Poornaprajna Institute of Scientific Research

PROMOTED AND MANAGED BY ADMAR MUTT EDUCATION FOUNDATION (AMEF)

Recognised by Department of Scientific & Industrial Research (DSIR) and MAHE, Manipal

BROCHURE

Main Campus : # 167, Poornaprajnapura, Bidalur Post, Devanahalli, Bengaluru - 562 164
City Campus : # 4, 16th Cross, Sadashivanagar, Bengaluru - 560 080
Web : www.ppisr.res.in ; **Email** : office@ppisr.res.in

H.H. Sri Eeshapriya Theertha Swamiji
Chairman

H. H. Sri Vibudhesha Theertha Swamiji
Founder, (1928 - 2009)

H.H. Sri Vishwapriya Theertha Swamiji
Former Chairman

Vision : To promote and nurture excellence in the fundamental and applied sciences for the advancement of scientific knowledge and the benefit of mankind.

Poornaprajna Institute of Scientific Research (PPISR) is situated near Bengaluru International Airport on a sprawling area of 27 acres. It was conceptualized and founded by the late H. H. Sri Vibudhesha Theertha Swamiji, the Chief Pontiff of the Udupi Sri Admar Mutt to create a serene and congenial environment, where scientists would be inspired to carry out innovative and original research in fundamental and applied sciences. The foundation stone for the institute was laid in 1998 by the then Prime minister, Sri Atal Bihari Vajpayee and the institute buildings were inaugurated in 2003.

The institute is funded by Admar Mutt Education Foundation (AMEF). The foundation is a trust sponsored by the Admar Mutt Education Council (AMEC) and registered under the Karnataka Trust Act. The AMEC is presently running 30 Poornaprajna Educational Institutions which have earned a name for themselves in providing quality education at school and college level. A Board of trustees consisting of eminent personalities was constituted to oversee the growth of PPISR. Theoretical Physics and Mathematics Division was initially established and research activities were initiated by recruiting post doctoral fellows and later full-time faculty were appointed in 2005.

Two new divisions for experimental research; Materials Science & Catalysis and Biological Sciences were founded in 2010. A few enthusiastic scientists joined as core faculty with proven accomplishments in India and abroad, and initiated state-of-the-art laboratories for advanced research programmes. In addition to research, PPISR also conducting outreach activities to develop innovative and imaginative platform for pedagogy and also the platform for basic and applied research, aimed at school and college students and teachers. Distinguished professors from renowned institutions such as IISc, JNCASR, RRI, IIA, CeNS, CUK etc are graciously helping PPISR as adjunct/honorary professors and also as Doctoral Advisory Committee members. The Research Advisory Committee was formed to review and guide the overall progress of the research undertaken by different faculty at PPISR.

The mission of PPISR is to carry out world-class research involving multidisciplinary academic & industrial collaborations and thus help the graduate students to reach their full potential by providing research guidance and technical skills required to live and work in a complex society.

RECOGNITION

Department of Scientific and Industrial Research (DSIR),
Govt. of India, New Delhi

Manipal Academy of Higher Education (MAHE), Manipal
recognized PPISR as an R&D centre
for conducting PhD programmes.

FROM THE DIRECTOR'S DESK...

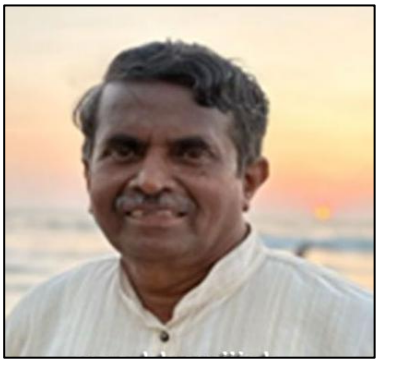
PPISR has been established with the aim of nurturing and promoting curiosity driven fundamental research in the basic sciences as well as the applied sciences. The main focus of our research activity is to be of relevance to the society at large, contributing to both new knowledge in frontier areas of research and also potential applications using multidisciplinary approaches. We are working to impart higher quality education to all students to carry out advanced research programmes leading to PhD degrees. The Institute has made a Signiant progress in terms of research programmes, research grants, and scientific meetings with eminent scientists during this period.

We are steadily making progress in highly competitive scientific research and PPISR is emerging into the limelight on the national and international stage by maintaining the uniqueness in the research field. Several new areas of research have been initiated through the projects sponsored by government agencies as well as industry sponsored projects. The Institute has published more than 480 research papers in national and international peer reviewed journals and filed two Indian patent applications as applicant along with four international patents have been filed by Scientists as inventors, out of which two US patents are granted. We believe that at a glance through this Brochure, you will understand that PPISR is on the right path in realizing H. H. Sri Vibudhesha Theertha Swamiji's dream of creating a vibrant and flourishing institutional environment for scientists and research scholars. It is currently carried forward under the guidance and encouragement of current Chairman HH Sri Eeshapriya Theertha Swamiji.

Dr. Ananda
Director (I/C), PPISR

BOARD OF TRUSTEES / MANAGEMENT

H. H. Sri Eeshapriya Theertha Swamiji Peetadhipathi, Shree Adamaru Matha Udupi	Chairman
Dr. A. P. Bhat, Professor (Rtd), PP College Udupi	Hon. Secretary
Sri G V Krishna, Chartered Accountant	Hon. Treasurer
Sri B.R. Prabhakara, IAS, Former Chief Secretary GOK	Member
Sri Rajendra J. Hinduja, Industrialist, Bengaluru	Member
Sri Laxmisha G. Acharya, Industrialist, Mumbai	Member
Dr. U. Shankar Rao, MD, National Hospital, Chennai	Member
Padma Shri Dr. V.R. Prahalada, Former Vice-Chancellor, Defence Institute of Advanced Technology (DIAT) Pune	Member
Prof. V. Nagaraja, Former President, JNCASR, Bengaluru	Member
Sri. Jayaprakash Madi, Industrialist Bengaluru	Member
Dr. Anand B. Halgeri, Former Director, PPISR	Adviser
Sri K. R. Prasad, Advocate, Bengaluru	Special Adviser
Dr. Ananda K, PPISR	Director (I/C)



Dr. A. P. Bhat
Hon. Secretary, AMEF & USAMEC

Sri. G. V. Krishna
Hon. Treasurer, AMEF & USAMEC

Research Accomplishments, Awards and Recognitions

- 32 students from PPISR have obtained their PhD degree from MAHE till now.
- 9 students have received Senior Research Fellowship from CSIR, Govt. of India, and 2 UGC JRF and 3 DST Inspire Fellows conducted PhD so far.
- Our research scholars have won several best presentation awards in various national/ international conferences.
- Four research scholars have won the prestigious Dr. KV Rao Research Awards given by Dr. K. V. Rao Scientific Society, Hyderabad.
- Ph.D. alumni of PPISR have got prestigious positions in Government and private organizations. Dr. Aravinda S. (Ph.D. in 2017) joined as Asst. Professor at Dept. of Physics, Indian Institute of Technology (IIT)-Tirupati. Dr. Manjunathan P. (Ph.D. in 2018) joined as Research Officer at Indian Oil Corporation, Govt. of India, Faridabad. Dr. Omkar S. (Ph.D. in 2015) was recruited as Quantum Architecture Developer at ORCA Computing, Toronto, Canada. Dr. Kempanna. S. K. (Ph.D. in 2021) joined as research scientist in the State Forensic Science Laboratory, Govt of Karnataka, Dr. Shweta (Ph.D. in 2022) working as Assistant Professor, National Forensic Science University, Gandhinagar, Gujarat. A few other alumni working as postdoctoral fellows in prestigious universities in the USA, Japan, Taiwan, Canada and Europe etc.

Bharat Ratna Prof. C. N. R. Rao Laboratory for Materials Science

Bharat Ratna Prof. C. N. R. Rao has recognized the high quality research conducted at PPISR during his visit to the institute in July 2015 and was very happy to donate funds to construct a new Materials Science laboratory. Subsequently, "Bharat Ratna Prof. C. N. R. Rao Laboratory for Materials Science" was inaugurated by him on July 28th 2016 in the presence of Prof. K. Kasturirangan, former Chairman, ISRO. This laboratory is conducting world class research in the area of novel energy and functional materials for diverse applications.

Materials Science and Catalysis

The Materials Science and Catalysis Division focuses on frontier areas - from clean energy solutions like CO_2 capture, biomass conversion, biogas valorization, and sustainable aviation fuels, to renewable solar fuels and chemicals. The division also works on advanced catalytic materials such as zeolites and mixed metal oxides, along with cutting-edge frameworks including metal–organic frameworks (MOFs) and covalent organic frameworks (COFs). In addition, they work on next-generation functional materials like organic semiconductors and electronic materials. In alignment with India's National Green Hydrogen Mission, our scientists are leading the transition to a green energy future. The institute has successfully pioneered and scaled up novel solar photocatalytic technology for hydrogen production. This leadership is demonstrated by our state-of-the-art pilot plant, the first of its kind, now operational on our campus. Partnership between industry and academics is the key step towards innovation and sustainable growth, while also ensuring that academic research remains industrially relevant. ***Over the past 15 years, scientists at Materials Science and Catalysis Division have successfully completed 21 industry-sponsored projects.***

Faculty

Dr. Sanjeev P. Maradur
Associate Professor & HOD
Ph.D: Shivaji University
Research Scientist, Jubilant Organosys Ltd
Postdoc: KAIST, CNU, S. Korea, University of Oklahoma, USA
Heterogeneous Catalysis

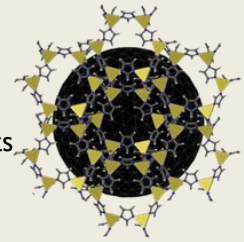
Dr.Naresh Nalajala
Assistant Professor
Ph.D: IITB-Monash Research Academy, Postdoc: NCL-Pune
(NPDF and Pool Scientist)
Electrocatalysis, Photocatalysis

Dr.Naga Suresh Enjamuri
Assistant Professor
Ph.D: IIT (ISM) Dhanbad
Postdoc: NCL-Pune, Hokkaido University Japan
Heterogeneous Catalysis

Dr. Shivakumar K. I.
Assistant Professor
Ph.D: CSIR NCL Pune
Postdoc: Polish Academy of Science Poland, Hokkaido University Japan
Functional Organic Materials

Areas of Research

- Heterogeneous Catalysis (Zeolites)
- Catalytic biomass transformations
- Catalytic CO_2, C-1 activation to value added products
- Porous Polymers, COFs & MOF materials



- Photocatalysis, Green Hydrogen, NH_3 Production
- Material development for Gas Sensing
- Catalytic CO_2, C-1 activation to value added products
- Organic semiconductors and electronic materials

Major Research Highlights

- More than 180 publications in reputed national/ international journals in last 15 years with average impact factor of >3.0.
- 21 industry sponsored projects and 11 Govt sponsored projects have been successfully conducted. 1 sponsored project are currently underway.
- 17 Research scholars obtained PhD degree from Materials Science Dept (award by Manipal University).
- 7 M. Tech. thesis guided as external guides in collaboration with other institutes.
- Three faculty have received "Award for research Publications" from VGST, Govt of Karnataka
- Received plaques from GTC Technology Inc, USA in appreciation of contribution in developing 1st and 2nd generation catalysts for toluene methylation process which was announced as technology world wide by GTC.
- 3 world (PCT) and 3 US patents filed by HPCL R & D in collaboration with Catalysis group of Materials science as co-inventors.
- Faculty are Referees for international journals such as Chemical Communications, RSC Advances, Catalysis Science &Technology, Appl. Catal. A, Catal. Commun., J. Chem. Sc., Chemical Eng J, etc.
- Research scholars have received 30 best paper presentation awards in national/ international conferences.
- Several conferences and workshops have been organized by Materials Science and Catalysis Department.

Biological Sciences

Driven by curiosity to understand nature's ingenuity in creation, starting from simple atoms to the generation of molecules, assemblies and their controlled interaction culminating at continuously evolving creatures appears to be a never ending endeavor. We at the Biological Sciences division are striving to play our part towards this journey and the the scientists conducting research in the frontier areas such as mycology, protein chemistry, and structural biology.

Faculty

Dr. Ananda K
Director (I/C).
& Associate Professor

PhD: Mangalore University **Post Doc:** Albert Einstein College of Medicine, NewYork, USA

Microbiology and Biochemistry

Dr. Amrutha A. S.,
Assistant Professor

PhD: Hokkaido University ,Japan
Postdoctoral Doctoral experience: RIES, ICReDD, Hokkaido University, Japan,
Asst. Professor, RIES, Hokkaido University, Japan

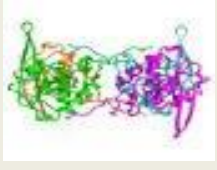
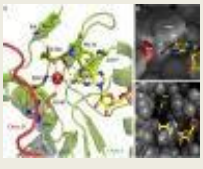
Areas of expertise: Photopharmacology, Photochemistry, Peptide chemistry, Organic Synthesis, Motor Proteins

Areas of Research

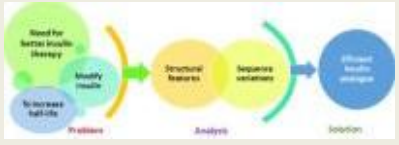
Structure based functional characterization of key molecules of biological and medicinal importance.





Chemical modification of therapeutic proteins and drugs using linker chemistry and polyethylene glycol to enhance their activity and half life.




Structure guided modification of T-cell costimulatory molecules to generate lead biologics to treat autoimmune disorders and cancer

Studies on endophytic fungi from medicinal plants and their secondary metabolites, bioactive compounds, enzymes etc.

Facilities and Strength

The biological science division has research facility with more than 3000 sq. ft of lab space. It is equipped with "gene-to-structure" molecular and structural biology facilities, extraction of plants and microbial metabolites, chemical modification and bio-conjugation of therapeutic proteins including their purification and characterization.

Major Research Highlights

- Biological Sciences Division has received six research grants from granting agencies such as DBT, DST and DAE, Govt. of India and VGST, Govt. of Karnataka since 2012 and support from global pharmaceutical company *Bristol Myers Sqibb*. The division has 50 research publications to its credit, 8 PhD degrees were awarded and 11 students received the best oral presentation awards since 2011.
- The division has established collaboration with several national and international organizations.
- Around 25 protein structures were determined and around 20 of them were deposited in Protein Data Bank (PDB) from PPISR since 2011.
- Thirty two endophytic fungi were identified by genomic sequencing of internal transcribed spacer (ITS) region and were deposited in GenBank in the name of PPISR.
- The department has filed two Indian patents; one based on insulin research and the other on immunology research.

Theoretical Sciences

The division works in the broad fields of many-body and mesoscopic physics, nanoscience, quantum information theory, quantum communication, quantum cryptography, the foundations of quantum mechanics and astrophysics

Mission and Goals

- Topological states of matter in many-body quantum systems
- Quantum cryptography and quantum noisy channels
- Space-time geodetic analysis of condensed matter systems
- Foundations of quantum nonlocality and contextuality
- Solar surface phenomena (convective network, etc.)

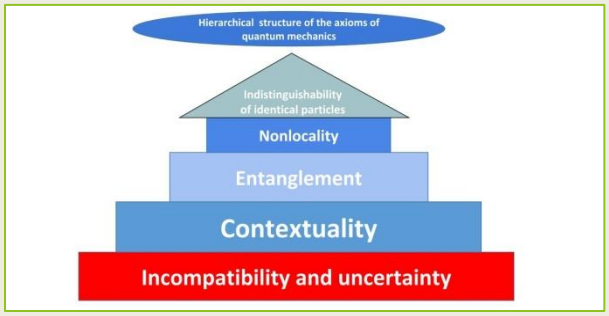
Faculty

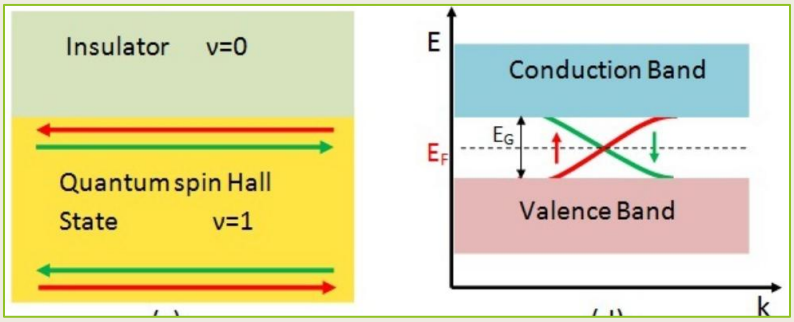
Dr. Sujit Sarkar
Associate Professor
PhD: SINP, Kolkata
Post Doc: BIU, Israel, WIS, Israel
Visiting Scientist: MPE, Germany

Topological State of Matter & Quantum Many body Physics

Dr. R. Srikanth
Associate Professor
PhD: IISc, Bengaluru
Post Doc: IIA Bengaluru, RRI, Bengaluru

Quantum Information & Foundations





Glimpses of Current Research

- Interplay of topology and Zak phase for different Hamiltonian systems
- Quantum non-Markovianity, information flow and error mitigation
- Interplay of symmetry and topology of Kitaev spin chain under interaction
- Quantum ghost imaging and cryptography over a quantum network
- Berry connection for the topological states in quantum matter
- Fractal and time-series analysis of Solar supergranulation
- Topological state of matter and conformal field theory in condensed matter physics.

Major Research highlights

- More than 150 publications in the area of theoretical physics and mathematics in reputed international journals like Scientific Reports (Nature), Physical Review A, Physical Review B, Nuclear Physics B, Quantum Information Processing, Physica B: Condensed Matter, Physica Scripta, Physics Letters A, Quanta, Advance in Theoretical & Mathematical Physics, among others. Two book chapters were also contributed by this division.
- Seven sponsored research projects till 2018 were sponsored by Govt. agencies and two PhDs were graduated from this division
- The faculty have several scientific collaborations with scientists at reputed institutes in India and abroad

Industry-Academia Partnership

Partnership between industry and academics is the key step towards innovation and sustainable growth and also ensures industrial relevance in academic research. Over the last 15 years, scientists of PPISR at materials science and catalysis division executed almost 21 industry projects successfully. The successful completion of the industry projects increased the reputation of PPISR as one of the very few research institutes which are truly having partnerships with industries on a continuous basis. The success in industry projects also built trust on PPISR because of which industries are approaching PPISR on regular basis with intent to give projects.

Success stories of PPISR

- PPISR successfully developed 1st and 2nd generation zeolite-based catalysts for aromatic technology
- PPISR received plaques in appreciation by GTC Technology Inc in 2012, 2014 and 2015 for developing 1st and 2nd generation catalysts for GT-Tolalk Technology.
- GTC announced GT-Tolalk Technology world wide in 2014.
- GTC licenced the technology to a Chinese refinery in 2015.
- The project sponsored by HP Green R & D Centre, HPCL completed successfully with 3 US patents granted where PPISR Scientists are co-inventors.

Poornaprajna Analytical Center

Poornaprajna Analytical Center (PAC) is available for all researchers from academic institutions and industry to characterize their samples. The instrumentsthat are available at PAC. Atomic absorption spectrophotometer (AAS) (Perkin Elmer), Fourier Transform Infrared Spectrophotometer (FTIR) (Bruker), Ultra Violet-Visible Spectrophotometer (UV-VIS) (Perkin Elmer), Powder X-Ray Diffractometer (PXRD) (Bruker), Chemisorption instrument(TPD, TPR, TPO), Surface Area Analyzer (N_2 sorption, BET)

Industry Sponsored Projects : 23 projects during 2010-2025

GTC Technology · HP · Shell · DEEPAK NOVOCHEM TECHNOLOGIES LIMITED · DEEPAK NITRITE · THERMAX · Bristol-Myers Squibb · GTC VORRO Environmental Services LLC · SULZER GTC Sulzer GTC Technology US Inc. · SRAVATHI · SUNLUX · SRAVATHI

Government Sponsored Projects: 26 projects during 2010-2025

SERB DIA — Science & Engineering Research Board, Department of Science & Technology, Government of India · Department of Biotechnology, Govt. of India · DRDO — Defence R&D Organisation, Ministry of Defence · BRNS — Atoms in the Service of the Nation · Government of Karnataka, Vision Group on Science and Technology, Department of Information Technology, Biotechnology and Science and Technology

Major Achievements

Research publications

More than 425 peer-reviewed articles were published in prestigious international journals.

Sponsored Projects

Institute has successfully completed industry sponsored projects from GTC Technology Inc, USA; Shell Technology Center, Bengaluru, Hindustan Petroleum Corporation Ltd (HPCL), Bengaluru, Deepak Novochem Technologies, Pune, Deepak Nitrite, Vadodara and Thermax Industries Pune. Four patents were filed in which PPISR scientists are co-inventors and 2 US patents were granted. Based on the project work at PPISR, GTC announced a GT-TolAlk technology worldwide in 2014. PPISR Scientists visited China for scale-up studies and also GTC Houston Office for a review meeting and technical discussion.

There are several projects sponsored by Govt. agencies including Department of Science and Technology (DST), Govt. of India; Dept. of Biotechnology (DBT), Govt. of India, Dept. of Space/ ISRO, Govt. of India and Vision Group of Science and Technology (VGST), Govt. of Karnataka.

Awards and accolades to faculty and students

The faculty received Award for Research Publications (ARP), invitations to give talks in national and international conferences and faculty became editorial board members of journals. They also made several visits abroad for invited talks, review meetings, synchrotron measurements, collaborative projects. Several doctoral students received best oral/poster presentation awards for their research work presented in national and international conferences.

Major conferences and workshops

23rd National Symposium on Catalysis with PPISR as organizing member of Catalysis Society of India, Bengaluru Chapter in January 2018; A dialog on Modern Science and Ancient Insights on Reality in October 2016; Thematic Workshop on Diffraction Methods for Structural Analysis in Materials Science sponsored by UGC-DAE in July 2016; Dialogue on Indian Philosophy and Modern Science in December 2015; Workshop on "Advances Of Theoretical Condensed Matter Physics in March 2016; Faculty Development Programme sponsored by VGST, Govt. of Karnataka on "Frontier Areas in Chemistry" in Feb, 2012; Five-days Summer School and Winter School for undergraduate students in Chemistry, Physics and Biological Science every year since 2011; Lecture Workshop on Advances in Biological Sciences Jointly organized by Science Academies of India and PPISR in January 2011; National Workshop on Advances in Materials Research Jointly organized by Science Academies of India and PPISR, in August 2010.

Research Facilities

Major Analytical Instruments

X-ray Diffractometer

HPLC

Chemisorption instrument

Surface area analyzer

Gas Sensing Analyzer

Atomic Absorption Spectrometer

Fluorescence & UV-Vis Spectrophotometer

FT-IR Spectrophotometer

Gas Chromatographs

TGA/DTA/DSC

Fast protein liquid chromatography

Catalytic Reactors

Fully Automated High Pressure Catalyst Testing Unit

Vapor phase down flow quartz reactors

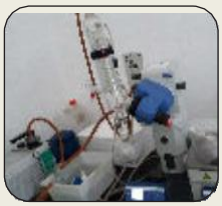
Photocatalytic Reactor

High pressure SS batch reactors

Solar simulator

Biological Facilities

ELISA plate Reader



Rotary Evaporator

Nano Drop

Cold centrifuge

PCR

Cold Room

FPLC

Smart reader

Microscope

Other Facilities

- Ultrasonicator
- pH and conductivity meter
- Programmable muffle furnaces
- Programmable tube furnaces
- Hot air Ovens
- Mechanical stirrers
- Microbial Culture
- Electric kneader
- Electric Extruder
- Crush Strength analyzer
- Attrition resistance tester
- Rotary Evaporators
- Ultra Cryostat
- HPLC Pumps
- Teflon lined autoclaves
- Distillation unit
- Oil baths
- Water baths
- Vacuum pump
- manual Extruder
- Cell Culture Lab

Photo Gallery

Plaque award by GTC USA for Catalyst & technology development

PhD award to students of PPISR at MAHE convocation ceremony

Organization of CATSYMP-23 by PPISR under CSI-Bengaluru Chapter

Thematic Workshop on Diffraction Methods for Structural Analysis

Workshop on "Modern science and ancient insights on reality", sponsored by ICPR

Address by Bharat Ratna Prof. C. N. R. Rao

Visitors to PPISR

Prof. G. U. Kulkarni, President, JNCASR on endowment lecture series in memory of Founder of PPISR

Visit of H.H. Sri Eeshapriya Theertha Swamiji

Out-reach programme for high school students

Lecture Workshop on Advances in Biological Sciences

Annual Founder's day celebrations

Visit of B.Tech. Chem Eng Students from MVJ College of Engineering Bengaluru

Research Advisory Committee

Padma Shri Dr. V. R. Prahalada	Former VC- Defence Institute of Advanced Technology, Pune
Prof. G. U. Kulkarni	Former President, JNCASR, Bengaluru
Prof. T. N. Guru Row	Professor, SSCU, IISc, Bengaluru
Prof. S. Natarajan	Professor, SSCU, IISc, Bengaluru
Prof. Chandrabhas Narayana	Professor, CPMU, JNCASR, Bengaluru
Prof. S. Ramakumar	Professor, IISc, Bengaluru
Prof. Udaykumar Ranga	Professor, MBGU, JNCASR, Bengaluru
Prof. Balasubramanian Gopal	Professor, MBU, IISc, Bengaluru
Prof. C. Sivaram	Professor, IIA, Bengaluru
Prof. Jayant Murthy	Professor, IIA, Bengaluru
Prof. Udaya Shankar	Professor, RRI, Bengaluru
Dr. Ananda K (Member Secretary)	Director (I/C), PPISR

Administration

Dr. Ananda
Director (I/C)

Mr. Narayan Kulkarni
Administrative Officer

Dr. Sanjeev P. Maradur
HOD, Materials Science and Catalysis Division

Dr. R.Srikanth
HOD, Theoretical Science Division

For enquiries from interested individuals regarding materials characterization as well as sample analysis, PhD positions, M.Sc. internship training programmes, feel free to contact us at office@ppisr.res.in . For more details visit our website : www.ppisr.res.in