals have heard more honest prayers than churches...They have witnessed far more sincere kisses than those in airports... It is in these moments, when the hospital touches the wounds of people, that different worlds intersect according to a divine design. And in this communion of destinies, we realize that alone, we are nothing. The absolute truth of people, most of the time, only reveals itself in moments of pain or in the real threat of an irreversible loss. A hospital is a place where human beings remove their masks and show themselves as they truly are, in their purest essence. In these abodes does one realise that life will pass quickly, so one should neither waste it in fighting with people, nor in criticizing or complaining excessively... Perfection does not exist. A human being cannot attain

perfection because we are simply not made to be fulfilled here. Here, we are given an opportunity to learn. So, make the most of this trial of life—and do it now. Respect yourself, respect others. Walk your own path, and let go of the path others have chosen for you."

The second are the words of the American philosopher, Ralph Waldo Emerson,

"What is success?

To laugh often and much;
to win the respect of intelligent people
and the affection of children;
to earn the appreciation of honest critics
and endure the betrayal of false friends;
to appreciate the beauty;
to find the best in others;
to leave the world a bit better, whether by a healthy child, a garden patch, or a
redeemed
social condition;
to know even one life has breathed easier because you have lived.

This is to have succeeded!"

Dr Sanjay Behari,Director, SCTIMST

HIGHLIGHTS OF THE YEAR 2024–2025

INFRASTRUCTURE DEVELOPMENT

❖ Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) Complex

A new nine-floor hospital complex supported byPMSSY was inaugurated on 20.02.2025by Dr JP Nadda, Honorable Union Cabinet Minister for Health and Family Welfare and by Dr Jitendra Singh, Honorable Minister of State for Science and Technology in the presence of several dignitaries at the national and state level. The funding for this complex came from the PMSSY Scheme by the Ministry of Health and Family Welfare (₹120 crores) and the Department of Science and Technology (₹110 crores), Government of India.It has 2,70,000 sq.ft. area, centrally air-conditioned,witha total of 170 beds, including 130 ICU beds and 40 pay wards. The PMSSY Complexis equipped with advanced facilities of nine ultra-modern operating theatres, MRI and CT scan units, threecatheterization laboratories,Sleep Study and Echocardiography facilities, and other state-of-the-art neuro and cardiac care services. Outpatient services hadbegun in the new complex from 25.03.2025.A fully automated multi-level car parking facility that can accommodate 116 cars is built adjoined to the new complex. The other amenities to be launched in phases include wellness centres, counseling rooms and cafeteria. The new block of SCTIMST represents a milestone in delivering a world-class patient centered health care services.



Inauguration of the PMSSY-Supported Advanced Hospital block at SCTIMST, Trivandrum. Lamp lighting ceremony by Dr Jitendra Singh, the Hon'ble Minister of State (Independent Charge), Ministry of Science and Technology and Ministry of Earth Sciences, Government of India, Dr Shashi Tharoor, Hon'ble Member of Parliament, Thiruvananthapuram, Kerala, Dr V.K Saraswat, Hon'ble Member NITI Aayog and Former President of the Institute, Shri. V. Muraleedharan, Former Minister, Minister for State for External Affairs & Parliamentary Affairs, Prof. Abhay Karandikar, Hon'ble Secretary, Department of Science and Technology, Government of India





Newly inaugurated PMSSY block – advancing healthcare with modern facilities- long view



PMSSY Block – A new chapter in advanced healthcare

Combination devices (CD) block in the BMT Wing Campus

The laboratories in the CD block are undergoing major upgrades, with the addition of two BSL-2 labs and a centralized testing area. New basic science laboratories are also being set up to support research related to the Hospital Wing.

Centre of Excellence for Minimally Invasive Cardiovascular Devices

This centre, funded by Department of Biotechnology was inaugurated in 06.07 2024 with a 5-year grant of ₹20.28 Crores. It focuses on developing ten advanced cardiovascular devices while establishing infrastructure for design, *in-vitro* evaluation and precision prototyping.

* The National Centre for Preclinical Evaluation of Cardiovascular Devices

This was approved under the Centre for Advanced Research Scheme of ICMR for the advancement in cardiovascular technologies from TRL 3 to TRL 6. It aims to provide certified facilities for in vitro, ex vivo, and in vivo evaluations, supporting both devices developed by SCTIMST and those from ICMR-sponsored centres. This is an ongoing project.

National Heart Failure Bio-bank

The existing ICMR Centre of Excellence in Heart Failure has developed the National Heart Failure (HF) Database (≈25,000 patients) and India's first National HF Bio-bank (≈4,000 bio-samples with annotated



data). Achievements of the Centre include an India-specific HF Quality of Life tool (used routinely), development of a point-of-care NT Pro-BNP device, and several major national and international clinical trials (e.g., Digoxin RCT, RISE-HF, Trivandrum HF Cohort, MASALA-HF).

VRDL (Virus Research and Diagnostic Laboratory)

A VRDL (Virus Research and Diagnostic Laboratory) funded by DHR-ICMR is being setup at the CD block of the BMT Wing. The total project outlay sanctioned by DHR-ICMR is Rs 19.70 Crores.

❖ National Facility for Biocompatibility of Medical Devices

❖ This is approved by Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Govt. of India for the Biocompatibility Testing of Medical Devices with a funding of Rs 5 crores

Cardiology Catheterization laboratory

A new Cardiology Catheterization lab has been established in the Hospital Block of SCTIMST on 03.12.2024

Report of Achievements and Performance of the Institute

Human Heart Transplantation

On 22.07.2024, the Institute successfully performed its first orthotopic heart transplantation on a 13-year-old girl havingend-stage dilated cardiomyopathy. The donor heart, allocated by the Kerala State Organ and Tissue Transplant Organization (K-SOTTO), came from a school teacher who succumbed to a ruptured intracranial aneurysm. The complex procedure was carried out by a multidisciplinary team from Cardiovascular and Thoracic Surgery, Cardiology, and Cardiac Anaesthesia, supported by transplant coordinators, residents, perfusionists, nursing, technical, and support staff. Kerala Police facilitated the rapid transport through a green corridor.

National Rankings

In 2024, SCTIMST was ranked 13th among medical institutes in India by the National Institute Ranking Framework (NIRF).

CONTRIBUTIONS TOWARDS NATIONAL MISSIONS

- 1. "Make in India"
- Product Development

A. Technology Transfer

During this year, technology transfer agreements have been signed with

- M/s Invasive Technologies Pvt. Ltd., Kozhikode, for Coronary Stent (TiN-coated).
- M/s BL Life Sciences, Delhi, for Bio-prosthetic Heart Valve.
- M/s Vranova Biotech Pvt. Ltd, Mumbai, for Chitosan-Based Antioxidant Polymeric Dressings for In-Situ Application of Antibiotic Drugs for Chronic Non-Healing Wounds.
- M/s Citizen industries, Gujarat, for Box–Tunnel System with Secured Gates for Mice Transfer and Enrichment.
- M/s Synapticore Technology Pvt Ltd, Delhi, for Intracranial Electrodes for Use in Acute and Chronic Electrocorticography.



- M/s Synapticore Technology Pvt Ltd, Delhi, forIsolation and purification of Plasma proteins Fibrinogen, Thrombin, Intra-venous Immunoglobulin, Albumin.
- M/s Shree Pacetronix Ltd, Indore, for Deep Brain Stimulator.

B. MoU /Collaborative product development

SCTIMST entered into Memoranda of Understanding (MoU) with the following institutions/industries:

• The World Health Organization: SCTIMST signed an MoU with the World Health Organization on Health Technology Innovations in 15.02.2025



Strengthening global healthcare collaboration – SCTIMST signs MoU with WHO

• Indian Space Research Organization (ISRO): SCTIMST signed a framework MoU with ISRO On 25.04.2025, to collaborate on Space Medicine, marking a major milestone for the field in India. The signing was done by Dr Sanjay Behari (Director, SCTIMST) and Shri Ganesh Pillai (Scientific Secretary, ISRO), in the presence of Dr V. Narayanan (Chairman, ISRO & Secretary, Dept of Space), Shri. Kris Gopalakrishnan (President, SCTIMST), Shri. Sunil Kumar (Additional Secretary & Head AI division, DST, Govt. of India), Prof. Manikandan (Deputy Director, SCTIMST) and officials from other associated institutions.



SCTIMST and ISRO unite for new horizons. Dr Sanjay Behari, Director, SCTIMST presents the MoU to Dr V. Narayanan, Chairman, ISRO & Secretary, Dept of Space



- Indian Institute of Space Science and Technology: A research MoU was signed with the Indian Institute of Space Science and Technology (IIST) on 06.11.2024 to conduct collaborative research on thermal comfort challenges faced by personnel in high-demand, critical environments.
- Indian Institute of Technology, Madras and Shiv Nadar University, Chennai: A tripartite MoU was signed on the 22.11.2024 with the Indian Institute of Technology Madras, and Shiv Nadar University, Chennai. It aims to foster collaborative research under the project "Prediction of Stroke risk in Children and Adults using Radiological and CFD Simulation with Clinical Evaluation".

Announcement function of an International MoU with WHO

The World Health Organization (WHO) has been in strategic discussions with SCTIMST to incorporate our diagnostic device technologies into their Health Technology Access Pool (HTAP), so as to disseminate in the global level. A Memorandum of Understanding to this effect in between WHO and SCTIMST, has been formally announced a major event organized at INSA Auditorium, New Delhi, on 09.08.2024. This MoU allows our Institute

(through the Department of Science and Technology) to enter into partnership with global entrepreneurs, licensing the technologies and creating revenue generation through royalties. The Union Minister Dr Jitendra Singh presided and the function was attended by dignitaries like Dr VK Saraswat, Member of NITI Aayog and President of SCTIMST, Prof. A Karandikar, Secretary, Department of Science and Technology, Dr Rogério Paulo Pinto de Sá Gaspar, Hon. Officiating Additional Director General and Director, Department of Regulation and Prequalification WHO, Geneva, Dr Roderico H. Ofrin, World Health Organization Representative in India, Dr Manisha Shridhar, Regional Advisor to South East Asia Regional Office, WHO, and Dr Sanjay Behari, Director, SCTIMST. Several members of INSA, DST, ICMR, DBT and other organizations, members of WHO, and officials of SCTIMST were also present for the meeting in New Delhi.



Global Collaboration in Action: SCTIMST Joins Hands with WHO. Dignitaries - Dr Jitendra Singh, the Hon'ble Minister of State (Independent Charge), Ministry of Science and Technology and Ministry of Earth Sciences, Government of India, Prof. Abhay Karandikar, Hon'ble Secretary, Department of Science and Technology, Government of India, Dr V.K Saraswat, Hon'ble Member NITI Aayog and Hon'ble President of the Institute, Dr RodericoH. Ofrin (WHO India representative)



Other MoUs signed:-

SCTIMST has signed the following MoUs for technological and academic collaborations -

- with M/s. South India Surgical Co. Ltd., on the technology of 'Peacock Retractor Device' on 30.04.2024.
- with M/s Skillveri Training Solutions Pvt. Ltd.For the collaborative development of 'Virtual Reality-based Solution for the Upper Limb Rehabilitation of Patients Who Have Got Mild to Moderate Disability Post-Stroke' on 06.08.2024.
- with AIIMS Kalyani on 24.05.2024, and AIIMS Rishikesh on 31.08.2024.- on the technology of 'Artificial Intelligence-based neonatal Infant cry analyzer and assessment of link between protophones and maternal sleep during pregnancy'.

C. Technical Research Centre for Biomedical Devices

SCTIMST has been identified as one among five DST Institutions for setting up Technical Research Centres (TRC). The specialized TRC in Research and Development for Biomedical Devices got implemented in SCTIMSTinJanuary2016, with more than 25 MedTech Projects. Later, during the COVID-19 period, 14 fast-track projects were added to manage the pandemic. Training, translational solutions, and testing consultancy to industry also were incorporated in the TRC.

After the successful outcomes in Phase 1 during 2016-2021, the TRC has been extended to Phase 2 by DST from May 2023 onwards. A total of 56 projects were approved in the core segments of Cardiovascular, Neuroprosthetics, and Hard Tissue Repair (Orthopedics and Dental). Certain Biological and Combinational Products and In-Vitro Diagnostic Devices were also included.

The Project Steering Committee (PSC) of the Technical Research Centre (TRC) has met twice this year on 10.05.2024 and 24.09.2024 to accelerate the project activities. There were major product launching and technology dissemination functions organized this year by TRC.

Director of SCTIMST, the Head of BMT Wing and TRC Co-ordinator participated in the Round Table Meeting on Translational Research, conducted by DST at the CeNS Campus, Bangalore on 08.07.24. The translational ventures done in our TRC were presented in the meeting. Achievements of SCTIMST in Phase I, (showcased along with the meeting) were well appreciated.

The project activities in the new proposals are in progress. The Medical Device Regulatory Compliance Facility (MDRCF), the Industry Institute Partnership Cell (IIPC), and the Technology Business Incubator (TIMed) are continuing to support the second phase of TRC. Major Class D devices like Aortic Stent Graft, Atrial Septal Defect Occluder, Flow Diverter Stent, and Left Ventricular Assist Device are in the final steps of validation.

Four products developed in TRC scheme were launched during this year after obtaining the Central Drugs Standard Control Organization (CDSCO) approval for manufacturing and marketing – (i) AG Chitra TB Diagnostic Kit by M/s Agappe Diagnostics, Kochi, on 08.04.2024; (ii) Gelatin-modified Bioink for 3D printing by M/s Scire Science, Kochi, on 20.11.2024; (iii) Drug-Eluting Bioceramics Beads for Osteomyelitis in Bone - BONYX by M/s. Onyx Medicals Pvt. Ltd.,



Display of Productsshowcased in the Round Table Meeting on Translational Research, conducted by DST at the CeNS Campus, Bangalore



Meerut, on 25.01.2025; and (iv) Drug-Eluting Bioactive Cement for Osteomyelitis in Bone - CAS-PRO by M/s. Onyx Medicals Pvt. Ltd., Meerut, on 25.01.2025.

D. Intellectual Property Rights

SCTIMST actively develops intellectual property (IP) in medical devices and biomedical technology, supported by a dedicated IPR Cell for creation, protection, and management. Its portfolio includes patents (Indian and international), design registrations, and trademarks. Through its Technology Business Division, the institute focuses on translating research into commercially viable technologies through licensing and industry partnerships. The Institute's IPR policy fosters innovation, safeguards inventors' rights, and ensures public benefit through effective technology transfer—reinforcing SCTIMST's leadership in medical technology development.

This year we have got 25 Indian Patents and 5 Foreign Patents granted. 12 Indian patents and 10 Design Registrations were filed.

2. "Skill India"

Technology Transfer and Commercialization

The Biomedical Technology (BMT) Wing of SCTIMST initiates the development and transfer of biomedical innovations to strengthen India's medical device industry. During 2024-25, several licensed technologies were launched as products:

- AG Chitra Tuberculosis Diagnostic Kit An affordable, rapid diagnostic platform for pulmonary TB, licensed to Agappe Diagnostics Ltd., and approved by CDSCO, on 08.04.2024.
- Scire Chitra GelMA-UVS Bioink A gelatin-modified bioink for 3D bioprinting, licensed toScire Science Pvt. Ltd., Kochi, on 20.11.2024.
- BONYX (Nanoporous bioceramic spherical beads) A drug eluting bone graft product for osteomyelitis, licensed to M/s. Onyx Medicals Pvt. Ltd., Meerut, on 25.01.25.
- CASPRO (Resorbable bioactive calcium sulphate) A drug eluting bone cement for osteomyelitis, licensed to M/s. Onyx Medicals Pvt. Ltd., Meerut, on 25.01.25.



AG Chitra Tuberculosis Diagnostic Kit



Scire Chitra GelMA-UVS Bioink



BONYX - Nanoporous Bioceramic Spherical Beads.



CASPRO - Resorbable Bioactive Calcium Sulphate.

Academic programs

SCTIMST offers academic courses in Medical Sciences, Biomedical Engineering and Public Health including DM, MCh, Post-doctoral (post-DM, post-MCh, post-MD), Nursing, PG Diplomas, MD in Transfusion Medicine, MPH, Advanced Certificate Programs, Ph.D Programs and M. Tech (Biomedical Engineering). Joint programs are conducted with IIT Madras, CMC Vellore, and National Institute of Epidemiology, Chennai.



In the academic year 2024, 148 students were admitted with SCTIMST in different programs, bringing the total student strength to 393. In addition, 349 external students under took observerships, internships, and project work during the year.

Faculty members and researcher scholars maintained high academic productivity, publishing 290 articlesin indexed journals with a cumulative impact factor of 1262.9 (average IF 4.5). They also participated in 360 scientific conferences in 2024-25.

3. "Digital India"

- Launched web-based software for Accommodation Management, SRC-IEC online submissions/review, and Staff recruitment portal.
- A new webpage for the Centre of Excellence for Minimally Invasive Cardiovascular Devices was launched.
- Development of the MG-ADL neurology score sheet module integrated into EMR.
- Implemented e-Office software with LDAP authentication and Intra-Institute staff training was conducted.
- LAN connectivity expanded across major blocks using fibre optic networks. .
- Conducted security and accessibility audits (VAPT) for all institute web applications.

NEW INITIATIVES

• New interventional Neuroradiology BIPLANE DSA LAB was inaugurated by Dr V.K Saraswat (President of the Institute, member NITI Aayog)





RESEARCH PROJECTS/PUBLICATIONS/PATENTS

- Number of research projects newly initiated during 2024-25:
 - Nationally funded 17
- Number of research publications: 290

HUMAN RESOURCE DEVELOPMENT/TRAINING

- PhDs awarded: 11
- Research/Technical manpower trained in DM/MCh/PDCC/PDF/MD/ MPH/DPH/Diploma courses/ Observership/affiliated programs (CMC-Vellore, NEI Chennai, IIPH Delhi, IITM-K Trivandrum; 393
- External students under took observerships, internships, and project work during the year: 349
- Manpower trained in research projects/Apprenticeship: 243



• Apart from these structured courses, the institute also contributed substantially to manpower generation through Workshops/Conferences/Training programs/Popular lectures/Awareness camps/Seminars and exhibitions, within and outside the institute.

Important Events Organized/Conducted by the Institute

International Conferences and Workshops

- 1. Asian Stroke Summer School 2024 was organized at Thiruvananthapuram (11–14 July 2024).
- 2. International Conference "TransMedTech 2024: Advances and Challenges in Medical Technology Translation" was organized at Thiruvananthapuram (12–14 Dec 2024).
- 3. 26th INDO-US Flow Cytometry Workshopwas organized in SCTIMST, Thiruvananthapuram (11–13 Feb 2025).
- **4.** Echocardiography Masterclass Heart Failure Awareness Days 2024 were organized by SCTIMST with HFA-ESC & HFAI (27 Apr 2024).

National Conferences and Workshops

- 1. **ISTM CME 2024**was organized at Thiruvananthapuram (11–12 July 2024).
- 2. Midterm CME, Indian Society of Paediatric Radiology SCTIMST (22–23 June 2024).
- 3. ISNACC 2025: 26th Annual Conference was organized, Thiruvananthapuram (24–26 Jan 2025).

Local Conferences, Workshops, and Events

- 1. 'World TB Day' in the BMT Wing, SCTIMST, Trivandrum on 24.03.2025.
- 2. 'State Conference on Nursing Management of Stroke', in AMCHSS, SCTIMST on 15.03.2025.
- 3. Workshop on Biomedical Innovations (Teachers' Awareness), in the BMT Wing, SCTIMST on 05.03.2025.
- 4. Workshop on Biomedical Innovations (SC/ST Empowerment), in the BMT Wing, SCTIMST on 04.03.2025.
- 5. Invited Talk: Antiseizure Medications & Synaptic Plasticity, SCTIMST on 12.02.2025.
- 6. 'Heart Failure Conflux 2025' (Virtual) on 01.02.2025 –02.02.2025.
- 7. "Back to Basics" in AMCHSS, SCTIMST during 17.01.2025 19.01.2025.
- 8. 'Workshop on Digital PCR', in the BMT Wing, SCTIMST during 23.10.2024 24.10.2024.
- 9. 'SCTIMST Open Day for Testing Services' (Hybrid), in the BMT Wing on 19.10.2024.
- 10. Workshop on Biomedical Innovations (Female Students), in the BMT Wing on 27.09.2024.
- 11. Training on Animal Handling, Laws, Ethics & Welfare, in the BMT Wing during 23.09.2024 27.09.2024.
- 12. 'World Patient Safety Day (Theme: Improving Diagnosis)', SCTIMST on 20.09.2024.
- 13. Workshop on Basics of Flow Cytometry in the BMT Wing during 22.08.2024 -24.08.2024.
- 14. '133rd Ambedkar Jayanthi', in the Hospital Wing, SCTIMST on11.08.2024.
- 15. 'Stakeholder Consultation on Healthy Ageing in Kerala', in AMCHSS, SCTIMST on 05.08.2024.
- 16. 'The Power of Public Health', AMC Hall on 06.07.2024.
- 17. 'Training on Animal Handling, Laws, Ethics & Welfare', in the BMT Wing during 10.06.2024–14.06.2024.
- 18. 'Workshop: R-Intro Cohort 7' (Intro to Data Science using R), at Govt. Medical College, Trivandrum during 06.05.2024–08.05.2024.
- 19. 'Accelerating Next-Gen Therapies'by Dr A. J. Mellott:, BMT Wing on 24.04.2024.



- 20. 'Workshop on Nursing Administration', in Hospital Wing, SCTIMST during 10.04.2024–11.04.2024.
- 21. 'State Conference: Unlocking Aortic Surgeries Nursing Excellence', on 08.06.2024.

SAMVAAD Online Lecture Series

International platform for expert lectures on medical science and technology.

- Relevance of Demography in Public Health Practice Prof. K. Srinivasan (on 05.08.2024).
- Why and How Should We Value Our Teachers and Mentors Prof. R. Krishna Kumar (13.08.2024).

Institute Day

SCTIMST celebrated the Institute Day on 28.02.2025 at AMCHSS Auditorium with Dr Mohanasankar (IIT Madras) as the Chief Guest. Events included competitions, awards, and recognition of employee contributions.

National Science Day

SCTIMST celebrated the National Science Day on 28.02.2025. Theme: "Empowering Indian Youth for Global Leadership in Science and Innovation for Viksit Bharat." Featured lab visits, interactive sessions, and a keynote by Prof. Mohanasankar (IIT Madras).

International Women's Day 2025

International Women's Day 2025' was celebrated in the BMT Wing, SCTIMST on 17.03.2025.

Theme: "For ALL Women and Girls: Rights, Equality, Empowerment." Included keynote talks, legal perspectives, and year-long IC initiatives under PoSH Act.

Number of Scientific presentations in Conferences by Faculty and Students: 360

AWARDS/HONOURS

- 1. Dr Ashutosh Carpenter, PDF Skull Base, Department of Neurosurgery, SCTIMST has been awarded First Prize (Quiz Competition) in the Neuroendocon MNA 2025 held on March 20-23, 2025 at Chennai.
- 2. Dr Ashutosh Carpenter, PDF Skull Base, Department of Neurosurgery, SCTIMST has been awarded Best Paper Award in the Neuroendocon MNA 2025 held on March 20-23, 2025 at Chennai.
- 3. Smt. Reshma John, Librarian Cum Documentation Assistant A, has won the Best Award Paper at SDSTLISER-2025, Tiruchirappalli, held on 1st March 2025.
- 4. Dr Priyanka SH, Project Associate in the Department of Transfusion Medicine has been awarded First Position in Oral Presentation at the ISBTI Kerala Chapter Annual State Conference 2025, Govt Medical College, Thrissur, held on 16th February 2025.
- Shammy S, Technical Assistant, Dept. of Transfusion Medicine, SCTIMST has been awarded Third Prize for the Scientific Paper Presentation (Technologist Category) at the Annual State Conference of Indian Society of Blood Transfusion & Immuohematology (ISBTI) Kerala Chapter Annual State Conference 2025, Govt Medical College, Thrissur, held on 16th February 2025.
- 6. Aiswarya A S, Technologist (PROJ/5094), Dept. of Transfusion Medicine, SCTIMST has been awarded Second Prize for the Scientific Paper Presentation (Technologist Category) at the Annual State Conference of Indian Society of Blood Transfusion & Immuohematology (ISBTI) Kerala Chapter Annual State Conference 2025, Govt Medical College, Thrissur, held on 16th February 2025.
- Dr Meethu Muraleedharan and Dr. Bhuvaneshwari.S, Junior Residents in the Department of Transfusion Medicine have won 1st Prize in Quiz at the Annual State Conference of Indian Society of Blood Transfusion & Immuohematology (ISBTI) Kerala Chapter Annual State Conference 2025, Govt Medical College, Thrissur, held on 16th February 2025.



- Parvathy Padmakumar, BBT student, Dept. of Transfusion Medicine, SCTIMST has been awarded Third Prize for the Quiz Competition (Technologist Category) at the Annual State Conference of Indian Society of Blood Transfusion & Immuohematology (ISBTI) Kerala Chapter Annual State Conference 2025, Govt Medical College, Thrissur, held on 16th February 2025.
- Sivakumar S, Junior Technical Officer, Dept. of Transfusion Medicine, SCTIMST has been awarded First Prize for the Quiz Competition (Technologist Category) at the Annual State Conference of Indian Society of Blood Transfusion & Immuohematology (ISBTI) Kerala Chapter Annual State Conference 2025, Govt Medical College, Thrissur, held on 16th February 2025.
- 10. Dr Shouvik Basu, Junior Resident, Dept. of Transfusion Medicine, has been awarded 2nd Prize for the scientific paper presentation in the Annual State Conference of Indian Society of Blood Transfusion & Immuohematology (ISBTI) Kerala Chapter Annual State Conference 2025, Govt Medical College, Thrissur, held on 16th February 2025.
- 11. Dr Meethu Muraleedharan, 2nd Year Junior Resident, Dept. of Transfusion Medicine, has been awarded 1st Prize for the Scientific Paper Presentation at the Annual State Conference of Indian Society of Blood Transfusion & Immuohematology (ISBTI) Kerala Chapter Annual State Conference 2025, Govt Medical College, Thrissur, held on 16th February 2025.
- 12. Dr Utkarsh Kumar, Senior Resident in Department of Neurosurgery, has won the BEST AWARD PAPER on scientific paper at INDSPNCON-2025, PGIMER, Chandigarh, held on 28th February to 2nd March 2025.
- 13. Dr Rakesh, Senior Resident in Department of Imaging Sciences and Interventional Radiology, has been awarded the first prize for oral presentation at the Indian Society of Neuroradiology (ISNR) Conference 2025, Bengaluru, held on 21st to 23rd February 2025.
- 14. Dr Adarsh Anil Kumar, Senior Resident in Department of Imaging Sciences and Interventional Radiology, has been awarded the third prize for oral presentation at the Indian Society of Neuroradiology (ISNR) Conference 2025, 21st to 23rd February 2025.
- 15. Dr Aditya Ajith, Senior Resident in Department of Imaging Sciences and Interventional Radiology, has been awarded the second prize for oral presentation at the Indian Society of Neuroradiology (ISNR) Conference 2025, 21st to 23rd February 2025.
- 16. Dr Silvie Thomas, PDCC Neuropathology, was awarded First Prize for Oral Paper Presentation at NPSICON 2025 organized by AIIMS, New Delhi, held on 20-22th February 2025.
- 17. Ms Arshajyothirmayi VA (PhD Scholar), Division of Sleep Research, Biomedical Technology Wing, SCTIMST received the Best Poster Presentation Award at the 11th Asian Sleep Research Society Congress & 8th Asian Forum on Chronobiology held at Andaz, Aerocity, Delhi, held on 8-9th February 2025.
- 18. Dr Sunil Kumar, Senior Resident in Department of Imaging Sciences and Interventional Radiology, has been awarded certificate of merit for poster presentation at the Indian Society of Neuroradiology (ISNR) Conference 2025, Bengaluru, held on 21st to 23rd February 2025.
- 19. Dr Adarsh Anil Kumar, Senior Resident in Department of Imaging Sciences and Interventional Radiology, has been awarded the certificate of merit for online quiz at the Indian Society of Neuroradiology (ISNR) Conference 2025, Bengaluru, held on 21st to 23rd February 2025.
- 20. Dr Apratim Roy Choudhury and Dr. Adarsh Anil Kumar, Senior Residents in Department of Imaging Sciences and Interventional Radiology have won the 2nd Prize in Grand Quiz 2025 at the Indian Society of Vascular and Interventional Radiology (ISVIR) Grand Quiz 2025, Kochi, held on 6th to 9th February 2025.



- 21. Dr Jineesh Valakkada, Additional Professor in Department of Imaging Sciences and Interventional Radiology, has been awarded the Second Prize for the Oral Presentation at the Indian Society of Vascular and Interventional Radiology (ISVIR) Grand Quiz 2025, Kochi, held on 6th to 9th February 2025.
- 22. Dr Adarsh Anil Kumar, Senior Resident in Department of Imaging Sciences and Interventional Radiology, has been awarded the First Prize for the Oral Presentation at the Indian Society of Neuroradiology (ISNR) Conference 2025, Kochi, held on 6th to 9th February 2025.
- 23. Dr Rohit Kumar, Senior Resident, DM Cardiovascular Imaging and Vascular Interventional Radiology has won 1st Prize in Oral Paper Presentation at the Indian Society of Neuroradiology (ISNR) Conference 2025, Kochi, held on 6th to 9th February 2025.
- 24. Dr Muddana Pooja Sai, Senior Resident, DM Cardiovascular Imaging and Vascular Interventional Radiology has won 2nd Prize in Oral Presentation in Vascular Interventions at the Indian Society of Neuroradiology (ISNR) Conference 2025, Kochi, held on 6th to 9th February 2025.
- 25. Dr Apratim Roy Choudhury, Senior Resident, DM Cardiovascular Imaging and Vascular Interventional Radiology, has won First Prize in Scientific Paper Presentation at the Indian Society of Neuroradiology (ISNR) Conference 2025, Kochi, held on 6th to 9th February 2025.
- 26. Ms.Gayathry G., PhD Scholar in the Division of Bioceramics, Department of Biomaterials Science and Technology, has got the Padmanabhan Ramamani Endowment Award, for the Best Paper (Student Category in Health Sciences) at the 37th Kerala Science Congress held at Thrissur, during 7-10 February 2025 Kerala Agricultural University, Thrissur, held on 7-10 February 2025.
- 27. Dr Anjane Sree S, Senior Resident, DM Neuroanesthesia, has won First Prize in Quiz Competition at the 26th Annual National Conference of the Indian Society of Neuroanaesthesiology and Critical Care, Kerala Arts and Crafts Village, Kovalam, Thiruvananthapuram, held on 24-26 January 2025.
- 28. Dr Sravan Sreekumar, Senior Resident, DM Neuroanaesthesiology has won 1st prize for Poster Presentation at the 26th Annual National Conference of Indian Society of Neuroanaesthesiology and Critical Care, Kerala Arts and Crafts Village, Kovalam, Thiruvananthapuram, held on 23-26 January 2025.
- 29. Dr Sreeja R, Senior Resident, DM Neuroanesthesia, has been awarded Best Paper in Neurocritical Care at the 26th Annual National Conference of Indian Society of Neuroanaesthesiology and Critical Care, Kerala Arts and Crafts Village, Kovalam, Thiruvananthapuram, held on 24-26 January 2025.
- 30. Dr Parvathy D, Senior Resident, DM Neuroanaesthesiology has won 2nd prize for Poster Presentation at the 26th Annual National Conference of Indian Society of Neuroanaesthesiology and Critical Care, Kerala Arts and Crafts Village, Kovalam, Thiruvananthapuram, held on 24-26 January 2025.
- 31. Dr Chandini Sunillal, Senior Resident, DM Neuroanaesthesiology has won 3rd prize in Poster presentation at the 26th Annual Conference of Indian Society of Neuroanaesthesiology and Critical Care, Kerala Arts and Crafts Village, Kovalam, Thiruvananthapuram, held on 24-26 January 2025.
- 32. Mr. Rajesh PG, Senior Research Fellow, CBNS, Department of Neurology has won the Best Poster award in Scientific Social Responsibility at the 37th Kerala Science Congress, Thrissur, held on 7-10 February 2025.
- 33. Dr Sheetal Sharma, Senior Resident, DM Cardiovascular Imaging and Vascular Interventional Radiology has won 2nd prize in a Scientific Poster at 23rd Asian Oceanic Congress of Radiology (AOCR) and 77th Annual Conference of Indian Radiological and Imaging Association (IRIA), Chennai, held on 23-26th January 2025.
- 34. Dr Smily Sharma, Assistant Professor (Ad Hoc), Imaging Sciences and Interventional Radiology, has won 2nd prize at the 23rd Asian Oceanic Congress of Radiology (AOCR) and 77th Annual Conference of Indian Radiological and Imaging Association (IRIA), Chennai, held on 23-26th January 2025.



- 35. Dr Lakshmi Natarajan, PDCC student of the Department of Microbiology has won the third prize in the case presentation competition conducted in association with the CME on Melioidosis, KIMS Health, Trivandrum, held on 22nd January 2025.
- 36. Ms Rukhiya Salim, PhD Scholar of the Division of Tissue Engineering and Regenerative Technologies has been awarded the Best Poster Presentation award from the journal Biomaterials Science (Royal Society of Chemistry), at the International Conference on Advances and Challenges in Medical Technology Translation (TransMedTech 2024) held in Trivandrum from 12th 14th December 2024.
- 37. Ms Anjana R S, PhD scholar, Division of Biophotonics and Imaging, Department of Biomaterial Science and Technology, Biomedical Technology Wing, has won the First Prize in Oral Presentation at the International Conference on Advances in Nanomaterials for a Sustainable Future organized by St.Joseph College for Women, Alappuzha, held on 9-11th January 2025.
- 38. Smt Lakshmi P., Nursing Officer C, NIC has won Third Prize in e-poster presentation Competition during the 44th Annual Conference of the Society of Indian Neuroscience Nurses, ITC Royal Bengal & ITC Sonar, Kolkata, held on 19th -22nd December 2024.
- 39. Smt Saji Gopinath, Nursing Officer-C, Neuro Operation Theatre, has won Second Prize in Poster Presentation, Third Prize in Neuro Quiz Competition and Third Prize in Model Exhibit Competition, in the 44th Annual Conference of Society of Indian Neuroscience Nurses, Neurological Society of India at ITC Royal Bengal & ITC Sonar, Kolkata, held on 19th -22nd December 2024.
- 40. Sri Rathish Rajan, Nursing Officer B, Neurosurgery Ward (NSWRD) has won the 1st prize in Neuro Quiz-PG during the 44th Annual Conference of Society of Indian Neuroscience Nurses, Neurological Society of India at ITC Royal Bengal & ITC Sonar, Kolkata, India, held on 19th -22nd December 2024.
- 41. Sri Prajeesh P Prakash, Nursing Officer B, NMICU (Neurology ICU) has won the 2nd prize in Neuro Quiz in the 44th Annual Conference of the Society of Indian Neuroscience Nurses, ITC Royal Bengal & ITC Sonar, Kolkata, held on 19th -22nd December 2024.
- 42. Smt Reshma S., PhD student, Division of Tissue Culture, Biomedical Technology Wing, has won the First Prize in an Oral presentation International Conference and Workshops on "New Approach Methodologies (NAMs) in Pharmacology and Toxicology Testing, Mahatma Gandhi Medical Advanced Research Institute- Sri Balaji Vidyapeeth, Puducherri, held on 5th-7th December 2024.
- 43. Smt Suchithra P. V., Nursing Officer-B, NSICU has won First Prize in Essay Competition-PG, Second Prize in Neuro Quiz Competition-PG and Consolation Prize in Model Exhibit Competition-PG at the 44th Annual Conference of the Society of Indian Neuroscience Nurses, ITC Royal Bengal & ITC Sonar, Kolkata, held on 19th -22nd December 2024.
- 44. Smt Shani M K, Nursing Officer-B, NMICU has won First Prize in Neuro Quiz Competition UG at the 44th Annual Conference of the Society of Indian Neuroscience Nurses, ITC Royal Bengal & ITC Sonar, Kolkata, held on 19th -22nd December 2024.
- 45. Dr Meethu Muraleedharan, Junior Resident, Department of Transfusion Medicine received second prize for Oral presentation at International Symposium Neonatal and Pediatric Transfusion Practices, Post Graduate Institute of Child Health, Noida, held on 21st December 2024.
- 46. Ms Nayana L R, Speech Therapist A, Department of Neurology received Third Prize for Oral Presentation at Zonal Conference held at Child Development Center, Medical College, Trivandrum, held on 16th-17th November 2024.
- 47. Ms Vipina V P, Speech Therapist B, Department of Neurology received Best Paper Award for Poster Presentation at the 16th National Level RCI-CRE approved conference of Indian Speech, Language and



- Hearing Association Kerala State Branch, Gokulam Convention Center, Kochi, held on 30th November 2024 and 1st December 2024.
- 48. Mr Joseph Xavier, PhD Scholar, Division of Tissue Culture, BMT Wing, has won the Best Poster Presentation Award at the International Conference on Biotechnology The Way Forward (ICBWF 2024), Department of Biotechnology, University of Kerala, India, held on 20th-22nd November 2024.
- 49. Mr Amir Suhail U, Division of Artificial Internal Organs has won Best Oral Presentation Award in a three-day International Conference and Workshops on NAMs, Mahatma Gandhi Medical Advanced Research Institute –Sri Balaji Vidyapeeth, Puducherri held on 5th-7th December 2024.
- 50. Mr Subhash N. N., Engineer C, in the Division of Artificial Internal Organs at the Department of Medical Device Engineering, received the Best Paper Award at the International Conference on Next Generation Technologies: Design and Manufacturing 2024, Centre for Nondestructive Evaluation (CNDE), Department of Mechanical Engineering, IIT Madras, held on 13th, 15th November 2024.
- 51. Dr Jayakrishnan R., Senior Resident, DM Cardiovascular Imaging and Vascular Interventional Radiology has won 1st prize in ISVIR Junior Wing National Interventional Radiology Quiz, Indian Society of Vascular Interventional Radiology, held on 8th December 2024.
- 52. Mr. Subhash N. N., Engineer C, Division of Artificial Internal Organs, Department of Medical Device Engineering, was awarded the Best Oral Presentation at the International Conference on Advanced Ceramics for Sustainability and the 88th Annual Session of the Indian Ceramic Society, held at the Indian Institute of Technology Madras, held on 28th-30th November 2024.
- 53. Dr Akhilesh Gowda G B, PDF (Skull base Neurosurgery) and Dr Arwin Das Prabhu, Senior Resident (MCh Neurosurgery) has won First Prize in Neuro Oncology Quiz held at Caritas Hospital, Kottayam, held on 3rd November 2024.
- 54. Mr Sarathkumar E, Ph.D. Scholar of Division of Biophotonics and Imaging, Department of Biomaterial Science and Technology, BMT Wing, has won the Best Oral Presentation Award (First Prize) at the SENSORS-2024, University of Kerala, Trivandrum, held on 27th-30th November 2024.
- 55. Dr Meethu Muraleedharan, Junior Resident, Department of Transfusion Medicine received Second Prize in Video Presentation at TRANSCON 2024, Mahatma Gandhi Convention Center, Ahmedabad, held on 21st -23rd November 2024.
- 56. Dr Adarsh Anil Kumar, Senior Resident in Department of Imaging Sciences and Interventional Radiology, has been awarded the best scientific paper at the Society of Pediatric Neuroimaging (SPIN) 2024, Goa, held on 25th-27th October 2024.
- 57. Dr Adarsh Anil Kumar, Senior Resident in Department of Imaging Sciences and Interventional Radiology has been awarded the Fellowship of the Society of Pediatric Neuroimaging (SPIN) 2024 after completing the necessary learning hours and assessment exams.
- 58. Dr Manisha K. Y., Post Doctoral Fellow, Department of Neurology has received the 'AV Srinivasan Deepak Arjundas Award' in IANCON 2024, Visakhapatanam, held on 17th -20th October 2024.
- 59. Dr Rohith M. G., Senior Resident, Department of Neurology has received the Second Prize in Scientific Paper Presentation in KENDOCON 2024, Calicut, held on 6th October 2024.
- 60. Dr Nandana J., Post Doctoral Fellow, Department of Neurology has received the award for 'Best Research Paper in Epilepsy' in IANCON 2024, Visakhapatanam, held on 17th -20th October 2024.
- 61. Dr Bharanidharan G, Sr. Resident, DM Neurology has won the First Prize in IAN BAR B QUIZ in IANCON 2024, Visakhapatanam, held on 17th -20th October 2024.



- 62. Dr Ankita Singh, Senior Resident (3rd Year) and Dr. Sedhupathi S, Senior Resident (2nd Year), Department of Cardiology have won 1st Prize in the Quiz Competition at the ISCCON 2024, held on 18th-20th October 2024.
- 63. Ms Saranya S S, Ph.D. Scholar in the Division of Bioceramics, Department of Biomaterials Science and Technology, has been awarded the Best Oral Presentation International Conference on Polymers and Nanomaterials (ICPN 2025), Mahatma Gandhi University, Kottayam, held on 21st -23rd March 2025.
- 64. Dr Ankush Ramesh Parate, Senior Resident in Neurosurgery, Department of Neurosurgery, SCTIMST won 1st Prize in Paper Presentation at SKULLBASECON 2024, New Delhi, held on 25th -26th October 2024.
- 65. Dr. Akhilesh Gowda G B, Fellow Resident Skull Base Neurosurgery, Department of Neurosurgery, SCTIMST won 1st Prize in Poster Presentation at SKULLBASECON 2024, New Delhi, held on 25th 26th October 2024.
- 66. Ms Priya Raj P S, 2nd year Diploma in Cardiovascular and Thoracic Nursing won first prize in Case study presentation at the National Cardiac Nursing Conference organized by Society of Cardiac Nurses (India), College of Nursing, AIIMS, Nagpur, held on 28th-29th September 2024.
- 67. Ms Jasmine Zacharias and Ms. Surya Sreekantan, Nursing Officers, SCTIMST, won first prize in the quiz competition at the National Cardiac Nursing Conference organized by Society of Cardiac Nurses (India), College of Nursing, AIIMS, Nagpur, held on 28th-29th September 2024.
- 68. Mrs Tessymol Antony, Nursing officer, CMICU won second prize in Case study presentation in National Cardiac Nursing Conference, College of Nursing, AIIMS, Nagpur, held on 28th-29th September 2024.
- 69. Mrs Asha VK, Nursing officer, Cardiac Surgery Ward won third prize in case study presentation in National Cardiac Nursing Conference, College of Nursing, AIIMS, Nagpur, held on 28th-29th September 2024.
- 70. Dr Ram Kishan N, Senior Resident in Department of Neurosurgery won Second Prize in Paper Presentation in NSI Kerala Chapter Mid-Term Meet 2024, Palakkad, held on 28th-29th September 2024.
- 71. Dr Arwin Das Prabhu, Senior Resident in Department of Neurosurgery won First Prize in Oral Presentation in KNS Mid-term Meet 2024, Palakkad, held on 28th-29th September 2024.
- 72. Ms Moon Moon Bagalari, PhD student in the Division of Microbial Technology, Department of Applied Biology, received the Best Poster Award at the International Conference on Frontier Areas of Science & Technology-2024 held at IIT Guwahat, held on 6th-7th September 2024.
- 73. Dr Vinu Rajendran, Assistant Professor, Dept. of Transfusion Medicine, SCTIMST has received the Young Scientist Award of Indian Society of Transfusion Medicine (ISTM), Kaldan Samudra Palace, Mahabalipuram, held on 27th-29th September 2024.
- 74. Dr Pooja Choudhary, Senior Resident in Department of Neurosurgery won Second Prize in Poster Presentation in KNS Mid-term Meet 2024, Palakkad, held on 28th-29th September 2024.
- 75. Dr Amrutha H, Senior Resident in the Division of Cardiothoracic and Vascular Anaesthesiology, won the First prize in the Interesting Echo Images session of the IACTA National Contest, Narayana Health City, Bengaluru, held on 24th August 2024.
- 76. Dr Niroop B S, Senior Resident in Department of Neurosurgery won Second Prize in Paper Presentation in NEUROVASCON 2024, Jaipur, held on 27th-29th 2024.
- 77. Dr Keerthy Nath S, Senior Resident in the Division of Cardiothoracic and Vascular Anaesthesiology won the First Prize in Golden Fate Echo National Contest, Narayana Health City, Bengaluru, held on 24th August 2024.



- 78. Dr A Maya Nandkumar, Scientist G, Division of Microbial Technology, Department of Applied Biology, Biomedical Technology Wing, was awarded the first prize in the Technology Innovation contest for the device 'Rapidogram', held in Singapore, during 24th- 26th April 2024.
- 79. Mrs Geethu S Nair, JRF in the SERB-POWER project, Department of Pathology, SCTIMST won the Best poster presentation award at the National Conference on Omics in Redefining Healthcare (ORAH-24), Jubilee Centre for Medical Research, Thrissur, held on 23rd-24th August 2024.
- 80. Ms. Jesna PV, PhD student, in the Division of In vivo Models and Testing, BMT Wing, won the Best poster presentation award in the National Conference on Recent Trends in Materials Science and Technology (NCMST-2024) held in Indian Institute of Space Science and Technology during 25-27 June, 2024.
- 81. Dr Akhilesh Gowda G B, Fellow resident- Skull base Neurosurgery, Department of Neurosurgery, SCTIMST has received the BEST PAPER (Video presentation) Award at NSI-YNFCON PUNE, held on 14th-16th June 2024.
- 82. Dr Harikrishna Varma P.R., Head, BMT Wing has been elected as Fellow of Biomaterials Science and Engineering (FBSE) in 2024 by the International Union of Societies For Biomaterials Science and Engineering (IUSBSE), Daegu, South Korea, held on 27th May 2024.
- 83. Ms Saranya CV, Ph.D Scholar in the Division of Dental Products, Department of Biomaterials Science and Technology won the First Prize in the Short Invited Lecture Presentation at the International Conference on Nano-Structured Materials and Nanocomposites held at Kottayam, held on 10th-12th May 2024.
- 84. Dr Saravana SA, Senior Resident, Department of Cardiology won the Best Paper Award during the Summer Conference of the Cardiological Society of India Kerala Chapter held on 4th and 5th May 2024 at Trivandrum.
- 85. Mr Rajesh PG, Senior Research Fellow, CBNS, Department of Neurology has received the Best Poster award at the 37th Kerala Science Congress in Feb 2025, Kerala Agricultural University, Thrissur, held on 7th-10th February 2025.
- 86. Mr Rajesh P G, Senior Research Fellow, CBNS, Department of Neurology has received the Best Poster award in Neurogenetics and Neuroimaging at the Alzheimer's Association International Conference (AAIC), NIMHANS, Bengaluru, held on 22nd -23rd April 2024.
- 87. Dr Bhushan S Akhade, PDF Cerebrovascular Surgery, Department of Neurosurgery, SCTIMST got the First Prize in the Podium Paper Presentation in the SGPGI Neurosurgery Foundation Day Celebration, Lucknow, held on 19th -21st April 2024.
- 88. Dr Manuraj N, Senior Resident, Department of Neurology got the first place in the paper presentation in the Indian National Stroke Conference 2024, Kolkatta, held on 28th-31st March 2024.
- 89. Dr Adarsh Anil Kumar, Senior Resident in the Department of Imaging Sciences and Interventional Radiology has been awarded the Third Prize for Oral Paper Presentation at the Indian Society of Neuroradiology (ISNR) Conference in Feb 2025, Hyderabad, held on 8th -10th March 2024.
- 90. Dr Akhilesh Gowda G B, Post-Doctoral Fellow Skull base Neurosurgery, Department of Neurosurgery, SCTIMST has been awarded the Best paper presentation (podium presentation) at NESICON 2024, Mumbai, held during 29th-30th March 2024.
- 91. Dr Ashutosh Carpenter, Senior resident, Department of Neurosurgery, SCTIMST has been awarded the Best paper presentation (podium presentation) at NESICON 2024, Mumbai, held on 29th -30th March 2024.



92. Dr Akhilesh Gowda G B, Post-Doctoral Fellow - Skull Base Neurosurgery, Department of Neurosurgery, SCTIMST has been awarded the 3rd Prize in Neuroendoscopy - Quiz Competition at NESICON 2024, Mumbai, held on 29th-30th arch 2024.

CORPORATE SOCIAL RESPONSIBILITY FUNDS RECEIVED

 $The\ Institute\ received\ a\ CSR\ grant\ of\ Rs\ 28.01\ Lakh\ during\ the\ FY\ 2024-25\ from\ M/s.\ Symega\ Food\ Ingredients\ Ltd$

REVENUE GENERATED BY THE INSTITUTE

Revenue generated by the Institute by way of Hospital Services and Testing Charges during the current Financial Year (2024-25) was Rs 130.61Crore, which is equal to 35.98 % of the DST`s grant-in-aid utilized during the year.

The Institute has a balance of Rs.15 Crores under the Emergency Reserve Fund, which was created out of patient care income of previous years.

FINANCIAL SUPPORT FROM THE DEPARTMENT OF SCIENCE AND TECHNOLOGY

Total grant sanctioned by the Department of Science and Technology through Treasury Single Account (RBI, New Delhi) for FY 2024-25 was Rs.363 Crores (as against Rs. 342.50 Crores received for 2023-24)

Revenue Grants: Rs. 330.00 Crores

Capital Grants Rs. 33.00 Crores

Institute Utilized grant in Aid of Rs 357.08 crores during 2024-25.

Total Extramural Research (EMR) funding received by the Institute from Government Agencies, Non-Governmental Agencies and International Agencies during 2024-25 is Rs 50.20 Crores.

DST/DBT Contribution towards EMR funding

- Funding for Ad-hoc Research projects throughZero Balance Subsidy Accounts (ZBSA) for the specified DST/DBT schemes amounted to Rs 23.73 Crores.
- Total number of ongoing research projects funded by DST and SERB/ANRF is 20 numbers, out of which 7 numbers were initiated during 2024-25.

The institute places on record its deep sense of gratitude to the Department of Science and Technology for its unswerving support at all time.





Homage

Prof (Dr) MS Valiathan



The founder director of the Sree Chitra Institute Professor M. S. Valiathan passed away on 17th July, 2024. He served as the Institute's director from 1974 to 1994, overseeing its transformation into an Institute of National Importance and laying the groundwork for its focus on advanced medical care and Biomedical Technology. His legacy of excellence and dedication to Medical Sciences & Technology will continue to inspire every member of SCTIMST family.





HOSPITAL WING

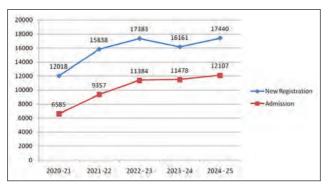


HOSPITAL ADMINISTRATION

MEDICAL ADMINISTRATION

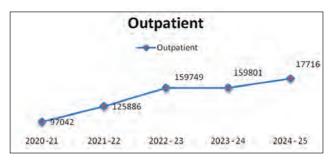
The core function of the Medical Administration Department is to foster an environment that ensures the highest standards of patient care in the hospital. This includes managing the operational framework necessary for the efficient and effective delivery of healthcare services. The following section provides an overview of hospital service statistics for the year 2024–25, reflecting our ongoing commitment to quality and excellence.

Building on the upward trend observed in the years after the pandemic–related decline in 2020–21, outpatient services continued to grow in 2024–25. A total of 17,440 new outpatient registrations were recorded across various departments and specialty clinics. Likewise, inpatient admissions rose to 12,107 during this period. This reflects an increase of approximately 8% in new registrations and 6% in admissions compared to the previous year.



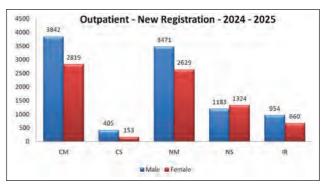
Trend in new registrations and admissions at SCTIMST

Data on outpatient visits for follow—up (review) at SCTIMST is presented in the Figure. Over the years, there has been a steady increase in the number of patients returning for follow—up consultations. For the period 2024–25,follow—up visits show a notable rise of around11%compared to the previous year.



Trend in outpatient visits for follow—up (review) at SCTIMST

Sex-disaggregated data of outpatient new registrations across departments for the year 2024-25are shown in the Figure. In most departments, male registrations exceeded those of females. In the Cardiology department, males accounted for 58% of the new registrations, while in Neuromedicine, male patients constituted57%. The Cardiac Surgery and Interventional Radiology (IR) departments also had a higher proportion of male patients, accounting for 73% and 59% of the new registrations, respectively. In contrast, the Neurosurgery department had a slightly higher proportion of female patients, accounting for approximately53% of the total.

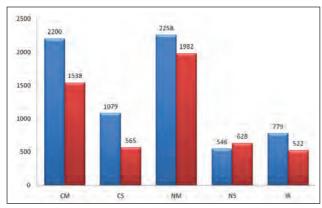


Sex disaggregated data – New registrations in the year 2024–25 – Department wise



CM- Cardiology, CS - Cardiac surgery, NM-Neuromedicine, NS Neurosurgery IR- Interventional Radiology

The attached Figure presents sex—disaggregated data of inpatient admissions across departments for the year 2024–25. Most departments had a higher number of males admitted as inpatients compared to females. Departments of Cardiology, Interventional Radiology and Cardiac Surgery had higher proportions of maleinpatient admissions, with males accounting for 59% 60% and 66% of the total admissions, respectively. In Neuromedicine, the gap was narrower, with males constituting 53% and females 47% in terms of inpatient admissions. Neurosurgery department had a higher number of female inpatients (54%) compared to males (46%).

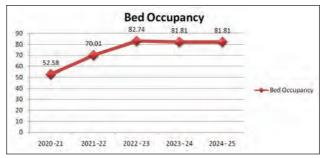


Sex disaggregated data – Patients admitted in the year 2024–25 –Department wise

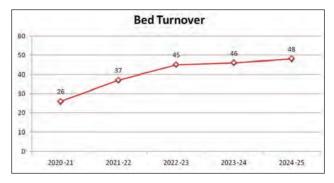
CM- Cardiology, CS - Cardiac surgery, NM-Neuromedicine, NS Neurosurgery IR- Interventional Radiology

Bed occupancy

Bed occupancy rate has shown a steady and positive trend over the past five years, as reflected in the Figure. From a low of 52.6 % in 2020–21, likely due to the impact of the COVID–19 pandemic, bed occupancy rose significantly to 70.01% in 2021–22, peaked at 82.74% in 2022–23, and has stabilised at 81.8 % in during 2023–24 and 2024–25.

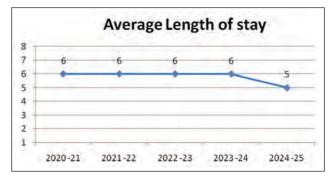


Bed Occupancy Rate at SCTIMST



Trend in the Bed Turnover Rate at SCTIMST

In 2024–25, the bed turnover rate at SCTIMST showed a marginal increase to 48 patients per bed per year from the previous year indicating a steady increased in bed utilization.



Average length of stay at SCTIMST

For the last four years, the average length of stay had remained steady at 6 days, but reduced to 5 days in 2024–25. In summary, the above three indicators could point to improved inpatient care and bed utilization and patient flow.



Distribution of Paying, Subsidized& Non-Paying Patients – Outpatient and Inpatient care

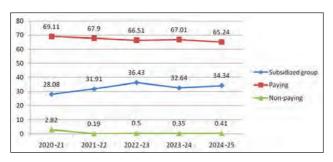
Outpatients

Over the years, there has been a slow but steady decline in the proportion of fully paying patients. The subsidized group has increased from about 28.1 % of the total outpatients in 2020–21 to more than one—third (34.3%) in the period 2024–25. Correspondingly, the proportion of fully paying patients has declined from 69.1% in 2020–21 to 65.2% in 2024–25. The trend indicates that an increasing number of patients are availing financial assistance for outpatient care at the hospital.

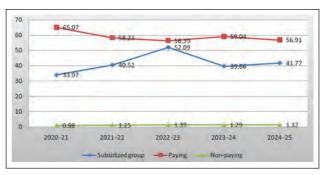
Inpatients

In the case of inpatients, the proportion of paying patients declined more sharply, from 65.1% in 2020–21 to 57% in 2024–25. Concurrently, the subsidized group has risen to 42% in the year 2024–25, reflecting a marked increase in the number of patients availing subsidized inpatient services. The non–paying category remained consistently low among both outpatients (0.4%) and inpatients (1.3%) during the mentioned period.

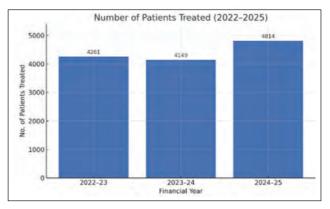
In conclusion, the data highlight an increasing number of outpatients and inpatients availing subsidized care and a corresponding decline in the proportion of fully paying patients. This may be due to increased access to financial support schemes, while also indicating a potential reduction in hospital—generated revenue from patient services.



Trends in the proportion of patients in the paying, nonpaying, and subsidized treatment categories—Outpatients



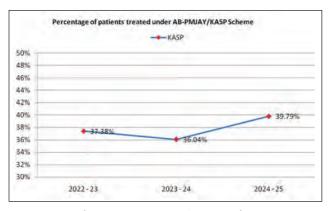
Trends in the proportion of patients in the paying, nonpaying and subsidized treatment categories—Inpatients



No of patients treated under the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB–PMJAY)/ KASP scheme

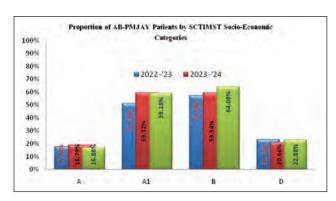
The Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB–PMJAY)/KASP scheme was initiated at the institute on April 7, 2022. Figure 10 illustrates the number of patients treated under this scheme during the last three financial years. In 2024–25, there was a considerable increase of about 16% in terms of number of patients treated compared to 2023–24





Proportion of AB–PMJAY/KASP Beneficiaries among Total Patients Treated

In 2024–25, the proportion of patients treated under the AB–PMJAY/KASP scheme increased notably to almost 40 percent, the highest share recorded in the last three years. In other words, nearly four out of 10 patients treated at the institute in 2024–25 were beneficiaries of AB–PMJAY/KASP.



*According to the hospital's socio-economic categorisation system introduced in February 2022 (prior to the implementation of the AB-PMJAY scheme), patients are classified into four categories: A (100% subsidy for specially vulnerable Antyodaya Anna Yojana (AAY) ration card holders, A1 (50% subsidy for AAY card holders), B (70% subsidy for Priority Households (PHH)/Below Poverty Line (BPL) card holders), and D (100% payment for Non-Priority Households (NPHH)/Above Poverty Line (APL) card holders.

In 2024–25, Category B and A1 formed the largest proportion of AB–PMJAY beneficiaries (64.1% and 59.2%, respectively), while 16.9% were from Category A, as per the hospital's socio–economic classification.

Notably, 22.88% of AB–PMJAY beneficiaries belonged to Category D, which corresponds to Non–Priority Households (NPHH/APL) — the hospital's full–payment category.

The details of the Departments/Divisions under the Medical Superintendent associated with patient care are provided below.

PHYSICALMEDICINE AND REHABILITATION (PMR) DEPARTMENT

The PMR department provides rehabilitation services to the patiants with a major focus on the restoration of function of neurologic and cardiac conditions. The department staff includes a physiatrist, seven physiotherapists, and a unit helper. The physiatrist assumes the role of department-in-charge and conducts the daily OP services and handles the interdepartmental OP/IP consultations. physiotherapy team provides top-notch services to the various wards, ICUs, as well as patients coming to the PMR department. Academic courses offered by the department include observership/internship opportunities for physiotherapy students and a 1-year advanced certificate program in physiotherapy for BPT graduates.

Activities:

Clinical Activities

This year showed a steady rise in the outpatient and inpatient service procedures provided by the PMR department. The department highlight continues to be the high-quality physiotherapy services provided at affordable rates for the patient community. The physiatrist (rehab physician) leads the physiotherapists in the rehabilitation process by taking over the medical care of the patients and tackling rehab issues with the use of medications, injections, assistive technology, and prompt referrals for surgical rehab interventions in indicated cases. The OP service of the department, rehabilitation clinic, conducted by the physiatrist, also showed a more than two-fold increase in patient attendance. With the increase of internship slots to ten, the department's manpower was bolstered, and many patients showed interest in continuing their rehabilitation program after



discharge at the PMR department on an OP basis. The year showed more participation from the department in various patient education and outreach programs and ended on a promising note with the allotment of an OP room in the PMSSY block ground floor for the PMR department.



Partial Body Weight Supported Gait Training in PMR
Department

Procedure Count

Clinic	Outpatient Attendance
Rehabilitation Clinic	670

Service Area	Procedure Count
In patient	19521
Out patient	4427

In-Patient Procedure Count

Procedure	Count
Exercise for single or multiple regions	6594
Respiratory therapy	12032
Cardiopulmonary program	411
Physical modalities	107
Physiatrist consultation	41
Trigger point injections	4
Static cycling	166
Balance and gait training	41
Tilt table session	125

Out-Patient Procedure Count

Procedure	Count
Exercise for single or multiple regions	1671
Respiratory therapy	83
Cardiopulmonary program	54
Physical modalities	2039
Physiatrist consultation	282
Static cycling	199
Balance and gait training	56
Tilt table session	15
Trigger point/intra articular injections	12
Manual myofascial release	14
Hand dynamometry	2

Academic Activities

- ◆ The department offers a 1-year advanced certificate program (ACP) in physiotherapy in neurological and cardiovascular sciences (2 seats each). The program currently has 2 students enrolled for the year 2025.
- The observership/internship program offered for BPT graduates/MPT students continues to remain in high demand with surplus applications. (10 slots)

Research Programmes

• Ms. Sivapriya N.L. ACP in physiotherapy student, in collaboration with the medical neurology department, conducted and completed a study on "Understanding fatigue burden in multiple sclerosis: Insights from the modified fatigue impact scale" under the guidance of Dr Jijo Varghese and Dr Sruthi S. Nair.





Rehabilitation of Cardiac Transplant Patient: Ms. Deepa With Nursing Staff

New Initiatives:

- ◆ The year threw up a novel challenge to the department with the task of rehabilitating the patient who underwent heart transplantation surgery. The prime responsibility for the same was assigned to Ms. Deepa G (chief physiotherapist), who was deputed to the post—operative care team for this task, and she was ably supported by Ms. Misha P.M (Physiotherapist − A). The rehabilitation program was successful, and the patient could be discharged home with marked improvement in her functional status.
- With the technical support from the computer division, daily physiotherapy procedures for inpatients are being digitally recorded through the INVEST EMR program and available at the fingertips for consultants/residents in the EMR CLIENT program alongside other lab/imaging reports. The department procedure codes were also updated to a user-friendly format to encourage transition to paperless documentation.

- Safety measures for the patients coming to the PMR department were enhanced with the installation of a patient attendant calling system and the acquisition of emergency equipment.
- Opportunity to do an internship at the PMR department has now been extended to MPT (Master of Physiotherapy) students with the approval of the Dean, Academics.
- The PMR department was included in the Know Your Lab and Academic Fest programs from this year.

Events Organized:

- Dr Jijo Varghese did a faculty presentation on the topic "Stroke Rehabilitation: Physiatrist's perspective" at the state-level conference on comprehensive nursing management of stroke conducted by SCTIMST Nursing division and comprehensive stroke care program on 15/03/2025.
- As part of the World Sleep Day Program on 14/03/2025, organized by the Division of Sleep Research, BMT wing, Dr Jijo Varghese took a class on the topic – "Can management of neck arm pain improve sleep health? " accompanied with live exercise demonstration by ACP students.
- ◆ Mr. Amal M. G (physiotherapist B) was the invited guest for a phone—in program on Doordarshan about the topic "Physiotherapy: When, why?" telecast live on 09/01/2025.
- On the occasion of World Alzheimer's Day observance on 21/10/2024 and related patient and caregiver interaction program conducted by the medical neurology department, Dr Jijo Varghese gave a talk on the importance of exercise in the elderly and fall prevention, followed by a live exercise demonstration by Ms. Jijimol George (Physiotherapist B) and BPT interns.
- ◆ As part of the regular institute academic fest conducted on 19/10/2024, Dr Jijo Varghese presented the topic Rehabilitation ICF Model, Rehab Team Concept, and the SCTIMST PMR Department.



- Dr Jijo Varghese was the resource person for the session on "Occupational hazards of Sanitation Workers" conducted at the BMT wing on 27/09/2024 in connection with the Swachhta Hi Seva 2024 campaign. Talk was followed by an exercise demonstration by BPT interns.
- Ms. Deepa G (chief physiotherapist) was the invited guest for a phone–in program on Doordarshan about the topic "Cardiac disease treatment and physiotherapy," telecast live on 11/09/2024.
- As part of World Physiotherapy Day, Ms. Deepa G (chief physiotherapist) recorded a talk about

- various aspects of physiotherapy on All India Radio, which was broadcast on 07/09/2024
- Dr Jijo Varghese participated as a panelist in an interactive discussion on common problems and new developments in multiple sclerosis as part of the World Multiple Sclerosis Day program organised by Medical Neurology and Multiple Sclerosis Society of India on 02/06/2024.
- Dr Jijo Varghese presented on "Cervico brachialgia" as an invited speaker at the GET SET REHAB April 2024 conference, Thiruvananthapuram, organized by the Trivandrum Physiatrists' Club.



Patient Education Programs: World Alzheimers Day and World Multiple Sclerosis Day



PMR Department Staff (Ms. Deepa and Mr. Amal) Live on TV





Swachhta Hi Seva 2024 campaign:Dr Jijo Varghese and BPT Interns at BMT Wing Program

MEDICAL SOCIAL WORK DIVISION

Medical social workers are placed in different clinical departments to provide direct service to patients, caregivers, and family members. This helps in minimizing the negative feelings of illness and hospitalization. Being a member of the multidisciplinary team, social workers offer unique services to the patients and their families. The socio-economic assessment, psycho social assessment, counseling services, and educational sessions for the patients are conducted by the social workers. In addition, they coordinate various clinics, financial support schemes, beneficiary schemes such as Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPMJAY), Rashtriya Arogya Nidhi (RAN), and other treatment plans in collaboration with the clinical departments. The division has one Scientific Officer (MSW), three medico social workers, and nine social workers in its team.

The Medical Social Work (MSW) Division of SCTIMST observed World Social Work Day (WSWD) on 18th March, 2025, at the hospital wing and conducted an outreach program at the Government. program and poster exhibition at the hospital wing and an outreach programme at Vithura.



Outreach program of MSW division at Govt. Tribal L. P School, Thalathoothakavu, Vithura



Poster Exhibition by the MSW division at Hospital Wing (18th March 2025)



DIETARY DEPARTMENT

The Dietary Department strives to maintain the highest standards of hygiene and quality in providing nutritious meals to all inpatients of the hospital. To ensure safety and standards in therapeutic care, outside food is not permitted for inpatients, and all meals are prepared and served exclusively by the dietry department.

Emphasizing personalized nutrition, expert dieticians conduct daily assessments and tailor therapeutic and individualized meal plans to meet each patient's requirements. Operating round the clock, the department provides three major and three minor meals every day, ensuring comprehensive nutritional support throughout the patient's hospital stay. Daily ward rounds by dieticians ensure that patient requirements are continuously assessed and appropriately addressed. Nutritional counselling services are offered to inpatients at the time of discharge, their caregivers, as well as outpatients who require specialized dietary guidance.

In alignment with NABH standards, the department introduced a nutritional assessment form in the year 2024–25 for all newly admitted patients in the medical block. This initiative marks a significant step toward strengthening nutritional screening protocols within the hospital.

During 2024–25, 64,262 patients were provided with meals, including those requiring Ryle's tube feeding and semisolid diets. Additionally, the department extended dietary services to 2,003 bystanders accompanying patients admitted for procedures such as Video EEG and Deep Brain Stimulation (DBS).

Customized diet calculations were carried out for 65 Ryle's tube–fed patients, and 159 outpatient consultations were conducted, particularly for ketogenic diets and other therapeutic dietary requirements. This included follow–up for patients discharged from the STICU on specialized feeding regimens.

The department also played an active role in training and academic development. Dietitian trainees received practical instruction, and educational sessions were conducted on emerging trends in nutrition.

Significant infrastructural maintenance was undertaken in the department, including major exhaust system cleaning and routine pest control measures, to ensure a safe and sanitary food preparation environment.

The department observed Rashtriya Poshan Maah 2025 in September, in alignment with the Hon'ble Prime Minister's vision of a 'Suposhit Bharat' (Malnutrition–Free India). The week–long campaign included displays on balanced diets, heart–healthy foods, and diabetic nutrition, along with educational sessions for OPD patients.

Further community outreach included participation in the World Heart Day program organized by the Cardiology Department, where specially prepared heart–healthy meal plates were showcased, and a nutrition awareness session was conducted at the Police Training College, Trivandrum.



Demonstration of nutritionally balanced meal plates and educational posters during Rashtriya Poshan Maah 2025, September 2024





Nutrition awareness session conducted on World Health Day at the Police Training College, Trivandrum

PHARMACY

The Pharmacy department facilitates the timely procurement, storage, dispensing, and distribution of medicines to all patients admitted for medical and surgical care at SCTIMST. The department ensures proper specification of drugs, prepares purchase indents, maintains accurate records, and monitors the storage and expiry of all medicines. It also oversees the distribution of medications such as transfusion fluids, parenteral preparations, and other medications to inpatients across all departments.

In addition to inpatient services, the department dispenses medications to the permanent staff of the institute and their dependents based on prescriptions issued by the staff doctor. Medicines are also provided to underprivileged patients under the patient welfare scheme, offering support of up to ₹500 per patient per month, with a maximum monthly outlay of ₹25,000. Monthly reports are submitted on the utilization of this scheme.

During the year 2024–25:

- A total of 1,656 receipt vouchers were processed based on indents prepared by the department, amounting to ₹12,01,59,271.
- A total of 8,454 issue vouchers were generated for inpatient distribution.
- For the staff clinic, 64 receipt vouchers worth

- ₹7,28,574 and 2,932 issue vouchers were prepared.
- Under the Patient Welfare Scheme, 741 patients received medicines worth a total of ₹1,92,914.
- In total 598 paediatric prescriptions were processed, with doses individually prepared with appropriate adjuvants to ensure safe and accurate administration, particularly for post–cardiac surgery patients.
- As part of the ABPMJAY/KASP/KBF scheme, 2,813 patients were provided medications at discharge, with drugs worth ₹4,85,614 dispensed up to 15 days.

The department also has a one—year trainee programme to provide practical exposure and skill development for young pharmacists. Patient counselling is provided on the proper administration of medicines, especially for paediatric patiants, and guidance is offered to both healthcare providers and patients when required.

LAUNDRY DIVISION

The Laundry division of the hospital plays a key role in ensuring infection control. The total number of linen pieces processed in the laundry during the year was around 434,000, and the total number of items ironed in the laundry was about 204,000. The laundry received used linen from the wards, operation theatres, outpatient departments, intensive care units, and procedure rooms in the hospital. The soiled and infected linen were processed separately.

TRANSPORT DIVISION

The institute continued its proactive efforts to modernize its vehicle fleet in compliance with the vehicle scrapping policy of the Ministry of Finance, Government of India. In the year 2024–25, three vehicles that had exceeded the 15–year age limit were scrapped, and new vehicles were procured as their replacements.

A seven—seater AC Maruti Ertiga was procured in place of the Toyota Corolla Altis, a new AC Mahindra Bolero Neo SUV replaced the older Mahindra Bolero Jeep, and a new Force Ambulance was procured



to replace the scrapped ambulance. In addition, recognizing the increased demand for academic and research–related mobility due to the rising number of students and courses, a 23–seater Ashok Leyland AC Bus was sanctioned by DST and procured during 2024–25. These new additions are expected to significantly enhance the dependability and efficiency of the institute's transportation services, improve connectivity between its two wings, and provide reliable support for its administrative, operational, and emergency requirements.



Launch of new transport vehicle

Key Events During the Year 2024–25

NABH accreditation – Training program

As part of the institute's ongoing efforts to secure accreditation from the National Accreditation Board for Hospitals & Healthcare Providers (NABH), a dedicated NABH Management Team was constituted to oversee and coordinate all related activities. In addition, 17 mandatory NABH committees were constituted in alignment with the accreditation requirements.

To further facilitate the application process, a weeklong facility audit and training program was conducted from June 10th to June 17th, 2024. The training was for the representatives of all departments from the Hospital Wing, also for the most recent NABH standards and requirements. The training was led by three experts: Dr R Ravikumar, the former Dean & Professor of Neuromicrobiology at

NIMHANS and Chief Coordinator, NABH at Kidwai Memorial Institute of Oncology, Bengaluru, Dr Uma Nambiar, CEO of Bagchi Parthasarthy Hospital, Indian Institute of Science, Bengaluru and Dr Komal Prasad, Neurosurgen, Mazumdar Shaw medical centre, Narayana Health City, Bengaluru.





NABH accreditation – Training program – June 10 to June 17, 2024

Training Program on GeM Procedures for Staff and vendors: Two one–day training programs were held on 26.12.2024 and 27.12.2024 for vendors and administrative staff, respectively, to improve procurement efficiency and the understanding of registration, product listing, and the transaction protocols of the GeM platform.

Inauguration of the Caregiver Lounge

A Caregiver Lounge was inaugurated on 06/02/2025 by Ms. Nirmala M.O. (Nursing Superintendent), Ms. Rosamma Manuel (Senior Scientific Officer), and a patient, in the presence of Dr Sanjay Behari (Director), Dr Kavita Raja (Medical Superintendent), Dr Manju Nair R. (Administrative Medical Officer),



and the staff of the institute. The caregiver lounge was established to serve as a comfortable waiting area for the bystanders of the patients.



Inaguration of Caregiver Lounge on February 6th, 2025

Other activities:

In addition to the above events, several operational and committee–level activities were undertaken under the auspices of the office of the Medical Superintendent.

Annual Maintenance Contracts for Equipment: During the financial year 2024–25, 77 annual

maintenance contracts for various high–value hospital equipment were finalised with the active involvement of the Stores Division.

Purchase Committee Meetings: 15 sessions convened to facilitate various procurements. During the financial year, the Hospital Wing recorded a total procurement of medicines amounting to ₹120,736,402.09

Negotiation Meetings: There were 21 meetings conducted with suppliers and service providers to reach optimum pricing and contractual terms for the benefit of the institute.

General Meetings: A total of 75 meetings were conducted to streamline workflow and address management procurement—related matters

GeM Meetings: There were six meetings were held with a special focus on the Government e–Marketplace (GeM) to facilitate procurement and engagement of services through GeM.

Procurement through GeM:

During the financial year 2024–25, the Hospital Wing recorded a substantial improvement in procurement through the Government e–Marketplace (GeM), with the proportion increasing from 47.2% to 85.5%.

MONTHLY GEM PROCUREMENT PERCENTAGE-2024-25 (FROM APRIL 2024 TO MARCH 2025)

Month	Budget/ Allocation Amount in lakh	Volume of procurement made through GeM (in Rupees lakh)	Percentage of Procurement through GeM (Percentage of Budget/ Allocation
	Hospital (lakhs)	Hospital (lakhs)	Hospital (%)
04/24	320.16	151.20	47.23%
05/24	217.96	56.60	25.97%
06/24	228.74	97.28	42.53%
07/24	344.59	125.86	36.53%
08/24	349.99	186.63	53.33%
09/24	449.60	287.26	63.89%
10/24	213.99	104.28	48.73%
11/24	514.90	331.00	64.28%
12/24	456.70	275.9	60.41%
01/25	424.02	291.23	68.68%
02/25	566.70	487.5	86.3%
03/25	444.32	379.88	85.5%



Staff

Hospital Administration

Dr Kavita Raja, Medical Superintendent

Dr Krishnakumar, K Associate Medical Superintendent

Dr Manju Nair R, Administrative Medical Officer (in charge)

Ms. Archana Rajan, D A Assistant Administrative Officer (OMS) – A

Nursing Services

Ms Nirmala M O, Nursing Superintendent
Ms Leena R K, Deputy Nursing Superintendent

Ms Smitha A S, Assistant Nursing Superintendent

Ms Anasooya R, Assistant Nursing Superintendent

Dr Shani S D, Assistant Nursing Superintendent

Physical Medicine and Rehabilitation

Dr Jijo Varghese Assistant Professor (Adhoc)

Ms Deepa G, Chief Physiotherapist

Central Sterile Services Department

Ms Preethamol P, Senior Nursing Officer

Anilkumar V, Sr. Technical Asst.

Infection Control Unit and Biomedical Waste Management

Ms Preena V, Nursing Officer C, Infection Control Nurse

Construction Wing

Mr SreekeshNair S, Asst. Engineer

Security & Safety

Mr Hemanth Kumar R P, Security & Safety Officer – B

Mr Santhosh Kumar K, Security & safty Officer – A

Dietary

Ms Jyothi Lekshmi S, Senior Dietician – A

Laundry

Mr Umesh Sankar S, Senior Laundry Supervisor

Medical Social Work

Ms Rosamma Manuel, Scientific Officer (MSW) & In-charge OPD & Patient Management Services

Dr Jiji T S, Medico Social Worker – B

Medical Records

Mr Sivaprasad R, Senior Medical Records Officer – A

Pharmacy

Ms Deepa K Nair, Senior Pharmacist

Transport

Mr Saji M S, Transport Supervisor

MEDICAL RECORDS DEPARTMENT

The Medical Records Department is a vital component of any healthcare organization, responsible for managing and safeguarding patient information. This department ensures the accurate, comprehensive, and secure documentation of patient health data, playing a critical role in supporting quality patient care, efficient clinical operations, regulatory compliance, and public health initiatives. This report provides a detailed overview of the department's performance over the past year, highlighting key achievements, challenges, and ongoing initiatives aimed at improving patient care and operational efficiency.

Activities

Health Information Management Activities

During the reporting period, the department continued to manage the creation, maintenance, and secure storage of comprehensive patient medical records. These records included medical histories, treatment plans, diagnostic results, and clinical notes. A significant development was the transition to digital health records, which greatly enhanced data accuracy and accessibility, thereby supporting better clinical outcomes and streamlined workflows.

The department consistently worked on verifying the accuracy and completeness of records. All patient information that was documented, were coded, and classified in accordance with the International Classification of Diseases (ICD–10) standards. Regular audits and reviews were conducted to maintain high standards of data quality, which in turn supported accurate diagnosis, effective treatment, proper billing, and academic research.

To ensure data confidentiality and security, the department implemented robust protection measures. These included both physical security for paper

records and cyber security protocols for electronic systems, aimed at preventing unauthorized access and data breaches. The department strictly adhered to all patient privacy regulations and confidentiality guidelines, which are essential for maintaining patient trust and legal compliance.

Compliance with national and international health information regulations remained a top priority. The department made ongoing efforts to stay aligned with documentation standards, data privacy laws, and secure record–keeping requirements. The department was subject to frequent audits to ensure conformity with evolving legal frameworks and industry best practices.

An efficient system for information retrieval was maintained to support clinical care, billing processes, audits, research, and legal requirements. Timely access to accurate health information remained central focus, ensuring informed decision—making and effective patient care delivery.

In terms of operational support, the department was responsible for managing patient registrations, admissions, and appointment scheduling. These efforts were directed at optimizing patient flow. Additionally, socio—economic and demographic data were regularly updated in accordance with institutional protocols. The department also processed and issued various patient documents such as certificates, insurance claims, and other medical reports which were not accessible through patient portals.

The department conducted both quantitative and qualitative analyses of patient records. These analyses helped identify healthcare trends, improve the quality of care, and inform hospital planning. Data from multiple departments were consolidated to ensure comprehensive health information management.



Specialized reporting activities included the handling of overseas patient information, which was reported to the Foreigner's Regional Registration Office (FRRO). The department also ensured that institutional deaths were reported accurately to local corporation authorities, to support accurate public health records.

Forms and documentation management was also a key responsibility. The department printed, stored, and distributed medical records forms, thereby ensuring standardized documentation practices and streamlined operations.

The department also contributed to academic advancement by conducting educational programs in Medical Records Science. These initiatives helped to train the next generation of health information professionals.

Key Achievements

One of the notable achievements was the improved healthcare access for underserved populations during 2024–25. The number of patients treated under the AB–PMJAY scheme increased from 4,149 to 4,814, marking a 16.0% growth. The proportion of total patients treated under the AB–PMJAY scheme rose from 36.15% to 39.76%, reflecting the department's efforts to extend financial support to economically weaker sections. Revenue cycle management was also enhanced through optimized claim processing, reduced denials, and real–time financial tracking, thereby contributing to the institution's financial stability.

The department also made significant strides in digital transformation and process automation. A fully electronic death notification system was implemented in collaboration with the Local Self Government Department (LSGD), which improved data accuracy and transparency in public health records. Additionally, online visa invitation processing for foreign nationals was introduced through the FRRO AYUSH portal, thereby simplifying documentation procedures and enhancing the patient experience.

The efficiency in record processing further improved during the reporting period. The average turnaround time for medical record requests improved by 30%, a result of process optimization, and technology upgrades, including automated retrieval systems and improved workflows. Internal audits showed a 95% compliance rate for data accuracy and security, underscoring the department's strong commitment to maintaining precise and secure patient record management.

Support for data management and research also witnessed considerable progress. The number of records released for study and research purposes nearly doubled from 48,341 to 93,155, indicating a 92.7% increase. This was facilitated by efficient digital record management. The number of certificates processed or issued experienced a slight increase from 4,393 to 4,419, indicating consistent administrative support. The volume of records scanned and uploaded declined from 744,577 to 683,413, representing an 8.2% reduction. This decrease reflected improved data management efficiency and a reduction in redundancy.

Performance Metrics

Activity	No.
New Registrations	17440
Admissions	12107
Reviews	155772
Bed Occupancy Rate	81.76%
Bed Turnover Rate	48 discharges/bed



Average Length of stay	5 days
Records released for study / research	93155
Certificates processed / issued	4419
Insurance Claims processed	1244
Records Scanned and uploaded	683413
Telemedicine Consultations	802
Patient treated under AB–PMJAY Scheme	4814
Percentage of total patients treated under the AB-PMJAY Scheme	39.76%
Accuracy of claims processed under the AB-PMJAY Scheme	98.19%
Average time taken to process a claim under the AB-PMJAY Scheme	14.58 days

Geographic Distribution of Patients

	Out Patient		Out Patient In Patient		atient
KERALA	13771	78.96%	9916	81.97%	
TAMIL NADU	3050	17.49%	1635	13.52%	
KARNATAKA	35	0.20%	20	0.17%	
ANDHRA PRADESH	44	0.25%	29	0.24%	
MAHARASHTRA	58	0.40%	52	0.43%	
OTHER STATES OF INDIA	440	2.52%	425	3.51%	
OUTSIDE INDIA	42	0.24%	20	0.17%	
Total	17440	100%	12097	100%	

Staff

Mr Sivaprasad R, Senior Medical Records Officer & Central Asst. Public Information Officer (Patient Information)

Ms Susan Jacob, Medical Records Officer – C
Mr Christudas J, Medical Records Officer – B
Ms Manna George, Asst. Medical Records Officer
Ms Manju K K, Sr. Medical Records Assistant
Ms Asha Krishna R O, Sr. Medical Records Assistant

Ms Suma B, Sr. Medical Records Assistant

Ms Remya L T, Medical Records Assistant – B

Mr Ragesh D V, Medical Records Assistant – B

Ms Sandhya C K, Medical Records Assistant – B

Ms Suma K K, Medical Records Assistant – A

Ms Sreena T, Medical Records Assistant – A

Mr Sumesh P S, Medical Records Assistant – A

DIVISION OF NURSING SERVICES

The Nursing Division of SCTIMST has a major role in achieving the target of providing the highest quality patient care with utmost dedication. The Nursing service has adopted a philosophy to maintain and excel in patient care through an ongoing process of caring, constant innovation, prevention of errors and thereby evolving policies to maintain the qualities amongst the staff in all areas. The aim of Nursing service is achieving excellent patient care by planning and supervising the care given to the patient, providing well–structured staff development program, serving as health educators and counselors to patient and families, encouraging and facilitating the nurses for higher education and research activities and keeping the employee morale high by safe guarding the health

and welfare of the employees. The Nursing service division of SCTIMST functions as a non-academic division under the control of Medical Superintendent.

The Nursing Superintendent (NS) is the head of the division. The Deputy Nursing Superintendent has to share the responsibilities with the NS. The other nursing personnel consist of the Assistant Nursing Superintendent, Senior Nursing Officers (Ward and Operation Theatre) and Nursing Officers. Nonnursing staff includes Unit Helpers and Cleaning Attendants. The nurses take full responsibility for the patient care without the assistance of the family members. Total patient care model is adopted for rendering patient care. The division is considered as a role model by nursing departments in various hospitals

List of Administrators in Nursing Office

Name	Code Number	Designation
Mrs. Nirmala MO	1442	Nursing Superintendent
Mrs. Leena R K	1232	Deputy Nursing Superintendent
Dr Shani S D	1786	Assistant Nursing Superintendent
Mrs. Anasooya R	1432	Assistant Nursing Superintendent
Mrs. Smitha AS	1741	Assistant Nursing Superintendent

Brief description of the activities:

- 1. Academic activities
- a) Workshops / conferences organized

Title and theme of the event	Date and Venue	Organizers/Co-organizers
State level workshop on "Nursing Administration—a road to excellence" for senior nurses and nurse administrators	10 th & 11 th April 2024 Auditorium 2 SCTIMST	Nursing Services Division
State Level Conference on "Unlocking the gateways of Aortic Surgeries: Empowering Nursing Excellence"	08/06/2024 AMCHSS Auditorium SCTIMST	Dept of CVTS & Nursing division



"Artificial Intelligence in Healthcare: Patient care, Education and Research" by faculty from CDAC	6/11/2024 Auditorium 2.	CDAC &Nursing Division
Training for new contract cleaning attenders on Orientation & General instruction, Environmental cleaning & disinfection, blood spillage management and Biomedical waste management	August 2024 Auditorium 2	Nursing Division
Orientation program for the newly joined contract staff nurses	14/08/2024 Auditorium 2	Nursing Division
24 th Annual conference of Pediatric Cardiac Society of India	14/11/2024 to 17/11/2024 Le Meridian Kochi	Pediatric Cardiac Society of India & Nursing Division
State level conference on Comprehensive Nursing Management of Stroke	15/03/2025 AMCHSS Auditorium	Nursing service division &Comprehensive stroke care program & DHS, Kerala

b) No. of Nurses underwent Training/Workshop

 Preena V (Infection control Nurse) & Asha B S (Nursing officer) attended a short course of Infection prevention & control from 9/09/2024 to 14/9/2024 at Christian Medical College, Vellore, Tamilnadu.

c) Paper presentation/ poster presentation

- Sreeja Gopinath (Nursing officer, NSICU) presented a case report on themanagement of a Patient with Pituitary adenoma in the 14th Asian Congress of Neurological Nurses' webinar series on 30/6/2024.
- 2. In the 44th Annual conference of the Society of Indian Neuroscience Nurses held at Kolkata on December 18–22, the following staff presented poster/paper presentations.
 - Ms Nirmala MO (Nursing Superintendent) presented a paper on "Neuroradiology interventions—nursing implications"
 - Ms Shani SD (Assistant Nursing Superintendent) presented a paper on "Medication adherence: A key mediator between treatment and outcome".
 - Ms Anasooya (Assistant Nursing Superintendent) presented a paper on "Demyelinating disease of Central

- Nervous System comprehensive management and its outcome— A case study
- Ms Sumakumari (Senior Nursing Officer) presented a paper on Case Report: Nursing Perspectives on Cerebral Vasospasm following Aneurysmal Subarachnoid Haemorrhage
- Ms Rajalakshmi V R (Senior Nursing Officer) presented a paper on "A successful outcome following Thrombolysis in a patient with vertebrobasilar stroke – A case report
- Prajeesh P Prakash (Nursing officer)
 –Factors associated with central line–associated bloodstream infections (CLABSI) among patients who underwent plasma exchange therapy in a tertiary care hospital
- Lakshmi P (Nursing officer) Case Report: Nursing Management of Cerebral Salt Wasting Syndrome in a patient following endovascular coiling for aneurysm
- Saji Gopinath(Nursing officer) Non– Mycotic Anterior Communicating Aneurysm In a case of DiGeorge Syndrome



- ◆ Achu G C (Nursing officer) –Jugular foramen schwannoma Type–D: A case study presentation
- Nidheesh (Nursing officer) Nursing perspective on a 9–month–old child with bilateral Moya–Moya disease whounderwent a single sitting– EDAS
- Rathish Rajan (Nursing Officer)

 Nursing Care of a Patient with Hirayama Disease
- Suchithra P V (Nursing officer) Cerebellar Hemangioblastoma In Von Hippel– Lindau Disease– Case Report

Other Activities

- Thenursing division of SCTIMST celebrated International Nurses' Week. The theme for International Nurses Day 2024 was "Our Nurses. Our future. The economic power of care." The Program was inaugurated by Prof. Dr Kavita Raja, Medical superintendent and the guest of honour was Mr. N S Sumesh Krishnan, the eminent Malayalam poet and orator. As part of the celebrations, various competitions like sports and arts, quiz, and scientific paper presentation were conducted on various days
- The World Hand Hygiene Week was observed by the Hospital Infection Control Unit (HICU) and the Nursing Service Division from 5th May to 9th May 2024. As part of the observance, various activities were conducted aimed at increasing awareness of hand hygiene among the staff and students in the hospital. The various programs include
 - * One day competency—based training for the Nursing Officers and Technicians, including theory sessions followed by skill stations. The skill stations focused on the demonstration of proper techniques in the insertion and management of External Ventricular Drain, Central Venous Catheters, Peripheral Venous Line, and Foley's catheter.
 - * Assessment of hand hygiene steps was done on 8th May to award the hand hygiene Champions' rolling trophy.

- * Inspection of cleanliness was conducted in all wards and ICUs to award the clean ICU and Clean Ward rolling trophy.
- * 24—hour teaching challenge on Hand hygiene was given to senior nursing officers and Infection Control Link Nurses. The prizes were given to units which conducted the maximum number of teaching sessions.
- * Avideo—making competition was conducted in order to raise awareness about infection control and prevention, in connection with the WHHD.
- Started Journal Club for nurses and Dr Shani.S.D presented a paper on Facilitators & barriers to medication adherence among stroke survivors in India –
- As part of the World Patient Safety Day Celebration, a special talk on Patient Safety was organised by the Safety Steering Committee, SCTIMST on 17/9/2024.
- Leena R K (Deputy Nursing Superintendent), Preena V (Infection control nurse), Preethamol (Senior nursing officer) did training for new contract cleaning attenders on orientation & General instruction, environmental cleaning & disinfection, blood spillage management, and Biomedical waste management
- Staff members of the Neuro Medical ICU prepared an educational video on anti-microbial resistance (AMR) for public awareness in connection with the World Antimicrobial Awareness Week celebration. Mr. Shafi,nursing officer, has directed & prepared the video.
- Participated in the 125th year celebration of Government Women's College, Trivandrum (COGNITOPIA), organised Multi-disciplinary Academic Fest from 16/01/2025 to 18/01/2025 and conducted training on CPR, explained lifestyle modification & displayed different posters related to cardiac & neuro conditions. Atotal of 17 nursing officers & unit helpers participated in this Program.





Cardiac surgery conference at AIIMS Nagpur on 28/09/2024 & 29/09/2024.



State Level Conference on "Unlocking the gateways of Aortic Surgeries: Empowering Nursing Excellence"



Photos of participation by the nursing division in Multi disciplinary Academic Fest (COGNITOPIA), organized by the Government Women's College Trivandrum from 16/01/2025 to 18/01/2025





Photos of participation by the nursing division in Multi disciplinary Academic Fest (COGNITOPIA), organized by the Government Women's College Trivandrum from 16/01/2025 to 18/01/2025



Patient safety day SCTIMST Nirmala M O Nursing Superintendent

DEPARTMENT OF ANAESTHESIOLOGY

Anaesthesiology is the largest clinical department of the Institute, comprising of two divisions; namely (a) Cardiothoracic and Vascular Anaesthesiology and (b) Neuroanaesthesiology, catering services to Cardiovascular, thoracic and Neurological diseases. The armamentarium of newer gadgets in the division consists of 3D and 4D perioperative echocardiography, lung ultrasound, NIRS, fibre—optic bronchoscopy, and anaesthesia depth monitoring. Additionally, the department has implemented opioid—free regional anaesthesia for surgical procedures, which is provided through single injections or continuous infusions of local anaesthetic agents through catheters.

A. DIVISION OF CARDIOTHORACIC AND VASCULAR ANAESTHESIOLOGY

The Division of Cardiothoracic & Vascular Anaesthesia cater to the patients undergoing various surgical procedures in adult and pediatric cardiac surgery, vascular and thoracic surgery, and interventions performed in cardiology and Radiology. The area of clinical services extended to six cardiac surgical operation theatres, two catheterization laboratories, one DSA lab, two MRI suites, and one CT scan room. Anaesthesiologists are inseparable team members of the adult cardiac surgical ICU, paediatric cardiac surgical ICU and Coronary Care Unit. This division shoulders the responsibility of providing round-theclock anaesthesia and resuscitation backup for all interventional and surgical procedures performed in the hospital. All clinical departments in the hospital are assured a 24 X 7 services by the resuscitation team for all critically ill patients. Chronic Pain and Geriatric Care Unit was run by the Division to alleviate suffering from chronic pain and geriatric diseases.

The Cardiothoracic and Vascular Anaesthesiology Division dispensed for the following surgeries and diagnostic and interventional procedures during the year:

Area	Number of Surger- ies/ Procedures
Adult Cardiac Surgery OT	1186
Pediatric Cardiac Surgery OT	422
Radiology Interventions	67
ICU -Anaesthesia	1205
Cathlab	782
Interventional pain clinic	961
OPD including geriatric	2927

1. Academic activities:

Academic activities involved bedside teaching and organizing seminars, symposia, lectures, journal clubs, discussions on focused topics, and clinical case scenarios. One of the objectives was to introduce resident doctors to the recent advances in subjects such as published guidelines, meta–analysis, and Pro & Con topics. All 1st and 3rd Saturdays are dedicated exclusively to the Department's academic sessions, and Wednesdays are for combined meetings between Cardiac Anaesthesia and Cardiac surgery.

2. Research activities:

30 Research programmes were currently ongoing in the Division and include both funded and unfunded programmes.

3. Events Organized:

 Conducted the FATE workshop, lungisolation workshop and regional nerve block workshop as part of ISNACC, Thiruvananthapuram (National Conference), 2024.



b. Seven public awareness cum training on firstaid and basiclife support was conducted by the Division, with the help of faculty, technical staff and residents of the Department. The institutions include Engineering, Police training camps and Government organisations.

List of faculty in Cardiac Anesthesia Division:

- 1. Dr Shrinivas V Gadhinglajkar, Professor (SeniorGrade) and Head
- 2. Dr Thomas Koshy, Professor (Senior Grade)
- 3. Dr Prasanta Kumar Dash, Professor (Senior Grade)
- 4. Dr P R. Suneel, Professor
- 5. Dr K P Unnikrishnan, Professor
- 6. Dr Subin Sukesan, Professor
- 7. Dr Saravana Babu M S, Additional Professor
- 8. Dr Mamatha Munaf, Assistant Professor

B. NEUROANAESTHESIA DIVISION:

Brief overview of the Division:

The Division of Neuroanaesthesia is a major subdivision of Anaesthesia at SCTIMST primarily involved in the perioperative management of neurologically ill patients. The division has five Faculty members, one PDF, and an annual intake of seven DM (Neuroanaesthesia) residents. The division's major activities include patient care, academics, research and publications, and administrative/corporate roles. The Code–Blue program was established by the division for the emergency resuscitation of patients in the hospital. Moreover, the the division extend their expertise in the management of critically ill neurological and neurosurgical patients spread across 4 ICU's and also involved in the transport of critically ill patients.

1. Clinical Activities:

 Management of perioperative care of complex neurosurgical procedures like intracranial bypass, awake craniotomies, advanced neuromonitoring, and functional and epilepsysurgeries in 4 operationtheatres

- Periprocedural Management of Interventional neuroradiology patients, including acute stroke interventions.
- Periprocedural Management of diagnostic neuroradiological procedures; MRI/CT
- Preanesthetic clinics/OPD
- Neurocritical care in 4 intensive care units.
- Transport of Critically ill patients
- Periprocedural management of out—of theatre procedures, such as Nerve/Muscle biopsy

The Neuroanesthesia Division has provided services for the following clinical areas in the year 2024–2025:

Area	No. of Surgeries/ Procedures 2024–2025
Neurosurgery Theatre	1425
NeuroRadiology Interventions	180
ICU Management in NSICU, Stroke ICU, IRICU and NMICU –	1500
MRI and Diagnostic Procedures	450
OPD including geriatric	2130

2. Research Activities:

The faculty is involved in funded and non–funded research projects. The funding is both intramural for faculty guides, TRC, and TDF funds for device development, and extramural via agencies like ICMR, DST, DBT, etc. Presently, 7 extramural, 5 intramural projects and 21 non–funded projects are ongoing in the division.

3. Academic activities:

Academic activities involved bed side teaching, and organizing seminars, symposia, lectures, journal clubs, discussions on focused topics and clinical case scenarios. One of the objectives was to



introduce resident doctors to the recent advances in the subjects such as published guidelines, meta–analysis, and Pro & Con topics. All $1^{\rm st}$ and $3^{\rm rd}$ Saturday sare dedicated exclusively to the divisions academic session and additionally Wednesdays and Thursday sare dedicated for the clinical discussions in addition to combined meetings between the division and Neurosurgery department.

4. New Initiatives:

- a. A new four–dimensional (4D) echocardiography machine with Transesophageal echo is installed in the Neuro Operation theater, and it is the first in the country to have 4D echo.
- b. A new PDF program in Perioperative neuromonitoring and neurocritical care started. One more collaborative PDF program in intraoperative neuromonitoring with the department of Neurosurgery is submitted for consideration
- c. Designed and developed an online integrated ICU handover charting solution

5. Events Organized:

- a. The first—ever certified Brain Death Determination and Certification Program, in which participants are certified by the government to determine and declare brain death, was conducted in collaboration with K— SOTTO and NOTTO on January 23^{rd,} 2025. Workshop Directors – Dr Manikandan, Dr Easwer HV, and Dr Ajay Prasad Hrishi.
- b. The Division of Neuroanesthesia hosted the 26th Annual Conference of the Indian Society of Neuroanaesthesiology and Critical Care (ISNACC 2025), which took place from 23rd to 26th January 2025 in Trivandrum, Kerala. The conference, organised by the Sree Chitra Tirunal Institute for Medical Sciences and Technology

(SCTIMST), brought together global experts in Neuroanaesthesia and critical care. More than 600 delegates and esteemed faculty members of national and international repute attended the event. Dr Kris Goplakrishnan, President, SCTIMST, delivered the inaugural ISNACC oration. Dr Sanjay Behari, Director SCTIMST, was the chief Guest of the ISNCC Convocation and conferred ISNCC fellowships. Organising Chairperson – Dr Manikandan S, Organising Vice–Chairperson – Dr Smita V, Organising Secretary– Dr Ajay Prasad Hrishi, Treasurer – Dr Unnikrishnan P and Scientific Committee– Dr Ranganatha Praveen

- c. CPR and Code Blue training was conducted for all the newly joined Staff and Students—Dr Ajay Prasad Hrishi, Code Blue committee Convenor
- d. Doctors from the division are part of the Swachh Bharat Abhiyan Committee. In September 2024, the committee conducted two outreach programs as part of Swachhata Hi Seva 2024, including public awareness campaigns focused on solid waste management and CPR awareness, as well as school outreach programs that covered oral and menstrual hygiene. Also, a poster competition, an exhibition— "Scrappy Ideas", a cleaning drive, and a seminar (Invited speaker: Dr V. Subhash Chandra Bose, Environment Scientist Former Director, Water Resource Department, Govt. of Kerala) were conducted as part of this.

BLS and First Aid training programmes conducted by Professor PK Dash and Dr Ajay Prasad Hrishi under Code Blue program initiative

- 1. In Hospital Wing, 2 nos
- 2. At BMT Wing, 1 no
- 3. Outside Institute, 7 nos





Annual Conference of the Indian Society of Neuroanaesthesiology and Critical Care (ISNACC 2025), 23rd to 26th January 2025

List of Faculty in Neuroanesthesia Division as on 31.03.2025

- 1. Dr S Manikandan, Professor and Head
- 2. Dr Smita V, Professor
- 3. Dr Ajay Prasad Hrishi P, Additional Professor
- 4. Dr Unnikrishnan P, Additional Professor
- 5. Dr Ranganatha Praveen CS, Additional Professor

Technical

- 1. Binu Thomas, Senior Scientific Assistant
- 2. Shibu V S, Senior Technical Assistant
- 3. Baiju Bavura S, Senior Technical Assistant
- 4. Tiny Babu, Senior Technical Assistant
- 5. Pradeep S L, Senior Technical Assistant
- 6. Sumesh T M, Senior Technical Assistant
- 7. Damodara Sarma E, Technical Assistant B
- 8. Archana S, Technical Assistant A
- 9. Manju R S, Technical Assistant A

DEPARTMENT OF BIOCHEMISTRY

The Department of Biochemistry is organized into three sections, each supporting the institute's clinical and research missions:

1. Central Clinical Laboratory (CCL)

The CCL provides round—the—clock diagnostic services in biochemistry, hematology, clinical pathology, and targeted amino—acid analysis. Equipped with fully automated analyzers and an integrated laboratory information system. CCL delivers rapid, high—quality results that guide patient management at the hospital.

2. Research Laboratories

The research laboratory undertakes both basic and translational projects that connect molecular insights with clinical impact. Current projects include:

- a. Role of NLRP3 Inflammasome in Alzheimers
 Disease
- b. Effect of MTH1 downregulation and the consequent accumulation of oxidized nucleotides at different sites in neuronal cells
- Comparing mitochondrial function and dynamics in atrial tissue of patients undergoing cardiopulmonary bypass surgery and aortic valve repair
- d. Expression dynamics and validation of Extracellular vesicle (EV) derived miRNAs in Glioma
- e. Exosomal cargo as biomarkers for Parkinson's disease
- f. Exosomes for bone regeneration
- g. Peripheral Blood Mononuclear Cells (PBMC) as a model for Fibrosis

3. Molecular Genetics Unit (MGU)

The MGU undertakes comprehensive molecular diagnostics, including mutation and single-

nucleotide polymorphism detection via Sanger sequencing and real-time PCR assays.

ACTIVITIES

Central Clinical Laboratory (CCL)

The Central Clinical Laboratory (CCL) is equipped with a range of fully automated diagnostic instruments to ensure high—throughput and accurate clinical testing. The major equipment in use includes:

- Dade–Behring/Siemens Dimension RXL a fully automated chemistry analyzer
- Aspen A1c HPLC Analyzer LD 500 for precise glycated hemoglobin (HbA1c) analysis
- Mindray BC-5180 and BC-5000 5-part differential hematology analyzers for complete blood count (CBC) and related parameters
- Gem Premier 3000 an advanced arterial blood gas (ABG) analyzer
- Cobas U 411 (Roche) automated urine analyzer for routine urinalysis
- Amax Destiny Plus a fully automated coagulation analyzer for hemostasis testing

During the year 2024–25, Central Clinical Laboratory carried out a total of 9,57,960 diagnostic investigations, reflecting the lab's high workload and operational efficiency.

SI. No.	Investigations	Number
1	Arterial Blood Gas	18083
2	General Chemistry	441819
3	Hematology & Coagulation	339627
4	Clinical Pathology [CSF, Motion, Urine]	158431
Total Investigations		9,57,960



Molecular Genetics Unit (MGU)

Sanger sequencing for single mutation/SNP is being performed during 2024–25 at MGU. About 48 investigations were carried out during the FY 2023–24.

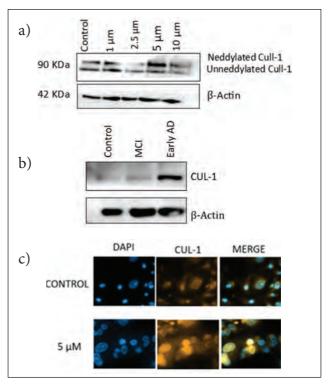
Research Programs

Three research laboratories supervised by faculty members are actively engaged in training and mentoring a total of eight PhD students at various stages of their doctoral research. In addition to this, the labs have supported the MSc thesis work of three postgraduate students and facilitated apprenticeship training for three students of other instituts. The academic and research activities within these laboratories include hands—on laboratory experiments, mandatory seminar presentations, weekly progress updates, and preparation for mid—program comprehensive examinations. Faculty members also provide continuous academic guidance and formal supervision for both PhD dissertations and MSc thesis of other instituts, ensuring rigorous research training and scholarly development.

Currently, six extramural funded projects (ICMR and SERB) are being carried out (total project cost: Rs. 110.65 Lakhs) as PIs, and six other projects are Co–PIs. Highlights of some of these projects are given below:

1. Role of NLRP3 Inflammasome in Alzheimers Disease

Microglial NLRP3 inflammasome activation is a key contributor to neurodegeneration in Alzheimer's disease (AD), where amyloid beta (Aβ) triggers the release of inflammatory cytokines like IL-1β and IL–18. The regulation of this inflammasome remains insufficiently understood, posing challenges for targeted therapeutic strategies. Cullin-1 (CUL-1), part of the SCF E3 ubiquitin ligase complex, has emerged as a potential negative regulator that can suppress NLRP3 inflammasome activation through its interaction. Our study in HMC3 microglial cells demonstrated a biphasic expression of CUL-1, with neddylated CUL-1 peaking at moderate Aβ concentrations and a steady decline in its unneddylated form. Aß exposure promoted nuclear localization of CUL-1 that could infere with its interaction with NLRP3. Furthermore, increased CUL-1 expression in AD patient-derived macrophages suggests a possible compensatory mechanism against chronic inflammation.

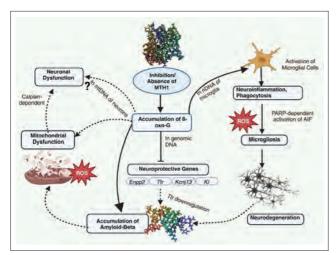


Representative western blot image after treatment with A β in HMC3 cell lines. Western blot analyses for CUL— 1 and NLRP3 Protein were performed 6 h after treatment with A β (0,1,2.5,5,10 μ M) respectively. β —Actin was used as loading control. b) Representative Image of western blot of Patient derived macrophages (control, MCI , AD). β —Actin was used as loading control. c) Immunofluorescence staining of CUL 1 expression in HMC3 Microglia after treatment with A β (0,5 μ M) . Yellow fluorescence and blue fluorescence represented CUL—1 and cellular nucleus respectively. Magnification; 63X

2. Effect of MTH1 downregulation and the consequent accumulation of oxidized nucleotides at different sites in neuronal cells

Increased $A\beta$ immunoreactivity in the brain was attributed to higher 8–oxo–G levels in the nuclear DNA of microglia in knockout mice models. Subsequent phagocytic action of activated microglial cells and downregulation of neuroprotective genes cause neurodegeneration and loss of neurons. Downregulation of the neuroprotective Ttr gene inhibits $A\beta$ cleavage, causing its aggregation.



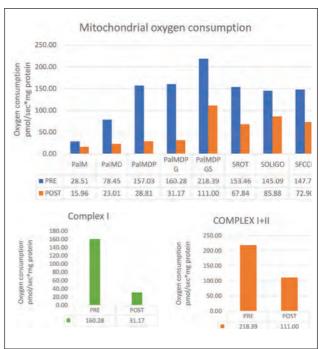


Mild 8–oxo–G accumulation in mitochondrial DNA (mtDNA) could invoke neuroprotective mechanisms in the neurons preventing neuronal cell loss. Beyond the threshold, mitochondrial dysfunction was observed following 8–oxo–G accumulation in mitochondrial DNA and Aβ accumulation. (AIF: Apoptosis–inducing factor Ttr: Transthyretin, Enpp2: Ectonucleotide pyrophosphatase/phosphodiesterase family member 2, Kcnj13: Potassium inwardly–rectifying channel, subfamily I, member 13, Kl: Klotho)

3. Comparing mitochondrial function and dynamics in atrial tissue of patients undergoing cardiopulmonary bypass surgery and aortic valve repair

This work focuses on the mitochondrial function in the cardiac tissue with ischemic block and undergoing CABG surgery compared to the group without a pre–existing ischemic insult. To determine if the mitochondrial recovery following reperfusion after cardiac surgery and cardioplegia is similar in patients with pre–existing ischemic insult compared with the group without the pre–ischemic insult.

Tissue samples were obtained both prior to the initiation of cardiopulmonary bypass (CPB) and after reperfusion, once the surgical procedures were completed. Mitochondria were isolated from both sets of tissues via differential centrifugation, then subjected to functional assessment using Oroboros O2K high–resolution respirometry.



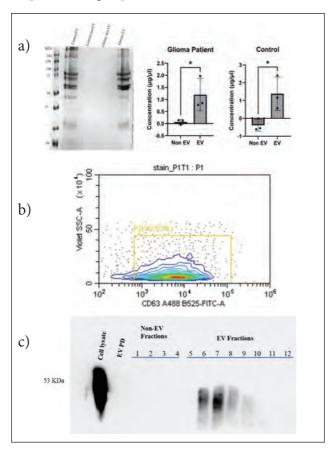
By analysing various states of mitochondrial respiration using SUIT protocol with Oroboros O2K, in pre and post cardioplegia tissue, we observed that mitochondrial respiration rates were notably higher in pre–surgical samples compared to post–reperfusion samples. Complex I linked respiration was found to be lowered in post CPB tissues as complex I is severely affected by reperfusion injury.

4. Expression dynamics and validation of Extracellular vesicle (EV) derived miRNAs in Glioma

Glioma is the most common and aggressive malignant brain tumor with poor prognosis and high intra— and intertumoral heterogeneity. microRNAs (miRNA) are one of the essential gene regulatory factors in glioma cell proliferation, treatment response and recurrence. Extracellular vesicles (EVs) are cell derived membrane surrounded vesicles that carry bioactive molecules and deliver them in to recipient cells. Through this regulatory mechanism, EVs can release selectively enriched miRNAs to activate specific signal pathways in the target cells and affect the micro— environment of glioma, therefore EV derived miRNAs play an essential role in proliferation, metastasis, drug resistance and immunity of gliomas. EV derived miRNAs are detectable in almost all kinds of body



fluids and EV lipid membranes protect miRNA from degradation; hence it is convenient tool for multiple diagnostic sampling.

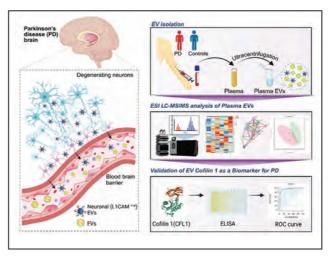


Extracellular vesicles (EV) characterization – a) Total protein estimation by BCA assay followed by SDS– PAGE analysis. b) CD63 Expression analysis by Flowcytometry– Flow cytometry contour plot showing CD63 expression on EVs, with 40.53% of events gated as CD63–positive.c) Western blot analysis of EV marker CD63 (1:500 dilution; Cat. #CBL553, Anti–CD63, clone RFAC4, Merck) was performed on non–EV & EV fractions. A total of 20 μL each of non–EV and EV samples were loaded per lane along with cell lysate and plasma EV fraction isolated via ultracentrifugation for immunoblot detection. (EV–PD – EV isolated from Parkinson's disease patient plasma sample).

5. Exosomal cargo as biomarkers for Parkinson's disease

The objective of this ICMR-funded study was to identify dysregulated proteins in exosomes isolated from 91 Parkinson's disease (PD) patients and 80

healthy controls to identify potential biomarkers for PD. Exosomes were isolated using ultracentrifugation characterized bv transmission microscopy, dynamic light scattering, and Western blotting, Proteomic analysis of total plasma Exosomes revealed 65 proteins, with 41 distinguishing PD from controls. Notably, Cofilin 1 (CFL1) was significantly elevated in PD Exosomes and emerged as a potential disease-specific marker. Importantly, CFL1 levels were not elevated in EVs from patients with other neurodegenerative diseases (PSP, ALS), indicating specificity to PD. The study supports the utility of EV-associated CFL1 as a minimally invasive and PDspecific biomarker, with potential applications in early diagnosis and clinical monitoring.



Schematic representation of extracellular vesicle (EV)—based biomarker discovery in Parkinson's disease (PD).

Total EVs were isolated from plasma by ultracentrifugation, including brain–derived EVs identified by western blot using L1CAM antibody. Total EVs were subjected to mass spectrometry for proteomic analysis. Cofilin–1 (CFL1) was identified as a candidate biomarker and validated by ELISA to confirm its diagnostic potential in PD.

6. Exosomes for bone regeneration

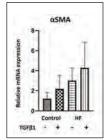
The use of exosomes in bone tissue engineering is emerging as a promising alternative strategy to stem cells. This study focuses on testing this possibility in vitro using exosomes with rat bone marrow stem cells (rBMSCs). Bone marrow was harvested from Wistar rats and cultured using the direct adherence method. The rBMSCs were

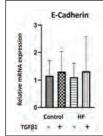


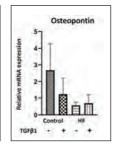
characterized through trilineage differentiation, flow cytometry, immunofluorescence, and real-time PCR. Exosomes were isolated through ultracentrifugation. The osteogenic differentiation of rBMSCs was evaluated using the isolated EVs, confirmed by the MTT Cell Proliferation Assay and In vitro Osteogenesis Assays. The concentration— and time—dependent enhancement of osteogenic differentiation by rBMSC—derived EVs was also performed. Most importantly, exosomes promoted osteogenic differentiation without adding any conventional chemical agents in the culture media. These findings will pave the way for further investigations to link exosomes' therapeutic benefits in bone tissue engineering and related applications.

7. Peripheral Blood Mononuclear Cells (PBMC) as a model for Fibrosis

The study was designed to explore the possibility of establishing human peripheral blood mononuclear cells (PBMC) as a model to study cellular changes in cardiac fibrosis. Human blood samples were collected from heart failure patients and healthy controls; PBMC's were isolated using density gradient centrifugation. Fibrotic changes were studied using qPCR after TGFb1 treatment. The data suggest that PBMCs maintained in culture can be used as a model system to elucidate fibrosis using various modulators.







Expression of fibrotic markers in PBMCs isolated from heart failure patients and healthy controls

New initiatives

Initiated the "Investigator Initiated Small Grant (PI: Dr Srinivas G) on 'Analysis of TREM2 variants associated with AD in Indian cohorts and functional assessment of Phagocytic efficiency, Inflammatory signalling and Metabolic switch in iPSC derived microglia', funded by ICMR.

Foreign Visits

 Dr Srinivas G was awarded the Short Term ICMR–International Fellowship to work at Aarhus University, Denmark, from July to September 2024.

Staff

Faculty

Dr Srinivas G, Scientist G & Head

Dr Madhusoodanan U K, Additional Professor

Dr Cibin T R, Associate Professor

Technical

Dr Geetha M, Scientific Officer (Lab)

Mr Siju K S, Scientific Assistant (Lab)

Ms Mangalamma H R, Scientific Assistant (Lab)

Mr Prem Mohan M, Sr. Technical Assistant (Lab)

Ms Deepa K Raj, Sr. Technical Assistant (Lab)

Mr Vinod D, Sr. Technical Assistant (Lab)

Ms Sreeja K R, Sr. Technical Assistant (Lab)

Dr Deepa D, Technical Assistant (Lab)-B

Mr Sarath Kumar R S, Technical Assistant (Animal Lab)-B

Ms Susan Mani, Technical Assistant (Lab)-B

Ms Hima V M, Technical Assistant (Lab)–B

Ms Divya T Nair, Technical Assistant (Lab)–B

Ms Anooja V, Technical Assistant (Lab)-A

Ms Archana M, Technical Assistant (Lab)-A

Mr Bijeesh V L, Technical Assistant (Lab)-A

Ms Midhuna S R, Technical Assistant (Lab)-A

Ms Thasni R M, Technical Assistant (Lab)-A

Mr Shaji V, Unit helper –B

Ms Jisha N R, Unit helper –A

Ms Smitha P K, Cleaning Attendant-B

DEPARTMENT OF CARDIOLOGY

The Department of Cardiology provides tertiary care services to patients referred with cardiovascular diseases. The department trains seven Senior Residents for DM Cardiology and one candidate for DM Paediatric Cardiology programmes respectively every year. The department runs the cardiology Technician Training course – DCLT– (Diploma in Cath Lab Technology) and supports the post–basic Nursing programme in cardiology. The department also offers post–doctoral (post DM/DrNB) fellowship programs in Interventional Cardiology, Electrophysiology and Paediatric cardiology with an intake of two candidates each in each subspecialty.

The highlights of the department in the year include

- First heart transplant was carried out in the institute in a 14-year-old child on 22 July 2024, who was being managed under cardiology department, by combined efforts of the cardiac surgery, cardiology, cardiac anaesthesiology and other coordinating and support teams
- Inauguration of the state-of-the-art cardiac catheterization laboratory by Institute President Shri Kris Gopalakrishnan on 3 December 2024
- Completion of 100 TAVR (transcatheter aortic valve replacement) procedures and initiation of percutaneous mitral valve implantation programme

The Department of Cardiology has three functional divisions.

- Division of Adult Cardiology and Interventions
- Division of Cardiac Electrophysiology
- Division of Paediatric Cardiology

Division of Adult Cardiology and Interventions

Brief Overview of the Division

The division of adult cardiology and interventions offers its expertise in the comprehensive management of a

wide range of heart diseases in adult patients including diagnostic evaluation, advanced interventional treatment and heart failure services. The division also runs academic and professional training programmes.

Activities of the Division - Clinical activities

The division runs adult cardiology clinics and speciality clinics such as Heart Failure Clinic, Intervention Clinic and Grown—up Congenital Heart Diseases Clinic. The division undertakes state—of—the—art care of patients needing various coronary and structural heart interventions and stays as a tertiary referral centre for the region.

(a) Non-invasive Cardiac Evaluation

- Echocardiography including advanced echocardiographic methods like trans—oesophageal echocardiography, tissue Doppler imaging, strain, speckle tracking, and 3D echocardiography (trans thoracic and trans—oesophageal). Currently, seven medium and high—end echocardiography machines are available in the Department of Cardiology.
- Stress testing—Tread mill exercise electrocardiogram and Dobutamine stress echocardiography.

(b) Invasive diagnostic facilities

- Diagnostic cardiac catheterization and angiography: The department has two cardiac catheterization laboratories installed presently, where various diagnostic and interventional cardiac catheterizations are undertaken. Digital subtraction angiography is also available for the imaging of vascular structures.
- Intravascular Ultrasound imaging for anatomical evaluation of coronary stenosis and optimization of coronary stenting especially in left main coronary artery interventions.
- Optical Coherence Tomography assessment of coronary lesions, used routinely to assess coronary



plaque characteristics and decision- making in management.

- Coronary physiology assessment for functional assessment of borderline coronary lesions: Hyperaemic (FFR) and Non- hyperaemic indices (RFR, iFR) are routinely undertaken.
- Intra-cardiac echocardiography is used to aid in device closure of atrial septal defects in selected cases.

(c) Interventional cardiovascular procedures

- TAVR –We have completed 100 TAVR procedures till now. This is one of the highest in the country in any public hospital.
- Advanced Mitral valve interventions Mitral Transcatheter Edge to Edge Repair (TEER) procedures and valve—in—valve implantation is being performed.
- Percutaneous coronary interventions include both emergent and elective, including advanced interventions with rotational atherectomy and intravascular lithotripsy are being performed routinely now—a—days. The procedures are guided by physiological evaluation (FFR / iFR) and imaging by OCT and IVUS.
- Percutaneous balloon valvotomies (mitral, aortic and pulmonary): One important therapeutic procedure offered by the division is balloon mitral valvotomy in pregnant women, which is supported by SAT Hospital Medical College, Trivandrum.
- Percutaneous closure of Atrial septal defects, Patent Foramen Ovale in patients referred from the Division of Stroke of the Institute, Ventricular septal defects, persistent arterial ducts in adults, ruptured sinus of Valsalva aneurysm, Para—prosthetic valvular leak, coronary—cameral fistula, arterio—venous fistula, pulmonary arterio—venous fistula etc. are routinely undertaken.
- Intra–aortic balloon pump counter–pulsation, is used to support hemodynamically unstable patients.
- Services including Coronary interventions and Pericardial drainage is provided for patients referred from the Regional Cancer Centre, Trivandrum

Academic activities

- 1. The division offers the following programs where the candidates are given exposure to various aspects of the practice of Interventional Cardiology.
 - Post Doctoral Fellowship in Adult Cardiology and Interventions: (Two positions in a year, one year program after DM/ DrNB Cardiology. The program involves hands—on training in all diagnostic aspects of adult cardiac care as well as interventional cardiac catheterizations. The Fellowship provides ample opportunities for professional and academic enhancement including research projects and publication/ presentation of scientific papers.
- The division conducts dedicated sessions on interventional cardiology including structural heart disease intervention to DM cardiology residents and fellows every Wednesday.
- 3. The division also conducts training programs on various aspects of coronary intervention using simulators and models like sessions on bifurcation coronary intervention.
- 4. PhD Mr Sarath S Nair, BMT Wing. Project— "Transcutaneous Energy Transfer System"

Research programmes

The HF research program under this division is recognised by ICMR as one of the Collaborating centre of Excellence (ICMR CCoE). This is for a period of five years from 2023 – 2028.

ICMR Centre of Excellence in Heart Failure

The ICMR Centre for Advanced Research and Excellence (CARE) in Heart Failure (HF) with a funding of 5 Crores is one of the flagship research initiatives of the institute that commenced in 2019 and has been extended to March 2027. The CARE in HF encompasses seven key projects integrating clinical sciences, basic sciences, epidemiology, rehabilitation and technology development. The National HF database is having the data of nearly 25000 patients with HF, collated from various registries across the country. National HF Biobank Facility, the first in the country, provides state–of–the–art storage facilities for bio samples of patients with heart failure has around 4000



bio–samples with annotated clinical data. The genetic study of patients with hypertrophic cardiomyopathy (HCM) and family members using NGS (next generation sequencing) is completed and is the largest study of the kind in the country. The India–Specific HF Quality of Life assessment tool developed and validated under the programme is now routinely used in clinics and projects. Other nationwide multicentric research activities recently completed include the assessment of the economic impact of heart failureand a 2x2 factorial trial on physical activity training and cognitive behavioural therapy in HF management.

A key activity of CARE was the development of a point—of—care device for NT Pro—BNP, the biomarker in patients with heart failure. This is in collaboration with the Biomedical Technology Wing of our institute and the Rajiv Gandhi Centre for Biotechnology.

Other ongoing Trials / Studies

- Digoxin in patients with rheumatic heart disease

– A randomized placebo–controlled trial (PI, Dr Arun Gopalakrishnan) and the RISE–HF Trial– Multicentric ICMR Funded trial on Ranolazine of HF with Preserved Ejection fraction, Trivandrum HF Cohort– phase IIwith 10 years of follow up of patients admitted with Heart Failure in the Trivandrum Heart Failure Registry which is the first long–term registry data in HF from India, MASALA–HF trial (multi–centre study in patients with heart failure and preserved ejection fraction, supported by research grant from National Institutes of Health, National Heart, Lung, and Blood, Institute, United States, Coordinated by University of California and Northwestern university, USA)

- "Prognostic value of circulating mi-RNA in patients with heart failure funded by the ICMR concluded in March 2025.

Biomedical device development

Non–invasive measurement of pulmonary congestion in emergency rooms. Joint Project with NIT Calicut and SCTIMST. Funded by Department of Science and Technology under the Device Development Programme (DDP)

Development of Coronary Stent System – TiN Coated Coronary Stent. funded by TRC. MoU signed with

Invasive Technologies P Ltd for transfer of technology on 23 September, 2024

Development of paracorporeal Left Ventricular Assist device and percutaneous catheter based assist device – Collaborative project with BMT wing, and CVTS department. studies ongoing.

Developing Point-of-Care Device for BNP (Heart Failure Biomarker) – Funded by ICMR, Collaborative project of BMT Wing, Hospital wing and RGCB, Ongoing

New Research initiatives

- PURI HF Trial ("Effectiveness of Indoor Air Purifiers on Heart Failure Outcomes) funded by ICMR and supported by New York University Grossman School of Medicine (NYUGSoM) study entering recruitment stage.
- Epigenetic Markers for Predicting Reverse Cardiac Remodelling in Dilated Cardiomyopathy

 – funded by the ICMR.

 – Funds released – Study will be initiated in April 2025
- Genesis II trial: A clinical evaluation of Hydra self– expanding transcatheter aortic valve"
- "Model 3 THV study: A prospective, multi centre, single arm study to evaluate the safety and performance of Model 3 transcatheter heart valve series"

Events Organized

Academic events

- Back To Basics Simulator—based cardiology training program is conducted by cardiology department at SCTIMST on January 17, 18, 19 2025 with nearly 200 residents in training from across the country and neighbouring countries attend. This is a flagship program of the department and is running into 12th year. The faculty are from among alumni of SCTIMST and the attendees include Junior consultants who want to brush up the basics, in addition to DM and DNB residents and fellows in training in cardiology.
- Heart Failure Clinics Plus edition 2024 An online Virtual bedside clinical case discussion program



for cardiology residents. This program coordinated by SCTIMST on behalf of the Heart Failure Association of India (HFAI). The programinvolves faculty and residents from all major cardiology teaching Institutes in the country.

- Heart failure Conflux The 5thconfluence of basic scientists and clinicians caring for heart failure was held on the online platform on Feb 1st and 2nd, 2025. Nearly 150 basic scientists and clinicians across the country and from abroad participated in the meeting. The keynote lecture was delivered by Dr Marco Metra, President Heart Failure Association of the European Society of Cardiology. The meeting was organized by the Centre of excellence for Heart Failure of ICMR at SCTIMST, Supported by the Heart Failure Association of India and ICMR.
- Echocardiography awareness masterclass was conducted on 27th April as a part of Heart failure awareness day in cardiology department SCTIMST, Thiruvananthapuram. Prof Harikrishnan S was the course coordinator. Dr Krishnamooorthy, DrArun Gopalakrishnan and Dr Deepa S moderated the event. Dr Shantanu Sengupta was the external faculty.
- MOU Signed with NewYork University Grossman School of medicine and SCTIMST for the study "Comparative Health Effectiveness with Medical and Invasive Approaches" with Dr Harikrishnan.S as the principal investigator.

Public events organized by the division

- The department conducted a Patient Awareness Program as part of the Heart failure Awareness days campaign by European Heart Failure Association supported by Heart Failure Association of India in Auditorium II at SCTIMST on 8 May, 2024
- 2. The department conducted a Public Awareness Program at Liquid Propulsions Systems Centre (LPSC), ISRO, Valiamala, Thiruvananthapuram, in association with Heart Failure Association of India (HFAI) on 30th April 2024. The one—day program involved talks by Dr Harikrishnan S and Dr Arun Gopalakrishnan followed by a cardiac camp for 200 staff of LPSC including physician evaluation, cardiology examination, detailed anthropometry, ECG, echo and heart failure screening.

3. Organized a workshop and hands on training program on cardio–pulmonary resuscitation for class 12 students on 21 February, 2025 at Lecole Chempaka school, Thiruvananthapuram.

Awards and recognitions

- Dr Harikrishnan S is recognised as one of the top 2% scientists globally by Stanford University in October 2024
- Dr Harikrishnan.S was awarded the Harpal S Buttar Oration by the International Academy of Cardiovascular Sciences India Section, which was delivered on 11th January 2025 at Ahmedabad
- Dr Harikrishnan S is nominated as a member of the PURSE Program management board (PURSE –PMB) of Department of Science and Technology (DST).
- Dr Harikrishnan S was awarded Certificate of Merit for being selected as an ICMR Collaborating Centre of Excellence for the pioneering research in heart failure at the SCTIMST Annual Convocation on 4th May 2024
- Dr Harikrishnan.S continues as the Chairman of the Council on Heart Failure of the Asian Heart Society since October 30, 2022.
- Dr Harikrishnan S continues as a member of the American College of Cardiology work group —The ACC Innovation Program — Digital Health work group for a period of 2 years 2023—2025. This group will provide leadership and guidance to the ACC Innovation program in support of the effective use of ongoing monitoring for heart failure and coronary artery disease.
- Dr Harikrishnan .S was nominated as a member of the Research Council of the Institute of Advanced Virology, Trivandrum and attended the first meeting on 18th November 2024
- Dr Harikrishnan S was nominated by Director General ICMR as a Member of the Scientific Advisory Committee (SAC) of the ICMR–National Centre for Disease Informatics and Research – Bangalore (NCDIR) The SAC has a mandate to review and guide scientific activities in the institute.



- Dr Harikrishnan.S is part of the group formulating the Evidence Based Guidelines on use of Stem Cell Therapy in India, nominated as Expert Member by DG-ICMR.
- Dr Harikrishnan.S serves as a member of the Expert Advisory Group (EAG) for Biomedical Device and Technology Development (BDTD) programme of DST.
- Dr Harikrishnan S is continuing as the chairman of the Local Advisory Committee (LRAC) of Multi–Disciplinary Research Unit in Govt Medical College, Trivandrum, which is under the ICMR.

Faculty

Dr Harikrishnan S, Professor Senior Grade and Head

Dr Bijulal S, Professor

Dr Sanjay G, Professor

Dr Abhilash S P, Professor

Dr Ramya Das Assistant Professor

Dr Sravan Kumar G, Assistant Professor (till August 2024)

DIVISION OF CARDIAC ELECTROPHYSIOLOGY

Brief overview about the Division:

The EP division of the institute has been recognized at international level in the evaluation and treatment of cardiac arrhythmias for its clinical, academic and research activities. The Division of Cardiac Electrophysiology (EP) at SCTIMST is one of the premier services of its kind in the country devoted to the care of patients with abnormalities in heart rhythm. The division takes care of patients at risk for sudden cardiac death and patients with heart failure patients who may potentially benefit from device—based therapy as well. The division of cardiac electrophysiology offers a full range of diagnostic and therapeutic services from common to extremely complicated and life—threatening arrhythmias.

Activities:

Clinical Activities

The Cardiac Electrophysiology division undertakes more than 900 procedures annually. Catheter guided electrophysiology testing and radiofrequency ablation is provided to patients with various cardiac rhythm disorders like atrioventricular re—entry (AVRT), atrioventricular nodal re—entry (AVNRT), atrial tachycardia, atrial flutters, cryoablation for atrial fibrillation, and ventricular tachycardias. The procedures are supported by a dedicated Cardiac electrophysiology laboratory with state—of—the—art 240—channel intracardiac ECG monitoring system (BARD—EP LAB SYSTEM PRO) system) and the 3D Electro anatomic mapping system (EnSite system). SCTIMST is one of the leading centres in the country for advanced 3D electro anatomical mapping facilities for arrhythmia management with an annual turnover of over 150 cases being done using this facility.SCTIMST EP division has one of the largest experiences in the country in managing paediatric arrhythmias.

Apart from routine dual and single chamber pacemaker implants, the division has significant expertise experience in conduction—system pacing. The division regularly performs intracardiac cardioverter—defibrillators for recurrent ventricular tachycardias not amenable to radiofrequency ablation and biventricular pacing (cardiac re—synchronization therapy) for congestive heart failure.

Physiological pacing programme: This is a treatment modality introduced worldwide less than half a decade ago. The division has performed more than 180 cases so far. A multicentre project on physiological pacing involving a few centres in Kerala is underway with Dr Narayanan Namboodiri as the principal investigator. Cryoablation programme: This is the novel therapy for treatment of atrial fibrillation. This therapy has helped 95 patients with refractory arrhythmia in three years. SCTIMST, Trivandrum is the largest single in public sector in the country to have a cryoablation programme now.

The pacemaker follow—up clinic is being run on Tuesdays and the complex devices and arrhythmia clinic (CDAC) on Thursdays to ensure meticulous programming of these devices to ensure optimal clinical utility and battery management.

Apart from these, the electrophysiology division maintains a non-invasive cardiac laboratory which has a 24-hour Holter System with advanced features. The division also gets referral for Head-up-tilt-table test (HUTT), an essential test in the diagnostic evaluation



of syncope. The additional diagnostic evaluations in the electrophysiology lab include assessment of sinus nodal and AV nodal functions, assessment of inducibility of ventricular tachycardia, drug challenge (flecainide, adrenaline etc.) tests for channelopathies, autonomic function tests and implantation of loop recorders.

Specialty OPD services

The EP division undertakes treatment of patients with diseases of heart rhythm and conduction system and for evaluation and management of patients having syncope (transient loss of consciousness of cardiovascular origin). The division also gets referrals for management of arrhythmias in the foetus and expecting mothers.

- Comprehensive Device and Arrhythmia clinic dedicated to optimization and follow up of patients with complex cardiac devices like CRT, AICD conduction system pacing and combo device
- EP clinic and VT clinic are the new arrhythmia clinic for review of patients with complex arrhythmia. They run on Thursday in speciality clinics.
- Periodic ECG forums, journal clubs and problem oriented discussions are being conducted regularly.
- EP division also actively participates in weekly MRI meet.

Academic activities

- 1. Post–Doctoral Fellowship in cardiac electrophysiology: one year programme after completion of DM/ DrNBCardiology. The program involves hands–on training in all diagnostic aspects of adult and paediatric cardiac arrhythmia, interventional electrophysiology and pacing. SCTIMST is the first centre to initiate a dedicated cardiac electrophysiology fellowship programme with more than 20 Fellows practising or leading their divisions in India / abroad. This is the largest number for any dedicated fellowship programme in any cardiac subspeciality in the country.
- 2. PhD scholar in genetic cardiac arrhythmia

The division conducts dedicated academic sessions on EP and devices for DM cardiology residents and fellows every Friday.

Research Programmes

- Cardiac Channelopathies— Genotype and phenotype correlation, recognition, family screening and optimal management. ICMR funded ongoing study under ICMR task force
- Cardiac Conduction system pacing registry (multicentric extramural funding)
- Effect of Yoga in cardiovascular risk factors, heart rate variability and Framingham score – a community–based study. Funded by DST under Satyam project
- Image integration: Fusion of 3D electroanatomic mapping systems with cardiac MR/CT acquired images.
- Impact of High rate atrial events noted in cardiac implantable electronic devices (CIEDs) in stroke risk
- Incremental benefit of double sequential defibrillation over conventional approach in restoration of sinus rhythm in patients with atrial fibrillation.
- Clinical impact of cardiac MRI in evaluation of non-ischemic cardiomyopathy diagnosis and management.
- Post-atriotomy atrial tachycardias— delineation of the electrophysiological characteristics of complex re-entrant circuits
- Cryoablation registry (extramural funding approved; being initiated)
- Stereotactic beam radiotherapy for treatment of VT (Funded by IHRS; extramural funding approved; being initiated)
- AF registry (follow up evaluation of Kerala AF registry)
- Rheumatic atrial fibrillation— epidemiology, rhythm vs. rate management, electrophysiological characteristics

Staff details:

Faculty

DrNarayanan Namboodiri–Professor, Program incharge for EP fellowship



Dr Abhilash S P – Professor Dr Jyothi Vijay M S –Assistant Professor Dr Saikiran K (Assistant professor ad hoc)

Division of Paediatric Cardiology

Brief overview

The Paediatric cardiology division is the most sought–after hub of care for children with various cardiovascular ailments and patients with congenital heart diseases in the state and neighbouring areas. We offer a one–year postdoctoral fellowship program in Paediatric Cardiology. The division offers foetal echocardiography and follow up of high–risk foetuses with structural heart diseases and cardiac dysrhythmias. The division does an average of 400 paediatric cardiac catheterizations and interventions annually, which is one of the largest in the government sector in India. The division works in close harmony with Congenital Heart Surgery division of Cardiac Surgery for hybrid interventions, comprehensive postoperative care and long–term rehabilitation of children with complex congenital heart diseases.

Activities of the Division

Clinical activities

The division of paediatric cardiology attends to children with heart diseases on all days of the week. We also run weekly Fontan clinic, grown—up congenital heart disease clinic, newborn—infant clinic, paediatric cardiology clinic, foetal cardiac clinic, and paediatric heart failure clinic. The division performs on an average, 400 cardiac catheterisations and interventions annually. Complex interventions like right ventricular outflow

tract stenting, patent arterial duct stenting, stenting of coarctation of aorta, closure of portosystemic shunts are also done. The division also performs several hybrid cases in collaboration with the paediatric cardiac surgical team. Foetal cardiac services is an established modality in the division with second and third trimester foetal cardiac imaging, counselling, and foetal arrhythmia management.

The paediatric cardiology division performs complex transthoracic, transoesophageal and foetal echocardiographic imaging for structural heart disease. Approximately 200 echocardiograms are performed in paediatric cardiology division weekly. The division conducts daily ward and CCU rounds with bedside training to the residents. The division conducts weekly paediatricforums for training residents. We also conduct twice weekly joint surgical conferences with the paediatric cardiac surgeon and the cardiac radiologist as part of providing heart team approach to managing congenital heart disease.

Academic activities

- Post–Doctoral Fellowship in paediatric cardiology: one year program after completion of DM/ DrNB Cardiology.
- 2. DM in paediatric cardiology Started in 2024.

Numerous didactic lectures were delivered inside and outside the institution. We also participated in Departmental, institutional, programs sponsored by National Associations and other educational Institutions. Mentorship & guidance were provided to students for thesis work.







New initiatives:

- a. The division started a formal paediatric heart transplantation program. The division actively worked up the recipient and was an active part in the first paediatric heart transplantation at SCTIMST in July 2024. This was the first paediatric heart transplantation in the state and received several accolades. A paediatric heart transplantation team is now established at SCTIMST.
- b. Percutaneous pulmonary valve implantation was established as a routine intervention in the department with substantial increases in the number of cases. The department successfully completed 21 transcatheter pulmonary valve replacements (TPVR). We were the first institute under the government sector in India to implant two self–expanding valves (Harmony).
- c. Percutaneous treatment for sinus venosus defects was initiated in the department in 2024.
- d. The Fontan clinic at SCTIMST is now a well—established multidisciplinary clinic. The version 2 of Fontan clinic protocol was released in 2024. Over 500 patients post Fontan completion are now being followed up at this clinic. The Fontan patient support group "Chitraspandanam" is functional and serves as a medium for guidance and education for care providers and patients alike. Several research projects have been initiated as part of the clinic.

Research initiatives:

The division initiated the Thiruvananthapuram low-birth-weight birth cohort collaboration with CDC, funded by the ICMR. Dr Arun Gopalakrishnan is the PI of this study titled "Adiposity gain, and early adiposity rebound in low-birth-weight children and its association with cardio metabolic risk, cardiac structure, and cardiac function in children at 2-years in Kerala: A birth cohort analysis". The MoU of this study was signed by the Director, SCTIMST and Director, CDC on the 27th of May 2024. The study is set to be a benchmark in the country in early screening and identification of cardiometabolic risk factors in infants and toddlers.

- ii. Centre of Excellence for Minimally Invasive Cardiovascular Devices – collaborative project with BMT for development of devices for use in congenital heart diseases. Dr Arun Gopalakrishnan is the clinical PI
- iii. Reconstruction geometry optimization and methodology development for surgery planning of children suffering from single ventricular heart disease, using computational fluid dynamics evaluation for patient—specific vascular model acquired by MRI scanning.
- iv. Echocardiographic left ventricular dimensions in predicting pulmonary systemic flow ratio in patients with ventricular septal defects.
- v. Effect of exercise training on 6-minute walk distance and quality of life in patients with Fontan circulation a single centre observational study.
- vi. Correlation Between Hepatic Stiffness and Exercise Capacity In Patients with Fontan Circulation, A Single Centre Cross Sectional Observational Study vii. Left and right atrial strain in secundum atrial septal defects and early changes after defect closure.
- viii. 4D quantification of right ventricle in TOF post–ICR patients by echocardiography and its correlation with cardiac MRI: A single–centre observational study.
 - ix. Experience with the use of Occlunix septal occluder for closure of Atrial septal defect in a tertiary care centre of South India.
- x. Experience with the use of Floret septal occluder for closure of atrial septal defects in a tertiary care centre of south India.
- xi. Long-term outcomes of atrial septal defect closure in adults older than 50 years
- xii. Correlation of ECG and CXR with MRI volumes in repaired TOF patients.
- xiii. Correlation between echocardiographic left ventricular size to Qp/Qs derived from cardiac catheterization in patients with isolated ventricular septal defects.



- xiv. Coagulation profile in children with cyanotic congenital heart diseases after initial surgical palliation.
- xv. Outcomes following pulmonary valve replacement after repaired Tetralogy of Fallot.
- xvi. The efficacy and safety of Dapagliflozin in paediatric heart failure
- xvii. Safety and efficacy of Sacubitril/valsartan for systemic right ventricular dysfunction a single centre study

Events Organized:

- a. The department organized a workshop on implantation of self–expanding percutaneous pulmonary valve with international and national faculty. We also successfully implanted two self– expanding valves (Harmony). We were the first institute under the government sector in India to implant this valve.
- b. The division organized a complex structural heart disease workshop on 14th November 2024 at Cardiology Cath lab, SCTIMST. Guest faculty: Dr Do Nguyen Tin, Ho Chi Minh City 1, Vietnam. Interventions conducted pulmonary AV malformation device closure, coarctation stenting, Abernethy malformation device closure, ASD device closure with deficient rims.
- c. Dr KM Krishnamoorthy, Dr Deepa S Kumar and Dr Arun Gopalakrishnan proctored an adult congenital heart disease workshop at the Cardiac

- catheterization laboratory at Government Medical College, Thiruvananthapuram on 31st August 2024. Interventions guided: ASD device closure, VSD device closure, paravalvar leak device closure.
- d. Dr Arun Gopalakrishnan and Dr Harikrishnan S organized the Heart Failure Masterclass 2024, an online nation—wide teaching program for Cardiology residents, on behalf of Heart Failure Association of India (HFAI). Ten sessions were held last year.

Staff details:

Faculty

- 1. Dr Krishnamoorthy KM: Senior professor of the division of paediatric cardiology.
- Dr Deepa S Kumar: Additional Professor, Division of Paediatric Cardiology
- 2. Dr Arun Gopalakrishnan: Additional Professor, Division of Paediatric Cardiology

Technical staff

Suji K – Scientific Officer, Cath Lab

Resmy PV – Sr Technical Assistant, Cardiology

Sheeja S – Sr Technical Assistant, Cardiology

SethuParvathy VK – Sr Technical Assistant, Cardiology

Midhun SV-Sr Technical Assistant, Cardiology

Princy V – Technical Assistant B Cardiology

Athira AT – Technical Assistant A Cardiology

DEPARTMENT OF CARDIOVASCULAR AND THORACIC SURGERY

The department has three divisions namely Paediatric Cardiac Surgery, Adult Cardiac Surgery, and Vascular and Thoracic Surgery.

The department is the largest unit in the state performing over 2000 cardiovascular surgeries in a year and managing around 6000 preoperative and postoperative cases in the outpatient department. The department runs Mch CVTS and Mch Vascular Surgery residency programs in addition to the PG diploma in Clinical Perfusion program.

Activities:

Clinical Activities

The department has six operating rooms, 22 ICU beds and 12 intermediate care beds. It offers surgeries for complex congenital heart diseases, coronary heart disease, valve diseases and vascular pathologies minimal access cardiac including reoperations in both elective and emergency settings. The department performs over 2000 surgeries in a year. OPDs are run on all days from Monday through Friday. Surgeries are performed on all institute working days, the numbers varying from eight to eleven per day. Eligible patients are beneficiaries of social welfare schemes like PMJAY and KASP. The department has received licence for conducting heart transplantation and patient are being worked up for the same.

The surgeries being commonly done are

1. Adult Cardiac Division

- Coronary Artery Bypass Grafting On Pump & Off Pump – MICS CABG
- Valve Repairs and Replacements
- Surgeries for Aortic diseases like aneurysms and Dissections

- Surgeries for Infective endocarditis
- Redo cardiac surgeries
- Surgeries for Grown–Up Congenital Heart diseases
- Miscellaneous Procedures like HOCM surgeries, VSR and LV aneurysm surgeries, Pericardiectomies, Cardiac Tumours – myxomas, secondaries, angiosarcoma, Pulmonary thromboembolectomy.
- Minimally Invasive Surgeries CABG, Valve replacements.

2. Paediatric Cardiac Division

- Neonatal surgeries like Arterial Switch Operation, TAPVC Repair, Truncus Arteriosus Repair, Norwood operation for HLHS, BT shunt
- Complex congenital surgeries like Senning operation, Double switch, Ross operation, ICR, Fontan, AV Canal correction, BDG.
- Conduit repairs with Homografts like Rastelli operation

3. Vascular Surgery division

- Surgeries for Thoracoabdominal Aneurysms, Thoracic aorta
- Surgeries like Infrarenal abdominal aortic aneurysm, Aorto femoral grafts, Femoropopliteal graft
- Arch debranching and Hybrid TEVAR
- AV Fistula for Dialysis patients
- **4. Departmental facilities** include Dialysis Unit, Homograft Valve Bank, ExtraCorporeal Membrane Oxygenation (ECMO) and Nitric oxide (NO) ventilation







Heart Transplantation Program

First cardiac transplantation surgery at SCTIMST was successfully performed on 22/07/2024.

The recipient was a 14–year–old young girl with Dilated Cardiomyopathy and severe biventricular heart failure, requiring frequent hospital admissions. The donor was a schoolteacher, admitted in a city hospital with subarachnoid hemorrhage. Organ was allocated to SCTIMST by K–SOTTO, the nodal agency for organ sharing, Government of Kerala.

The child was discharged on 07/09/2024 and is doing well on follow-up.

Wet lab program for post graduate training was undertaken. Several observers from across the country visited the department for training in vascular surgery and cardiac surgery.

The department has been effectively running the homograft valve bank, ensuring the availability and successful implantation of homograft valves for patient care

Ongoing specialty Initiatives:

The Heart in Pregnancy Clinic was established to cater to the unique needs of women with congenital heart disease undergoing pregnancy, who are considered to be at high risk. This initiative represents a major step forward in providing safe, coordinated, and specialized management for this vulnerable patient group. The combined expertise of the SCTIMST – SAT teams will work to counsel, evaluate, categorize and formulate individualized treatment plans for these young women and also draft policies and guidelines for patient care for the community.

Minimal access cardiac surgery program – MICS CABG procedure started successfully.

Research Programmes

Extramural funded



Secend generation of TTK Chitra Heart Valve

Titanium Chitra Heart Valve Study (TC2) with Dr Vivek V Pillai as PI. The pilot human trial of the second generation of TTK Chitra Valve was completed successfully in 40 patients. Data presented at IACTSCON2025, New Delhi. Multicentre pivotal study is being initiated.



 Bioprosthetic Pericardial Heart Valve – With Dr Vivek Pillai as Clinical PI, animal trials with both proposed models are progressing successfully. The processes for patenting and technology transfer have also been initiated.



Bioprosthetic Pericardial Heart Valve

- 2. Alginate Dialdehyde Gelatin as a post–surgical adhesion prevention material in cardiac surgery Swine model, DURATION: 2 years, Funding agency: BIRAC, Funds received: INR 4904100
- 3. Effect and outcome determinants of Right ventricular function in post operative tetralogy of Fallot, a retrospective observational cohort study Duration: 3 years, Funding agency: ICMR, Funds received: 38.76 lakhs.
- 4. Vascular division has ongoing project on development of small diameter vascular surgery graft.

5. Collaborative programs with Department of biochemistry, Cellular Cardiology and Biobank.

Staff details:

Faculty

Dr Vivek V Pillai, Professor and Head of the Department

Dr Baiju S. Dharan, Professor

Dr Varghese T Panicker, Professor

Dr Sabarinath Menon, Professor (on leave)

Dr Bineesh K R, Additional Professor

Dr Sowmya Ramanan, Additional Professor

Dr P. Shivanesan, Additional Professor

Dr Renjith. S, Assistant Professor

Dr Prajna Bhargavi Kota, Assistant Professor

Dr Simon Phillipose, Assistant Professor

Dr Veena Vasudev, Assistant Professor

Technical Staff

Ms Beegum Thaslim, Senior Scientific Assistant (Perfusion)

Ms Maya I, Senior Perfusionist

Mr Sujith V M, Perfusionist – B

Mr Don Sebastian, Perfusionist – B

Mr Shanu P S, Perfusionist – B

Mr Rijesh S R, Perfusionist – A

Mr Sujesh S, Perfusionist – A

Ms Beena B Pillai, Transplant Co-ordinator – A

DIVISION OF CLINICAL ENGINEERING

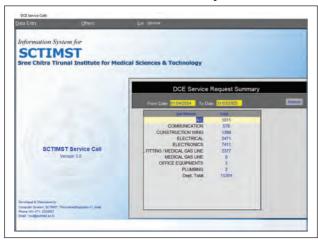
The Division of Clinical Engineering (DCE) is vital to the efficiency, productivity, and safety of the hospital. The Division assists in the daily operations of a healthcare facility and is responsible for implementing and managing technology—based projects from beginning to end. The Division ensured proper equipment management by promoting the use of a standard—based approach that imparts safer, efficient, and high—quality management of medical equipment.

Activities:

Service Activities

During the year, the Division extended its service to the Institute by successfully managing more than 15,000 work requests registered through the computerised complaint—management system. This included testing and certification of the newly—installed equipment, maintenance and repair of the existing equipment and infrastructure facilities and modification of electrical and air—conditioning systems.

The Mechanical Division is responsible for the



design, installation, commissioning, and maintenance of critical building systems, including Heating, Ventilation, and AirConditioning (HVAC), Medical Gas & Fitting Systems, and Pumping Systems.

The Electrical section is responsible for the operation and maintenance of all electrical systems across the hospital campus. It oversees power distribution, transformer substations, generator systems, UPS, and emergency power infrastructure to ensure uninterrupted power supply to critical areas. The division also manages preventive maintenance schedules, compliance with electrical standards, and energy efficiency initiatives. It plays a vital role in supporting the continuous functionality of life–support and diagnostic equipment.

- Operation and Maintenance of electrical infrastructure, including transformers, HT/LT panels, and power distribution systems to ensure seamless supply across the hospital.
- Maintenance and Support of Electrical Equipment used in critical departments such as CSSD, Laundry, Dietary, and Medical Gas Systems, ensuring operational efficiency and compliance.
- Management of Backup Power Systems, including DG sets and UPS units, to maintain power continuity in patient care and support areas during outages.
- Coordination with Utility Agencies and Regulatory Bodies for electrical load approvals, statutory inspections, and adherence to energy compliance norms.

DCE was actively involved the monitoring the work of the new Hospital Block infrastructure facilities. This included evaluation of works related to electrical power, air conditioning, medical gases, telecommunication, vacuum chute, etc. for the new hospital.



Training and academic activities

- Actively participated in the MTech. Clinical Engineering and other PG Diploma programmes.
- A significant number of apprentices with BTech, Diploma, and ITI qualifications were trained in the Biomedical, Electrical, and Mechanical Divisions of DCE. Many engineering students completed an internship in the Division.
- The Division provided technical support to many government institutions in Trivandrum, including the Regional Cancer Centre, Rajiv Gandhi Centre

for Biotechnology, Department of Physiology, JIPMER Puducherry, AIIMS—Patna,Institute of Advanced Virology, Government of Kerala. etc.

New Initiatives:

Commissioning of New Facilities, such as the PMSSY block, including end—to—end electrical installation, inspection, and system testing to meet clinical and regulatory standards. Biomedical/ Electronics, Electrical, and Mechanical subdivisions of DCE played a key role in the planning, designing, and execution of the infrastructure facilities at the PMSSY block.

Electrical Installations at PMSSY Hospital



High Tension 11 kV panel.



1600 kVA Dry-type Transformers



Low-Tension Electrical Panels



Chillers



Chilled water pumps



Cooling Towers



Condenser water pumps



Mechanical installations PMSSY Block-

The HVAC system in the PMSSY Block is designed with the following key components for efficient cooling performance:

• Chillers:

Three (3) water–cooled screw–type chillers, each with a cooling capacity of 375 TR (Total: 1125 TR). The chillers are of twin–screw configuration for enhanced reliability and performance.

Primary Chilled Water Pumps:

Three (3) variable speed primary chilled water pumps, one for each chiller, to optimise flow and energy efficiency based on real—time load demands.

• Cooling Towers:

Three (3) cooling towers with variable frequency drives are provided to reject the condenser heat. Each tower is paired with one chiller for dedicated operation and redundancy.

• Condenser Water Pumps:

Three (3) condenser water pumps, one per chiller and cooling tower set, ensuring consistent and efficient heat rejection from the condenser circuit.

 70 Air Handling Units, 57 Fan Coil Units and 51 Cassette Units.

Events Organised:

During the year, DCE organised 6 Colloquiums, various hands—on workshops (as part of the 'know your equipment series') for imparting advanced technical training on various medical equipment.

Staff details:

Faculty

Mr Shaj Upendran, Engineer 'G' & Acting Head Mr Manoj G S, Engineer 'D' Mr Anoop Jose, Engineer 'D' Mr Vishal V P, Engineer 'C' Mr Praveen James, Engineer 'C'

Technical Staff

Amalraj R (Technician (MRAC) – A) Anu A (Technician (MRAC) – A) Babu A (Sr. Technician (Electrical) – A) Deepak M L [Technician (Mrac) – A] Ganesh A [Sr. Technician (Mrac) – A] Gireeshkumar V.K. [Sr. Technician (Mrac) – A] Girishkumar K [Sr. Technician (Mrac) – A] Jinoy.S [Apprentice Trade – Mrac] Karthik K [Technician (Electrical) – A] Kiran R [Technician (Fitter) – A] Latheesh Kumar S. [Technician (Electrical) – A] Mansoor N A [Technician (Mrac) – A] Manu M.H. [Ir. Technical Asst. (Electrical)] Nandulal S. [Technician (Fitter) – A] Rahul G Dharan [Technician (Mrac) – A] Rajan V. [Unit Helper – B] Renjith Kumar R. [Technical Asst. (Electrical)—B] Saju S. [Technical Assistant (Electrical)—A] Sarath S.T. [Technician (Fitter) – A] Selastin A.J. [Technical Assistant (Electrical)—A] Shajimon P. [Jr. Technical Asst. (Electrical)] Shalin Raj M.R. [Technical Assistant (Telecommunication)–B] Shibu George [Sr. Technician (Electrical) – A] Sooraj S. S [Technician (Electrical) – A] Sreekumar B. [Junior Engineer (Electrical) – A] Sreelal S. [Technician (Electrical) – A] Subash S.P. [Technical Assistant (Telecommunication)-A] Suguna P B [Jr. Technical Asst. (Electronics) – A] Swamy S.S. [Jr. Technical Assistant (Mrac) – A] Unnikrishnan Nair G [Technician (Fitter) – A] Vijeesh T.K. [Technician (Electrical) – A]

Vishnu Swaroop S. V [Technician (Electrical) – A]

COMPUTER DIVISION

The Computer Division is an integrator for the total Information Technology (IT) infrastructure of the Institute. The Division provides IT services to the three wings of the Institute (Hospital Wing, Biomedical Technology Wing, and Achutha Menon Centre for Health Science Studies) and serves as a scientific, technological, and data resource for Academic, Administrative, Patient Care, Research, and Finance management. Division provides hardware and in–house developed software for various IT solutions. Data Centre of the Institute, which is maintained by the Computer Division, is built on the latest information technology with state–of–the–art infrastructure for housing various servers, storage, and networking equipment.

Routine Activities

- 1. Maintenance of all software, updating and developing new forms and reports.
- 2. Maintenance of Institute Web Sites (Intranet andInternet), site updates, and new web page development.
- 3. Network monitoring, management, maintenance, and new cabling work.
- 4. Tuning and backup activities of higher–end physical servers (18 numbers) & maintenance.
- 5. Tender publishing, activities related to the online recruitment of Staff and Students.
- 6. Updating and maintenance of all Portals and software platforms (Blood Donor, Vendor, Pension, Customer Service Cell for Testing and Calibration Services, Patient, Institute Digital Repository (DSpace), e-learning, Cloud Storage, Redcap data collection software, Email Server, VC Software, Openproject, Gateway Security, Backup Software, ODK, R Server etc).

- 7. Optical Mark Recognition (OMR) evaluation, updating software modules related to the recruitment of Senior Staff Selection Committee (SSSC) and Junior Staff Selection Committee (JSSC), Academic admissions, etc.
- 8. Report generation against various requests related to Audit, Research, IT Committee, and Department of Science and Technology (DST).
- 9. Hardware and software maintenance of Servers, Storage, Personal Computers, Routers, Switches, Scanners, and Printers, holding a remarkable uptime of 99.98% (Total 1779 devices).
- 10. Monitoring of Data Centre and Management of 18 Physical servers, Storage (350 TB x 2), Back up 400 TB, firewall / cyber security, etc.
- 11. Data backup, maintenance of data, and network security.
- 12. Monitoring e-payment status.
- 13. Monitoring of medical equipment integrated with the Electronic Medical Records (EMR), Surveillance, etc.
- 14. Work related to conducting Video Conference (VC) Meeting for various departments
- 15. Training for Apprentices, Staff and Students.
- 16. General help to staff, students on information technology–related issues.

New Initiatives

1. Launched web-based software for Accommodation Management related to all hostels and quarters of SCTIMST on 27.09.2024 (https://ams.sctimst.ac.in).



- 2. Launched web-based software SRC-IEC Reviewer for Institutional Ethics Committee and Scientific Research Committee on 21.06.2024 with options for online application submissions and online review (https://iec.sctimst.ac.in).
- 3. Re-launched web-based software for online Staff Recruitment on 19.06.2024 with all options for scrutiny, admit card, selection process, offer letters, etc. (https:/rect.sctimst.ac.in)
- 4. Hosted a new web page for the Centre of Excellence for Minimally Invasive Cardiovascular Devices.
- Developed software module for a neurology score sheet 'MG Activities of Daily Living (MG–ADL) profile' and implemented for the in EMR under service Neurology.
- 6. Implemented e—Office software and hosted it in the Institute Data Centre as per the approval dated 01.04.2024 and initiated training to all staff. Created LDAP local server setup for the two—factor user authentication (https://eoffice.sctimst.ac.in).
- 7. Completed the 10 Gbps LAN connectivity through Fibre between the PMSSY Block,

- AMCHSS, Block 1, Block 2, and Block 3. Completed the installation of core switches, floor switches, wireless controllers, access points, etc in the new PMSSY block.
- 8. Installed PC, Scanners, Printers, etc. at user sites for eOffice implementation.
- Conducted security audit VAPT and accessibility audit for all web applications of the Institute.
- 10. Completed major bid processing for the procurement of servers, storage, virtualization software, and database.

Staff

Dr Geetha, G. Scientist G (Sr. Grade)

Mr Suresh Kumar B, Engineer G

Mr Rejith L R, Sr. Programmer

Mr Saji K S, Programmer – B

Mr Manoj M, Sr. Technical Assistant (Computer) – B

Mr Anish R, Sr. Technical Assistant (Computer) – B

Mr Sakilnag P S, Sr. Technical Assistant (Computer) – B

Smt Aswathy D, Technical Assistant (Computer) – A

DEPARTMENT OF IMAGING SCIENCES AND INTERVENTIONAL RADIOLOGY

The department of IS and IR caters to the radiological needs of the institute. It runs separate DM programmes Neuroimaging and Interventional Neuroradiology, Cardiovascular imaging and vascular interventional radiology and a two year diploma programme [(Diploma in Advanced Medical Imaging Technology (DAMIT)]. There are seven permanent faculty, eleven technologists, 19 senior residents, six DAMIT students, four PhD/ Research fellows associated with the department. The department runs a teaching programme from 8 to 9am in the morning and is part of multi-disciplinary clinical meets with the Neurology, Neurosurgery, Cardiology and Cardiac surgery department. The department runs a separate OPD for interventional Neuroradiology and Vascular Interventional Radiology and has a dedicated ICU and ward for the patients undergoing interventional procedures

Activities:

Clinical Activities

About 916 patients were treated as inpatients (IP) and outpatients (OP) in the last year at the 253–bed hospital, and around 917 advanced interventional procedures were performed.

Procedures	Patient Volume
Interventional Radiology OPD patients	3000
Major and minor interventional procedures	800
CT scan	5000
MRI Scan	5800
Ultrasound Scan	3000
Xray	22000

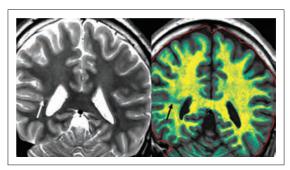
Research Programmes

New Initiatives:

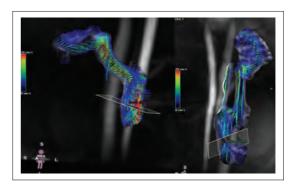
 The Institute signed an MoU with Digital University of Kerala, IISER, and CSIR-NIIST, Thiruvananthapuram, for working on medical imaging research.

New procedures started: –

1) Synthetic MRI



- 2) Resting state fMRI in Epilepsy
- 3) 4 D flow MRI imaging for abdominal applications



Events Organized:

a. The department held an International Radiology Day event on November 20, 2024, which included awareness sessions on radiation and MR safety, as well as a quiz for institute staff.





b. The national level Mid-term CME of the Indian Society of Pediatric Radiology was conducted by IS & IR department on 22–23 June, 2024 focusing on Paediatric Neuro and Cardiac imaging. The event was attended by more than 150 delegates from across India.

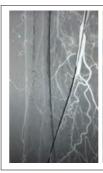


c. Hosted Kerala's first EHPVO Cholangioscopy Workshop for Interventional Radiologists on 28th November 2024, attended by IR's nationwide with faculty support from Dr Sanjay Baijal (Medanta, New Delhi).





d. A workshop on rotational atherectomy for peripheral arteries was conducted in the department, attended by approximately 20 delegates from across Kerala.





Staff details:

Faculty

Dr C Kesavadas, Professor and Head
Dr Bejoy Thomas, Professor
Dr E R Jayadevan, Professor
Dr Santhosh Kumar Kannath, Professor
Dr A Anoop, Additional Professor
Dr Jineesh V, Additional Professor
Dr Ajay Alex, Associate Professor
Technologists

Githakumari V, Junior Scientific officer Alex Jose, Sr. Tech .Assistant Sheeba Kumari R, Sr. Tech .Assistant Johnson C, Sr. Tech .Assistant Krishnakumar N, Sr. Tech Assistant Vikas K N, Sr. Tech Assistant Mahesh P S, Sr. Tech Assistant Joyi K, Sr. Tech Assistant Sandhya V S, Sr. Tech Assistant JijuJ J, Tech Assistant Pandi Meena N, Tech Assistant

DEPARTMENT OF MICROBIOLOGY

Services

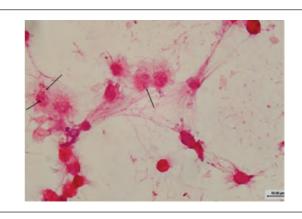
- a. Provide accurate and quick reports on all specimens sent to the Laboratory.
- b. Give a consultant clinical microbiology service.
- c. Antimicrobial and diagnostic stewardship.
- d. Liaison with Hospital Infection Control Unit'
- e. Outbreak investigation and containment using microbiological methods.
- f. Academic: PDCC course in Hospital Infection Control.
- g. Conduct training in infection control for all classes of staff.
- h. Observership programme for MSc students from other institutes.
- i. Enhance and support research activities of all wings of the institute.

Activities:

A. Laboratory Work:

- 1. Bacteriology/Mycology
- a) Infective endocarditis— There were 25 cases of infective endocarditis. Of these, five were prosthetic valve endocarditis (PVE). PVE was caused by E.faecalis, Staphylococcus sciuri, Candida glabrata, Candida tropicalis, and Candida parapsilosis. Causative agents of Native Valve IE wereone case of Abiotropha defectiva, MRSA, four cases of Enterococcus faecalis, five cases of alpha haemolytic streptococci, and three cases of Enterococcus faecalis. One case of Candida auris from pulmonary valve vegetation and one case of Beta haemolytic streptococci from the mitral valve of a rheumatic heart disease patient. No Gram—negative bacteria. Treatment was

- initiated based on our advice and monitored for any complications. This year, we have started team management of Infective endocarditis with members included from cardiology, radiology, ID physician, cardiac surgery, and Microbiology, with a total survival of 22 out of 25 cases. Surgical intervention was done successfully for six patients.
- b) Rare isolates from different specimens: Neisseria flava from a permanent pacemaker (done outside in 2011) lead, Candida auris from 8 samples, Streptococcus pluralimanium, Neisseria cineris, Burkholderia pseudomallei from a case of neuromelioidosis, two cases of Corynebacterium striatum infection, a case of Serratia fonticula, and two cases of Hemophilus parainfluenzae.



Burkholderia pseudomallei causing neuromelioidosis
– safety pin appearance in CSF

- c) Mycology: Total specimens 103. 32 samples yielded Candida albicans, tropicalis, glabrata, auris, parapsilosis, lusitaniae, Trichosporon asahii, and mycotoxinovorans
- d) Mycobacteriology: Total specimens: 107. Isolated *M.tuberculosis* from 4 samples Tissue from



Temporal lobe, cerebellum, left basal ganglia and sputum

- Serology Total: 4359, CRP–3753, Rheumatoid Factor 414, ASO 173, Syphilis treponemal antibody–46, RPR–43, Widal–9, Malarial antigen 3, Serum Procalcitonin(sepsis marker)–2879, Thyroid function tests:15367
- 3. Viral Serology– Number (positives): HIV 9721(10), HCV– 9721(27), HBsAg 9721(62)
- 4. Molecular Diagnostics –

RT-PCR: SARS CoV-2- 40(6 positives),1 sample each for HIV, HCV, and HBsAg

Panels-Multiplex RT-PCR-

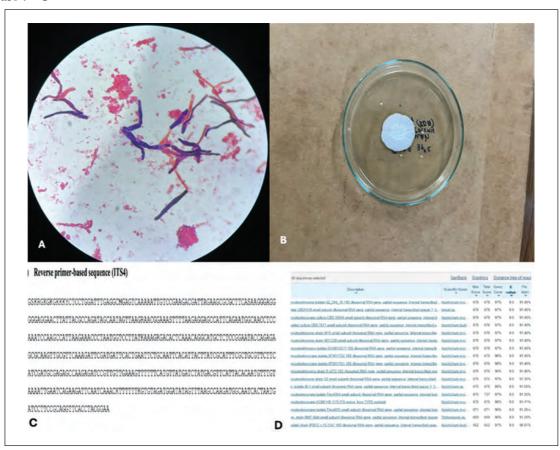
Neuro 9 –1

Tropical Fever Core – 8 (1 positive for Rickettsiae) Rapid Film Array (Chip Based multiplex) –

Meningoencephalitis panel with CSF samples from both inpatients and from other hospitals – 56(1 positive) – Cytomegalovirus

Respiratory panel with nasal/nasopharyngeal samples/sputum from both inpatients and from other hospitals – 35(13 positives) – Influenza virus AH3(4) and AH1 2009(2), Human Rhinovirus(4), Coronavirus HKU1, NL63, Mycoplasma pneumonia(2), Human metapneumovirus (1)

Sequencing studies— 3 sampleswere processed, identified as Apotrichium(2) and Cladosporium species (1)

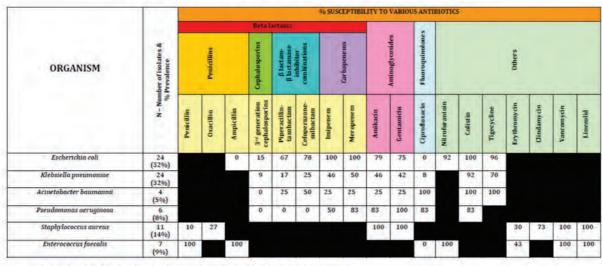


Grams stained smear showing fungal elements in blood culture; B. Fungal growth on culture medium (Sabouraud Dextrose Agar); C. ITS-4 based sequence obtained after Sanger sequencing; D. Blast result identifying the fungal isolate as Apiotrichum mycotoxinivorans

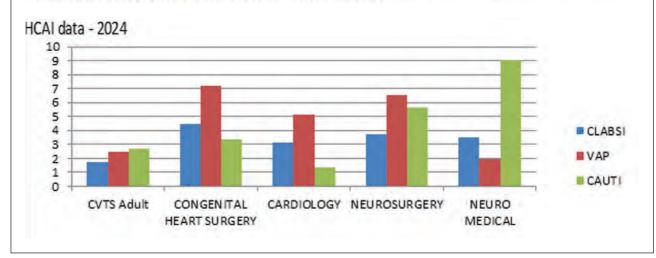


SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY

ANTIBIOGRAM OF CMICU & HFICU FROM 1st JANUARY 2024 TO 31st DECEMBER 2024



NB: Antibiogram of isolates less than 30 (N<30) may not be the true representative of the susceptibility pattern.



Homograft valve bank. As per the MOU with the Forensic Sciences Department of the Government Medical College, Trivandrum

Harvested – 20 (Pulmonary and aortic–10 each) from cadaver.

Implanted – 13 (Pulmonary–6 and Aortic–7)–by Congenital Heart Surgery Department

On March 31^{st,} 2025, 15 valves were stored in the bank.

B. Infection Control and Antibiotic Stewardship

Hospital Infection Control Committee meetings (2), ICT meeting (7) and link nurses meeting (8) were conducted during this period.

Healthcare associated infections surveillance data and the Antibiogram for the year 2024were presented at the HICC meeting in January 2025.

In-service training conducted

24 training sessions were conducted and a total of 604 healthcare workers were trained, including 50



doctors, 260 nursing officers, 10 technicians, and 284 cleaning attenders.

In-service training organised

- Biomedical waste Management –Two training sessions by Mr. Sujith L, Co–ordinator, IMAGE on biomedical waste management wereorganized.
- 2. Advanced instrument reprocessing was discussed by the resource person, Ms. Merlin Kuriakose, from ASP India Ltd.

Training conducted outside

- Preena.V(ICN) and Preethamol, senior nursing officer, CSSD, conducted 4sessions of trainingfor nursing students at Kerala State Women's Development Corporation
 - (KSWDC), through its finishing school, REACH is conducting 'Advanced Skill Enhancement

- Program in Nursing (ASEPN). Regarding central line care, intravenous medication administration, and peripheral IV cannulation, and its management.
- Preena.V (ICN) conducted a one day training on infection control and prevention for the nursing and technical staff of MBR Medical Trust Specialists' Hospital, Eranakulam

Training attended

 ICN was deputed for 7 days of training on Hospital infection prevention and control for nurses at CMC Vellore in the period from 09/09/2024 to14/09/2024.

Events conducted by the HICU:

World Hand Hygiene Day was conducted on May 5^{th} , 2024



Hand Hygiene Day, May 5th 2024









Hand Hygiene Day, May 5th 2024

Activities: Skill Training Workshop, Webinar on "Optimal humidity for ventilators to prevent VAP", Hand hygiene assessment, Assessment of cleanliness to award best Ward and ICU, Hand Hygiene teaching challenge, Case report competition, and video making competition

World Antimicrobial Awareness Week was celebrated from November18thto 24th 2024 (Fig). Badges were distributed to all staff and AMSP committee members, sparking curiosity and conversation. A striking poster campaign followed, bringing AMR awareness to the public through 30 posters in Malayalam, English, and Hindi, displayed prominently in patient waiting areas. A slogan competition was held with the theme "Impact of Antimicrobial Resistance on Public Health." On November 19, a public awareness video on antibiotic safety was released, created by a

spirited team from the Neuro–Medical ICU, under the guidance of Tisha K. Vijayan and direction by Shafi M. Akbar. In addition, there was a webinar, outreach programmes on Doordarshan and AIR, and a quiz open for all staff. Members of the Antimicrobial Stewardship Committee shared case reports from their clinical practice, painting a vivid picture of the challenges posed by resistant infections — and the critical importance of working together to overcome AMR.



World Antimicrobial Awareness Week (WAAW) 18th to 24th Nov 2024

Regular activities of antimicrobial stewardship and infection prevention were carried out throughout the year. There were no outbreaks, and any increase in any of the HCAI were quickly contained by appropriate measures.

C. Research Programmes

- 1. Dr Kavita Raja, Professor and Head
 - a. Co–guide for a study on the outcome of Infective endocarditis by DrMuzammil Lone, Cardiology DM Resident



 Co-guide for PhD project of Mr. Jeshurun, IIT, Chennai, on development of a rapid kit for IVD of Hepatitis B using microfluidics. One patent applied.

2. Dr Dinoop K P, Additional Professor-

Incollaboration with the Division of Molecular Medicine, BMT Wing, TRC projects (Clinical co–investigator):

- a) Principal Investigator (PI): Development of 2nd generation Chitra SARS-CoV2/Flu/ RSV multiplex RT-PCR kit for detection of treatable respiratory viral pathogens: Proof of concept, SCTIMST Technology Development Fund (TDF): Rs. 9.7 lakhs; July 2024 – June 2025
- b) Co–Investigator (Co–I): An isothermal platform–based fever panel for the detection of tropical fever etiology, Funded by DST–TRC: Rs. 24.5 lakhs; February 2024 July 2025
- c) Co–Investigator (Co–I): Rapid detection of viable pathogenic bacteria using nanosensors, Funded by DST–TRC: Rs. 10.6 lakhs: February 2024 – January 2026
- 3. Dr Jyothi EK, Scientist D:
 - a) TRC projects: Development of a Human Amniotic Membrane (HAM) Bank technology for Various Clinical Applications"; 2025–2026 extension
 - b) Collaborations with various faculty members of BMT wing for the analysis of antimicrobial properties of different polymers and other nanoparticles.

New Initiatives:

- a. Human Amniotic Membrane project initiated with IEC approval of both SCTIMST and Govt Medical College, Trivandrum

 — DrJyothi EK
- b. Virus Research and Diagnostic Lab(VRDL) sanctioned by DHR–ICMR and fund transferred Rs.19,710,000/– transferred including an annual grant of 46,40,000/– every year for the next 5 yrs (2024–2029) for staff salary and other consumables (PI–Dr Kavita Raja)–Visit to Instituteof Advanced Virology was undertaken to finalise the technical

details. Inspection by a Scientist from DHR and suggestions for the final plan given. Submitted to CPWD for estimate

- c. TDF sanctioned for DrDinoop KP- RT-PCR based respiratory panel
- d. MGU- Sequencing of unidentified fungi also started

3. Events Organized and Attended:

World hand Hygiene Day – May5th to May 9th 2024–Competitions for creating videos, case report presentation, best ward and ICU were conducted in addition to a workshop on skill training and a webinar on importance of humidification in ventilator care, to improve awareness regarding prevention and control of infections.

World Antibiotic Awareness Week – 18th to 24th Nov 2024, conducted quiz for all staff,

Staff details:

Faculty

Dr Kavita Raja, Professor and Head

Dr Dinoop KP, Associate Professor

Dr Jyothi EK, Scientist C

Technical

Smt. Soja Rani, Scientific Assistant

Smt.Smitha, Scientific Assistant

Sri. Ranjith, Technical Assistant (lab)

Smt. Cinta, Technical Assistant (lab)

Sri. Vishwanath, Technical Assistant (Lab)

Smt. Vandana, Technical Assistant (lab)

Smt. Anjana, Technical Assistant (lab)

Smt. Beena, Transplant Co-ordinator, Homograft lab

Unit Helpers

Smt.Reena, Unit Helper

Sri. Suresh, Unit Helper

DEPARTMENT OF NEUROLOGY

The Department of Neurology comprises multiple subsections which provide specialized and comprehensive care to patients with various neurological disorders. The Department conducts general neurology outpatient clinics daily from Monday to Friday, as well as weekly specialty clinics for review of patients under different subsections.

A total of49978outpatients were seen in general neurology, including43878 reviews and6100 new registrations. A total of 20953 patient visits were recorded across the various specialty clinics. The inpatient number was 4246 in 2024–25. The bed strength was 60, and the bed occupancy rate was 94.45%. There were 29 mortalities recorded in this period.

A new division, "Neuro-ophthalmology and Neuro-otology Division" and laboratory were initiated from 8 October 2025. A special clinic – NONO clinic – was also started for the specialized management of patients with neuro-ophthalmological and neuro-otological symptoms. An immunotherapy unit and immunotherapy committee were started in 2024 for streamlining intravenous immunotherapies.

The Department organized a postgraduate education programme titled Sree Chitra Outgoing Residents' Exam—Oriented Course (SCORE) on 8 and 9 March 2025. The case—based discussions were moderated by eminent faculty from all over the country and attended by more than 250 delegates.

The faculty and students of the department participated in many national and international conferences and received several prestigious awards during the last year. The Department continued to pursue major research projects and produce notable publications. The activities of the various subsections of Neurology in the last year are enumerated in the individual sections.

COGNITION AND BEHAVIOURAL NEUROLOGY

This section provides clinical services to children and adults with cognitive problems in disorders like mild cognitive impairment, dementia, epilepsy, Alzheimer's dementia, stroke, learning disability, developmental delay, and post–operative cognitive problems. It also provides advice and technical support to the Alzheimer's and Related Disorders Society of India (ARDSI), a voluntary organization that helps dementia patients and caregivers. The section also carries out clinical and basic science research in the field of dementia, cognition, and behaviour.

Activities:

The Division conducts a Memory and Neurobehavioral Disorders clinic (MNC) every week. In 2024-25, 680 patients were seen in the clinic. Cognitive retraining strategies for mild cognitive impairment (MCI) and dementia were regularly followed in the division, and cognitive retraining sessions were given for 51 patients. A comprehensive Cognitive Retraining manual was developed and validated, integrating key cognitive domains such as memory, attention, emotion processing, language, and visuospatial orientation. It is designed for use with individuals diagnosed with MCI due to Alzheimer's Disease (AD) and those in the early stages of AD.A home-based Cognitive Rehabilitation manual was also created and validated. It features simple exercises and lifestyle modifications that can be carried out at home with caregiver support, aiming to enhance the quality of life for patients involved in the study. A blood biomarker platform using Raman spectroscopy for the diagnosis of early dementia was developed and validated.

The faculty and project fellows/ staff delivered invited lectures and presented posters in national conferences.



Events Organized:

World Alzheimer's Day 2024 (21 September 2024):

In connection with World Alzheimer's Day 2024, a CME was conducted on the topic 'Controversies in Dementia Management' in SCTIMST (Figure 1). A patient and caregiver education programme was held on the same day (Figure 2).

Awards and Honours

Mr. Rajesh PG, Senior Research Fellow, CBNS, Department of Neurology has received the Best Poster award in Neurogenetics and Neuroimaging, for the work titled "Graph theoretical connectivity analysis identifies Hippocampus and Supramarginal gyrusmetrices as a diagnostic classifier of AD, MCI and healthy controls" at the Alzheimer's Association International Conference (AAIC) Neuroscience Next 2024: India Hybrid Hub held from 22nd to 23rd April 2024 at NIMHANS, Bengaluru

Mr. Rajesh PG, Senior Research Fellow, CBNS, Department of Neurology won the Best Poster award in Scientific Social Responsibility, for the work titled "Alzheimer's may challenge memory, but the ability to see joy in a happy face stands strong" at the 37th Kerala Science Congress held from 7th to10th, February 2025 at Kerala Agricultural University, Vellanikkara, Thrissur



Cognitive retraining session



Caregiver Forum in the World Alzheimer's Day 2024 programme

COMPREHENSIVE CARE CENTRE FOR MOVEMENT DISORDERS

The Comprehensive Care Centre for Movement Disorders (CCCMD) caters to patients with Movement Disorders. "Movement disorders" include Parkinson's disease, other conditions mimicking Parkinson's disease ("Atypical" and "Secondary" Parkinsonian conditions), various non-Parkinsonian tremor disorders and some conditions like chorea, dystonia, etc. Movement disorders occur when an area of the brain called the "basal ganglia" and its related structures are affected by any disease process. The CCCMD provides comprehensive medical and surgical care to patients affected with Movement Disorders and trains Neurologists in their diagnosis and management. The centre is also involved in research projects pertaining to Movement Disorders and R&D projects collaborating with the Biomedical Technology Wing of the Institute. The centre also offers PhD programs in research related to the pathogenesis and therapeutics of Movement Disorders and supports PhD programs of other departments, related to movement disorders. The centre also provides training to one post-doctoral fellow every year; the Post–Doctoral Fellowship (PDF) Program is offered to Neurologists for advanced training in diagnosing and managing Movement disorders. The centre also actively participates in research and has published nine scientific articles in indexed medical journals in the past year.

Activities:

The clinical activities of CCCMD include outpatient clinic services (A weekly movement disorders speciality clinic), a Deep Brain Stimulation (DBS) Programming Clinic, a Botulinum Toxin Injection Clinic, and a Movement Disorders surgical Program. During the year, 702 new patients with various movement disorders registered for the services of the section. There were 2940 review clinic visits by patients in the Movement Disorders Clinic and DBS follow—up Clinic taken together. In addition, 280 patients sought out—patient clinic review through the telemedicine facility. 144 patients visited for DBS programming and other surgical assessments.



There were 624 patient visits for Botulinum Toxin injections in the Botulinum Toxin Injection clinic. 24 functional neurosurgical procedures were performed, including deep brain stimulation surgeries and IPG replacements, for patients with Movement disorders.

The CCCMD is also involved in research in the field of Movement Disorders. It was a participating centre in an international multi-centre research project, funded by the Michael J Fox Foundation, USA, titled "Genetic Architecture of Parkinson's Disease in India." This is a Genome-wide Association study (GWAS) aimed at exploring the genetic factors predisposing to Parkinson's disease in the Indian population, and was the first of its kind from India, and was completed in the year. Around 20 centres were participating from across India to ensure a pan-Indian representation for the study population. Another externally funded project- "Spiral Dx- Tremor Diagnosis and Quantification using Artificial Intelligence"— is a multi-centre collaborative project funded by the Department of Biotechnology (DBT), Government of India. This project aimed to develop an artificial intelligence algorithm to identify various tremor subtypes easily, by analysing the characteristics of spirals drawn by the patients on paper / a digital surface interface device (a tablet computer) (Figure 4). This project was also completed in the year and the results were published in a high impact journal, "Movement Disorders" (with an impact factor of 8.7) A third project, funded by the Movement Disorders Society of India (Clinical Registry of Movement Disorders) is aimed at forming a systematic database of patients with Movement Disorders, to facilitate clinical research. Another project, Pan-India Registry of Progressive Supranuclear Palsy, was initiated (PAIR-PSP). This project aims at deciphering the clinical features, natural history, and genetic characteristics of the rare movement disorder, Progressive Supranuclear Palsy. This project is funded by the Michael J Fox Foundation through the Parkinson's Research Alliance of India; funding has been sanctioned, and the procedural formalities to receive funding are ongoing.

CCCMD also actively participated as the clinical collaborator for an R&D project for the indigenous development of the Deep Brain Stimulator System

for Movement Disorders. This project, funded by the DST, was carried out by the Biomedical Technology Wing of the Institute and was completed in the year. The Institute has invited expressions of interest from industry for technology transfer. Bhabha Atomic Research Centre (BARC) was also a collaborator for this project, providing technical support for the sophisticated electronic circuitry involved. The CCCMD is also involved in externally funded research projects, collaborating with the Biochemistry Department, and is aimed at addressing the pathogenic mechanisms and biomarkers of Parkinson's disease. A project titled "Identification and Characterisation of Ubiquitin and SUMO-modified exosome proteins from Parkinson's disease patients' blood" was funded by the ICMR and explored the potential of exosomal cargoes in blood as a biomarker for Parkinson's disease. A second project aimed at measuring glucocerebrosidase activity for monitoring lysosomal functions in Parkinson's disease is funded by ICMR and is ongoing.

Mr Vineeth Radhakrishnan, who was doing a PhD course in CCCMD, completed his project and was awarded a PhD degree in the year. His research project explored the connectivity between the basal ganglia and cerebellum in healthy subjects and the alterations in Parkinson's disease, using advanced functional MRI-based techniques (Figure 5) The results were published in a high-impact journal, Frontiers in Ageing Neuroscience. A second PhD student was working on an R&D project aimed at the development of Deep Brain Stimulation leads able to sense abnormal signals from the Parkinson's disease brain so that adaptive Deep Brain Stimulation could be given. He has completed the thesis. Two other PhD students, under the Biochemistry department, are working on exosomal cargoes as biomarkers for Parkinson's disease and metabolomic profiling in Parkinson's disease, respectively.

There are Institute–funded and several non–funded research projects which are ongoing, in addition to the externally funded projects discussed above. These include "Unravelling the clinical and genetic spectrum of Neurodegeneration with Brain Iron Accumulation" (SCTIMST funded) and the effect



of diabetes on manifestations of Parkinson's disease (SCTIMST funded). The non–funded projects address various aspects of movement disorders like surgical complications of Deep Brain stimulation, clinical profile and temporal evolution of isolated dystonia, pain as a non–motor symptom in Parkinson's disease, clinical evolution of functional movement disorders and impact of DBS on survival in Parkinson's disease.

New Initiatives:

CCCMD received a donation of Rs 1 Crore from the family of a patient, Sri AVS Iyer, who had been under treatment for Parkinson's disease for more than 10 years, underwent Deep Brain Stimulation in SCTIMST in 2015, and passed away five years later due to unrelated medical problems. The donation is primarily aimed at supporting the treatment of poor patients with Movement Disorders. The Governing Body of the Institute accepted the guidelines to use this fund, and the Institute started using the interest from the fund to support the treatment of poor patients with movement disorders, from March 2025 onwards.

Events Organized:

The faculty of CCCMD participated in online awareness programs for the public, in connection with the World Parkinson's Day (April 11). The faculty also delivered talks in Akashavani and Doordarshan in July 2024, in connection with International Brain Day.

Awards and Honours:

Dr Syam K served as a member of the executive committee of the Movement Disorders Society of India, a member of the CME committee of the International Parkinson and Movement Disorders Society, and an Associate editor of the journal, Annals of Indian Academy of Neurology, during the period.

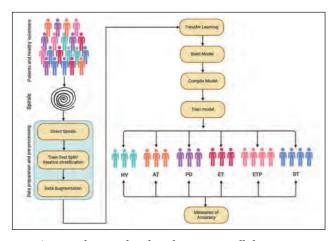
Dr Divya KP served as Movement disorders subsection editor for the journal Neurology India and represented India in the GP2 (Global Parkinson's Genetics Program) Regional Investigators Meeting in Kuala Lumpur, Malaysia held from 10–12th July 2024 .GP2 is primarily a collaborative initiative for genetic research in Parkinson's disease. Dr Divya also served as a Working Group Committee Member of GP2's Aligning Science Across Parkinson's (ASAP) Initiative.

Dr Asish Vijayaraghavan received travel grant award to attend the International Congress of Parkinson's disease and Movement Disorders, at Philadelphia (September 27– October 1, 2024) and present the research paper on "Deep Brain Stimulation Surgery—Hurdles and Maladies"

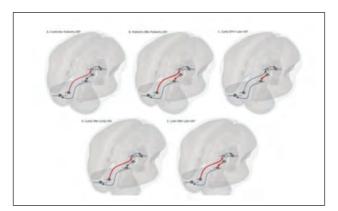


SCTIMST uses the latest developments in Deep Brain Stimulation technology, including leads capable of Directional Stimulation and sensing from the brain. The figure shows a C—arm fluoroscopic image of the directional DBS leads, located in the brain target, in a patient with Parkinson's disease (Image taken intra—operatively for confirmation of lead position, during a DBS surgery in SCTIMST)





A recently completed multi–centre collaborative research project (Participating centres– AIIMS, New Delhi, NIMHANS, Bangalore, and SCTIMST) examined how an artificial intelligence algorithm could be developed to differentiate various tremor disorders. This figure shows the Study design and methods of this project. AT, ataxia; DT, dystonic tremor; ET, essential tremor; ETP, essential tremor plus; HV, healthy volunteer; PD,Parkinson's disease. The results of the project were recently published in a high–impact journal, Movement Disorders, and this figure is reprinted from the publication.



A PhD research project undertaken in the Comprehensive Care Centre for Movement Disorders explored the connections between basal ganglia and cerebellum and how they were altered in different Parkinsonian states. This figure shows the changes in effective connectivity during different conditions for the cerebellum–basal ganglia network. Connections shown in red depict the significant changes during each condition.

COMPREHENSIVE CENTRE FOR SLEEP DISORDERS

Sleep division provides clinical services for outpatients with sleep disorders and runs a 2 bedded polysomnography lab and performs overnight sleep studies, CPAP titrations and multiple sleep latency tests. In addition, we provide comprehensive insomnia care including cognitive behavioural therapy (CBT–I) with the help of Neuropsychologist.

Activities:

Clinical activities include regular Outpatient services through Sleep clinic which is conducted once a week on Thursday afternoon for new and review patients with varying sleep problems–including obstructive sleep apnea, narcolepsy and insomnia. There were 197 new patients and 562 review patients in the Sleep Clinic in 2024–25. 173 polysomnography studies were also performed.

The Division initiated a study titled "Cardiac signals for sleep apnea prediction in stroke survivors", in collaboration with National Institute for Technology, Calicut (NIT–C). This study received funding from ICMR under small grant scheme 2024 for an amount of 57 lakh INR and the project duration is 3 years.

New Initiatives:

The Division procured an ambulatory level 2 PSG machine in March 2025 and have started offering ambulatory sleep diagnostic services to the patients.

COMPREHENSIVE NEUROINTENSIVE CARE PROGRAM

The division of the Comprehensive Neurointensive Care Program is an eight-bed Intensive Care unit setting well-equipped with ventilators and monitors for each bed. The services are aimed at the comprehensive management of neurological emergencies such as status epilepticus, neuromuscular emergencies (myasthenic crisis, Guillain Barre syndrome, etc), other immunemediated and demyelinating central and peripheral nervous system disorders, neuro-infections, coma of unknown origin, metabolic encephalopathies, and movement disorder emergencies. This subdivision has optimal facilities for therapeutic plasma exchange and other immunomodulatory treatments for autoimmune



conditions, continuous EEG monitoring, and aggressive seizure management protocols. The optimal functioning of the division is accomplished through the efforts of neurologists, neuro—anaesthetists, nursing staff, rehabilitation professionals, and other paraclinical and supporting staff. Beyond acute management, neurointensive care emphasizes early rehabilitation planning, psychosocial support, and family engagement.

Activities:

Clinical

In 2024–25, a total of 212 patients were admitted to the Neuromedical ICU, and there were 2 mortalities recorded.

Diagnosis of patients admitted to Neuromedical ICU

Condition	Number
CNS demyelination	40
NMOSD/MOGAD	17
MS	7
LETM	6
Others	10
CNS infections	10
Status epilepticus	4
Autoimmune encephalits	18
APLA Syndrome	1
CVT	3
Hypertrophic pachymeningitis	2
Developmental epileptic encephalopathy	6
CNS malignancy	5
Sepsis and septic encephalopathy	1
Myasthenia gravis	8
Guillain Barre Syndrome	21
CIDP	8
Myopathy	1
Others	84

Procedures performed and special therapies given in NMICU in 2024–25

Procedure/ Medication	Number
Therapeutic plasma exchange	53
Intravenous immunoglobulin	21
Rituximab	39
Tocilizumab	4
Cyclophosphamide	4
Ocrelizumab	3
Epidural blood patch	5

Research Programs:

The Division has 2 publications and two IEC approved research projects in the previous year. Mr Prajeesh P Prakash, nursing officer B, presented the research topic titled 'Factors Associated with Central Line–associated Bloodstream Infections with Special Reference to the Location and Duration of Central Line among Patients who Underwent Plasma Exchange Therapy in a Tertiary Care Hospital: A Case–control Study' at SINNCON 2024, Kolkata (72nd annual conference of neurological society of India) in December 2024.

New Initiatives:

NMICU staff prepared an educational video on 'hand hygiene' and a public awareness video on 'antibiotic resistance.'

COMPREHENSIVE STROKE CARE CENTRE

The comprehensive stroke care center provides comprehensive care for patients with stroke. It is a 11 bedded unit with seven ICU beds and four ward beds. It has state of art facilities which includes intravenous thrombolysis, mechanical thrombectomy, carotid endarterectomy and stenting, decompressive craniectomy for malignant stroke, and moya—moya revascularization surgery. The stroke team involves neurologists, neurosurgeon, vascular surgeon, neuroanesthesiologists, interventional radiologists, and cardiologist. Comprehensive rehabilitation is also provided in the unit.



Activities:

Research Activities

The Department has eight ongoing projects funded by the Indian Council of Medical Research and the World Stroke Organization, among others. One project on atrial cardiopathy in cryptogenic stroke was completed last year.

Clinical Activities

The routine clinical activities of the division are summarised below

Events Organized:

1. Asian Stroke Summer School 2024:

The Asian Stroke Summer School 2024, organized by the Comprehensive Stroke Care Program, Department of Neurology and the Department of Imaging Sciences and Interventional Radiology, SCTIMST, Thiruvananthapuram, and the University of Bern, Switzerland, was conducted from 11th to 14th July 2024 at O by Tamara, Thiruvananthapuram. Dr PN Sylaja, Professor of Neurology, Dr Jayadevan ER, Professor of ISIR, Dr Gralla, and Dr Urs Fischer from the University of Bern were the course directors. The 4–day teaching course was well received. WHO sent 22 participants from Sri Lanka, Maldives, Bhutan, Bangladesh, Myanmar, and Timor Leste for

this teaching course. The inauguration was presided over by Dr Sanjay Behari, Director, SCTIMST, and inaugurated by the Chief Guest, Smt. Veena George, Honourable Minister for Health and Family Welfare, Government of Kerala. Dr Chandrabhas Narayana, the esteemed guest and the Director of the RGCB, Thiruvananthapuram, was the guest of honor.

Clinical activities of the Stroke Unit in 2024–25

Areas / Procedures	No of Patients
Stroke Clinic Attendance (Direct)	3104
Stroke Clinic Attendance (Teleconsultation)	42
Stroke unit admission	489
Carotid Endarterectomy	26
Carotid Stenting	8
IV thrombolysis	21
Mechanical Thrombectomy	32
Moya-Moya Revascularization	36
Decompressive Hemicraniectomy	10
Hematoma Evacuation	4
Cerebellar decompression	3



Faculty of Asian Stroke Summer School 2024



2. Mission Stroke Programme

A mission stroke programme was conducted by the Comprehensive Stroke Care Programme, SCTIMST, in collaboration with the NCD division, Government of Kerala, Indian Academy of Neurology(IAN), and Kerala Association of Neurologists (KAN). In this ground-breaking move aimed at combating the devastating effects of stroke, Kerala has become the first state in India to launch the 'Mission Stroke' initiative. Aimed at raising stroke awareness, ensuring timely medical intervention, and enhancing treatment outcomes for stroke patients, the initiative has been rolled out in Pathanamthitta district. The programme was inaugurated on 7th September 2024, in Royal Auditorium Pathanamthitta by Hon'ble Health Minister of Kerala State, Smt Veena George, followed by the release of a brochure on Stroke awareness. Dr Reena K J, Director of Health Services, Govt of Kerala, presided over the inaugural meeting. Dr Sylaja PN, Professor, Department of Neurology, welcomed the gathering. Dr VG Pradeep Kumar, Joint Treasurer, IAN, spoke about the vision and mission of the programme. Dr Bipin Gopal Das, Deputy DHS, State NCD Division, Govt of Kerala elaborated on stroke care in Kerala. Dr Achal Srivatsava represented IAN, and Dr Suresh Kumar represented the KAN. The DMO, Deputy DMO, and Neurologist, Dr Stanley, Neurologist, District Hospital Pathanamthittawere also part of the program. The event was attended by a total of 350 nurses, health workers, and Asha workers,



Release of brochure on stroke awareness

3. World Stroke Day programme

The World Stroke Organization (WSO) observes October 29 as World Stroke Day every year with specific themes. This year the WSO campaign drew inspiration from the power of our brain's infinite connections, energy and capacity to overcome harnessing it to the emotional power of sport to show that as a team we have the power to be #GreaterThan stroke. For this purpose, a walkathon was conducted by the Comprehensive Stroke Care Programme, SCTIMST along with Sports cell, SCTIMST in association with the Lions International and ITEN runner's club on October 27th 2024. The walkathon aimed to raise the public awareness on prevention of stroke and its timely treatment. SriP.Vijayan, Additional Director General of Police flagged off the event at 6:30 am from Vivekananda Park, Kowdiar. There were more than 350 participants representing SCTIMST, Lions International and ITEN runners club. A public awareness session was conducted at Kanakakunnu Palace on stroke symptoms, prevention and its risk factors by Dr Sylaja PN and Dr Sapna Erat Sreedharan from the Department of Neurology followed by Dr Easwar H V from Department of Neurosurgery and Dr Ajay Prasad Hrishi from the Department of Neuroanesthesia of SCTIMST.



The flagging off of "Stride against Stroke"—Walkathon was flagged off by Additional Director General of Police Sri P Vijayan in Trivandrum district, Kerala.



NEUROMUSCULAR AND MULTIPLE SCLEROSIS DIVISIONS

The subsection caters to two broad and diverse groups of disorders, namely neuromuscular disorders (diseases of anterior horn cells, nerves, neuromuscular diseases and muscles) and acquired demyelinating diseases of central nervous system (multiple sclerosis and related diseases). The patient care services include a weekly Neuromuscular clinic, and a monthly Multiple Sclerosis clinic, and a Genetic Neuromuscular Clinic. The team also routinely caters to the care of patients with neuromuscular disorders and central nervous system demyelinating diseases admitted in the neurology wards and intensive care unit.

Activities

Clinical Activities

The Neuromuscular clinic functions on Tuesday of every week. In 2024–25, the clinic recorded 2961 patient visits. The Multiple Sclerosis (MS) Clinic recorded 58 patient visits, and the Genetic Neuromuscular Clinic (GENM) had 11 patients during the same period.

The summary of studies conducted in the electrophysiology lab in 2024–25 is given below.

Electrophysiological studies conducted in 2024–25

Study	Number
Nerve conduction studies	1422
Electromyography	641
Repetitive nerve stimulation	138
Single fibre electromyography	29
Visual evoked potential	339
Brainstem auditory evoked potential	50
Somatosensory evoked potential	98

Research Activities

The multicentric project 'Indian multiple sclerosis and allied demyelinating disorders registry and research network' funded by the Indian Council of Medical Research, was initiated in August 2021 and extended for one more year in 2024. The intramural funded project titled 'Mobile hoist with hoist—assisted wheel

chair' was funded by Technical Research Centre was completed with the development of a prototype in October 2024. The intramural funded PDF project titled 'Utility of motor unit number index for assessment of disease progression in Hirayama disease: A longitudinal comparative study' is ongoing.

The faculty and fellows participated in several national and international conferences in 2024–25. Dr Jemini George, PDF Neuromuscular Disorders, made three conference presentations during her tenure. Dr Puppala Sri Sai Srujana, PDF Neuromuscular Disorders, was awarded first prize for poster at the Advances in Pediatric Neuromuscular Disorders International Symposium in March 2025. Dr Sruthi S Nair, Additional Professor, attended a brief international observership in Italy in June 2024 on childhood neuromuscular diseases in Giannina Gaslini Institute, Genoa, Italy, through a competitive application via the Trialect exchange programme.

New Initiatives

A new sub-clinic entitled 'Genetic neuromuscular clinic' was initiated from March 2024 and is being conducted every fourth Tuesday. The purpose of the clinic is to streamline the multidisciplinary care for rare genetic neuromuscular diseases.

Events organized

The Division organized the Patient Awareness Programme for World Multiple Sclerosis Day held on 2 June 2024 in SCTIMST. The panel discussion, Challenges in multiple sclerosis – the way ahead, was attended by nearly 60 patients and their family members.



Panel members for the Multiple Sclerosis Day Programme conducted at SCTIMST in June 2025



PEDIATRIC NEUROLOGY AND NEURODEVELOPMENTAL DISORDERS DIVISION

The Pediatric Neurology & Neurodevelopmental Disorders subdivision is dedicated to comprehensive evaluation and management of children presenting with a spectrum of neurological conditions. A cornerstone of this subdivision is the Comprehensive Care Centre for Neurodevelopmental Disorders (CCCND), which offers multidisciplinary interventions for children diagnosed with Autism Spectrum Disorder, Attention Deficit Hyperactivity Disorder, Intellectual Disability, Cerebral Palsy, and related neurodevelopmental disorders. Specialty clinic focusing on autism and other neurodevelopmental disorders are conducted on the first and third Saturdays of each month. Furthermore, weekly Pediatric Neurology meetings are held to deliberate on the management of complex and rare neurogenetic disorders, fostering a collaborative approach to patient care.

The subdivision actively engages in research, with major areas including functional neuroimaging studies in autism spectrum disorders and neurogenetics. During the reporting period, two extramurally funded projects were undertaken, underscoring the subdivision's commitment to advancing research in pediatric neurological sciences.

Activities:

Clinical Activities

In 2024–25, 266 pediatric neurology cases were admitted to the inpatient ward, 450 cases were

evaluated in the autism speciality clinic, and 905 patients accessed services through the Comprehensive Care Centre for Neurodevelopmental Disorders (CCCND).

Research Programmes

Two extramural funded projects were conducted in the last year, and 8 articles were published, including major publications in genetics of leukodystrophy and neurodevelopmental disorders. Five scientific paper presentations were made at various conferences.

New Initiatives:

The Division created and validated the 'Indian Facial Emotion Database of 3D avatars (IFED–3D)', which has been funded by CSIR, DST. This database provides 90 facial emotion avatars expressing 6 basic emotions and neutral face (Figure 10). This database can aid the research on emotion recognition and advance the research in the field of cognitive sciences in India.

Events Organized:

A Parent awareness program titled "Social Empowerment of Children with Neurodevelopmental Disorders" was conducted on April 4, 2024, on the occasion of autism awareness week.



Representative images of IFED-3D



Participants of the patient awareness programme on neurodevelopmental disorders



R MADHAVAN NAYAR CENTER FOR COMPREHENSIVE EPILEPSY CARE

R Madhavan Nayar Centre for Comprehensive Epilepsy Care (RMNC) provides comprehensive care for all types of adult and paediatric epilepsies to patients from all parts of India and the neighbouring countries. It is the main Centre for epilepsy surgery in India and South-east Asia and offers world-class yet affordable comprehensive epilepsy care, comparable to any other centre in the world (Table 5). The mission of the Centre is as follows: (1) to provide comprehensive medical, surgical, psychosocial and occupational care for patients with epilepsy with a special emphasis on the surgical treatment of medically refractory epilepsies, (2) to undertake advanced clinical and basic science research in various areas of epilepsy, (3) to enhance epilepsy awareness among the primary care physicians and general public and (4) under the subsection of Kerala Registry for Epilepsy in Pregnancy (KREP) to address issues pertaining to women with epilepsy

Activities

The routine activities include two weekly specialty clinics, admissions to the epilepsy ward for video EEG, epilepsy care, and pre–surgical evaluation. Two or three epilepsy surgeries are performed every week, and patient management conferences are held every week.

During the year, the Centre completed 87epilepsy surgeries to become the first and only Centre in India to have completed more than 2700 epilepsy surgeries.

Summary of activities in RMNC in 2024–25

Procedure	Number
Video EEG monitoring	994
Epilepsy surgery	87
Electro Corticography(ECOG)	73
WADA test	1
Epilepsy clinic attendance (EP1+EP2)	5413
KREP clinic attendance	577
Epilepsy Ward admissions	273
Electroencephalogram (Outpatient)	4115

RMNC team continued its services in comprehensive epilepsy care. The Centre continued to perform short

term and long-term video telemetries and indoor ward admissions for comprehensive evaluation of children and adults with complex epilepsies. The reputed epilepsy surgery services were also continued with regular post operative follow-ups. Palliative vagus nerve stimulation and ketogenic diet services were also provided. Dedicated pediatric epilepsy services are provided on all Wednesdays, including ketogenic/ modified ketogenic dietary advice, genetic testing and genetic counselling for parents of children with complex epilepsies. The Kerala Registry for Epilepsy in Pregnancy (KREP) services also continued to deliver care to women with epilepsy and monitored children born to these women from a clinical and developmental perspective. The centre is also involved in training, academic activities and research projects of post doctoral fellows in epilepsy and senior residents in neurology.

Events organized

National Epilepsy Day 2024

R Madhavan Nayar Centre for Comprehensive Epilepsy Care (RMNC), Department of Neurology, Sree ChitraTirunal Institute for Medical Sciences and Technology, Trivandrum celebrated National Epilepsy Day 2024 on 18th November 2024 with Patient Interactive Programme at Auditorium—2 of the hospital. Introduction to National Epilepsy Day was given by Dr Ashalatha Radhakrishnan, Professor and Incharge of RMNC, Neurology. Epilepsy Awareness session was conducted by RMNC Multidisciplinary team members. Ms.Lincy Philip, Occupational therapist gave talks on "Occupational issues in patients with epilepsy", Ms. Vipina V P. Speech therapist, talked on "Speech and language disorder in children with epilepsy -how to manage?", DrVishal M V, Medical social worker, talked on "Social work interventions for patients with epilepsy", Ms.Jayasree P, Senior Nursing officer, talked on "First Aid during a seizure", Mr. Pradeep M, Technical Assistant, talked on "Importance of day EEG in patient with epilepsy". Also conducted a Poster Display, Music and Essay competitions for Patients, Staff and Students. Prizes for the winners were on the ceremony distributed by DrRamshekhar N Menon. Professor, Neurology. All the participants were given a brochure regarding epilepsy care. The programme was attended by over 70 people, including patients, their caregivers, staff, and students.





National Epilepsy Day 2024 activites

Staff details

Faculty

Dr Ashalatha R, Professor and Head

Dr Sylaja PN, Professor

Dr Sajith S, Professor

Dr Syam K, Professor

Dr Ramshekhar N Menon, Professor

Dr Sapna Erat Sreedharan, Professor

Dr Ajith Cherian, Professor

Dr Sruthi S Nair, Additional Professor

Dr Soumya Sundaram, Additional Professor

Dr Divya K P, Additional Professor

Dr Asish Vijayaraghavan, Assistant Professor

Dr Kiren George Koshy, Assistant Professor

Dr Manisha K Y, Assistant Professor Ad Hoc

Technical

Ms Nandini V S, Junior Scientific Officer

Ms Preetha Govind G, Senior Technical Assistant

Ms Salini K R, Senior Technical Assistant

Mr Pradeep M J, Senior Technical Assistant

Ms Shana N Nair, Senior Technical Assistant

Mr Anees C A, Senior Technical Assistant

Ms Deepa Paul Miranda, Technical Assistant – B

Therapists

Mr Gangadhara Sarma S, Senior Psychologist

Ms Sushama S R, Psychologist – B

Ms Aswathy K, Psychologist – A

Ms Lincy Phillip, Senior Occupational Therapist

Dr Manju Mohan P, Speech Therapist – B

Ms Vipina V P, Speech Therapist –B

Ms Nayana L R, Speech Therapist – A

Social Workers

Ms Rekha M, Social Worker – B

Dr Remya M, Social Worker – A

Mr Renjith P K, Medico Social Worker – A

DEPARTMENT OF NEUROSURGERY

The Department of Neurosurgery provided comprehensive surgical services for brain and spinal tumors, skull base lesions (including endoscopic approaches), complex vascular conditions (including cerebral bypass procedures) and functional disorders such as epilepsy and parkinsonism.

The department successfully trained four residents, who completed the MCh Neurosurgery program, and four postdoctoral fellows, who completed fellowships in Cerebrovascular Surgery, Functional Neurosurgery, Spine Surgery, and Skull Base Surgery.

The faculty members were actively engaged at both national and international levels, being invited to deliver lectures at prestigious conferences and to serve as proctors in operative workshops conducted at leading medical institutions across the country. The department also hosted several national and international observers who visited to gain expertise in specialized areas of neurosurgical care, including surgical treatment of epilepsy and Moyamoya disease.

Activities:

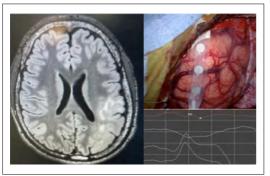
Clinical Activities— Patients requiring quaternary—level care in cerebrovascular surgery, functional neurosurgery, skull base minimally invasive surgery, neuro—oncology, and spine surgery received state—of—the—art neurosurgical management.

During the year, a total of 1,179 patients were admitted for various surgical procedures. The outpatient department recorded a significant increase in patient numbers, with 2,507 new registrations and 22,399 follow—up visits.

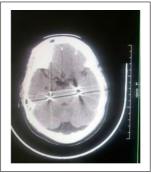
New Initiatives:

- An MoU was signed on November 6, 2024 between Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) and the Indian Institute of Space Science and Technology (IIST) to collaboratively conduct research focused on thermal comfort challenges faced by personnel in high-demand, critical environments. The partnership, outlined under the projects "Development of Mathematical Human Thermal Behaviour Model for a Reference Indian Subject" and "Evaluation of Thermal Comfort of Operating Theatre Personnel using Surgical Gown and Personal Protective Equipment," aims to break new ground in understanding and enhancing the thermal regulation and comfort of individuals exposed to challenging conditions. As part of this collaboration, a detailed discussion was held and later based on the MoU with IIST, the various aspects have been incorporated in the Space Medicine program of SCTIMST. Funding has been granted to IIST for procurement of equipment. Studies regarding the same will be undertaken in 2025 and 2026.
- A tripartite MoU was signed on 22nd November, 2024between Sree Chitra Tirunal Institute for Medical Sciences and Technology SCTIMST the Indian Institute of Technology, Madras and Shiv Nadar University, Chennai. The MoU aims to foster collaborative research under the project "Prediction of Stroke risk in Children and Adults using Radiological and CFD Simulation with clinical evaluation". Computational fluid dynamics and fluid structure interaction studies are being undertaken in collaboration with the partnering institutes.





SSEP Phase reversal central sulcus localisation



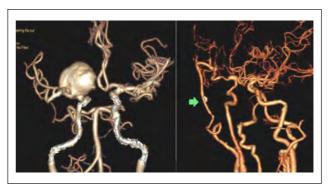
Bilateral hippocampal depth electrodes "Wasted hippocampal syndrome"



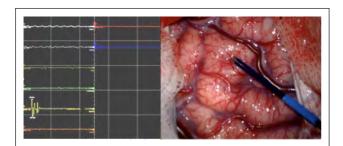
CT angiogram showing bilateral brain bypass surgrery done for Moyamoya angiopathy



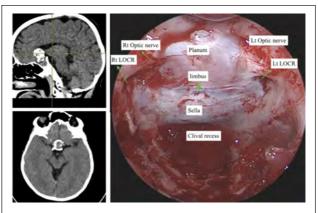
Awake brain surgery language mapping



A giant brain aneurysm treated by flow reversal using a rare internal maxillary artery - radial artery graft - middle cerbral artery bypass



Motor evoked potential



The endoscopic management of a craniopharyngioma showing the structures in the sphenoid





Educational CME: "The Chitra Neurosurgical Update 2024 was conducted on August 31st – September 1st, 2024. On this occasion, Prof. R. N. Bhattacharya, former Head of the Department, was felicitated in recognition of his outstanding contributions to the field of Neurosciences at SCTIMST."

Events Organized:

The department conducted educational CME: Chitra Neurosurgical Update 2024 on Aug 31– Sept 1, 2024

Staff details:

Dr Krishnakumar K, Professor and Head

Dr Easwer H V, Professor

Dr George C Vilanilam, Professor

Dr Jayanand Sudhir B, Additional Professor

Dr Prakash Nair, Additional Professor

Dr Ganesh Divakar, Assistant Professor

DEPARTMENT OF PATHOLOGY

The Department of Pathology has a central role at the Institute, providing laboratory and autopsy services, participating in academic activities and carrying out research on the diagnosis and causation of neurological and cardiovascular diseases.

Activities

I. Clinical Activities

The Department provides surgical pathology, cytology, immunopathology and autopsy services pertaining to neuropathology, cardiovascular and thoracic pathology to the clinical departments.

The clinical services provided by the Department during the year are summarized in the Table below:

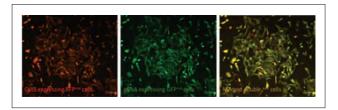
Category	Number
Surgical samples	1478
 Neurosurgical biopsies 	1067
 Cardiovascular & thoracic biopsies 	411
Muscle biopsies	35
Frozen sections	712
Cytology	35
Immunohistochemistry	6616
Haematology (peripheral smears)	
Molecular test (FISH for 1p/19q)	1
Immunopathology	7203
• ELISA	4300
 Indirect immunofluorescence tests Immunoblots 	1537
 CSF oligoclonal band assay 	1154
· CSI ougocionai bana assay	212

II. Research Programmes

Both extramural-funded and intramural-funded research projects were carried out during the year.

1. Functional study of IRF2BPL gene in human induced pluripotent stem cells (PI: Dr Divya M S, Funded by: ANRF-SERB)

Guide RNAs targeting the only exon of IRF2BPL were designed using bioinformatics tool, cloned into plasmids and clones obtained were confirmed by PCR and Sanger sequencing. For transfection, we used guide RNA plasmids expressing GFP and Cas9 plasmid expressing RFP. SHSY5Y cell line was double transfected with Cas9 and guide RNA plasmids. Cells were collected after 72 hours post transfection and colonies showing green and red fluorescence signals were sorted by FACS and expanded. We generated an IFRF2BPL knock out SHSY5Y neuroblastoma cell line, which can be further used to elucidate the potential mechanism(s) by which IRF2BPL regulates neurodevelopment and the diseaseassociated phenotypes upon its perturbation in vitro. The stable IRF2BPL-KO SHSY5Y cell line will be used for studying the effect of IRF2BPL gene knock out in neuronal differentiation and the data can provide insights into the potential mechanisms of neurodevelopmental disorders which will lead to in-depth mechanistic studies.



SH–SY5Y cells showing guide RNA expression (GFP positive) and Cas9 expression (RFP positive) after FACS sorting

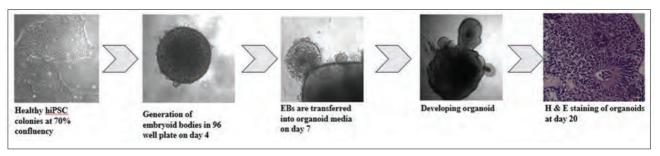
2. A novel approach for generation of cortical brain organoids without shaking (Dr Divya M S)

We standardized the protocol for the generation of cerebral organoids from human induced pluripotent stem cells (hiPSCs) and compared different cell



concentration and effect of shaking during the generation of organoids. For this, we first generated embryoidbodies (EBs) from different cell concentration, in a 96-well plate in complete E8 medium and refreshed the EBs to start germ layer differentiation and neural induction in neural induction medium for 1 week. After 1 week, we transferred the EBs into

organoid media and incubated for another 2 weeks. On day 18, we embedded the EBs into Matrigel to generate cerebral organoids exhibiting optically clear neuroepithelium buds. After embedding with Matrigel in the 6–well plate, the organoids will keep maturing. Organoids at different time points were collected for histological and molecular analysis.



Generation of cerebral cortical organoids from hiPS cells

3. Characterization of the biofingerprint of the histomolecular subtypes of adult– type diffuse gliomas using Raman spectroscopy (PI: Dr Deepti A N, Funded by: ANRF–SERB)

The project aims to correlate the molecular features of different types of adult—type diffuse gliomas like astrocytoma—IDH mutant, glioblastoma—IDH wildtype and oligodendrogliomas with their Raman spectroscopic features to investigate if the glioma subtype can be identified by intra—operative Raman spectroscopy. During the year, the protocols for Raman spectroscopy and molecular tests were standardized. PhD student and project staff recruitments are underway.

4.Comparison of Raman spectra of intracranial meningiomas obtained from snap-frozen tissue and formalin-fixed paraffin-embedded tissue: An exploratory study (PI: Dr Deepti A N, Funded by: TDF – SCTIMST)

The project aims to assess the utility of formalin–fixed tissue for Raman spectroscopic analysis. During the year, forty meningioma samples were collected. For each sample, Raman spectra were obtained from cryosection and formalin–fixed tissue pairs. Data analysis is underway.

III. Teaching and training activities

1. Interdepartmental teaching sessions (Neuropathology, Radiology–Pathology, Epilepsy–Pathology, Tumor Board): 68 sessions

- Neuropathology classes for DM Neurology senior residents: 16 sessions
- Pathology classes for MD Transfusion Medicine and Diploma in Medical Records students: 4 sessions
- 4. Teaching Biochemistry and Molecular Genetics as part of PhD Course Work
- 5. DM/MCh thesis co-guides: 1
- 6. PDCC (Neuropathology) guide: 1
- 7. PhD co-guide: 1
- 8. Project work of MSc students: 6
- 9. Internship training students: 1
- 10. Project Staff (JRF, Project Assistant): 2

IV.Science outreach activities

Dr Divya M S gave a talk titled "Women in STEM: Addressing the challenges and shaping the future perspectives from an early career researcher" as part of the International Women's Day Program at Government Women's College, Thiruvananthapuram.

New Initiatives

1. The department enrolled in the External Quality Assessment Programme for histopathology, Immunohistochemistry and Immunology.



2. Four new Immunohistochemistry antibodies for muscle biopsy diagnosis were introduced.

Events Organized

A one–day workshop on Molecular Biology techniques was organized by Dr Divya M S for BSc Biotechnology Students at Government College, Karyavattom, as part of ANRF–SERB Social Science Responsibility (SSR) Scheme.

Staff Details

Faculty

Dr Deepti A N, Additional Professor & Acting Head Dr Rajalakshmi P, Additional Professor Dr Divya Mundackal Sivaraman, Scientist C

Technical Staff

Mr James T, Junior Scientific Officer (Pathology) Ms Resmi S R, Scientific Assistant (Lab) Ms Sheeja M, Senior Technical Assistant (Lab) Ms Saritha Gopakumar, Technical Assistant (Lab) – B

DIVISION OF CELLULAR AND MOLECULAR CARDIOLOGY

The Division focuses on basic and translational research in cardiovascular biology and provides academic training to students. The current research focuses on cellular and molecular mechanisms involved in pathological remodelling of the heart post—cardiac injury, the role of cardiac progenitor cells and exosomal microRNAs in cardiac remodelling. During the year, the Division supported a DST—Inspire faculty, 3 PhD students, and 1 ICMR project staff in research and offered short—term training for thesis work in molecular cardiology and molecular biology techniques to several undergraduate and postgraduate students from Universities in Kerala and Tamil Nadu.

Activities:

The research activities of 3 different projects carried out at the Division of Cellular and Molecular Cardiology, led by Dr Neethu Mohan, are summarized below

a. Synthesis and characterization of ECM mimic—hydrogels to investigate cardiac fibroblast response

Our PhD student, Ms. Aswany MG, is focused on investigating the role of extracellular matrix in regulating the cardiac fibroblast response in 3D. Gelatin-methacrylate-based (GelMA) hydrogels of varying composition were synthesized and fabricated by UV-crosslinking in collaboration with the Biomedical Technology Wing, SCTIMST. Gelatin of varying bloom strength was combined with different volumes of methacrylate to synthesize hydrogels of different composition. GelMA was characterized using NMR, and the stability of the hydrogels was tested in vitro. Further, cardiac fibroblast spreading in hydrogel-coated plates was evaluated, and the study on the effect of varying stiffness on cells during cardiac remodelling is ongoing.

b. Phenotypic transition of c-kit cells

In an ICMR–funded study, our PhD student Ms. Indraja Devidasan elucidated the phenotypic transition of c–Kit+ cells in the myocardium in vitro from cells isolated from the mouse heart. The molecular mechanism by which the cells transition to myofibroblasts was elucidated by gene silencing using siRNA, protein activity inhibition using inhibitors, and overexpression of genes.

c. Studies on collagen receptor and its crosslinking agent to reduce cardiac fibrosis and adverse effects

Fibrosis is one of the major pathological consequences following cardiac injury, resulting in heart failure. In an ICMR-funded study, our PhD student, Ms. Sruthi Radhakrishnan, elucidated the molecular mechanism in regulating cardiac collagen crosslinking agent lysyl oxidase. Through in vitro studies in cardiac fibroblasts and a rat model of myocardial infarction, the molecular mechanism by which a matricellular protein, Periostin regulates lysyl oxidase was elucidated. This PhD thesis work was completed, and the results were published in the journal Cell Biochemistry & Function. Additionally, in collaboration with BMT Wing, in a rat model of myocardial injury, we investigated whether inhibiting the activity of a collagen receptor at critical time points during cardiac remodelling would ameliorate fibrosis and initiate a favorable cardiac repair.

d. Functional and regulatory role of exosomal



microRNAs from satellite cells overexpressing cardiogenic factors

This study of exosomal miRNAs led by Inspire Faculty, Dr Dhanya, is summarized below. Satellite cells, normally quiescent underneath the myofibre basal lamina, are skeletal muscle stem cells responsible for postnatal muscle growth, repair, and regeneration. Here, we isolated and cultured myofibres from TA and EDT muscles of mice under standardised conditions. We hypothesized that overexpression of the master regulatory transcription factors that control the gene networks can convert them into cardiomyocyte-like like cells after subsequent treatment with chemical defined media. Reprogrammed satellite cells exhibit spindle shape, enlarged and showed characteristics of myocardial cells in culture. Immunofluorescent analysis revealed the expression of cardiac markers, cardiotroponin 1 and ANP, was comparable to that of the cardiomyoblast cell line, H9c2. Expression of the cardiac–specific transcription factors and members of the myocyte enhancer family has been reported to mediate the activation of expression of markers of early, intermediate, and terminal cardiac cell differentiation in cardiac embryonic and stem cells. Moreover, several growth factors have been identified that play an important role in the initial induction of cardiac differentiation. However, the precise pathway of the molecular cascades stemming from these growth factors leading to cardiac–specific gene expression remains to be elucidated.

New Initiatives:

Events Organized:

Three scientific talks and interactions were organized by the Division by inviting international and national faculty





Talk by Dr Pradeep Punnackal

- a. Accelerating Next—Generation Therapies Through Generation of Tissue—Mimetic Microenvironments, Delivered by A.J. Mellott, Ph.D. CEO, & Co– Founder, Ronawk, Overland Park, KS, USA on April 24, 2024, at SCTIMST
- b. Cellular Mechanisms of Synapse Development in Neurons, Delivered by Dr Soham Chanda, Assistant Professor, Department of Biochemistry & Molecular Biology, Colorado State University, Fort Collins, Colorado, USA, on October 22nd, 2024 at SCTIMST
- c. Antiseizure Medications and Synaptic Plasticity in the Brain by Dr Pradeep Punnackal, Assistant

Professor, Department of Biophysics, PGIMER, Chandigarh on February 12th, 2025 at SCTIMST

Staff details:

Faculty

Dr Neethu Mohan (PhD), Scientist E & In-Charge

Technical

Ms Sunitha S, Technical Assistant Lab–B Mr Sharon B R, Technical Assistant Lab–A

Unit Assistant

Ms Sasikala V, Senior Unit Assistant

PAIN CLINIC

Pain Clinic at SCTIMST, functions as aunique model for patient care providing multidisciplinary services under one roof. The Pain Clinicians as a team are physically present in the same Consultation room, which helps with arriving at a fast clinical consensus. With its comprehensive patient initiatives for the past 13yrs, this clinic remains noteworthy even now, for the Pain services undertaken within the public-health sector domain of India under SCTIMST.

The team members help with facilitating all therapeutic decision making and subsequent execution of high skilled intervention and regenerative procedures. The following procedures are routinely done.



Images from procedures undertaken at Pain Clinic

Regenerative Prolotherapy: Platelet Rich Plasma (PRP) therapy using the patient's own blood component for regeneration healing involving degenerative musculoskeletal conditions.

Fluoroscopy guided: musculoskeletal interventions for nerve blocks and degenerative disc radiculopathy with chronic non-cancer pain conditions.

Ultrasound guided: regenerative intervention therapies and nerve blocks for chronic regional pain conditions.

Therapeutic infiltrations: Musculoskeletal facial plane infiltrations, plexus infiltration-interventions& trigger point injections.

Radiofrequency ablation: Cranial nerves ganglia and spinal nerve root and ganglions.

Epidural-Regional: Anaesthetic injections &Ozone Therapies.

Research and Technology: Development initiatives for unmet clinical needs involving industrial technology transformation under "Make in India", ongoing collaborations with Industrial Partners and various Institutions of National importance are being undertaken.

New initiative

Tata Elxsi under MOU with SCTIMST had provided a CSR Grant of Rs. 8.4 Lakhs per year, for 5 years (July 2024-2029) under the Clinical services Project mode: "Augmentation of the Prolotherapy services at the Pain Clinic."

Project with research grant 5years - Specialised Geriatric Care from the PAIN Clinicexclusively caters for the elderly patients with Chronic-Musculoskeletal degenerative non-cancerous Pain Conditions. This was initiated with grant of 31.25 Lac Indian Rupees from Kusuma Trust UK (2021-2026).

Activities

During the year 2024-2025, 2628 patient foot falls were catered under Pain Clinic (677)/GPCRIS (1951) OPD and Intervention suites, the details of which are provided in the table below:



Total Registered Patients in Pain Clinic & Geriatric Pain Clinic (GPCRIS)	2301
Procedure &outpatient (OPD) services	Total
Direct Outside–hospital Referrals to PAIN CLINIC	64
Direct Outside–hospital Referrals to GPCRIS	87
Review & Direct In–Hospital Referrals PAIN CLINIC	472
Review & Direct In–Hospital Referrals GPCRIS	882
Procedures count for services catered this annumunder PAIN CLINIC	141
Procedure count forservices catered this annum under GPCRIS	982

OPD & Intervention -

Pain Clinic multidisciplinary OPD

Pain ClinicFriday OPD offered services from 2:00PM onwards. Major interventions are performed in theDigital Subtraction AngiographyRadiology Catheterization Laboratory, slots scheduled as perperforming Interventional Pain Physicians.Minor interventions are performed in the OPD procedure room/observation room adjacent to the Cath-Lab and at Room 2103, 1st floor, Middle Block.

Geriatric Pain Care & Regenerative Intervention Services & OPD (GPCRIS)

Geriatric Pan Clinic OPD offer regenerative intervention consultation services on all working days from 8:00AM onwards at Room 2103, 1st floor, Middle Block. Geriatric Pain specialized Regenerative services, catersexclusively the elderly patients with chronic musculoskeletal non-cancerous pain. These specialized procedures are being provided on all working days, initiated with Research Grant from Kusuma Trust UKunder MOU with SCTIMST (2021-2026).



Lt. Col (Dr) Abhishek Shrivastava AMC, Dr Vignesh I, Senior Residents CTVA, Dr Nisha Ramakrishnan, Project Medical Officer, Geriatric Pain Clinic OPD -Regenerative services, are performing Minor Autologous regenerative interventions.

Awards & Honours.

1) Dr Subin Sukesan was invited as an expert faculty for Tech Talks and Mentorship programmes for Start-ups and as Nodal faculty for IIT Kanpur, involved in Clinical advisory panel member for industries with medical device development underIndian Council for Medical Research (ICMR) mPRiDE initiatives.

Patents, Technology development transfers and Research:

The various ongoing clinical services in Pain Clinics, have led to patent-filing for unmet clinical needs, with the related technology development &transfer to Industrial partners, undertaking of MOU's, device developments and the initiation of cooperation with other institutes.

Under MOU with IIT-K, Dr Subin Sukesan served as nodal officer to facilitate the formation of "With the will Teams" having core group of investigators, from both the institutions to work in specific areas of collaborations, for the execution of goal specific plans, developing indigenous medical devices, exchange of information related to projects of mutual interest, joint submission of proposals for funding, collaborative publications share faculty expertise with diverse modalities which were being undertaken.



Regenerative Pain clinicserviceswas involved with coordination pre-clinical research collaboration knowhow inputs with Prof. Dr Amitabha Bandyopadhyay, Department of Biological Sciences & Bioengineering IIT Kanpur, for regenerative therapies and newer medical device technology development with industrial translation needs. Collaborations are ongoing for Osteoarthritis Pain, regenerative autologous therapies, supporting Start-up industries, with undertaking of Tech-talks and clinical mentoring sessions for related medical device developments.



Health Tech Ideation Immersion on decoding entrepreneurship and opportunities in the health-tech sectorProf Dr Amitabha Bandyopadhyay with 1-yearfellows Mr. Ankush and Mr. Saksham from IITK after undertaking SCTIMST Clinical immersion.

Involvement with Health Tech Ideation & Innovation Programme of IIT-K, Pain Clinic manning Faculties Dr Subin Sukesan, Dr Saravanababu M. S., Dr Shrinivas V. G, Dr Prashanta Kumar Dash in collaboration with Er. Shaj Upendran, Head Department of Clinical Engineering (DCE), Mr. Praveen James, Mr. Manoj K andMr. Vishal was involved with engineering team students from IIT-K for the use of technology and skills intending healthcare benefitspromoting innovations and entrepreneurship for finding cures or improving the quality of life in patients.

Figure: Mr. Shaj Upendran & Mr. Praveen James with 1-year HII fellows Mr. Ankush and Mr. Saksham from IIT-Kanpur.

Regenerative Prolotherapy as a point of care affordable therapy are facilitated under Pain Clinic.

These are tailored as per the patient needs, along with the physical and supportive community rehabilitation therapies. Autologous PRGF-Prolotherapy routinely performed using the patient's own platelet rich plasma for chronic pain conditions, including osteoarthritis, rheumatoid arthritis, bursitis and chronic musculoskeletal pain conditions. This clinical service autologous blood product component processing collaboration from Departmentof Transfusion Medicine under Dr Debasish Gupta (Prof.& Head) and Dr Vinu Rajendran (Assistant Professor) with involvement from trainee MD students.

Faculty & Staff

Dr Subin Sukesan, Professor, In-charge.

Dr Shrinivas VG, Professor Senior Grade.

Dr Easwer HV, Professor, Department of Neurosurgery.

Dr Saravanababu M.S, Additional Professor, Department of Anaesthesiology.

Dr Prasanta Kumar Dash, Professor Senior Grade, Head Department of Anaesthesiology.

Dr Santosh K. Professor, Department of IS&IR.

Dr Jijo Varghese Assistant Professor (Adhoc) Physical Medicine & Rehabilitation.

Dr Suneel PR, Professor, Department of Anaesthesiology.

Dr Jayadevan ER, Professor, Department of IS&IR

Dr Jineesh V. Additional Professor, Department of IS&IR.

Dr Unnikrishnan K. P, Professor, Department of Anaesthesiology.

Dr Vinu Rajendran, Assistant Professor, Department of Transfusion Medicine.

Dr Biju Soman, Professor and Head AMCHSS.

Dr Mamatha Munaf, Assistant Professor, Department of Anaesthesiology.

DEPARTMENT OF TRANSFUSION MEDICINE

Division of Blood Transfusion Services set up in 1976 by Col Luxa of Armed Forces Medical Corps. First Blood Bank in the State to have Blood component separation facility in the 1980s. Since then, Blood Bank has grown into full–fledged Department of Transfusion Medicine.

Activities

Clinical activities/services

Achievements during this period include

- 85% Voluntary blood donation
- State of the art Equipment
- 100% Blood component separation facility
- Individual Donor Nucleic acid Testing for all donated units
- Apheresis facility
- Academic training MD Transfusion Medicine and Post graduate Diploma in Blood Banking Technology
- Research Collaborations with AMCHSS and BMT

Blood Centre Statistics	Apr 2024– Mar 2025
Number of Donors Registered	9576
Number of Donations	6423
Number of Outdoor Blood donation Camps	112
Apheresis Donation	34
Number of Blood Grouping	28467
Number of Cross-matching	9346
Immunohematology Workups (referral)	16
Autologous Transfusions	8
Platelet rich plasma therapy	524

Research Projects

Extramural Funded Projects -2

- Anusandhan National Research Foundation (SERB), Core Research Grant 20.56 lakhs) PI Dr Amita R
- Transfusion Medicine Academic Society, 40,000 INR (PI– Dr Amita R)

Outcome

- Publications 6
- Patents -2

Events organised/participated:

- 1. 14th June celebrated as World Blood Donors Day
- 2. 1st October celebrated as National Voluntary Blood donation Day
- 3. First National CME of Indian Society of Transfusion Medicine (11–12th July 2024)
- 4. Manpower training: September 2024 Dr Amita R was the resource person for the Laboratory Technician Training of Trainers, organized by National Blood Transfusion Council, DGHS
- 5. Media awareness talks:Talk on Akashavani
- 6. World Blood Donor Day –14th June 2024 by Dr Amita R
- 7. Apheresis blood donation –07 March 2025 by Dr Vinu Rajendran
- 8. Socio-cultural dynamics of Blood Donation 14th March 2025 by Dr Amita R

Contribution in Professional Societies:

- 1. Dr Vinu Rajendran appointed joint secretary of Transfusion Medicine Academic Society
- 2. Dr Amita R, Additional Professor appointed



- 3. Member of AABB Donor Hemovigilance Working Group
- 4. Member of Blood Donor Management Special Interest group of Indian Society of Transfusion Medicine
- 5. Member of International Society of Blood Transfusion (ISBT) Clinical Transfusion Working Party
- 6. Consultant for POL–APP for promoting voluntary blood donation, Government of Kerala

7. Subject Expert for HLL Management Academy, blood based invitro diagnostic kit development

Faculties:

- Dr Debasish Gupta Professor & Head (superannuated in March 2025)
- Dr Amita R, Additional Professor
- Dr VinuRajendran, Assistant Professor



National Voluntary Blood Donation Day



First National CME of Indian Society of Transfusion Medicine

BIOMEDICAL TECHNOLOGY WING



DEPARTMENT OF APPLIED BIOLOGY

The Department of Applied Biology plays a major role in the development and testing of medical devices as it offers medical device evaluation in compliance with International Standards such as ISO 10993 for biocompatibility, ASTM standards, OECD guidelines, and United States Pharmacopia (USP). Numerous tests conducted by the Department are on the ISO 17025 quality platform and have been authorized by COFRAC of France. These testing platforms are also offered as a service to external clients, such as International and Indian manufacturers of medical devices, and also for academic Institutes and researchers. Strong research foundations within the Department's Divisions have also led to the development of several technologies. Innovative research projects in the areas including memory and learning, stem cell therapy, 3D bioprinting, biomaterial-tissue interactions, materialcell microbiological interactions, alternatives to animal testing, and laboratory animal investigations are being carried out by the Department.

The Department of Applied Biology comprises the following Divisions (1) Experimental Pathology, (2) In–Vivo Models and Testing, (3) Laboratory Animal Science, (4) Microbial Technology, (5) Molecular Medicine, (6) Sleep Research, (7) Tissue Culture, (8) Tissue Engineering and Regenerative Technologies, (9) Thrombosis Research, and (10) Toxicology. The activities of the Division are described below

I. DIVISION OF EXPERIMENTAL PATHOLOGY

The division focuses mainly on (1) Development of biomedical devices and evaluation of biomaterials; (2) Consultancy services to internal and external researchers on all aspects of animal experimentation focusing on experimental pathology and (3) Disease/health monitoring of laboratory animals.

Apart from this, the Histopathology laboratory is a CDSCO–approved Medical Device Testing Laboratory and has been maintaining COFRAC accreditation since 2002. Histopathology lab has infrasture to undertake routine as well as a wide range of specialized techniques for evaluation of biocompatibility of various biomaterials as per international standards and pre–clinical evaluation of medical devices as per ISO standards and approved protocols.

Developmental Activities

Submitted five proposals for publishing 'Expression of Interest' call for the following Class D products of animal origin, fabricated out of porcine cholecyst extracellular matrix.

- 1. CholecemTech: A base technology for recovering extracellular matrix from porcine gall bladder.
- 2. Dermatederm: An 'advanced wound care product' for treating chronic wounds like diabetic ulcer.
- Cholegel: A hydrogel useful as surface modification agent for medical devices for mitigating tissue reaction.
- 4. *Injectable cholegel*: An advanced wound care product.
- 5. Choleguard: A multilayered cholecyst extracelluar matrix suitable for applications requiring high mechanical strength (e.g.: hernia repair, GTR membranes).

Other significant achievements:

- Dr TV Anilkumar received Prof. MS Valiathan certificate of merit for the outstanding research investigator 2024 during the 40th annual convocation of SCTIMST on 4th May 2024.
- Dr TV Anilkumar, Dr Geetha CS, and the research team received certificate of appreciation



for developing and transfer of the technology, "The process for preparation of extracellular matrix scaffolds from mammalian cholecyst, jejunam, and urinary bladder" during the 40th annual convocation on 4th May 2024.

◆ Dr TV Anilkumar delivered keynote lecture at the workshop on "Laboratory animal handling" at the Department of Biochemistry, University, Kerala, from 21–23 August 2024.

Histopathology laboratory

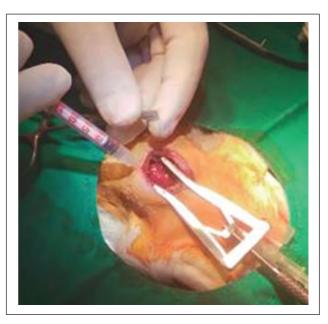
Testing and evaluation

At the Histopathology laboratory, a total of 316 tissue specimens were received, which include subcutaneous

Histopathology - Specimen Details 2024 Subcutaneous implantation (ISO10993-6) Heart Myocardial infarction with gel Mitral bioprosthesis, electric valves Pig gall bladder ECM Anti Adhesion thoracic organs Bioink, Rat liver ECM Systemic toxicity study-mice Pig liver biopsy Necropsy Bone with Implant (ISO10993-6) Bone with Implant (Dental)

tissue and bone with implant for biocompatibility evaluation as per ISO 10993–6. Preclinical evaluation/Proof of concepts, such as bioprosthetic heart valve, mitral electric valve, pig liver biopsy device, decellularised scaffolds, and extracellular matrix of porcine and rat with cells using 3D bioprinting technique were evaluated. Titanium alloy dental screw implants with modified profile and surface implants implanted in the rabbit femur and tibia bone were evaluated by gross and histology evaluation. The rat myocardial infarct model treated with biomolecules was also received, and histopathology evaluation was carried out on it.

Gross and Histopathological evaluation – Rat heart with hydrogel implant. Rat MI model created and injected with test compound loaded hydrogel. Surgical procedure was performed by Dr Sachin J Shenoy.



Test compound injection into rat left ventricle myocardial infarct region.

Number of reports issued in 2024

Accredited test reports	4
Non-accredited test reports	13
Necropsy reports	3
Total number of reports issued	20



Training/outreach programs

- ♦ Under DST-sponsored SC/ST empowerment programme, one graduate student observed to the routine histotechnique activities of the Histopathology Laboratory.
- An invited lecture was deliverd by the In Charge on 26th April 2024, World Veterinary Day Celebration 2024 at Veterinary College and Research Institute, Tirunelveli, Tamil Nadu.
- ♦ The In Charge Participated World Biomaterial Congress 2024, Daegu, Republic of South Korea, which was organised by The Korean Society for Biomaterials from 26 to 31 May 2024 and delivered an invited talk on "Histopathology Evaluation of Multifunctional Biomaterials for Cardiovascular Application".

II. DIVISION OF IN VIVO MODELS AND TESTING (DIMT)

Primary aim of the division is to support medical devices and biomaterials development at SCTIMST. This is achieved by developing animal models for conduct of 'proof of concept' and 'preclinical' animal evaluation of medical devices and biomaterials. As a secondary aim, the division supports Indian medical device industry by conducting preclinical and proof of concept animal studies.

Apart from this, the division is actively pursuing research on tissue based medical devices.

For the conduct of 'preclinical' or 'proof of concept' animal evaluation, physiologically normal or disease induced animal models are used. These studies, meant for assessing functional safety and performance of medical devices done under GLP compliant documentation either in large animal or in small animal models. Large animal studies simulate actual clinical use in human patients. The division is equipped with qualified and trained staff, excellent infrastructure such as well—equipped operation theatre, catheterisation OT, Imaging facility (fluoroscopy and ultrasound), 4 channel Electrophysiology acquisition system, Clinical laboratory, acute care rooms, animal preparation/explantation rooms and CCSEA registered large animal house which provides healthy, traceable large experimental animals such as pigs and sheep.

The division owns a Research laboratory for Tissue based

medical devices where it runs own research projects and guide PhD students to achieve the research objectives.

The overall activities of the division are guided by the following 'Mission statement'

DIMT strives for

- Worldwide acceptance of animal research data generated by implementing the best practices
- ♦ Development of novel animal models and evaluation techniques required for safety/efficacy evaluation of emerging medical devices
- Training of manpower required to sustain core activities
- Research enabling replacement to regeneration of diseased organ.

Developmental Activities

Ongoing /progressing

• Development of Bioprosthetic Heart valve (BHV)

BHV is developed for replacing diseased heart valve. In 2022, a total of 30,896 surgical heart valve procedures were performed in India (Global data report). India is forecast to register a compound annual growth rate (CAGR) of around 24% between 2024 and 2033. Also, average age for heart valve replacement in India has increased to 50 to 55 years as the etiology is shifting from inflammatory to degenerative causes. This provides an opportunity for the use of a better performing biological heart valves. Accordingly, SCTIMST had funded for a program of developing bovine pericardium based bioprosthetic heart valve under TRC. Proof of concept for the Chitra Bioprosthetic heart valve was established and 'Development of Bioprosthetic heart valve' was completed.



Chitra Bioprosthetic Heart Valve



New initiatives: Silk fibroin impregnated decellularised porcine pericardium with less than 0.14mm thickness was developed. Proof of concept study on this product for paediatric cardiac application such as RVOT reconstruction patch was completed in six months following pig aortic patch model. Expression of interest from industry for this product is being invited through SCTIMST website. Presently this product is tried for the construction of pulmonary valved conduit.



Pulmonary valved conduit—prototype

Technology Transfer activities

'Expression of interest' was invited on SCTIMST website, for the technology 'Bioprosthetic Heart valve'. M/s BL Lifesciences Pvt Ltd, New Delhi expressed interest in this technology and the negotiation for technology transfer was completed. The signing of the MOU for technology transfer is in pipeline.

Research programs:

1. TRC project 'Development of decellularised porcine artery for small diameter vascular conduit as BT shunt'.

Two types of prototype grafts, degradable and non-degradable were fabricated as part of POC study. The degradable vascular conduit is made from bulk modified decellularised porcine artery through silk-fibroin impregnation and in situ cross-linking. The non-degradable graft is made from surface

- modified decellularised porcine artery by Parylene C coating. New batches of the grafts are prepared for repeating the mechanical testing.
- 2. The following milestones were achieved this year
 - I. SF100 and SF50G50 impregnated decellularised porcine artery were made.
 - II. Characterization of decellularised porcine artery is in progress.
 - III. Confirmation of SF impregnation is in progress.
 - IV. Mechanical studies: Suture retention and circumferential tensile strength— were completed. Substantial improvement in these mechanical properties was noticed in comparison to control (decellularised porcine artery).
 - V. Thromboresistance properties of novel peptides was established in comparison to heparin.
 - VI. Method for conjugating these peptides onto decellularised tissue surface was established.

Testing and evaluation

- 1. GLP study for external customer "In Vivo Biofunctional Evaluation of Sirolimus and Tirofiban eluting coronary stent systems in porcine coronary artery model without DAPT" was completed during 2024–2025, and the completed report was submitted.
- 2. Evaluation of electrical mechanical heart valve for an external customer is ongoing.
- 3. Evaluation of the transjugular venous access liver biopsy catheter for an external customer was initiated.
- 4. Conducted pig studies under the TRC project on the Development of a Bioprosthetic Heart Valve.

Other significant achievements:

- ♦ Tissue—Based Devices laboratory was set up at the CD block. This lab will focus on the development and translation of tissue—based medical devices such as bioprosthetic heart valves, pulmonary valved conduits, cardiac patches, etc.
- ♦ Technology transfer for the Bioprosthetic heart valve to M/s BL Life Sciences Pvt Ltd, New Delhi, was finalised.





Tissue-Based Devices Laboratory

III. DIVISION OF LABORATORY ANIMAL SCIENCE

The Division works with the primary objective to perform small laboratory animal housing, production, health care, and welfare assessments, and to maintain housing standards to suit the National (CCSEA) and International Standards (ISO 10993 Part 2; 2022) guidelines, and to maintain compliance. The division's mandate is to ensure technically intact small laboratory animal experimentation and research activities by providing care and by ensuring the health of small laboratory animals. LAS is taking care of the conduct of IAEC inspections and meetings to sanction animal experimentation, its documentation, and to maintain the statutory requirements on animal facilities registration with CCSEA. Our division also performs funded animal studies to develop animal models and to set up proof-of-concept studies in biomedical research. Training and dissemination of knowledge in the field is also a key area in which the division focuses on.

Developmental Activities

University of Copenhagen's external study "Characterization of the impact of gender, methodology and analgesic treatment on welfare implications, functionality outcomes and histopathology in a spinal cord injury (SCI) model" of budget Rs. 1,04,200/— is ongoing.

Technology Transfer activities

LAS is now involved in the development of a rodent enrichment and transport system in collaboration with Industrial partner M/s CITIZEN Industries, Ahmedabad. The prototype is produced, the MoU signed in 2023, and the Technology is transferred in May 2025.

Testing and evaluation

- ♦ IAEC Meeting conducted on May 10th processed 9 B forms and 4 requests.
- Dr Harikrishnan attended the CCSEA, New Delhi, meeting held on 30th April 2024.
- ♦ Dr Harikrishnan VS attended the FELASA (Federation of European Laboratory Animal Science Associations) auditing and interacted with the academic auditors for the purpose of re–accreditation of the TANUVAS (Tamil Nadu Veterinary and Animal Sciences University) FELASA Functions ABCD course on June 21st, 2024.
- ◆ Dr Harikrishnan VS delivered an invited lecture and practical class teaching at TANUVAS, Chennai, in the FELASA Accredited Non– Non– Veterinarians Training program on 23rd July 2024.
- ◆ Dr Harikrishnan VS, attended the 124th 125th, and 126th CCSEA meetings held in 30th July, 28th August and 30th September 2024 respectively.
- ◆ Dr Harikrishnan VS attended meeting for— "Sign off – Memorandum of Agreements with the Sponsor of Trials under the ICMR Network of Phase I Clinical Trials" on 11th September 2024 as a member of the ICMR Health Product Screening Committee (HPSC)".
- ◆ Dr Harikrishnan VS was nominated as Teaching Assistant (Honorary) and Alumnus status of LabVet Europe, the European Laboratory Animal Veterinarians Masters programme offered by the Department of Veterinary Disease Biology, Uni of Copenhagen, Denmark.
- dipECLAM (European College of Lab Animal Medicine) Residency of Dr Harikrishnan VS (Valid until year 2030) was renewed.
- Dr Harikrishnan was invited to talk in the National workshop on "Laboratory Animal Handling, Experimental procedures and In– Vivo Imaging" at the Institute of Life Sciences, Bhubaneswar, from 7th to 11th January 2025. Scientific lecture on the topic "Refinement of 3R System: Analgesia, Anaesthesia and Euthanasia",



on 9th January 2025 at ILS, and practical teaching on the same topic were sought.

♠ Invited to lecture/teach on "Sample Collection Methods & Techniques in Animals" on 25th February, 2025 from 09–30 AM to 10–30 AM and "Introduction to Transgenic, Knockout, and Gene-editing Technologies in animal research" on 28th February 2025 from 12–00 PM to 1–00 PM .in the DHR-ICMR funded 4 weeks Comprehensive training program on Animal Research and Experimentation & Good Laboratory Practices (CARE-GLP) organized at CSIR-North East Institute of science & Technology (CSIR-NEIST) Jorhat, Assam during February 17 to March 14, 2025.

Training/outreach programs

- A Group of 43 Students of IISER were trained in the basics of laboratory animal usage in Biomedical Research on 4th February 2025
- Organized two sessions of animal handling training course for 20 trainees from across Kerala from 10th to 14th June 2024 and 23rd to 27th September 2024.

IV. DIVISION OF MICROBIAL TECHNOLOGY

Description of the Division:

The Division of Microbial Technology works on the quality platform that is accredited by Cofrac of France. The Division offers medical device evaluations, specifically product release studies, which involve sterility tests and endotoxin assay, and Biomaterial and medical evaluation assays, like in vitro genotoxicity assay and Bioburden analysis, a prerequisite in the medical device development process. In addition, the Division is also responsible for monitoring all cleanrooms on the campus, which includes microbiological monitoring of air and water in cleanrooms.

The research focus of the Division is on understanding the trigonal interactions between the medical device, host, and bacteria and immune modulations, in order to understand the impact of medical devices on patients. In the technology development arena, the Division focuses on the development of rapid diagnostic devices for bacterial infections.

Developmental Activities

- ♦ TRC project: 'Rapid detection of viable pathogenic bacteria using nanosensors,' where we are working on developing suitable nanosensors to identify viable bacteria in body fluids like blood, CSF, pleural fluid, etc, which would help in rapid diagnosis and suitable antibiotic therapy.
- ♦ TDF project: 'Standardisation of Rapid Minimum Inhibitory Concentration Determination for UTI pathogens in Enterobacteriaceae group.' Here, the focus is on determining the minimum inhibitory concentration of antibiotics for Enterobacteriaceae, a group that causes urinary tract infection, for the initiation of effective therapy. The work is ongoing to get the MIC values within two hours of culture identification.

Research programs:

- ♦ DBT Sahaj project "National Translational Research Facility for Biomaterials, Medical Devices & In vitro diagnostics (IVDs)" is ongoing and is in the third year.
- ◆ The three—institute joint ICMR project titled "Design and development of potential super hydrophobic biomaterial to minimise catheter associated urinary tract infections: proof of concept" is in its second year.

Testing and evaluation

The Division of Microbial Technology is accredited by *Cofrac* of France and undergoes two internal audits and one external audit in a year. For the last 23 years, the Division has maintained its accreditation and contributed to Medical device development and evaluation.

ISO 17025 Accredited tests offered by the Division

- ♦ Sterility test as per USP <71>
- ♦ Determination of a population of microorganisms on products—Bioburden Analysis. ISO 11737–1
- ♦ Genotoxicity test— A test for gene mutation in



bacteria- Bacterial reverse mutation assay (Ames test). –ISO 10993 –3, OECD 471

- Tests performed for maintenance of the quality system
- ♦ Microbiological monitoring of controlled environment—Based on USP <1116>.
- Microbiological analysis of water—Based on ISO 4831
 - Test performed in support of research & development:

- ♦ Antimicrobial activity testing of materials
- ♦ Evaluation of biomaterial—bacterial interactions by bacterial adhesion studies.
 - Other tests
- ♦ Spore viability test Based on <USP 55>.
- ♦ Culture and Sensitivity
- ♦ Growth promotion test for microbiological media— Based on USP; Chapter <71> & <1117>, ISO 11133 & ISO 7218.

Details of the test performed in 2024.

Sl No	Name Of Test	Requests	Samples
1	Sterility test as per USP– Clause <71>	4	4
2	Microbiological monitoring of controlled environments—Based on USP $<$ 1116 $>$	35	84
3	Microbiological analysis of water-Based on ISO 4831	17	37
4	Spore Viability Test based on USP- Clause <55>	1	1
5	Antimicrobial activity testing- Agar diffusion method	2	5
6	Bacterial Adhesion Studies	2	23
7	Viable Microbial count– Porcine gall bladder sample	4	4
8	Growth Promotion Study in Media Validation	8	34
	Total	59	156

Study requests handled in 2024.

- 1. Testing of *Ganoderma lucidum* extract–coated fabric for antimicrobial activity against MRSA and VRSA.
- 2. Antimicrobial activity testing of polymer coatings—From VSSC.
- 3. Determination of antimicrobial efficacy of Sterigen solution—Ongoing.

Other significant achievements:

 Dr A Maya Nandkumar, was awarded the first prize in the Technology Innovation contest for Rapidogram, the Rapid diagnostic kit for UTI with antibiotic sensitivity, at the First ASEAN Women Scientists Conclave held in Singapore in April 2024.





- ◆ Ms Moon Moon Bagalari, PhD student, received the Best Poster Award at the International Conference on Frontier Areas of Science &Technology-2024 held at IIT Guwahati from September 6-7, 2024, for her work entitled "Influence of Carbon Black Nanoparticle on Virulence Factors of Clostridium Spp."
- ◆ Dr A Maya Nandkumar attended the World Biomaterials Conference 2024, May 26 – 31, 2024, in South Korea, Daegu, and presented her work "Impact of carbon black nanoparticles (CBNP)on bacterial virulence and host immune function".

V. DIVISION OF MOLECULAR MEDICINE

The Division of Molecular Medicine focuses on both basic and applied research in biology. The primary research interest is to understand the functional aspects of neural networks involved in memory formation and learning, using C. elegans as the model system. In applied research, the main objective is to develop innovative nucleic acid–based diagnostic techniques for the early detection of infectious organisms such as Mycobacterium tuberculosis, SARS–CoV–2, human papillomavirus, Plasmodium, Leptospira, and others.

Developmental Activities

1. Development of real-time loop-mediated amplification (rt-LAMP) assay for early detection of pulmonary tuberculosis:

Tuberculosis (TB) is a serious global health issue, with an estimated 10 million new cases and 1.5 million deaths each year. The World Health Organization (WHO) classifies TB as a priority infectious disease, as it is so difficult to diagnose and treat. Traditional methods, such as smear microscopies, are often inconclusive because of very low sensitivity. The nucleic acid amplification test (NAAT) is a rapid TB screening test that detects TB bacteria from sputum samples in less than three hours. PCR (polymerase chain reaction)—based tests, such as CBNAAT and Truenat, are available to confirm positive TB cases. Though these technologies are highly accurate, they can handle only a few

samples at a time and are developed as a closed system (requiring a proprietary PCR machine to run the rest).

An open platform nucleic acid amplification test, which can utilise the existing PCR testing infrastructure established during the COVID–19 pandemic, could be a game–changer in large–scale population–based screening for pulmonary TB.

RT-LAMP TB diagnostic kit is developed to achieve this objective. This diagnostic tool is based on the real-time Loop-Mediated Isothermal Amplification (RT-LAMP) protocol, which is accurate, faster, and more cost-effective. During the assay, 40 data points will be collected from each sample to accurately detect the presence of TB bacteria. This test is a nucleic acid amplification technique that is simpler than PCR. The test can be easily performed with minimal training and run on any PCR machine having fluorescence detection.

The technology has been licensed to M/S Agappe Diagnostics. The company received the CDSCO approval, and ICMR is validating the kit for its suitability for the national tuberculosis programme.

2. An isothermal platform–based fever panel for the detection of tropical fever etiology

Fever is a common symptom of many infectious diseases, and diagnosing the underlying cause can be challenging. Traditional diagnostic methods, such as culture and serology, can be time-consuming and may not provide accurate results. However, advances in molecular biology have led to the development of nucleic acidbased fever panel diagnostics, which can rapidly and accurately identify the causative agent of a fever. Nucleic acid-based fever panel diagnostics work by detecting the genetic material (DNA or RNA) of pathogens in a patient's sample. The most common method is polymerase chain reaction (PCR), which amplifies specific regions of the pathogen's genetic material so that it can be detected. Other methods include loop-



mediated isothermal amplification (LAMP) and nucleic acid sequence—based amplification (NASBA). One advantage of nucleic acid—based fever panel diagnostics is their speed. PCR can produce results in as little as a few hours, while traditional methods may take days or even weeks. Another advantage is their sensitivity and specificity. Nucleic acid—based tests can detect very small amounts of pathogen DNA or RNA, which means they are less likely to produce false—negative results.

There are several commercially available nucleic acid—based fever panel diagnostics on the market, such as BioFire FilmArray and Luminex Aries. These tests can detect a wide range of pathogens, including bacteria, viruses, and fungi. They are particularly useful for diagnosing infections that are difficult to culture or that have atypical symptoms. These predicate devices are based on PCR.

In this study, we are developing a cost–effective nucleic acid–based fever panel as a rapid tool for diagnosing infectious diseases. We will be attempting to develop a real–time LAMP technology as one of the most sensitive and specific nucleic acid–based tests

Achievements

MoU with the World Health Organisation:

The technologies developed at SCTIMST to address the COVID–19 pandemic led to an initial MoU with WHO for the COVID–19 Technology Access Pool program. This program has since been expanded into the Health Technology Access Pool (HTAP) from January 31, 2025, by WHO, which aims to facilitate the transfer of health technologies and foster collaboration to build end–to–end product development capacity in low– and middle–income countries (LMICs).

HTAP emphasizes pandemic prevention, preparedness, and response while also promoting access to health products that address existing public health priorities. It actively targets platform technologies and other health products relevant during and beyond health emergencies.

A delegation from WHO visited the SCTIMST on February 12–13, 2025. The purpose of the visit was to develop a work plan for collaboration with the institute and to identify the health technologies developed by SCTIMST that meet the HTAP selection criteria. They also discussed the potential for forming global and regional health technology consortia.

Attending the meeting from WHO were Mr. Michael Ward, HTAP Senior Technical Specialist; Dr Cheleka Mpande, Technical Officer; Dr Dragana Milic, Diagnostics Expert; Mr. Einstein Kesi, Medical Devices Expert; Dr Manisha Shridhar, Regional Advisor for Intellectual Property Rights, Trade, and Health at the WHO South East Asia Regional Office; and Dr Madhur Gupta, Technical Officer, Pharmaceuticals, and Medical Products Focal Point, WHO Country Office.



MoU with the World Health Organisation

Research programs:

1. Role of Dopamine in Manganese-induced neurotoxicity

Dopaminergic neurodegeneration is a hallmark of Parkinson's disease (PD), with its onset associated with genetic susceptibility and ageing. It has been postulated that "dysfunction" of the dopamine circuit results in movement disorders in Mn exposure, whereas degeneration of dopaminergic neurons occurs in PD. Though it is generally accepted that individuals exposed to Mn have a higher risk of developing PD, the link between metal toxicity and the development of the disease is still debated. The studies on the death of dopamine neurons



have suggested the involvement of multiple factors, including mitochondrial dysfunction, inflammatory response to the neurons, oxidative stress, attenuation in gene transcription levels, and translational depression of the tyrosine hydroxylase gene, an essential enzyme involved in dopamine synthesis from tyrosine. Our earlier study has shown that Mn exposure to C. elegans larvae affects the adaptive learning ability at later stages of its development.

The involvement of dopamine in Mn-mediated neurotoxicity is not well understood. The susceptibility of dopamine neurons to Mn exposure during early development and its influence in altering neuronal function and behaviour has not been studied. In this study, we have used C. elegans as a model system to evaluate the effect of DA in augmenting dopaminergic neuronal toxicity.

Our results on larval and adult worms showed that exogenous/endogenous DA is essential to cause severe neurodegeneration, results in loss of developmental, physiological, and behavioural functions. Cat-2 mutants showed resistance to Mn-induced neurotoxicity, while the Cat-2 overexpressing UA54 strain showed significant neurotoxicity to dopaminergic neurons on Mn exposure. These results confirm the earlier observation that both endogenous and exogenous DA is directly involved in the Mn-induced neurotoxicity. Our study provides new insights about the functional role of DAdependent enhancement of Mn-induced DAergic neurodegeneration. Both exogenous and endogenous DA studies emphasise the vulnerability of DA neurons to Mn exposure and show possible modes of the pathogenesis of PD. Further understanding of these changes would help decipher the disease onset both in Manganism and PD, with a view of a better treatment strategy.

2. Altered Insulin signalling affects memory formation pathways in C. elegans

In response to unfavorable conditions and environmental stress, *Caenorhabditis elegans*

undergoes an alternative developmental stage known as the dauer larva. This stage is associated with various metabolic changes and allows the worms to survive in harsh conditions for several months. They can resume normal development when favorable conditions return.

This study investigates the impact of altered insulin signaling on memory in post—dauer *C. elegans*. Our major findings reveal significant deficits in both short—term and long—term associative memory in these post—dauer nematodes. Through behavioral assays, we demonstrate a marked impairment in memory retrieval, suggesting a potential link between the post—dauer state and cognitive dysfunction.

Notably, we found that the short–term memory deficit observed in post–dauer worms can be improved by administering exogenous insulin. These findings highlight the critical role of insulin signaling in modulating memory processes in post–dauer *C. elegans*, providing insights into the molecular mechanisms that underlie memory defects during this developmental stage.

3. Developing an inclusion complex for controlled release of tyramine

Tyramine (TA) is a naturally occurring trace amine with significant physiological effects, predominantly through its interaction with trace amine-associated receptors (TAARs). The TAARS can have a significant impact on various aspects of neurophysiological modulation. TA is known to have sympathomimetic effects in vertebrates and is also known to have catecholamine-releasing properties. TA is found in numerous foodstuffs, most notably in aged and fermented food. Exogenous TA is reported to mediate paralytic effects through the hyperactivation of endogenous signalling pathways in C. elegans. For instance, C. elegans possesses specialized tyraminergic neurons that are distinct from octopaminergic and dopaminergic cells, both of which are influenced by TA. Moreover, TA has been shown to modulate specific motor programs, including pharyngeal pumping, head twitching,



and escape responses, via extra—synaptic release from the RIM neurons in C. elegans. Studying the physiological role of TA under direct release conditions presents significant challenges. A controlled and sustained release of drugs that target TAARs can be achieved through the use of inclusion complexes.

The formation of tyramine (TA) and β-cyclodextrin (β–CD) inclusion complex was studied using absorption, FT-IR, and 1H NMR spectroscopic studies. The results obtained from the absorption spectral analysis revealed the formation of a 1:1 inclusion complex of TA and β–CD with a binding constant of $K_h = 20M^{-1}$. FT-IR and 1H NMR analysis revealed that TA has complexed within the hydrophobic cavity of β–CD to form an inclusion complex. The inclusion complex of TA and β –CD was then evaluated in Caenorhabditis elegans for its effects on TA release-induced immobilization, migration patterns, egg-laying behaviour, and short-term associative memory. The controlled release of TA facilitated by β-CD allowed for effective administration at lower doses compared to direct exposure, ensuring a continuous and stable release profile. Our study provides a promising strategy for achieving controlled and sustained release of TA, with significant implications for studying behavioral patterns and neuromodulation in biological systems.

VI. DIVISION OF SLEEP RESEARCH

Getting good sleep has become a challenge in the current era. Research in this division is aimed at finding suitable pharmacological and non-pharmacological therapeutic remedies for the treatment of insomnia. Ongoing RCT intends to find the mechanism of *YogaNidra* to improve sleep health and wellbeing in menopausal women. The role of sleep during pregnancy is studied by acquiring neonatal cries trained them using AI–ML. The neural basis of cognitive impairment is studied through ontogenetic dysregulation of autonomic balance. Novel research findings are presented in Conferences and published in Journals. The division provides internships in sleep and cognitive testing, and regularly conducts sleep awareness program.

Developmental Activities

- Ongoing RCT is to find neural correlates of YogaNidra for the management of insomnia in peri–menopausal women. This study will help to find neural markers for brain relaxation (DST/ SATYAM/ WISE KIRAN).
- Development of AI-based neonate-infant cry analyzer and assessment of the link between protophones and maternal sleep during pregnancy (Program CSRI, DST KIRAN)

Research programs:

In a pre-clinical study, the effects of sleep restriction during late pregnancy were studied on the disruption of the development of sleep and autonomic balance (using heart rate variability – HRV) in relation to cognitive development. Sleep was recorded based on EEG and neck muscle activity (EMG), and HRV was derived from heart rate (ECG). Sleep loss during pregnancy impaired the autonomic imbalance during early development in offspring by activating their sympathetic outflow and suppressing the development of the parasympathetic component in growing pups. These studies provided evidence that sleep during pregnancy is a strong prenatal factor that can risk the brain networks during perinatal development when fine-tuning of sleep with the cardiac autonomic system is achieved, which is a foundation step for optimal emotional regulation in growing babies.

We have reported impaired crying patterns (vocalizations in ultrasonic range) in the pups born to sleep-restricted mothers during late pregnancy. These studies emphasized the importance of sleep during pregnancy for optimal neurocognitive development in neonates. In continuation, a clinical study is conducted on human babies to investigate the correlation between sleep during pregnancy and to find an early marker from acoustic signals, eg, from their crying profiles in babies by using artificial intelligence and machine learning tools.

In peri–menopausal women, poor sleep quality is a serious health issue that affects their overall well–being and quality of life. Based on findings of a previous pilot study, RCT was conducted to find the therapeutic effects of 24 weeks of *YogaNidra* intervention and the mechanism of its action in this age group of women.



This RCT will provide the effectiveness of *YogaNidra* as a therapeutic tool for the management of insomnia and to improve overall well–being in postmenopausal age.

Outreach Program:

- Special talk on Sleep Wisdom for Children at Bhartiya vidhya Bhavan Senior Secondary School, Vattiyoorkavu, Trivandrum during Science Club Inauguration at School Auditorium on 11 July 2024
- ii. Organized World Sleep Day on theme Make Sleep Health a Priority on March 14, 2025 (BMT wing, SCTIMST)
- iii. An invited talk on Sleep Physiology to Sleep Health Perspectives in the Conference Hall of Govt Ayurveda Panchkarma Hospital, Poojappura 12 Mar 2025 as part of the World Sleep Day celebrations.
- iv. Dr Kamalesh K Gulia delivered talk on Sleep Health: An emerging concern at Centre for Women's Development Studies (CWDS) – an autonomous research institute supported by the Indian Council of Social Science Research, New Delhi on 10 Feb 2025
- v. Talk in Hindi on Sleep, Technology and Artificial Intelligence: Challenge to keep Good Health and Wellbeing in Modern era during 2nd All India Scientific and Technology Rajbhasha Symposium conducted by DST at Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital, Uttrakhand during 20–21 Nov 2024
- vi. Guest Lecture on 'Technology and Sleep for Health and Wellbeing' at the Division of Biotechnology, Karunya Institute of Technology and Sciences, Coimbatore on 5th August 2024
- vii. International Yoga Day 21 June 2024: YogaNidra, a potential therapeutic tool for management of insomnia in elderly life in the online seminar conducted by the Indian Naturopathy Yoga Graduate Medical Association, Kerala chapter & Centre for Integrative Medicine and Research (INYGMA KL & N–CIMR)
- viii. Evaluation in sleep research: An overview webinar in the Masterclass on sleep and dreams

- organized by Torrent Pharma and Damos Educare on 20 April 2024
- ix. Dr Kamalesh K Gulia delivered talk on Sleep health, consumer sleep technology and artificial intelligence: Challenges and innovations of the modern era in Hindi (निद्रा स्वास्थ्य, उपभोक्ता नींद प्रौद्योगिकी और कृत्रिम बुद्धिमत्ता: आधुनिक युग की चुनौतियाँ एवं नवाचार) on 6th March 2025 at the Centre for Nano and Soft Matter Sciences (CeNS), Bengaluru, sponsored by Department of Science & Technology.
- x. Delivered a talk on Sleep in Elderly for Good Health and Wellbeing: Challenges, Myths and Resolution in the 21st Biennial International Conference of Association of Gerontology (India) during 13–15 December, 2024 on theme "Elderly Empowerment and Graceful Ageing" at National Institute of Health and Family Welfare, Munirka, Delhi

Training:

- ♦ MSc Project work (Internship): Mr Christy George (MSc Computational Biology in Machine Learning, University of Kerala): Thesis titled Computational Approaches to Evaluate EEG Correlates of Relaxation (15 Feb to 7 Jul 2024)
- ♦ Mr Abhin Raj (MSc student, Zoology, BHU) completed 6 weeks Internship at the Division of Sleep Research from 20 May − 1 July 2024.
- ♦ Two summer trainees in the SC/ST program Ms Lakshmi Nandana (BSc student, Botany Dept, Kerala University) and Mr Amal VU (BSc student, Mar Ivanios College, Trivandrum) completed the lab training in the project "Recording the ultrasonic sounds in stressed plants" from 02.04.2024 to 31.05.2024.
- ◆ Lab visit of summer trainee SC/ST on 6th April 2024
 - CME cum Workshop talk
- i. Sleep loss: Kaleidoscopic view of an invisible risk to our health in the CME cum Workshop on the topic "Science of sleep: Attracting young researchers" on 24 May 2024 conducted by Department of Physiology, Faculty of Medicine



& Health Sciences, SGT University, Budhera, Gurugram, Haryana

Symposium and talks organized

- ii. Importance of perinatal sleep for the cognitive development in children: Preclinical and clinical updates at the 11th Asian Sleep Research Society Congress & 8th Asian Forum on Chronobiology held at Aerocity from 8–9 Feb 2025.
- iii. Sleep regulation and management strategies in various age groups: Recent updates at the APPICON conference 2024 at ESIC hospital, Chennai during 12–13–December 2024 & Delivered a talk on Sleep disruptions during pregnancy and postmenopausal life: Emerging concerns
- iv. "Sleep Counts" for a healthy brain: Insights from autonomic, neurovisceral and muscular integration in the International Conference on Advances In Mechanisms and Approaches to Neuro–therapeutics (AIM–AT) & XLII Annual Meeting of Indian Academy of Neurosciences 2024 (IAN–2024) during November 12–14, 2024 at National Institute of Mental Health and Neurosciences, Bengaluru, 560029, Karnataka, India &
- v. Preclinical evidences on maternal sleep loss and poor cognitive outcomes in offspring in the 11th Asian Sleep Research Society Congress & 8th Asian Forum on Chronobiology held at Aerocity from 8–9 Feb 2025.
- vi. Revisit AI to understand intricacies of sleep analysis and diagnosis: Emerging trends in the 11th Asian Sleep Research Society Congress & 8th Asian Forum on Chronobiology held at Aerocity from 8–9 Feb 2025.
- vii. Sleep disruptions during pregnancy and postmenopausal life: Emerging concerns during Recent updates the APPICON conference 2024 at ESIC hospital, Chennai during 12–13–December 2024
- viii. Role of prenatal sleep in shaping the behavioural phenotypes of offspring: Complex modulation

of heart-brain networks in the International Conference on Advances in Mechanisms and Approaches to Neuro-therapeutics (AIM-AT) & XLII Annual Meeting of Indian Academy of Neurosciences 2024 (IAN-2024) during November 12, 2024 at National Institute of Mental Health and Neurosciences, Bengaluru, 560029, Karnataka, India

Other significant achievements:

- i. Dr Kamalesh K Gulia is a member of the Subject Expert Committee of Health, Food and Nutrition (HFN) theme area of the Department of Science and Technology (DST) under Women in Science and Engineering (WISE)— Societal Challenges with Opportunities (SCOPE) Fellowship program of WISE–KIRAN Division for 2024–2026.
- best poster Award for papers titled "Study of sleep—wakefulness associated changes in heart rate variability in adult female rat to model the sleep—cardiac autonomic functional dynamics" & "REM sleep restriction during late pregnancy disrupts the optimal development of sympathovagal balance in developing rat pups" authored by Arshajyothirmayi VA, Narayanan Namboodiri and Kamalesh K Gulia during 11th Asian Sleep Research Society Congress (ASRS) & 8th Asian Forum on Chronobiology (AFC) held at Aerocity, Delhi during 8–9 Feb 2025.

II. DIVISION OF TISSUE CULTURE

The Division of Tissue Culture is a facility under the Department of Applied Biology that conducts accredited cytotoxicity testing services and applied biology research. In the year 2024–25, the division analyzed approximately 51 samples for cytotoxicity under both accredited and non–accredited tests. The division's quality system is audited by COFRAC, France, and found to comply with the required standards. The testing service activities of the Division of Tissue Culture also include cell culture studies tailored to specific customer requirements, as well as academic research in various areas. Specific tests like biomaterials' osteogenic potential, cytocompatibility, scratch wound assay, cell proliferation, particle uptake



study, and cytotoxicity evaluation of bioinks are offered to customers.

The division also maintains a state–of–the–art 3D bioprinting and biofabrication facility, which is equipped with a multi–technology 3D bioprinter with tissue and organ printing capabilities. A new Biosafety Level 1 laboratory is being set up, which will serve as the main facility for the division's technology–oriented research programs on 3D bioprinting.

Developmental Activities

Bioink for 3D bioprinting

The Division of Tissue Culture initiated the 3D Bioprinting and Biofabrication of Liver program within the Technical Research Center (TRC). This research started with the creation of 3D Bioprinted in vitro hepatotoxicity test system for screening drugs and small molecules. The key accomplishments are India's first-of-its-kind indigenous patented bioink formulation, designed for creating live tissues through a cutting-edge technology called Three Dimensional (3D) Bioprinting. The main features of this product are the advantage of storage and 3D Bioprinting at ambient temperature, and the protection of cells from ultraviolet light during 3D Bioprinting of live tissues. Various versions of bioinks such as Hyaluronic Methacrylate (HAMA), Allylated gelatin (GelAGE) and Chitosan Methacrylate (ChiMA) has been developed and is under various evaluation processes.

The modified gelatin—based Chitra GelMA Bioink was transferred to M/S Scire Science Pvt Ltd (May 2024). An MoU was signed by the Director, SCTIMST and the Director, Scire Science.



Signing of MoU between SCTIMST and Scire Science Pvt Ltd.

Development of Liver Disease Model and Transplantation of 3D Bioprinted Liver

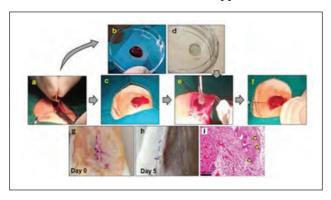
Dr Anil Kumar PR received the Grant under the ICMR Investigator—initiated Project intermediate grant, entitled "Clinically relevant Three—Dimensional Bioprinted Liver Construct and its Efficacy Evaluation in Porcine Liver Disease Model". 3D bioprinting of liver construct for transplantation in large animal requires large volume of bioink.as well as large number of cells. The bioink synthesis has been scaled up from 10 g to 100 g per synthesis. Different batches of bioink were synthesized and the scale up protocol was optimized. The cell isolation from porcine liver has been standardized and the cell culture optimization is ongoing. Very large sized constructs were designed and 3D printed to check the printability of the bioink and its stability under physiological conditions in vitro.

Efficacy Evaluation of 3D Bioprinted Liver Constructs Established from Niche Specific Bioink

A project funded by ANRF under the Core Research Grant was completed. In this project a tissuespecific bioink composed of Gelatin Methacrylamide enriched with antioxidants (GelMA-AO) and liverderived extracellular matrix (LECM) proteins was developed. An organ perfusion system was developed to decellularize whole liver of rat and porcine liver tissues. A niche-specific variant, termed NS-bioink, was created by adding LECM to GelMA-AO, and was characterized for its physicochemical properties and 3D printability. Cytotoxicity was evaluated in vitro according to ISO 10993-5, and hemocompatibility was assessed per ISO 10993-4. Live-dead staining confirmed cell viability in the bioink. Biocompatibility of GelMA-AO was first tested in rabbit and rat models following ISO 10993-6 standard. The liverspecific response was examined by implanting 3D printed NS-GelMA constructs into rat livers, with both in vivo studies indicating their biocompatibility for creating cell-laden bioprinted structures (Figure 2). Mesenchymal stem cells (MSCs) from rat bone marrow were differentiated into Hepatocyte-Like Cells (HLCs) through a three-step process and characterized. These HLCs were 3D bioprinted using NS-GelMA bioink and subsequently transplanted into the livers of normal rats after partial hepatectomy.



Biochemical and histological evaluations confirmed that NS-GelMA is an effective niche-specific bioink for liver construct biofabrication. The successful transplantation of 3D bioprinted hepatocyte-like cells in the NS-GelMA underscores the potential of this approach for creating functional liver constructs for transplantation. The project has not only produced valuable technological innovations and trained personnel, but has also contributed to the academic community through multiple publications with cumulative impact factor of 19.2 in international journals and presentations in international conferences. The outcome of the project has underlined the need for establishing a foundation for further exploration in transplantable liver constructs derived from stem cells for clinical application.



Implantation of 3D printed GelMA–AO in rat liver:
(a) partial liver resection using a trephine; (b) resected tissue; (c) implant or defect site created by liver recession; (d) 3D printed GelMA–AO of similar size as of defect size; (e) implantation of 3D printed construct at defect site; (f) application of fibrin glue; (g, h) images showing progressing wound healing post–surgery and (i) Histological analysis after 30days of implantation showing vascular structures surrounding the implant site.

Pre-validation of 3D bioprinted in vitro hepatotoxicity test system

Validation of the in vitro test system is essential for the future validation and regulatory approval of the assay platform. A pre-validation of 3D hepatotoxicity test was started to transition from a proof of concept to a fully validated in vitro test system. Three drugs were identified and their half-maximal inhibitory concentrations were estimated. A perfusion pump was designed and developed at TIC to facilitate the 3D culture. The experiment necessitates the analysis of intermediate drug metabolites. Two drugs were screened for IC50 dosage. HepG2 cells were 3D bioprinted and treated with a drug (CUSAT sample). Media was collected on Day 1, 3, and 7, and the drug's effect on liver function was analyzed by urea and LDH assay.

Development of Biopolymeric Orthopaedic Fixtures

Orthopedic fixtures such as screws, plates, nails, rods, wires, and pins are essential medical devices used in orthopedic surgery to stabilize fractured or injured bones, facilitate healing, and restore function. While conventional metallic fixtures provide excellent strength and durability, they can interfere with imaging techniques and often require a second surgical procedure for removal. The project led by Dr Naresh Kasoju, aims to develop resorbable orthopedic fixtures using natural biopolymers, specifically silk fibroin, to eliminate the need for a second surgery, thereby reducing patient discomfort and financial burden. Silk fibroin protein was extracted from cocoons and made into solid block, which was machined into desired shape. The mechanical strength was enhanced by incorporation of plasticizers and bonding agents and parameters were optimized. The biomaterials were tested for in vitro non-cytotoxicity and found to be suitable for future in vivo studies.

New initiatives

Multi-organ chips for drug screening

A new multi chamber chip model was designed for the Liver – Lung – Kidney axis and Gut – Liver – Kidney axis. The novel design will give flexibility in connecting the cell culture chambers to the perfusion device in an easy plug—and—perfuse set up. The cell culture in the chip has been optimized, and the disease model is being studied. The Multi–organ—on—chip technology is very important for drug screening as it is expected to provide clinically reliable data by replicating complex inter–organ interactions. This approach enhances the prediction of drug efficacy and toxicity, ultimately improving the drug development process and reducing reliance on animal testing.



Liver disease model for transplantation of 3D bioprinted liver construct

A liver disease rat model serves as a simple but vital in vivo test system for evaluating the efficacy of transplanted 3D bioprinted liver tissues. The study involves inducing liver disease and transplantation of 3D bioprinted liver tissue into this model. This study is aimed at the assessment of graft survival, host integration, vascularization, and the restoration of liver—specific functions. This in vivo system provides critical insights into the regenerative potential and biocompatibility of the 3D bioprinted constructs, facilitating the development and optimization of effective cell—laden liver implants for therapeutic applications.

In vitro perfused 3D Liver disease model for drug screening

Three–dimensional structures in biological models accurately replicate the natural architecture and microenvironment of tissues compared to conventional 2D cultures. In a 3D environment, more relevant cellular behavior is expected in proliferation, differentiation, response to stimuli and tissue–specific functions. However, it is essential to simulate the blood flow conditions in the 3D construct to simulate the in vivo mass transfer. A study on perfused 3D models for drug screening has been initiated towards this goal. These models are expected to enable the assessment of drug metabolism, toxicity and efficacy in a controlled environment that mimics the complex interactions within the liver.

Collaboration with the College of Engineering Trivandrum

Under the MoU between SCTIMST and College of Engineering Trivandrum, Dr Anil Kumar PR participate in a PhD program of CET to develop a device for high–throughput production of GelMA beads for biomedical applications.

Achievements

Technology Transfer activities

The technology of Chitra GelMA–UVS–bioink formulation was transferred to M/s Scire Science Pvt Ltd, Kochi.

Commercialization

One of the most important achievements of Division of Tissue Culture is the development of India's first—of—its—kind indigenous patented bioink formulation for 3D bioprinting. The bioink presents a promising alternative for disease model systems in drug discovery, chemical testing, and personalized medicine development. Tissues constructed with bioink could enhance the reliability of laboratory experiments, potentially reducing the reliance on animal testing. The main features of this product are the advantage of storage and 3D Bioprinting at ambient temperature and the protection of cells from Ultra Violet light during 3D Bioprinting of live tissues. The technology has been transferred to industry and has been launched for commercial production in the brand name of Scire Chitra GelMA UVS Bioink.





The bioink has been launched in the market in the brand name of Scire Chitra GelMA UVS bioink.

3D Bioprinting Test Platform to customers.

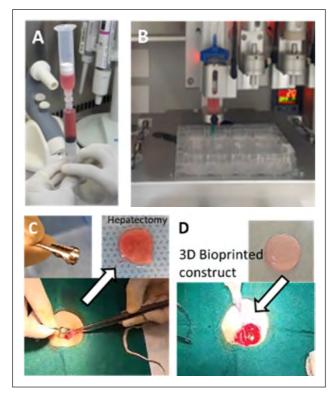
The in vitro hepatotoxicity testing system utilizing 3D bioprinted liver constructs is now accessible to customers. This system provides methods for bioprinting liver constructs specifically designed for in vitro hepatotoxicity assessments, allowing external customers to evaluate liver toxicity in a laboratory setting. A complete battery of tests for qualifying a formulation as bioink is also available.

Research programs

Pre-clinical evaluation of photoprotective bioink The potential of bioink is the ability to artificially create functional organ structures using cells isolated from tissues. The 3D-printed artificial organs can be used in advanced regenerative therapies for organ



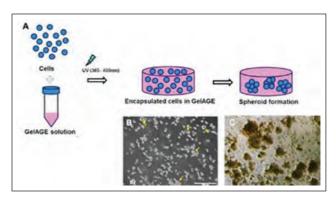
replacement or to restore the function of damaged organs. Bioprinting soft organs such as the liver requires achieving a high cell density in the bioink, which presents significant challenges. The methodology to bioprint liver constructs with high cell density has been optimized to get histoarchitecture closely to natural liver tissue. Histological evaluations of 3D printed samples following subcutaneous implantation demonstrated their biocompatibility. The surgical protocol for the implantation of 3D printed GelMA-AO scaffold was first developed. Subsequently liver construct was fabricated using GelMA-AO formulation using primary rat liver cells and was transplanted into a rat model to assess efficacy. The results of a thirty-day transplantation study of the bioprinted liver construct indicated no negative host reactions. These 3D-printed artificial organs could play a crucial role in advanced regenerative therapies, either for organ replacement or for restoring the functionality of damaged organs



The 3D bioprinted liver construct for transplantation. (A) Liver cells are mixed in bioink, (B) 3D bioprinting of liver construct sized to the liver site, (C) Hepatectomy of rat liver and (D) Transplantation of bioprinted construct.

New bioink formulation from modified Gelatin

Flexibility in 3D bioprinting is essential for commercial and clinical application of the technology. bioink has to be versatile in its bioprinting capacities especially to print at room temperature. Allylated gelatin (GelAGE) synthesized by the chemical reaction between the epoxy group of allyl glycidyl ether (AGE) and the amine group of gelatin biomacromolecule, It is flexible to 3D bioprint by lithographybased digital light processing (DLP) and extrusion-based bioprinting. The crosslinking of GelAGE requires thiol-containing compounds like dithiothreitol. A DTT free GelAGE bioink was developed which is noncytotoxic and 3D bioprintable at room temperature and moderate air pressure with good cell viability and activity. The bioink was evaluated for 3D bioprinting of liver parenchymal construct using HepG2 cells. Cells in the bioink organized into spheroids and can find application in in vitro toxicological analysis and as transplantable tissue constructs.



(A) Illustration showing the spheroid formation in GelAGE. (B) HepG2 cells encapsulated in GelAGE bioink on day 2. (C) HepG2 spheroids formed on day 5.

Process – property – function relationship study in silk biomaterials for corneal tissue engineering applications

Dr Naresh Kasoju leads the study on process–property–function relationships of silk–based biomaterials where substantial exploratory research has been conducted on the the fabrication of silk fibroin biomaterials under various processing conditions. After identifying the influence of different fabrication and post–fabrication treatments on the physicochemical and



biological properties of silk fibroin films in corneal tissue engineering, a new study has been initiated to investigate how variations in processing parameters affect the hydrogels' physicochemical, mechanical, and biological properties, particularly optimizing transparency, biocompatibility, and mechanical strength.

Process – property – function relationship study in alginate biomaterials for cell encapsulation applications

Extensive exploratory research has been conducted by Dr Naresh Kasoju in the field of alginate-based biomaterials, focusing on the fabrication of alginate hydrogels under varying process conditions. Despite numerous studies, the information on the processproperty-function relationship remains as a gap. To address this, alginate hydrogels beads were prepared by ionic gelation method and conducted a detailed investigation on various process parameters influencing bead characteristics, particularly their biomolecular diffusion properties. This research, which involves fabricating alginate beads loaded with five different biomolecules, holds significant promise for cell encapsulation and tissue engineering as it aims to optimize alginate systems to enhance cell viability and tissue functionality in biomedical applications.

Academic research activities

PhD

One PhD program has been awarded on the topic Functional evaluation of three dimensional Bioprinted liver constructs developed using photoprotective bioink and one is continuing on the aspects of tissue specific bioink for 3D bioprinting of liver construct. Two PhD research has been initiated on multiorgan on chip for drug screening. One PhD program explores development of perfused 3D liver disease model where as another on look at the development of biofabricated liver in small animal liver disease model. A PhD program on in vitro engineered corneal tissue model for ocular irritation testing has been initiated to explore the silk fibroin—based biocomposites to develop corneal tissue—engineered model for toxicological testing.

Service activities:

Testing and evaluation

The Division of Tissue Culture provides cytotoxicity assessments of biomaterials and biomedical devices for external customers while also supporting the institute's research and technology programs. The Division conducts both accredited and non–accredited tests as part of the initial biomaterial screening process and offered 51 tests. Additionally, in vitro tests tailored to meet specific customer requirements were also supported such as cell proliferation, wound healing, hepatoprotective assay etc. in study plan approach. The division has taken part in both internal and external audits conducted by the Quality Cell, and the COFRAC from France has audited the division for its accredited cytotoxicity testing procedures.

Training/outreach programs

Workshops organized

- 1) Dr Anil Kumar PR, Co-organized Workshop on "Image Analysis in Scientific Research IASR 2024" with The Department of Biotechnology, Cochin University of Science and Technology (CUSAT), Kochi. on 29 and 30, April 2024 at CUSAT, Kochi
- 2) Dr Anil Kumar PR and Dr Naresh Kasoju Co-organized a workshop training program on Laboratory notebook and research data management with the Division of Academic Affairs (DAA) on 21/10/2024 at MSV Block, BMT Wing.
- Dr Anil Kumar PR, Co-organized Workshop on "Recent Advancements in 3D Printing Technologies" with School of Polymer Science and Technology, Mahatma Gandhi University, Kottayam
- 4) Dr Naresh Kasoju organized a series of 3 awareness programs on "One–Day Workshop on Biomedical Innovations" meant for Female, SC/ST, and Faculty, conducted jointly by SCTIMST, Trivandrum and National Academy of Science India Kerala Chapter during 27th Sep 2024, 4th Mar, and 5th Mar 2025.





One–Day Workshop on Biomedical Innovations: An Awareness Program for Empowerment of Female Candidates (27th Sep 2024)



One–Day Workshop on Biomedical Innovations: An Awareness Program for Empowerment of SC/ST Candidates (4th Mar 2025).



One–Day Workshop on Biomedical Innovations: An Awareness Program for Faculty Members (5th Mar 2025)



5) Dr Naresh Kasoju co-organized "International Workshop on Manufacturing Technologies for Tissue Engineering and Drug Delivery Systems" along with National Institute of Technology, Jalandhar, during 24–28th Mar 2025.

Conferences organized

- ◆ Dr Anil Kumar PR co-organized a Pre-Conference Workshop on 3D Printing, held as part of the International Conference on Recent Advances in Polymer Science: Synthesis, Processing and Applications (POLYMERA 2024) with the School of Polymer Science and Technology, Mahatma Gandhi University, Kottayam on 1st Dec, 2024.
- ♦ Dr Naresh Kasoju contributed as the Organizing Secretary for the International Conference on Advances and Challenges in Medical Technology Translation (TransMedTech−2024), along with a Pre−Conference Workshop on Medical Device Development & Translation, organized jointly by SCTIMST, Trivandrum and Society for Tissue Engineering and Regenerative Medicine (India) and Society for Biomaterials and Artificial Organs (India) (11–14 Dec 2024).



Opening Ceremony of TransMedTech–2024, organized jointly by SCTIMST, Trivandrum and SBAOI and STERMI (12–14 Dec 2024).

Invited talks

Dr Anil Kumar PR presented keynote talk

(i) on Evaluation of Bioink Precursors as Biomaterial for 3D Bioprinting at the "Indo-

- French Workshop on Functional Materials for Emerging Applications" organized by the Dept of Physics, MG University, on 16–18 March 2025
- (ii) In the symposium on "The Future is Here—II: Translational road maps, Stem Cells, Biomarkers and Biomaterials in Ophthalmology " at LV Prasad Eye Institute, Hyderabad, from 9–12 January 2025.
- (iii) on "3–D Bioprinting in Medical Applications" in the International Conference on Recent Advances in Polymer Science: Synthesis, Processing and Applications (POLYMERA 2024) at Convergence Academia Complex, organized by School of Polymer Science and Technology, Mahatma Gandhi University, Kottayam on 1st Dec, 2024.
- (iv) On "High Throughput Biofabrication of Spheroids for In vitro Screening" in the "International Conference and Workshops on New Approach Methodologies (NAMs) in Pharmacology and Toxicology Testing (NAMs–PONDY)", A Satellite Program to 4th Asian Congress for Alternatives to Animal Experiments (ACAAE) and 7th Annual Conference of Society for Alternatives to Animal Experiments (SAAE–I) organized by Sri Balaji Vidyapeeth University, Puducherry and SAAE–I at Mahatma Gandhi Medical Advanced Research Institute, Sri Balaji Vidyapeeth, Puducherry on 5 Dec, 2024.
- (v) on the Biological Evaluation of Biofabricated Soft Organs: An experience with 3D bioprinted liver constructs at the International Conference on Advances and Challenges in Medical Technology Translation (TransMedTech–2024) organized by SCTIMST and Society of Biomaterials and Artificial Organs India at Trivandrum during 12–14 Dec, 2024.
- (vi) On "Democratizing 3D technology with education and research to benefit all industry" in the International Conference and Exhibition during 4th edition of 3D GRAPHY Engineering and Medical (3D GEM) 2024 at IIT Delhi on 9–10, Nov 2024.



- (vii) On "Advances in Tissue Imaging and Analysis" during the Annual Meeting of Indian Association of Veterinary Pathologist (IAVP), Technological Advancements in Microscopy Series, Exploring Veterinary Pathology and Diagnostic Innovations in Animal and Poultry Diseases Amidst Climatic Challenges, organized by Sher–e–Kashmir University of Agricultural Sciences and Technology– Chatha, Jammu on 28–30, Nov 2024.
- (viii) On Status of 3D Printed Tissues & Organs at the 13th International Conference and Exhibition on 3D Printing and Additive Manufacturing Technologies AM 2024 organized by the Additive Manufacturing Society of India (AMSI) on 24–25, Oct 2024.
- (ix) on Biological Evaluation of Bioink and Self– Organization of Tissues in Three Dimensional Bioprinted Liver: An Overview at the Workshop on Next–Generation Biomaterials for Advanced Bioprinting Applications, Organized by Next Bigg Innovations Pvt Ltd and AIIMS, New Delhi during 20–21 August 2024

Kasoju N. Smart and Sustainable Biomaterials and Scaffolding Technologies for Regenerative Medicine and Tissue Engineering. International Workshop on Manufacturing Technologies for Tissue Engineering and Drug Delivery Systems organized jointly by NIT Jalandhar and SCTIMST Trivandrum (24–28 Mar 2025).

Dr Naresh Kasoju presented

- (i) 3D Bioprinting of Soft Tissues: Basics, Printability Assessment and Preclinical Evaluation. Hands—On Workshop on Designing and 3D Bioprinting organized by Manipal School of Life Sciences, Manipal Academy of Higher Education, Manipal (29–30 Nov 2024).
- (ii) Silk biomaterials and its applications in tissue engineering. Second All India Official Language Scientific and Technical Seminar organized by Arya Bhatta Institute of Observational Sciences, Nainital (20–21 Nov 2024).
- (iii) A lecture on data organization and management as part of One Day Training for PhD and MTech

- students organized by Division of Academic Affairs, SCTIMST Trivandrum (21 Oct 2024).
- (iv) Sustainable biomaterials and scaffolding technologies for tissue engineering regenerative medicine. An International on Sustainable Conference Science and Technology for Tomorrow organized by School of Sciences, Woxsen University in association with INTI International University and University College London (virtual, 16–20 Sep 2024).
- (v) A hands—on session on "Image Processing and Analysis by Image J for Life Sciences" at Workshop on Image Analysis in Scientific Research organized by Cochin University of Science and Technology, Kochi (29–30 Apr 2024).
- (vi) 3D Bioprinting Skin Tissue Constructs: From Formulation to Preclinical Evaluation. First All India Official Language Scientific and Technical Seminar organized by International Advanced Research Centre for Powder Metallurgy and New Materials, Hyderabad (21–22 Mar 2024).

Other significant achievements

- 1) Dr Anil Kumar PR has become the Advisory Committee for the Health Security under the Technology Vision 2047 of Govt of India, TIFAC, New Delhi
- 2) Dr Naresh Kasoju participated as subject expert in the meetings held by ICMR–DHR, New Delhi on the development of evidence–based guidelines for therapeutic use of stem cells for clinical use (virtual, 2024–25).
- 3) Dr Naresh Kasoju has been invited as a Member of Project Steering Group for reviewing the Investigator Initiated Small Grants 2024 constituted by the Indian Council for Medical Research, New Delhi (virtual, 22 Oct 2024).
- 4) Dr Naresh Kasoju has been invited as a Member of Project Steering Group for evaluating the Investigator Initiated Intermediate Grants 2024 constituted by the Indian Council for Medical Research, New Delhi (virtual, 13 Jun 2024).
- 5) Dr Naresh Kasoju has been invited as Academic



Editor for the International Journal of Biomaterials – a reputed journal dedicated to biomaterials science and engineering published by Wiley group (Mar 2025).

- Dr Naresh Kasoju has been invited as Associate
 Editor for the Journal of Biological Engineering
 – a reputed journal dedicated to biological science and engineering published by Springer Nature group (Mar 2025).
- 7) Dr Naresh Kasoju has been guest editing a special issue on "Frontiers in 3D printing and bioprinting: innovations and applications in regenerative medicine, in vitro toxicology, and beyond" for International Journal of Bioprinting published by AccScience Publishing (2024–25).

VIII. DIVISION OF TISSUE ENGINEERING AND REGENERATIVE TECHNOLOGIES

Aim: The primary objective of this division is to design suitable biological substitutes and tissue–engineered constructs based on the principles of tissue engineering. Additionally, efforts are underway to develop advanced wound dressings and microfluidic paper–based devices for diagnostic applications.

Objectives: Our specific goals include: (a) creating innovative, biodegradable, and biomimetic "designer" scaffolds; (b) studying the regeneration process using adult cells and guiding stem cell differentiation; and (c) elucidating the molecular pathways that regulate growth factors, molecules, and drugs to enhance tissue regeneration. We are also exploring the use of bioprinting technology to produce cell-incorporated tissue constructs for various applications, along with the development of sophisticated wound dressings. The scaffolds and biomaterials produced through conventional methods, electrospinning, 3D bioprinting, and other innovative techniques developed by our division have potential applications in drug delivery, wound healing, and hemostasis. Three PhD students and five project staff are contributing to the research and development activities in the Division.

Mission Statement: Our mission is to advance research and development in biomedical engineering, with a particular focus on tissue regeneration and repair.

Developmental Activities

The Division is developing an injectable hydrogel designed for use alongside microfracture surgery to guide tissue repair or serve as a carrier for autologous chondrocyte implantation. The HyaloCRAFT CHITRA gel is an affordable, biodegradable system enriched with glucosamine components that can be photocrosslinked to form hydrogels capable of regenerating hyaline-like cartilage. Laboratory validation involving chondrocyte culture has been completed, and the process has been validated under clean room conditions. Currently, the product is undergoing assessments for biological safety and plans to study the efficacy in animal models. Additionally, as part of the TRC program, we are working on creating a universal delivery device equipped with a specialized light source for crosslinking, which can be integrated with an arthroscopic system.

New initiatives

The ICMR small grant project with PI: Dr Shivendu Ranjan of IIT Kharagpur and Co–PI: Dr Lynda V Thomas and Dr Harikrishnan VS, entitled "3D Printed Bioresorbable Microneedle array–based sutureless breathable dermal–substitute system for second–degree burn wounds to treat microbial infection, hypertrophic scar, and with skin regenerative properties (3DBioResMiNee)" has been initiated.

Technology Transfer activities.

The lint–free absorbent dressing technology was transferred to Ms Phraction Scientific, who is presently moving to attain a commercial manufacturing license and is initiating their clinical trials.

Research programs:

1. Technology Development and Clinical Validation of an Injectable Hydrogel for Repair of Articular Cartilage Defects

Injectable hydrogel systems have drawn great importance as they show the ability to conform to any shape, irrespective of the defect geometry. The objective of this study is the development of an injectable hydrogel that can be injected in conjunction with microfracture surgery to direct tissue repair or as a carrier system in gel—based autologous chondrocyte



implantation. The HyaloCRAFT CHITRA gel is a cost effective, biodegradable, photocrosslinkable hyaluronic acid-based gel system enriched with glucosamine moieties that can be implanted in conjunction with Microfracture surgery or used as a carrier system for autologous chondrocyte implantation in a minimally invasive arthroscopic or mini arthrotomy procedure, which may decrease the postoperative recovery and rehabilitation procedures. The gel shows good rheological properties, especially viscoelastic parameters like elastic modulus, viscosity, injectability, and flow properties. The gel is also cytocompatible, and the Hemocompatibility results give an assurance to the material without forming any haemolysis, coagulation, inflammation, or immune reactions. These gels are also found to be highly stable. To ensure the effectiveness of the hydrogel solution, encapsulation with primary chondrocyte cells has been performed. To ensure the effectiveness of the hydrogel solution, encapsulation with chondrocyte cells was being done. The study plan was to carry it out at two time points of 14 and 28 days. The study covers the biochemical properties, gene expression studies, immunocytochemical characterization, and live/dead assay. This project is being funded by the DBT accelerated translational grant for commercialisation.

2. Chondroinductive and chondroprotective small molecules decorated photocrosslinkable gel matrix systems for autologous chondrocyte Implantation (ACI) – a regenerative approach scaffolds.

Autologous chondrocyte implantation (ACI) is a commonly employed surgical method for repairing damaged cartilage tissue. The first-generation ACI involved injecting cultured chondrocytes directly into the defect site and covering it with periosteum, a procedure that was technically complex. The second-generation ACI utilized a collagen membrane to cover the cellloaded defect, but challenges remained with ensuring consistent cell retention and uniform distribution within the defect. The third-generation approach introduced resorbable three-dimensional (3D) matrices to seed chondrocytes, which are then reimplanted into the defect site. However, treating irregular or large defects often led to graft detachment issues. To overcome these limitations, researchers have explored gel-based matrices encapsulating chondrocytes. Nonetheless,

maintaining the chondrogenic phenotype within these gels remains a significant challenge. In response, a novel injectable, photocrosslinkable hydrogel system based on glycosaminoglycans has been developed. This system incorporates chondroinductive and chondroprotective small molecules, with their release profiles being carefully evaluated. This proof—of—concept study aims to create an improved environment that promotes the regeneration of hyaline—like neocartilage. This research is expected to lead to a patentable injectable hydrogel system that combines a cocktail of chondroprotective and chondroinductive agents, enhancing the efficacy of the ACI technique.

3. Designer small diameter vascular grafts for reduced neointimal hyperplasia through triggered release of All–trans retinoic acid (atRA) from biofunctionalized Gelatin–vinyl acetate–PCL fibrous scaffolds'

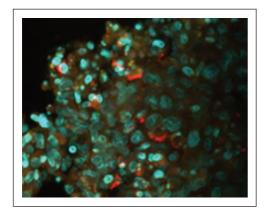
In this study, a dual electrospun tissue-engineered vascular graft was fabricated with a unique two-layer design. The inner layer consisted of thermoplastic polyurethane incorporating all-trans retinoic acid (atRA)-loaded nanoparticles, while the outer layer was made of a copolymer blend of gelatin and vinyl acetate blended with polycaprolactone (GeVAc-PCL). The release profile of atRA was investigated, along with its potential to induce differentiation of smooth muscle cells (SMCs) into a contractile phenotype. Adiposederived mesenchymal stem cells (ADMSCs) were isolated, and their differentiation under the influence of atRA was studied. To provide kink resistance and structural integrity, the tubular scaffold was reinforced with a nitinol braided system. Nitinol wires, widely used in medical devices, are known for their biocompatibility and shape-memory properties, making them ideal for this application. The localized and controlled delivery of atRA in smaller, effective doses minimizes neointimal hyperplasia, and the nitinol braid provides mechanical support to the vascular grafts. Ms Asha Nath, PhD student, is working in this project.

4. Small molecules decorated photocrosslinkable gel system enabling chondrogenic differentiation of mesenchymal stem cells towards a "microfracture plus" therapeutic strategy.

Regenerating hyaline–like articular cartilage remains a major challenge in both clinics and research.



Injectable hydrogels are widely used as scaffolds for cartilage repair, but maintaining cell phenotype and function within these systems is difficult. Incorporating small molecules as bioactive agents offers a promising strategy to enhance cell behaviour and improve cartilage tissue engineering outcomes. This work which is part of the PhD work of Ms Kirthana aims to develop an injectable photocrosslinkable hydrogel scaffold (CHMA & PEGDA-based) incorporating small molecules to support mesenchymal stem cell differentiation and enhance cartilage regeneration, particularly when combined with microfracture techniques. Over the past year, non-toxic concentrations of selected small molecules were tested to determine their effectiveness in promoting both chondrogenesis and chondroprotection. Bone marrow-derived mesenchymal stem cells (BMMSCs) were differentiated in vitro over 28 days by culturing on both tissue culture plates and as pellet cultures. The resulting chondrocytes were evaluated for morphology and function using RT-PCR, biochemical assays, and confocal microscopy. The most effective concentrations were then incorporated into CHMA/ PEGDA hydrogel systems to study their impact in a 3D environment over another 28-day period. Chondrogenic potential was assessed through GAG and collagen quantification and immunostaining for specific marker genes, with an upregulation of anabolic genes observed. Drug-induced protective effects were evaluated by measuring reactive oxygen species, nitric oxide levels, and overall cell health. Additional small molecules are currently being investigated.



3D confocal imaging of differentiated chondrocytes on Honokiol–loaded CHMA/PEGDA hydrogels, stained for Collagen II and Aggrecan.

5. 3D Printed Tissue engineered Islet transplant system (3D–PITS)–Influence of extrinsic factors and microenvironment for protecting and enhancing the viability and functionality of differentiated islet–like clusters

Diabetes mellitus (DM) is a complex metabolic disease characterized by impaired insulin secretion in response to glucose, resulting from the autoimmune destruction of pancreatic β-cells, insulin secretion, and or insulin resistance. Oral hypoglycemic medications and insulin therapy are the primary treatments for diabetes mellitus; however, they do not replicate the natural pulsatile release of insulin. This limitation makes it challenging to maintain normal blood sugar levels and increases the risk of long-term complications and hypoglycemia. Therefore, the development of islet-like clusters (ILCs) from stem cells on a three-dimensional scaffold mimicking the natural islet environment for transplantation in Type 1 Diabetes Mellitus (T1DM) patients has been explored. Furthermore, encapsulating transplanted ILCs in a polymeric immunoprotective device will ensure their safe delivery and protect them from the host immune response. The present project underscores the critical role of cell-matrix and cell-cell interactions in sustaining the viability and functionality of islets. It aims to explore the application of specific extrinsic factors that may enhance the performance of the 3D-PITS device. The current project aims to develop a novel strategy for islet transplantation using adipose derived mesenchymal stem cells transformed into islet-like clusters, potentially revolutionizing the approach to islet transplantation. Ms Rukhiya Salim, PhD student is also doing research in this area.

6. Development of a Biomimetic gel system and a multifunction arthroscopic device for Autologous chondrocyte implantation—

The main aim of this work is the development of an injectable gel system and the multifunction arthroscopic device that can both deliver the gel and also photocrosslink it directly at the injected site. A prototype for the injector system of the arthroscope is being designed. Moreover, the biomimetic gel system was standardised based on the crosslinking efficiency.



Testing and evaluation

Informally extended contact angle analysis and FTIR testing facility has been provided to members of other labs on campus and external labs. Other free testing services provided include inverted and upright fluorescence microscopes, lyophilizer, viscometer, etc., offered to members of many labs on campus

Testing samples were received for the following instruments:

1) FTIR, 2) Contact angle, 3) Microplate Reader (Synergy H1), 4) RT–PCR

Total number of testing requests during 2024–25.

- 1) FTIR 3 test requests
- 2) Contact angle 15 test requests
- 3) Microplate Reader (Synergy H1) 2 test requests
- 4) RT-PCR 17 test requests

Training/outreach programs

Dr Lynda V Thomas

(i) Conducted a session as faculty for workshop under Orthobiologics in Sports Medicine on Scaffolds of practical use conducted on 14th June 2024 at Ortho-One Orthopedic Speciality Centre, Coimbatore; (ii) Presented an invited lecture on Basics in Cartilage Biology - Advent of Small Molecules on 14th June 2024 at Ortho-One Orthopedic Speciality Center, Coimbatore; (iii) Attended the Laboratory System and Internal Audit training as per ISO/IEC 17025:2017 organized by Training and Capacity Building (TCB) Cell, Quality Council of India at Chennai, Tamil Nadu held on 01–03 July 2024; (iv) Presented a paper entitled 'Exploring the potential of small molecules as Chondroprotective agent for cartilage repair at the Indan Cartilage Congress to be held in Nagpur on 28– 29th November 2024' and was awarded ICS –ICRS fellowship for the year 2024.; (v) presented an invited talk on 'Scaffold fabrication technologies in tissue engineering - challenges and future perspectives' at the 5th Global Regenerative Summit held on 22–23rd November 2024 at Sri Lalithambigai Medical College, Chennai.; (vi) Presented a paper entitled 'Exploring the potential of small molecules as Chondroprotective agent for cartilage repair' at the Indian Cartilage

Congress held in Nagpur on 28–29th November 2024.; (vii) Presented an invited talk entitled 'Bioengineering 3D liver cancer tissue models using tissue engineering approaches – challenges and future perspectives in scaffold development' at the Indo–French Seminar on Novel Approaches in Inflammation, Vaccine Development and Therapeutics in Liver Cancer organized by INSERM and ILBS held in Paris France from 28th –29th January 2025.

Other significant achievements:

- Dr Lynda V Thomas was awarded Certificate of Appreciation for procuring a grant of one crore and above during the Convocation held at the Institute.
- Ms Rukhiya was awarded RSC Journal second prize for the poster competition for the TransMedTech conference 2024

IX. THROMBOSIS RESEARCH

The Division of Thrombosis Research conducts research and development activities, provides technical support for the product development, and contributes to the academic programmes of the Institute. In research and development, our focus is on 3D bioprinted tissue constructs, advanced Haemostatics materials, combinational matrices for wound healing, off-the-shelf blood-derived products, autologous blood-derived products, and point-ofcare devices. The Division offers in-vitro blood compatibility testing as per the ISO/IEC 17025 quality platform. The Division is accredited with COFRAC, France, with more than 23 accredited tests for blood material interaction studies for medical devices, and provides testing services for national and international medical device industries and researchers.

Developmental Activities

1. Electrospun Polymeric Membranes as Leukodepletion Filter media: This project focuses on the development of electrospun polymeric membranes as advanced leukodepletion filter media. Importantly, this approach also explores the recovery of captured WBCs from the membrane, opening up opportunities for downstream diagnostic, therapeutic, or research applications, such as immune profiling or cell–based



assays. The study presents a cost-effective, efficient, and multipurpose filtration strategy suitable for use in transfusion medicine and biomedical research. Electrospun membranes offer high tunability in fibre architecture and porosity, enabling efficient WBC capture with minimal loss of red blood cells and platelets. Through surface modifications like plasma treatment, the membranes exhibit enhanced hydrophilicity and biocompatibility. The mechanical properties of the membranes were characterised using Universal Testing Machine (UTM), Dynamic Mechanical Analysis (DMA), and the functional group characterisation was done using Fourier Transform Infrared Spectroscopy (FTIR). surface wettability of the membranes confirms that after plasma surface treatment, the hydrophilicity significantly improved. In vitro cytotoxicity (MTT and direct contact assays) confirmed that the materials were non-cytotoxic. Flow cytometry studies demonstrated >99% leukodepletion, with improved flow rates in plasma-treated membranes.



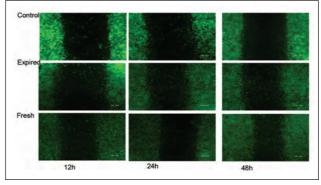
Design of Syringe filter prototype.

2. Development of an advanced thrombin–based haemostatic patch :

Human thrombin–based advanced hemostats are imported in India and are highly priced. In this project, we developed an advanced indigenous hemostatic patch consisting of a chitosan– Polyvinyl alcohol sponge impregnated with human thrombin in different shapes and sizes. Developed patches were evaluated for their cytocompatibility and hemocompatibility. The physicochemical characterization of the patches was also done. The in vitro blood clotting index assay was carried out to evaluate its functionality. The blood clotting efficacy was compared with the two commercially available haemostat and efficacy was found to be >10 times in comparison with the compared commercial haemostats



Different sizes and shapes of haemostatic patches for different applications



FDA staining images of scratch wound assay showing comparative effect of platelet lysate prepared from fresh and expired platelets on fibroblast cells.

3. Development and evaluation of a platelet-rich plasma-based therapeutic cocktail for hemostasis and tissue regeneration: Platelets are reservoirs of bioactive agents like growth factors and cytokines, which can be used for regenerative therapies. Due to their short shelf life, around 30% of stored platelet bags are often discarded in the blood banks yearly. This study aims to utilize these expired platelets for preparing a therapeutic cocktail for hemostasis and tissue regeneration. The study successfully optimized a protocol for the preparation of platelet lysate (PL) from both fresh and expired platelet-rich plasma (PRP). Further optimization of platelet count and PL concentration established an ideal range for maximizing regenerative potential in vitro. Results of in-vitro study suggest that expired PRP, which would otherwise be discarded, can be effectively repurposed into a valuable therapeutic product for tissue regeneration.

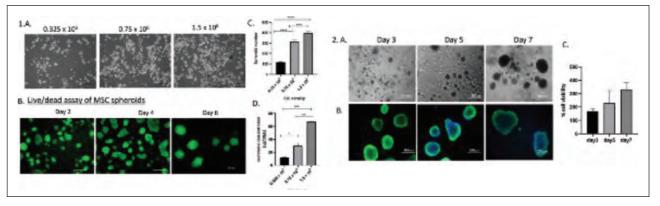


New initiatives

- 1. Development of a technology for the preparation of haemostat for personalized therapeutic application: Haemostats have widespread applications in treating traumatic injuries, surgical bleeding control, and regenerative therapies. This project aims to prepare point—of—care technology for the preparation of an autologous thrombin and platelet—rich fibrinogen concentrates for the surgical haemostatic and wound healing applications
- 2. Development of the Skin tissue construct as testing platform for drugs and cosmetics: To curtail the need of cosmetic and drug testing and to reduce animal testing, 3D bioprinted constructs are getting attention. In this initiative, 3D bioprinted dual layer construct is analysed for barrier function test and permeability analysis as per the standard guidelines. The construct will be further validated as a testing platform for cosmetics and drugs.

Research programs:

1. Exploring the effect of secretome of plateletmesenchymal stem cells spheroids on angiogenesis and healing in chronic wounds: As part of this research project mesenchymal stem cell (MSC) seeding densities in 3D cultures was optimized to enhance spheroid formation and secretome yield. MSCs cultured in ultra-low attachment plates formed spheroids across all tested cell counts (0.325 \times 106, 0.75 \times 106, and 1.5×10^6 cells). However, higher seeding density (1.5) × 10⁶ cells) resulted in larger and more numerous spheroids by day 2, maintaining viability up to 7 days and producing higher concentrations of bioactive factors. An alginate-gelatin-carboxymethyl cellulose (CMC) composite hydrogel (ALG+GEL+CMC) was utilized to promote spontaneous mesenchymal stem cell (MSC) spheroid formation, providing a biomimetic and scalable 3D culture platform. Spheroids formed within this matrix exhibited high viability and compact morphology, comparable to those produced by conventional suspension culture



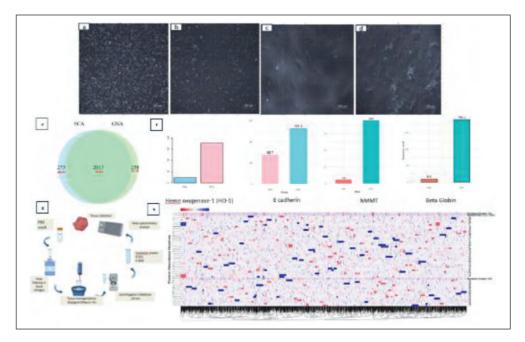
Optimization of MSC cell count for 3D culture for secretome preparation. a. Representative phase contrast images of spheroids formed from MSCs at different seeding density b. Live/dead images of MSC spheroids formed from 1.5 x 10⁶ cells cultured in DMEM for 6 days and secretome quantification. 2. Alginate–gelatin–CMC hydrogel promoted spontaneous formation of MSC spheroids. A. Representative phase contrast image of spheroids formed spontaneously in Alginate–gelatin–CMC hydrogel and in vitro culture up to 7 days. B. Representative live/dead images of spheroid bioink cultured at day 3, 5,7. C. Percentage cell viability of cultured spheroids.

2. 3D printed pituitary adenomas as a model system to study molecular mechanisms for endocrine tumors: As part of this project, pituitary adenoma tissue samples were collected from patients following approval from the Institutional Ethics Committee.

Cells were isolated from the tissue sample. Proteins were extracted from the collected samples using an optimized isolation protocol. The protein extracts were then subjected to deep proteomic analysis using liquid chromatography—mass spectrometry (LC—MS).



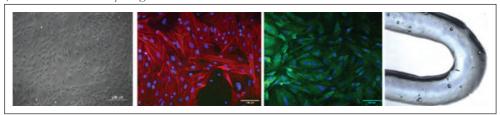
Statistically significant proteins were identified based on the abundance ratio between SCA and GNA groups. By analyzing the grouped abundance values across samples, proteins that were highly expressed in each group were identified. Notably, the differentially expressed proteins included nicotinamide N-methyltransferase (NNMT), beta-globin, heme oxygenase, and E-cadherin.



(a–d) Representative images of pituitary adenoma cell culture (e) Venn diagram showing the proteins in SCA vs GNA groups (f) Bar diagram representing the expression of high abundant proteins in SCA group like Heme oxygenase, E–cadherin, NMMT, Beta globin (g) Protocol for protein isolation from pituitary adenoma (h) Heatmap showing the hight abundant proteins in each sample group.

3. Natural polymer–based multicomponent 3D bioprinted vascularized skin construct as an optimal skin substitute: For 3D bioprinted tissue construct vascularization is critical to get host tissue integration. In this study, we explored vasclarization in an optimized hydrogel formulation using co–axial printing. As part of this project, three different hydrogel formulations

containing Alginate, collagen peptide, and fibrinogen based on their physicochemical, mechanical, and biological properties, printability were optimized. Dual–layer skin constructs were printed using an optimized formulation. Optimisation of vascularization is ongoing.



Phase contrast images of Rat skin fibroblast cells for explant culture, actin staining of the rat fibroblast cells, Vimentin staining of rat fibroblast cells, Stereo image of coaxial bioprinting blue color indicating the inner channel and white indicating outer channel



Service/Academic activities:

Testing and evaluation

In-vitro haemocompatibility testing performed for 23 work orders, covering a total of 254 hematology analyses and 305 coagulation tests (including PTT, PT, and fibrinogen) with comprehensive reports issued. Biochemistry tests, including measurements of pH, 2,3–DPG, ATP, sodium, potassium, and glucose, were carried out on 15 samples. Plasma hemoglobin levels and percentage hemolysis were analyzed in 87 samples. Platelet aggregation studies were conducted on 156 samples received from our hospital and external healthcare facilities. As part of quality assurance efforts, inter-laboratory comparison (ILC) testing was completed for 24 hematology samples, 8 biochemistry samples, and 12 coagulation samples. Rheological analyses comprising amplitude sweep, frequency sweep, time sweep, and temperature sweep tests—were performed on 95 samples. Flow cytometry was conducted on 385 samples for both research and testing applications. One research project, "Evaluation of Blood Compatibility titled and Cytotoxicity of Biopolymer-Flavonoid Nanosystems," was successfully completed and reported. Thirty fives samples were analyzed for potassium concentration as part of a study to develop a proof of concept for a potassium adsorption filter intended for PRBC transfusion units.

Training/outreach programs

- Organized a workshop on flowcytometry on 22nd Aug to 24th August 2024
- Indo—US flowcytometry workshop was conducted on 11th to 13th February 2025.
- Dr Anugya Bhatt delivered an invited talk in the 16th annual conference and workshop organized by the Cytometry Society India from 17th to 20th October at ACTREC, Tata Memorial Centre, Navi Mumbai
- Dr Renjith P Nair delivered an invited talk at SN College Varkala as part of National Science Day

- organized by SN College Varkala in association with the Kerala State Council for Science, Technology and Environment (KSCSTE) on 4th February 2025.
- Dr Renjith P Nair and Ms Aparna presented papers in the 65th Annual Conference of the Indian Society of Hematology & Blood Transfusion, Haematocon 2024, on 9th November 2024, Nagpur, India.
- Dr Renjith P Nair delivered an invited talk at Eklavya Model Residential School, Wayanad, as part of National Science Day 2025 celebrations on 02/03/2025.
- Dr Renjith P Nair delivered an invited talk at St Stephens College, Pathanapuram, as part of National Science Day 2025 celebrations on 25th February 2025
- Dr Renjith P Nair delivered an invited talk at MM NSS College, Kottiyam as part of National Science Day 2025 celebrations on 24th February 2025

Other significant achievements:

◆ Ms. Athira K. R. has won the Travel Award Prize in the Basic Sciences Category for attending the 16th Annual Conference of The Cytometry Society (India), organized on 19th & 20th October 2024 at ACTREC, Tata Memorial Centre, Navi Mumbai, in collaboration with ICMR—NIRRCH, & ICMR—NIIH, Mumbai

X. DIVISION OF TOXICOLOGY

The Division of Toxicology is a leading lab for pre-clinical evaluation of materials and medical devices, adhering to international standards like ISO, USP, and ASTM. Accredited by COFRAC France under ISO 17025, the division conducts biocompatibility tests to assess toxicity and potential biological hazards, ensuring safety during clinical use. Recognized by CDSCO, it offers 13 accredited in vivo tests and specializes in evaluating medical devices, pharmaceuticals, nanomaterials, and tissue–engineered products.



Developmental Activities

The division is developing multi-organ-on-a-chip technology for pre-clinical toxicity evaluation. This innovative platform integrates interconnected organ models on a microfluidic chip, enabling the study of complex interactions and systemic effects of drugs and materials. Expected to provide more accurate and predictive toxicity and biocompatibility data, this technology enhances the reliability of pre-clinical testing and reduces reliance on animal models.

Service/Academic activities:

Testing and evaluation.

During the year, 63 materials were evaluated for toxicity and issued 37 Accredited and 20 Non–accredited reports. The statistics of report generation are as follows: Acute systemic toxicity—16, Guinea pig maximization test—6, Implantation in bone—1, Closed patch test—3, Intracutaneous reactivity test—10, chromosomal aberration micronucleus test—1, Physicochemical analysis of potable water for various divisions—20.

Staff details-Department of Applied Biology

Dr T V Anilkumar, Scientist G and HoD

Dr Anoopkumar Thekkuveettil, Scientist G

Dr A Maya Nandkumar, Scientist G

Dr P R Umashankar, Scientist G (Veterinary)

Dr Kamalesh K Gulia (Faculty), Scientist G

Dr Anil Kumar P R, Scientist G

Dr Sachin J. Shenoy, Scientist G (Veterinary)

Dr A Sabareeswaran, Scientist G

Dr Anugya Bhatt, Scientist G

Dr Harikrishnan V S, Scientist G

Dr Lynda Velutheril Thomas, Scientist F

Dr Remya N S, Scientist E

Dr Naresh Kasoju, Scientist D

Dr Renjith P Nair, Scientist D

Mr Pradeep Kumar S S, Junior Scientific Officer

Dr Geetha C S, Junior Scientific Officer

Mr Anil Kumar V, Senior Scientific Assistant (Lab)

Mrs Sumitha K C, Senior Scientific Assistant (Lab)

Mr Joseph Sebastian, Scientific Assistant

Mr Santhosh Kumar R, Senior Technical Assistant (Lab)

Ms Reeja Rani D C, Senior Technical Assistant (Lab)

Ms Sreedevi V S, Technical Assistant (Lab)-B

Ms Manju G Nair, Technical Assistant

Ms Neena Issac, Technical Assistant (Lab B)

Ms Ashtami Dev S, Technical Assistant (Lab A)

Ms Sudha Chandran, Technical Assistant

Mrs Lekshmi A V, Technical Assistant (Lab)-A

Ms Smitha P, Technical Assistant (Anaesthesia)–A

Mrs Shyama S, Technical Assistant (Lab)–A

Mr Biju V, Laboratory Animal Care Taker A

Mr Manoj Kumar K, Laboratory Animal Care Taker A

Mr Sunil Kumar M, Animal Handler – B

Mr Sunil L, Animal Handler A

Mr Vishnu R, Animal Handler A

Mr Manoj M, Lab – Animal Attendant

DEPARTMENT OF BIOMATERIALS SCIENCE AND TECHNOLOGY

The Department focuses on the development of biomaterials and affordable products for various biomedical applications. The research teams are pursuing state-of-the-art developmental work related to nano-biomaterials, bone graft substitute materials, bioceramic coatings, drug-eluting ceramic structures. advanced polymeric compositions, nano/micro delivery systems, Wound dressing materials, microneedles, 3D printing, mucoadhesive patches, haemostatic sponges, bioactive cements, dental restorative materials, etc. These are being explored for various applications like bone tissue engineering, regenerative dentistry, drug and biologics delivery, photodynamic and photothermal therapy, biosensors, and diagnostic devices. Products being designed include bioceramics-based graft materials, biocompatible and resorbable polymer scaffolds for tissue engineering and wound healing, mucoadhesive bandages, and organically modified composites.

The Department of Biomaterials Science and Technology (DBST) has been instituted with a vision of being a centre in the country for the synthesis and evaluation of biomaterials for various biomedical applications. DBST consists of four divisions.

(I) Division of Bioceramics, (II) Division of Biophotonics and Imaging, (III) Division of Biosurface Technology, and (IV) Division of Dental Products

I. DIVISION OF BIOCERAMICS

The Division is primarily engaged in developing bioceramics—based tissue repair materials for orthopaedics and dentistry. The research team is working on the design of related products, their evaluation, and technology transfer. Current research areas of interest are bone graft substitute materials, bioceramic coatings, drug delivery systems, and nerve guide conduits.

Developmental Activities

The Bioceramics Lab has been working on multiple innovative product development programs. Funding from the Technical Research Center (P8309) has been utilized for the development of a Strontium—doped drug delivery apatite system.

The lab has also worked on developing a Zinc–doped apatite system. The developed zinc system has been utilized to develop a ceramic–extracellular matrix composite. The micronutrient–loaded antimicrobial system is being established. This provides a platform for the deployment of novel bone graft systems with multifarious applications.

The lab is carrying out pioneering work in the development of ceramic titanium composites under a DBT–funded project entitled "Engineered Ceramic—Titanium System" with a sanctioned budget of Rs. 1,70,92,400/—. The institute is collaborating with the Malabar Cancer Centre to ensure that developed interventions will reach patients in need.

Ongoing /progressing

1. Resorbable graded composite membranes that release bioceramic particles in vivo for guided tissue regeneration (GTR):

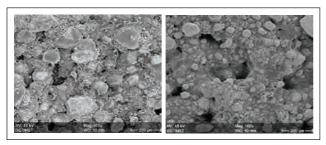
The membrane is essentially a thin polymer sheet with a base layer and a binder layer upon which bioceramic particles are embedded. The base polymer layer is strong enough for GTR applications in dry conditions. The particles will be embedded half–submerged into the binder layer. In wet conditions in the body fluid environment in vivo, the binder part degrades and releases the particles, which will help in the faster regeneration of the defective periodontal bone. The composite membrane was prepared using polycaprolactone (PCL) through multiple solvent–casting, blended with Polyethylene glycol (PEG) at



different weight percentages (from 1 to 10 wt %) to obtain degradable layers. Hydroxyapatite ceramic particles (100–micron size) were disbursed onto the binder layer during solvent drying.

Surface wettability of membrane samples (PCL and PEG added in ratios 1%, 3%, 5%, and 10%) was found in the range of 76 to 80 degrees. In the mechanical tests, the modulus values were above 80 MPa, and the tensile strength was nearly 15 MPa. In–vitro degradation study of the different compositions was done by immersing them in Phosphate Buffered Saline (PBS) at 37 °C and measuring the weight loss. The samples showed higher degradation in an increasing manner with respect to the PEG content. 10% PEG content showed above 12 % w/w degradation in 60 days.

It was seen that a membrane typically carries more than 50% bioceramic particles w/w on it. The degradation accelerated with ultrasound vibrations for 90 minutes, leading to the dislodging of more than 4% loaded particles.



SEM image of the top surface of the membrane with bioceramic particles on resorbable binder layer (Picture on left) and after subjecting to accelerated dissolution driven by ultrasonic probe for 90 min (Picture on right). The gaps and holes represent the locations from which the large particles got dislodged.

Technology Transfer activities.

The product launching function of two innovative drug–eluting bone graft products developed by the Bioceramics team was organised on 24 January 2025 in Trivandrum. The products under the brand names CASPRO and BONYX, manufactured by M/s. Onyx Medicals Pvt. Ltd., Meerut, UP, flagged–off for distribution by Hon. President of SCTIMST, Shri. S. Kris Gopalakrishnan. Several dignitaries, including the Director, SCTIMST, and Senior Orthopedic Consultants, participated in the function, and DST representatives joined online.







Research programs:

1. Decellularized neurocompatible substrates for peripheral nerve repair:

Peripheral nerve injuries are challenging because nerves have limited regenerative capacity, and functional recovery is to be achieved at the earliest. Tissue engineering approach gives a lot of promises for substrates that promote nerve regeneration. Among these, biocompatible, resorbable polymeric substrates with a biomimetic surface are preferred. This study focuses on the development characterization of Polycaprolactone-Polyvinylpyrrolidone (PCL-PVP) substrate with decellularized coating for peripheral nerve repair. The substrate design leverages the mechanical stability and tuneable degradation properties of PCL while incorporating PVP to enhance hydrophilicity and cell compatibility. The substrate was fabricated using solvent casting techniques, and Neuronal cell lines were cultured onto the surface. A decellularization process was done to remove cellular components and immunogenic material, ensuring while preserving structural and biochemical cues essential for nerve regeneration. The biocompatibility of the decellularized PCL-PVP substrate was assessed using neuronal cell culture, which showed robust cell attachment, proliferation, and alignment along the porous architecture, critical for guiding the axonal regrowth. Its ability to support cellular activity,

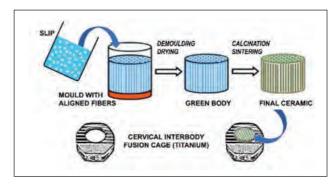


guide axonal growth, and promote functional recovery positions it as a potential alternative to traditional nerve repair methods.

2. Slip casting technique for making ceramic cages with open aligned pores for vertebral fusion:

In ceramic processing, slip—casting is an important technique in which slurries of the precursor are made and poured into a mould which can replicate the intended features and converted to final ceramic structure. In the work, slip casting is adopted to make a vertically porous ceramic cage for vertebral fusion. A stable and castable HA slurry was developed through systematic optimization of dispersant, binder, pH, and solid loading parameters to fabricate aligned open-channel ceramic scaffolds via slip casting. Sodium polyacrylate, an anionic polyelectrolyte, served as an effective dispersant by enhancing the colloidal stability of HA suspensions through electrostatic repulsion. Optimal dispersion was achieved at 4 wt% sodium polyacrylate and pH 10.5, resulting in zeta potentials up to -50 mV and stable dispersions for over 10 hours. Various binders, including PVA, PEG, dextran, and starch, were evaluated for their impact on green and sintered density as well as mechanical performance. PVA emerged as the optimal binder, offering the highest compressive strength (≈180 MPa) and sintered density (2.42 g/cm³) at 4 wt% concentration. FTIR confirmed complete burnout of PVA post-sintering, indicating effective removal of organics. Viscosity studies revealed that slurries with 55 wt% solid content provided the best compromise between castability and particle packing, maintaining sufficient fluidity for complex mold infiltration while preventing sedimentation. Aligned open-channel hydroxyapatite (HA) scaffolds were successfully fabricated via slip casting using a sublimable fiber templating technique, enabling precise control over directional porosity. Post-casting, sintering was done at an optimum temperature of 1200 °C, and the ceramic samples were evaluated for crystallinity, densification, mechanical strength, and biological properties. Protein adsorption studies revealed enhanced protein binding in aligned scaffolds due to increased surface area from the channel architecture.

In vitro cytocompatibility was validated using L929 fibroblast cultures. Direct contact assays showed intact cellular morphology (Grade 0 cytotoxicity), and Alamar Blue assays confirmed high viability (~90%), indicating that the fabricated HA scaffolds are non–cytotoxic and suitable for biomedical applications such as bone tissue engineering.



Schematic of the slip casting steps of vertically porous ceramic cage for vertebral fusion

Service/Testing

The Division provides testing services for materials characterization – (i) X–Ray Diffractometry, (ii) Microhardness testing, (iii) Infrared spectrometry, and (iv) Elemental analysis using AES–ICP.

Academic activities

The PhD Colloquium by Ms. Gayathry G, PhD Scholar with Dr Manoj Komath, was conducted on 19.02.25 on the thesis topic "Development of hybrid bioceramic bone grafts with open channel structure incorporating osteoinductive cues".

Training/outreach programs

A training program, "Publishing a Research Paper" was conducted on 25.07.2024, for the researchers of the Institute by Dr Manoj Komath.

A lecture on "Biomedical Research and Translation of Products" was delivered on 4th March 2025 by Dr Manoj Komath in the One–Day Workshop on Biomedical Innovations (An Awareness Program for SC/ST Candidates) conducted in the BMT Wing. More than 35 candidates participated.



Awards

- 1. Ms Gayathry G, PhD Scholar with Dr Manoj Komath in the Division of Bioceramics, has got the Padmanabhan Ramamani Endowment Award for the Best Paper (Student Category in Health Sciences) for the work entitled "Hybrid Ceramic Grafts: Enhancing Bone Regeneration in Orthopaedic Defect Repair" at the 37th Kerala Science Congress held at Kerala Agricultural University, Thrissur, during 7–10 February 2025.
- Ms Saranya S S, Ph.D. Scholar with Dr Manoj Komath, has been awarded the Best Oral Presentation (Third position), for the work entitled "Neurocompatible PCL and Polyvinylpyrolidone Patterned Blended Substrates for Peripheral Nerve Repair" at the International Conference on Biopolymers and Green Composites (BPGC–24) organized by CIPET, Kochi, during 18th and 19th October, 2024.
- 3. Dr Manoj Komath received the "Trailblazer in Research Dissemination" Award on 7th February 2025 at the "International Conference on Craniofacial Pathology and Biology (ICCPB 2025)" organised by the Department of Oral Pathology and Oral Biology, Saveetha Dental College, SIMATS, Chennai.

IL DIVISION OF BIOSURFACE TECHNOLOGY

The main research focus is on the development of biomaterials and drug delivery systems for various therapeutic applications.

Main thrust is on translational research towards product development in the area of advanced wound care, focusing on controlled drug delivery systems for biologically active molecules and other drugs using polymeric scaffolds and nano/microparticle—based drug delivery systems.

The division's mission is to develop polymeric biomaterial—based systems for wound healing and drug delivery towards clinical applications and their translation to a product.

Developmental Activities

Development of organ preservation medium for organ transplantation: Organ transplant arises as a necessity

in patients with terminal organ failure. However, there are enumerable challenges associated with organ transplantation. Apart from the non-availability of organs, there are other limitations associated with organ transplantation. Among these, one is the need for improved alternatives for organ preservation medium. Currently, there are many organ storage solutions available, mostly from the US or European countries. Though all these solutions vary slightly in their composition, the purpose is to minimize the injuries that occur in ex vivo conditions to maximize the organ re-functioning. As per reports, though there is a shortage of organs for transplant in India, ours is the third largest country in the number of transplants done per year. The highest number of organ transplantations was of the kidney. In this work, it is proposed to develop a medium for preserving the organ patency by minimising the possible damage arising following surgical removal and storage before transplantation. Developed different formulations of organ preservation medium. Currently, two variants of this solution are being developed. Cell viability studies were done and found to be cytocompatible. Ex vivo studies using rat aorta demonstrated that the in-house formulation retains cell viability highly in comparison with the predicate solution. In vivo assessment using rat kidney explants is ongoing.

New initiatives

Nasal Pack: Chitosan—based sponges are designed in the form of tampons which can be easily kept within the nasal cavity. These chitosan sponges are water water—absorbing material that can compress the bleeding blood vessel. Moreover, the antibiotics that can be loaded onto these sponges can be delivered to the wound site following the surgery.

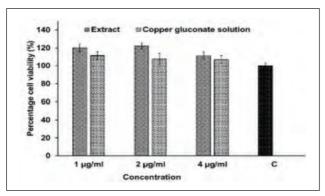
Research programs:

1. Studies on chitosan based wound material–cell interactions and its impact on wound healing:

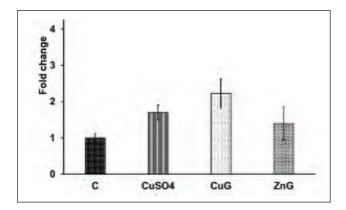
To investigate novel therapeutic strategies aimed at modulating the wound microenvironment, a proline–conjugated chitosan scaffold is utilized as an effective carrier for the targeted delivery of therapeutic ions for a better wound healing state. A cell proliferation assay was conducted on L929 cells using the CCK–8 Kit to assess the effects of various concentrations of copper gluconate and extracts derived from ion–loaded chitosan–proline



(CS-P) scaffolds (Fig. 1). The results demonstrated a marked enhancement in the proliferation rate of L929 cells following treatment with the samples, showing statistically significant differences compared to the control group. Additionally, an in vitro scratch wound assay was performed on both L929 and HaCaT cells to investigate the wound-healing properties associated with copper ions. The findings revealed that exposure to copper gluconate at a concentration of 3.4 μ g/ml notably stimulated the migration of fibroblasts and keratinocytes, leading to improved wound closure compared to the untreated control group. Furthermore, the effect of copper and zinc ions on Col α 1 gene expression in L929 cells was analyzed by RT-PCR. After treatment with extracts from the ion-loaded CS-P scaffolds, the results indicated an enhanced gene expression profile in the mouse fibroblast cell line.



CCK-8 assay. Impact of copper ions on L929 cell proliferation



Col a1 expression in mouse fibroblast cell line. Fold change in expression, as measured by RRT–PCR analysis, reveals increased mRNA expression after 24 h exposure to extracts of ion–loaded CS–P scaffold.

2. Stimuli-responsive matrices for localized drug delivery

In chronic wounds, high levels of reactive oxygen species, inflammation, and elevated levels of enzymes are present, which disrupt the normal healing process. Therapeutic molecules have been used to enhance wound healing. But the dosage of the drug administered mostly does not reach the targeted site. Higher dosage of the drug can cause systemic toxicity. To overcome this, Stimuli–sensitive chitosan scaffolds for wound healing studies have been developed. This will respond to wound microenvironment and deliver the therapeutic molecule in the needed dosage to the targeted wound site without causing systemic toxicity. Several characteristics are there for a wound dressing that are porous nature, swelling ability, drug release property, and most importantly non cytotoxic to cells. Chitosan has been conjugated with different molecules to develop the stimuli-sensitive scaffolds, and their physicochemical characterisation studies, biological evaluation studies were done.

The porous morphology of the scaffold was analysed from the FESEM images. The surface of the CSDTP matrix was smooth without any cracking. HPLC analysis of released insulin from CSDTP: The retention time of insulin released in phosphate buffer within 24 h and 48 h has no shift in comparison with insulin standard. Since there is no change in retention time it shows that there is no degradation of insulin by matrix—biomolecule interaction. In vitro direct contact test of the CSDTP scaffold showed no signs of cytotoxicity on the L929 cells, and the cell morphology remained unaffected.

Development of CS–CYS scaffolds and their characterisation studies: swelling ability, degradation property, and drug release efficiency of the scaffold were assessed. In vitro cytotoxicity study using L929 fibroblast cells on CSCYS scaffold showed no toxicity to cells. in vitro direct contact assay, the scaffold showed no signs of cytotoxicity on both L929 cells and HaCaT cells. In vitro ROS scavenging activity of the CSDTP and CSCYS scaffold was checked by DCFDA assay, the result shows that the material has ROS scavenging property. Drug–releasing ability of the conjugated chitosan scaffold (CSCYS) was studied in



phosphate buffers of different pH. Cumulative release percentage of the drug insulin in different pH was found to be 40% in 24 24—hour time period.

3. Polymeric nano drug delivery systems for solid tumor anticancer applications

Cancer treatment requires multiple levels of investigation. Chemotherapy is the first-line treatment approach for cancer, but it still faces many challenges, such as poor tumor selectivity, toxicity, and multidrug resistance (MDR). A diverse array of nanocarriers has been developed, decisively addressing chemotherapy's limitations and revolutionising the treatment approach. Recognising the intricate physiological characteristics of the tumor microenvironment (TME), the development of chemotherapy with nanotechnology is a promising strategy for effective treatment. The tumor microenvironment plays a unique role in tumorigenesis, growth, and metastasis. Tumor microenvironment stimuli sensitive features, such as mild acidic pH and redox environment, could be utilised efficiently to release the anticancer drugs in tumor cells. Stimuli-responsive nanoparticles are a promising approach because they enable the safe delivery of drugs and control their release at tumor sites. In our work, a pH/redox-responsive cationic pullulan nanoplexes were designed by synthesising cationic pullulan through polyethyleneimine conjugation and attaching anticancer drug Doxorubicin to cationic pullulan through a pH-sensitive hydrazone bond and a redox-responsive disulfide bond. Disulfide linkage was provided with the help of 3' 3'-dithiodipropionic acid (DTPA) through EDC chemistry. Nanoplexes were prepared by complexing calf thymus DNA and pullulan conjugates at different ratios, and their characterisation was performed by DLS. The stability of nanoplexes was evaluated by Agarose gel electrophoresis. The conjugation was established by FTIR and NMR spectroscopy. Stimuli-sensitive release was carried out at pH 6.8, 5.4, and high GSH conditions. In vitro cytotoxicity of nanoplexes, drug release, cellular uptake studies, and live-dead assay were carried out in the breast cancer cell line, MCF-7. The quantification of cell death caused by nanoplexes was performed by flow cytometry analysis. To mimic the TME and to demonstrate deep penetration of nanoparticles, a 3D cell culture method (Spheroids) generation was attempted through suspension culture using the MCF 7 cell line.

Other significant achievements:

Dr Rajalekshmy G P, who completed PhD under the guidance of Dr Rekha M R, won the SPSI Gold medal for best PhD thesis during the period 2023–24 from the Society for Polymer Science India, Trivandrum Chapter.

III. DIVISION OF DENTAL PRODUCTS

The aim of our division is to develop and translate innovative and affordable dental healthcare technologies. to generate highly competent biomaterial scientists through education, training, and research. Currently, the laboratory is engaged in the development of bio/bioactive GTR membrane for periodontal regeneration, biodegradable microneedles, cell encapsulated click gels as bioinks for 3D Bioprinting, modified GIC and polymer scaffolds for tissue regeneration, development of photocrosslinkable bioinks for DLP printing, biodegradable microbeads for trans arterial chemoembolization, injectable hydrogels for bone tissue regeneration, and plasticizer-free polymer network using nanogel additives. Our Mission is to become an internationally recognized team in developing and translating affordable healthcare technologies for the prevention of lifestyle diseases through dental care, training, education, and innovative research

Developmental Activities

1. In situ setting shell nacre cement

Osseointegration of the in situ setting shell nacre cement was studied in a 2mm cortical defect surgery in the midshaft of the femur of Sprague Dawley rats for 6 and 12 weeks. Histology studies of the implantation were completed.

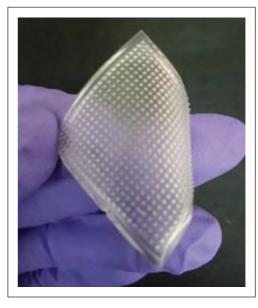
2. Polymer composite membrane for periodontal tissue regeneration

A project entitled "Development and biocompatibility evaluation of a polymer composite membrane for periodontal tissue regeneration" under TRC Phase II was ongoing



- (PI: Dr Lizymol P. P.) As part of technology development for periodontal regeneration, guinea pig maximization test, acute systemic toxicity test, acute intravenous application, acute systemic toxicity test, intracutaneous administration, heamocompatibility test, animal irritation test and *in vivo* preclinical studies of optimised GTR membrane are initiated. Raman spectroscopy analysis of the membrane was completed to confirm the successful loading of the genistein in the membrane.
- 3. 3D Printed Pliable Bioactive Composites for Management of Craniofacial Defects: The project initiated under TRC Phase II is progressing. The 3D printing parameters for printing polymer/ bioceramic constructs were optimized. The composite constructs with enhanced mechanical properties such as tensile strength, compressive strength, and fracture toughness, were fabricated. The in vitro biomineralization studies showed promising bioactivity.
- 4. 3D Printed Bioactive Implants for Cleft Palate Management: The project funded by ICMR, New Delhi is progressing. The research focuses on the development of 3D printable, self—expandable polymer—bioceramic composites for the treatment of cleft palate defects. Optimized composite formulations were engineered to replicate the mechanical properties of the native palate, specifically in terms of modulus and toughness, and subsequently fabricated using 3D printing. The resulting structures were characterized for their physicochemical properties and were found to exhibit the desired attributes consistent with those required for a synthetic palate substitute.
- 5. Dissolvable microneedles mounted on a pliable backing for acaricide delivery: The Project titled "Therapeutic patches with dissolving microneedles for the dermal delivery of acaricides for control of parasitic dermatitis" approved under ANRC–CRG research program and aims at fabrication of larger patches of dissolvable microneedles on mounted on a pliable backing so as to cover larger areas of affected skin. To achieve this, polymer compositions were optimized to obtain patches

containing rigid/solid microneedles integrated on a flexible backing. This is a collaborative project between SCTIMST, Trivandrum, and SIMATS, Chennai.



Dissolvable solid microneedles mounted on a pliable backing for acaricide delivery

- 6. Development of High-Throughput Micro-Needle Array Fabrication Method and System: This project entitled "Development and Evaluation of Batch Production System for Making Microneedle Array Patches for Transdermal Drug Delivery," is a collaborative initiative between SCTIMST Trivandrum and Central Manufacturing Technology Institute (CMTI), Bangalore, and is approved under the DST-TDT/AM program. The project aims at developing a high-throughput batch processing system that would aid in the mass production of microneedle patches. A High-Throughput Micro-Needle Array Fabrication Method and System has been jointly developed under this project.
- 7. Surgical Phantoms for ultrasound imaging: This is a collaborative initiative between SCTIMST Trivandrum and One Simulations Private Ltd., Noida. The project aimed to develop a specialized hydrogel system designed to closely mimic the mechanical and structural properties of biological



- tissue. This biomimetic approach was intended to enhance the effectiveness of ultrasound imaging by providing a realistic tissue—like environment. By simulating the acoustic properties of human tissue, the hydrogel system could significantly improve image clarity and diagnostic accuracy during ultrasound procedures.
- 8. Development of plasticizer-free acrylic denture soft liners using nanogel additives: The project was funded by IYBA/DBT. Soft liners have been widely used in dentistry as they form a cushioned layer between the hard denture base and the oral mucosa and have the potential of improving comfort to patients with ridge atrophy, thin and non-resilient mucosa, bony undercuts, and bruxomania. They are also recommended in the cases of irregular bone resorption, immediate prosthesis, healing after implant placement, and for patients with xerostomia. However, one of the major concerns is the use of high concentrations of plasticizers in acrylic denture soft liners, especially phthalate esters. The plasticizer migration from these polymer networks can cause changes in the mechanical properties of soft liners and compromise elasticity. Because of these characteristics, acrylic soft-liners are used only for a short period of time. The project aims to develop acrylic denture soft liner formulation using nanogel additives without incorporating any small molecule plasticizer such as phthalate esters
- 9. In situ formation of injectable thermoreversible silk protein hydrogel for Guided–Bone Tissue Engineering: The project aims to investigate the use of silk protein–based thermoreversible injectable hydrogels for in alveolar bone tissue regeneration. This project was funded by ICMR, New Delhi, and is a collaborative project with KLE Dental College, Belgavi. The thermoreversible nature of the hydrogel allows it to form a thin film at body temperature, providing mechanical stability and support for tissue regeneration
- 10. Drug–Eluting Mucoadhesive Bandages for oral drug delivery in vitro and in vivo evaluations: This is an ongoing project under TRC Phase

- II. The study aims to develop a three–layer sandwich bandage (Mucoband) that has enhanced mucoadhesive properties and has a sustained drug release profile.
- 11. Development of Kaolin incorporated gellan gum based composite hemostat sponge: This is an ongoing project under Technology Development Fund (TDF, SCTIMST). The project aims to develop a kaolin integrated composite sponge for rapid hemostasis.
- 12. Catheter-directed image-guided delivery of small-molecule chemotherapeutic agents using radiopaque biodegradable microspheres for the treatment of hepatocellular carcinoma: This project was funded by ICMR, New Delhi. Trans arterial chemoembolization (TACE) is a vital treatment option for both early and advanced stages of hepatocellular carcinoma (HCC), especially when other treatment methods are not viable for various reasons. In TACE, HCC nodules are embolized by delivering either radiopaque or non-radiopaque embolic agents directly into the hepatic artery. These embolic agents contain small-molecule anticancer drugs that enhance treatment outcomes by combining chemotherapy with ischemic effects. Chemoembolization with drug-eluting microbeads (DEB-TACE) is similar to conventional lipiodol-based TACE but offers distinct advantages. DEB-TACE can induce permanent embolization and maintain sustained local concentrations of anticancer drugs, unlike conventional TACE (c-TACE), which provides only a temporary embolic effect. However, the repeated use of DEB-TACE can lead to permanent embolization, resulting in decreased liver function. It may also hinder the ability to access previously embolized vascular beds in case of recurrence. Additionally, the lack of radiopacity in standard drug-eluting microbeads necessitates the use of an extra contrast agent. The main objective of the project is to develop cost-effective, readyto-translate biodegradable microspheres that are effective for endovascular embolization.



Technology Transfer activities.

- GelMA–UVS bioink: A Memorandum of Understanding (MoU) was signed between SCTIMST, Trivandrum, and SCIRE Science Private Limited, Kochi, for the transfer of technology related to Chitra GelMA–UVS Bioink. The commercial launch of GelMA bioink under the brand name Scire–Chitra–GelMA commenced at the BMT wing.
- 2. Analgesic loaded polymeric microneedles: The prototype is ready, and the technology for manufacturing of prototype in the laboratory is scale is ready. An MoU with CMTI has been signed to scale up this technology and obtain the prototype in large numbers. A joint proposal has also been sanctioned for this by DST.
- 3. 3D printable bioactive composites for craniofacial applications: The 3D printed bioactive composites for craniofacial applications have been successfully developed and optimized for clinical relevance. These materials demonstrate excellent mechanical integrity, biocompatibility, and the potential to support bone regeneration in complex craniofacial defects. The technology is now fully ready for translational research and commercialization, marking a significant step toward advanced, patient—specific therapeutic solutions.

Research programs:

1. Development of photo-crosslinkable bioinks for DLP printing

Alginate—based bioinks compatible with Digital Light Processing (DLP) have been successfully formulated to enable precise and high—resolution bioprinting. These bioinks exhibit excellent photopolymerization behavior, making them ideal for creating complex, cell—laden structures with fine architectural control. Upon printing, they form tough and resilient hydrogels with enhanced mechanical strength compared to conventional alginate systems. This advancement paves the way for their use in fabricating robust tissue constructs for regenerative medicine and biofabrication applications.

2. Innovative Water–Soluble Acaricide Formulations via Advanced Complexation Techniques:

Acaricide formulations that can be effectively solubilized in water are currently under development to enhance their environmental compatibility and ease of application. To address the inherent hydrophobicity of many acaricides, a range of innovative complexation techniques—such inclusion complexes, nanoemulsions, and polymerbased carriers—are being systematically investigated. These approaches aim to significantly improve the water solubility and bioavailability of the active ingredients, ensuring more efficient pest control with reduced chemical load. The scientific novelty lies in the integration of advanced formulation strategies to transform traditionally insoluble compounds into water-dispersible systems, potentially setting a new benchmark in acaricide delivery.

3. Design and development of injectable kaolin incorporated hemostatic tissue sealant hydrogels: This study aims to develop a composite rapid hemostatic hydrogel in an injectable form for neurointerventions. (PhD program)

Service/Academic activities:

1 Testing and evaluation (if any)

- UTM (Compressive strength, Tensile strength, suture pullout strength & flexural strength) – 889 samples.
- HPLC and GPC 351 samples.
- DLS analysis (Particle size & Zeta potential) 130 samples.
- Hardness test 24 samples
- UV Vis analysis 120 samples.
- Thermocycling 47 batches of samples.
- FTIR 15 samples.

2 Training/outreach programs (if any).

- Dr Shiny Velayudhan attended the onboarding Training Programme for Newly Inducted Members of BIS Technical Committees, conducted by BIS on 29 – 30 May 2024.
- Dr Manju S attended the One–Day Training on ISO
 & IEC Online Standards Development training



program organized by BIS for experts designated on ISO/IEC projects on 21.03.2025.

Invited Lectures /Conference participation

- Lizymol P P, gave the invited lecture on "Organically Modified Ceramic Polymer Based Radiopaque Composites for Dental Applications" at the International Conference on Clinical Translation of Biomaterial-based Therapeutics and Devices (ICBTD 2025) organised by Somaiya Vidyavihar University on Feb 7, 2025.
- 2. Saranya C V, (short invited lecture) on "Bionanocomposite membrane for periodontal guided tissue regeneration (GTR)" authored by Saranya C V, Lizymol P P, at the International Conference on Nano–structured materials and Nanocomposites held at Kottayam, Kerala, during 10–12 May 2024. The conference was jointly organized by Mahatma Gandhi University, Kottayam, Kerala, Gdansk University of Technology, Poland; Wroclaw University of Technology, Poland; University of Johannesburg, South Africa; and University of Lorraine, France.
- 3. Dr Lizymol P P, attended and chaired one session in the TransMedTech Conference on 11–12–2024
- Dr Shiny Velayudhan delivered an Invited Lecture on "Dissolving Microneedles for Delivery of Analgesics" at the 15th International Conference, APM–2024 on "Sustainable & Innovative Materials and Design for Global Needs", 14–16 March 2024, Ahmedabad.
- 6. Dr Shiny Velayudhan delivered an invited lecture in the National Conference on polymers, "Crosslinks 2024" organized by the Department of Chemistry, National Institute of Technology Calicut, during 12–13 July 2024.
- 7. Dr Shiny Velayudhan delivered a contributory lecture on "Design and Evaluation of Dissolving Microneedles for Transdermal Delivery of Analgesics" at the International Conference on Advances and Challenges in Medical Technology Translation, TransMedTech24, Trivandrum, 12–14 December 2024.

- 8. Dr Manju S delivered an invited lecture on "Development of Plasticizer Free polymer matrix using reactive nanogel additives for Biomedical application" at APA–EPNOE–GFL International Conference on Polymers for Advanced Technology (APA 2024), Jaipur, conducted on 18.10.2024 (Invited talk)
- Dr Manju S. presented a poster on "Microwave Assisted Synthesis of Ionic Liquids for Antimicrobial/Antibiofilm Coatings on Dental Material" at the 12th World Biomaterials Congress (WBC 2024), May 25 – 31, 2024, Daegu, South Korea.
- 10 Dr Manju S presented an invited lecture on "Mucoadhesive Drug Delivery Systems: Challenges and Opportunities" during the National conference" at Revolutionizing Healthcare Series 01: Innovations in Smart Polymeric Drug Delivery Systems organized by the School of Pharmacy, Dhanalakshmi Srinivasan University, Thiruchirapalli, Tamil Nadu, conducted on 27.07.2024.

Other significant achievements:

Awards and Recognitions

- 1. Ms Saranya C V, PhD student under the guidance of Dr Lizymol, received the first prize for a short invited lecture presentation for the paper entitled "Bionanocomposite membrane for periodontal guided tissue regeneration (GTR)" authored by Saranya C V and Lizymol P P at the International Conference on Nano–Structured materials and Nanocomposites held at Kottayam, Kerala, India, during 10–12 May 2024. The conference was jointly organized by Mahatma Gandhi University, Kottayam, Kerala, India, Gdansk University of Technology, Poland, Wroclaw University of Technology, Poland, University of Johannesburg, South Africa, and University of Lorraine, France on 10–12 May 2024.
- Ms Saranya C V, PhD student under the guidance of Dr Lizymol P P received the second Best Poster Award for a poster entitled 'Genistein loaded multilayered electrospun membrane for



periodontal guided tissue regeneration' authored by Saranya C V, Deepu D R, Anugya Bhatt, TV Anil Kumar, Arun Anirudhan, Lizymol P P, in a poster competition as a part of Institute day and National Science Day celebration, in SCTIMST, held on 28/02/2025.

- 3. PhD colloquium of Ms Saranya C V (Guide Dr Lizymol P P) was conducted on 07–01–2025.
- 4. Dr Manju S, received the Certificate of Excellence during the Institute Day and the National Science Day celebration of the Institute conducted on 28/02/2025.

Staff details

Dr H K Varma – Scientist G (Senior Grade)

Dr Manoj Komath – Scientist G & Head of the Department

Dr Jaysree R S – Scientist G

Dr Lizymol P P – Scientist G (SIC)

Dr Rekha M R - Scientist G

Dr Shiny Velayudhan – Scientist F

Dr Manju S – Scientist F

Dr Francis Fernandez – Scientist D

Dr Nishad K V – Scientific Assistant (Instruments)

Dr Remya K R – Technical Assistant (Instruments) – A

Mr Sajin Raj R G – Technical Assistant

(Instruments) – B

Dr Deepu D R – Technical Assistant (Instruments) – B

Ms Sreekala Balan P – Technical Assistant (Lab) – B

Mr Jijo P T – Technical Assistant (Instruments) – A

DEPARTMENT OF MEDICAL DEVICES ENGINEERING

The department is committed to the research and development of medical devices, covering the complete life cycle from conceptualization to technology transfer. This process involves empirical design, computer—aided modelling, in—silico evaluation, fabrication, prototyping, and functional assessment. The department is organised into five divisions: (I) Division of Artificial Internal Organs, (II) Division of Extracorporeal Devices, (III) Division of Medical Instrumentation, (IV) Division of Polymeric Medical Devices, and (V) Division of Precision Fabrication. Each contributing to specialised areas of device development and support, including regulatory services.

I. DIVISION OF ARTIFICIAL INTERNAL ORGANS

The division is executing R&D projects aimed at the development of high–risk medical devices. This division has its core competencies in design, prototyping, in vitro evaluation, process development, and technology documentation for cardiovascular and neuroprosthetic devices. The division has initiated programs in Assistive Technologies, Orthopaedics and *In–vitro* Diagnostics.

Developmental Activities

- Second generation TTK-Chitra Valve: The pilot clinical trials in 40 patients have been completed. Pivotal trials are planned to start by last quarter of 2025.
- 2. Aortic Stent Graft: One patent on an improved delivery system for this device was granted in 2024. The institute is looking for an industrial partner for commercialising this device.
- 3. Flow Diverter Stent: Five patents were granted for the device and delivery system (Brazil, European Union, USA and 2 Indian) in 2024.

- The technology is being transferred to M/s Biorad Medisys, Pune.
- 4. ASD Occluder: Two patents were granted for the device and delivery system in 2024. A heat treatment facility for the device was established in the division for shape setting of NiTiNOL components. The technology is being transferred to M/s Biorad Medisys, Pune.
- Titanium Nitride coated Coronary stent system: The project has completed the Proof-of-Concept stage, and a Technology Transfer Mou has been signed with M/s Invasive Technologies Pvt Ltd, Calicut.
- 6. Mitral Annuloplasty Ring: Proof–of–concept studies of the project have been completed. An Expression of Interest (EOI) for technology transfer has been called for.
- HLL Chitra Ceredrain Hydroccephalus Shunt

 Non-Adjustable Version of the Device –
 Production Revamp: The first generation HLL
 Chitra Ceredrain shunt is the non-adjustable (pressure) burr hole type version of Hydrocephalus
 Shunt. Product revamp-related activities and regulatory clearance are in progress at HLL
 Lifecare Limited, Trivandrum.
- 8. Hydrocephalus Shunt with Flat Type Adjustable Differential Pressure Valve: The second-generation Hydrocephalus Shunt with Flat Type Adjustable Differential Pressure Valve is the programmable version of the Hydrocephalus Shunt. Conceptual Design and Patenting completed. The activities related to the completely assembled prototype and performance testing are in progress.
- Lumbar peritoneal Shunt: The device is used to drain CSF from the lumbar subarachnoid space



- to the peritoneal cavity in cases of conditions including normal pressure hydrocephalus, Communicating Hydrocephalus, Idiopathic Intracranial Hypertension, etc. The design is prepared, which is required to be verified for performance.
- 10. Spinal fixation system for thoracolumbar stabilization: The fixation system is intended to correct spinal deformities. The project has reached the prototyping stage.
- 11. Wearable Fall Sensor: The objective of the project is to develop a wearable gadget using an inertial measurement unit (IMU) for fall detection. Data acquisition and AI–based classification of sensor data have been completed. A fall simulator using a mannequin, motorised hoist, and drop has been developed.
- 12. NT–ProBNP Device development: The ICMR–funded NT–proBNP device development project has reached the final stage of establishing proof of concept. The institute plans to move forward with this project in a co–development mode.
- 13. Sepsis Rapid Test Kit: This is a co-development project with M/s. Biogeneix, Lucknow, for developing a point-of-care diagnostic tool for early sepsis detection. Initial prototypes have been successfully developed and are undergoing optimisation to improve performance and reliability.
- 14. Development of Pedicle Screw–Based Dynamic Stabilisation Systems for degenerative diseases of lumbosacral spine: This DST–funded project aims to develop the stabilization system for enhanced treatment of structural spinal disorders. The project is in the design phase.
- 15. Development of high strength cast Ti6Al4V for orthopaedic implants: Design of a 2–level anterior cervical plating system comprising of a low–profile plate, sleek variable–angle screws, and self–locking clip arrestors has been completed. Prototyping is in progress. A heat treatment process for the strength enhancement of Ti6Al4V titanium alloy castings is also being taken up as part of the project.

- 16. Superelastic NITINOL staples for spinal fixation during anterior cervical discectomy fusion surgeries, as an alternative to conventional plating systems. Design of the staple and in silico evaluation are in progress.
- 17. Mitral Clip: This is a minimally invasive device to correct Mitral regurgitation. The design and prototyping of the device are in progress.
- 18. Muscle Biopsy under Ultrasonic guidance: The device uses real—time ultrasound technology to guide optimal sample collection during muscle biopsy. The project is in the design and prototyping phase.

New initiatives

- 1. COE for Minimally Invasive Cardiovascular Devices: A Centre of Excellence in Cardiovascular Minimally invasive devices sanctioned by DBT, Govt. of India, for 5 years and a fund of 20 crores has been inaugurated in June'24. Ten cardiovascular devices, including Transcatheter Aortic Valve, Thoracic Aortic Stent Graft, Clot Retriever Stent, Flow Modulator, Superficial Femoral Artery Stent, Patent Ductus Arteriosus Occluder, Venous Stent, Vascular Plug, Ventricular Septal Defect Occluder and Inferior Venacava Filter, are being developed. Infrastructure for design, in vitro evaluation and precision prototyping is also being established.
- 2. Chitra Peacock retractor (Funded by: South Indian Surgical Private Limited (SISCO), Chennai): The project is aimed at developing a retractor for complex brain surgery procedures, particularly for the treatment of deep–seated tumours. It is in the evaluation phase.
- 3. Lordotic expandable corpectomy cages for cervical spine: This implant is intended for stabilizing the spine following resections of the vertebral body due to trauma or tumours. It has a design aimed at enhancing bone integration. Currently, the implant is in the prototype development phase.
- 4. Sound Producing Voice Prosthesis: This DST—funded project aims to develop a novel sound—producing voice prosthesis. The project is in the design phase



5. Fontan Surgery planning system: This ICMR—funded project aims to develop a methodology to plan Fontan surgical correction for patients with Single Ventricular Heart disease. The objective is to improve post—surgical blood circulation. The data collection and analysis are in progress.

Technology Transfer activities.

Institute signed a Memorandum of Understanding with Invasive Technologies Pvt Ltd on September 23, 2024 for the technology transfer of Titanium Nitride coated coronary stent.



MoU with Invasive Technologies Pvt Ltd on September 23, 2024

Research programs:

1. Research & development of a mechanical knee joint for a stance control knee ankle foot orthosis(SCKAFO) is underway, aimed at enhancing mobility assistance. SCKAFO is intended to assist individuals with lower limb weakness by enabling controlled knee stability during the stance phase and allowing free knee motion during the swing phase, thereby improving gait efficiency and safety. DST funds the project under the TIDE scheme.

Training / Outreach Programs

- a) Er Anoop Gopinathan and Er Sarath S Nair delivered a talk at St Joseph College of Engineering Palai as part of AICTE–VAANI on the Topic of Modern Implantable Medical Device Technologies on 30th August 2024
- b) "Lab-to-Market Transitions in Assistive-Tech: Conventional Vs Emerging Mobility Solutions",

- Subhash N N, Empower 2024, NISH, Trivandrum, on 18 October 2024.
- c) "Design to Delight: Crafting Products with User Experience and Ergonomics in Mind", Subhash N N in Innovation, Design, and Entrepreneurship (IDE) Bootcamp, organized by All India Council for Technical Education (AICTE) and the Ministry of Education, Government of India (MoE) Innovation Cell (MIC) at Amal Jyothi College of Engineering ,Kottayam on 26 September 2024.
- d) Manoj G.delivered a talk on integrating Chemistry and Engineering for medical device developments at "SENSORS–2024" organised by the Dept of Chemistry, University of Kerala.

Other Significant Achievements

Er. Arvind Prajapati and Er. Subhash NN received the Certificate of Excellence from SCTIMST

Conferences

- Failure mode effect analysis of coronary stent. Subhash N N, Muraleedharan C V, Medical material and devices (MMD) 2024, ASM, Mumbai, 4–6 Sep 2024.
- THz Waves for Dimensional Verification of Biocompatible Implants. N N Subhash, CV Muraleedharan, Krishnan Balasubramaniam; ICENDE 2024

 – ASNT, Hyderabad. 22

 – 24 Aug 2024.
- Non-Destructive Evaluation Techniques for Material Characterization of Biocompatible Implants. NN Subhash, CV Muraleedharan, Krishnan Balasubramaniam; ICENDE 2024– ASNT, Hyderabad. 22–24 Aug 2024
- 4. Dr Sivakumar KGV did a technical presentation at the ASM International MET 2024 Conference, Bombay Exhibition Centre
- N N Subhash, C V Muraleedharan, Krishnan Balasubramaniam presented "Application of Terahertz imaging for QA/QC of biocompatible implants". ICNGT 2024, IIT Madras, Chennai, November 13–15, 2024
- 6. N N Subhash, Rajeev A, Sujesh S, Sachin J Shenoy, Umashankar P R, Sabareeswaran A,



Harikrishnan S, C V Muraleedharan presented TiN Coated Coronary Stent: Proof of Concept studies. ICNGT 2024, IIT Madras, Chennai, November 13–15, 2024

- "Minimally Invasive Cardiovascular Devices". Dr Sujesh S, IC–MNSS 2024, IISc Bangalore, July 2024.
- 8. Subhash N N, Muraleedharan C V TiN coated coronary stent: Lab to Animal studies. 88th Annual Session of the Indian Ceramic Society, IIT–Madras, Chennai, November 28–30, 2024. (Best paper presentation award).
- 9. Charushree S, Janani K, Akalya R, Mahalakshmi T, Mano Ranjitham R, Subhash N N, Muraleedharan C V and Sumith S Stepping Forward: A Novel Approach to Stance Control Knee Ankle Foot Orthoses. EMPOWER 2024, NISH Trivandrum, 17–19 October 2024.
- Subhash N N, Sumith S and Muraleedharan C V Stance Control Knee Ankle Foot Orthosis: From Concept to Product Architecture & Configuration design. EMPOWER 2024, NISH Trivandrum, 17–19 October 2024.
- 11. Dr Manoj G delivered a talk on integrating Chemistry and Engineering for medical device developments at "SENSORS–2024" organised by the Dept of Chemistry, University of Kerala.

II. DIVISION OF MEDICAL INSTRUMENTATION

The Division of Medical Instrumentation focuses on the development of advanced medical technologies including active implants, bioelectrodes, diagnostic devices, and electrical signal monitoring systems. Core areas include innovations in Deep Brain Stimulators, Spinal Cord Stimulators, and cardiac devices, alongside tools for impedance measurement and electrochemical studies. The division is also a part of the ICMR Centre for Advanced Research dedicated to the preclinical evaluation of cardiovascular devices.

Developmental Activities

1. Deep Brain Stimulator: This project aims to develop a neurostimulator that generates electrical impulses to normalize brain activity in neurological disorders such as Parkinson's disease,

Essential Tremor, and Dystonia. In collaboration with BARC, the prototype development and initial safety studies have been successfully completed. The Institute along with BARC has identified a potential industrial partner for scaling up and commercialisation of the product.

- 2. Implantable Cardioverter Defibrillator (ICD) : ICDs are lifesaving devices used in cases of Sudden Cardiac Arrest caused by irregular heart rhythms like Ventricular Tachycardia and Ventricular Fibrillation. The project is being co—developed with M/s. Shree Pacetronics Ltd., Indore. The project has reached prototyping and integration phase
- 3. Implantable Tibial Nerve Stimulator for Overactive Bladder Control: Meant for treating Overactive Bladder syndrome, this implant wirelessly stimulates the tibial nerve to regulate bladder muscle activity. The device is in its conceptual design stage
- 4. Intracranial Electrodes: Proof of concept studies on intracranial electrodes for electrocorticography have been completed. Institute has identified an industrial partner for scaling up and commercialisation of the device.

New initiatives

A new project is initiated with support from Digital University, Kerala for development of graphene—based microelectrodes for sensing and stimulation in neuromodulation applications.

Service activities:

As part of activities of ICMR Centre for Advanced Research, evaluation of pacemaker leads (M/s. Shree Pacetronix, Indore) were evaluated for safety assessment as per the International Standard ISO 14708.

III DIVISION OF EXTRACORPOREAL DEVICES

The Division is engaged in the research and development of extracorporeal life support medical devices, mainly focusing on the cardiopulmonary system. The major ongoing activities in the Division include developing the Percutaneous Left Ventricular Assist Device, Implantable LVAD, Implantable



Micro Infusion pumps for targeted drug delivery, the transcutaneous energy transfer system and the Organ Care and Transportation System. The Division also supports various projects of the Institute and external customers for rapid prototyping, ETO sterilization, and regulatory affairs. The faculties of the division are also engaged in national–level activities like Materio–vigilance Programme of India and the Bureau of Indian Standards as expert members.

Developmental Activities

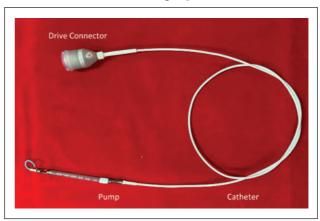
1. Implantable Left Ventricular Assist Device: The project focuses on improving the capability of the Chitra LVAD model developed as part of the TRC Phase I to meet the clinical implantation requirements such as reduced weight, size, and incorporate the transcutaneous energy transfer system, implantable batteries and accessories for fixing the LVAD on ventricles. The project also focusses on improving the blood compatibility by incorporating better surface coating and validate the technology with animal evaluations. The proof of concept prototype of the implantable system is developed as shown below. The implantable system consists of a magnetically levitated miniature blood pump with integrated brushless motor, attached to an implantable controller. External systems consist of transcutaneous energy transfer system and a battery pack, to power the device wirelessly.



Implantable LVAD – Proof of Concept Prototype

2. Minimally Invasive Percutaneous Left Ventricular Assist Device: The project focuses on developing a catheter–based minimally invasive miniature pump to provide temporary circulatory support for patients with cardiogenic shock. The proof of concept of the system is developed as part of the Technical Research Center (TRC) scheme of Department of Science and Technology (DST) as shown below. "Development and in–vivo evaluation of Percutaneous Minimally Invasive Left Ventricular Assist Device", with a budget allocation of Rs. 4.83 crores are sanctioned by ICMR under ICMR Extramural Research – Intermediate Grant 2024 for further developing the device up to TRL 6.

Preliminary bench top analysis in progress. Development of Controller, accessories, pump optimisation, components qualification, bill of material finalisation in progress.

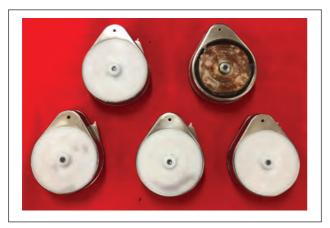


Percutaneous Minimally Invasive LVAD – Proof of Concept Prototype

3. Implantable Infusion Pump: In this project, an implantable device for targeted delivering the drugs such as Baclofen/Morphine/ to different portions of the body such as intrathecal space or peritoneal cavity is being developed. Proof of concept is established with *in—vitro* and *in—vivo* experiments. The wireless charging to recharge the implanted battery is established. Multiple prototypes were developed and tested the performance reproducibility. Design change for reducing the thickness of the pump is completed as TRC phase II project. Multiple prototypes fabrication for preclinical evaluation were completed. Expression

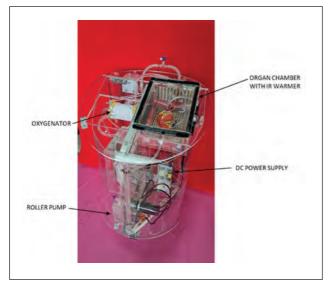


of interest called for technology transfer. Discussions with industries is in progress.



Implantable Infusion Pump for intrathecal applications

4. Organ Care System for Transportation: An extramural project "Design and development of an organ care system for transplantation" has been approved as an ICMR Adhoc project, with a budget of Rs. 96.59 lakhs. The project focuses on creating a portable, controlled environment to preserve and monitor donor organs in real–time, enhancing their viability for transplantation. This system integrates advanced perfusion technology and real–time physiological monitoring to improve transplant success rates. Prototype fabrication in progress as shown below(Figure).



Organ Care System for Transportation (OCTS) – Prototype fabrication in progress

5. Transcutaneous Energy Transfer System (TETS): An automatically controlled Transcutaneous Energy Transfer System for wirelessly powering implantable medical devices such as LVAD, total artificial heart, and Implantable infusion pumps is developed and validated with various medical devices. Automatically Controlled TETS is developed to compensate for the variations in efficiency and power transfer during dynamic clinical conditions. Extensive *in–vitro* and tissue model performance and stability evaluation confirms the potential benefit of automatically controlled TETS for powering active implantable medical devices especially Left Ventricular Assist Device.



Transcutaneous Energy Transfer System (TETS)

- 6. Coagulation Analyzer: The Point—of—Care Blood Coagulation Analyzer is a portable device designed for rapid PT—INR testing to assess blood coagulation. The project is funded by Department of Science and Technology (DST). Industrial design is prepared and device with surface mount components are fabricated. Limited clinical evaluation started.
- 7. Male Urinary Incontinence Device: An Industry-funded collaborative project between M/s. Abhaya 3CD Private Ltd., Chennai, and SCTIMST to deliver technical support in regulatory and biological evaluation for developing male urinary incontinence devices. Test License and Clinical Investigation license obtained for industry. Currently Pivotal multicentric clinical evaluation is in progress across five centres in India.



New initiatives

1. National Centre for Preclinical Evaluation of Cardiovascular Devices

The National Centre for Preclinical Evaluation of Cardiovascular Devices was approved under the Centre for Advanced Research scheme of Indian Council of Medical Research (ICMR). It is a first of its kind centre in the country, facilitating the upgradation of Medical Device Technologies from TRL 3 to TRL 6 in the cardiovascular domain.

The objective of this centre is to set up a certified/accredited facility for in vitro and ex–vivo/in–vivo functional evaluation of cardiovascular devices, for providing design verification/test reports for regulatory submission.

It is expected to provide preclinical evaluation support to medical devices developed at SCTIMST as well as devices from ICMR sponsored centres.

2. Regulatory Compliance Access Portal (Re–CAP) for Medical Devices and In–vitro Diagnostics: The project aims to create a single window system for mapping the regulatory compliance information including Product classification, applicable standards, documentation requirements etc. with funding from Technical Research Center (TRC) scheme of Department of Science and Technology (DST).

Technology Transfer activities.

1. Automatic Contrast Injector

Technology of Automatic Contrast Injector is transferred to M/s Cyrix Healthcare Pvt Ltd. Training was provided to the industry. Technology scale—up is in progress by industry partner.

Technology Transfer of Automatic Contrast Injector

Research programs:

1. Total Artificial Heart (TAH): Prior art analysis and feasibility study of various concepts of blood pumping in TAH is being in progress. Concepts of various subsystems for integrating to TAH is being studied. Different candidate models are considered for further studies.

2. Glucose Detection: Efforts are in progress to develop the concept for a point of care device for the detection of glucose, lactate and pyruvate from samples collected through micro dialysis. The hypothesis emphasises optical methods of detection. The research aims to develop the possibility of *im-situ* measurement of glucose for developing implantable insulin pumps in the future. Electronics design and optical design is completed for sample evaluation.

Testing and evaluation

- 1. Providing the service of ethylene oxide sterilisation to internal and external customers through customer service cell.
- 2. Providing the service of regulatory affairs to external customers through the customer service cell.

Training/outreach programs

Sarath S Nair participated in the following outreach activities –

- Delivered Role Model Talk for Scholars of Vigyan Jyoti Program of DST, GoI on 18th Sep 2024
- Resource person for Symposium organized by Adi Shankara Institute of Engineering and Technology on 23/8/2024.
- iii. Delivered the expert session on the topic "Point of care sensing device for blood clot time measurements" on 31 Nov 2024, during the Symposium on Emerging Nanotechnologies for Sensors Organization and Recognition Systems 2024 (SENSORS 2024) in 29th November, 2024, organized by the Department of Chemistry, University of Kerala.
- iv. Invited Speaker for the National Science day program held at MM NSS college, Kottiyam, Kerala on 24/02/2025
- v. Delivered the Keynote address during the Eleventh International Conference on Biosignals, Images, and Instrumentation (ICBSII 2025) on March 26—28, 2025 at Sri Sivasubramaniya Nadar College of Engineering (SSN), Chennai, India.



Amrutha C delivered the following invited talks:

- Causality Assessment of medical device in 13th Induction cum training program for medical device adverse event monitoring centres across India organized by IPC, Ghaziabad.
- ii. Regulatory Framework of Medical Devices & Biopharma Products in India" at Sahrdaya College of Engineering and Technology, Thrissur on 4th October 2024.
- iii. "From Idea to Approval: Understanding Indian Medical Device Regulations" at Ezhuthachan College of Pharmaceutical Sciences, Trivandrum as part of Pharmacy Week Celebration on 22nd Nov 2024.
- iv. Regulatory Pathways in medical Device development" at TransmedTech 24 conference organized by SCTIMST-SBAIO on 11th December 2024.

Significant achievements:

- i. Sarath S Nair received the Best paper Award for the Paper titled, "A Generalized Iterative Design Approach for Optimal frequency estimation of the Transcutaneous Energy Transfer System" in the 14th international conference on science and innovative engineering –14 ICSIE 2024 hybrid conference – Chennai on 27th – 28th April, 2024.
- ii. Nagesh D S continued as a member of the Mission Committee for the preparation of a Mission Document on the Development and Commercialization of an Indigenous Artificial Heart constituted by the NITI Aayog.
- iii. Amrutha C continued as the member and secretary of Impartiality Committee for ICMED ISO 13485 Certification constituted by Indian Pharmacopeia Commission.
- iv. Nagesh D S, Vinodkumar V, Amrutha C, represented the Institute in committees of the Bureau of Indian Standards: (i) Medical and Surgical Cardiology Equipment Sectional Committee, MHD 06.
- v. Nagesh D S, Vinodkumar V, and Amrutha C, continued as a member of Materiovigilance Programme of India (coordinated by Indian Pharmacopeia Commission, Ghaziabad) monthly

partners meeting as an expert member for providing technical support in the causality assessment of medical device adverse events reported by the manufacturers and other healthcare professionals across the country.

IV. POLYMERIC MEDICAL DEVICES

The Division of Polymeric Medical Devices focuses on the development of new polymers, polymeric formulations, composites, and devices for different biomedical applications. The lab is equipped with facilities for compounding/mixing, molding, filament extrusion, parylene coating, Atomic Force Microscopy imaging, and electrospinning. The lab is also equipped with equipment for static testing and dynamic mechanical analysis of polymeric materials. Facilities for polymer synthesis are also in place.

Developmental Activities

- 1. The material development (i.e., Phase 1 of the project) of the Tata Steel funded Project 'Short coir fibre reinforced Polylactic acid biocomposite for orthotic wrist support device' was completed. The product development activities (i.e., Phase 2) involve fabrication of an orthotic wrist support splint from short coir reinforced polylactic acid biocomposite via injection moulding is ongoing (Project team: Dr Gijo Raj, Mr Subhash N N, Mr Adarsh A B, and Dr Roy Joseph).
- 2. Initiated the R&D activities of the TRC-funded project titled, "Lead-free flexible Polymer composite sheet for radiation shielding of Thyroid". A flexible polymer composite sheet was developed with CT number 2900. Radiation shielding experiments on the material are progressing at BARC Mumbai (Project team: Dr Gijo Raj, Dr S Harikrishnan, and Dr Roy Joseph).
- 3. Developed a prototype of latex-based cover for transesophageal echocardiography probe in the TDF-funded Project titled 'Evaluation and standardisation of latex-based cover for transesophageal echocardiography' (Project team: Dr Gijo Raj, Dr Roy Joseph, and Dr Shrinivas Gadhinglajkar).



New initiatives

- 1. An Atomic Force Microscope (AFM) was successfully installed at the Division of Polymeric Medical Devices, Department of Medical Devices Engineering, BMT Wing, SCTIMST. Installation and Training of AFM was completed on 8th August 2024. The machine allows imaging of the surface of medical devices, polymers, and thin films with nanoscale spatial resolution. It also allows the quantitative estimation of nanomechanical properties of surfaces such as adhesion, stiffness, and energy dissipation.
- 2. An amendment to the research agreement between SCTIMST and Tata Steel Limited was signed. This research agreement was extended up to December 2025 for the execution of Phase 2 of the project titled 'Design and develop biodegradable orthotic wrist support device from short coir fibre reinforced polylactic acid biocomposite'.
- 3. Successfully conducted 3D printing of flexible polymer filaments of Ethylene Vinyl Acetate for the fabrication of a model aorta.
- 4. Successfully conducted 3D printing of coir fibre/Polylactic acid composite filaments.

Testing

The division offered test services such as mechanical testing of materials, dynamic mechanical analysis, impact testing, compression moulding, and imaging using the atomic force microscope to external and internal customers.

Training/outreach programs

- Dr Ramesh P delivered an invited talk on 'Electrospun polymers and composites for biomedical applications' at National conference on polymers 'Crosslinks 2024' at National Institute of Technology, Calicut on 13th July 2024.
- Dr Gijo Raj delivered a talk on 'Rubber in Medical Devices' at the 10th Stakeholders Connect Meeting (SCM) on Friday, 19th July 2024 at Institute of Cooperative Management, Thiruvananthapuram. The conference was organized by Kerala Medical Technology Consortium, and National Council

for Co-operative Training.

- 3. Dr Roy Joseph delivered an Invited talk on 'Rubber in Medical Devices', at the 10th Stakeholders Connect Meeting (SCM) on Friday, 19th July 2024 at Institute of Cooperative Management, Thiruvananthapuram. The conference was organized by Kerala Medical Technology Consortium, and National Council for Co–operative Training.
- 'Radiopaque Liquid Embolic System a Class D Injectable Neurovascular Device for embolizing Arteriovenous Malformation of the Brain' was displayed during the meeting of DST-TRC officials in JNCASR, Bangalore on 08.07.2024.



- 5. Dr Ramesh P attended the Administrative Vigilance training at INSA, New Delhi from 31st July –2nd August 2024 organized by Department of Science and Technology.
- 6. Dr Roy Joseph, Scientist G (Sr. Gr.), gave a keynote lecture on the topic, 'Applications of Alginates in Modern Healthcare' at the 'International Conference on Biopolymers & Green Composites (BPGC 2024)' organized by the Central Institute of Petrochemicals Engineering & Technology (CIPET) Kochi, Kerala on 19 October 2024. (Conference dates: 18–19 October 2024).



7. Dr Gijo Raj participated in the Scientific Social Responsibility activities of the DST–FIST research project at Mahatma Gandhi Mission's Dental College & Hospital at Navi Mumbai during 24th to 26th September 2024. The team visited Govt. schools in Chouk and Vashivali village at Raigad, Maharashtra and MGM school in Nerul, Navi Mumbai and demonstrated various activities where in working models were made from scrap plastic bottles, glass, tubes, paper and cardboard in an effort to convert locally available waste materials to tools for helping learning and spreading knowledge



8. Dr Roy Joseph, Scientist G (Sr. Gr.), was a resource person at the International Conference on 'Pharma Future: Navigating career paths in dynamic pharma landscape' (CAPCON–24) held on 22nd and 23rd November 2024, organized by Dr Moopan's College of Pharmacy, Wayanad and gave an invited talk on the topic, 'Medical Devices: Innovation, Regulation, and Commercialization'.

राबबलेल्या या उपक्रमाबद्दल संस्थेच्या व शाळेच्या वतीने

आभार व्यक्त करण्यात आले

विज्ञानातील नाविन्यपूर्ण प्रतिकृती विद्यार्थ्यांना प्रत्यक्षात

हाताळता आल्याने विविध प्रयोगांचा मनसोक्त आनंद घेता

 Dr Gijo Raj, Dr Unnikrishnan, Ms Kirthana Mohan, Ms Rukhiya Salim, and Mr Dipin Das represented SCTIMST at EPOCH'24, a national– level technical fest organized by the Department of Polymer Science and Rubber Technology at

- Cochin University of Science and Technology during 29th and 30th October 2024.
- 10. Ms Jasmin Joseph made an oral presentation of a paper titled "Development of parylene–coated natural rubber latex–based product to improve the biocompatibility". Authors: Jasmin Joseph and Ramesh Parameswaran, at the International Rubber Conference RUBBERCON 2024 on 5th – 7th December 2024 at Hotel Le Meridien, Kochi, Kerala. (ICMR project 8258).
- 11. Dr Gijo Raj, Mr Subhash M S, and Mr Binu A U represented SCTIMST during the National Technical Expo at the 37th Kerala Science Congress held from 7 to 10 February 2025, at Kerala Agricultural University, Thrissur, Kerala.

Significant achievements:

- Ms Gopika V Gopan, PhD student of Dr Roy Joseph, Division of Polymeric Medical Devices, defended her PhD thesis successfully on 21st June 2024 and declared passed in her viva voce. The title of her PhD thesis was 'Radiopaque iodinated compound grafted polymer: Synthesis and evaluation for monotherapy.'
- 2. The PhD viva voce examination of Ms Prima S., PhD student of Dr P Ramesh, Division of Polymeric Medical Devices, defended her PhD thesis successfully on 8th January 2025. The thesis title was "Silver Ion and /or Graphene Oxide Incorporated Electrospun Matrices for Guided Neurite Extension".
- 3. The PhD viva voce examination of Ms. Gopika Ramesh, PhD student of Dr Roy Joseph, Division of Polymeric Medical Devices, defended her PhD thesis successfully on 6th January 2025. The PhD thesis title was 'Gallium Curcumin Nanoparticle Conjugate: A Potent Alternative to Antibiotics Against Pseudomonas Infection.'

Empowerment programs for SC and ST students

SEED Division, DST has given two projects to empower SC and ST students. These projects have aimed to bring an impact on the education, skill development, employability, and health of Scheduled Tribe (ST) communities in the country through a



series of interventions. To achieve this aim, candidates belonging to ST communities were provided with research awards, fellowships, and scholarships of the following natur

- Innovative research award to do post-doctoral research in the biomedical stream.
- Fellowships/Scholarships for students admitted to postdoctoral, postgraduate, and diploma programs of SCTIMST, namely, DM/ MCh/ MPhil/ MPH/ PG Diploma/ Diploma courses.
- Fellowships/Scholarships to students who are interested in pursuing a PhD program in biomedical research.
- Provide exposure to biomedical research to young students at various stages of education, i.e., from +2 to PG degree, through a summer scholarship scheme.

The total number of beneficiaries from the Scheduled Tribe who received academic training was 43: (Master of Chirurgiae (MCh) – 01; Doctor of Philosophy (PhD) – 03; Research Associate (RA III) – 01; Summer Scholarship Program – 38).

The academic output from the ST project was: Papers published = 19; Conference Proceedings = 01; Conference presentations = 14; Awards received = 09.

Other activities under the project are: Awareness programs conducted = 31; No. of participants = 604; No. of pieces of Equipment procured = 18; Awareness Leaflets Produced = 09; Other Training Programs conducted = 02.

The total number of beneficiaries from the Scheduled Caste who received academic training was 55: (Doctor of Medicine (DM) – 01; Doctor of Philosophy (PhD) – 03; Master of Philosophy (MPhil) – 02; Diploma in Nursing – 02; Research Associate (RA III) – 01; Master of Public Health (MPH) – 02; PG Diploma – 02; Summer Scholarship Program – 42).

The academic output from the SC project was: Papers published = 09; Patents (applied) = 2; Conference presentations = 06; Awards received = 04; Poster presentations = 05; Workshops attended = 15; Conferences attended = 13; Internship attended = 01; Training attended = 01; Awareness leaflets = 10.

Other activities under the project are: No. of Awareness Programs Conducted = 27; Total No. of Participants = 377; No. of Pieces of Equipment Procured = 10; Other Training Programs Conducted = 02

IV. DIVISION OF PRECISION FABRICATION

The Division of Precision Fabrication serves the institute by providing the service of high precision fabrication of prototype components, Moulds, Jigs and Fixtures for various research programmes, in addition to providing maintenance support for the departments. The division has the capability of machining, developing and inspecting components using Computerized Numerical Control (CNC) and conventional machines like 5 axis and 3 axis Milling machines, lathe, Electric Discharge machines. Shapers, surface grinders etc.

Developmental Activities

The division supports other divisions for designing and fabricating components. In the year 2024–2025, the Division of Precision Fabrication completed approximately 41 work orders pertaining to the fabrication and machining of test setups and prototypes, for projects like Left Ventricular Assist Device, Bio prosthetic Heart Valve, Implantable Micro Infusion Pump, Intracranial Electrodes, etc.

Training/outreach programs: Organised an exhibition of Medical devices developed at SCTIMST in the Yearly Engineering Students Summit – 2024 organised by IEEE Kerala section on 24th August at Ernakulum to motivate young engineers to pursue Medical device development as a career. This was organised by in collaboration with IEEE EMBS Kerala chapter.



Service activities:

Photographs of certain components Fabricated in the division:







Staff Details

Mr Muraleedharan C V, Scientist G (Senior Grade) Head of the Department

Dr Sujesh Sreedharan, Engineer G

Mr Ranjith G, Engineer F

Dr Manoj G, Scientist F

Dr Sivakumar K G V, Engineer F

Mr Anoop Gopinathan, Engineer D

Mr Subhash N N, Engineer D

Mr Arvind Kumar Prajapati, Engineer D

Mr Saurabh S Nair, Engineer D

Mr Rajeev A, Sr. Scientific Assistant

Mr Subhash Kumar M S, Technical Assistant – B

Mr D S Nagesh, Scientist G (Senior Grade)

Mr Vinodkumar V, Engineer G

Mr Sarath S Nair, Engineer F

Ms Amrutha C, Scientist D

Ms Sreedevi V, Technical Assistant – Instruments B

Mr Jithin Krishnan, Engineer D

Ms Neethu S, Engineer C

Mr Biju Benjamin, Technical Assistant (Instruments) B

Dr Roy Joseph, Scientist G (Senior Grade)

Dr Ramesh P, Scientist G (Senior Grade)

Dr Gijo Raj, Scientist D

Ms Jasmin Joseph, Scientific Assistant (Instruments)

Mr Prathyush M, Foreman (Tool Room)

Mr Reji Kumar S, Technical Assistant

(Machine Operation) B

Mr Jiji Kumar R S, Technical Assistant-

(Machine Operation) A

Mr Sinulal M V, Technical Assistant-

(Machine operation) A

Mr Vijesh S S, Jr. Tech. Assistant-

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DEPARTMENT OF TECHNOLOGY AND QUALITY MANAGEMENT

The Department of Technology and Quality Management facilitates safeguarding the intellectual property rights associated with the innovations, technologies, and know-how developed by the scientists, engineers, and clinicians of the institute. It also provides a framework for the transfer of valuable technologies to industry for commercialization. The department provides support to ensure the quality and compliance of medical devices and technologies developed by the institute by offering tests and other support services. The Department comprises the following key units: (i) Calibration Cell (CAC), (ii) Central Analytical Facility (CAF), (iii) Customer Service Cell (CSC), (iv) Engineering Services, (v) Intellectual Property Rights Cell. (vi) Quality Cell, and (vii) Technology Business Division (TBD).

Activities of the individual divisions are detailed below:

I. CALIBRATION CELL

Calibration Cell (CAC) is an in-house facility of SCTIMST for maintaining measurement traceability in accredited tests. Measurement results are made traceable to the SI units either through calibrations or with the use of Reference Materials (RM). Mechanical and thermal calibrations carried out by the Calibration Cell are accredited by NABL, India, as per ISO 17025. A facility for the development of RM (reference materials) for biological evaluation of materials and medical devices as per ISO 10993 standards is also available with CAC. The division also accepts requests for system validations for external customers on a payment basis.

Developmental Activities

To meet the regulatory requirements for biocompatibility evaluations, as per international standards ISO 10993, a Proof-of-Concept project

under TRC was completed at the Calibration Cell for the development and standardization of inhouse Reference Biomaterials (RMs). CSIR–NPL is India's "National Measurement Institute" by the act of Parliament and is the custodian of "National Standards" with a responsibility for the realization, establishment, and dissemination of standards at par with the international level. Collaboration with CSIR–NPL can address the national needs of the medical device development industry and researchers by providing APEX–level standards as Certified Indian Reference Materials with the trade name 'Bharatiya Nirdeshak Drvaya'.

New initiatives

The team members of the Calibration Cell and Engineering services are involved in the following developmental activities:

 Development of a connected platform for Infrastructure management under the TRC (DST) Scheme.

Testing and evaluation

NABL audit was conducted at the Calibration Cell, and accreditation is renewed for thermal and mechanical calibrations. During this audit, calibration of the electronic balance with 0.01mg resolution is brought under the NABL accreditation scope. Validity of accreditation is extended up to February 2029. A total of 369 calibrations were completed, including site calibrations for the hospital wing and external customers.

Other significant achievements

Mr. Arumugham V. received the Best Performance Prize for the permanent non–academic employee of the institute for the year 2023–24. He received the award on 15th August 2024.



II. CENTRAL ANALYTICAL FACILITY

Central Analytical Facility (CAF) is a nodal centre for the physicochemical analysis of materials and medical devices under the quality platform. CAF caters to a diverse array of tests spanning spectroscopic analysis, thermal analysis, chromatographic analysis, mechanical testing, and imaging. All the testing activities of CAF conform to ISO 17025:2017. CAF received accreditation from the National Accreditation Board for Testing and Calibration Laboratories (NABL) for tests for determining transition temperatures of materials using differential scanning calorimetry (DSC) as per ASTM D3418 in 2024–25. This is given for four years. CAF provides analytical support and guidance to the projects run by other departments. CAF also organizes training programs and demonstrations for the benefit of students and industries. CAF is also actively involved in study projects to perform the physicochemical evaluation of materials and medical devices generated by internal/external/industry customers.

Developmental Activities

A project entitled "Ionic liquid-based smart membranes for bacterial filtration, concentration, and detection," funded by the Technical Research Centre (TRC), Department of Science and Technology (DST), Govt of India, is ongoing at CAF. The objective of this project is to develop flexible smart membranes using ionic liquid-based materials and explore their applications in bacterial filtration, concentration, and detection. Ionic liquid-based flexible membranes were developed by different approaches, and their response towards bacterial adhesion and their bactericidal action were evaluated. Ionic liquid-based membranes displayed better surface characteristics, wettability, bacterial attachment, and bactericidal action than the control membranes.

Research programs

Ionic liquids and allied soft materials are known to possess impressive properties and have the potential to be used in a wide range of biomedical applications. A library of Ionic liquids was synthesized at the CAF, and their antimicrobial activities were studied. Ionic liquids and their polymers (poly (ionic liquids), PILs) could

be used for generating antibacterial safety coatings. A PIL safety coating was applied over medical-grade stainless steel (SS316), which was found to protect the steel from bacteria and corrosion. Long-term immersion studies using a corrosive medium of 3.5% sodium chloride (NaCl) solution underlined the stability of the PIL coating in safeguarding the medical grade alloy surface. The presence of charged centres in the PILs could be employed for generating flexible and wearable devices for digital health applications. Research works initiated on the application of PILs in developing triboelectric nanogenerators and thin film transistors for various applications, such as biosensing, in collaboration with the National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) and the Indian Institute for Space Science and Technology (IIST).

Testing and evaluation

CAF offers the testing service to both internal and external customers through the customer service cell. During 2024–25, around 996 samples submitted by various customers were analyzed at CAF, and 205 test reports were generated. 24 NABL–accredited test reports were generated during this period. In addition to this, two study projects sponsored by the customers for the evaluation of their samples using various equipment available in CAF were completed during this period. Four study projects are ongoing in the division.

Training/outreach programs

- A one-year apprenticeship training program
 was initiated at CAF for postgraduates with a
 Master's degree in Chemistry/Physics/Materials
 science. During the training period, the students
 would be trained to operate various analytical
 equipment and perform sample analysis in the
 quality management system. Three students
 joined the program during the reporting period.
- CAF is hosting postgraduate students for their dissertation project as part of their academic program. Two MSc Chemistry students completed their project work at CAF during this period.
- The division co-hosted three workshops on biomedical innovations, organized jointly



by SCTIMST and the National Academy of Sciences, India (NASI) Kerala chapter, exclusively for female students (27/09/24), SC/ST students (04/03/25), and faculty (05/03/25). Dr Renjith S. (CAF) and Dr Naresh K. (TIC) were the organizing secretaries of these workshops.

- The division was actively involved in the organization of TransMedTech 2024, an international conference organized by the Society for Biomaterials and Artificial Organs (India) (SBAOI) and the Society for Tissue Engineering and Regenerative Medicine India (STERMI) in association with SCTIMST on December 12–14, 2024. Mr. Willi Paul was the treasurer of the conference.
- Dr Renjith S., Scientist C, CAF delivered lectures and conducted quiz programs as part of the outreach program and are listed below:
 - o "Mysteries of Chemistry" during the one—day sensitization program for the school students of classes 8th to 12th, organized by the Kerala University Department of Chemistry Alumni Association (KUDoCAA) on 18th May at the Department of Chemistry, University of Kerala.
 - Orientation lecture to the first batch of students of the 4–year undergraduate program (4YUGP) at the Department of Chemistry, University College, Trivandrum on 23/07/24.
 - O Conducted a space quiz during the National Space Day celebrations at the institute (22/08/24).
 - o Invited talk on "Role of Chemist in medical device development" on 15/10/2024 at the PG and Research Department of Chemistry, Sree Narayana College, Kollam.
 - o Delivered a talk on "Chemical characterization of medical devices" as part of the one–day workshop on testing services organized by the Industry Institute Partnership Cell (IIPC) on 19/10/24.
 - o Delivered a talk on "Rasathanthram:

Rasmulla lokathinay" to the selected 80 students of the 9th standard attending the Yusuf Hamied chemistry camp organized by the Royal Society of Chemistry (RSC) and the University of Kerala at the Department of Chemistry, University of Kerala on 20/10/24.

- o Conducted the vigilance quiz during the vigilance awareness week celebration at the institute (01/11/2024).
- Delivered a talk on "Emerging materials for biomedical applications" on 09/12/24 as part of the 'National Seminar on recent advances in applied chemistry' organized by the Department of Chemistry, St. Stephen's College, Pathanapuram.
- O Delivered a talk on 'Contribution of Chemistry in Medical Device Development' during the 'ASPIRE 2025' seminar series organized by Sree Narayana College Chathannur on 19/02/25.
- Delivered an audio talk on microplastics in the Shastralokam program broadcast by the Trivandrum station of All India Radio (Akashvani) on 03/04/25.

III. CUSTOMER SERVICE CELL

The Institute offers testing services for the physicochemical, biological, and calibration services. SCTIMST is a Certified medical device testing laboratory under the CDSCO. Around twenty biological tests are accredited by Le Comité Français d'Acreditation (COFRAC) of France. Calibration services, residual EO, TGA, DSC – accredited by NABL. In this financial year, on the external testing, nearly 200 test requests were from the medical device industry. Around 30 industrial customers availed of the testing services of the Institute in 2024–25.

Customer Service Cell coordinated the internal and external testing services and also study projects for the evaluation of medical devices & biomaterials. The summary of the testing services is as follows:



Description	External			Internal		
	2022–23	2023–24	2024–25	2022–23	2023–24	2024–25
No. of work orders	625	543	494	169	180	186
No. of test materials	1400	1150	1139	496	563	786
Income generated, INR	42,79,943	45,337,79	43,91,134	10,83,340	16,97,000	11,17,700

The division organized an "Open Day – Testing services" on 19th October 2024. The event aimed to give exposure to testing services offered by the institute to the medical device industry, researchers, start—ups, and students. There were nearly 100 participants for the event. The event consisted of lecture sessions, demonstrations, and lab visits. Students from the following institutions visited the institute:

(i) College of Engineering, Muttathara; (i) School of Medical Education, Kottayam; (i) SCT college of

engineering; (i) All Saints college; (i) Biochemistry Dept, University of Kerala; (i) SME Manimalakunnu; (i) Amritha Vishwa Vidyapeetham, Amritapuri, Kollam; (i) Mar Athanasius College, Kothamangalam; (i) Ezhuthachan College of Pharmaceutical Sciences, Marayamuttom; (i) Sri Sivasubramaniya Nadar college of engineering, Tamilnadu; (i) Marian Engineering College, Trivandrum; and (i) SN College, Kollam.



Participants of 'Open Day - Testing Services'

IV. ENGINEERING SERVICES

The division is dedicated to delivering technical support for the general maintenance of equipment and environment at various facilities, management of utility supplies like network engineering, electrical power, water supply, etc., and maintenance of waste

incinerator and sewage systems of the campus. The electrical section maintains:

- 11 kV supply substation system.
- Transformer with a total 2350 KVA capacity.
- Diesel generator (total 1750KVA).
- UPS system with a total 400KVA capacity for power backup.



New initiatives

The team members are involved in: Setting up a Usability Engineering facility under the TRC (DST) Scheme and, development of a connected platform for Infrastructure management under the TRC (DST) Scheme.

Introduction of new patient care and treatment models

Virtual Reality Tool for Surgical Planning and Medical Teaching (in collaboration with Imaging Sciences & Interventional Radiology Department, Department of Cardiology and Government Engineering College, Barton Hill, Trivandrum) Workshop conducted for:

- Cardiology Society of India, Kerala Chapter, on May 3rd, 2024.
- Mid-term CME of the Indian Society of Paediatric Radiology on 22nd June 2024.
- Indian Society of Radiographers and Technologists, Vizag on 27th Sep 2024.
- Paediatric Cardiology Society of India at Amrita Institute, Kochi on 14th Nov 2024.
- Back to Basics (Dept. of Cardiology) at SCTIMST on Jan 17–19, 2025.
- Indian Society for Vascular and Interventional Radiology (ISVIR 2025) at Bolgatty Palace on 8th Feb 2025.

Service activities

The division manages both new works and maintenance services related to infrastructure support systems. More details are given below:

- Maintenance: A total 1526 number of maintenance works were attended by the Engineering Services division.
- New works done by the electrical division through work orders: 63 Numbers
- New works done by MRAC division through work orders: 31 Numbers
- New works done by the Water Services division through work orders: 24 Numbers
- The work summary at the Network Services Division is listed below:

- Completed and commissioned the Networking activities for the CD block.
- Computer & peripheral maintenance management: 465 requests.
- Technical coordination of online events/ meetings like NABL and COFRAC online audit, etc: 90 total online meetings.
- Deployment of new computers/devices: Completed around 13 requests
- Intranet user registration: Completed around 57 requests.
- Bring Your Own Device (BYOD) registration: Processed around 159 requests.
- Software as a Service (SaaS): Completed around 36 requests.

V. INTELLECTUAL PROPERTY CELL

Total IPR summary of the institute till 31st March 2025

- 1. Indian patents sealed 248
- 2. Indian Patent Applications filed 103
- 3. Foreign patents sealed 28
- 4. Foreign patent application filed 09
- 5. Design registrations 84
- 6. Trademarks 08

Patents and design registrations granted during the financial year 2024–25

- 1. Indian patents sealed 25
- 2. Indian patent application filed -12
- 3. Foreign patents sealed 05
- 4. Foreign patent application filed -01
- 5. Design Registrations 10

Patents (India) Granted

- Orthotic Device for Offloading Diabetic Foot Ulcer; Subhash Neyyattinkara Neelakandan, Muraleedharan Chirathody Vayalappil; 06/07/2020, 564676, dtd.31/03/2025
- A Formulation of Pure Dimethoxy Curcumin— Human Serum Albumin and a Process for the Preparation Thereof; Lissy Kalliyana



- Krishnan, Renjith Parameswaran Nair, Mejo Chiratteparambil Korah, Deepa Sathee; 15/05/2020, 560503, dtd. 8/02/2025
- Vascularised Multi-Organ-On-A-Chip Device; Parayanthala Valappil Mohanan, Joseph Xavier, Akhil Venugopal, Arathi Ashok; 31/03/2021, 559591, dtd.04/02/2025
- A Voice Prosthesis Device; Bipin Thomas Varghese, Sujesh sreedharan, Kollengode Ramanathan; 28/01/2019, 557417, dtd. 03/01/2025
- 5. Method and System for Predicting the Occurrence of a Neurologic Event in a Subject; Elizabeth Thomas Thiruvila Kalayil, Devanand Palayil, Sudalaimani Chermadurai, Parathy Kochunarayana Pillai, Parvathy Kochunarayana Pillai, Sasi Pilacheri Meethal, Ramehekar Menon, Ashalatha Radhakrishnan, Sanjeev Varghese Thomas; 06.11.2020, 536715, dtd. 03/05/2024
- 6. A Procedure for Fabricating and Using Decellularized Porcine Cholecyst as Muscle Graft for Repairing Full or Partial Thickness Abdominal Defect/Hernia.; Dhanush Krishna Balakrishnan Nair Syam Kennekkattu Venugopal Narayanan Divakaran Nair Thapasimuthu Vijayamma Anilkumar; 27/12/2013, 553067, dtd. 24/10/2024
- 7. Swab Collection Booth; Ramesh Babu, Muraleedharan Chirathody Vayalappil, Arvind Kumar Prajapati, Kelekanjeri Ganapathi Vishwanathan Siva Kumar, Saurabh Nair, Nagesh Divakara Panickar Sulochana; 13/04/2020, 551497, dtd. 30/09/2024
- 8. Preparation of Curcumin Incorporated Cholecystic Extracellular Matrix Hydrogel (Cemh) Formulations; Thapasimuthu Vijayamma Anilkumar, Akhila Rajan, Geetha Chandrika Surendran; 15/05/2018, 550844, dtd. 24/09/2024
- 3D-Printed Biphasic Scaffold for Tracheal Reconstruction; Prabha D Nair, Rahul V Gopi; 18/10/2019, 550797, dtd. 23/09/2024
- Universal Airway Device for Lung Isolation; Gijo Raj, Azhar Kareem Shyla, Chennakeshavallu Gundapalli Narasimhaiah, Suneel Puthuvassery Raman; 29/04/2021, 550343, dtd. 17/09/2024

- Implantable Micro Infusion Pump with Residual Volume Measurement; Sarath Sasidharan Nair, Nagesh Divakara Panickar Sulochana; 20/10/2020, 550358, dtd. 17/09/2024
- A Flexible and Retractable Closure Device, with Bending Recovery Properties; Gijo Raj, Prakash Nair, Roy Joseph, Hariharan Venkat Easwer, Manoj Komath; 02/12/2020, 549085, dtd. 29/08/2024
- Device for Contactless Adjustment of Proportion of Gases, Particularly for Management of FiO2; Sarath Sasidharan Nair, Nagesh Divakara Panickar Sulochana; 25/10/2021, 548750, dtd. 27/08/2024
- System and Method for Detection of Liquid Types Within Catheter of an Implantable Micro Infusion Pump; Sarath Sasidharan Nair, Nagesh Divakara Panickar Sulochana; 23/09/2021, 548511, dtd. 23/08/2024
- Cavity Conformable Surgical Space Stent Retractor; Arvind Kumar Prajapati, George Chandy Vilanilam; 27/07/2020, 544421, dtd. 08/07/2024
- 16. A Portable Device and a Method for Locating the Superficial Veins of Human Body for Intravenous Puncture and Tracing the Route of Veins with Peripheral Scanning; Sarath Sasidharan Nair, Nagesh Divakara Panickar Sulochana, Bejoy Thomas; 16/09/2017, 543883, dtd. 01/07/2024
- 17. Flocked Swabs and a Process for the Manufacture Thereof; Lynda Velutheril Thomas, Ashok Sreedhar, Neethu Mohan, Rahul, Jijo Wilson; 14/05/2020, 543367, dtd. 27/06/2024
- 18. An In Vitro Nidus Device to Evaluate Liquid Embolic Agents; Arvind Kumar Prajapati, Roy Joseph, Jayadevan Enakshy Rajan; 17/09/2019, 542206, dtd. 19/06/2024
- Deployable Field Units for Emergency Response.; Subhash Neyyattinkara Neelakandan, Muraleedharan Chirathody Vayalappil; 31/03/2020, 543057, dtd. 26/06/2024



- 20. Downstream Heat Treatment Processes for Strength Enhancement of Slender TI6AL4V Shaped Implant Castings; Kelekanjeri Ganapathi Vishwanathan Siva Kumar, Chirathodi Vylappil Muraleedharan, Ajmal Mohammed T;20.8.2021, 540820, dtd. 05/06/2024
- 21. An Improved Delivery Device for Deployment of Stent Grafts; Sujesh Sreedharan, Subhash Neyyattinkara Neelakandan, Krishna Kumar Sreekumaran, Subhash Kumar Mahadevan Subhashmandiram; 30/1/2019;538205, dtd. 16/05/2024
- 22. An Inter–Vertebral Spacer Device with a Delivery Instrument Employing a Protracting Pin Mechanism and a Method for Deployment; Manoj Komath, Sajin Raj Rajan Girija, Venkatesan Ramesh Babu; 14/11/2018, 537273, dtd. 08/05/2024
- 23. Automatic Smart–Bin with Combined UV– Enabled Microwave–Based Disinfection of Hospital Waste; Sethuramen Manikandan, Manoj Govinda Pillai Sulochana Amma, Rahul; 18/04/2020, 537139, dtd. 07/05/2024
- An Expandable Surgical Space Retractor with Tunable Expansion Ratio; George Chandy Vilanilam, Arvind Kumar Prajapati, Chirathodi Vylappil Muraleedharan; 19/04/2021, 532338, dtd. 09/04/2024
- 25. A Composite Sponge for Hemostatic and Wound Healing Applications; Parayanthala Valappil Mohanan, Remya Nirmal Suma; 13/01/2020, 532468, dtd. 10/04/2024

Patents (India) Filed

- Real-Time Loop Mediated Amplification Assay for the Detection of Human Papillomavirus; Anoop Kumar Thekkuveethil, Ria Elza Varghese, Anjana Usha; 21/05/2024
- 2. A Method for Preparing a Solvent–Free 3D Printable Polymer Composite Biomaterial; Shiny Velayudhan, Manoj Komath, Anil Kumar Pallickaveedu Rajan Asari, Deepu Damodharan Ragini; 01/04/2024

- 3. Fluorescence Mapping System for Optical Pathology; Jayasree R S, Arun Anirudhan V, Shaiju S Nazeer, Jeena R S, Anish Karimpannur John, Bhadra Devi Nair S, Nandana V L, Nayana V L, Shreya R S, Anantha Krishnan S, Sethulekshmi S, Sanil L Daniel; 16/05/2024
- A Polymeric Medical Electrode and Its Method of Preparation; Nitha V Panicker, Ramesh P, Jasmin Joseph; 08/08/2024
- Method of Electrochemical Biosensing N– Terminal Brain Natriuretic Peptide (Nt–Pro BNP) and the Process Thereof; Vani Maya, Manoj Gopi, Harikrishnan Sivadasan Pillai, Renjith Sasi; 01/10/2024
- 6. Hemostatic Sponge with Accelerating Clotting Cascades; Manju S, Umashankar PR; 02/09/2024
- 7. Multilayered Drug-Loaded Electrospun Membrane for Tissue Regeneration; Saranya Chulliyil Veluthedath, Lizymol Pampadikandathil Philipose, Deepu Damodharan Ragini; 13.11.2024
- 8. Ceramic Barrier for Reducing Metal Ion Elution From Metal–Based Coronary Stents and a Method of Manufacturing the Same; Subhash Neyyattinkara Neelakandan, Sujesh Sreedharan, Muraleedharan Chirathody Vayalappil; 07.10.2024
- Device and Method of Versatile Training for Deep Micro-Vascular Anastomosis; Jayanand Sudhir Bhanu, Arvind Kumar Prajapati; 29.11.2024
- Parylene–Coated Electrospun Polyurethane Fibrous Membrane for Dura Substitute Application; Ramesh P, Prakash Nair, Umashankar P R, Sabareeswaran A, Easwer HV, Theerdha V Nair; 28/03/2025
- A Flexible Pedicle Screw Supporting Apparatus; Arvind Kumar Prajapathi, Muraleedharan CV, Ganesh Divakar, Unnikrishnan MM, Krishnakumar K; 26/02/2025
- A Bioprosthetic Heart Valve; Ranjith G, Muraleedharan C V, Umashankar P R, Vivek V Pillai, Rajeev A, Subhash Kumar MS, Unnikrishnan MM; 03/02/2025



Patents (Foreign) Granted

- A Radiopaque Polymeric Liquid Embolic System; Roy Joseph, Jayadevan Enakshy Rajan, Gopika Valsalakumari Gopan; USA; 04/05/2021; US11, 986, 571 B2; 21/05/2024
- A Radiopaque Polymeric Liquid Embolic System; Roy Joseph, Jayadevan Enakshy Rajan, Gopika Valsalakumari Gopan; European Union; 04/6/2021; EP3873547; 07/08/2024
- A Self Expanding Flow Diversion Device with Enhanced Kink Resistance and Radial Strength; Sujesh Sreedharan, Anku Sreekumar Sreehari Unnikrishnan Nair; Brazil; 25/03/2021;BR 11 2021 0058516; 02/07/2024
- 4. Implantable Atrial Septal Defect Occlusion Device with Woven Central Section on Left Atrial Flange; Sujesh Sreedharan, Jijo Jerard, Liji Geetha Vijayan, Bijulal Sasidharan; European Union; 07/07/2020; 3700432; 12/02/2025
- Implantable Atrial Septal Defect Occlusion Device with Woven Central Section on Left Atrial Flange; Sujesh Sreedharan, Jijo Jerard, Liji Geetha Vijayan, Bijulal Sasidharan; Brazil; 29/06/2020; BR11 2020 013348–5;28/01/2025

Patents (Foreign) Applications Filed

 Nanozyme Based Lateral low Assay Device; Jayasree R S, Sarathkumar Elangovan; PCT; PCT/IN2024/051526; 21.08.2024

Design Registrations (India)

- A Design of Multi-Organ Chip for Inhalation Toxicity Assessment; Mohanan P V, Joseph Xavier, Megha K B, Amir Suhail U, Ajai Krishnan M J, Reshma S;03.06.2024; 418872-001
- A Design of 'Multi Organ on a Chip for Adme Studies'; Dr Mohanan P V, Reshma S, Megha K B, Joseph Xavier, Amir Suhail U, Ajai Krishnan M J 03.06.2024; 418873–001
- A Design of Multi-Organ Chip for Major Organ Toxicity Evaluation; Mohanan P V, Amir Suhail U, Magha K B, Joseph Xavier, Reshma S, Ajai Krishnan M J; 03.06.2024; 418870-001

- 4. A Design of A Multi–Organ Chip for Target Organ Toxicity Evaluation; Mohanan P V, Ajai Krishnan M J, Megha K B, Joseph Xavier, Reshma S, Amir Suhail U; 03.06.2024; 418871–001
- A Design of A Multi-Organ Chip for General Toxicity Evaluation; Mohanan P V, Ajai Krishnan M J, Megha K B, Joseph Xavier, Reshma S, Amir Suhail U; 24.07.2024; 424396–001
- A Design of Multi–Organ Chip Consisting of Blood–Brain Barrier for Neurotoxicity Evaluation; Mohanan P V, Amir Suhail U, Magha K B, Joseph Xavier, Reshma S, Ajai Krishnan M J 24.07.2024; 424397–001
- 7. A Novel Mitral Clip for Correction of Mitral Regurgitation; Ranjith G, Muraleedharan C V, Sajin Raj R G; 17.06.2024; 420330–001
- 8. Disposable Paper Based Colorimetric Device for Multimodal Detection of Alzheimer's Disease Biomarkers; Jayasree R S, Sarathkumar Elangovan, Jijo P T; 21.06.2024; 420796–001
- Design of Bilayered All–Trans Retinoic Acid Loaded Elecrospun Small Diameter Vascular Graft with Internally Braided Nitinol Providing Enhanced Flexibility; Lynda Velutheril Thomas, Asha V Nath, Anandhu A; 24.10.2024;435527–001
- Haemostat Applicator for Restricted Narrow Endoscopic Surgical Spaces
 Harness; Prakash Nair, Easwer H V, Praveen James, Anoop Jose, Shaj Upendran, Asihab M; 22–01–2025; 445216–001

VI. QUALITY CELL

Activities of the Quality Cell include the implementation, maintenance, and continual improvement of the Quality Management System (QMS). This includes, but is not limited to, ensuring that the facilities, equipment, personnel, methods, practices, records, and their control are in conformance with the requirements of international standards.

Service/Academic activities

Quality Cell is involved in supporting all testing and calibration laboratories, as well as the auxiliary



support services/sections in maintaining the Quality Management System.

Major activities of the Quality Cell during the period from April 2024 to March 2025 are:

- i) Internal Audits:
 - Two internal audits were conducted—first (IABMT100.Y24) and second (IABMT200. Y24) during 6–14 May 2024 and 11–20 November 2024, respectively.
 - Corresponding post–audit meetings were conducted on 12th June 2024 and 18th December 2024.
 - An additional audit at the Calibration Cell (IABMT200.Y24/1) for verification of Site calibration was done on 9th January 2025. This audit was a recommendation from the NABL reassessment conducted on December 21–22, 2024, and is also part of the second internal audit (IABMT200.Y24) for the year 2024.
- ii) Technical Management Committee (TMC) Meetings chaired by Head, BMT Wing:
 - Two TMC meetings were conducted on 13th June 2024 (TMC–I, 2024) and 19th December 2024 (TMC–II, 2024).
- iii) Management Review Committee (MRC) Meeting chaired by Director, SCTIMST:
 - MRC meeting conducted on 21st January 2025.
- iv) COFRAC and NABL assessment:

The following three external assessments were conducted during 2024–25.

- COFRAC surveillance assessment of the biological testing as per ISO/IEC 17025:2017 was conducted during 29–30 August 2024. Continued accreditation received up to 31st May 2028.
- NABL renewal assessment of the Physicochemical testing (Central Analytical Facility) conducted during 28–29 December

- 2024. Accreditation renewed up to 13th February 2029.
- NABL renewal assessment of Calibration Facility conducted during 21–22 December 2024. Accreditation renewed up to 16th February 2029.
- v) Training/Workshop organized/participated:
 - A half-day brainstorming session on 'Risk Assessment' was conducted at the Seminar Hall, MSV Building (Floor II), on November 28, 2024, from 09:30 am to 12:30 pm. Twenty-seven participants, including testing personnel, supporting staff members, and internal auditors, attended the program.
 - Three personnel, including two newly joined staff, completed training on 'Laboratory accreditation and Internal auditor training as per ISO/IEC 17025:2017' during July 1–3, 2024, at Chennai, organized by the Quality Council of India under GOI.
- vi) CDSCO-Medical Device Testing Laboratory:
 - The registration as the 'Medical Device Testing Laboratory' under CDSCO was renewed for another 5 years till 24th September 2029.
- v) ISO 13485:2016 implementation:
 - The TMC Committee was constituted vide order dated 10–09–2024 for discussing the concerns related to the implementation of the standard.
 - An adequacy audit for the Quality Manual & System Procedures in the Quality Management System as per ISO 13485:2016 (IABMT101.Y24) was conducted during November 25–28, 2024.
 - For the implementation of ISO 13485:2016, approval for engaging a consultant, Mr. M.G. Sathyendra, Qmart Global, Bengaluru, was obtained, and he visited the BMT Wing from 17–18 February 2025. The first visit was for two days, reviewing the documentation and proposed action plan for the retaining



- work for the implementation of QMS in the targeted laboratories.
- Nine meetings have so far been conducted for the implementation of ISO 13485:2016 with the faculty of the targeted laboratories, after the consultancy visit on 17–18 February 2025, till the end of March 2025. The implementation as per the consultant's action plan is progressing.

vi) QMS Documentation:

- One Quality Manual, 37 System procedures, 1 Guidelines, and 48 Work Procedures revised and issued to the Laboratories/ sections.
- 70 Laboratory notebooks & 85 Registers/log books prepared and issued.

vii) Verification of Corrective Actions:

- Corrective actions taken for 27 numbers of internal audit non-conformities were verified and closed.
- Action taken for the seven Risk/Opportunity for improvement identified by different laboratories was verified for its effectiveness.
- Action taken for 27 corrective actions raised by different laboratories was verified for its effectiveness and closed.

Training/outreach programs

 The Quality Cell at BMT Wing organized a brainstorming session on "Risk Assessment" held at the Seminar Hall, MSV Building (Floor II), on November 28, 2024, from 09:30 am to 12:30 pm. About 27 participants, including testing personnel, supporting staff members, and internal auditors, attended the program.



The Competency Development Cell at BMT Wing organized a refresher training session on: 'Biostatistics in Scientific Research – An Overview' and 'How to Get Cited', held at the Video conferencing room, MSV Building, on May 6, 2024. The session was conducted in a hybrid mode from 10:30 am to 12:30 pm. Dr Jissa V.T., Scientist D, AMCHSS, SCTIMST, and Dr Dimple Gopi, Librarian cum Documentation Officer, served as the resource persons, engaging participants in a productive learning experience. A total of 30 participants, including both staff members and students, attended the training program.



VII TECHNOLOGY BUSINESS DIVISION

The Technology Business Division focuses on the following activities of the Institute:

- Institute industry interactions related to technology transfer and research project collaborations.
- Intellectual Property Rights, such as patents, designs, and trademark registrations of the Institute.
- Testing services and specific protocol—based study requests from the industry and academia for medical devices and biomaterials.
- Training, problem solving and collaborative activities of the Institute with industry through the Industry Institute Partnership Cell.
- Internal research project funding of the Institute comprising of the Technology Development Fund Scheme, internal review of the project application and also interim status reviews of projects.
- Reports/questions for submission to external agencies such as DST, DSIR, ICMR, Lok Sabha/ Rajya Sabha, etc., on the activities of the Institute.



- Outreach programs giving exposure to students from different Institutions across India at the Institute and outside on the development of medical devices.
- Clinician discussions on the projects aimed / under development.

Developmental Activities of TBD

A usability engineering facility was established with a camera, monitor, and patient bed by TBD, Engineering Services and Calibration Cell. The Usability engineering group conducted self–training and brainstorming on the standard ISO 62366 through presentations, case studies, articles, etc. A study was initiated with an automated trolley e–drive. The study was conducted after IEC clearance.



Usability study on automated trolley e-drive

Technology Commercialization: Product Launches

1. Launch of CASPRO and BONYX

CASPRO – Resorbable recrystalline calcium sulfate and BONYX – Nanoporous bioceramic spherical beads based on technology transferred by the Institute were launched by M/s. Onyx Medicals Pvt Ltd, Meerut, UP. The product launch was done by the Hon'ble President of the Institute, Mr. Kris Gopalakrishnan, at Trivandrum on 24th Jan 2025. Dr Sanjay Behari (Director, SCTIMST), Dr Harikrishna Varma (Head, BMT Wing), Dr K. Venugopal Menon (HoD & Senior Consultant, Rajagiri Hospital), Dr HV Easwer (Professor, SCTIMST), Mr. Priyam Rastogi (Sales Director, M/s. Onyx Medicals), and other senior faculty from the Institute were present.



Product launch of CASPRO – Resorbable recrystalline calcium sulfate and BONYX – Nanoporous bioceramic spherical beads

2. Launch of Scire Chitra GelMA UVS Bioink for 3D Bioprinting

M/s. Scire Science Pvt. Ltd., KINFRA, Hi–Tech Park, Kochi, which took the technology for gelatin–based GelMA UV safe bioink, officially launched the product under the brand name of *Scire Chitra GelMA–UVS Bioink* on November 20, 2024, at SCTIMST in Trivandrum. The event was graced by distinguished dignitaries such as Shri. Kris Gopalakrishnan (Hon'ble President, SCTIMST); Dr V.K. Saraswat (Member of NITI Aayog and former SCTIMST President); Prof. Abhay Karandikar (Secretary of the Department of Science & Technology), and Dr Manoranjan Mohanty (Head AI Division, Dept. of Science & Technology).







Product launch of Scire Chitra GelMA UVS Bioink for 3D Bioprinting

3. Launch of AG Chitra Tuberculosis Diagnostic Kit

Dr VK Saraswat, Hon'ble President, SCTIMST, launched the AG Chitra Tuberculosis Diagnostic kit on 8th April 2024 in online mode. Dr Abhay Karandikar (Secretary, DST), was also present at the function. The kit was developed by the Institute for fast and accurate diagnosis of pulmonary tuberculosis. The technology was licensed to M/s. Agappe Diagnostics Pvt. Ltd. Following the successful validation, the Central Standard Drug Control Organization (CDSCO) had approved the kit for manufacturing and commercialization.





Product launch of AG Chitra Tuberculosis Diagnostic Kit



Product launch of AG Chitra Tuberculosis Diagnostic Kit

Expression of Interest

An Expression of Interest was invited for the following products during the year:

- Deep Brain Stimulator
- Mitral Annuloplasty ring
- Intracranial electrodes for use in acute and chronic Electrocorticography for periods up to 15 days
- Isolation and purification of Plasma proteins
 -Fibrinogen, Thrombin, Intravenous Immunoglobulin, Albumin.

Technology Transfer

The Technology Transfer agreement of the Titanium nitride (TiN) coated coronary stent was signed with M/s. Invasive Technologies Pvt. Ltd., Kerala on 23rd September 2024. The Chitra coronary stent, intended for the treatment of coronary artery disease, consists of (a): L605Metal Stent platform and (b): Titanium Nitride Ceramic coating.



Technology Transfer of TiN-coated coronary stent



MoU/Collaborative product development

The following Memoranda of Understanding (MoU) were signed during the year:

Date of signing	Name of the partner	Objectives of the MoU	
30/Apr/2024	South India Surgical Co. Ltd.	Co-development of the peacock retractor	
24/May/2024	AIIMS, Kalyani	Development of AI-based neonate infant cry analyzer and assessment of the link between protophones and maternal sleep during pregnancy	
6/Aug/2024	Skillveri training solutions private limited	Co-development of a VR-based solution for the upper limb rehabilitation of patients who have mild to moderate disability post stroke.	
31/Aug/2024	AIIMS, Rishikesh	Development of AI-based neonate infant cry analyzer and assessment of the link between protophones and maternal sleep during pregnancy	

Staff - Department of Technology and Quality Management

Dr Roy Joseph – Scientist G (Sr. Grade) and Head of the Department

Dr P Ramesh – Technical Manager, Scientist G (Senior Grade)

Mr S Balram, MTech – Scientist G (Senior Grade)

Dr Anugya Bhatt - Quality Manager, Scientist G

Ms Leena Joseph – Dy. Technical Manager, Engineer G

Ms Sandhya C G – Engineer G

Mr Rajkrishna Rajan – Engineer G

Mr Sajithlal M K – Engineer G, Network Service Cell

Mr Vinodkumar V – Dy. Quality Manager (Medical Devices), Engineer G

Dr Arun Anirudhan V – Engineer F, Network Service Cell

Dr Naresh Kasoju – Dy. Quality Manager (GLP Studies), Scientist D

Dr Renjith S. – Dy. Quality Manager, Scientist C

Mr Willi Paul – Scientific Officer (Instruments)

Mr Sreekanth S.L. – Sr. Scientific Assistant

Ms Priyanka A – Sr. Scientific Assistant (Lab)

Mrs Nimi N – Scientific Assistant (Instruments)

Arumugham V – Jr. Scientific Officer (Instruments)

Mr Rajesh R P – Jr. Scientific Officer (Instruments)

Dr Sasikala T S – Technical Assistant (Instruments) – A

Mr Sajid A – Technical Assistant B

Ms Asha Rani V, — Technical Assistant (Instruments)—B

Mr. Shajimon P – Technical Asst. (Electrical)

Mr Mahesh R – Technical Asst. (Electrical)

Mr Binu A U – Technical Asst., Network Service Cell (Instruments)

Mr Dilu P – Technical Asst. (Electrical)

Mr Binu C P – Asst. Engineer (MRAC)

Ms Deepa G K – Asst. Engineer (Civil)

Mr Sabu K S – Jr. Engineer (Electrical)

Mr Sreejith L K – Jr. Engineer (Instrumentation)

Mr Sajimon B. – Jr. Technical Asst. (Electrical)

Mr Ajithkumar V – Jr. Technical Assistant (MRAC)

Mr Mahesh P Nair – Jr. Technical Asst. (Electrical)

Mr Ilaya Raja J – Technician (Electrical)

Mr Sivakumar K – Technician (Electrical)

Mr Santhosh Kumar R S – Technician (Electrical)

ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES



ACHUTHA MENON CENTRE FOR HEALTH SCIENCE STUDIES (AMCHSS)

AMCHSS, the public health unit of SCTIMST, is engaged in teaching and training in health sciences. AMCHSS pioneered the Master of Public Health (MPH) course and PhD in Health Sciences (for both full–time and parttime students) in the country. The current research focus of AMCHSS includes non–communicable diseases, health systems, equity concerns like gender, health of marginalized communities, environment, infectious diseases, data science in public health, etc. AMCHSS family currently includes ten full–time faculty members and 39 PhD scholars, around 50 technical staff (project staff) and 55 MPH students.

Academic Activities

- o A Collaborative Research Agreement (CRA) was signed between the institute and AIIMS, New Delhi, for the collaborative project titled "Using Digital Solutions to Improve Cause of Death Data in India" with Dr Biju Soman as the PI on 10/02/2025.
- o A Memorandum of Understanding (MoU) was signed between the institute and the Indian Institute of Technology (IIT) Mumbai, with effect from 21/01/2025, got signed in this month. The aim is to foster research and academic collaboration between the Geospatial Information Science Engineering Hub (GISE) at IIT Bombay and the AMC Data Science Lab, led by Dr Biju Soman.

Research Programmes

o Dr Srikant A received approval for a project entitled "Exploring the Role of DNA Methylation Changes as Early Markers of Gestational Diabetes Mellitus in a Community–based Longitudinal Study from South India," for funding from ICMR (64 Lakhs).

New Initiatives:

- Dr Srikant A received approval for a project entitled "Deciphering the role of microRNAs in distinguishing functional and nonfunctional corticotroph pituitary neuroendocrine tumours" for funding from TDF, SCTIMST (3.20 Lakhs).
- o A Memorandum of Understanding (MoU) was signed between the institute and the Indian Institute of Technology (IIT) Mumbai, with effect from 21/01/2025,

got signed in this month. The aim is to foster research and academic collaboration between the Geospatial Information Science Engineering Hub (GISE) at IIT Bombay and the AMC Data Science Lab.

Events Organized:

- 1. The First AMCHSS Legacy Lecture Series was started on 27th March 2024 with a lecture delivered byDr Sankara Sarma, former Head, AMCHSS..
- Collaborators' consortium meeting of the Kerala Diabetes Prevention Project funded by the National Health and Medical Research Council, UK, was organised at AMCHSS on 22 August 2024..
- 3. Collaborators' consortium meeting of the scale—up project on hypertension and diabetes control initiatives in Kerala and Tamil Nadu was organised from 19–21 August 2024 at AMCHSS.
- 4. conducted the Indo-Swedish Grant Investigators Workshop at Hotel Mascot. (ICMR grant. Project No 5473 on 13–11–2024 15–11–2024)
- 5. Dr Muniyandi Malaisami, Head of Dept of Health Economics, ICMR–National Institute of Research in Tuberculosis, gave a guest lecture on "Importance of health economics for public health, especially in TB prevention" on 7th January 2025 at AMC Seminar Hall. One–day sensitization workshop on "the basics of sex, gender, and sexuality; then look at healthcare needs of people from LGBTQIA+ communities" was organised jointly by AMCHSS and SANGATH Bhopalon 14th January 2025. The external experts included Dr Anant Bhan–Sangath Bhopal, Dr Harikeerthan–Sangath Bhopal, Dr Amir Khan Maroof Director Professor, Dept of Community Medicine, University College of Medical Sciences, New Delhi.
- 6. Dr Mala Ramanathan worked with collaborators for Indo–Swedish Grant from the ICMR (Project no. 5473) to develop measures for measuring social frailty among the elderly from 30th December 2024 to 3rd January 2025, in Mumbai along with co–investigators from IIPS, Mumbai.



- 7. Basic Life Support Training (BLS) was conducted at AMCHSS with the help of the Head of the Anaesthesia department, Dr Prasanta Kumar Dash (Professor Senior Grade) and his team, on 28th January 25. Around 40 participants including MPH students and Project staff of AMCHSS attended the program, and were trained in BLS techniques.
- 8. The first session of the Public Health Students Forum seminar series was held in AMCHSS Seminar Hall on 31st January 2025, inaugurated by Dr Soman. The session was on the "Public Health Act," and the speaker was Dr Meenakumari S, Associate Professor, Govt. Law College, Thiruvananthapuram.
- 9. Public Health Students Forum organised a webinar to commemorate the World TB Day on 24 March 2024. Dr SS Lal, our former student and currently the Director, ReAct Asia Pacific, shared his hands—on experience in working with various international agencies on addressing Tuberculosis with the students.
- 10. A meeting between Dr Nachiket Mor, economist and former India Country Director of the Bill and Melinda Gates Foundation and faculty members of AMCHSS was conducted to identify areas of research interests on the 7th February 2025.
- 11. Organised by AMCHSS, SCTIMST, Thiruvananthapuram and IIMAD, Thiruvananthapuram 695011, AMCHSS, Seminar Hall, February 3rd and 4th, 2025AMCHSScoorganised a Workshop on Data analysis using the Longitudinal Ageing Study in India (LASI) data jointly with IIMAD, Thiruvananthapuram 695011, AMCHSS, Seminar Hall, February 3rd and 4th, 2025, with funding support from Project no.5473 of SCTIMST,
- 12. 'The cognitive consequences of social frailty: a mixed methods study of precarity and resilience among aging populations in India and Sweden.
- 13. The faculty members, MPH, PhD students, and project staff members of AMCHSS attended a discussion session with Smt. Sujatha Rao IAS, the former union secretary to the Ministry of H&FW, where she talked about her experience of policy planning and implementation of health sector reforms using examples of NACO. She is currently a member of the newly constituted Academic Committee. The meeting with the Department was held on 11th February, 2025.

Awards and Honours:

- 1. Dr Soman got a travel fellowship to attend the "R in HTA Hackathon 2024" held at the Queen's University, Belfast, Northern Ireland, on Aug 5–6, 2024.
- 2. Dr Jeemon P has featured in the top 2% of scientists' lists (2024) by Stanford University (within the top 1000 scientists in the sub–field of General and Internal Medicine).
- Dr Jeemon P was nominated as a member of the National Institute of Health Research (NIHR), UK funding committee on Research and Innovation for Global Health Transformation.
- 4. Prinu Jose, PhD Student, won the first prize at the poster competition of the National Conference on "Early Detection and Early Intervention of Neuro Developmental Disorders" held by the Child Development Centre, Kerala and UNICEF. Her poster was titled "Never the twain shall meet? Bridging the gap of policy translation of community—based rehabilitation model for children with developmental disabilities in Kerala", and co—authored by Dr Arsha VR and Dr Ravi Prasad Varma
- 5. Dr Mathew, PhD scholar with Dr Soman and the recipient of the International Fellowship for Young Biomedical Scientists from the Government of India (Indian Council for Medical Research), presented his work on "The use of spatial epidemiology for tuberculosis control in India" at the Health Research Institute at University of Canberra, Australia, on 20 November 2024.

Book chapters:

1. Prof. Rakhal Gaitonde wrote an OP–ED in The Hindu –December 7th 2024 – https://www.thehindu.com/opinion/lead/public–health–insights–from–the–1896–bombay–plague/article68955779.ece

Faculty

Dr Biju Soman, Professor & Head

Dr Mala Ramanathan, Professor (Senior Grade)

Dr Srinivasan K, Professor

Dr Rakhal Gaitonde, Professor

Dr Ravi Prasad Varma P, Professor

Dr Jeemon P, Additional Professor

Dr Srikant A, Associate Professor

Dr Manju R. Nair, Scientist D

Dr Jissa VT, Scientist D







Research Methodology and Data Analysis workshop at the IQRAA International Hospital and Research Centre, Kozhikode, on 11–12 June 2024



Workshop on "Health Data Science using R" at Bangalore in collaboration with the Institute of Public Health on 15-17 June 2024



Inauguration of Journal Club at SPP, KUHS on Jun 29, 2024 Dr Jeemon P has featured in the top 2% of scientists lists (2024) by Stanford University





Field Visit to Manickkal Panchayat for MPH students – arranged by Prof/Ravi Prasad Varma.



Director, Dr Sanjay Bihari giving his tributes to Dr Richard A Cash on 23/10/2024 at AMCHSS



Dr Soman and the AMCHSS team as key resource persons at the National workshop on data analysis and spatial epidemiology using R at Yenapoya University, Mangalore, from 03–05 October 2024





MPH 2024 batch conducted a medical and dental camp at the BUDS school in Venganuur Panchayat under the leadership of Prof. Ravi Prasad Varma on 25 October 2024.



"Comprehensive Workshop on Research Methodologies and Data Analysis Using R" at the IQRAA International Hospital and Research Centre, Kozhikode, on 14–16 November 2024 by AMCHSS.



The Indo-Swedish Grant - Investigators Workshop at Hotel Mascot on 13-15 Nov 2024.





The basics of sex, gender, and sexuality; then look at the healthcare needs of people from LGBTQIA+ communities workshop hosted by AMCHSS



Students and faculty members participating in BLS training



Students and faculty members attending the Public Health Students Forum seminar



Students and faculty members attending the Workshop on Data analysis using the Longitudinal Ageing Study in India (LASI) data





Students and faculty members attending the session with Smt. Sujatha Rao, IAS



Panel Discussion on Transforming Public Health Education in India at IPHACON2025, 21–23 March at Belagavi.



Participation in the INSA-NCGG LEADS programme at INSA, New Delhi

DIVISION OF ACADEMIC AFFAIRS



DIVISION OF ACADEMIC AFFAIRS

The Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum continues to be a much sought—after destination for super specialty courses leading to DM or MCh Degrees in Cardiac and Neurosciences. This is also one of the few institutions that offer post—doctoral fellowship programs in subspecialty areas of Cardiac and Neurosciences. In addition, the Institute offers Masters and PhD courses in Medical, Biomedical and Health Sciences and, Diploma and PG Diploma courses in related areas.

Activities

Programs Offered during the year 2024-25

Post-doctoral Programs

- 1. DM Cardiology
- 2. DM Neurology
- 3. DM Neuroimaging and Interventional Neuroradiology
- 4. DM Cardiovascular Imaging and Vascular Interventional Radiology
- 5. DM Cardiothoracic & Vascular Anaesthesia
- 6. DM Neuroanaesthesia
- 7. DM Paediatric Cardiology
- 8. MCh Cardiovascular & Thoracic Surgery
- 9. MCh Vascular Surgery
- 10. MCh Neurosurgery (After Ms)
- 11. Post–doctoral Fellowship (Post DM/MCh/DNB)
 - I. DepartmentofNeurology
 - i. Electroencephalography
 - ii. Epilepsy
 - iii. MovementDisorders
 - iv. Neuromuscular Disorders
 - v. Stroke

II. DepartmentofCardiology

- i. AdultCardiologyand Interventions
- ii. CardiacElectrophysiology
- iii. PaediatricCardiology

III. DepartmentofNeurosurgery

- i. CerebrovascularSurgery
- ii. Skull BaseNeurosurgery
- iii. Spine Surgery
- iv. Functional Neurosurgery

IV. DepartmentofCVTS

- i. AdultCardiacSurgery
- ii. Paediatric CardiacSurgery

V. Department of Anaesthesiology

- i. Pediatric cardiac Anaesthesia
- ii. Perioperative Neuromonitoring and Neurosurgical Intensive Care
- iii. Adult Cardiothoracic Vascular Anaesthesia

12. Post Doctoral Certificate Courses (PDCC)

- I. Dept. of Transfusion Medicine
 - i. PDCC in Transfusion Transmitted Disease Testing
- II. Dept. of Microbiology
 - i. PDCC in Hospital Infection Control
- III. Dept. of Pathology
 - i. PDCC in Neuropathology
- 13. Integrated MD-PhD, DM-PhD and MCh-PhD

PhD (Full Time)

Subject streams

- 1. PhysicalSciences
- 2. ChemicalSciences



- 3. Biological Sciences/Biomedical Sciences
- 4. Bioengineering
- 5. Biomaterial Science and Technology
- 6. Health Sciences
- 7. Medical Sciences

PhD (Part-Time)

1. Health Sciences

Master's Programs

- 1. MD in Transfusion Medicine
- 2. Master of Public Health (MPH)
- 3. Master of Technology (MTech) Biomedical Engineering

Diploma Programs

- 1. Diploma in Public Health
- 2. Post Basic Diploma in Cardio-Thoracic Nursing
- 3. Post basic Diploma in Neuro Science Nursing
- 4. Diploma in Operation Theatre and Anaesthesia Technology
- 5. Diploma in Advanced Medical Imaging Technology

PG Diploma Programs

- 1. Cardiac Laboratory Technology
- 2. Neuro-Technology
- 3. Medical Records Science
- 4. Clinical Perfusion
- 5. Blood Banking Technology

Advanced Certificate Programs

- 1. Physiotherapy in Neurological Sciences
- 2. Physiotherapy in Cardiological Sciences.

Other Programs

Joint Programs with other institutions (IIT Madras & CMC Vellore)

- 1. MTech (Clinical Engineering)
- 2. PhD (Biomedical Devices and Technology)

Affiliated Programs conducted at other Centres

A. National Institute of Epidemiology, Chennai

 Master of Public Health (Epidemiology and Health Systems)

B. Christian Medical College, Vellore

- 1. MS Bioengineering
- 2. PhD in Bioengineering/Biomedical Sciences
- 3. Master of Public Health (MPH)

The annual selection process for admission to various programs was carried out in November and December. The selection for PhD (Fellowship holders) and MPH/DPH was conducted in May & June 2024. The newly admitted students were welcomed and addressed by the Director, Dean, and senior faculty members at a function held on 18th January 2025.

The Orientation Program for the Senior Residents was conducted in two sessions. The first session was from 1st March 2025 and the second was from 15th March 2025. The student community attended several national and international conferences and brought laurels to the Institute by winning awards for their work and presentations.

Admission Process

Admissions to various programs of study are regulated by policy and procedures recommended by the Academic Committee and approved by the Governing Body of the Institute from time to time. The notification for admission was published all over India through advertisements in leading newspapers (Malayalam, Hindi, and English) during 1st week of September every year and on the Institute website. The assessment and interviews for admission to DM/ MCh/MD programs were conducted through INI-SS/INICET. The entrance exam and or interview for Post-Doctoral Fellowship, PDCC, postgraduate and diploma programs were held in the Institute during November/December. Admissions to PhD (Fellowship holders), Master of Public Health, and Diploma in Public Health were carried out during May/June.

During the year 2024–2025,162 students enrolled in different academic programs conducted by the



institute. The details of the students/residents admitted from 01st April 2024 to 31 March 2025 are as follows:

Program	No. of students	Program	No. of students
DM	26	MPH (SCTIMST)	24
MCh	9	MPH (NIE)	16
PDF	13	MPH (CMCV)	12
MD	2	PhD (SCTIMST)	15
PDCC	3	MS Bioengineering (CMCV)	5
M.Tech (Jt. Program With IITM & CMCV)	20	Diploma/ PG Diploma/ Certificate	23

The total strength of students on the rolls of the Institute (including the joint programs and affiliated programs) as of 31.03.2024 was 395.

Short-Term Training/Obsevership

provided short-term Institute training/ observership to candidates sponsored by Government/ Autonomous Institutions, Health Sector Organizations, Approved Medical/Dental/ Nursing/Engineering Colleges and other Paramedical Institutions. The training/observership was arranged in consultation with the respective Department/ Discipline. Observers from various institutions all over the country spent varying periods from 15 days to 3 months in different Departments of the Institute. A total of 351 candidates completed their observership/ internship/project work/training at SCTIMST during the year 2024-2025.

Annual Convocation (40th Batch) and 7th G. Parthasarathi Oration

The annual convocation ceremony of the 40st batch was conducted on 4th May 2024. In total, 162 students received their degrees/diplomas/ certificates for the year 2023–2024. The program was held at the Achutha Menon Centre of Health Sciences Auditorium, from 10.00 a.m. Dr Sanjay Behari, Director, SCTIMST delivered the welcome address and presented a report of the activities of the institute. DrAbhay Karandikar (Secretary, Dept. of Science & Technology, Govt. of India), the Chief Guest delivered the convocation address for the function. The heads of various departments presented their new graduands and the degrees were conferred to the graduands by Dr Vijay Kumar Saraswat, the Hon'ble President of the institute. The number of degrees awarded under different specialties was as follows: DM program (Cardiology / Neurology / Cardiothoracic and Vascular Anaesthesia /Neuroanaesthesia/Neuroimaging and Interventional Neuroradiology) – 24; MCh program (Cardiovascular and Thoracic Surgery and Neurosurgery) – 12; MD (Transfusion Medicine) – 1; Post Doctoral Fellowship (PDF) program (Adult Cardiology and Interventions / Cardiac Electrophysiology / Cerebrovascular Surgery / Electroencephalography / Epilepsy / Neuromuscular Disorders / Paediatric Cardiac Anaesthesia / Paediatric Cardiology / Skull Base Neurosurgery / Stroke) – 12; Master of Public Health – 57; MS Bioengineering – 5& PhD – 20. Diploma and PG diploma programs:31 sttudentas. DrAbhay Karandikar (Secretary, Dept. of Science & Technology, Govt. of India), the Chief Guest delivered the convocation address for the function. The guest of honor of the function was Dr V. Narayanan (Distinguished Scientist and Director Liquid PropulsionSystems Centre Indian Space Research Organization Department of Space, Govt. of India) During the convocation, the members of the SCTIMST faculty who have given outstanding contributions in various areas were awarded certificates of merit and plaques. The name of the award and the winner for the year 2024 are given below:



- Prof. M.S. Valiathan Certificate of Merit for the Outstanding Research Investigator 2024
 Dr Anilkumar.T.V., Scientist G, Division of Experimental Pathology.
- Certificate of Merit 2024 for outstanding achievement in the clinical specialty – Dr Ajay Prasad Hrishi P, Additional Professor Department of Anaesthesiology.
- Certificate of Merit 2024 for the best paper publication –Ms. Anupama Sekar., PhD scholar.
- Certificate of Merit 2024 for outstanding achievement in basic science research –Dr Rekha M.R, Scientist G, BMT wing.

- Certificates of appreciation in various categories were awarded by the dignitaries.
- Dr Mohandas Dr Richard A. Cash merit certificate for the best outgoing Master of Public Health student was presented to Dr George Joseph Kodickal, Graduand from AMCHSS
 - Seventh G. Parthasarathi Oration was also conducted along with the convocation. Dr Shiv Kumar Sarin (Director Institute of Liver and Biliary Sciences, President, National Academy of Medical Sciences) was the G. Parthasarathi Orator.
- **G.** Parthasarathi Orator: Dr Shiv Kumar Sarin (President, National Academy of Medical Sciences, Director, Institute of Liver and Biliary Sciences)





Degrees/Diplomas/Certificates Awarded during the year 2024–25

There were 162 students found eligible to receive degrees/diplomas/certificates during the year 2024–2025.

Program	Number of students	Program	Number of students
DM	24	MS Bioengineering	5
MCh	12	Diploma in Cardiovascular & Thoracic Nursing	7
PDF	12	Diploma in Neuro Nursing	4
PDCC	2	PG Diploma in Blood Banking Technology	3
MD	1	PG Diploma in Clinical Perfusion	1
DPH	0	PG Diploma in Cardiac Laboratory Technology	3
MPH (SCTIMST)	22	PG Diploma in Medical Records Science	2
MPH (CMCV)	12	Diploma in Advanced Medical Imaging Technology	3
MPH (NIE)	23	Diploma in Operation Theatre and Anaesthesia Technology	2
PhD	20	PG Diploma in Neuro Technology	5





































National Science Day Celebrations

National Science Day 2025 was celebrated by Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, on 28th February 2025. The theme for the year 2025 was 'Empowering Indian Youth for global leadership in Science and Innovation for Viksit Bharat'. The program was attended by about 23 students from National College, four students from Mahatma Gandhi College, Thiruvananthapuram, andten students from Kerala University Kariavattom Campus, six students from Shiv Nadar College of Engineering, teachers from the above colleges, teachers from the colleges, and faculty and students of SCTIMST. The program was held

at the Combinational Devices (CD) block at BMT Wing, SCTIMST Trivandrum.

The event commenced with the Welcome speech by Dr Srinivasan K., Dean. The chief guest of the function was Dr Mohan Sankar S., Professor and Head of Healthcare Technology, Innovation Centre, and Brain Centre, IIT Madras, Chennai. He talked on the topic 'an overview of cutting–edge research in the Service of mankind and current advances in the field of functional imaging of the brain connecting it at the gross to microscopical level' followed by group discussion. Er. Muraleedharan C.V., Associate Head and Scientist G(Sr.Gr.) handed over a memento to the speaker on behalf of SCTIMST.









Institute Day Celebrations

Institute Day 2025 was celebrated by Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, on 28th February 2025. The event began with an invocation by a Staff member. The Dean of Academic Affairs formally welcomed all dignitaries and the audience to the celebration. This was followed by a formal inauguration withthe lighting of the lamp led by Dr Harikrishna Varma, Head BMT Wing. Dr Krishnakumar K., Associate Medical Superintendent; Smt. Nirmala M.O., Nursing Superintendent, and DrJayasree R.S., Associate Dean (IIIA) felicitated.

The prizes for the poster Competition, Painting Competition, and awards of Excellence were given by the Chief Guest, Dr MohanSankar, Professor, IIT Madras.













ONLINE ACTIVITIES

During the year, various activities such as examinations, Question Papers, Thesis evaluations, Answer sheet evaluations, etc., were conducted online. All admission procedures were made online. Online application submission and application fee payment were the initial steps to apply for the programs conducted at SCTIMST. This was made completely online using the indigenously developed online software. SCTIMST has the facility to conduct the entrance examination online through Moodle software. The

setting of question papers and the evaluation of answer sheets were also performed with the indigenously developed portal for this purpose. The evaluation of dissertations/theses and answer sheets, etc., was done online through our indigenously developed software, 'Examinator'. Several other academic meetings were conducted with the computer division. The hostel accommodation was done through the newly developed software "Accommodation Management System". The institute has started an e–office system for the file movement.

Staff

Dean, Academic Affairs	Dr Srinivasan K
Associate Dean (PhD Program)	Dr Umashankar P.R.
Associate Dean (Research & Publication Cell)	Dr Narayanan Namboodiri K.K.
Associate Dean (Faculty & Student Affairs)	Dr Unnikrishnan K.P.
Associate Dean (Curriculum & Examinations)	Dr Suneel P.R.
Associate Dean (Health Science Studies)	Dr Dr Rakhal Gaitonde
Associate Dean Inter-Institutional and Interdisciplinary Affairs (IIA)	Dr R.S. Jayasree
Registrar	Dr Santhosh Kumar B.
Deputy Registrar	Ms. Radha M.
Asst. Admin. Officer (Academic)–B	Ms. SujaT.S.
Executive Assist –A	Mr. Ajish Chandran
Upper Division Clerk – B	Ms. Akhila K. Babu

HINDI CELL

The Hindi cell of SCTIMST is forpromoting the effective use and implementation of the official language within the institute. To foster greater interest and encourage the utilization of Hindi among officers and employees of the institute, the cell organizes a variety of workshops periodically. The Official Language Implementation Committee (OLIC) also convenes quarterly meetings to review and discuss advancements related to the usage of the official language. Each year, the Hindi Cell publishes two volumes of its home magazine "Chitralekha" further contributing to the promotion of Hindi.

Activities

Following the guidelines of the Ministry of Home Affairs, Department of Official Language, four meetings of the OLIC were organized during the financial year 2024–25, and the report was forwarded to the Department of Science and Technology.

Hindi workshops are organized every quarter by the Hindi Cell for the officers and employees of the institute, so that the problems faced by the employees while using the official language can be reduced, and Hindi can be used as much as possible. Hindi Cell organized various workshops on various topics for the staff of departments/sections of the Institute, namely the Medical Superintendent's office, Hospital wing, Finance and Accounts Division, Personnel and Administrative Division, and the Purchase and Stores Sections of the Hospital wing.







Hindi home magazine "Chitralekha"

During the year, Hindi Cell published two volumes (Volume I and II) of the Hindi home magazine,

"Chitralekha". The officers, employees, and students of the institute have made substantial contributions through their insightful articles.





Events Organized

HINDI FORTNIGHT CELEBRATION 2024

Hindi Fortnight was celebrated with great enthusiasm at Sree Chitra Tirunal Institute for Medical Sciences and Technology from 18.09.2024 to 30.09.2024. Various competitions like Hindi quiz competition, Hindi slogan competition, Hindi noting and drafting, Hindi calligraphy competition were organized for the officers and employees of the institute. Employees took part enthusiastically in the competitions. The winners of the competitions were honored with certificates in the closing ceremony held on 30.09.2024. After the distribution of awards, a Hindi workshop was organized for all the officers and employees.Dr Suresh Kumar R, Sr.Manager (OL) and Member Secretary TOLIC (Undertaking), conducted a workshop on the topic "Noting and Drafting". A total of 14staffmembers participated in the workshop. The closing ceremony ended with a vote of thanks by Ms. Neetu KM, Junior Hindi Translator.

























HINDI FORTNIGHT CELEBRATION 2024

Organization of various competitions

CLOSING CEREMONY

Awards and Honours

1. Under the TOLIC Official Language Awards 2023–24, SCTIMST has received a **Special Mention Award** for Best Official Language Performance and **Third Prize** for '**CHITRALEKHA**', 'In–House Hindi Magazine' of SCTIMST.







Hindi Day Celebration 2024 and the Fourth All India Official Language Conference

Dr Kamalesh K Gulia, Scientist G, BMT Wing, participated in the Hindi Day celebration 2024 and the Fourth All India Official Language Conference at Bharat Mandapam, New Delhi, on 14–15 September 2024.





Second All India Scientific and Technical Official Language Seminar 2024

The 2nd All India Science and Technology Rajbhasha Symposium was conducted in the Hindi language at the Aryabhata Research Institute of Observational Sciences (ARIES), Nainital, Uttarakhand, where Dr Naresh Kasoju and Dr Kamalesh K. Gulia represented SCTIMST, Trivandrum. This program aimed to promote the expression of scientific and Technological findings in the Hindi language, so that they could reach the masses. Delegates from various DST institutes shared their research in Hindi. Esteemed Rajbhasha officials from Home Ministry, Dr Chhabil Kumar

Meher, Mr. ArunKansal, DST, Dr Manish Kumar Naja (Director, ARIES), Dr Samir Kumar Ohja (TOLIC, Haldwani) and Dr Chandra Mohan Nautiyal (Retired Senior Scientist), Shri Mohit Kumar Joshi (Organizer) and other esteemed delegates deliberated their views on this noble endeavor and also released the Souvenir of the meeting.

Dr Kamalesh delivered a talk onSleep, technology, and artificial intelligence: The challenge of maintaining good health and a happy life in the modern era,andDrNaresh Kasojudelivered a talk on the topic "Silk—based biomaterials and their use in tissue engineering applications".





South India Official Language Regional Scientific and Administrative Conference

South India Official Language Regional Scientific and Administrative Conference was organized by the Centre for Nano and Soft Matter Sciences, Bengaluru, under the aegis of the Department of Science & Technology during 6-7 March 2025. In this conference, Dr Arun Anirudhan and Dr Kamalesh K. Gulia represented SCTIMST, Trivandrum. This conference was aimed at promotingRajbhasha in administrative matters and for the expression of Scientific and Technological findings in the Hindi language so that it can reach the masses. Under the Chairpersonship of Prof Tata N Rao, Esteemed officials A. Dhananlakshmi (Joint Secretary, DST, Vigilance), Prof BLV Prasad (Director, CeNS), and Dr Prashant Dhakephalkar (Director, Agarkar Research Institute) deliberated in Hindi. In further sessions, delegates from various DST institutes shared their research in Hindi.







Staff Details

1. Ms. Neethu K M, Junior Hindi Translator cum Typist –A

LIST OF OLIC MEMBERS

- 1 Dr Sanjay Behari, Director (Chairman)
- 2 Dr Harikrishna Varma P.R., BMT Wing,
- 3 Dr Debasish Gupta, Professor, Dept. of Blood Transfusion Medicine
- 4 Dr Manikandan S, Professor, Anaesthesiology,
- 5 Dr Manoj Komath, Scientist G, BMT Wing,
- 6 Dr Rakhal Gaitonde, Professor, AMCHSS,
- 7 DrAnugya Bhatt, Scientist G, BMT Wing,
- 8 Dr Kamalesh K Gulia, Scientist G, BMT Wing
- 9 Dr Ravi Prasad Varma P, Additional Professor, AMCHSS
- 10 Dr Madhusoodanan U.K., Associate Professor, Biochemistry
- 11 Dr Amita R, Associate Professor, Dept. of Blood Transfusion Medicine
- 12 Dr Manoj G, Scientist E, BMT Wing
- 13 DrJissa V.T., Scientist C, AMCHSS
- 14 Shri Arvind Kumar Prajapati, Engineer C, BMT Wing
- 15 Shri Saurabh S Nair, Engineer C, BMT Wing
- 16 Ms. Radha M, Deputy Registrar
- 17 Ms. Priya P, Administrative Officer–A, Hospital Wing
- 18 Dr Santhosh Kumar B, Registrar (Convener)

DIVISION OF NURSING EDUCATION

1. Brief overview of the Division

- The Division of Nursing Education coordinates and implements the academic and clinical activities for two specialty nursing programs offered by the Institute
 - o Diploma in Cardiovascular and Thoracic Nursing.
 - o Diploma in Neuronursing.
- The Division is also involved in clinical research and facilitates the observership of M.Sc. Nursing students from both within and outside Kerala.
- Organizes conferences and advanced training programs for the professional development of nurses in collaboration with the Nursing Service Division of the Institute and other professional organizations.
- 2. Data on Graduated Students (as on December 2024)

Name of the Program	Number of graduated students
Diploma in Cardiovascular and Thoracic Nursing	Four
Diploma in Neuronursing	One

3. Clinical & Research Activities

- The members of the division are actively involved in the scientific deliberations in various national conferences, and the details are given below.
 - Antony T, Abhilash SP, Suja Raj L. Factors associated with return to work within three months following acute myocardial infarction

 a cross–sectional study. Presented at:
 National Cardiac Nursing Conference; 2024
 Sep 28–29; AIIMS, Nagpur.
- o Helen George, Harikrishnan S, Suja Raj L. Assessment of lipid control in patients

- with coronary artery disease (CAD) after percutaneous coronary intervention (PCI) a cross–sectional study. Presented at: National Cardiac Nursing Conference; 2024 Sep 28–29; AIIMS, Nagpur.
- o Varshakrishna JA, Suja Raj L. Incessant ventricular tachycardia: A case report. Presented at: National Cardiac Nursing Conference; 2024 Sep 28–29; AIIMS, Nagpur.
- o Priya Raj PS, Varghese T, Panicker, Suja Raj L. Management of CABG patient with intra–aortic balloon pump (IABP) a case report. Presented at: National Cardiac Nursing Conference; 2024 Sep 28–29; AIIMS, Nagpur.
- o Varsha Krishna JA, Deepa S Kumar, Suja Raj L. Assessment of pre–operative nutritional status of children below 2 years of age admitted for congenital cardiac surgery a cross–sectional study. Presented at: Nursing Session of the Pediatric Cardiac Society of India (PCSI); 2024 Nov 14–17; Kochi, India.
- o Hani Indran, Nirmala MO, Preethamol P, Suja Raj L. Assessment of knowledge on management of patients on tracheostomy among nurses in a selected tertiary level hospital a crosssectional study. Presented at: National Annual Conference of Society of Indian Neuroscience Nurses; 2024 Dec 18th 22nd; Kolkata.
- Educational activities/ Training Programmes conducted by the division are:
 - o Online course: Organized an online training programme for nurses in collaboration with the Society of Cardiac Nurses (India) titled "Comprehensive Approach to Management of Patients with Heart Failure Updates for Nurses". The course was conducted through virtual mode from December 28, 2023 to February 22, 2024.
 - o **Simulation–based Training:** Conducted a simulation–based training session on *infection*



prevention in collaboration with the Hospital Infection Control Unitas part of the World Hand Hygiene Day 2024 Celebrations.

- The division actively participated in various competitions held as part of the Swachhta Hi Seva Campaign – 2024, and received prizes in recognition of performance.
- The division members received the following awards during the year 2024–25.
 - o Ms.Priya Raj PS (Diploma in CVTS Nursing): first prize for case report presentation at the National Cardiac Nursing Conference, AIIMS, Nagpur.
 - o Ms.Varsha Krishna J A (Diploma in CVTS Nursing): first prize in the scientific paper presentation at the Nursing Session of the Pediatric Cardiac Society of India, Kochi.
 - o **Ms. Hani Indran** (Diploma in Neuronursing): first prize in the National conference of Society of Indian Neuroscience Nursing Conference held from Dec. 19–21, 2024, at Kolkatta.
- Other activities: Facilitated observership for 40 M.Sc. Nursing students from various institutions across India, providing them with exposure to advanced specialty practices and multidisciplinary care settings.
- Curriculum Revision: Revised the curriculum and duration of the Specialty Diploma Programs in Nursing in alignment with the Indian Nursing Council (INC) Guidelines, effective from the academic year 2025 onwards.



Award– Ms. Hani Indran.
Paper presentation (SINN–'24)–1st prize



Award– Ms. Varsha Krishna Paper presentation (PCSI)–1st prize





Organizing team — Simulation — based training for nursing officers conducted as part of Hand–hygiene day celebration—May 2024

Name of the faculty: Mrs. Suja Raj L, Senior Lecturer in Nursing

LIBRARY, HOSPITAL WING

The Hospital Wing library has a collection of 16042 books and 15990 back volumes of journals. During the current year, the library subscribes to 108 journals. Electronic access to the journals we subscribe to was activated and made available in both campuses.

Being part of the National Knowledge Resource Consortium (NKRC), the library continues to get access to the full text of selected journals from Elsevier, Wiley, Springer, Oxford University Press, American Chemical Society, Royal Society of Chemistry, Nature Publishing Group, Taylor & Francis, etc., and databases of Web of Science and ASTM Standards.

SCTIMST became a member of ONOS in January 2025. A total of 30 major international journal publishers are participating in ONOS. All the journals published by these publishers will be accessible to the students, faculty members, and researchers of the Institute.

The publications of our Institute from 1977 onwards have been listed on the library site with an interface to search by date, department, and author. The average impact factor of the journals in which the articles are published is also available.

Library subscribed resources are available to our users through MyLOFT remote access software outside the campus since July 2021.

Staff

Ms Sudha T, Librarian-cum-Information Officer - A

Mr Anil Kumar C, Sr.Librarian—cum—Documentation Officer – B

Mr Jayamohan C S, Librarian–cum–Documentation Assistant – B

Mrs Reshma John, Librarian—cum—Documentation Assistant – A

Mr Soumesh P, Librarian—cum—Documentation Assistant —A

LIBRARY, BMT WING

Located within the BMT Wing of SCTIMST, housed in Satelmond Palace, Poojappura, Thiruvananthapuram, the BMT Wing Library serves the academic and research community engaged in biomedical R&D in medical devices, biomaterials, tissue engineering, and related disciplines.

The library holds an extensive collection of 11,499 books and 6,019 back volumes, supporting advanced research in biomedical sciences. Given the BMT Wing's primary focus on biomedical research and experimentation, the library continues to subscribe to the Materials for Medical Devices Database—a comprehensive, peer–reviewed resource developed by ASM International. This database consolidates scientific and engineering knowledge on implantable medical materials to support the design of surgical, cardiovascular, orthopedic, and neurological medical devices.

The library also maintains a substantial collection of standards and patents, which are crucial for the Quality Management System and ongoing R&D activities of the BMT Wing. These standards are updated regularly to ensure relevance and compliance. In addition, the library archives valuable documentation from various laboratories, with the Librarian—cum—Documentation Officer serving as the Chief Document Archivist.

The BMT Library functions as a Digital Library, equipped with Wi–Fi connectivity throughout the campus, benefiting all researchers and students. It offers a range of services including:

- Information services
- Reference services
- Reprographic services
- Current Awareness Services (CAS)
- Selective Dissemination of Information (SDI) services

Regular orientation and information literacy programs are conducted for students and research scholars to help them navigate and utilize library resources effectively. Additionally, the library provided one—year apprentice training programs for two library professionals during the year. A wide array of e—books and e—journals is also accessible to users, further enhancing the research infrastructure.

In line with the vision of making India Atmanirbhar and achieving Viksit Bharat@2047, the Government of India has implemented the One Nation One Subscription (ONOS) scheme. This initiative nationwide provides access to high-impact international scholarly research articles and journal publications for students, faculty, and researchers of all central and state government-managed Higher Education Institutions, as well as R&D institutions. As our institution is a member of ONOS, we have access to over 13,000 online journals, significantly enriching the academic and research capabilities of the BMT Wing.

Staff

Dr Dimple Gopi, librarian—cum—Documentation Officer – B

Ms Seema S, librarian—cum—Documentation Assistant—B

MEDICAL ILLUSTRATION

The Medical Illustration has been actively engaged in various key functions that support the academic, clinical, and administrative goals of the Institute. The core activities of the division during the reporting period are summarized below:

1. Function and Clinical Photography

The Medical Illustration regularly provides professional photography services for official functions and clinical purposes. This includes documentation of institutional events, patient–related photography for medical records, and visual content creation for academic use.

2. Audio-Visual Support for Academic and Official Programs

Comprehensive audio-visual (AV) support has been extended to various academic sessions, workshops, national and international conferences, and official programs conducted within the Institute. This includes setting up and managing sound systems, projectors, and presentation support to ensure the smooth conduct of events. Last year, the division provided audiovisual support for major institutional events, including the inauguration of the PMSSY block, the Annual Convocation, RC meetings, and SSSC sessions.

3. Live Streaming Services

With technical collaboration from the Computer Division, the division facilitates live streaming of important institutional programs, academic events, and conferences. This ensures broader outreach and participation, especially in hybrid or virtual event formats.

Staff

Liji Kumar G, Scientific Officer Vijikumar N, Sr. Projectionist



SCTIMST SPORTS CELL

ATHLETIC EVENTS 2024











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- Complete surgical correction of tetralogy of Fallot with Ebstein's anomaly. Rangwala, ZS; Ramachandran, K; (...); Dharan, BS. Jul-aug 2024. AN-NALS OF PEDIATRIC CARDIOLOGY. 17 (4) , pp.285-287
- 3. Recognition of an Unusual Pattern in a Case of Narrow Complex Tachycardia. Mondal, S; Abhilash, SP and Namboodiri, N. Aug 6 2024. CIRCULATION. 150 (6), pp.506-508.
- 4. Binu A, Hv E, Nair P, Stanley A, Patel BK, Urulangodi M, Mandagini G, Jose T. Role of Copeptin in Predicting Postoperative Hyponatremia and Hypernatremia in Patients Undergoing Endoscopic Pituitary Adenoma Surgery. Neurosurgery. 2024 Sep 1;95(3):641-650. doi: 10.1227/neu.00000000000002927. Epub 2024 Mar 29. PMID: 38551356.
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EXTERNALLY-FUNDED RESEARCH PROJECTS (ONGOING)

Hospital Wing

Sl. No.	Title of the Project	Principal Investigator	Funding Agency
1	Tichval–2 Pilot Study TTK Chitra Titanium Heart Valve (Model –Tc2) Clinical Pilot Study	Dr Vivek Pillai	TTK Health Care
2	Contemporary outcomes in cardiac channelopathies guided by genotype—based management	Dr Narayanan Namboodiri K K	ICMR
3	EP Device Registry	Dr Narayanan Namboodiri K K	St Jude Medical India Pvt Ltd,
4	Biophysical evaluation of various bipolar configurations in RF ablation of ventricular myocardium in a bovine model and a prototype design of a custom–made bipolar RF ablator model	Dr Narayanan Namboodiri K K	Indian Heart Rhythm Society (IHRS)
5	Centre for Advanced Research and Excellence in Heart Failure – overall management of the Project	Dr Harikrishnan S	ICMR
6	Centre for Advanced Research and Excellence in Heart Failure – Biobank	Dr Harikrishnan S	ICMR
7	Centre for Advanced Research and Excellence in Heart Failure – NGS Genetics	Dr Harikrishnan S	ICMR
8	Centre for Advanced Research and Excellence in Heart Failure – National HF Database	Dr Harikrishnan S	ICMR
9	Centre for Advanced Research and Excellence in Heart Failure – Economic Impact	Dr Harikrishnan S	ICMR
10	Centre for Advanced Research and Excellence in Heart Failure – Quality of Life	Dr Harikrishnan S	ICMR



11	Centre for Advanced Research and Excellence in Heart Failure – NT proBNP Point–of–Care device development	Dr Harikrishnan S	ICMR
12	Centre for Advanced Research and Excellence in Heart Failure – Structured Physical Training	Dr Harikrishnan S	ICMR
13	Trivandrum Heart Failure Cohort	Dr Harikrishnan S	ICMR
14	Ranolazine for heart failure with preserved Ejection fraction (HFpEF): A randomized double—blind placebo controlled trial (RISE – HFpEF study)	Dr Harikrishnan S	Centre For Chronic Disease Control (CCDC)
15	The effectiveness of indorr Air Purifiers on Heart Failure outcomes (The PURI–HF Trial)	Dr Harikrishnan S	ICMR
16	Center for Advanced Research in Pulmonary Hypertension – PROgnostic Model for Indian Patients with Eisenmenger Syndrome: A Pan–India Prospective Study of Children and Adults (PROMISE–Eisenmenger Study)".	Dr Harikrishnan S	ICMR
17	Early life–nutrition in first thousand days of life and its association with early adiposity rebound, cardio metabolic risk and cardiac function in Low–birth–weight children at 2–years in Kerala	Dr Arun Gopalakrishnan	ICMR
18	Randomized placebo-controlled trial of digoxin in patients with rheumatic heart disease	Dr Sanjay G	ICMR
19	Development of an Artificial Intelligence based Radiomics Brain MRI Platform to Generate Post–Contrast Images without Performing Gadolinium–injected–MRI for clinical decisions in Glioma Patients: A novel strategy to bypass contrast injected MRI	Dr Bejoy Thomas	ICMR
20	Pre and post—operative evaluation in the temporal lobe epilepsy patients by integrating functional resting state & structural MR Imaging and correlation to post—surgical outcome	Dr Smitha K A	ICMR-DHR



21	Creation of Gold standard Medical imaging datasets of dural based lesions treated with primary Gamma knife radiosurgery or Microsurgery for developing Artificial Intelligence tools	Dr George.C.Vilanilam	ICMR
22	Study on the Environmental, geographic and Genetic factors in Moyamoya angiopathy	Dr Jayanand Sudir	Symega Food Ingredients Ltd (CSR funding)
23	Prediction of Stroke in Children and Adults using radiological and CFD simulation with clinical evaluation	Dr Jayanand Sudir	ANRF/SERB
24	Development Of Intelligent Anti– Drowning Wearable Gadget With Smart Buoyancy System	Dr Manikandan S	ICMR
25	Indigenous Anesthesia Depth monitoring system using Brain Monitoring Technology	Dr Manikandan S	ICMR through C Dac
26	Development of Indigenous point of care Transcranial Doppler (TCD) machine for patient management.	Dr Manikandan S	DBT
27	Effect Of Total Intravenous Anesthesia And Inhalational Anesthesia On The Markers Of Neuronal Inflammation And Perioperative Cognitive Disorders In Patients Undergoing Neurosurgery: A Prospective Randomised Trial (TINND Trial)	Dr Ajay Prasad Hrishi	ANRF/SERB
28	Comprehensive and novel model for health care in geriatric pain conditions in India	Dr Subin Sukesan	Kusuma Trust, U K
29	Augmentation of Prolotherapy services under Pain Clinic	Dr Subin Sukesan	Tata Elxsi
30	Establishment of the India Stroke Clinical Trial Network (INSTRuCT)	Dr Sylaja P N	ICMR
31	HTA of National Stroke Care Registry Programme: Development of hospital based stroke registries in different regions of India	Dr Sylaja P N	ICMR
32	Improvis–ation (Improving stroke care in India – Advancing the INSTRuCT Operations and Network)	Dr Sylaja P N	NIHR, UK



33	Early versus Late initiation of direct oral Anticoagulants in post–ischaemic stroke patients with atrial fibrillatioN (ELAN): An international, multicentre, randomised– controlled, two–arm, assessor–blinded trial	Dr Sylaja P N	Insel Gruppe AG University Hospital of Bern Switzerland
34	Medication adherence and management of risk factors for secondary prevention of stroke using smart phone—based application: A feasibility study	Dr Sylaja P N	World Stroke Organization, Switzerland
35	A multicenter, international, randomized, placebo controlled, double—blind, parallel group and event driven Phase 3 study of the oral FXIa inhibitor asundexian (BAY 2433334) for the prevention of ischemic stroke in male and female participants aged 18 years and older after an acute non–cardioembolic ischemic stroke or high–risk TIA	Dr Sylaja P N	Bayer Pharmaceuticals Private Limited
36	A randomized, multicentric, double—blind, placebo—controlled clinical trial of Nardostachys jatamansi and Withania somnifera formulation (SDA–217) as add—on therapy in patients of chronic insomnia	Dr Ashalatha R	ICMR
37	Effectiveness of a Supervised Aptitude–based Cognitive retraining intervention in mild cognitive impairment and Early Dementia due to Alzheimer's disease–The SACRED study"	Dr Ramshekhar Menon	ICMR-DHR
38	Incidence, prevalence, risk analysis of dementia and basic research thereof	Dr Ramshekhar Menon	DBT through NBRC
39	Clinical Registry of Movement Disorders	Dr Syam K	Movement Disorders Society of India
40	Enhancement of Research and Clinical resources of Movement Disorder Program under the Comprehensive Care Centre for Movement Disorder, SCTIMST	Dr Syam K	Dr T S Ravikumar Foundation, USA
41	Deciphering the genetic architecture of Parkinson`s disease in Indian population	Dr Divya K P	Michael J Fox Foundation, USA
42	Genetic architecture of Parkinson's disease in India	Dr Divya K P	Michael J Fox Foundation, USA



43	Comprehensive Care Centre for Neurodevelopmental Disorders	Dr Soumya Sundaram	Federal Bank Hormis Memorial Foundation (CSR)
43	Development of an online parent—mediated behavioral intervention platform for neurodevelopmental disorders	Dr Soumya Sundaram	Centre Of Excellence For Disability Studies, GoK
44	Functional near—infrared spectroscopy— an exploratory cross—sectional study on clinical utility and it's applicability as a biomarker in the evaluation of autism in comparison with other neurodevelopmental disorders	Dr Soumya Sundaram	ICMR
45	Indian Multiple Sclerosis and Allied Demyelinating Disorders Registry and Research Network	Dr Sruthi S. Nair	ICMR
46	Cardiac signals for Sleep apnea prediction in Stroke survivors	Dr Sapna Erat Sreedharan	ICMR
47	Study of the effect of donor characteristics and component processing methods on formation of microparticles in stored blood using flowcytometric approach	Dr R Amita	SERB
48	Comparing mitochondrial function and dynamics in atrial tissue of patients undergoing cardiopulmonary bypass surgery and aortic valve repair	Dr Sreenivas G	SERB
49	Identification and characterization of ubiquitin and SUMO modified exosomal proteins from Parkinson's disease patients' blood	Dr Madhusoodanan U K	ICMR
50	Role of S100 proteins in Cardiac Fibrosis	Dr CIBIN	ICMR
51	Characterization of the biofingerprint of the histomolecular subtypes of adult–type diffuse gliomas using Raman spectroscopy	Dr Deepti	ANRF/SERB



BMT Wing

Sl. No.	Title of the project	Principal Investigator	Funding Agency
1	Bioengineered construct with cardiac mesenchymal cells for myocardial repair	Dr Senthilkumar Muthuswamy	DBT (Ramalingaswamy Fellow)
2	Extending benefits of biomedical science and technology to SC & ST communities through all level participatory engagement – ST components	Dr Roy Joseph	DST
3	Extending benefits of biomedical science and technology to SC&ST communities through all level participatory engagement – SC components	Dr Roy Joseph	DST
4	Design and development of a micro dialysis set—up for cerebral applications	Mr. VinodKumar. V	DST
5	Development of plasticizer–free acrylic denture soft liners using nanogel additives	Dr Manju S	DBT
6	Development of pedicle screw-based dynamic stabilization systems for degenerative diseases of lumbosacral spine	Mr. Arvind Kumar Prajapathi	DST
7	National translational research facility for biomaterials,meical devices& In Vitro diagnostics	Dr Maya Nandkumar	DBT
8	Development of stance control knee ankle foot orthosis SCKAFO for knee instability management	Mr. Subhash N. N.	DST
9	Designer small diameter vascular grafts for reduced neointimal hyperplasia through triggered release of alltransretinoic acid(atRA) from biofunctionalisedgelatin vinyl acetatePCL fibrous scafffolds	Dr Lynda V. Thomas	SERB
10	Exploring the effect of seretome of plateletmesenchymal stem cell spheroids on angiogenesis and healing chronic wounds	Dr Anugya Bhatt	SERB
11	Designing and studies on nanoplatforms for diagnostic imaging and targeted therapy	Dr Sunita Prem Victor	DST
12	Development of wearable Advanced Fall Detection watch with wireless alarm system for help activation	DrManikandan S	SERB



13	Design and validation of products based on bioactive self–setting injectable material (CASPA) for dental tissue regeneration	Dr Manoj Komath	DBT
14	Technology development and Clinical Validation of Injectable Hydrogel for repair of articular cartilage defects	DrLynda.V.Thomas	DBT
15	Design and development of an organ care system for transplantation	Mr. Vinod Kumar. V	ICMR
16	Neural Correlates of YOGA Nidra for Management of insomnia in peri- menopausal women	DrKamalesh.K.Gulia	DST
17	Development of AI based neonate—infant cry analyzer and assessment of link between protophones and maternal sleep during pregnancy	DrKamalesh.K.Gulia	DST
18	Research exposure cum Training programme in biomedical sciences domain area for students from north—eastern states and UT's of jammu&kashmir and ladakh region	Dr Subin Sukesan DrJayasree.R.S. (Co–PI)	DST
19	Chondroinducive and Chondro protective small molecules decorated photocrosslinkable gel matrix systems for auto-logous chondrocyte implantation.	DrLynda.V. Thomas	SERB
20	Development of Peri–rectal radiation protection Spacer (LSRB–412)	Dr Jayasree. R.S.	DRDO
21	Transcutaneous Energy Transfer System for Implantable Medical Devices	Mr. Sarath.S. Nair	INAE-SERB
22	Point of Care Blood Coagulation Analyzer development and Limited Clinical Validation	Dr Anugya Bhatt	DST
23	An indigenous novel device for ultrasound guided mimallyinvasive, single—operator driven, suction based muslebiopsytechnology: A proof—of—concept prototype development	Dr Sujesh Sreedharan	ICMR
24	3D-printed Tissue engineered Islet transplant system (3D-PITS)-Influence of extrinsic factors and mciroenvironment for protecting and enhancing the vialb	Dr Lynda. V. Thomas	ICMR
25	Clinically relevant Three DimentionalBioprinted Liver Construct and its Efficacy Evaluation in Porcine Liver Disease Model	DrAnilkumar.P.R.	ICMR



26	Design and development of machine learning enabled autoflurescence device for pre operative breat lump diagnosis and intra–tumour brease tumour margin assessment	DrJayasree.R.S.	ICMR
27	Development of Three–Dimensional printable Defect Specific Bioactive Composite Implants for Cleft Palate Management	DrShiny Velayudhan	ICMR
28	Design and Development of potential super hydrophobic Biomaterial to minimise catheter associated Urinary Tract Infections: the proof of concept	Dr P. Ramesh	ICMR
29	In situ forming Injectable Thermoreversible Silk Protein hydrogel for Guided Bone Tissue Engineering	DrManju.S.	ICMR
30	National Centre for Preclinical evaluation of Cardiovascular Devices	Mr. Vinod kumar.V	ICMR
31	Development and Evaluation of Batch Production System for making microneedle arrary for Transdermal Drug Delivery	DrShiny Velayudhan	DST
32	Reconstruction geometry optimization and methodology development for surgery planning of children suffering from single Ventricular Heart Dieses, using Computational fluid dynamics evaluation for patient	Mr.Saurabh S Nair	ICMR
33	Development of a novel biosensor for the detection of inflammatory cytokines	DrMegha.K.B	DST
34	Centre of Excellence for minimally invasive cardio vascular devices	DrSujesh Sreedharan	DBT
35	Therapeutic pateches with dissolving micro needles for the dermal delivery of acaricides for control of parasitic dermatitis	DrShiny Velayudhan	SERB
36	Graphene based flexible electrodes for ECG	Mr.Jithin Krishnan	DIGITAL UNIVERSITY OF KERALA
37	Engineered Ceramic Titanium Systems for Hard Tissue Reconstruction	DrH.K.Varma	DBT
38	Virus Research and Diagnostics Laboratory (VRDL)	DrKavitha Raja	ICMR
39	Development of sound producing voice prosthetic device for patients who have undrgone total laryngectomy which provides better quality of speech	Mr.Saurabh S Nair	DST



40	Catheter directed image guided delivery of small molecule chemotherapeutic agent using radio opaque biodegradable microspheres for the treament of hepatocellular carcinoma	DrManju.S	ICMR
41	Nanoengineered 3D printed thinner BRS for controlled degradation, efficient endothelializaion, antithrombotic & vSMC– Anti proliferative: An indigenous approach tp treat atherosclerosis	DrP.R.Umasankar	ICMR
42	Implantable tibial nerve stimulator for overactive bladder control	Ms.Neethu.S	ICMR
43	Development and in-vivo evaluation of Percutaneous Minimally Invasive Left ventricular Assist Device	Mr.Sarath.S.Nair	ICMR

Achutha Menon Centre For Health Science Studies

Sl. No.	Title of the Project	Principal Investigator	Funding Agency
1	Resource Centre/HUB for conducting "Health Technology Assessment"	Dr Biju Soman	Department of Health Research, Government of India
2	Adapting surveillance (Nikshay) data to create decision support systems for tuberculosis elimination in Kerala using spatial epidemiology	Dr Biju Soman	Central TB Division, Ministry of Health and Family Welfare
3	Time Motion Study of Accredited Social Health Activist (ASHA) workers in India	Dr Biju Soman	NITI-Ayog through Public Health Foundation of India, New Delhi
4	Using digital solutions to improve cause of death data in India	Dr Biju Soman	AIIMS, Delhi from the University of New South Wales,
5	Exploring the Role of DNA Methylation Changes as Early Markers of Gestational Diabetes Mellitus in a Community–based Longitudinal Study from South India	Dr Srikant A	ICMR
6	The long-term effect of peer-led lifestyle intervention program on diabetes progression and cardiovascular risk: The Kerala Diabetes Prevention Program	Dr Jeemon P	National Health and Medical Research Council, Australia
7	Worksite-based lifestyle program for reducing diabetes and cardiovascular risk in India (India-Works)	Dr Jeemon P	Madras Diabetes Research Foundation/ Emory University



8	Team-based collaborative care model, facilitated by a mHealth enabled and trained nurse, for management of heart failure in India (TIME-HF)",	Dr Jeemon P	Wellcome Trust-DBT India Alliance
9	Scale up of an adapted Kerala Diabetes Prevention Program to improve control of hypertension and diabetes among people living in the states of Kerala and Tamil Nadu	Dr Jeemon P	National Health and Medical Research Council, Australia

Institute-Funded Intramural Projects (Ongoing)

Title of the project	Principal Investigator	Funding
The Effect Of Total Intravenous Anesthesia And Inhalational Anesthesia On The Markers Of Neuronal And Systemic Inflammation In Patients Undergoing Resection Of Supratentorial Gliomas: A Prospective Randomized Controlled Trial (TINSI Trial).# 6124	Dr Ajay Prasad HrishI	SCTIMST
Prospective observational study on the association between perioperative cortisol level and hemodynamic variables in patients on steroid therapy undergoing pituitary surgeries # 6125	Dr P Unnikrishnan	SCTIMST
Utility of motor unit number index for assessment of disease progression in Hirayama disease: A longitudinal comparative study # 6127	Dr Sruthi S Nair	SCTIMST
A Study to assess the prevalence of Rhesus Blood group phenotypes among blood donor population in a tertiary care blood centre in Kerala. # 6128	DrDebasish Gupta	SCTIMST
A study of the outcomes of silent corticotroph adenomas following surgery # 6129	Dr Prakash Nair	SCTIMST
Effect of diabetes and glycemic status on motor and non-motor dysfunction in Parkinson's disease- a comparative observational study" # 6130	Dr Syam K	SCTIMST
Contrast Enhancement For Intraoperative Quantitative Assessment Of Left Ventricular Volumes Using Transesophageal Echocardiography # 6131	Dr Shrinivas Gandhinglajkar	SCTIMST
"Effect of sevoflurane anaesthesia on systemic –immune inflammatory markers in patients undergoing revascularization surgery for Moya Moya disease: A prospective observational pilot study # 6132	Dr Ranganatha Praveen C S	SCTIMST



Study of the correlation between Autonomic dysfunction, inflammatory markers and perioperative/periprocedural complications in aneurysmal Sub Arachnoid Haemorrhage. A prospective observational Study # 6133	Dr S Manikandan	SCTIMST
Comparison of sagittal spinal alignment parameters of lumbar spine in normal population vs patients with MRI-negative low backache # 6134	Dr Ganesh Divakar	SCTIMST
To Study The Utility Of Synthetic Mri As A Qualitatative And Quantitative Tool In Evaluation Of Epileptic Lesions And Assesing The Advantages/Disadvantages Over Conventional Mri Sequences # 6135	Dr Kesavadas	SCTIMST

Institue Funded TDF Project (Ongoing)

S1.			
No:	Title of the Project	Principal Investigator	
1	Parylene C deposited polycarbonate urethane membrane for dural defect repair	Dr Ramesh P	
2	Development of kaolin incorporated gellan gum based composite haemostat sponge	Dr Manju S	
3	Standardisation of rapid Minimum inhibitory concentration determination for UTI pathogens in Enterobacteriaceae group	Dr Maya Nandkumar	
4	Pre–validation of in vitro 3D bioprintedHeapatotoxicitytes system of drug metabolite analysis	Dr Anilkumar PR	
5	Scale up, formulation, optimization and evaluation of polymeric phantom for performing radiotherapy dose measurements	Dr Roy Joseph	
6	Development of soft absorbable/ non-absorbable nasal packs for nasal packing following endoscopic skull base surgery	Dr Rekha MR	
7	Vacuum loading systems for signal loaded grafts	Dr Francis B Fernandez	
8	Development of new generation endotracheal tube for neurosurgery	Dr S Manikandan	
9	Deciphering the role of microRNAs in distinguishing functional and non-functional corticotroph pituitary neuroendocrine tumours	Dr Srikant A	
10	Evaluation and standardisation of latex based cover for transesophageal echocardiography	Dr ShrinivasGandhinglajkar	
11	Comparison of Raman spectra of intracranial meningiomas obtained from snap frozen tissue and formalin fixed paraffin embedded tissue : An exploratory study	Dr Deepti AN	



12	Identification and development of indigenous plant based lectins for use as blood grouping reagents	Dr Amita R
13	Development of 2 nd generation Chitra SARS – CoV2/ Flu/RSV multiplex RT PCR kit for detection of treatable respiratory viral pathogens :PoC	Dr Dinoop KP

TRC Project (Ongoing)

Sl.	Project Title	Principal Investigator	
1	Development of decellularised porcine artery for small diameter vascular conduit as BT shunt and peripheral vascular applications	DrP.R.Umashankar	
2	Percutaneous LVAD	Mr.Sarath.S.Nair	
3	Development of a Novel mitral clip – PoC	Mr.Ranjith.G	
4	Development of MRI contrast agent for clinical use	DrJayasree.R.S.	
5	Implantable Tibial Nerve Stimulator	Mr.Neethu.S	
6	Radiopaque polymeric liquid embolic agent for peripheral applications	DrRoy Joseph	
7	Lumboperitoneal Shunt	Mr.Anoop Gopinathan	
8	Lordotic expandable corpectomy cages for cervical spine	Mr.Arvind Kumar Prajapathi	
9	Development of AR/VR based platform to visualize and interact with the patient specific 3D anatomical data, reconstructed from MRI/CT	Mr.Saurabh.S.Nair	
10	Ceramic Matrices for active factor delivery	DrFrancis B Fernandez	
11	Development of a Biomemetic gel system and a multifunction arthroscopic device for Autologous chondrocyte Implantation	DrLynda.V.Thomas	
12	Development of Bio polymeric Orthopaedic Fixtures	DrNaresh Kasoju	
13	Fabrication and evaluation of 3D printed Pliable Bioactive composites for Management of Craniofacial Defects	DrShiny Velayudhan	
14	Superelastic NITINOL staples for orthopaedic fixation	DrKGV Sivakumar	
15	Development and biocompatability evaluation of a polymer composite membrane for periodontal tissue regeneration	DrLizymol.P.P	
16	In vitro and In vivo validation of 3D Bioprinted skin construct	DrAngya Bhatt	
17	Development of organ preservation medium for organ transplant	DrRekha.M.R.	
18	Zein based electrospun membrane for oral cancer local drug delivery	DrP.Ramesh	
19	Ionic liquid based smart membranes for bacterial concentration, filtration and detection	DrRenjith.S	
20	Human Thrombin impregmated Chitosan – PVA haemostatic patch	DrRenjith.P.Nair	
21	Development of drug eluting mucoadhesive bandages for the treatment of localized oral disease condition : in vitro and in vivo evaluation	DrManju.S	
22	An isothermal platform – based fever panel for the detection of tropical fever etiology	DrAnoopKumar.T	



23	Rapid detection of viable pathogenic bacteria using nano sensors	DrMaya Nandkumar
24	To develop indigenous melatonin detection kit (In vitro diagnostics)	DrKamalesh.k.Gulia
25	Development of rapid in–vitro diagnostic kit for sepsis (Pro–calcitonin based)	DrManoj.G
26	Lead free flexible polymer composite sheet for radiation shielding of Thyroid	DrGijo Raj
27	Mice transfer and enrichment box tunnel system with securing gates	DrHarikrishnan.V.S
28	Development of an Indigenous Automated surgical patty maker for reducing burden on essential manpower	DrArun Anirudhan
29	Development of an automated portable cardiopulmonary resucitation (aCPR)	DrSmitha.V
30	Sodium alginate hydrogel (ADA–GEL) for preventing post operative surgical adhesion after neuro surgery of the brain and spinal cord	DrPrakash Nair
31	Development of a hand held integrated suction irrigation system for neurosurgery	DrEaswer.H.V
32	Pre clinical validation studies of electrospun meshes conjugated with small molecules / peptides enhancing neovascularisation	DrJayanandSudhir.B
33	Mobile hoist with hoist assisted motorized wheel chair	DrSruthi.S. Nair
34	Artificial Intelligence enabled intelligent Anaesthesia Delivery system (AI–IADs)	DrAjay Prasad Hrishi
35	Development of Autonomic Function Monitor for Nociception and perioperative monitoring using combined Heart Rate Variability (HRV) , Pulse Pleth Index and Galvanic skin conductance	DrS.Manikandan
36	Development of a proof of concept for potassium Adsorption filter for transfusion of packed red cell (PRBC units)	DrAmitha.R
37	Development of an indigenous polymerase Chain Reaction (PCR) system	Mr.Shaj Upendran
38	Development of a Human Amniotic Membrane (HAM) Bank technology for Various Clinical Applications	DrJyothi.E.K
39	Usability engineering facility to meet regulatory requirements	Ms.Sandhya C.G.
40	IP management system for products, processes & designs developed under TRC	Mr.Rajkrishna Rajan
41	Development of connected platform for Infrastructure management	Mr.Sajithlal.M.K
42	Development of Left Ventricular Assist Device	Mr.D.S.Nagesh
43	Development of Aortic stent graft for endovascular treatment of thoracic aortic aneurysms	Mr.DrSujesh.S
44	Development of a Deep Brain Stimulator system for movement disorders	Mr.C.V.Muraleedharan
45	Implantable cardioverter defibrillator	Mr.C.V.Muraleedharan
46	Development of annuloplasty ring for mitral valve correction	Mr.Ranjith.G
47	Bioprosthetic heart valve	DrUmasankar.P.R
48	Programmable hydrocephalus shunt	Mr.Anoop Gopinath
49	Implantable Micro Infusion Pump with wireless charging	Mr.Sarath.S.Nair



50	Point of care detection of human papiloma virus using loop mediated amplification of DNA	DrAnoop.Thekkuveettil
51	Development of Nitinol based occlusion device for non surgical closure of atrial septal defect	DrSujesh.S
52	Development of titanium nitride coated coronary stent system	Mr.Subhash.N.N
53	Development of flow divertor stent for the treatment of complex intracranial aneurysms	DrSujesh.S
54	Spinal fusion system for thoraco-lumbar stabilization	Mr.Aravind Kumar Prajapathi
55	Development of high strength Ti 6AI4V castings for orthopaedic implants	K.G.V.Sivakumar
56	Development of spinal cord stimulator for pain management	Mr.Jithin Krishnan
57	Development of a Regulatory Compliance Access Portal (Re–CAP) for Medical Devices & In Vitro Diagnostics	Ms.Amrutha.C

COMPLETED PROJECTS

Hospital Wing, Achutha Menon Centre For Health Science Studies & BMT Wing

Title of the Project	Principal Investigator	Funding Agency
Understanding disease clustering (Multi-morbidity) in the tribal population of Kerala	Dr Jeemon	ST Grant-SCTIMST
Documenting cause of death among tribal population through automated verbal autopsy using Information and Communication Technology (ICT)	Dr Jissa V T	ST Grant-SCTIMST
Mobile Telemedicine Project for Waynad	Dr Biju Soman	DST (ST Grant)
Effect and outcome determinants of right ventricular function in post-operative Tetralogy of Fallot: A retrospective descriptive study	Dr Baiju S Dharan	ICMR
Prognostic value of circulating microRNAs in heart failure	Dr Sanjay G	ICMR
Spiral Dx: Tremor diagnosis and quantification using artificial intelligence	Dr Syam K	DBT
Encoding of interhemispheric interactions in mirror dystonia: A window to the physiology of dystonia	Dr Divya K P	Dystonia Medical Foundation, USA
Prevalence of atrial cardiopathy in cryptogenic strokes in comparison with strokes of known etiology – A prospective study	Dr Sapna Erat Sreedharan	ICMR



Device for the efficient and effective placement of hemostatic material on the walls of surgical cavity following the excision of brain Tumors.	Dr Prakash Nair	DBT
Development of HPC tools for CFD-based patient specific management of Cerebral Aneurysms	Dr B Jayanand Sudhir	National Supercomputing Mission (NSM)
Computational Fluid Dynamics based tools to the aid of clinical decision making in the management of intracranial aneurysms	Dr B Jayanand Sudhir	SERB
Development of portable low-cost disposable defibrillator for cardiac arrest management	Dr Manikandan S	DST
A Comprehensive framework for treatment of impairment of upper extremity due to stroke by computational modelling and virtual reality	Dr Sylaja P N	MHRD & TCS under UAY scheme
HPSR Fellowship India	Dr Rakhal Gaitonde	Forum for Health Systems Design and Transformation (HSTP)
A family-based randomized controlled trial of cardiovascular risk reduction in individuals with family history of premature coronary heart disease in India	Dr Jeemon P	Wellcome Trust DBT India Alliance
Assessment of Design, Implementation, and Use of Antimicrobial Resistance Action Plan in the State of Kerala in 2023	Dr Biju Soman	Society For Health Information Systems Programmes (HISP India)
National Environmental Health Profile	Dr Manju R Nair	Ministry of Environment, Forest and Climate change
Delineating the role of DNA methylation in insulin resistance driven breast cancer development and progression	Dr Srikant A	DBT
DNA methylation profiling of gangliogliomas and dysembryoplastic neuroepithelial tumors	Dr Rajalakshmi P	SERB
Regulation of progenitor cell function in heart by angiotensin	Dr Neethu Mohan	ICMR
Molecular mechanisms of stress-induced NLRP3 activation and neuroinflammation by macrophages in presence of amyloid-beta in Alzheimer`s disease	Dr Sreenivas G	ICMR
Comprehensive monitoring of patients in Neurocritical care	Dr Ajay Prasad Hrishi	ICMR-DHR
Alginate dialdehyde-gelantin as a post surgical adhesion prevention material in cardiac surgery swine model	DrSowmya Remanan	BIRAC

STATUTORY COMMITTEE MEMBERS 2024–25 (as on 31.03.2025)

INSTITUTE BODY

From 01.04.2024 to 17.09.2024

Dr V. K. Saraswat

(President), Member-NITI Aayog

Shri. Umesh G. Jadhav

Hon'ble Member of Parliamaent (Lok Sabha)

Dr Shashi Tharoor

Hon'ble Member of Parliament (Lok Sabha)

Secretary to Govt. of India

Dept. of Science and Technology

Director General of Health Services (DGHS)

Smt. Annie. G. Mathew

Joint Secretary (Pers.) Ministry of Finance

Ms. Ishita Roy

Joint Secretary (Higher Education), Govt. of India

Dr Ali Manikfan Abdullage

Regional Director,

Ministry of Health and Family Welfare

(Govt. of India) Director General of Health Service

Shri. Rajan N. Khobragade

Principal Secretary Health & Family Welfare & Ayush. Department of Health & Family Welfare, Government of Kerala

Dr K. P. Sudheer

Executive Vice President, KSCSTE

Kerala State Council for Science,

Technology and Environment

Prof. V. P. Mahadevan Pillai

Vice Chancellor, University of Kerala

Dr Tapas K. Kundu

Director, Central Drug Research Institute (CDRL)

Dr Chitra Mandal

Indian Institute of Chemical Biology (IICB)

Dr T. P. Senkumar

Ex-DGP Kerala

Prof. Gagandeep Kang

Executive Director

Translational Health Science & Technology Institute

Prof. B. Ravi

Dept. of Mechanical Engineering, IIT Mumbai

Dr B. N. Gangadhar

Director, NIMHANS

Prof. Shally Awasthi

King George's Medical University

Prof. Goutam Ganguly

Bangur Institute of Neurosciences

Dr Sanjay Behari

(Member Secretary) Director, Sree Chitra Tirunal Institute for Medical Sciences & Technology

Dr Harikrishna Varma. P. R.

Head, Biomedical Technology Wing

Sree Chitra Tirunal Institute for Medical Sciences & Technology, One member of Parliament (Rajya Sabha) (to be elected)

From 18.09.2024 to 31.03.2025

Shri. S. Kris Gopalakrishnan

(President) Co–Founder, Infosys, Chairman, Axilor Ventures Pvt. Ltd., Centre for Brain Research, Indian Institute of Science Campus, CV Raman Avenue Bangalore

Dr V. K. Saraswat

Member, NITI Aayog New Delhi

(Former President, SCTIMST, Thiruvananthapuram)

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Shri. E. T. Mohammed Basheer

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Secretary to Govt. of India
Dept. of Science and Technology
Technology Bhavan, New Mehrauli Road, New Delhi

Shri. Vishvajit Sahay

Additional Secretary & Financial Adviser Dept. of Science and Technology Technology Bhavan, New Mehrauli Road, New Delhi Representative of Department Education Government of India, New Delhi

Dr Atul Goel

Director General of Health Services (DGHS)
Directorate General of Health Services (DGHS)
Ministry of Health & Family Welfare
Nirman Bhavan, Maulana Azad Road, New Delhi
Joint Secretary (Medical Education)
Ministry of Health, Government of India, New Delhi

Dr Rajan N. Khobragade IAS

Additional Chief Secretary to Govt. (Health & Family Welfare)

Department of Health & Family Welfare, Government of Kerala, Thiruvananthapuram

Prof. Mohanan kunnummal

Vice Chancellor, University of Kerala, Thiruvananthapuram

Dr K. P. Sudheer

Executive Vice President, KSCSTE Kerala State Council for Science, Technology and Environment Sasthra Bhavan, Pattom, Thiruvananthapuram

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Shri. N. Ganapathy Subramaniam

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Prof. Jayesh Bellare

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Dr Ramakrishnan A. G.

Adjunct Faculty, Heritage Science & Technology, IIT Hyderabad, Professor (Retd.), MILE Laboratory, Dept. of Electrical Engineering, Associate Faculty, Centre for Neuroscience, Indian Institute of Science, Bangalore

Prof. S. Ganesh

Professor, Department of Biological Sciences and Bio–Engineering, Indian Institute of Technology, Kanpur, India

Prof. Pramod Garg

Professor & Head, Department of Gastroenterology All India Institute of Medical Sciences, Ansari Marg, New Delhi

Prof. Arvinda H. R.

Professor, Neuroimaging and Interventional Radiology, National Institute of Mental Health and Neuro Sciences (NIMHANS), Hosur Road/Marigowda Road (Lakkasandra, Wilson

Dr Sanjay Behari

Gardon), Bangalore

Director, Sree Chitra Tirunal Institute for Medical Sciences & Technology

Dr Harikrishna Varma P. R.

Head, Biomedical Technology Wing Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram

GOVERNING BODY

Dr V. K. Saraswat (President) Member–NITI Aayog

Secretary to Govt. of India

Dept. of Science and Technology

Director General of Health Services (DGHS)

Financial Advisor.

Department of Science and Technology

Dr K. P. Sudheer

Executive Vice President, Kerala State Council for Science, Technology and Environment



Dr T. P. Senkumar

Ex-DGP Kerala

Prof. Goutam Ganguly, Bangur Institute of Neurosciences

Dr Sanjay Behari

(Member Secretary), Director, Sree Chitra Tirunal Institute for Medical Sciences & Technology

Dr Harikrishna Varma P. R.

Head, Biomedical Technology Wing, Sree Chitra Tirunal Institute for Medical Sciences and Technology

Dr Mala Ramanathan

Professor (Sr. Grade), AMCHSS

Shri. Muraleedharan C V, Scientist G (Sr. Grade), Biomedical Technology Wing, Sree Chitra Tirunal Institute for Medical Sciences and Technology (from 05.01.2024–)

Shri. S. Kris Gopalakrishnan

(President) Co-Founder, Infosys, Chairman, Axilor Ventures Pvt. Ltd., Centre for Brain Research, Indian Institute of Science Campus, CV Raman Avenue, Bangalore

Prof. Abhay Karandikar

Secretary to Govt. of India

Dept. of Science and Technology Technology Bhavan, New Mehrauli Road, New Delhi

Shri. Vishvajit Sahay

Additional Secretary & Financial Adviser Dept. of Science and Technology Technology Bhavan, New Mehrauli Road, New Delhi

Dr Atul Goel

Director General of Health Services (DGHS) Directorate General of Health Services (DGHS) Ministry of Health & Family Welfare Nirman Bhavan, Maulana Azad Road, New Delhi

Dr K. P. Sudheer

Executive Vice President, KSCSTE Kerala State Council for Science, Technology and Environment, Sasthra Bhavan, Pattom, Thiruvananthapuram

Prof. Jayesh Bellare

Institute Chair Professor, IIT Bombay 131, Chemical Engineering, Department of Chemical Engineering, Indian Institute of Technology, Powai, Mumbai

Prof. Pramod Garg

Professor & Head, Department of Gastroenterology All India Institute of Medical Sciences Ansari Marg, New Delhi

Dr Sanjay Behari

Director, Sree Chitra Tirunal Institute for Medical Sciences & Technology

Dr Harikrishna Varma P. R.

Head, Biomedical Technology Wing Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram

Dr Kavita Raja

Professor(Sr. Grade) & Head, Department of Microbiology, Sree Chitra Tirunal Institute for Medical Sciences and Technology

ACADEMIC COMMITTEE

Dr Sanjay Behari (Chairperson)
Director, SCTIMST, Thiruvananthapuram

Dr Sujatha Rao

Former Secretary, Ministry of Health and Family Welfare for the Government of India, Former Director General of the National AIDS Control Organization (NACO)

Dr Chitra Sarkar

Former Professor, Department of Pathology and Former Dean (Research), All India Institute of Medical Sciences, New Delhi, Former President of AIIMS, Guwahati

Dr Vedantam Rajshekhar

Former Professor and Head, Neurosurgery, CMC Vellore

Dr Ajay Bahl

Head, Department of Cardiology, PGI Chandigarh

Dr Kaushik Chatterjee

Professor & Chair, Department of Bio Engineering, Indian Institute of Science, Bangalore

Dr Neethu Singh

Professor, Centre for Biomedical Engineering, IIT, New Delhi

Head, Biomedical Technology Wing SCTIMST, Thiruvananthapuram

Dean

SCTIMST, Thiruvananthapuram



Dr Roy Joseph

Scientist–G (Sr.Grade) & Former Dean, SCTIMST, Thiruvananthapuram

Dr V G Shrinivas

Professor & Former HoD, Dept. of Anaesthesiology, SCTIMST, Thiruvananthapuram

Dr Harikrishnan S

HoD, Dept. of Cardiology, SCTIMST, Thiruvananthapuram

DrEaswer H V

Professor, & Former HoD, Dept.of Neurosurgery, SCTIMST, Thiruvananthapuram

Dr Geetha G

Scientist "G", (Sr.Grade), Computer Division, SCTIMST, Thiruvananthapuram

Dr Rakhal Gaitonde

Professor, AMCHSS, SCTIMST, Thiruvananthapuram

FINANCE COMMITTEE

Secretary, Department of Science and Technology/ or nominee of Secretary, DST

Addl. Secretary & FA, Integrated Finance Division (IFD), DST/representative

Prof. Jayesh Bellare

Institute Chair Professor, IIT Bombay, Department of Chemical Engineering,

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Dr Sanjay Behari, Director, SCTIMST

(Chairperson)

FA of the Institute (Ex-officio Convener)

RESEARCH COUNCIL

Prof. R. Chidambaram

(Chairperson), Chairman, School for Advanced Studies in Nuclear Science and Technology, BARC Former Principal Scientific Adviser to Govt. of India Former Chairman, Atomic Energy Commission

Dr William Selvamurthy

Director General, Amity Directorate of Science & Innovation, Chancellor, Amity University Chhattisgarh and Chair Professor for Life Sciences Former Distinuished Scientist and Chief Controller R&D (LS), DRDO

Prof. Gagandeep Kang

Director, Global Health, Bill & Melinda Gates Foundation in Seattle, Washington Former Executive Direcor, Translational Health Science and Technology Institute, Faridabad Former Professor, Department of Gastrointestinal Sciences, CMC Vellore

Dr Arvind Rajwanshi

Director, AIIMS, Raebareli, Dalmau Road, Raebareli Tehsil, Uttar Pradesh – 229405

Dr Rakesh K Gupta

Director & Head, Department of Radiolory, Fortis Memorial Research Institute, Gurgon, Haryana

Prof. B Ravi

Director, National Institute of Technology Directorate, Main Building, NITK, Surathkal, Karnataka

Dr Renu John

Professor, Department of Biomedical Engineering, IIT, Hyderabad, Co–Founder and Head of Center for Healthcare Entrepreneurship (CfHE) Chair, Center for Interdisciplinary Program, IIT, Hyderabad

Dr Sreekumar E

Director, Indian Institute of Advanced Virology Thonnakkal, Thiruvananthapuram

Dr Vinay K Nandicoori

J C Bose Fellow, Director, CSIR–Center for Cellular and Molecular Biology, Hyderabad

Dr Rajeev Bagarhatta

Principal and Controller, Senior Professor of Cardiolory, SMS Medical College, Jaipur

Dr MV Padma Srivastava

Professor, Head, Department of Neurology Chief, Neurosciences Center, AIIMS, New Delhi, Hon. Professor, UCLAN, UK, Past President Indian Stroke Association

Dr Sachin Talwar

Professor, Department of Cardiothoracic and Vascular Surgery, AIIMS, New Delhi

Dr Santanu Dhara

Professor, Associate Dean (R&D) PIC (IPR & IR) Biomaterials and Tissue Engineering Group



School of Medical Science and Technology, IIT, Kharagpur – 721302

Mr. Ajay Pitre, MD

Managing Partner, Pitre Business Ventures LLP, 3B, P V House, 85 Damle Path, Off Law College Road, Erandwane, Pune – 411004

Mr. Samuel Williams George

Managing Direcor, GESCO Healthcare Private Limited, G–6 GEE CRESCENT, 114, Ponamallee High Road, Chennai – 600084

Director

SCTIMST (Ex-Officio) Thiruvananthapuram – 695011

NEW COMMITTEE FROM 25-03-2025 TO 31-03-2025

Prof. Ashutosh Sharma (Chairperson)

Former Secretary to Govt. of India, Dept. of Science & Technology (DST) Institute Chair Professor and C V Seshadri Chair Professor at the Department of Chemical Engineering of Indian Institute of Technology, Kanpur

Dr William Selvamurthy

Former Distinuished Scientist and Chief Controller Research and Development

DRDO, President, Amity Science, Technology and Innovation Foundation, Chancellor, Amity University Chhattisgarh and Chair Professor for Life Sciences, Scientific Advisory Committee to Cabinet (SAC–C), Chairman of Programme Management Board in the Society for Bio–Medical Technology

Prof. Gagandeep Kang

Director, Global Health, Bill & Melinda Gates Foundation in Seattle, Washington Former Executive Direcor, Translational Health Science and Technology Institute, Faridabad\ Former Professor, Department of Gastrointestinal Sciences, CMC Vellore

Dr Arvind Rajwanshi

Director, AIIMS, Raebareli, Dalmau Road, Raebareli Tehsil, Uttar Pradesh – 229405

Dr Rakesh K Gupta

Director & Head, Department of Radiolory Fortis Memorial Research Institute, Gurgon, Haryana, India

Prof. B Ravi

Director [Former Professor, IIT Mumbai] National Institute of Technology Directorate, Main Building, NITK, Surathkal, Karnataka

Dr Renu John

Professor, Department of Biomedical Engineering, IIT, Hyderabad, Co–Founder and Head of Center for Healthcare Entrepreneurship (CfHE), Chair, Center for Interdisciplinary Program, IIT, Hyderabad, India – 502284

Dr Sreekumar E

Director, Indian Institute of Advanced Virology (IAV)Bio 360, Life Sciences Park, Thonnakkal, Thiruvananthapuram

Dr Vinay K Nandicoori

J C Bose Fellow

Director, CSIR–Center for Cellular and Molecular Biology, Hyderabad

Dr Rajeev Bagarhatta

Senior Professor (Cardiolory), Principal and Controller, SMS Medical College and Attached Group of Hospitals, Jaipur

Dr MV Padma Srivastava

Former Professor, Head, Department of Neurology Chief, Neurosciences Center, AIIMS, New Delhi, Hon. Professor, UCLAN, UK, Past President Indian Stroke Association

Dr Sachin Talwar

Professor, Department of Cardiothoracic and Vascular Surgery, AIIMS, New Delhi

Dr Santanu Dhara

Professor, Associate Dean (R & D) PIC (IPR & IR) Biomaterials and Tissue Engineering Group School of Medical Science and Technology, IIT, Kharagpur – 721302

Mr. Ajay Pitre, MD

Managing Partner, Pitre Business Ventures LLP, 3B, P V House, 85 Damle Path, Off Law College Road, Erandwane, Pune – 411004

Mr. Samuel Williams George

Managing Direcor, GESCO Healthcare Private Limited, G–6 GEE CRESCENT, 114, Ponamallee High Road, Chennai – 600084



Director

SCTIMST (Ex-Officio) Thiruvananthapuram – 695011

INSTITUTIONAL ETHICS COMMITTE

Chairperson-IEC

Dr Kusumakumary P.

(Chairperson/Clinician/ Non–Affiliated) (Retired Additional Director. Regional Cancer Centre, Thiruvananthapuram) DGRA 54, Doctors Garden, Ulloor Medical College PO, Thiruvananthapuram, 695011.

Members

Dr Manoj Murhekar

(Health Science Expert/Social Scientist/ Non–Affiliated)

Director, Scientist G, ICMR National Institute of Epidemiology, Chennai, Tamil Nadu – 600077.

Dr Pradeep S.

(Basic Medical Scientist/ Non–Affiliated) Professor & Head, Dept. of Pharmacology Dr Somervell Memorial CSI Medical College and Hospital, Karakonam P.O., Thiruvananthapuram, Kerala

Dr Annapurna Y.

(Basic Medical Scientist/ Non–Affiliated)
Professor and HOD, Department of Pharmacology
Government Medical College
Thiruvananthapuram–695011.

Dr Indu P. V.

(Clinician/Non-Affiliated)

Professor of Psychiatry, Government Medical College Thiruvananlhapuram–695011.

Dr Rejnish Kumar

(Clinician/ Non–Affiliated)
Additional Professor, Regional Cancer Centre (RCC), Thiruvananthapuram–695011.

Adv. N. Anand

(Legal Expert/ Non–Affiliated) Advocate, High Court of Kerala II Floor, Papali Enclave, Providence Road Providence Jn., Ernakulam–682018.

Adv. Priya Kaimal

(Legal Expert/Non-Affiliated)

Advocate, High Court of Kerala C/8, V.B. Crest, St. Martin Road, Palarivattom Ernakulam–682025.

Smt. Rekha Radhakrishnan

(Lay person/Non–Affiliated) Principal (Retired), Gov!. Model HSS for Girls Anupama, BN 188, Bapuji Nagar Medical College PO, Thiruvananthapuram–695011.

Dr Harikrishna Varma P. R.

(Medical Technology Expert/Affiliated) Head – Biomedical Technology Wing, SCTIMST, Poojapura, Thiruvananthapuram–695012.

Dr Narayanan Namboodiri K. K.

(Clinician/Affiliated)

Professor, Department of Cardiology, SCTIMST, Thiruvananthapuram–695011.

Prof. Manikandan S.

(Clinician/Affiliated)

Professor, Department of Anaesthesiology, SCTIMST, Thiruvananthapuram–695011.

Dr Biju Soman

(Basic Medical Scientist/Affiliated)
Professor, AMCHSS
SCTIMST, Thiruvananthapuram–695011.

Dr Syam K.

(Clinician/Affiliated/Alternative Member Secretary) Professor, Dept. of Neurology SCTIMST, Thiruvananthapuram–695011.

Member Secretary

Dr Srinivas G.

(Member Secretary /Basic Medical Scientist/ Affiliated)

Scientist – G, Department of Biochemistry SCTIMST, Thiruvananthapuram–695011.

INSTITUTIONAL ANIMAL ETHICS COMMITTEE

Dr Anilkumar T. V.

(Chairperson), Scientist G, Division of Experimental Pathology, Biomedical Technology Wing, SCTIMST

Dr Harikrishnan V. S.

(Member Secretary), Scientist E Division of Laboratory Animal Science Biomedical Technology Wing SCTIMST



Dr Anughya Bhatt

Scientist F,

Division of Thrombosis Research Biomedical Technology Wing SCTIMST

Dr Neethu Mohan

Scientist D

Cellular and Molecular Cardiology SCTIMST

Dr Sachin J. Shenoy

Scientist F

Doivision of in–vivo Models and Testing Biomedical Technology Wing SCTIMST

Dr Manju Sebastian,

CPCSEA, Main Nominee

Dr J. Jaslin Edward

Link Nominee

Dr Sujith M.

Scientist from outside the Institute

Dr Santhosh Sankaran

Socially Aware Nominee

INSTITUTIONAL COMMITTEE FOR STEM CELL RESEARCH

Prof Chandrabhas Narayana (Chairman),

Director, Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram

Prof Shaji R V,

Professor, Department of Hematology, CMC Vellore, IDA Scudder Road, Vellore, Tamil Nadu – 632004

Dr Pradeep Kumar G

Scientist G, Reproductive Biology Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram

Dr C. Nirmala

Prof. & Head (Rtd) Dept. of Obstetrics and Gynaecology, MCH, C–VI–L, Millanium Apartment Gagathy, Thiruvananthapuram – 695014

Dr Manoi Unni

Clinical Associate Professor Clinical Hematology, Fellowship in Stem Cell Transplant, Amrita Cardio–Oncology Clinic AIMS, Ponekkara P.O, Kochi, Kerala – 682041

Smt. Sathi Nair

Rtd. Chief Secretary

TC-5/943(1), Samtripthi, Devapalan Nagar Peroorkada, Thiruvananthapuram – 695005,

Dr KRS Krishnan

Technology Management Adviser & Chairman Advisory Committee, NABL (India) & Formerly, Adviser Engineering & Technology (DST) Director (Technical & Operations) HLL Lifecare Ltd., 4–B, Cloud Nine Apartments, Law college Jn. PMG, Barton Hill, Thiruvananthapuram

Dr Annie John

ICMR Emeritus Scientist, Department of Biochemistry, University of Kerala, Trivandrum

Dr P Manickam

Scientist E, ICMR–National Institute of Epidemiology(NIE) R 127, Ayapakkam, Chennai – 600077

Sri. Nemom V Sanjeev

Advocate, Nemom Chamber, Maharani Buildings, G K N Towers, Vanchiyoor PO, Thiruvananthapuram – 695035

Dr Aneesh V Pillai

Assistant Professor, School of Legal Studies, Cochin University of Science and Technology (CUSAT), Cochin University PO, Kochi – 682022

Dr Neethu Mohan

(Member Secretary), Scientist D Division of Cellular and Molecular Cardiology SCTIMST, Thiruvananthapuram

Ms Sreepriya C S

(Co–ordinator), Executive Secretary to the Director–cum–Ethics Committee Co–ordinator SCTIMST, Thiruvananthapuram

NEW COMMITTEE FROM 21-06-2024TO 31-03-2025

Prof. Chandrabhas Narayana (Chairperson)

Director, Rajiv Gandhi Centre for Biotechnology Thycaud PO, Poojappura, Thiruvananthapuram–695014

Prof. Shaji R. V.

(Vice Chairperson)

Professor, Department of Hematology CMC Vellore, IDA Scudder Road, Vellore, Tamil Nadu – 632004



Dr Pradeep Kumar G. (Member)

ICMR–Emeritus Scientist, Department of Biotechnology, University of Kerala, Kariavattom PO, Thiruvananthapuram

Dr C. Nirmala (Member)

(Professor & Head (Rtd) Dept. of Obstetrics and Gynaecology, MCH), C–VI–L, Millanium Apartment, Gagathy, Thiruvananthapuram – 695014

Dr Manoj Unni (Member)

Clinical Associate Professor

Clinical Hematology, Fellowship in Stem Cell Transplant Amrita Cardio–Oncology Clinic, AIMS, Ponekkara P.O, Kochi, Kearala – 682041

Dr Tarun Bhatnagar (Member)

Scientist F, ICMR School of Public Health ICMR National Institute of Epidemiology(NIE), Chennai, Tamil Nadu

Dr KRS Krishnan (Member)

Professor & Director (IIE)

Karunya Institute of Technology & Sciences (A Deemed to be University) Karunya Nagar, Coimbatore – 641114, Tamil Nadu

Dr Poonkuzhali Balasubramanian (Member)

Professor, Department of Haematology, Wellcome – DBT Senior Fellow, Department of Haematology, Christian Medical College, Vellore, Ranipet Campus, Kilminnal Village, Pincode – 632 517, Tamil Nadu

Prof. Irudaya Rajan (Member)

Former Professor, Centre for Development Studies (CDS), Founder Chair, International Institute of Migration & Development (IIMD) BN 43–A, Bapuji Nagar, Pongummoodu, Medical College P.O, Thiruvananthapuram – 695011, Kerala

Dr S. S. Giri Sankar (Member)

(Associate Professor (Retd.) Govt. Law College, Ernakulam), Principal, St.Dominic's Colleg of Law, Kanjirapally, Kottayam

Dr Aneesh V Pillai (Member)

Assistant Professor, School of Legal Studies Cochin University of Science and Technology (CUSAT), Cochin University PO, Kochi – 682022

Dr Seema P Uthaman (Member)

Department Of Psychiatric Social Work

Institute of Mental Health and Neurosciences Kozhikode, Kerala, India – 673008

Dr Neethu Mohan (Member Secretary)

Scientist E, Division of Cellular and Molecular Cardiology, SCTIMST, Thiruvananthapuram

Ms. Sreepriya C. S. (Coordinator)

Sr. Principal Private Secretary to Director SCTIMST, Thiruvananthapuram

INSTITUTIONAL BIO-SAFETY COMMITTEE

Dr Maya Nandkumar A.

(Chairperson), Scientist G, SCTIMST

Dr Abdul Jaleel K. A

(External Expert), Scientist G, Rajiv Gandhi Center for Biotechnology, Thiruvananthapuram

Nominee of DBT, (External Expert)

Dr Madhusoodanan U. K.

(Internal Expert), Associate Professor, SCTIMST

Dr Dinoop K. P.

(Biosafety Officer), Associate Professor, SCTIMST

Dr Amita R.

(Internal Expert), Associate Professor, SCTIMST

Dr Renjith S.

(Internal Expert), Scientist B, SCTIMST

Dr Anugya Bhatt

(Member Secretary), Scientist G, SCTIMST

TECHNOLOGY DEVELOPMENT COMMITTEE

Prof. Sanjay Behari (Chairperson)

Director, SCTIMST Head, BMT Wing, SCTIMST

Dr S Ganesh

Professor, Department of Biological Sciences and Bioengineering, Indian Institute of Technology, Kanpur

Dr Unnikrishnan Nair

Director, Vikram Sarabai Space Centre (VSSC), Thiruvananthapuram

Dr Kuruvilla Joseph

Sr. Professor & Dean, Chemistry, IIST, Thiruvananthapuram



Dr Naresh Bhatnagar

Professor, Department of Mechanical Engineering, Indian Institute of Technology, Delhi

Prof. N. R. Jagannathan

J C Bose National Fellow and Professor of Eminence Former Professor and Head of Imaging Sciences (NMR facility), AIIMS, New Delhi

Dr Mohanasankar Sivaprakasam

Professor of Electrical Engineering, Nodal officer for Health Care Innovation Centre, IIT Chennai

Dr Kesavadas C.

Professor (Sr.Grade) & Head, Department of Imaging Sciences& Interventional Radiology(IS&IR), SCTIMST, Thiruvananthapuram

Dr Prasanth Kumar Dash

Professor & HoD, Department of Anaesthesiology, SCTIMST, Thiruvananthapuram

Mr. S Balram

Scientist G, BMT Wing, SCTIMST, Thiruvananthapuram

BUILDING COMMITTEE

Dr Sanjay Behari (Chairperson) Director, SCTIMST

Dr K P Sudheer

Ex Officio Principal Secretary S&T Department & Executive Vice President KSCSTE Sasthra Bhavan Pattom, Thiruvananthapuram

Head, BMT Wing (Ex-Officio), SCTIMST

Mr. S J Vijaya Das

Chief Project Examiner, Kerala Infrastructure Fund Board

Smt. Girija K.S (Co–opted Member) Former Chief Town Planner, Govt. of Kerala

Dr Sunil Gupta (Co-opted Member) | Head of Neurosurgery, PGI Chandigarh Financial Advisor (Ex-officio Convener), SCTIMST

SENIOR STAFF SELECTION COMMITTEE

Director (Chairman – Ex–Officio)

Head, Biomedical Technology Wing

Nominee of the Secretary, DST

An expert from outside the Institute nominated by the President

Scientist nominated by the President from among the members of the Institute

Senior academic staff of the Institute not below the rank of Professor/Scientist G/Engineer G

JUNIOR STAFF SELECTION COMMITTEE

The Medical Superintendent

Head, Biomedical Technology Wing

A representative of the Academic Wing of the Institute nominated by the Director

Three Members nominated by the President SPECIAL RESERVATION CELL

Sri. Kiran K.V.

Asst. Accounts Officer, F&A Division (Officer)

Sri. Renu Remesan, Nursing Officer – B

Sri. Vinod D., Technical Assistant (Lab) -B

Smt. Preethamol P, Nursing Officer –C

Sri. Aji K, Physiotherapist –B

Sri. Kiran K. V. (Cell Officer)

Assistant Purchase & Stores Officer, SCTIMST

Sri. Aji K., Sr. Physiotherapist, SCTIMST

Sri. Vinod D.

Sr. Technical Assistant (Lab) – B, SCTIMST

Sri. Renu Remesan, Nursing Officer – B, SCTIMST

Dr Remya K. R.

Scientific Assistant (Instruments), SCTIMST

INTERNAL COMPLAINTS COMMITTEE

Dr Jayasree R. S. Chairperson Scientist G, BMT Wing

Adv. Sreeja Sasidharan

Chairperson, POSH Local Committee, Trivandrum

Dr Bejoy Thomas

Professor Senior Grade, Dept. of IS&IR

Dr Sanjay G., Professor, Dept. of Cardiology

Dr Lizymol P. P., Scientist G, BMT Wing



Dr Sachin J. Shenoy, Scientist G, BMT Wing

Dr Sruthi S. Nair

Additional Professor, Dept. of Neurology

Dr Jissa V. T., Scientist D, AMCHSS

Nursing Superintendent, Smt. Rosamma Manual Scientific Officer(MSW)

Ms. Rukhiya Salim, PhD Student, BMT Wing

Ms. Krishnendu C, PhD Student, AMCHSS

PUBLIC GRIEVANCE COMMITTEE

Dr Harikrishna Varma P R

(Chairperson), Head, BMT Wing, SCTIMST

Dr Thomas Koshy

Professor Sr. Grade, Department of Anaesthesia, SCTIMST

Dr Maya Nandakumar

Scientist G, Division of Microbial Technology, BMT Wing, SCTIMST

Dr Debahish Gupta

Professor & HOD, Department of Transfusion Medicine, SCTIMST

Dr Jeemon P.

Additional Professor, AMCHSS, SCTIMST

Mr. Vipin C. G., Financial Advisor (i/c), SCTIMST

Ms. Leena R. K.

Deputy Nursing Superintendent, SCTIMST

Ms.SudhaT.

Librarian-cum-Information Officer, SCTIMST

Ms. Rosamma Manuel

Scientific Officer (MSW), SCTIMST

Mr. Lekshmanan Pillai C

(Nodal Officer), Administrative Officer Gr I.(i/c), SCTIMST

EMPLOYEES GRIEVANCE COMMITTEE

Hospital Wing & AMCHSS

Dr Sylaja P. N.

(Chairperson), Professor & HOD, Department of Neurology, SCTIMST.

Dr Abhilash S. P.

Professor, Department of Cardiology, SCTIMST.

Dr Ravi Prasad Varma

Additional Professor, AMCHSS, SCTIMST.

Dr Ajay Prasad Hrishi

Additional Professor, Department of Anaesthesiology, SCTIMST.

Ms. Nirmala M. O.

Nursing Superintendent, SCTIMST.

Dr Jyothi E. K.

Scientist C, Department of Microbiology, SCTIMST.

Ms. Beegum Thaslim

Sr. Scientific Assistant (Perfusion), SCTIMST.

Administrative Officer

(Convener), Hospital Wing, SCTIMST.

BMT WING

Dr Anilkumar T. V.

(Chairman), Scientist G, SCTIMST.

Dr Sujesh Sreedharan

Engineer G, Division of Artificial Internal Organs, SCTIMST.

Dr Anugya Bhatt

Scientist G, Division of Thrombosis Research, SCTIMST.

Dr Rekha M. R.

Scientist G, Division of Biosurface Technology, SCTIMST.

Dr Gijo Raj

Scientist C, Division of Polymeric Medical Devices, SCTIMST.

Dr Dimple Gopi

Librarian—cum—documentation Officer —A, SCTIMST.

Ms. Sumitha K. C.

Sr. Scientific Assistant (Lab), SCTIMST.

Administrative Officer Gr.I (Convener), BMT Wing, SCTIMST.



REPORT OF THE INTERNAL COMMITTEE ON SEXUAL HARASSMENT OF WOMEN IN THE WORKPLACE (PREVENTION, PROHIBITION AND REDRESSAL) POSH ACT 2013

Internal Committee (IC) of SCTIMST fulfills the requirements of Section 21(1) of the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013. Currently, the IC is Chaired by Dr Jayasree RS with Dr Bejoy Thomas, Dr Sanjay G, Dr Lizymol PP, Dr Sachin J Shenoy, Dr Sruthi S Nair, Dr Jissa VT, Smt. Nirmala MO, and Smt. Rosamma Manual as the other members. Adv. Sreeja Sasidharan is the external expert. Ms. Rukhiya Salim and Ms. Krishnendu C are the student representatives The details of complaints received by the committee are given below:

- 1. The number of complaints of sexual harassment received in the year: 1
- 2. Number of complaints disposed of during the year: 1
- 3. Number of cases pending for more than 90 days: Nil The IC organised the following events during the FY 2024-25.

To commemorate the 10th anniversary of the Prevention of Sexual Harassment at the Workplace (PoSH) Act 2013, IC of SCTIMST have organized awareness classes. In connection with the learning

week from 19th to 25th October, 2024 classes on "Women Empowerment and PoSH Act" by Adv. Sreeja Sasidharan, Lawyer and Chairperson of the Local Committee of Trivandrum District, and on "Ethics and Values" by Dr Anishia Jayadev, Institute of Management in Government were conducted.

International Women's Day 2025 was celebrated at BMT wing with the theme "For ALL Women and Girls: Rights, Equality, Empowerment". A series of impactful addresses and messages highlighted the importance of gender equality, women's empowerment, and the ongoing journey towards a more inclusive society. The event was held with great enthusiasm and was attended by personnel and students of the institute. The inaugural address was delivered by Dr Harikrishna Varma PR, Head, BMT Wing, SCTIMST. Dr Kavita Raja, Medical Superintendent, SCTIMST, and Adv. Sreeja Sasidharan delivered the Women's Day message, emphasizing the importance of gender equality in society. Shri. CV Muraleedharan, Associate Head, BMT Wing, emphasized that International Women's Day highlights the strengths, achievements, and contributions of women across all fields. He noted that women are the foundation of families, communities, and nations, playing a crucial role as mothers, innovators, leaders, and changemakers. On this occasion, the senior female staff members of the institute who were about to retire this year were honored and felicitated for their valuable contributions.





PROGRESS ON IMPLEMENTATION OF INTEGRITY PACT IN SCTIMST AS PER CVC REQUIREMENT.

In the year 2007, the Central Vigilance Commission vide office order dated 04.12.2007 recommended implementation of a concept called "Integrity Pact" (IP) in respect of all major procurements. The IP essentially envisages an agreement between the prospective vendors/bidders and the buyer, committing the persons/officials of both parties not to exercise any corrupt influence on any aspect of the contract. The IP, in respect of a particular contract, shall be operative from the date the IP is signed by both parties till the final completion of the contract.

The Governing Body of SCTIMST vide its resolution No.V.37 dated 03.03.2018 recommended to incorporate IP, depending on the nature of procurements/contracts above a threshold value of Rupees One Crore in respect of Integrity Pact. The IP is to be implemented through Independent External Monitors (IEMs) appointed by the organization. IEMs would review independently and objectively whether and to what extent parties have complied with their obligations under the pact. The main role and responsibility of IEM is to resolve issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or indicates bias towards some bidders.

SCTIMST had appointed Shri Prahlad Kumar Sinha, IP &TAFS (Rtd) and Dr Ved Prakash ITS (Rtd) as Independent External Monitors (IEM) for the implementation of the IP at SCTIMST for a period of three years. Both the IEMs were appointed as per the recommendation from the Central Vigilance Commission (CVC) from their empanelled list. During the years 2021 to -2024, the IEMs visited SCTIMST at periodic intervals. The IEMs had signed the non-disclosure agreement with the Institute.

They had examined the interests of the Institute and signed the 'absence of conflict-of-interest declaration. Integrity Pact incorporated in open tenders with an estimated value of more than Rs 1.00 Cr floated by SCTIMST during the financial year 2021-2024.

RESERVATION AND OTHER WELFARE MEASURES FOR SCHEDULED CASTES/SCHEDULED TRIBES/ OTHER BACKWARD CLASSES/ ECONOMICALLY WEAKER SECTIONS AND PERSONS WITH DISABILITIES

SCTIMST has been following, in letter and spirit, the Presidential Directives and other guidelines related to reservation / concession for Scheduled Castes / Scheduled Tribes/Other Backward Classes/Economically Weaker Sections issued by the Government of India from time to time. An adequate monitoring mechanism has been put in place in the Institute for sustained and effective compliance with the Reservation Policy. Rosters are maintained as per the directives and are regularly inspected by the Liaison Officer to ensure compliance. A Special Reservation Cell for SC/ST employees is functioning with five members, including an Officer. In order to monitor the implementation of reservation of students admitted to various academic programs, a Student Reservation & Equal Opportunity Cell is also functioning. This Cell will address the grievances of candidates/students who belong to reservation categories on reservation related matters and ensure measures to prevent any caste based discrimination in the Institute. Cell will also monitor and implement various scholarships (International/National/State/Others) opportunities to students belong to reservation categories.

The following were the major activities by the Institute for Scheduled Castes/Scheduled Tribes/Other Backward Classes/ Economically Weaker Sections and Persons with Disabilities:

- Nominated Liaison Officer for SC/ST/PWD, Liaison Officer for OBC, Liaison Officer for EWS and Liaison Officer for Ex-service Men.
- 2. Constitution of a five member Special Reservation Cell including one office-in-charge of the Cell
- 3. Implemented reservation in all temporary and project appointments above 45days.
- Implemented reservation in Group A academic posts, laid down in the Central Educational Institutions (Reservation in Teachers' Cadre) Act, 2019 (10 of 2019) through regulation amendment vide Govt of India Gazette notification.
- 5. Providing Fellowship for SC/ST students.
- 6. Free treatment for ST patients (both OP and IP) utilizing the fund received from Government of Kerala.



ADMINISTRATIVE DIVISIONS

Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) is employing around 1000 personnel consisting of Doctors, Scientists, Engineers, Nursing Officers, Paramedical/Technical staffs, Administrative and auxiliary staff for the Hospital Wing as well as for the Biomedical Technology Wing. Administration Divisions are the key facilitator of the various activities of the Institute. A brief note on important Administrative Divisions and names of staffs employed in each division are listed below:-

Finance and Accounts Division

The key roles and responsibilities of the Finance and Accounts Division of the Institute includes the following functions:-

- 1. Preparation of the Annual Budget of the Institute and submission of the approved budget to the Ministry.
- 2. Coordination with Department of Science and Technology for the release of Grant-in-aid from the Ministry.
- 3. Processing of staff entitlement payments including Salary, Provident fund, Pension, Gratuity, Loans, Advances and Medical reimbursement.
- Proper accounting of Receipts and Expenditure of the Institute and effective utilization of the Grantin aid. Ensuring the payments are made through PFMS TSA/Hybrid TSA as per guidelines of GoI.
- 5. Managing round the clock Cash Counters.
- 6. Submission of claims for dues receivable with Government agencies and follow-up
- 7. Pivotal role in procurement and price negotiation meetings
- 8. Preparation of Annual Accounts of the Institute, submission of the Annual Accounts to C & Damp; AG Audit and coordination of the audit.

The following staffs are working in the F & A Division of the Hospital Wing and BMT Wing:-

Vipin C G	Chief Accounts Officer-B/Financial
	Adviser in Charge
Venkita Subramania Iyer N	Senior Accounts Officer- B
Seethamoni K P	Senior Officer-A (Accounts BMT Wing)
Vidya K S	Senior Accounts Officer-A
Bindu R S	Assistant Accounts Officer-B
Binitha K O	Assistant Accounts Officer- A
Sreenath K K	Assistant Accounts Officer-A
Alka Asok T	Executive Assistant -B
Kohila S	Executive Assistant-B
Deepa L S	Executive Assistant-B
Deepthi V V	Executive Assistant-A
Aswathy M C	Executive Assistant-A
Deepa S Dev	Executive Assistant-A
Gopakumar S	Upper Division Clerk-B
Subramanian P	Upper Division Clerk-B
Jayasree Neelakantan	Upper Division Clerk-B
Leena S V	Upper Division Clerk-B
Jayalal J S	Upper Division Clerk- B
Kaveri B S	Upper Division Clerk-B
Arathy Nair	Upper Division Clerk-B
Jayalakshmi S	Upper Division Clerk-A
Suja K G	Upper Division Clerk-A

2. Personnel and Administration Division:-

The Personnel Management of the institute focus on recruitment of staff as per the laid rules and regulations, engagement of outsourced personnel through GeM contracts, facilitating periodical FCP and VOP promotions, service benefits, sanction of leave, disciplinary proceedings, establishment and legal matters related to the Institute.

The electronic file management system, e-Office, developed by National Informatics Centre (NIC) has been implemented in the Institute with effect from 10.03.2025. All employees are trained in e-office by Project Engineers from NIC who are deployed to provide on-desk training/support to all staffs.



The following staffs are working in the Personnel and Administration Division of the Hospital

Wing and BMT Wing:-

Beena P Nair	Administrative Officer Gr I (BMT Wing)
Lakshmanan Pillai C	Administrative Officer Gr I (i/c)
Priya P	Administrative Officer Gr II
Chithra T.S	Assistant Administrative Officer-B
Sreedevi L	Assistant Administrative Officer-A
Sunil Kumar D	Executive Assistant-B
Smitha P M	Executive Assistant-B
Sarath Sam S.S.	Executive Assistant -B
Surekha S.R.	Executive Assistant-A
Smithesh S	Upper Division Clerk-B
Vishnu Prasad S	Upper Division Clerk-B
Syamlal M S	Upper Division Clerk-B

3. Purchase and Stores Division:-

Purchasing Department in the Institute ensures steady supply of high-quality medical equipment, general materials, services, balancing cost-effectiveness with patient safety and care quality which also includes supplier negotiation relationship management & market analysis. Its activities include procurement of all materials for Hospital/Clinical/Medical Research and Projects consisting of various equipments, spares, accessories, consumables, disposables, textiles etc through Government E Marketplace portal. Integrity Pact is ensured for all open tenders with an estimated value of more than Rs 1.00 crores.

The key roles and responsibilities of Purchase and Stores division includes:-

- 1. Supplier Selection: Identifies and evaluates reliable suppliers who provide quality goods and services consistently
- 2. Negotiation: Negotiates prices, terms, and contracts to secure the best value for the hospital.

- 3. Cost Control: Focuses on cost reduction without compromising on quality, ensuring the best value for money
- 4. Inventory Management: Monitors inventory levels to prevent stock outs or excess stock, ensuring smooth operations.
- 5. Quality Assurance: Ensures that all purchased items meet the hospitals required standards for patient safety and care.
- 6. Order Follow-Up: Tracks purchase orders to ensure timely delivery of materials as per the agreed-upon schedule.

The following staffs are working in the Personnel and Administration Division of the Hospital Wing and BMT Wing:-

Promod S	Sr Purchase and Stores Officer (in charge - BMT Wing)
Priya P	Sr Purchase and Stores Officer (i/c)
Shiju V S	Purchase and Store Officer - A
Kiran K V	Assistant Purchase and Stores Officer-B
Shibu Raj	Assistant Purchase and Stores Officer-B
Dhanya Gopal	Assistant Purchase and Stores Officer-A
Jayalakshmi T	Assistant Purchase and Stores Officer-A
Lakshmy G K	Executive Assistant - B
Shaju Hussain	Executive Assistant-B
Sumitha S	Executive Assistant-B
Bineesh N S	Executive Assistant -B
Neena K H	Executive Assistnat-A
George Thomas	Executive Assistant-A
Lakshmi Rajaclosy	Executive Assistant-A
Pradeep George	Upper Division Clerk-B
Rajani B L	Upper Division Clerk -B
Sheeba R M	Upper Division Clerk-B
Subin D Savio	Upper Division Clerk-B
Neena Sunny	Upper Division Clerk-B



Lakshmi S S Upper Division Clerk-B Veena L Upper Division Clerk-B

4. Research and Publication Cell:-

and Publication Cell Research facilitates collaborative MoUs with different R & D Institutions/funding agencies based on the request of Principal Investigators, Rooting of Approvals for publications/paper/abstract presentation by Faculty and Students. This division also provides placement to short term project staffs through a laid down selection procedure, accounting of project expenditure, timely submission of Utilization certificate to funding agencies and submission project schedules to annual audit. The coordination/compilation of departmental technical reports to the Annual Report of the Institute is also done by R & P Cell.

Sithara Kariat Assistant Administrative Officer-B Kumar N R Executive Assistant-B

5. Internal Audit Department:-

Internal Audit department is headed by an Audit officer on deputation from C & AG, GoI. This department ensures compliance of prescribed rules and procedures for incurring expenditure, realization of revenue and maintenance of accounts thereof. All bills exceeding Rs 10 Lakhs are pre-audited by this department. Inspection/audit of various units is also carried out by this Department.

Biju M David Internal Audit Officer on deputation from C & AG

Jeeva K H Assistant Administrative Officer-A





BALANCE SHEET AS AT 31st March 2025

CORPUS/CAPITAL FUND AND LIABILITIES		2024-25	2023-24
CORPUS/CAPITAL FUND AND LIABILITIES		Rs.	Rs.
CAPITAL FUND	1	8435831218	7496888065
RESERVES & SURPLUS	2	260688134	259415766
EARMARKED ENDOWMENT FUNDS	3	900996178	758928351
SECURED LOANS & BORROWINGS, UNSECURED LOANS & BORROWINGS, DEFERRED CREDIT LIABILITIES	4,5,6	0	0
CURRENT LIABILITIES & PROVISIONS	7	581957600	564879833
TOTAL		10179473130	9080112016
ASSETS			
FIXED ASSETS	8	3052432437	2910090449
INVESTMENTS FROM EARMARKED ENDOWMENT FUNDS	9	603969481	486660115
INVESTMENTS-OTHERS	10	260688134	259415766
CURRENT ASSETS , LOANS, ADVANCES ETC	11	6262383078	5423945686
MISCELLANEOUS EXPENDITURE (TO THE EXTENT NOT WRITTEN OFF)			
TOTAL		10179473130	9080112016
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTINGENT LIABILITIES & NOTES ON ACCOUNT	25		

Sd/-Financial Adviser Sd/-Director



INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR 2024-25

INCOME	Schedule	2024-25	2023-24
INCOME	Scriedule	Total	Total
		Rs.	Rs.
Income from Sales / Services	12	1255266180	1183928925
Grants Received from Govt of	10	220000000	207500000
India(Salary & General)	13	3300000000	2975000000
Fees/Subscription	14	22592324	22671050
Income from Investments }	15	22592324	22671050
Withdrawal from ERF }		0	0
Income from Royalty, Publication etc	16	2798483	1581121
Interest earned	17	244644936	185605360
Other Income	18	12080311	6029018
TOTAL		4850794622	4388989181
EXPENDITURE			
Establishment Expenses	20	2484928624	2264750743
Other Administrative Expenses	21	1243850615	1338136758
Bank Charges	23	77876	79737
Depreciation - Current Year		236502851	192558298
TOTAL		3965359966	3795525536
Balance being Excess Expenditure			
over Income (-)/Excess income over		885434656	593463645
expenditure(+)			
Add: Transfer to Special Reserve Account		3034392	1272368
BALANCE BEING SURPLUS CARRIED TO CAPITAL FUND		882400264	592191277

Sd/- Sd/- Director



SCHEDULES		2024-25	2023-24
	PARTICULARS	[Rs.]	[Rs.]
SCHEDULE 1 - CO	RPUS/CAPITAL FUND		
	Balance as at the beginning of the year	11084559237	9835659751
	Less Depreciation up to the end of the previous year	3489745357	3395112874
	Net balance at the beginning of the year	7594813880	6440546877
	Add: Grants received from Government of India for creation of Capital Assets	270838127	481180834
	Add: Grants received under CSR scheme	0	0
	Less:Unutilized Grant-in-Aid (capital)	0	0
	Less: Gol Grant Receivable for 7th CPC	204714247	0
	Deduct: Balance of net expenditure transferred from the Income and Expenditure Account Or add excess of income over expenditure	882400264	592191277
	Less: Value of Assets Written off during the year	107506806	17030922
	Deduct Transfer to BMT/Add Transfer from CHO	0	0
		0	0
	BALANCE AS AT THE YEAR-END	8435831218	7496888065
SCHEDULE 2-RESER	EVES AND SURPLUS:		
	1. Capital Reserve:		
	As per last Account		
	Addition during the year		
	Less:Deduction during the year		
	3. Special Reserves:		
	As per last Account	259415766	255904290
	ddition during the year (Current year transfer- Increase in provision)	1272368	3511476
	Less: Deductions during the year	0	0
	4. General Reserve:		
	As per last Account		
	Addition during the year		
	Less: Deductions during the year		
	TOTAL	260688134	259415766

Sd/-Financial Adviser Sd/-Director



SCHEDULE 3-EARM	ARKED/ENDOWMENT FUNDS	2024-25	2023-24
	a) Opening balance of the funds	758928351	756026315
	b) Additions to the funds:		
	i. Donations/grants	517492478	271201248
	ii. Income from Investments made on account of funds		
	iii. Other additions (Specify nature)	751496016	808895995
	TOTAL (a+b)	2027916846	1836123557
	c) Utilisation / Expenditure towards objective of funds		
	i. Capital Expenditure		
	- Fixed Assets	34802151	32619925
	- Others	0	0
	Total (Detailed Schedule Attached)	34802151	32619925
	ii. Revenue Expenditure		
	- Salaries, Wages and allowances etc.	65362588	71289600
	- Rent & Consumables etc.,	114197740	128444964
	- Other Administrative expenses	912558189	844840717
	Total	1092118516	1044575281
	TOTAL (c)	1126920667	1077195206
	NET BALANCE AS AT THE YEAR-END (a+b+c)	900996178	758928351

Sd/Financial Adviser Sd/Director



SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCHEDULE 3-EARMARKED/ENDOWMENT FUNDS - AS ON 31.03.2025

PROJ #	NAME OF GRANTEE/ PRINCIPAL INVESTIGATOR)-WISE BREAK				
		OPENING BALANCE	ADDITIONS	TO FUND			
			GRANTS	OTHER RECEIPTS	TOTAL	FIXED ASSETS	
	HOSPITAL PROJECTS		ADDITIONS				
5000	PROJ-MISCELLANEOUS	12511117	0	0	12511117	0	
5040	DEVELOPING EXPERIMENTAL THERAUPEUTICALS	406363	0	0	406363	0	
5055	ROCKFELLER FOUNDATION,USA	686120	0	0	686120	0	
5078	PROJECT GRANT/DR MALA RAMANATHAN	5810	0	0	5810	0	
5094	KERALA STATE AIDS CONTROL SOCIETY	412341	179650	0	591991	0	
5100	AMC/MAC ARTHUR FOUNDATION/02-70546	46315	0	0	46315	0	
5108	EVAL.SUB-TYPES DEMENTIA/ DR.MATHURA	15801	0	0	15801	0	
5119	STAKE HOLDER-PERCEPT/INST. REV BO	104493	0	0	104493	0	
5133	WHO FELLOWSHIP TRAINING CBICD	215059	0	0	215059	0	
5139	A 24 WEEK, MULTICENTER/DR. MATHURANATH	2602047	0	0	2602047	0	
5140	HARVARD SCHOOL OF PUBLIC HEALTH	91794	0	0	91794	0	
5142	BANKING FOR BETTER HEALTH-MEDISAVE	153911	0	0	153911	0	
5146	DEVELOPMENT OF SPECTROSCOPIC PROTOCOL	11026	0	0	11026	0	
5150	PROTOCOL 6002-INT 001	12097	0	0	12097	0	
5153	DEV REF. MANUAL FOR PRIMARY	155802	0	0	155802	0	
5159	NCD RISK FACTOR SURVEILLANCE	71123	0	0	71123	0	
5174	CHANGES IN SLEEP WAKEFULNESS-Dr.Mohanku.	49317	0	0	49317	0	
5175	SURGICAL TRAIL IN LOBAR INTRACEREBRAL	39125	0	0	39125	0	



SCIENCES & TECHNOLOGY, THIRUVANANTHAPURAM

Amount Rs.

UTILIZATION							NET BALANCE
CAPITAL EXP	ENDITURE		REVENUE E	XPENDITURE			
OTHERS	TOTAL	SALARIES/ WAGES	RENT/ CONSUM ABLES	OTHER ADMN EXP	TOTAL		
0	0	UTILIZ 0	ZATION 0	2333598	2333598	2333598	10177519
0	0	0	0	8930	8930	8930	397433
0	0	0	0	0	0	0	686120
0	0	0	0	0	0	0	5810
0	0	0	0	183047	183047	183047	408944
0	0	0	0	0	0	0	46315
0	0	0	0	0	0	0	15801
0	0	0	0	0	0	0	104493
0	0	0	0	0	0	0	215059
0	0	0	0	0	0	0	2602047
0	0	0	0	0	0	0	91794
0	0	0	0	153911	153911	153911	0
0	0	0	0	0	0	0	11026
0	0	0	0	0	0	0	12097
0	0	0	0	0	0	0	155802
0	0	0	0	0	0	0	71123
0	0	0	0	0	0	0	49317
0	0	0	0	0	0	0	39125



5180	COMMUNITY BASED INTRVEN- CV DIS	18308	0	0	18308	0	
5184	COMP HEALTH CARE PROJECT ST	3357999	0	0	3357999	0	
5190	PREVALENCE OF TYPE II DIABATES IN RURAL	42210	0	0	42210	0	
5192	TO PROVIDE INFRASTRUCTURE TO AMCHSS	145023	0	0	145023	0	
5193	SAFE MOTHERHOOD PROGRAMME	71796	0	0	71796	0	
5201	OPEN LEBEL TRIAL IN PARKINSON	169789	0	0	169789	0	
5203	STUDY IN MRI - ISIR	26183	0	0	26183	0	
5209	MANAGEMENT - CORONARY EVENT	164611	0	0	164611	0	
5213	CREATION OF AMC FUND	21676821	0	910749	22587570	0	
5226	ISOLATION, CHARACTERIZATION OF GLIOMAS	265709	0	0	265709	0	
5227	MONOTHERAPY/ ACTIVE CONTROL	173370	0	0	173370	0	
5234	IMPROVING LOCALIZATION IN LESION NEGATIVE	-2860415	0	0	-2860415	0	
5237	KERALA DIABETES PREVENTION PROGRAM(K-DPP	26957	0	0	26957	0	
5238	IMPROVING LOCALIZATION IN LESION NEGA	4884	0	0	4884	0	
5245	IMPROVING LOCALIZATION IN LESION N	184938	0	0	184938	0	
5247	A PHASE 3, 12-WEEK, DOUBLE BLIND, PLA	1070132	0	0	1070132	0	
5248	A PHASE 3, DOUBLE BLIND, PLACEBO AND A	431799	0	0	431799	0	
5267	EVALUATION STUDY OF THE ASHA	190689	0	0	190689	0	
5275	ENCODING OF INTERHEMISPHERIC -	220865	0	0	220865	0	
5277	VASCULAR CONGNITIVE IMPAIRMENT	39340	0	0	39340	0	
5279	FAMILY LED REHABILITATION AFTER STROKE	25860	0	0	25860	0	
5284	INTERNATIONAL STUDY FOR COMPARATIVE	19308	0	0	19308	0	
5289	MITOCHONDRIAL METABOLISM	2232	0	0	2232	0	
5292	A RESTING STATE FMRI & TASK	2282	0	0	2282	0	
5294	MTP/EC SERVICES OF WOMEN	227053	0	0	227053	0	



0	0	0	0	0	0	0	18308
0	0	0	0	2047348	2047348	2047348	1310651
0	0	0	0	0	0	0	42210
0	0	0	0	0	0	0	145023
0	0	0	0	0	0	0	71796
0	0	134400	0	0	134400	134400	35389
0	0	0	0	0	0	0	26183
0	0	0	0	0	0	0	164611
0	0	0	0	42842	42842	42842	22544728
0	0	0	0	0	0	0	265709
0	0	0	0	0	0	0	173370
0	0	0	0	0	0	0	-2860415
0	0	0	0	0	0	0	26957
0	0	0	0	0	0	0	4884
0	0	0	0	0	0	0	184938
0	0	0	0	0	0	0	1070132
0	0	0	0	0	0	0	431799
0	0	0	0	0	0	0	190689
0	0	0	0	0	0	0	220865
0	0	0	0	0	0	0	39340
0	0	0	0	0	0	0	25860
0	0	0	0	0	0	0	19308
0	0	0	0	0	0	0	2232
0	0	0	0	0	0	0	2282
0	0	0	0	0	0	0	227053



5296	ELECTROENCEPHALOGRAPHY- WORKSHOP	25230	0	0	25230	0
5297	THE HUMAN BRAIN MAPPING PROJ	2962	0	0	2962	0
5300	ANALYSING FUNCTIONAL NETWORKS	603761	0	0	603761	0
5301	IN VITRO BETA AMYLOID UPTAKE	2715	0	0	2715	0
5307	A RESTING FMRI	136985	0	0	136985	0
5310	KERALA DIABETES PREVENTION	116497	0	0	116497	0
5313	EQUIPMENT FOR HEART FAILURE	563776	0	0	563776	0
5314	NON COMMUNICABLE DISEASES	90169	0	0	90169	0
5315	PROSPECTIV SINGLE ARM MUL	433622	0	0	433622	59950
5317	MERES1 TRIAL A PROSPECTIVE	64965	0	0	64965	0
5319	ENCORE	40532	0	0	40532	0
5323	CHITRA DHWANI	35500	0	0	35500	0
5325	DECIPHERING THE GENERIC	1158484	0	0	1158484	0
5326	NEURO DEVELOPMENTAL DISORDERS	3132893	0	169638	3302531	0
5327	MOVEMENT DISORDER	3621733	0	0	3621733	0
5332	HYPOXIA AND MINERALISATION	641	0	0	641	0
5336	ESTABLISHMENT OF THE INDIAN STROKE CLINICAL TRIAL NETWORK (INSTRUCT)	64348	0	0	64348	0
5337	SECONDARY PREVENTION BY STROKE	159697	0	0	159697	0
5341	SLEEP APNEA	333752	0	0	333752	0
5342	TRIVANDRUM HEART FAILURE	26431	0	0	26431	0
5343	BRAIN IRON DEPOSITION	90448	0	0	90448	0
5344	IMPROVEMENT OF SECONDARY	14014	0	0	14014	0
5345	MOBILE TELEMEDICINE PROJECT	18468722	0	0	18468722	0
5348	PROSPECTIVE STUDY OF PATIENTS	32888	0	0	32888	0
5350	ICMR-THSTI FORMS	106715	0	0	106715	0
5354	WORKSITE BASED LIFESTYLE	777521	0	0	777521	0



25230	0	0	0	0	0	0	0
2962	0	0	0	0	0	0	0
603761	0	0	0	0	0	0	0
2715	0	0	0	0	0	0	0
129316	7669	7669	7669	0	0	0	0
116497	0	0	0	0	0	0	0
563776	0	0	0	0	0	0	0
90169	0	0	0	0	0	0	0
360433	73189	13239	13239	0	0	59950	0
64965	0	0	0	0	0	0	0
40532	0	0	0	0	0	0	0
35500	0	0	0	0	0	0	0
1158484	0	0	0	0	0	0	0
2783243	519288	519288	59965	0	459323	0	0
3357601	264132	264132	0	0	264132	0	0
641	0	0	0	0	0	0	0
64348	0	0	0	0	0	0	0
159697	0	0	0	0	0	0	0
333752	0	0	0	0	0	0	0
26431	0	0	0	0	0	0	0
90448	0	0	0	0	0	0	0
14014	0	0	0	0	0	0	0
18335256	133466	133466	133466	0	0	0	0
32888	0	0	0	0	0	0	0
106715	0	0	0	0	0	0	0
609134	168387	168387	0	0	168387	0	0



5355	REGIONAL TRC FOR HEALTH ASSESSMENT	4599636	5180000	0	9779636	0	
5356	AROGYAM NETWORK (KIRAN)	14809819	0	0	14809819	0	
5357	MOLECULAR, CLINICORADIOLOGIC AND PATHOLOGICAL CHARACTERIZATION OF OLIGODENDROGLIOMAS WITH CIC AND FUBP1 MUTATIONS (EMR/2016/005832)	88265	0	0	88265	0	
5358	AN OBLIGATE ROLE FOR DISCOIDIN DOMAIN RECEPTOR 2 IN CELL CYCLE PROGRESSION AND APOPTOSIS RESISTANCE IN CARDIAC FIBROBLASTS	650735	0	0	650735	0	
5361	IMPROVING STROKE CARE IN INDIA (IMPROVISE)	2033200	0	0	2033200	0	
5365	NATIONAL ENVIRONMENTAL HEALTH PROFILE	277063	0	0	277063	0	
5368	VIRTUAL REALITY-BASED SOLUTION FOR EFFECTIVE NEUROANATOMY TEACHING	6228393	0	0	6228393	0	
5369	WORKSHOP ON BRAIN CONNECTIVITY ANALYSIS AND CONFERENCE ON BRAIN COMPUTER INTERFACE	119963	0	0	119963	0	
5370	TRANSCRIPTIONAL AND TRANSLATIONAL REGULATION OF PERIOSTIN AND ITS INTERACTION WITH DDR2 IN CARDIAC FIBROSIS	242806	0	0	242806	0	
5371	GENERAL ANESTHESIA VS SEDATION-COGNITIVE DECLINE IN ELDERLY – A RANDOMIZED CONTROLLED TRIAL IN PATIENTS WITH CHRONIC SUBDURAL HEMATOMA (GASCOE)	527522	0	0	527522	0	
5373	ARCHITECTURE OF PARKINSON'S	1022012	0	0	1022012	0	
5374	RISK ANALYSIS OF DEMENTIA	0	1503013	0	1503013	0	
5375	CARE IN HEART FAILURE	3048149	0	0	3048149	0	
5376	CARE IN HEART FAILURE	1657172	0	0	1657172	0	
5377	CARE IN HEART FAILURE	2855279	0	0	2855279	0	



5205197	4574439	4574439	1360930	0	3213509	0	0
14809819	0	0	0	0	0	0	0
64519	23746	23746	23746	0	0	0	0
650735	0	0	0	0	0	0	0
2033200	0	0	0	0	0	0	0
261879	15184	15184	15184	0	0	0	0
0	6228393	6228393	6228393	0	0	0	0
97363	22600	22600	22600	0	0	0	0
206846	35960	35960	0	0	35960	0	0
527522	0	0	0	0	0	0	0
825412	196600	196600	0	85000	111600	0	0
0	1503013	1503013	1503013	0	0	0	0
911026	2137123	2137123	102543	0	2034580	0	0
528699	1128473	1128473	51940	577333	499200	0	0
2596018	259261	259261	89975	169286	0	0	0



5378	CARE IN HEART FAILURE	887604	0	0	887604	0
5379	CARE IN HEART FAILURE	1926494	0	0	1926494	0
5380	CARE IN HEART FAILURE	891257	0	0	891257	0
5381	CARE IN HEART FAILURE0	2501055	0	0	2501055	0
5384	MAHATARI JATAN YOJANA	400000	0	0	400000	0
5386	COMPREHENSIVE AND NOVEL MODEL	1000932	0	0	1000932	0
5389	PEDIATRIC EPILEPSY SYNDROME	0	219806	0	219806	0
5390	HUMAN GUT MICROBIOME	45829	0	0	45829	0
5392	DNA METHYLATION IN INSULIN	0	1350000	0	1350000	0
5393	LIFESTYLE INTERVENTION	6507120	0	0	6507120	0
5395	ROLE OF CONNEXINS	64929	0	0	64929	0
5397	SYNUCLEINOPATHY PATHOLOGY	508354	0	0	508354	0
5399	STROKE CARE REGISTRY	114097	385903	4646	504646	0
5400	VISUAL OUTCOME RECURRENCE	56019	0	0	56019	0
5401	PREVENTION IN STROKE	55781	0	0	55781	0
5402	CRANIOVERTEBRAL ANOMALIES	388500	0	0	388500	0
5403	VIRTUAL AIRWAY ASSESSMENT	5001	0	0	5001	0
5404	EMOTIONAL FACE RECOGNITION	19172	0	0	19172	0
5405	DNA METHYLATION PROFILING	1247801	0	0	1247801	0
5407	LUNG ULTRASOUND WORKFLOW	40100	0	0	40100	0
5408	DRUGS CONTROL	176215	0	0	176215	0
5410	CEREBROSPINAL FLUID	29123	0	0	29123	0
5411	SYSTEM THINKING APPROACH	6463883	0	0	6463883	0
5412	CARDIAC CHANNELOPATHIES	516969	1850166	0	2367135	0
5413	CHRONIC INSOMNIA	252978	0	0	252978	0
5414	AVAILABILITY, DISTRIBUTION AND	489359	0	0	489359	0
5415	ARTERIAL STROKE IMAGING	0	0	0	0	0



862116	25488	25488	25488	0	0	0	0
1926494	0	0	0	0	0	0	0
891257	0	0	0	0	0	0	0
1066818	1434237	1434237	5966	0	1428271	0	0
400000	0	0	0	0	0	0	0
1000932	0	0	0	0	0	0	0
27114	192692	192692	23563	0	169129	0	0
45829	0	0	0	0	0	0	0
77322	1272678	1272678	119260	854708	298710	0	0
6017620	489500	489500	0	0	489500	0	0
64929	0	0	0	0	0	0	0
495154	13200	13200	13200	0	0	0	0
62621	442025	442025	39993	0	402032	0	0
56019	0	0	0	0	0	0	0
55781	0	0	0	0	0	0	0
388500	0	0	0	0	0	0	0
5001	0	0	0	0	0	0	0
0	19172	19172	0	0	19172	0	0
1247801	0	0	0	0	0	0	0
40100	0	0	0	0	0	0	0
176215	0	0	0	0	0	0	0
1	29122	29122	29122	0	0	0	0
2115715	4348168	4348168	0	0	4348168	0	0
1271992	1095143	1095143	39154	111249	944740	0	0
0	252978	252978	10821	60060	182097	0	0
489359	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0



5416	IMPROVIS-ATION (IMPROVING ST	372981	0	0	372981	0
5417	REGULATION OF PROGENITOR CE	931701	0	0	931701	0
5419	HPSR FELLOWSHIP INDIA	60000	0	0	60000	0
5420	TTK CHITRA	6659707	0	0	6659707	0
5421	OUTCOME DETERMINANTS OF TOF	757613	0	0	757613	0
5422	ATRIAL CARDIOPATHY	0	0	8490	8490	0
5423	CHARACTERIZATION OF UBIQUITIN	396600	0	0	396600	0
5424	HPC TOOLS	293295	0	0	293295	0
5425	HEART DISEASE REGISTRY	32612	0	0	32612	0
5426	EDOXABAN FOR	215685	264352	0	480037	0
5427	PROGNOSTIC VALUE OF CIRCULATING MICRORNAS IN HEART FAILURE	1131252	0	40978	1172230	0
5428	EXCOA-CVT	7164	0	0	7164	0
5429	TREATMENT OF IMPAIRMENT	1039513	0	0	1039513	0
5430	JUGULAR VENUS SATURATION	577766	0	0	577766	0
5431	NLRP3 ACTIVATION	501713	0	0	501713	0
5432	CLINICAL TRIAL (STROKE)	566173	0	0	566173	0
5433	MANAGEMENT OF HEART FAILURE	1828112	8762182	0	10590294	0
5434	SPIRAL DX: TREMOR DIAGNOSIS	0	0	0	0	0
5435	MULTIPLE SCLEROSIS	1180984	919033	0	2100017	0
5436	FLUID DYNAMICS BASED TOOLS	1066256	0	0	1066256	337496
5437	NON INVASIVE MEASUREMENT	87817	116000	0	203817	0
5438	AZADI KA AMRIT	48101	0	0	48101	0
5439	MOVEMENT DISORDERS (MDSI)	1462885	0	0	1462885	0
5440	RANDOMIZED- PLACEBO CONTROLLED	49470	1726921	0	1776391	26800
5441	SCALEUP OF AN ADAPTED KERALA	8419245	0	0	8419245	0
5442	A PROSPECTIVE, MULTICENTRIC	13483	0	0	13483	0



0	0	0	104022	0	104022	104022	268959
0	0	0	815782	20619	836401	836401	95300
0	0	0	0	0	0	0	60000
0	0	0	0	442167	442167	442167	6217540
0	0	147000	298990	310623	756613	756613	1000
0	0	8490	0	0	8490	8490	0
0	0	20880	361478	14242	396600	396600	0
0	0	0	0	293295	293295	293295	0
0	0	0	0	0	0	0	32612
0	0	0	0	130990	130990	130990	349047
0	0	499140	576024	0	1075164	1075164	97066
0	0	0	0	0	0	0	7164
0	0	193833	89780	534275	817888	817888	221625
0	0	0	0	0	0	0	577766
0	0	0	414014	47907	461921	461921	39792
0	0	0	0	0	0	0	566173
0	0	2839514	0	6751422	9590936	9590936	999358
0	0	0	0	0	0	0	0
0	0	690267	0	1052305	1742572	1742572	357445
0	337496	132627	0	596133	728760	1066256	0
0	0	116000	0	0	116000	116000	87817
0	0	0	0	0	0	0	48101
0	0	120000	0	1140	121140	121140	1341745
0	26800	927360	0	25175	952535	979335	797056
0	0	1062581	0	792134	1854715	1854715	6564530
0	0	0	0	3042	3042	3042	10441



5443	RETROSPECTIVE STUDY OF THE	12194	0	0	12194	0	
5444	STROKE-SMART PHONE APPLICATION	669571	0	0	669571	392350	
5445	REGISTRY ISCHEMIC STROKE	508499	0	0	508499	0	
5446	MITOCHONDRIAL FUNCTION	1273046	1000000	0	2273046	43483	
5447	A V S IYER FUND	10056312	5350000	231558	15637870	0	
5448	DONOR CHARACTERISTICS	482098	400000	0	882098	0	
5449	STROKE CLINICAL TRIAL NETWORK	3845743	2610434	0	6456177	0	
5450	TRANSFORMING COVID-19 DATA	1060596	247642	0	1308238	0	
5452	PEDIATRIC COHORT STUDY	63840	0	0	63840	0	
5453	NO PAIN TRIAL	0	490351	0	490351	0	
5454	ICMR RA FELLOWSHIP	186013	733697	0	919710	0	
5456	RENAL DISEASE	556273	0	0	556273	0	
5457	COST-EFFECTIVENESS OF	115142	0	0	115142	0	
5458	CLINICAL AND ECHOCARDIOGRAPHIC	14516	142415	0	156931	0	
5459	NEURODEVELOPMENTAL PHENOTYPES	1015903	0	0	1015903	0	
5460	RANOLAZINE FOR HEART FAILURE	395951	675359	0	1071310	0	
5461	MENTAL HEALTH CARE	1442508	0	0	1442508	0	
5462	EMOTION PROCESSING	573420	671853	0	1245273	0	
5463	MARKERS -CEREBRAL OXYGENATI ON	24900	0	0	24900	0	
5464	GLUCOCEREBROSIDASE	1031057	0	0	1031057	0	
5465	S100 PROTEINS	1734110	1525915	0	3260025	0	
5466	INFRA.SPECTROSCOPY	290862	951624	0	1242486	0	
5467	FUNCTIONAL MRI	1177629	0	0	1177629	0	
5468	NOVEL GENE YANALTS IN MOYAMOYA	1543909	1740678	0	3284587	0	
5469	HEART FAILURE	130906	361720	0	492626	14984	
5470	COGNITIVE RETRAINING	463549	795910	0	1259459	0	
5472	EXOSOMES/EXOSOMAL MIRS	0	2837253	0	2837253	0	



0	0	0	0	0	0	0	12194
0	392350	0	0	0	0	392350	277221
0	0	0	0	508499	508499	508499	0
0	43483	359600	437577	5431	802608	846091	1426955
0	0	0	0	0	0	0	15637870
0	0	377000	196289	185756	759045	759045	123053
0	0	1760481	1198824	687926	3647231	3647231	2808946
0	0	0	0	40663	40663	40663	1267575
0	0	0	0	0	0	0	63840
0	0	327260	0	163091	490351	490351	0
0	0	571923	0	4570	576493	576493	343217
0	0	224389	0	3578	227967	227967	328306
0	0	0	0	0	0	0	115142
0	0	0	0	0	0	0	156931
0	0	394455	621448	0	1015903	1015903	0
0	0	495600	15960	2187	513747	513747	557563
0	0	0	0	98784	98784	98784	1343724
0	0	690584	0	21559	712143	712143	533130
0	0	0	0	0	0	0	24900
0	0	310358	315671	58373	684402	684402	346655
0	0	706749	908436	96336	1711521	1711521	1548504
0	0	826285	0	152358	978643	978643	263843
0	0	842520	169729	85877	1098126	1098126	79503
0	0	310000	1199600	81559	1591159	1591159	1693428
0	14984	205000	0	34200	239200	254184	238442
0	0	472440	189600	11065	673105	673105	586354
0	0	1550936	0	1286317	2837253	2837253	0



5473	COGNITIVE CONSEQUENCES	3098654	4430461	0	7529115	0
5474	HEMOSTATIC MATERIAL	0	1436124	0	1436124	99294
5475	TUBERCULOSIS ELIMINATION	1198342	0	0	1198342	0
5476	BEHAVIORAL INTERVENTION	4575	0	0	4575	0
5478	ANTI-DROWNING GADGET	2038048	1030106	0	3068154	320550
5479	EP DEVICE REGISTRY	534128	1952292	0	2486420	0
5480	BIPOLAR RF ABLATOR MODEL	0	293000	0	293000	0
5481	COMPREHENSIVE MONITORING OF	131701	0	0	131701	0
5482	UNDERSTANDING HEART FAILURE	1034707	961881	0	1996588	0
5483	TIME MOTION STUDY	97790	0	0	97790	0
5484	EARLY LIFE NUTRITION	3330035	0	0	3330035	4929
5485	ANTIMICROBIAL RESISTANCE	226800	0	0	226800	0
5486	AIR PURIFIERS	556000	0	0	556000	0
5487	MEDICAL IMAGING DATASETS	1074104	0	0	1074104	147975
5488	PROLOTHERAPY SERVICES	0	840000	0	840000	0
5489	A MULTICENTER, INTERNATIONAL	0	814653	0	814653	0
5491	ANESTHESIA DEPTH MONITORING	0	1520560	0	1520560	0
5493	BLOCKADE OF THE CXCL-2- CXCR-2	0	43442	0	43442	0
5495	NEURONAL INFLAMMATION	0	1124800	0	1124800	0
5496	STROKE IN CHILDREN &ADULTS	0	1870800	0	1870800	0
5498	HISTOMOLECULAR SUBTYPES	0	1681540	0	1681540	0
5499	TEMPORAL LOBE EPILEPSY	0	1867040	0	1867040	0
5500	PULMONARY HYPERTENSION	0	677328	0	677328	0
5502	SLEEP APNEA PREDICTION	0	2769718	0	2769718	0
5504	ROLE OF DNA METHYLATION	0	3727598	0	3727598	0
5505	IMPROVE CAUSE OF DEATH	0	871404	0	871404	0
6077	TECHNICAL ADVISORY COMMITTEE	0	333420	0	333420	0
6117	UNDERSTANDING DISEASE CLUST	0	381699	0	381699	0



0	0	150820	0	3759463	3910283	3910283	3618832
0	99294	311129	0	1025701	1336830	1436124	0
0	0	548110	0	194976	743086	743086	455256
0	0	0	0	4575	4575	4575	0
0	320550	1257900	103739	95707	1457346	1777896	1290258
0	0	216000	0	195597	411597	411597	2074823
0	0	0	0	23397	23397	23397	269603
0	0	0	0	131701	131701	131701	0
0	0	741871	95200	489046	1326117	1326117	670471
0	0	0	0	0	0	0	97790
0	4929	730736	1756924	113010	2600670	2605599	724436
0	0	0	0	0	0	0	226800
0	0	220000	0	0	220000	220000	336000
0	147975	199341	1800	33773	234914	382889	691215
0	0	572536	0	0	572536	572536	267464
0	0	246774	0	281004	527778	527778	286875
0	0	0	0	35474	35474	35474	1485086
0	0	0	0	0	0	0	43442
0	0	23600	0	76667	100267	100267	1024533
0	0	0	0	93645	93645	93645	1777155
0	0	0	0	123300	123300	123300	1558240
0	0	443497	0	72240	515737	515737	1351303
0	0	0	0	19728	19728	19728	657600
0	0	0	0	29118	29118	29118	2740600
0	0	0	0	96714	96714	96714	3630884
0	0	0	0	0	0	0	871404
0	0	333420	0	0	333420	333420	0
0	0	208144	0	173555	381699	381699	0



6118	AUTOMATED VERBAL AUTOPSY	0	3475797	0	3475797	34474
6124	LEARNING ACTION CYCLES	0	140980	0	140980	0
6125	CORTISOL LEVEL	0	55008	0	55008	0
6127	MOTOR UNIT NUMBER INDEX	0	61970	0	61970	0
6128	RHESUS BLOOD GROUP	0	17410	0	17410	0
6129	CORTICOTROPH ADENOMAS	0	185367	0	185367	0
6130	GLYCEMIC STATUS ON MOTOR	0	29620	0	29620	0
6131	LEFT VENTRICULAR VOLUMES	0	161000	0	161000	0
6132	SEVOFLURANE ANAESTHESIA	0	18450	0	18450	0
6133	SUB ARACHNOID HAEMORRHAGE	0	3020	0	3020	0
6134	COMPARISON OF SAGITTAL	0	4000	0	4000	0
6135	SYNTHETIC MRI AS A TOOL	0	59700	0	59700	0
7101	ADVANCE TO P I	0	0	0	0	0
		205834548	75832064	1366059	283032672	1482285
1014	OTHER PROJECTS	C1 407C4		000500074	000710405	
1014	NEW PENSION SCHEME	6149764		232563671	238713435	
1301	EMPLOYEES PENSION FUND	370133271		422995811	793129083	
1075	PATIENT WELFARE FUND	16893810		1211540	18105350	
1078	DR. RICHARD A CASH & DR K MOHANDS AWARD	542716		0	542716	
1080	STAFF BENEVOLENT FUND	12787083		3686376	16473459	
1099	CSR GRANT - REVENUE	11369525		2801900	14171425	
	TOTAL (B)	417876169	0	663259298	1081135468	0
	BMT PROJECTS					
5000	PROJECT SUSPENSE	3323152	507200	74932320	78762671	0
5057	DYNAMIC ORTHOPAEDIC PVT LTD, HYDROXY	6788	0	0	6788	0
5089	DETEC & TREAT OF CANCER BY LASER	3959	0	0	3959	0
7000	MISCELLENEOUS PROJECT	30944	0	0	30944	0
7001	PRO;SAHAJANAND VASCU;DR. AURTHUR	78109	0	0	78109	0
7002	Dr.TOMS LABORATORY, Dr. K.KRISHNAN	13876	0	0	13876	0
7003	PROJ:D.S.T. DR.P.V. MOHANAN	2537	0	0	2537	0
7004	PROJ:ATMRF:DR LISSY					
7004		551	0	0	551	0
7004	KRISHNAN PROJECT:DYNAMIC ORTHOPAEDICS	551 13656	0	0	13656	0



0	34474	1776103	549780	1115440	3441323	3475797	0
0	0	0	140980	0	140980	140980	0
0	0	0	55008	0	55008	55008	0
0	0	0	61970	0	61970	61970	0
0	0	0	17410	0	17410	17410	0
0	0	0	185367	0	185367	185367	0
0	0	0	29620	0	29620	29620	0
0	0	0	161000	0	161000	161000	0
0	0	0	18450	0	18450	18450	0
0	0	0	3020	0	3020	3020	0
0	0	0	4000	0	4000	4000	0
0	0	0	59700	0	59700	59700	0
0	0	0	0	0	0	0	0
0	1482285	40366163	13014828	37416335	90797326	92279611	190753061
				233426705 405527215 156147	233426705 405527215 156147	233426705 405527215 156147	5286730 387601868 17949203
				405527215	405527215	405527215	387601868
0	0	0	0	405527215 156147	405527215 156147	405527215 156147	387601868 17949203
o	o 0	o 487200	0 72597423	405527215 156147 15000 2181740 1779006	405527215 156147 15000 2181740 1779006	405527215 156147 15000 2181740 1779006	387601868 17949203 527716 14291719 12392419
				405527215 156147 15000 2181740 1779006 643085813	405527215 156147 15000 2181740 1779006 643085813	405527215 156147 15000 2181740 1779006 643085813	387601868 17949203 527716 14291719 12392419 438049655
0	0	487200	72597423	405527215 156147 15000 2181740 1779006 643085813	405527215 156147 15000 2181740 1779006 643085813 73084623	405527215 156147 15000 2181740 1779006 643085813 73084623	387601868 17949203 527716 14291719 12392419 438049655 5678049
0	0	487200 0	72597423 0	405527215 156147 15000 2181740 1779006 643085813 0	405527215 156147 15000 2181740 1779006 643085813 73084623	405527215 156147 15000 2181740 1779006 643085813 73084623	387601868 17949203 527716 14291719 12392419 438049655 5678049 6788
0 0 0	0 0 0	487200 0	72597423 0 0	405527215 156147 15000 2181740 1779006 643085813 0 0	405527215 156147 15000 2181740 1779006 643085813 73084623 0	405527215 156147 15000 2181740 1779006 643085813 73084623 0	387601868 17949203 527716 14291719 12392419 438049655 5678049 6788 3959
0 0 0 0	0 0 0	487200 0 0	72597423 0 0	405527215 156147 15000 2181740 1779006 643085813 0 0	405527215 156147 15000 2181740 1779006 643085813 73084623 0	405527215 156147 15000 2181740 1779006 643085813 73084623 0	387601868 17949203 527716 14291719 12392419 438049655 5678049 6788 3959 30944
0 0 0 0	0 0 0 0	487200 0 0 0	72597423 0 0 0 0	405527215 156147 15000 2181740 1779006 643085813 0 0	405527215 156147 15000 2181740 1779006 643085813 73084623 0	405527215 156147 15000 2181740 1779006 643085813 73084623 0	387601868 17949203 527716 14291719 12392419 438049655 5678049 6788 3959 30944 78109
0 0 0 0 0	0 0 0 0 0	487200 0 0 0 0 0	72597423 0 0 0 0 0	405527215 156147 15000 2181740 1779006 643085813 0 0 0	405527215 156147 15000 2181740 1779006 643085813 73084623 0 0	405527215 156147 15000 2181740 1779006 643085813 73084623 0 0 0	387601868 17949203 527716 14291719 12392419 438049655 5678049 6788 3959 30944 78109



				-		
7006	PROJ: D.S.T. D.S.NAGESH	181074	0	0	181074	0
7009	CHITOSAN BASED WAINED DRESSING	4762	0	0	4762	0
7011	DST-FAB: CLINICALLY/ SIG:SHAPE OF HEVA	213826	0	0	213826	0
7014	AUROLAB,ARAVIND EYE HOSPITAL	13674	0	0	13674	0
7015	TTK.HEALTHCARE. DEVELOPMENT OF VALV	39424	0	0	39424	0
7016	INDO-GERMAN COMMITTEE MEETING-DST	5407	0	0	5407	0
7017	HINDUSTAN LATEX. EVALU:BLOOD BAG	39263	0	0	39263	0
7018	ALL INDIA COUNCIL FOR TECHNI:EDU:SH	1288313	0	0	1288313	0
7019	DST.NIRANJAN	69847	0	0	69847	0
7020	IFCPAR-DR.JAYAKRISHNAN	188	0	0	188	0
7022	DST-LBFDPSBC-DR.SHARMA	79385	0	0	79385	0
7023	DEV: HYDRO-CEPHALUS- HINDUSTAN LATEX	45510	0	0	45510	0
7026	DEV.HEART VALVE-DST. MURALEE	2522	0	0	2522	0
7029	DONERG/LIFE SCIENCE BOARD	6876	0	0	6876	0
7031	DBT/DR P V MOHAN/DEV INVITROPYRO	79064	0	0	79064	0
7032	DST. DR. ANNINE/BONE REGENERATION	29166	0	0	29166	0
7033	BIOFUNCTIONAL EVALUATION DR. UMASANKER	72581	0	0	72581	0
7034	DST. DR. NIRMALA RACHEL	14664	0	0	14664	0
7035	DST-H.K.VARMA	95433	0	0	95433	0
7037	INVIVO EVALUATION/ STED/DR. LISSY	6205	0	0	6205	0
7039	JNC/ASR/DR. MOHANAN/ STUDY OF ACCUTE	44684	0	0	44684	0
7040	BIOMED/ C.V. MURALEEDHARAN	44000	0	0	44000	0
7041	CSIR-GRANT-ASHA S MATHEW,PHD STUDENT	55973	0	0	55973	0
7042	CSIR-GRANT-BERNADETTE K. MADATHIL,PHD	25870	0	0	25870	0
7043	CSIR-GRANT-SAILAJA.G.S.SRF	9067	0	0	9067	0
7044	LISI NO TRIAL TRIAL MERIND	21673	0	0	21673	0
7045	NIRMALA RACHEL, CSIR	14063	0	0	14063	0
7047	U.G.C. GRANT- RESEARCH FELLOW	300935	0	0	300935	0
7048	CSIR GRANT- JOSENA JOSEPH	47473	0	0	47473	0
7049	CSIR GRANT - MARY VARGHESE	35837	0	0	35837	0



0	0	0	0	0	0	0	101074
0	0	0	0	0	0	0	181074
0	0	0	0	0	0	0	4762
0	0	0	0	0	0	0	213826
0	0	0	0	0	0	0	13674
0	0	0	0	0	0	0	39424
0	0	0	0	0	0	0	5407
0	0	0	0	15222	15222	15222	24041
0	0	0	0	34744	34744	34744	1253569
0	0	0	0	0	0	0	69847
0 0	0	0	0	0 0	0	0	188 79385
0	0	0	0	0	0	0	45510
0	0	0	0	2522	2522	2522	0
0	0	0	0	0	0	0	6876
0	0	0	0	79064	79064	79064	0
0	0	0	0	0	0	0	29166
0	0	0	0	0	0	0	72581
0	0	0	0	0	0	0	14664
0	0	0	0	0	0	0	95433
0	0	0	0	0	0	0	6205
0	0	0	0	0	0	0	44684
0	0	0	0	0	0	0	44000
0	0	0	0	0	0	0	55973
0	0	0	0	0	0	0	25870
0	0	0	0	0	0	0	9067
0 0	0	0	0	0	0	0	21673 14063
					0		
0	0	0	0	0	0	0	300935
0	0	0	0	0	0	0	47473
0	0	0	0	0	0	0	35837



INTEDECT DDO IECT ACCOUNT	0112006	0	7006414	17010200	0
					0
NAIR	12062	0	0	12062	0
DR.SREENIVASAN/DEVEL.OF TEMP.RES.CO-OPLY	22619	0	0	22619	0
DST-DR.ANOOP-DIFF:EXPR:RAT BRAIN	44434	0	0	44434	0
CSIR-NMITLI SCHEME- C.V.MURALEEDHARAN	756552	0	0	756552	0
DST - PROJECT.DR.JAYABALAN	14471	0	0	14471	0
MUTHALEE	124392	0	0	124392	0
"STENT"INVITRO	101675	0	0	101675	0
					0
	153302	0	0	153302	0
NANDKUMAR	375	0	0	375	0
C.V.MURALIDHARAN	76292	0	0	76292	0
DR.MOHAN	289303	0	0	289303	0
SCI	11935	0	0	11935	0
DR.UMASHANKAR	399773	0	0	399773	0
ENGINEERING HYBRID	10518	0	0	10518	0
	88349	0	0	88349	0
	878	0	0	878	0
ARROW HAEMO DIALYSIS	30882	0	0	30882	0
DR.R.V.THAMPAN - CSIR	26381	0	0	26381	0
CSIR - KALADHAR - BST	39103	0	0	39103	0
					0
	50562	0	0	50562	0
VIOLA.B.MORRIS	22072	0	0	22072	0
AGEING	140584	0	0	140584	0
					0
					0
					0
					0
NAMBOODIRI	26821	0	0	26821	0
FELLOWS	34082	0	0	34082	0
	DR.SREENIVASAN/DEVEL.OF TEMP.RES.CO-OPLY DST-DR.ANOOP-DIFF:EXPR:RAT BRAIN CSIR-NMITLI SCHEME- C.V.MURALEEDHARAN DST - PROJECT.DR.JAYABALAN ICMR PROJECT/ SUDHAKAR MUTHALEE DR. LIZY-SAHAJA:EVA "STENT"INVITRO DR.T.V.KUMARI,DBT.BIOGENE VSSC - PROJECT. D.S. NAGESH STEC-PROJECT: DR.MAYA NANDKUMAR SAHAJANAND MED.TECH. C.V.MURALIDHARAN STUDY PROJECT: CLRI- DR.MOHAN STUDY PROJECT - BIOSYNC SCI ARROW INTERNATIONAL: DR.UMASHANKAR DBT-DR.MAYA- TISSUE ENGINEERING HYBRID USV LTD. MUMBAI - DR.MOHAN INDO-US JOINT PROJECT ARROW HAEMO DIALYSIS DR.R.V.THAMPAN - CSIR CSIR - KALADHAR - BST PROJ/7092/SEA FOOD PROJ/7093/CSIR GRANT-LPA PROJ/7095/CSIR GRANT-VIOLA.B.MORRIS PROJ/7099/BCL PROJ/7099/BCL PROJ/7100/ITR PROGRAMME PROJ/7103/CSIR/VIDYARAJ PROJ/7105/CSIR/NEENA & 2	CSIR GRANT - MANITHA B NAIR DR.SREENIVASAN/DEVEL.OF TEMPRES.CO-OPLY DST-DR.ANOOP-DIFF:EXPR:RAT BRAIN CSIR-NMITLI SCHEME- C.V.MURALEEDHARAN DST - PROJECT.DR.JAYABALAN ICMR PROJECT/ SUDHAKAR MUTHALEE DR. LIZY-SAHAJA:EVA "STENT"INVITRO DR.T.V.KUMARI,DBT.BIOGENE VSSC - PROJECT. DS. NAGESH STEC-PROJECT: DR.MAYA NANDKUMAR SAHAJANAND MED.TECH. C.V.MURALIDHARAN STUDY PROJECT: CLRI- DR.MOHAN STUDY PROJECT - BIOSYNC SCI ARROW INTERNATIONAL: DR.UMASHANKAR DBT-DR.MAYA- TISSUE ENGINEERING HYBRID USV LTD. MUMBAI - DR.MOHAN INDO-US JOINT PROJECT ARROW HAEMO DIALYSIS DR.R.V.THAMPAN - CSIR CSIR - KALADHAR - BST PROJ/7092/SEA FOOD 1993 PROJ/7093/CSIR GRANT- VIOLA.B.MORRIS PROJ/7099/BCL PROJ/7100/ITR PROGRAMME PROJ/7100/ITR PROGRAMME PROJ/7100/ITR PROGRAMME PROJ/7100/ITR PROGRAMME PROJ/7101/CSIR/SONIA.T.A 2650 PROJ/7107/CSIR/NEENA & 2 34082	CSIR GRANT - MANITHA B	CSIR GRANT - MANITHA B NAIR NAI	CSIR GRANT - MANITHA B NAIR NAIR NAIR DR. SREENIVASAN/DEVEL.OF TEMPRES. CO-OPLY DST-DR.ANOOP-DIFF-EXPR:RAT BRAIN



0	0	0	0	658504	658504	658504	16351796
0	0	0	0	0	0	0	12062
0	0	0	0	22619	22619	22619	0
0	0	0	0	0	0	0	44434
0	0	0	0	756552	756552	756552	0
0	0	0	0	0	0	0	14471
0	0	0	0	0	0	0	124392
0	0	0	0	0	0	0	101675
0	0	0	0	0	0	0	38659 153302
0	0	0	0	0	0	0	375
0	0	0	0	0	0	0	76292
0	0	0	0	0	0	0	289303
0	0	0	0	0	0	0	11935
0	0	0	0	0	0	0	399773
0	0	0	0	10518	10518	10518	0
0	0	0	0	0	0	0	88349
0	0	0	0	0	0	0	878
0	0	0	0	0	0	0	30882
0	0	0	0	0	0	0	26381
0	0	0	0	0	0	0	39103
0	0	0	0	0	0	0	1993 50562
0	0	0	0	0	0	0	22072
0	0	0	0	0	0	0	140584
0	0	0	0	0	0	0	7011
0	0	0	0	0	0	0	4079
0	0	0	0	0	0	0	2650
0	0		0	0	0	0	5682
0	0	0	0	0	0	0	26821
0	0	0	0	0	0	0	34082



	DD0 1/7400/00ID/					
7108	PROJ/7108/CSIR/ FRANCIS.B.FERNANDEZ	2154	0	0	2154	0
7110	PROJ/7110/CSIR/DEEPA.R	10919	0	0	10919	0
7111	PROJ/7111/CSIR/SHEEJA LIZA EASO	6353	0	0	6353	0
7200	JOINT PROGRAME/M.TECH	464180	0	0	464180	0
7210	PROJ/7210/CSIR/SOMA DEY	1641	0	0	1641	0
7220	COST OF ANIMAL FEED	1200000	1269680	0	2469680	205833
7230	PROJ/7230/CSIR/MANJU.S	12421	0	0	12421	0
7250	PROJ/7250/CSIR/KIRAN.S.NAIR	15281	0	0	15281	0
7260	PROJ/7260/ST0X083Y09/ DR.P.V.MOHANAN	149985	0	0	149985	0
7290	PROJ/7290/CSIR/RAKHI.A	19584	0	0	19584	0
7330	Y.M.THASNEEM - UGC GRANT	7195	0	0	7195	0
7370	VALIDATION OF ETO STERILSATION SYSTEM-	108169	0	12899	121068	56050
7375	ICMR PROJECT- Ms. Renu Ramesh	32250	0	0	32250	0
7385	CSIR GRANT - CAROLINE DIANA SHERLY	1322	0	0	1322	0
7390	TOXICITY STUDY OF MATIRIALS Dr. P V Mohanan	5158846	0	0	5158846	0
7395	RAISNG ANTIBODIES IN RABITS - DR V S HARIKRISH	817080	0	0	817080	64476
7400	CSIR GRANT :SHAIJU S NAZEER	3333	0	0	3333	0
7402	PROOF OF CONCEPT STUDY - DR UMA SHANKAR	100747	0	0	100747	0
7403	ICMR GRANT - PARVATHY R S	22455	0	0	22455	0
7404	BIOFUNCTIONAL AND HISTILO - DR UMA SHANKAR	440441	0	0	440441	24780
7405	IN VITRO EVALUATION OF CELL- DR T V KUMAR	188124	0	91360	279484	0
7406	CSIR GRANT - R ARATHI	6135	0	0	6135	0
7407	TRSF MESENCHYMAL STEM CELL	1686	0	0	1686	0
7409	SRUTHI PHD STUDENT UGC	9292	0	0	9292	0
7411	DEV POLY ADHESIVE & POTT	206140	0		206140	0
7412	REMYA K CSIR FELLOW	19900	0		19900	0
7413	"PROJ/7413/ANTIMICROBIAL ACTIVITY"	89586	0	0	89586	0
7414	"PROJ/7414/EFFECT OF NANOGRAPHENE MOUSE"	34620	0	0	34620	0
7415	"PROJ/7415/AXONAL GUIDANCE"	18450	0	0	18450	0
7416	"PROJ/7416/PULMONARY FIBROSIS"	40338	0	0	40338	0
7417	"PROJ/7417/INVITRO & INVIVO EVALUATION"	352864	0	0	352864	0
7419	PROJ/7419/DETERMINATION OF TOXICITY	52516	0	0	52516	0



0	0	0	0	0	0	0	2154
0	0	0	0	0	0	0	10919
0	0	0	0	0	0	0	6353
0	0	0	0	0	0	0	464180
0	0 205833	0 296774	949343	0	0 1246117	0 1451950	1641 1017730
0	0	0	0	0	0	0	12421
0	0	0	0	0	0	0	15281
0	0	0		0	0	0	149985
0	0	0	0	0	0	0	19584 7195
0	56050	0		65018	65018	121068	0
0	0	0	0	0	0	0	32250
0	0	0	0	0	0	0	1322
0	0	0	406386	0	406386	406386	4752460
0	64476	183280	27911	0	211191	275667	541413
0	0	0	0	0	0	0	3333
0	0	0	0	0	0	0	100747
0	0	0	0	0	0	0	22455
0	24780	0	125464	0	125464	150244	290197
0	0	0	78412	0	78412	78412	201072
0	0	0	0	0	0	0	6135
0	0	0	0	0	0	0	1686
0	0	0		0	0	0	9292
0	0	0	0	0	0	0	206140 19900
0	0	0		0	0	0	89586
0	0	0	0	0	0	0	34620
0	0	0	0	0	0	0	18450
0	0	0	0	0	0	0	40338
0	0	0	0	0	0	0	352864
0	0	0	0	0	0	0	52516



	PP 0 1/7 400 /					
7422	PROJ/7422/ HISTOPATHOLOGICAL EVALUATION	2712236	0	110000	2822236	329711
7423	PROJ/7423/TRACKING CARDIAC STEM	63872	0	0	63872	0
7424	PROJ/7424/SYNAPTIC PROTEOME	1357	0	0	1357	0
7425	PROJ/7425/BIOENGINEERED SKIN AFT FOR	691	0	0	691	0
7426	PROJ/7426/POLYMERIC MICRO NEEDLES	347825	0	0	347825	0
7427	PROJ/7427/ANIONIC POLYSAECHARIDE BASED .	151	0	0	151	0
7428	PROJ/7428/BACTERIAL RESISTANCE	1638	0	0	1638	0
7429	PROJ/7429/BIORESORBABLE POLYMER MESH	101326	0	0	101326	0
7430	PROJ/7430/TEST OF CRANIAL FIXATION	201070	0	0	201070	0
7431	PROJ/7431/SHELL NACRE	150382	0	0	150382	0
7432	PROJ/7432/CSIR CONTIGENCY GRANT	10807	0	0	10807	0
7433	PROJ/7433/CSIR CONTIGENCY GRANT	8054	0	0	8054	0
7434	PROJ/7434/CSIR CONTIGENCY GRANT	9150	0	0	9150	0
7435	PROJ/7435/CSIR CONTIGENCY GRANT	7119	0	0	7119	0
7436	PROJ/7436/CSIR CONTIGENCY GRANT	8485	0	0	8485	0
7438	PROJ/7438/SCTAC2010 DRUG FORMULATION	129674	0	0	129674	0
7440	CSIR CONT.GRNAT/MANJULA P M	18356	0	0	18356	0
7441	PROJ/7441/ THERMORESPONSIVE POLYMERIC	528822	0	78960	607782	173413
7442	PROJ/7442/RAPID PROTOTYPING FACILITY	25035	0	0	25035	0
7443	PROJ/7443/MATRIX GEL(CHOLEGEL)	212622	0	0	212622	0
7444	PROJ/7444/DIABETIC FOOT ULCER	69944	0	0	69944	0
7445	PROJ/7445/RIGID KNEE BRACE	20485	0	0	20485	0
7446	PROJ/7446/FAST RESORBING CERAMIC	20000	0	0	20000	0
7447	PROJ/7447/BIOMINERAL BASED SELF-SETTING	3982	0	0	3982	0
7448	PROJ/7448/STRUCTURAL PERFORMANCE ASSES	37618	0	0	37618	0
7449	"PROJ/7449/SHORT COIR FIBER"	30120	0	0	30120	0



0	329711	0	101887	138775	240662	570373	2251863
0	0	0	0	0	0	0	63872
0	0	0	0	0	0	0	1357
0	0	0	0	0	0	0	691
0	0	0	0	0	0	0	347825
0	0	0	0	0	0	0	151
0	0	0	0	0	0	0	1638
0	0	0	0	0	0	0	101326
0	0	0	0	0	0	0	201070
0	0	0	0	2401	2401	2401	147981
0	0	0	0	0	0	0	10807
0	0	0	0	0	0	0	8054
0	0	0	0	0	0	0	9150
0	0	0	0	0	0	0	7119
0	0	0	0	0	0	0	8485
0	0	0	0	0	0	0	129674
0	0	0	0	0	0	0	18356
0	173413	0	173632	0	173632	347045	260737
0	0	0	0	0	0	0	25035
0	0	0	0	0	0	0	212622
0	0	0	0	0	0	0	69944
0	0	0	0	0	0	0	20485
0	0	0	0	0	0	0	20000
0	0	0	0	0	0	0	3982
0	0	0	0	0	0	0	37618
0	0	0	0	0	0	0	30120



	"DDO 1/7/50/HVDDID						
7450	"PROJ/7450/HYBRID COATINGS"	12174	0	0	12174	0	
7451	"PROJ/7451/EFFECTS OF BACOPA MONNIERI"	46648	0	0	46648	0	
7452	"PROJ/7452/ANTI- MICROBIAL ACTIVITY"	83278	112405	0	195683	0	
7453	PROJ/7453/LIVER SCAFFOLDS	1238	0	0	1238	0	
7454	PROJ/7454/NANOSENSITIZERS	6586	607525	0	614111	0	
7455	PROJ/7455/RAPID DIAGNOSTIC KIT	15634	0	0	15634	0	
7456	"PROJ/7456/EVALUATION STUDIES OF DTRT"	700230	0	0	700230	0	
7457	"PROJ/7457/BIODEGRADABLE ORTHOTIC WRIST"	789643	0	0	789643	0	
7458	PROJ/7458/CSIR CONTINGENCY	373	0	0	373	0	
7459	"PROJ/7459/SANDWICH IMMUNOSENSOR"	13295	625180	0	638475	0	
7460	PROJ/7460/DRUG EFFICACY	186645	534000	0	720645	0	
7461	"PROJ/7461/TECHNOLOGY CONCLAVE 2022"	912930	0	0	912930	0	
7462	PROJ/7462/DEW-2022	106000	0	0	106000	0	
7463	PROJ/7463/CHITRA JOURNAL	12170	0	0	12170	0	
7464	PROJ/7464/SUPPORT FOR THE REGULATORY	123700	0	0	123700	0	
7465	PROJ/7465/VALIDATION OF RT-LAMP	450000	0	0	450000	0	
7467	PROJ/7467/DEVELOPMENT OF MG/ZN	130082	0	0	130082	0	
7468	PROJ/7468/INJECTABLE HYDROGEL	475473	0	0	475473	0	
7469	PROJ/7469/REGENERATION OF CARDIAC CELLS	148849	550552	0	699401	0	
7470	PROJ/7470/FLAVONOID NANO SYSTEMS	295551	0	0	295551	0	
7471	PROJ/7471/3D MICROTISSUES	40000	0	0	40000	0	
7473	PROJ/7473/TOXICOLOGICAL PROFILING	780600	0	0	780600	13949	
7474	PROJ/7474/CDSCO VALIDATION	182800	58800	0	241600	0	
7475	PROJ/7475/3D PRINTED PITUITARY ADENOMAS	0	689453	0	689453	0	
7476	PROJ/7476/MEDICAL ELECTRODES	11566	110000	0	121566	0	
7477	PROJ/7477/DEVELOPMENT AND BIOCOMP	62040	0	0	62040	0	
7478	PROJ/7478/TESTING OF POLYMER SHEETS	0	151800	0	151800	0	
7479	PROJ/7479/CHITRA PEACOCK RETRACTOR	0	177000	0	177000	0	



12174	0	0	0	0	0	0	0
19043	27605	27605	0	27605	0	0	0
157809	37874	37874	0	37874	0	0	0
	0 607525	0 607525	0 66218	0	0 541307	0 0	0
	0	0	0	0	0	0	0
677630	22600	22600	0	22600	0	0	0
397028	392615	392615	2948	108520	281147	0	0
373	0	0	0	0	0	0	0
50400	588075	588075	0	33295	554780	0	0
113175	607470	607470	0	24470	583000	0	0
912930	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
12170	0	0	0	0	0	0	0
123700	0	0	0	0	0	0	0
286800	163200	163200	0	0	163200	0	0
2654	127428	127428	0	127428	0	0	0
405426	70047	70047	0	0	70047	0	0
67185	632216	632216	0	14964	617252	0	0
245606	49945	49945	0	49945	0	0	0
0	40000	40000	0	40000	0	0	0
754751	25849	11900	11900	0	0	13949	0
241600	0	0	0	0	0	0	0
0	689453	689453	296513	0	392940	0	0
0	121566	121566	0	121566	0	0	0
1761	60279	60279	0	60279	0	0	0
100695	51105	51105	0	51105	0	0	0
177000	0	0	0	0	0	0	0



7480	PROJ/7480/CARTILAGE RENERATION	0	305000	0	305000	0
0004	PROJ/8004/PROGRAM	070045	0	0	070045	0
8004	SUPPORT & TISSUE	-278345	0	0	-278345	0
8005	PROJ/8005/PROGRAM SUPPORT & TISSUE	-98722	0	0	-98722	0
8006	PROJ/8006/BIOCONJUGATION NANO MAT.	139019	0	0	139019	0
8008	PROJ/8008/CSIR GRANT- PADMAJA.P.NAMBI	12990	0	0	12990	0
8009	PROJ/8009/DBT/ DR.T.V.ANILKUMAR/DE TISSUE	-310641	0	0	-310641	0
8011	PROJ/8011/NANOFRONT/ DR.NIRANJAN/INTRAMAS	139900	0	0	139900	0
8012	PROJ/8012/VSSC/ DR.NIRANJAN/DESIGN STUDIES	2148623	0	0	2148623	0
8015	PROJ/8015/DR.ANOOPKUMAR/ PROGRAMME	12581	0	0	12581	0
8020	PROJ/8020/CSIR/DR.LISSY KRISHNAN	19974	0	0	19974	0
8021	PROJ/8021/ANGIOGENESIS EXP/DR.UMASHANKAR	79036	0	0	79036	0
8023	PROJ/8023/KSCSTE/ DR.H.K.VARMA	76545	0	0	76545	0
8024	PROJ/8024/IIT/ DR.P.R.ANILKUMAR	2935	0	0	2935	0
8026	PROJ/8026/	3339	0	0	3339	0
8027	PROJ/8027/DR.P.V.MOHANAN	79732	0	0	79732	0
8028	PROJ/8028/DR.DIKSHA PAINULY	22332	0	0	22332	0
8031	PR0J/8031	-309053	0	0	-309053	0
8032	PROJ/8032/O.S.N.NAIR	128471	0	0	128471	0
8034	PROJ/8034/FLURO PASSI DR.ROY JOSEPH	679576	0	0	679576	0
8035	PROJ/EVALN OF SEWING RING- DR.UMASHANKAR	18801	0	0	18801	0
8038	PROJ/DEV OF MISSION PROGRAM - DR.GSB	1182223	0	0	1182223	0
8040	PROJ/SYNTHESIS OF OXIDE- DR.H.K.VARMA	1475	0	0	1475	0
8046	PROJ/DIFF. OF ADULT PRO - DR.ASHA.S.MATHEW	739755	0	0	739755	0
8049	PROJ/NEW VISION BIOMAT- DR.C.P.SHARMA	13271	0	0	13271	0
8059	PROJ/CELL SHEET ENGG- DR.P.R.ANILKUMAR	108000	0	0	108000	0
8062	PROJ/ACCELERATED AREING/ MR.C.V.MURALI	213728	0	0	213728	0
8064	NONVIRAL GENE DELIVERY VECTORS- DR.REKHA	33801	0	0	33801	0



0	0	0	4742	0	4742	4742	300258
0	0	0	0	0	0	0	-278345
0	0	0	0	0	0	0	-98722
0	0	0	0	0	0	0	139019
0	0	0	0	0	0	0	12990
0	0	0	0	0	0	0	-310641
0	0	0	0	0	0	0	139900
0	0	0	0	0	0	0	2148623
0	0	0	0	0	0	0	12581
0	0	0	0	0	0	0	19974
0	0	0	0	0	0	0	79036
0	0	0	0	0	0	0	76545
0	0	0	0	0	0	0	2935
0 0	0 0	0 0	0 0	0 0	0	0 0	3339 79732
0	0	0	0	0	0	0	22332
0 0	-309053 128471						
0	0	0	0	0	0	0	679576
0	0	0	0	0	0	0	18801
0	0	0	0	0	0	0	1182223
0	0	0	0	0	0	0	1475
0	0	0	0	0	0	0	739755
0	0	0	0	0	0	0	13271
0	0	0	0	0	0	0	108000
0	0	0	0	0	0	0	213728
0	0	0	0	0	0	0	33801



8068	INSPIRE RESEARCH PROJECT -DR.BINDU.P.NAI R	3957	0	0	3957	0	
8069	PROJ/8069/STUDIES BIODEGRADABLE	1425	0	0	1425	0	
8070	PROJ/8070/PINSPIRE FACULTY AWARD-DR.SHIV	472881	0	0	472881	0	
8071	PROJ/8071/REGEN .OF INTERVERTEBRAL DISC	5840	0	0	5840	0	
8072	PROJ/8072/NANO CALCIUM PHOSPHATE	15412	0	0	15412	0	
8074	PRODUCTION OF NOVEL NANO INDO-UK DR.CP.S	303180	0	0	303180	0	
8077	HOME BASED VITAL SIGNS - DR.NIRANJAN.D.	204510	0	0	204510	0	
8079	DOSE RANGING STUDY FOR DES / DR.SABAREES	731710	0	0	731710	0	
8082	ASSESSMENT OF CERAMICCONSTRUCTS - FRANC	37118	0	0	37118	0	
8083	IN VITRO OSTEOARTHRICITIC- DR.NEETHUMOHAN	8295	0	0	8295	0	
8086	PROJ/8086/GOLD NANORODS FOR THERAPY	18627	0	0	18627	0	
8087	PROJ/8087/CONTROLLED DELIVERY	26581	0	0	26581	0	
8090	INSPIRE FELLOW PHD KEERTHI S JRF	23446	0	0	23446	0	
8094	ALTERNATE	902	0	0	902	0	
8095	DEV RAPID UTI DR. MAYA - DST	8173	0	0	8173	0	
8097	MULTIFUNCN - DBT SUNITHA PREM	223322	0	0	223322	0	
8098	HOW ACTIN FILAMENT STRUCTUDR RENU MOH	1129	0	0	1129	0	
8102	"ENGINEERING BIOMIMETIC NICHE TARA.S"	54225	0	0	54225	0	
8106	PROJ/8106/MECHANISM OF ANGIOGENESIS	18301	0	0	18301	0	
8107	"PROJ/8107/DEFINING MECHANO -BIOLOGY TO HETEROGENEITY IN MUSCLE STEM -BIOLOGY"	190819	0	0	190819	0	
8108	"PROJ/8108/Development Of A Dental Restorative Material Based On Inoprganic Hybrid Resin OF A DENTAL RES"	44556	0	0	44556	0	
8113	"PROJ/8113/TREATMENT OF BONE DEFECTS"	139800	0	0	139800	0	
8114	"PROJ/8114/NANO PARTICLES WITH CELLS"	58	0	0	58	0	



3957	0	0	0	0	0	0	0
1425	0	0	0	0	0	0	0
472881	0	0	0	0	0	0	0
5840	0	0	0	0	0	0	0
15412	0	0	0	0	0	0	0
303180	0	0	0	0	0	0	0
204510	0	0	0	0	0	0	0
731710	0	0	0	0	0	0	0
37118	0	0	0	0	0	0	0
8295	0	0	0	0	0	0	0
18627	0	0	0	0	0	0	0
26581	0	0	0	0	0	0	0
23446	0	0	0	0	0	0	0
902 8173	0 0	0 0	0 0	0 0	0 0	0 0	0
223322	0	0	0	0	0	0	0
1129	0	0	0	0	0	0	0
54225	0	0	0	0	0	0	0
18301	0	0	0	0	0	0	0
190819	0	0	0	0	0	0	0
44556	0	0	0	0	0	0	0
139800	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0



8115	PROJ/8115/TECHNOLOGY RESEARCH CENTRE	0	74271687	0	74271687	0	
	"PROJ/8116/Program support of Translational research on Bio						
8116	materials for orthopaedics and	292647	0	0	292647	0	
	Dental applications						
	SUPPORT ON TRAN" "PROJ/8117/Gold Nanorod						
	Based Targeted nanoprobe						
	for cancer theranostics:						
8117	Diagnosis by surface Enhanced Raman Scattering (SERS) and	10371	0	0	10371	0	
	Fluorescence imaging and						
	therapy by PDT and PPT						
	BASED TARGETED" PROJ/8123/DEV.OF LEFT						
8123	VENTRICULAR DEVICE	0	200658	0	200658	0	
8124	PROJ/8124/DEV. OF AORTIC STENT GRAFT	0	105896	0	105896	0	
8125	PROJ/8125/DEV. OF DEEP	0	52792	0	52792	0	
0400	BRAIN STIMULATOR PROJ/8126/CARDIOVERTER	0	100100	0	100100	0	
8126	DEFIBRILLATOR	0	106130	0	106130	0	
8129	PROJ/8129/DEVPT.OF BIOPROSTHETICHEART VALVE	0	417335	0	417335	0	
8134	PROJ/8134/HYDROCEPHALUS SHUNT	0	215550	0	215550	0	
	PROJ/8138/DEVLPMT						
8138	OF PLATFORM TECLGY	0	376597	0	376597	0	
	IMPLATABLE MICRO INFUSION RECHRGING SYSTEM						
8146	PROJ/8146/POINT OF CARE	0	426549	0	426549	0	
	DETECTION PROJ/8150/DEV. OF						
8150	OCCLUSION DEVICE	0	199862	0	199862	0	
0150	PROJ/8152/DEVELOPMENT OF	0	0	0	0	0	
8152	TITANIUM NITRATE COATED CORONARY STENT	0	0	0	0	0	
	PROJ/8155/DEVPT.OF FLOW						
8155	DIVERTERTREATMENT OFANEURYSMS	0	241565	0	241565	0	
8160	PROJ/8160/TOXICOLOGICAL	0	0	0	0	0	
0100	EVALUATION	U		U	U	U	
8161	PROJ/8161/LARGE ANIMAL EVALUATION	0	0	0	0	0	
0474	PROJ/8171/ENTERIC COATING	0000		^	0000	0	
8171	& MICRO INCAPSULATION OF ANTIBODIES	8806	0	0	8806	0	



0	0	634584	9931805	63705298	74271687	74271687	0
0	0	0	0	0	0	0	292647
0	0	0	0	0	0	0	10371
0	0	180301	20357	0	200658	200658	0
0	0	101149	4700	47	105896	105896	0
0	0	0	49642	3150	52792	52792	0
0	0	0	106130	0	106130	106130	0
0	0	165151	252184	0	417335	417335	0
0	0	0	215550	0	215550	215550	0
0	0	0	376597	0	376597	376597	0
0	0	54000	372549	0	426549	426549	0
0	0	174194	15668	10000	199862	199862	0
0	0	0	0	0	0	0	0
0	0	117098	122526	1941	241565	241565	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	8806



8173	PROJ/8173/BLOOD DRAIN AREA TARGETED NANO CONSTRUCTS FOR DIAGNOSIS OF BRAIN DISEASES & DELIVERY OF THERAPUETICS INTO THE BRAIN	3463	0	0	3463	0	
8175	PROJ/8175/MUSTER- MUSCULOSKELETAL STEM CELL TARGETING	862544	0	2968	865512	0	
8176	PROJ/8176MUSTER- MUSCULOSKELETAL STEM CELL TARGETING	440815	0	23946	464761	0	
8178	PROJ/8178/PRECLINICAL EVALUATION & COMMERCIALISATION ANTI SNAKE VENOM (IGY)	55087	0	0	55087	0	
8179	PROJ/8179/DEVELOPMENT OF NOVEL PROTOTYPE MECHANICAL PLOT RETRIVER FOR TREATMENT OF ACUTE CEREBRAL ISCHEMIC STROKE	281435	0	0	281435	0	
8180	PROJ/8180/TO MODEL THE EFFECT OF MUTATION OF HCN CHANNELS IN NEURONAL EXITABILITY AND IMPACT OF GABABR ON GIRK AND HCN MUTATION USING NEURON	43768	0	0	43768	0	
8182	PROJ/8182/A TISSUE ENGINEERED SKIN SUBSTITUTE WITH LOCALISED HAIR FOLICLE STEM CELLS FOR HAIR FOLICLES AND SEBACIOUS GLAND REGENERATION	0	0	0	0	0	
8183	PROJ/8183/BIO ENGINEERED CONSTRUCT WITH CARDIAC MESENCHYMAL CELLS FOR MYOCARDIAL REPAIR	266949	0	97383	364332	0	
8185	PROJ/8185/BLOOD BRAIN BARRIER PERMEABLE NANOCARRIERS FOR DIAGNOSIS7THERAPHY OF NEURO GENERATIVE DISEASES	83400	2165524	0	2248924	0	
8186	PROJ/8186/3D PRINTED CELL FREE BIPHASIC MATRICCES LOADED WITH AN ADMIXTURE OF BIOMOLECULES FOR ENHANCED PROGENITOR CELL	26898	0	0	26898	0	



0	0	0	0	0	0	0	3463
0	0	0	0	332747	332747	332747	532765
0	0	0	0	464761	464761	464761	0
0	0	0	0	0	0	0	55087
0	0	0	0	0	0	0	281435
0	0	0	0	0	0	0	43768
0	0	0	0	0	0	0	0
0	0	118500	243256	0	361756	361756	2576
0	0	964554	100000	1100970	2165524	2165524	83400
0	0	0	0	0	0	0	26898



8187	PROJ/8187/DEVELOPMENT OF HUMAN-ON-A-CHIP DEVICE TECHNOLOGY	250000	0	6811	256811	241878	
8188	PROJ/8188/EXPERT ADVISORY GROUP	300114	0	0	300114	0	
8189	PROJ/8189/CARE IN heart failure NT pro BNP POC DEVICE	2575660	0	0	2575660	0	
8190	PROJ/8190/MAGNETO-optic sensor for cardiac biomarker detection.	169220	0	0	169220	0	
8192	PROJ/8192/ B277:B282EXTENDING BENEFITS OF BIOMEDICAL SCIENCE &TECH TO ST COMPONENTS	21321	2242540	0	2263861	0	
8193	PROJ/8193/EXTENDING BENEFITS OF BIOMEDICAL SCIENCE &TECH TO SC COMPONENTS	1	10034076	2001073	12035150	5017607	
8194	PROJ/8194/STEM CELL DERIVED EXOSOMETHERAPY FOR CLINICAL MGT OF LUNG DAMAGEIN CRITICALLY ILL CORONA VIRAL PNEUMONIA PATIENTS	1	0	0	1	0	
8195	"PRO/8195/AN EASY 7RAPID DETECTTION PLATFORM FOR VIRAL DISEASES FROM SALIA"	0	0	0	0	0	
8196	"PROJ/8196/DEVPT OF MODIFIED GLASS IONOMER CEMERT TO IMPROVE MECHANICAL PROPERTIES"	0	0	0	0	0	
8198	"PROJ/8198/EFFICACY EVALUATION OF 3D BIOPRINTED LIVER CONSTRUCTS ESTABLISED FROM NICHE SPECIFIC BIOINIK&STEMCELL DERIVED HEPATOCYTE LIKE CELL"	426377	0	26146	452523	0	
8199	PROJ/8199/DESIGN AND DEVPT OF A MICRO DIALYSIS SET-UP FOR CEREBRAL APPLICATIONS	0	474995	0	474995	0	
8200	"PROJ/8200/GENDER ADVANCEMENT FOR TRANSFORMING INSTITUTIONS"	990	13698	0	14688	0	



8122	248689	6811	6811	0	0	241878	0
300114	0	0	0	0	0	0	0
2561140	14520	14520	0	14520	0	0	0
169220	0	0	0	0	0	0	0
21321	2242540	2242540	1416548	42336	783656	0	0
282	12034868	7017261	6063643	4720	948898	5017607	0
0	1	1	1	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
284985	167538	167538	0	121247	46291	0	0
0	474995	474995	377470	79125	18400	0	0
990	13698	13698	13698	0	0	0	0



8201	"PROJ/8201/DEVPT OF PLASTICIZER FREE ACRYLIC DENTURE SOFT LINERS USING NANOGELADDITIVES"	0	281831	0	281831	0	
8202	"PROJ/8202/DEVPT OF PEDICLE SCREW BASED DYNAMIC STABILIZATION SYSTEMS FOR DEGENERATIVES DISEASES OF LUMBOSACRAL SPINE"	85575	1809853	0	1895428	127472	
8204	PROJ/8204/SYNTHESIS AND CHARACTERISATION OF Zn-Fe LAYERED DOUBLE HYDROXIDE 3D SCAFFOLD LOAED WITH ANTI-INFLAMATORY PEPTIDE	30324	411516	0	441840	0	
8205	"PROJ/8205/NATIONAL TRANS- LATIONAL RESEARCH FACILITY FOR BIOMATERIAL& DEVICE&INVITRO DIAGNOSTICS"	39718365	13434934	0	53153299	20745440	
8206	PROJ/8206/KNEE ANKLE FOOT	0	960386	0	960386	0	
8207	PROJ/8207/ ALGINATEDIALEHHYDE- GELATIN AS APOST SURGICAL ADHESION PREVENTION MATERIAL IN CARDIC SURGERY SWINE	1101675	0	32721	1134396	0	
8208	PROJ/8208/DESIGNER SMALL DIAMETER VASCULAR GRAFTS FOR REDUCED NEOINTIMAL HYPERPLASIA THROUGH	470256	550000	11023	1031279	0	
8209	PROJ/8209/EXPLORING THE EFFECT OF SERETOME OF PLALTELET MESENCHYMAL STEM CELL SPHEROIDS ON ANGIOGENESIS AND HEALINGCHRONIC WOUNDS	2320089	902000	18444	3240533	1507000	
8210	PROJ/8210/DESIGING AND STUDIES O NANOPLATFORMS FOR DIAGNOSTIC IMAGING AND TARGETED THERAPY	0	1242705	0	1242705	0	
8211	FABRICATION OF TUMOR MICROENVIORNMENT RESPONSIVE MoS2/Fe/Au/TA// GoX/FA/ NANOCATALYST FOR SELECTIVE CANCER ABLATIO Via SYNERGISTI C CHEMO DYNAMIC &PHOTOTHERMAL	116745	1628600	3575	1748920	0	



0	0	0	27701	254130	281831	281831	0
0	127472	259840	82778	1413560	1756178	1883650	11778
0	0	0	38060	403780	441840	441840	0
	20745440	245188	608431	11961237	12814856	33560296	19593003
0	0	221074	252113	487199	960386	960386	0
0	0	8410	32721	1093265	1134396	1134396	0
0	0	611320	16622	157048	784990	784990	246289
0	1507000	492626	311720	180377	984723	2491723	748810
0	0	948720	0	293985	1242705	1242705	0
0	0	1467400	204122	53575	1725097	1725097	23823



8212	PROJ/8212/DEVELOPMENT OF WEARABLE ADVANCED FALL DETTECTION WATCH WITH WIRELESS ALARM SYSTEM FOR HELP ACTIVATION	276667	750000	0	1026667	0	
8213	PROJ/8213/INJECTABLE MATERIAL CASPA	0	923911	0	923911	44958	
8214	PROJ/8214/INJECTABLE HYDROGEL	0	2113520	0	2113520	265767	
8215	PROJ/8215/ORGAN CARE SYSTEM	4105276	2069173	0	6174449	182565	
8216	PROJ/8216/NEURAL CORRELATES OF YOGA	0	1228640	0	1228640	0	
8217	PROJ/8217/DEVELOPMENT OF AI BASED	0	1892644	0	1892644	593280	
8218	PROJ/8218/RESEARCH EXPOSURE CUM TRAINING	0	1179529	0	1179529	0	
8219	PROJ/8219/ CHONDROPROTECTIVE MOLECULES	645099	600000	13257	1258356	0	
8220	PROJ/8220/SPINAL FIXATION SYSTEM FOR THORACOLUMBAR STABLIZATION	0	18911	0	18911	0	
8221	PROJ/8221/DEVELOPMENT OF HIGH-STRENGTH TI-6AI-+4V CASTINGS FOR ORTHOPAEDIC IMPLANTS	0	79083	0	79083	0	
8250	PROJ/8250/RADIATION PROTECTION SPACER	1003257	1155711	19879	2178847	47870	
8251	PROJ/8251/TRANSCUTANEOUS ENERGY TRANSFER	1623639	1388345	28773	3040757	0	
8252	PROJ/8252/COAGULATION ANALYZER	0	1589675	0	1589675	0	
8253	PROJ/8253/MUSCLE BIOPSYTECHNOLOGY	1596400	329187	0	1925587	210040	
8254	PROJ/8254/ISLET TRANSPLANT SYSTEM	3393600	0	0	3393600	363549	
8255	PROJ/8255/BIOPRINTED LIVER CONSTRUCT	24662400	4175186	0	28837586	377566	
8256	PROJ/8256/AUTO FLURESCENCE DEVICE	0	986249	0	986249	0	
8257	PROJ/8257/CLEFT PLATE MANAGEMENT	0	7718648	132280	7850928	0	
8258	PROJ/8258DESIGN AND DEVELOPMENT OF	0	2376086	0	2376086	0	
8259	PROJ/8259/SILK PROTEIN HYDROGEL	2640749	0	0	2640749	648929	
8260	PROJ/8260/EVALUATION OF DEVICE	0	84791808	0	84791808	1780818	
8261	PROJ/8261/DEVELOPMENT AND EVALUATION OF	0	1526256	0	1526256	0	



0	0	40.4007	104005	00.400	004500	001500	00517
0	0	434927	134085	62488	631500	631500	395167
0	44958	0	221254	657699	878953	923911	0
0	265767	241168	497831	1108754	1847753	2113520	0
0	182565	558713	435764	106223	1100700	1283265	4891184
0	0	0	0	1228640	1228640	1228640	0
0	593280	216223	66559	1016582	1299364	1892644	0
0	0	0	0	1179529	1179529	1179529	0
0	0	431520	229154	90468	751142	751142	507214
0	0	0	18311	600	18911	18911	0
0	0	28064	51019	0	79083	79083	0
0	47870	272097	428984	137132	838213	886083	1292764
0	0	673671	511520	185062	1370253	1370253	1670504
0	0	190040	338000	1061635	1589675	1589675	0
0	210040	376420	37046	0	413466	623506	1302081
0	363549	569544	487365	22000	1078909	1442458	1951142
0	377566	1123005	1663754	172433	2959192	3336758	25500828
0	0	486008	23600	71092	580700	580700	405549
0	0	814277	380782	88031	1283090	1283090	6567838
0	0	435338	135397	69206	639941	639941	1736145
0	648929	389172	301972	101198	792342	1441271	1199478
0	1780818	734037	216929	478643	1429609	3210427	81581381
0	0	67754	158466	1300036	1526256	1526256	0



8262	PROJ/8262/SINGLE VENTRICULAR HEART	0	1735670	0	1735670	296915	
8263	PROJ/8263/INFLAMMATORY	0	2760000	0	2760000	0	
8264	CYTOKINES PROJ/8264/CENTRE OF	0	117804907	0	117804907	0	
0204	EXCELLENCE PROJ/8265/THERAPEUTIC	U	117004907	U	117004307	U	
8265	PATCHES	0	1470560	0	1470560	0	
8266	PROJ/8266/GRAPHANE BASED ELECTRODES	0	800000	0	800000	0	
8267	PROJ/8267/ENGINEERED CERAMICS	0	8748733	0	8748733	0	
8268	PROJ/8268/VIRUS RESEARCH LAB	0	19710000	372277	20082277	0	
8269	PROJ/8269/VOICE PROSTHESIS DEVICE	0	2982020	0	2982020	0	
8270	PROJ/8270/CATHETER -DIRECTED IMAGE GUIDED	0	7591448	0	7591448	0	
8271	PROJ/8271/NANO ENGINEERED 3D PRINTED	0	50000	0	50000	0	
8272	PROJ/8272/IMPLANTABLE TIBIAL NERVE	0	1046496	0	1046496	0	
8273	PROJ/8273/DEVELOPMENT AND IN VIVO	0	34816192	0	34816192	0	
8300	PROJ/8300/DECELLULARISED PORCINE ARTERY	0	176716	0	176716	0	
8301	PROJ/8301/PERCUTANEOUS LVAD	0	268562	0	268562	0	
8302	PROJ/8302/NOVEL MITRAL CLIP	0	91857	0	91857	0	
8303	PROJ/8303/MRI CONTRAST AGENT	0	255225	0	255225	0	
8307	PROJ/8307/CORPECTOMY CAGES	0	262278	0	262278	0	
8309	PROJ/8309/CERAMIC MATRICES	0	621693	0	621693	0	
8310	PROJ/8310/A BIOMIMETIC GEL SYSTEM	0	222085	0	222085	0	
8311	PROJ/8311/ORTHOPEDIC FIXTURES	0	214246	0	214246	0	
8312	PROJ/8312/BIOACTIVE COMPOSITES	0	429838	0	429838	0	
8313	PROJ/8313/NITINOL STAPLES	0	253179	0	253179	0	
8314	PROJ/8314/POLYMER COMPOSITE MEMBRANE	0	206946	0	206946	0	
8315	PROJ/8315/3D BIOPRINTED CONSTRUCT	0	508529	0	508529	0	
8316	PROJ/8316/ORGAN PRESERVATION MEDIUM	0	158543	0	158543	0	
8317	PROJ/8317/ELECTROSPUN MEMBRANE	0	115352	0	115352	0	
8318	PROJ/8318/IONIC LIQUID- BASED MEMBRANE	0	181361	0	181361	0	
	DI TOLD INICIVIDITATIVE						



0	296915	101252	0	35990	137242	434157	1301513
0	0	339167	151381	2269452	2760000	2760000	0
0	0	1448421	79438	116277048	117804907	117804907	0
0	0	85911	14779	108061	208751	208751	1261809
0	0	32143	200	0	32343	32343	767657
0	0	0	59948	8688785	8748733	8748733	0
0	0	240400	4128	0	244528	244528	19837749
0	0	12181	109720	2860119	2982020	2982020	0
0	0	0	6625	93288	99913	99913	7491535
0	0	0	0	0	0	0	50000
0	0	0	4459	28296	32755	32755	1013741
0	0	0	0	399792	399792	399792	34416400
0	0	95380	81336	0	176716	176716	0
0	0	115162	153400	0	268562	268562	0
0	0	91857	0	0	91857	91857	0
0	0	71845	183380	0	255225	255225	0
0	0	87097	175181	0	262278	262278	0
0	0	0	621693	0	621693	621693	0
0	0	60968	161117	0	222085	222085	0
0	0	107148	107098	0	214246	214246	0
0	0	56981	372857	0	429838	429838	0
0	0	17419	235760	0	253179	253179	0
0	0	0	206946	0	206946	206946	0
0	0	0	508529	0	508529	508529	0
0	0	84480	74063	0	158543	158543	0
0	0	100918	14434	0	115352	115352	0
0	0	94968	86393	0	181361	181361	0



	PROJ/8319/CHITOSAN-PVA HAEMOSTATIC PATCH		0	493965		0	493965	0
X 3 711	PROJ/8320/DRUG ELUTING MUCOADHESIVE		0	304526		0	304526	0
8321	PROJ/8321/TROPICAL FEVER ETIOLOGY		0	223691		0	223691	0
8333	PROJ/8322/RAPID DETECTION OF VIABLE		0	100044		0	100044	0
8333	PROJ/8323/MELATONIN		0	1200		0	1200	0
8324	DETECTION KIT PROJ/8324/RAPID IN-VITRO		0	62254		0	62254	0
8325	DIAGNOSTIC KIT PROJ/8325/POLYMER		0	90571		0	90571	0
8326	COMPOSITE SHEET PROJ/8326/BOX TUNNEL		0	59672		0	59672	0
	SYSTEM PROJ/8332/MOBILE HOIST		0	199000		0	199000	0
8333	PROJ/8333/ANAESTHESIA		0	884431		0	884431	0
	DELIVERY SYSTEM PROJ/8335/POTTASSIUM							
8333	ADSORPTION		0	175614		0	175614	0
8337	PROJ/8337/HUMAN AMNIOTIC MEMBRANE		0	39484		0	39484	0
X 3 3 X	PROJ/8338/MEDICAL DEVICE REGULATION		0	22099		0	22099	0
x	PROJ/8339/IP MANAGEMENT SYSTEM		0	62129		0	62129	0
8 3/411	PROJ/8340/INFRASTRUCTURE MANAGEMENT		0	100862		0	100862	0
		1352	17634	441660414		85912509	662790557	33319866
	INTERNAL PROJECTS							
	PROJ/6252/URETHANE MEMPROJ/6253/HAEMOSTAT SP			0	0	25848 81833	25848 81833	0
	PROJ/6254/INHIBITORY CONCENTRATION			0	0	38903	38903	0
6255	PROJ/6255/HEPATOTOXICIT SYSTEM	Y TEST		0	0	84480	84480	0
6257	PROJ/6257/DEVELOPMENT ABSORBAB	OF SOT		0	0	60470	60470	0
6258	PROJ/6258/VACUUM LOADI SYSTEMS	NG		0	0	37208	37208	0
6262	PROJ/6262/COMPARISON C RAMAN SPECTRA)F		0	0	88000	88000	0
	PROJ/6263/PLANT BASED I	FCTINS		0	0	70077	70077	0
6364	PROJ/6264/2ND GENERATION CHITRA SARS			0	0	471331	471331	0
	Total Internal projects			0	0	958150	958150	0
	Total (C)		13521763			86870659	663748707	
	GRAND TOTAL (A+B+C)		75892835	1 5174924		751496016	2027916846	34802151



0	0	112083	381882	0	493965	493965	0
0	0	58469	246057	0	304526	304526	0
0	0	69988	153703	0	223691	223691	0
0	0	41496	58548	0	100044	100044	0
0	0	0	1200	0	1200	1200	0
0	0	48929	13325	0	62254	62254	0
0	0	0	90571	0	90571	90571	0
0	0	0	59672	0	59672	59672	0
0	0	0	0	199000	199000	199000	0
0	0	0	884431	0	884431	884431	0
0	0	75279	100335	0	175614	175614	0
0	0	39484	0	0	39484	39484	0
0	0	0	22099	0	22099	22099	0
0	0	62129	0	0	62129	62129	0
0	0	66194	34668	0	100862	100862	0
0	33319866	24592008	100629179	232056041	357277228	390597094	272193463
0	0	3888 0	21960 81833	0	25848 81833		
0	0	38903	0	0	38903		
0	0	84480	0	0	84480	84480	0
0	0	25714	34756	0	60470	60470	0
0	0	0	37208	0	37208	37208	0
0	0	88000	0	0	88000	88000	0
0	0	60077	10000	0	70077	70077	0
0	0	103355	367976	0	471331	471331	0
0	0	404417	553733	0	958150		
0 0	33319866 34802151	24996425 65362588	101182912 114197740	232056041 912558189	358235378 1092118517		



SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY, THIRUVANANTHAPURAM

EDULE 4-SECURED I	_OANS AND BORROWINGS:	2024-2025	2023-2024
1. (Central Government		
2. 9	State Government (Specify)		
3. I	Financial Institutions		
	a) Term Loans		
	b) Interest accured and due		
4. [Banks:		
	a) Term Loans-Interest accured and due		
	b)Other Loans(specify)- Interest accured and due-Over draft		
5. 0	Other Institutions and Agencies		
6. [Debentures and Bonds		
7. 0	Others(Specify)		
	Against OD facility- cheques issued		
TO	TAL		
EDULE 5-UNSECURE	D LOANS AND BORROWINGS	2024-2025	2023-2024
1. (Central Government		
2. \$	State Government (Specify)		
3. I	Financial Institutions		
4. [Banks:		
	a) Term Loans		
	b) Other Loans(specify)		
5. 0	Other Institutions and Agencies		
6. [Debentures and Bonds		
7. I	Fixed Deposits		
8. 0	Others(Specify)		
TO	TAL		
DULE 6-DEFERRED	CREDIT LIABILITIES:	2024-2025	2023-2024
	Acceptances secured by hypothecation of capital ripment and other assets		
b) (Others		
TO	TAL		
5. (6. I 7. I 8. (7. I 9. (1. I) EDULE 6-DEFERRED a) A equ b) (Banks: a) Term Loans b) Other Loans(specify) Other Institutions and Agencies Debentures and Bonds Fixed Deposits Others(Specify) TAL CREDIT LIABILITIES: Acceptances secured by hypothecation of capital sipment and other assets Others	 	2023-20

Sd/Financial Adviser Sd/Director



SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY, **THIRUVANANTHAPURAM**

SCHEDULE 7-CURRENT LIABILITIES AND PROVISIONS	2024-2025	2023-2024
1. Acceptances		
2. Sundry Creditors:		
a) For Goods	272940531	252803024
b) Others	0	0
3. Advances Received	85244749	77506469
4. Interest accured but not due on:	0	0
a) Secured Loans / borrowings	0	0
b) Unsecured Loans / borrowings	0	0
5. Statutory Liabilities:	0	0
a) Overdue		
b) Others	29903562	27964279
6. Other current Liabilities	163617919	170335693
TOTAL(A)	551706761	528609465
B.PROVISIONS		
1. For Taxation	0	0
2. Gratuity	0	0
3. Accumulated Leave Encashment	0	0
4. Trade Warranties/Claims	0	0
5. Others(Specify) Audit fee	23761874	30350000
Emergency Reserve Fund contribution	0	0
Technology Development Fund contribution	6488966	5920368
TOTAL(B)	30250840	36270368
TOTAL(A+B)	581957600	564879833

Sd/-**Financial Adviser** Director

Sd/-



SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL

SCHEDULE 8- FIXED ASSETS

GROSS BLOCK

PARTICULARS	Cost/valuation as at the beginning of the year (01.04.2024)	Additions during the year 2024-25	Deductions during the year 2024-25	
A. FIXED ASSETS:				
1. LAND:				
a) Freehold	16894606	0	0	
b) Leasehold				
2.BUILDINGS:				
a) On Freehold Land *	47627608	0	0	
b) On Leasehold Land				
c) Ownership Flats/Premises				
d) Superstructures on Land not belonging to the entity	477182357	431738445		
3. A) PLANT MACHINERY & EQUIPMENT	3570766758	190720074	103968906	
B) Equipment - From Non Monetary grants	2	0	0	
4. VEHICLES	7428045	5744447	2344270	
5. FURNITURE, FIXTURES	97644911	35778974	176805	
6. OFFICE EQUIPMENT	1236622	0	0	
7. COMPUTER/ PERIPHERALS	7177670	0	0	
8. ELECTRIC INSTALLATIONS	173068457	0	0	
9. LIBRARY BOOKS	273714008	2704447	0	
10. TUBEWELLS & W.SUPPLY	301965	0		
11. OTHER FIXED ASSETS				
A) OXYGEN CYLNDRS/GAS PLANT INST	17786048	389440		
B) KITCHEN/CANTEEN EQUIPMENTS	4377091	190360	25325	
C) PAINTINGS	450216	0		
D) SURGICAL EQUIPMENTS	1147384	0	991500	
Total for the year (Total -A)	4696803749	667266187	107506806	
Total for the previous year	4383714219	330120452	17030922	
Captial Work in Progress (B)	1800957874	-278840356	0	
Total for the year (A+B)	6497761623	388425831	107506806	

* Depreciation for item2(a) has been provided along with depreciation on 2(d)

Sd/-Financial Adviser Sd/-Director



SCIENCES & TECHNOLOGY, THIRUVANANTHAPURAM

	,	DEPRECIATIO	N.I.		NET B	LOCK
Cost/valuation at the year end (31.03.2025)	Depreciation as at the beginning of the year (01.04.2024)	Depr on items written off	During the year 2024-25	Total up to the year end (31.03.2025)	As at the end of current year end (31.03.2025)	As at the previous year end (31.03.2024)
16894606	0	0	0	0	16894606	16894606
47627608	0		0	0		
908920802	400715551	0	55583286	456298837	500249573	124094413
3657517926	2701693883	94632128	157568420	2764630176	892887750	869072875
2	1	0	0	1	1	1
10828222	6799723	2139489	925198	5585432	5242790	628322
133247080	67071541	144462	6631998	73559077	59688003	30573370
1236622	1135035		10159	1145194	91428	101587
7177670	7113822	0	25539	7139361	38309	63848
173068457	132990305	0	4007812	136998117	36070340	40078153
276418455	254425909	0	8797016	263222925	13195530	19288099
301965	257675		4429	262104	39861	44290
			0			
18175488	11304907		2748232	14053139	4122349	6481141
4542126	2596726	20587	196599	2772737	1769389	1780365
450216	425190		2503	427693	22523	25026
155884	1140917	989149	1646	153414	2470	6467
5256563129	3587671185	97925815	236502838	3726248209	1530314920	1109132563
4696803749	3410868350	15755462	192558297	3587671186	2910090437	2578642363
1522117518	0	0	0	0	1522117518	1800957874
6778680647	3587671185	97925815	236502838	3726248209	3052432438	2910090437

Sd/Financial Adviser Sd/Director



SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY, THIRUVANANTHAPURAM

SCHEDULE 9 - INVESTMENTS FROM EARMARKED/ENDOWMENT FUNDS	2024-25	2023-24
1. In Government Securities	47081032	47081032
2. Other approved Securities	5685391	5685391
3. Shares	0	0
4. Debentures and Bonds	0	0
5. Subsidiaries and Joint Ventures	0	0
6. Others (to be specified)	0	0
Pension & Staff funds	208974215	177662919
Project funds	342228843	256230772
TOTAL	603969481	486660114
SCHEDULE 10-INVESTMENTS-OTHERS	2024-2025	2023-2024
1. In Government Securities		
2. Other approved Securities		
3. Shares		
4. Debentures and Bonds		
5. Subsidiaries and Joint Ventures		
6. Others (to be specified) Sinking Fund Investments	150000000	150000000
Technology Fund	110688134	109415766
6. Others (to be specified)		
TOTAL	260688134	259415766
SCHEDULE 11-CURRENT ASSETS, LOANS, ADVANCES ETC	2024-2025	2023-2024
A. CURRENT ASSETS		
1. Inventories:		
		0
a) Stores and Spares	0	0
a) Stores and Spares b) Instruments & Loose Tools	0	0
b) Instruments & Loose Tools		
b) Instruments & Loose Tools c) Stock-in trade	0	0
b) Instruments & Loose Tools c) Stock-in trade Store items	168601042	153412709
b) Instruments & Loose Tools c) Stock-in trade Store items Inventory of Small and large animals	168601042 1247673	0 153412709 0
b) Instruments & Loose Tools c) Stock-in trade Store items Inventory of Small and large animals Stamps	168601042 1247673 1368	0 153412709 0 3437
b) Instruments & Loose Tools c) Stock-in trade Store items Inventory of Small and large animals Stamps Medicine	168601042 1247673 1368 22722578	0 153412709 0 3437 15324752
b) Instruments & Loose Tools c) Stock-in trade Store items Inventory of Small and large animals Stamps Medicine 2. Sundry Debtors: a) Debts Outstanding for a period exceeding	168601042 1247673 1368 22722578	0 153412709 0 3437 15324752 0



3. Cash balances in hand(including cheques/drafts and imprest)	1824613	2044344
4. Bank Balances:	0	0
a) With Scheduled Banks:	0	0
-On Current Account	2226981	2226981
-On Deposit Accounts(L.C. margin & Commitment deposit)	4823142107	4049515994
-On Savings Accounts	371819112	164920647
b) With non-Scheduled Banks:	0	0
-On Current Account	0	0
-On Deposit Accounts	0	0
-On Savings Accounts	0	0
5. Post-Office-Savings Accounts	0	0
TOTAL(A)	5935439665	4873007844
B.LOANS, ADVANCES AND OTHER ASSETS		
1. Loans:		
a) Staff	18860565	15464314
b) Other Entities engaged in activities/ objectives similar to that of the Entity	0	0
c) Other(specify)	0	0
2. Advances and other amounts recoverable in cash or in kind or for value to be received:	0	0
a) On Capital Account	215732868	243542894
b) Prepayments	0	0
c) Others	14715344	14682167
3. Income Accured:	0	0
a) On Investments from Earmarked/ endowment Funds	76807649	71243501
b) On Investments-Others	0	0
c) On Loans and Advances	0	0
d) Others (Royalty)	826986	1290719
(includes income due unrealised)	0	0
4. Claims Receivable	0	0
From Govt of India on Grant in aid (7th CPC arrears)	0	204714247
TOTAL(B)	326943412	550937843
TOTAL(A+B)	6262383078	5423945686
Savings bank account includes Rs.15/- (GL code No.2410-Synd Bank vikas certificate)		



SCHEDULE 12- INCO	DME FROM SALES/SERVICES	2024-2025	2023-2024
	1. Income from Sales		
	a) Sale of Finished Goods	0	0
	b) Sale of Raw Material	0	0
	c) Sale of Scraps	0	0
	2. Income from Services		
	a) Labour and processing charges	0	0
	b) Professional/Consultancy Services	0	0
	c) Agency Commission and Brokerage	0	0
	d) Maintenance Services	0	0
	e) Others (Specify)	0	0
	From Hospital Services-Gross Income	1241809105	1158630311
		0	0
	From Projects	7476629	20662778
	Testing & Facility charges received	5980446	4635836
	TOTAL	1255266180	1183928925
SCHEDULE 13- GRA	NTS/SUBSIDIES	2024-2025	2023-2024
	(Irrevocable Grants & Subsidies Received)		
	1. Central Government (Salary & General)	3300000000	2975000000
	2. State Government(s)	0	0
	3. Government Agencies	0	0
	4. Institution/Welfare Bodies	0	0
	5. International Organisations	0	0
	6. Others(Specify)	0	0
	TOTAL	3300000000	2975000000
SCHEDULE 14-FEES	SUBSCRIPTIONS	2024-2025	2023-2024
	1. Entrance Fees	2823150	1516780
	2. Annual Fees/ Subscriptions	15087193	16067145
	3. Seminar/Program Fees	0	0
	4. Consultancy Fees	0	0
	5. Examination Fees and others	4681981	5087125
	TOTAL	22592324	22671050
SCHEDULE 15- INCO	DME FROM INVESTMENTS	2024-2025	2023-2024
	1) Interest		
	a) On Govt. Securities	0	0
	b) Other Bonds/Debentures	0	0
	2) Dividends:		



	a) On Shares	0	0
	b) On Mutual Fund Securities	0	0
	3) Rents	0	0
	4) Others(Special Reserve Funds)1.Interest on Sinking Fund	6964188	10168307
	2.Withdrawal from Sinking Fund	0	0
	3.Interest on Technology Fund	6448199	4005400
	TOTAL	13412387	14173707
SCHEDULE 16- INCO	OME FROM ROYALITY, PUBLICATION ETC	2024-2025	2023-2024
	1) Income from Royalty	2798483	1581121
	2) Income from Publications	0	0
	3)Others(Specify)	0	0
	TOTAL	2798483	1581121
SCHEDULE 17- INTI	EREST EARNED	2024-2025	2023-2024
	1) On Term Deposit		
	a) With Scheduled Banks	236581245	175303214
	b) With non-scheduled banks	0	0
	c) With Institutions	0	0
	d) Others	0	0
	2) On Savings Account	0	0
	a) With Scheduled Banks	7691306	9897644
	b) With non-scheduled banks	0	0
	c) Post Office Savings Account	0	0
	d) Others(accrued)	0	0
	3) On Loans	0	0
	a) Employees/Staff	372385	404502
	b) Others	0	0
	4) Interest on Debtors and other Receivables	0	0
	TOTAL	244644936	185605360
SCHEDULE 18- OTH	IER INCOME	2024-2025	2023-2024
	1. Profit on Sale/disposal of Assets:		
	a) Owned assets	0	0
	b) Assets acquired out of grants, or received free of cost	0	0
	c) WIP written back from Repairs and Maintanance	0	0
	2. Rent	3790371	3372301



3. Fees for Miscellaneous Services 4. Miscellaneous Income Rent 114068 183643 Other Income (including grant 8175872 2473074 receivable from DST for 7th CPC Prior period income 0 TOTAL 12080311 SCHEDULE 19 - INCREASE /(DECREASE) IN STOCK OF FINISHED GOODS & 2024-2025 WORK IN PROGRESS a) Closing stock - Finished Goods - Work in progress 0 0 0 0 0 0 0 0 0 0 0 0
Other Income (including grant receivable from DST for 7th CPC Prior period income 0 0 0 TOTAL 12080311 6029018 SCHEDULE 19 - INCREASE /(DECREASE) IN STOCK OF FINISHED GOODS & 2024-2025 2023-2024 a) Closing stock 0 0 0 - Work in progress 0 0
receivable from DST for 7th CPC Prior period income 0 0 TOTAL 12080311 6029018 SCHEDULE 19 - INCREASE /(DECREASE) IN STOCK OF FINISHED GOODS & 2024-2025 2023-2024 WORK IN PROGRESS 0 0 0 - Work in progress 0 0
TOTAL 12080311 6029018 SCHEDULE 19 - INCREASE /(DECREASE) IN STOCK OF FINISHED GOODS & 2024-2025 2023-2024 a) Closing stock - Finished Goods 0 0 - Work in progress 0 0
SCHEDULE 19 - INCREASE /(DECREASE) IN STOCK OF FINISHED GOODS & 2024-2025 WORK IN PROGRESS a) Closing stock - Finished Goods - Work in progress 0 0
WORK IN PROGRESS 2024-2025 2023-2024 a) Closing stock 0 0 - Finished Goods 0 0 - Work in progress 0 0
WORK IN PROGRESS 2024-2025 2023-2024 a) Closing stock 0 0 - Finished Goods 0 0 - Work in progress 0 0
- Finished Goods 0 0 - Work in progress 0 0
- Work in progress 0 0
- Work in progress
- Finished Goods 0
- Work in progress 0
TOTAL 0 0
SCHEDULE 20-ESTABLISHMENT EXPENSES 2024-2025 2023-2024
a) Salaries and Wages 1635910066 1510234938
b) Allowances and Bonus 19539621 18349105
c) Contribution to Provident Fund 0
d) Contribution to other fund(specify) 0
e) Staff Welfare Expenses 22093492 17942609
f) Expenses on Employee's Retirement and Terminal Benefits 565810608 510945746
g) Others(Specify) PG Training & Accademic payments 241574837 207278345
TOTAL 2484928624 2264750743
SCHEDULES 21- ADMINISTRATIVE EXPENSES 2024-2025 2023-2024
a) Purchases 831803663 800949325
b) Concession to Poor patients/Labour and 38711978 41171565 processing expenses
c) Cartage and Carriage Inwards 75281 81858
d) Electricity and power 75470778 60882476
e) Water charges 12331872 8132805
f) Insurance 2388689 4029263
g) Repairs and maintenance 95514507 121276886
h) Excise duty 0
i) Rent,Rates and Taxes 3905
j) Vehicles Running and Maintenance 1373952 846095
k) Postage, Telephone and Communication Charges 4836575 4067690



	I) Printing and Stationary	80830	21701
	m) Travelling and Conveyence Expenses	5825819	4591101
	n) Expenses on Seminar/Workshop	3093115	958762
	o) Subscription Expenses	0	0
	p) Expenses on Fees	0	0
	q) Auditors Renumeration	814788	594400
	r) Hospitality Expenses	0	0
	s) Professional Charges	0	0
	t) Provision for Bad and Doubtful Debts/Advances	0	0
	u) Irrecoverable Balances Written-off	0	0
	v) Packing Charges	0	0
	w) Freight and Forwarding Expenses	0	0
	x) Prior period expenses	6604683	30048515
	y) Distribution Expenses	0	0
	z) Advertisement and Publicity	3376439	3711829
	z1) Others(specify)	161543741	255932488
	TOTAL	1243850615	1338136758
SCHEDULE 22 - EXP	ENDITURE ON GRANTS, SUBSIDIES ETC.	2024-2025	2023-2024
	a) Grants given to Institutions/Organisations	0	0
	b) Subsidies given to Institutions/Organisations	0	0
	TOTAL	0	0
SCHEDULE 23-INTE	REST	2024-2025	2023-2024
	a) On Fixed Loans		
	b) Bank Charges)	77876	79737
	c) Others(specify)	0	0
	TOTAL	77876	79737

Sd/Financial Adviser Sd/Director



SCHEDULES FORMING PART OF ACCOUNTS AS AT 31-03-2025

SCHEDULE 24- SIGNIFICANT ACCOUNTING POLICIES

1. ACCOUNTING CONVENTION

Financial Statements are prepared based on historical cost convention and accrual method of accounting except in the accounts not directly connected with the functioning of the Institute including the Staff Benevolent Fund, Pension, etc.

2. INVENTORY VALUATION

Stores and spares including machinery spares are valued at cost.

3. INVESTMENTS

Investments including long-term investments are carried at cost.

4. FIXED ASSETS

Fixed assets are stated at the cost of acquisition inclusive of inward freight, duties and taxes incidental and direct expenses related to the acquisition. Non-monetary assets acquired free of cost are recorded at a nominal value ie. Re.1 (Rupee One).

5. DEPRECIATION

Depreciation is provided on the reducing balance method at the rates specified by the Income Tax Act 1961. In respect of additions to fixed assets during the year depreciation is provided for the full year. In case of condemnation of an asset, depreciation for the current year has not been provided and the accumulated depreciation for the previous years has been duly deducted from the accumulated depreciation and is shown in Schedule 1 - as was suggested by the audit party during the previous year audit (2021-22).

6. GOVERNMENT GRANTS/SUBSIDIES

Government Grant Capital is treated as additions to the Capital fund of the of Institute. Grants in respect of specific fixed assets acquired are shown as a deduction from the cost of the related asset. Government Grants/subsidies are accounted on a Grant release order basis.

7. FOREIGN CURRENCY TRANSACTIONS

Transactions denominated in foreign currency are accounted at the exchange rate prevailing at the date of transactions.

8. RETIREMENT BENEFITS

Gratuity: From 2006 (with the implementation 6th Pay Commission report), the gratuity payments are treated as Institute expenses and accounted for on an actual payment basis.

Leave Salary: Leave encashment eligible at the time of retirement/reliving is treated as Institute expenses and accounted for on an actual payment basis.

Pension: From the year 2006, (with the implementation 6th Pay Commission report) 12% of the salary is transferred to the Pension Fund.

New Pension Scheme: In the case of employees who joined on or after 01.01.2004, 10% of the salary is deducted as an employee's subscription and 14% as employer contribution is being made by the Institute. The funds are remitted to NPS Trust Account maintained by GOI and subscription details are forwarded to NSDL/CRA every month.

9. PROVIDENT FUND

Assets and Liabilities of the General Provident Fund account were separated from the Balance sheet of the Institute and shown as separate statements. Interest is provided on the accumulations as per the rates prescribed by Central Government from time to time. Receipts & Payment Account is also prepared and placed along with Balance sheet.

10. EMERGENCY RESERVE FUND

An amount equal to 7.50 per cent of receipts from patients is to be transferred to a Fund for meeting unexpected requirements for Fixed assets subject to a maximum of Rs.50 Crore. It was decided to reduce the limit of ERF to Rs.15 crore and utilize the remaining funds and the guideline of recouping these funds does not apply until further decision.

11. TECHNOLOGY DEVELOPMENT FUND

Receipts against technology developed by the Institute are transferred to the above fund and interest earned is utilized for meeting additional expenses on Improvement of technologies already developed.

Sd/- Sd/-

Financial Adviser Director



SCHEDULE 25-CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS

1. CONTINGENT LIABILITIES

Rs. In lakhs

	2024-25	2023-24
Claims against the Institute not acknowledged as debts	NIL	NIL
Bank Guarantee given by Institute	44.69	54.85
Letters of credit opened on behalf of Institute	NIL	85.66
In respect of claims from parties for non- execution of orders	NIL	NIL

Service Tax:

" The office of the Commissioner of Central Excise and Customs vide order no: C.No.IV/16/152/2014 ST ADJ. Dated 08.06.2015 confirm the demand of Service tax Rs. 4.72 Lakhs under section 73(2) of the Finance Act 1994, being service tax short paid under the category "Technical Inspection and certification service" during the period 1.4.2009-31.03. 012. Further, impose a penalty of Rs 2.36 lakhs towards penalty under section 78 and Rs.0.05 lakhs for contravention of section 70 of the Act. To file an appeal against the order, the institute paid Rs.0.35 lakhs towards a deposit (i e 7.5% of demand confirmed)." During the year 2018-19, Institute received Order-In-Appeal dated 19.09.2018 issued by Commissioner (Appeals) rejecting the appeal filed by the Institute. Institute filed an appeal before CESTAT, Bangalore against the above and remitted Rs. 0.44 lakh as a deposit under section 35F of the CE Act.

Name of the Statute	Nature of Dues	Amount in Rs. in lakhs	Period to which the amount relates	Forum where dispute is pending.
Service Tax	Service tax and penalty	4.72	01/04/2009 to 31/03/2012	CESTAT, Bangalore.

Demand from GST Department against project fund of private parties during the period 2017-2024:-

Based on the reply furnished for the Show Cause Notice, GST Department has reduced the demand on project funds received by the Institute from private parties from Rs.7,34,16,154/- to Rs. Rs.1,82,14,309/- for the period from 01.07.2017 to 31.03.2024. Institute has filed an appeal to this order by remitting 10% of the demand to waive off the entire demand.

Remittance to MHA for FCRA:-

Institute has paid an amount of Rs. 2355831/- based on the order from DST vide No.AI/5/2/SCTIMST/2024(E-48834) dt 29.10.2024 for the rein station of suspended FCRA registration of the Institute due to the non submission of return for the year 2019-20.

2. UNEXPIRED CAPITAL COMMITMENTS

Rs. in lakh

	2024-25	2023-24
The Estimated value of orders remaining to be executed on Capital Account	263.56	443.80
Construction of New Hospital block (NHB)& Hospital Equipments & Facilities for NHB	776.27	344.99
Completion of Combination Devices Block Furniture, BSL, AHU, Gate & Incinerator	463.02	431.70

Ministry of Health and Family Welfare approved the construction of a new Hospital Block in the Institute at a cost of Rs.230 crore. The project is funded jointly by the Ministry of Health and Family Welfare - MoHFW (Rs. 120 crore) and the Department of Science & Technology - DST (Rs.110 crore). Institute received Rs.110 crore from DST was fully transferred to CPWD as advance . MoHFW directly transfers its fund to CPWD. PMSSY NHB was inaugurated on 20.02.2025. The building will be capitalized on receipt of completion certificate.

Combinational Devices Block & Animal House at BMT wing both were completed by CPWD on deposit scheme and were capitalized during the year.

Lease obligation for rentals for Plant	NIL	NIII
& Machinery	IVIL	NIL



3. CURRENT ASSETS, LOANS & ADVANCES

The aggregate amount shown in the Balance sheet for the Current assets, Loans and Advances, has the value, which is realisable in the ordinary course of business.

4. PROVISIONS

Provision for Income tax was not made since there is no taxable income for Institute under Income tax Act 1961, during the year.

5. FOREIGN CURRENCY TRANSACTIONS:

Rs. in lakh

	2024-25	2023-24
5.1 Value of Imports Capital Goods Stores Spare & Consumables	441.77 0.00	361.46 15.27
5.2 Expenditure in foreign currency Travel Expenses	NIL	NIL
5.3 Earnings: Value of Exports	NIL	NIL

- 6 Current year Income, net of expenditure, under the Institute Ethics Committee has been treated as income of the Institute amounting to Rs. 40.28 lakh (previous year Rs.6.46 lakh).
- Claim for Audit fees by C&AG amounting to NIL has been paid during the year. Provision for Audit fees of C&AG and others, Repair and Maintenance etc have been made for the current year amounting to Rs.162.54 lakh.
- 8. Accrued Interest on Investment amounting to Rs.768.07 lakh (previous year Rs. 712.43 lakh) has been provided in the current year accounts.
- As pointed out by C&AG, an unutilized portion of Grant in Aid(ST General) is shown as current liability.
- 10. To release the pension dues as per the CCS pension rules, an additional amount of Rs.3728.25 lakh has been expended over and above the sanctioned 12% Institute contribution (amounting to Rs.323.79 lakh) to the Pension Fund.
- 11. Institute has done the actuarial valuation to ascertain the liability on account of Gratuity, Pension and Leave Encashment in respect of serving employees through an Actuary. As per their valuation report, the liability is as follows:

Present value of the past service gratuity	Rs. 6800.00 lakh
Present value of the pensionary liability for serving employees	Rs. 21091.00 lakh

Present value of the pensionary liability for existing pensioners	Rs. 50000.00 lakh
The present value of the past service leave encashment	Rs. 7215.00 lakh

12. (a) Value of assets acquired from externally funded projects during the last eleven years has been identified as detailed below:-

FY 2014-15	Rs.15.36 lakh	FY 2020-22	Rs.518.19 lakh
FY 2015-16	Rs.117.22 lakh	FY 2021-22	Rs.1043.04 lakh
FY 2016-17	Rs.718.52 lakh	FY 2022-23	Rs.156.03 lakh
FY 2017-18	Rs.850.68 lakh	FY 2023-24	Rs.326.19 lakh
FY 2018-19	Rs.940.31 lakh	FY 2024-25	Rs.347.67 lakh
FY 2019-20	Rs.1165.23 lakh		

Since the cost of acquisition of these assets is nil, no depreciation has been charged on these assets.

- (b) Value of non-monetary assets acquired by the Institute is shown at a nominal value of Rs.2.
- 13. Technology Development Fund

An amount of Rs.30.34 lakh (previous year Rs. 12.73 lakh) was transferred to Technology Development Fund. During the year Rs.9.58 lakh has been spent from Technology Development Fund. (Previous year Rs.7.66 lakh)

 Funding of In house Projects to set off negative balance.

Administrative expenses include an amount of Rs.10.46 lakh (Previous year Rs.2.82 lakh) transferred to In house project fund to set off negative balance.

15. Grant release order received for Capital Rs.3300.00 lakh, for Salary Rs. 20000.00 lakh, and General Rs. 13000.00 lakh for expenditure through TSA. Expenditure from Capital head Rs.2708.38 lakh; Salary head Rs.20000.00 lakh; General head Rs. 13000.00 lakh. (Thereby leaving the unspent/lapsed GOI from TSA amount to Rs. 591.62 lakh under Capital Head).

An amount of Rs.40.00 lakh is being repaid as interest on an unutilized non-TSA grant (ST grant) to DST and Rs.238.61 lakh is being repaid as interest to MoHFW as interest on the unutilized grant (PMSSY).

16. Corresponding figures for previous years have been regrouped, wherever necessary.

Schedules 1 to 25 annexed, form an integral part of the Balance Sheet as of 31-03-2025, and Income & Expenditure Account for the year ended on that date.

Sd/-Financial Adviser Sd/-Director



SCHEDULE TO RECEIPTS & PAYMENTS ACCOUNTS FOR THE PERIOD FROM 01-04-2024 TO 31-03-2025

	RECEIPTS	2024-25	2023-24		Payments	2024-25	2023-24
		Rs.	Rs.			Rs.	Rs.
1	Opening Balances			I	Expenses		
a)	Cash In Hand	2044344	1561407				
b)	Bank Balances				a) Establishment expenses	2368591243	2222852769
	I) In Current Account	1	1		b) Administrative Expenses		
	ii)In deposit Account				For Purchases	18845217	20506873
	iii)Savings Account *	167147641	322217927		Other expenses	108420141	93365859
				II	Payments made against funds for various		
II	Grant Received				Projects		
	From Government of India				As Per schedule	87557916	87799199
	Under Object head - Creation of Capital assets	270838127	387680834				
	Under Object Head - Salary/General scheme	3300000000	2975000000	Ш	Investments & Deposits made		
					a) Out of Earmarked funds	155932725	139924688
					b) Out of own funds		
Ш	Receipts against Earmarked Funds						
				IV	Expenditure on Fixed Assets & Capital work		
	a) Earmarked funds	6093899	5139702		-in- progress		
	b)Own funds						
					a) Purchase of Fixed Assets	85125826	270262830



IV	Interest Received				b)Capital work-in- progress		
	a) On Bank	47472696	78107182	V	Refund of Loans		
	deposits b) Loans Advances			•	Refulia of Louis		
	etc	637	6008				
	c) On NCMMR funds	0	0				
V	Receipts from services			VI	Finance Charges(Bank charges)	77875	33042
	Receipts from Patient services	1048766548	943482118				
	Other receipts including Royalty	37157506	51630587	VII	Other Payments		
					To Funds/Deposit- refunds	2189469962	2126499004
VI	Other receipts			VIII	Closing Balance		
	Grant received for Projects	242674007	113281450		a) Cash in hand	1824613	2044344
	Refund of Deposits (LC Margin)				b) Bank Balances		
	Other receipts	267696219	252329034		I) In current Account	1	1
					iii) Savings Account *	374046106	167147641
	Total	5389891625	5130436251		Total	5389891625	5130436251

Sd/Financial Adviser

Sd/Director



GPF RECEIPTS & PAYMENTS ACCOUNTS FOR THE PERIOD FROM 01-04-2024 TO 31-03-2025

	RECEIPTS	2024-25	Payments	2024-25
1	Opening Balances	[Rupees]	Daymont to mombors	[Rupees]
			Payment to members	
a)	Cash In Hand	0	Final Settlement	23893007
b)	Bank Balances		Loan and advances	30343886
	I) In Current Account	0	Withdrawals	
	ii)In deposit Account			
	iii)Savings Account *	14370952		
Ш	RECEIPTS to members account		Investments & Deposits made	24810969
	Subscription	34833190		
	Refund of Ioan	779099		
Ш	Interest on investments		Finance Charges(Bank charges)	0
	Interest on SB a/c	5001356		
	Interest on bank deposits			
VI	Other receipts		Closing Balance	
	Grant received for Projects	0	a) Cash in hand	0
	Refund of Deposits(LC Margin)	28556397	b) Bank Balances	
	Other receipts		I) In current Account	0
			iii) Savings Account *	4493132
	Total	83540994	Total	83540994

Sd/-Financial Adviser Sd/-Director



SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY, THIRUVANANTHAPURAM Provident Fund Account For The Year Ended 31-03-2025

Particulars	2024-25	2023-24
	[Rupees]	[Rupees]
LIABILITIES		
MEMBERS BALANCE	42072833	60697437
MEMBERS CREDITS [for march]	2547375	2574826
BALANCE DUE TO MEMBERS NOT IN SERVICE		
Under EPF scheme	7696198	7696198
,,GPF,,	532055	532055
PENSION FUND DUES	0	0
RESERVES&SURPLUS-INTEREST	301216490	282644094
TOTAL	354064951	344085868
ASSETS		
INVESTMENT AT COST	329663549	328761739
DUES TO PF ACCOUNT		
FROM INSTITUTE	2547375	2574826
FROM PF COMMISSIONER	0	0
INTEREST ACCRUED NOT DUE	17360895	8437093
BALANCE WITH BANKS		
SBT -GPF A/C	4493132	14370952
TOTAL	354064951	344085868
. 3 17 (=	20.00.701	21.00000

Sd/Financial Adviser

Sd/Director



SEPARATE AUDIT REPORT ON THE ACCOUNTS OF SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY (SCTIMST), THIRUVANANTHAPURAM FOR THE YEAR 2024-2025

A. Balance Sheet

A.1 Liabilities

A.1.1 Current Liabilities and Provisions (Schedule 7 - ₹ 58.20 crore)

A.1.1.1_No provision of retirement benefit of ₹ 85106 lakh on the basis of actuarial valuation report as prescribed in provision of AS 15. This resulted in understatement of Current Liabilities and Provision and Capital Fund by ₹ 85106 lakh. Further disclosure required as per AS 15 is not made in Notes to Accounts.

A.1.1.2 No provision was made in the accounts for the expenditure of ₹ 23.48 lakh towards leave salary and pension contribution payable in connection with the deputation of an official for the period 01.04.22 to 31.03.24. This had resulted in understatement of liabilities and of prior period expenditure, both by ₹ 23.48 lakh.

B. Income & Expenditure Account

B.1 Income

B.1.1 Overstatement of Income (Schedule-17 'Interest Earned' - ₹ 24.46 crore)

Bank interest of ₹48.92 lakh earned on the project balances held as liabilities under Schedule-3 'Earmarked/Endowment Fund' (GL Code-5000 Project Suspense) was transferred to institute's account as its income under Schedule-17 'Interest Earned' from term deposits created out of funds under the projects by Central/State Govt. agencies etc. Since, the interest was to be apportioned among these projects only, this had resulted in overstatement of income besides understatement of liabilities on account of 'Earmarked/Endowment Funds' by ₹ 48.92 lakh.

C. General

C.1 Records not available/provided

(i) Suspense Balance

Suspense Account is an account that can be used temporarily to carry doubtful receipts and reimbursements or discrepancies pending their analysis and permanent classification (i.e. an account in the general ledger in which amounts were temporarily recorded).

However, scrutiny of the ledger balances with the figures shown in the annual accounts of SCTIMST revealed five suspense accounts with balance of ₹2.26 crore¹ (three suspense



accounts with GL Code 5000 - Project Suspense under Schedule-3 and two suspense accounts with GL Code 2780 - Hospital and BMT wing) pertaining to liabilities side of the Balance Sheet against which funds would have been kept lying in the accounts.

As the balances under these ledgers retained since long and transaction wise details were not maintained for the balances recorded in all these six ledgers for ascertaining the actual/

permanent classification, Audit disclaims any opinion on the correctness of liabilities shown against more than 500 projects under Schedule-3 'Earmarked/Endowment Funds' related to the Balance Sheet of the institute besides the amount held under various unverified suspense balances shown in the accounts.

(ii) Incomplete Provident Fund Accounts

As per the Uniform Format of Accounts prescribed for Central Government Autonomous Bodies, Annual Accounts should have comprised of Receipts and Payments Account, Income and Expenditure Account and Balance Sheet of the entity. However, SCTIMST did not annex/provide the Income and Expenditure Account along with the Balance Sheet for the Provident Fund Account maintained by the institute. As the PF accounts were incomplete, the same could not be certified in Audit. Any possible omission/errors in these accounts are, therefore, disclaimed.

C.2 Non-refund of interest earned and unutilised funds of the Govt. of India

(i) Non utilisation of Employee Pension Fund

An amount of ₹38.76 crore was depicted as liability towards 'Employee Pension Fund' (GL 1301) and included in the total amount of ₹90.10 crore under Schedule-3 'Earmarked/ Endowment Funds' created for releasing the pension dues as per CCS Pension Rules. Since the entire disbursement of pension was made out of other sources (Govt. grant etc.), no disbursement of pension was made from the accumulated fund.

The ledger account may be reconciled and the balance amount held with the institute accumulated through Govt. grants/contribution refunded back to the Govt. of India (DST).

(ii) Unutilised Grants-in-aid (Scheduled Tribes Component)

An amount of ₹16.36 crore against 'Other Current Liabilities' under Schedule-7 'Current Liabilities and Provisions' included an unspent balance of ₹8.62 crore (GL 1013) lying with the institute since 2018-19 against annual grants-in-aid (Scheduled Tribes). It was noticed from

^{1 ₹ 57.80} lakh, ₹ 101.76 lakh, ₹ 9.61 lakh, ₹ 6.68 lakh, ₹ 50.10 lakh



the accounts that the institute had incurred an expenditure of ₹46.39 lakh during 2024-25 for some in-house/intramural projects and newspaper advertisements without obtaining any permission to utilise the funds after 2018-19. Since no carry forward permission was granted/obtained for utilisation of the grant after 2018-19, required as per GFRs, any utilisation of this grant would be unauthorised. Thus, the entire amount lying with the institute may be refunded immediately along with interest earned over the years.

SCTIMST replied (August 2025) that the Institute decided to refund the amount to the Consolidated Fund of India (CFI) and the reply is silent about the refund of interest earned over the years. However, no supporting documents were provided to substantiate the claim.

C.3 Static balances under Earmarked/Endowment Funds

Scrutiny of receipts, payments and balances under various projects (526 Nos.) reported under Schedule-3 (External/Earmarked/Endowment Projects) of the Balance Sheet revealed that 263 projects (both BMT and Hospital Wing) had no receipt/payment transactions during the year 2024-25. Despite this, a liability of ₹5.09 crore was reflected in the accounts against these projects.

Without furnishing the date of closure of these projects, SCTIMST stated that unspent project funds are being verified and after completion of the project, remaining balance in the government funded projects are refunded along with interest. It was also added that the funds remaining in the private funded projects are retained for meeting possible future contingent liabilities.

However, funding agency wise details were not furnished and hence Audit could not confirm the unspent balance pending for refund under these projects.

D. Management Letter

Deficiencies which have not been included in this Separate Audit Report have been brought to the notice of the Management through a Management Letter issued separately for remedial/corrective action.

E. Assessment of Internal Controls

In order to verify the Internal Control Mechanism related issues, scrutiny of the records provided to audit revealed the following: -

i). Adequacy of Internal Control System

During the audit of the institute, the following deficiencies in relation to internal control system were observed: -



(I) Huge unsettled debtors against capital procurements

An amount of ₹21.57 crore reported in the accounts under Schedule-11 'Current Assets, Loans, Advances etc.' includes 81 number of unsettled advances (99 Nos.) totaling ₹8.96 crore, paid to suppliers between November 2006 and March 2024 for the procurement of capital items/equipment (GL Code 2701) by the Hospital as well as BMT Division. Besides, advances paid for payment of custom duty ₹ 25.26 lakh (GL 2705) between July 2007 and March 2021 were lying unsettled. Hence, it is recommended that a thorough review of these long-outstanding advances be undertaken to assess the status of the intended procurements. Based on the findings, the advances should either be capitalised upon receipt of the items or recovered promptly in cases where the procurements have not materialised.

(II) Huge unsettled creditors against suppliers and expenses

(i) The amount of ₹27.29 crore shown under Schedule-7 'Current Liabilities and Provisions' as 'Sundry Creditors for Goods' includes ₹5.91 crore against 648 creditors for expenses (GL Code 1215) booked between March 2016 and March 2024, and ₹6.61 crore pertaining to 160 creditors for the supply of services/materials, including capital items (GL Code 1205), lying outstanding for payment from February 2018 to March 2024 in both the Hospital and BMT divisions of SCTIMST. Hence, it is recommended that a review of these old payables lying in the accounts may be undertaken to verify the actual expense of the envisaged items from these 808 vendors in order to settle these long pending liabilities.

ii). Adequacy of Internal Audit Systems

The Internal Audit Wing of the Principal Accounts Office, Ministry of Science and Technology (MST), conducted an internal audit of SCTIMST in August 2023, covering the period from April 2021 to March 2023. The internal audit identified a total of 29 outstanding paras, including 9 paras pertaining to the period from 2009-10 to 2020-21. Audit observed that no response had been furnished for settlement of these outstanding paragraphs till date.

Besides that, the institute's Resident Internal Audit Division (IAD), led by the Internal Audit Officer, also conducts pre-audit of the institutional activities and submits a monthly summary of the pre-audited files, along with remarks, to the Director for necessary remedial action.



iii). System of Physical Verification of Fixed Assets

According to Rule 213(1) of General Financial Rules (GFR), 2017 the fixed assets should be verified at least once in a year and outcome of the verification recorded in the corresponding register of assets. Physical verification of the fixed assets of SCTIMST for the year 2024-25 was initiated and a total of 99 departments were identified for the verification. Out of 99 departments, 47 departments submitted stock verification certificate and the remaining 52 departments have not yet completed the process and most of them have requested additional time to complete the verification.

Audit observed that a lot of items are condemned and kept for disposal however, no action has been taken for disposal of these items.

iv). System of Physical Verification of Inventory

The physical stock verification of Main Store items at SCTIMST for the year 2024-25 revealed that 26 expired items (93,421 Nos.) were included among the 182 issuable items in the Main Stores inventory. Though approval for the disposal of these expired items was granted by the Competent Authority in May 2024, no further action was taken for disposal of these expired items.

v). System of Physical Verification of Library

The institute has a total 58,210 number of books, back volumes etc. maintained in two libraries, (one at Hospital wing with 37,986 books and another at Biomedical Technology Wing (BMT) with 20,224 books). Physical verification of these libraries was conducted upto March 2023 after a period of three years. At Hospital wing, five books of ₹ 22,549/- were reported as missing during 2020 & 2023 verification and yet to be traced-out and two more books costing ₹ 6,811/- could not be traced during the stock verification in 2023. Similarly, one book valued at ₹ 35/-was reported missing at the BMT Wing. Audit observed that the financial impact of these missing books was not accounted for in the Institute's annual financial statements.

vi). Regularity in Payment of statutory Dues

SCTIMST is regular in depositing undisputed statutory dues including Provident Fund, Employees state insurance, Income Tax, Sales Tax, Custom Duty, Cess, Service Tax and Other statutory dues with the appropriate authorities.

F. Grants-in-aid

Out of the Grants-in-Aid of ₹ 357.08 crore received during the year, opening balance of ₹16.92 crore as cash-in-hand/at bank, and ₹155.08 crore as receipts towards Interest Received on Bank Deposits, Loans, Advances, Patient Services, Royalty, Fees, Subscriptions and other receipts etc, the organisation could utilise a sum of 491.49 crore leaving a balance of ₹37.59 crore as on 31st March 2025.



Additionally, the institute has investments and deposits of ₹568.78 crore out of Earmarked Projects/Funds, Funds for procurement of Equipment/Construction of new hospital block, LCs from generated funds etc. shown in Schedule-9, 10 & 11 pertaining to the Balance Sheet.

For and on behalf of the CAG of India

Place: New Delhi Date: 03.11.2025

Director General of Audit Central Expenditure (Environment and Scientific Departments)



Reply to Separate Audit Report of the Comptroller & Auditor General of India on the Accounts of Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Thiruvananthapuram for the year ended 31st March 2025.

Audit Para No.	Details	Reply
A. Balance Sheet A.1. Liabilities A.1.1. Current Liabilities and Provisions (Schedule 7 – Rs. 58.20 crore)	No provision of retirement benefit of Rs. 85106 lakh on the basis of actuarial valuation report as prescribed in provision of AS 15. This resulted in understatement of Current Liabilities and Provision and Capital Fund by Rs. 85106 lakh. Further disclosure required as per AS 15 is not made in Notes to Accounts.	Provision for pensionary benefits was not created due to an insufficient balance in the pension fund. On every year actuarial valuation is being done. The total liability is declared in the notes forming part of the Balance Sheet. There were audit observations on the non-creation of provisions for retirement benefits in previous financial years till 2023. In 2022-23, DST assured to take care of the pensionary benefits as per 7th CPC provisions through Grants-in-Aid. DST was not in a position to provide for huge investment for pension funds of the Institute, and so the provision was not considered feasible. However, to comply with AS 15, actuarial valuation is done every financial year, and the liability was rightly disclosed in the notes forming part of the Balance Sheet.
A.1.1.2	No provision was made in the accounts for the expenditure of Rs 23.48 lakh towards leave salary and pension contribution payable in connection with the deputation of an official for the period 01.04.22 to 31.03.24. This had resulted in understatement of liabilities and of prior period expenditure, both by Rs 23.48 lakh.	Provision for Leave Salary & Pension Contribution payable in connection with the deputation of officials will be made from the financial year 2025-26 onwards.
B. Income & Expenditure Account B. I Income Overstatement of Income (Schedule-17 'Interest Earned' - Rs 24.46 crore)	Bank interest of Rs.48.92 lakh earned on the project balances held as liabilities under Schedule-3 'Earmarked/Endowment Fund' (GL Code-5000 Project Suspense) was transferred to institute's account as its income under Schedule-17 'Interest Earned' from term deposits created out of funds under the projects by Central/State Govt. agencies etc. Since, the interest was to be apportioned among these projects only, this had resulted in overstatement of income, besides understatement of liabilities on account of 'Earmarked/Endowment Funds' by Rs.48.92 lakh.	Audit may please note that the research grants were received from various funding agencies for the purpose of utilization of the same towards the expenditure of project activities spread of the duration of the project. The interest earned is only incidental income on holding the funds in Bank account for utilization towards committed expenditure payable on becoming due. The stated amount does not consist for project scheme funded by DST and DBT, where in Zero Balance Subsidiary Accounts are maintained and as such the question of earning and refund of interest does not arise. In all other cases where the Bank interest earned is refundable as per the terms and condition for the grant-in-aid, the same is regularly being transferred. The stated amount of interest earned is an incidental income earned during the course of temporary holding of funds pending utilization of funds for project activities, when it becomes due Income which are nonrefundable are transferred to the interest income of the Institute.



C. General C.1. Records not available/ provided

(i) Suspense Balance Suspense Account is an account that can be used temporarily to carry doubtful receipts and reimbursements or discrepancies pending their analysis and permanent classification (i.e. an account in the general ledger in which amounts were temporarily recorded).

However, scrutiny of the ledger balances with the figures shown in the annual accounts of SCTIMST revealed five suspense accounts with balance of 22.26 crore/ (three suspense accounts with GL Code 5000 - Project Suspense under Schedule-3 and two suspense accounts with GL Code 2780 - Hospital and BMT wing) pertaining to liabilities side of the Balance Sheet against which funds would have been kept lying in the accounts.

As the balances under these ledgers retained since long and transaction wise details were not maintained for the balances recorded in all these six ledgers for ascertaining the actual / permanent classification, Audit disclaims any opinion on the correctness of liabilities shown against more than 500 projects under Schedule-3 'Earmarked/Endowment Funds' related to the Balance Sheet of the institute besides the amount held under various unverified suspense balances shown in the accounts

(ii)
Incomplete
Provident Fund
Accounts

As per the Uniform Format of Accounts prescribed for Central Government Autonomous Bodies, Annual Accounts should have comprised of Receipts and Payments Account, Income and Expenditure Account and Balance Sheet of the entity. However, SCTIMST did not annex/ provide the Income and Expenditure Account along with the Balance Sheet for the Provident Fund Account maintained by the institute. As the PF accounts were incomplete, the same could not be certified in Audit. Any possible omission/errors in these accounts are, therefore, disclaimed.

(i) GL 5000 is used as a control account to maintain the creditors for purchases using project funds. When the item is received after debiting the concerned project for expenditure. a credit entry for payable to the supplier is made in the GL 5000. This entry will be nullified on the release of payment to the supplier after due verification. There may be instances of payments to be made during the next financial year, which will lead to a substantial reduction in the balance. Reconciliation is being made to identify the amounts payable, and rectification entries, if any, is to be made. The exercise would be completed before the end of the financial year 2025-26. The technical issues pointed out by the audit are being examined by the Systems Department. Suspense a/c with GL 2780 is maintained for unidentified credits in the bank account, including RTGS by patients towards advance for IP admission, which will subsequently be charged to the IP advance ledger at the time of admission.

The Suspense a/c of projects is Rs.1.58 crore, which is only 3% as against the total receipt of project funds (Rs.51,74,92,478) which is negligible based on the materiality concept.

Fully reconciled suspense a/c will be submitted in the next audit. Earnest efforts will be taken to minimize accumulation under these accounts. Based on the above explanations, the audit observation may kindly be dropped.

It may please be noted that Trial Balance, Receipts and payments and Balance sheet of the GPF account were prepared and submitted to Audit. GPF a/c consists of Subscription from the employees covered under the scheme as receipts and Loan/Withdrawal and final settlement on retirement as payments. The only other item in the account is interest earned on the investment of fund in term deposits and the interest paid/payable to the subscribers on the member's balance. These income and expenses are maintained in the same ledger account right from the inception of the fund and as the surplus/deficit if any is not attributable to any other account, the income and expenditure account was not prepared.

However, steps will be taken to prepare the I&E account from next financial year onwards as observed by the audit. In view of the above, audit para may please be dropped.



C.2 Nonrefund of interest earned and unutilized funds of the Govt. of India

An amount of Rs.38.76 crore was depicted as liability towards 'Employee Pension Fund' (GL 1301) and included in the total amount of Rs.290.10 crore under Schedule-3 'Earmarked/ Endowment Funds' created for releasing the pension dues as per CCS Pension Rules. Since the entire disbursement of pension was made out of other sources (Govt. grant etc.), no disbursement of pension was made from the accumulated fund.

The ledger account will be scrutinized for reconciliation and to confirm the balance and necessary action would be taken during the F. Y 2025-26.

(i) Non utilisation of Employee Pension Fund

The ledger account may be reconciled and the balance amount held with the institute accumulated through Govt. grants/contribution refunded back to the Govt. of India (DST).

Institute has already taken up the matter with Department of Science and Technology for necessary permission to utilize/refund the funds lying under Schedule Tribes component. As there is no favorable reply from DST, Institute decided to refund the amount to the Consolidated Fund of India. This may be verified in the next audit.

(ii) Unutilized Grants-in-aid (Scheduled Tribes Component) An amount of Rs.216.36 crore against 'Other Current Liabilities' under Schedule-7 'Current Liabilities and Provisions' included an unspent balance of Rs.28.62 crore (GL 1013) lying with the institute since 2018-19 against annual grantsin-aid (Scheduled Tribes). It was noticed from the accounts that the institute had incurred an expenditure of Rs.246.39 lakh during 2024-25 for some in-house/intramural projects and newspaper advertisements without obtaining any permission to utilize the funds after 2018-19. Since no carry forward permission was granted/obtained for utilization of the grant after 2018-19, required as per GFRs, any utilization of this grant would be un authorized. Thus, the entire amount lying with the institute may be refunded immediately along with interest earned over the years.

SCTIMST replied (August 2025) that the Institute decided to refund the amount to the Consolidated Fund of India (CFI) and the reply is silent about the refund of interest earned over the years. However, no supporting documents were provided to substantiate the claim.



C.3 Static balances under Earmarked/ Endowment Funds	Scrutiny of receipts, payments and balances under various projects (526 Nos.) reported under Schedule-3 (External/Earmarked/Endowment projects) of the Balance Sheet revealed that 263 projects (both BMT and Hospital Wing) had no receipt/payment transactions during the year 2024-25. Despite this, a liability of 25.09 crore was reflected in the accounts against these projects. Without furnishing the date of closure of these projects, SCTIMST stated that unspent project funds are being verified and after completion of the project, remaining balance in the government funded projects are refunded along with interest. It was also added that the funds remaining in the private funded projects are retained for meeting possible future contingent liabilities. However, funding agency wise details were not furnished and hence Audit could not confirm the unspent balance pending for refund under these projects.	Steps are being taken to furnish the funding agency wise details of the projects in which unspent balance is static even after completion of the project tenure. It was also pointed out to the audit that there is an order from GST department to remit GST on the project funds received during the period from 2017 to 2024 bases on a show cause notice. All unspent balance under the Government funded project will be refunded with interest to the funding agencies and is duly shown as liability in balance sheet. Remaining balance will be taken to the miscellaneous income of the Institute after paying off the necessary tax liability if any after the final verdict of appeal pending before the GST department.
D. Management Letter	Deficiencies which have not been included in this Separate Audit Report have been brought to the notice of the Management through a Management Letter issued separately for remedial/corrective action.	The points mentioned in the Management letter are noted for future guidance and remedial/corrective action.
E. Assessment of Internal Controls i). Adequacy of Internal Control System	In order to verify the Internal Control Mechanism related issues, scrutiny of the records provided to audit revealed the following: - In order to verify the Internal Control Mechanism related issues, scrutiny of the records provided to audit revealed the following: - During the audit of the institute, the following deficiencies in relation to internal control system were observed: -	
(I) Huge unsettled debtors against capital procurements	An amount of Rs. 221.57 crore reported in the accounts under Schedule-11 'Current Assets, Loans, Advances etc.' includes 81 number of unsettled advances (99 Nos.) totaling Rs.28.96 crore, paid to suppliers between November 2006 and March 2024 for the procurement of capital items/equipment (GL Code 2701) by the Hospital as well as BMT Division. Besides, advances paid for payment of custom duty Rs.25.26 lakh (GL 2705) between July 2007 and March 2021 were lying unsettled. Hence, it is recommended that a thorough review of these long-outstanding advances be undertaken to assess the status of the intended procurements. Based on the findings, the advances should either be capitalised upon receipt of the items or recovered promptly in cases where the procurements have not materialised.	Audit comment is noted. The review of all advances will be made and based on the findings; the advances will be either capitalized upon receipt of the items or recovered promptly in cases where the procurements have not materialized. The progress in this regard will be intimated to audit



(II) Huge unsettled creditors against suppliers and expenses

(i) The amount of ₹ 27.29 crore shown under Schedule-7 'Current Liabilities and Provisions' as 'Sundry Creditors for Goods' includes ₹ 5.91 crore against 648 creditors for expenses (GL Code 1215) booked between March 2016 and March 2024, and ₹ 6.61 crore pertaining to 160 creditors for the supply of services/materials, including capital items (GL Code 1205), lying outstanding for payment from February 2018 to March 2024 in both the Hospital and BMT divisions of SCTIMST. Hence, it is recommended that a review of these old payables lying in the accounts may be undertaken to verify the actual expense of the envisaged items from these 808 vendors in order to settle these long pending liabilities.

Audit comment is noted. The review of all payables will be made. The progress in this regard will be intimated at the time of next audit.

(ii) Adequacy of Internal Audit System

The Internal Audit Wing of the Principal Accounts Office, Ministry of Science and Technology (MST), conducted an internal audit of SCTIMST in August 2023, covering the period from April 2021 to March 2023. The internal audit identified a total of 29 outstanding paras, including 9 paras pertaining to the period from 2009-10 to 2020-21. Audit observed that no response had been furnished for settlement of these outstanding paragraphs till date.

Replies on the Internal audit were submitted to audit for verification. However, 29 paras are still outstanding even after furnishing the replies. However revised replies are being furnished which can also be verified in the next audit.

Audit observation is noted, and necessary

instructions will be issued to the concerned

departments to complete the process on time.

Besides that, the institute's Resident Internal Audit Division (IAD), led by the Internal Audit Officer, also conducts pre-audit of the institutional activities and submits a monthly summary of the pre-audited files, along with remarks, to the Director for necessary remedial action.

(iii) System of Physical Verification of Fixed Assets

According to Rule 213(1) of General Financial Rules (GFR), 2017 the fixed assets should be verified at least once in a year and outcome of the verification recorded in the corresponding register of assets. Physical verification of the fixed assets of SCTIMST for the year 2024-25 was initiated and a total of 99 departments were identified for the verification. Out of 99 departments, 47 departments submitted stock verification certificate and the remaining 52 departments have not yet completed the process and most of them have requested additional time to complete the verification.

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Audit observed that a lot of items are condemned and kept for disposal however, no action has been taken for disposal of these items.



(iv) System
of Physical
Verification of
Inventory

The physical stock verification of Main Store items at SCTIMST for the year 2024-25 revealed that 26 expired items (93,421 Nos.) were included among the 182 issuable items in the Main Stores inventory. Though approval for the disposal of these expired items was granted by the Competent Authority in May2024, no further action was taken for disposal of these expired items.

Audit observation is noted, and necessary instructions will be issued to the concerned departments to complete the process on time.

(v) System of Physical Verification of Library

The institute has a total 58,210 number of books, back volumes etc. maintained in two libraries. (one at Hospital wing with 37,986 books and another at Biomedical Technology Wing with 20,224 books). Physical verification of these libraries was conducted upto March2023 after a period of three years. At Hospital wing, five books of ₹22,549/- were reported as missing during 2020 & 2023 verification and yet to be traced-out and two more books costing ₹ 6,811/- could not be traced during the stock verification in 2023. Similarly, one book valued at ₹ 35/-was reported missing at the BMT Wing. Audit observed that the financial impact of these missing books was not accounted for in the Institute's annual financial statements.

Audit observation is noted and necessary instructions will be issued to the concerned departments to complete the process on time.

(vi) Regularity in payment of statutory Dues

SCTIMST is regular in depositing undisputed statutory dues including Provident Fund, Employees state Insurance, Income Tax, Sales Tax, Customs Duty, Cess, Service Tax and other statutory dues with appropriate authorities

All statutory payments, such as Provident Fund, Income Tax TDS of employees/pensioners and contractors, TDS on GST, GST, LIC, Customs Duty, and other Cess and dues are made on time to the respective authorities.

F. Grants-in-aid

Out of the Grants-in-Aid of Rs. 357.08 crore received during the year, opening balance of Rs. 16.92 crore as cash-in-hand/at bank and Rs. 155.08 crore as receipts towards Interest received on Bank Deposits, Loans, Advances, Patient services, Royalty, Fees, Subscriptions and other receipts etc. the organization could utilize a sum of Rs. 491.49 crore leaving a balance of Rs. 37.59 crore as on 31st March 2025.

Additionally, the Institute has investments and deposits of Rs. 568.78 crore out of Earmarked Projects/Funds, Funds for procurement of Equipment/ Construction of new hospital block, LCs from generated funds etc. shown in Schedule -9, 10 & 11 pertaining to Balance Sheet.

Grants-in-Aid received and utilized during the year Rs. 357.08 crore and the disclosed in the Notes forming part of Balance Sheet. Internal generation of Rs. 155.08 crore through various activities of Hospital patient care, R&D, Academic and others are detailed in the Income & Expenditure Statement. Investments are disclosed in the Schedule 9, 10 & 11 pertaining to Balance Sheet.