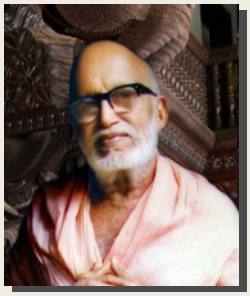
Poornaprajna Institute of Scientific Research

PROMOTED AND MANAGED BY ADMAR MUTT EDUCATION FOUNDATION (AMEF)

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

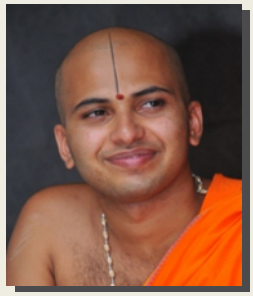
BROCHURE

Main Campus : # 167, Poornaprajnapura, Bidalur Post, Devanahalli, Bengaluru - 562 164
City Campus : # 4, 16th Cross, Sadashivanagar, Bengaluru - 560 080
Ph : 080 - 2361 1836 ; **Web :** www.ppisr.res.in ; **Email :** admin@poornaprajna.org



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

H.H. Sri Vishwapriya Theertha Swamiji
Chairman



H.H. Sri Eeshapriya Theertha Swamiji
Vice-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 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 significant 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 around 300 research papers in national and international peer reviewed journals and Four international patents have been filed, 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 H. H. Sri Vishwapriya Theertha Swamiji and also enthusiastic support from H. H. Sri Eeshapriya Theertha Swamiji.

Dr. Anand B. Halgeri
Director, PPISR

Board of Trustees / Management

H. H. Sri Vishwapriya Theertha Swamiji Peetadhipathi, Sri Admar Mutt, Udupi	Chairman
H. H. Sri Eeshapriya Theertha Swamiji Junior Swamiji, Sri Admar Mutt, Udupi	Vice-Chairman
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Sri H. L. Suresh, Chairman, Axens India Pvt. Ltd., New Delhi	Member
Prof. V. Nagaraja, President, JNCASR, Bengaluru	Member
Dr. Anand B. Halgeri, PPISR,	Director
Sri P. Sreenivasa Rao, PPISR,	Financial Advisor
Padma Vibhushan Prof. P. Rama Rao FASc, FNA, FNASc, Ex. Secretary, Ministry of S &T, GOI	Special Advisor
Sri K. R. Prasad, Advocate, Bengaluru	Special Advisor

Dr. K. Srihari
Hon. Secretary, AMEF & AMEC

Sri P. Sreenivasa Rao
Financial Advisor-PPISR,
Former Senior Deputy GM,
Finance & Vigilance,
Bharat Electronics, GOI.

Ph.D. Awards

Fifteen research scholars from PPISR have obtained their PhD degree from MAHE till mid 2020 in the following research areas.

- Catalytic biomass conversion and biodiesel synthesis
- Pore engineered zeolite catalysts for aromatization and aromatic substitution reactions
- Designing solid acid catalysts for Prins reaction and toluene methylation
- Functional Nanomaterials & band-gap engineering for photocatalysis & photoluminescence
- Metal-organic frameworks(MOFs) and their nanohybrids for heterogeneous Catalysis
- Sealed-tube pyrolysis for Nano-metal oxides
- Polymeric composite membranes for Pervaporation
- Bioactive compounds from endophytic fungi
- α-Amylase & aldose reductase inhibitors from endophytic fungi of medicinal plants
- Structural studies of purine phosphoribosyl transferases from pathogenic bacteria
- Effect of radiation on laccase producing endophytic fungi and applications of fungal laccase
- Quantum noise and quantum dynamics, Axiomatic aspects of contextuality and nonlocality
- Alkali rare earth double tungstates for PL, electrochemical & theoranaotics applications
- Mesoporous polymers and their application in adsorption and catalysis

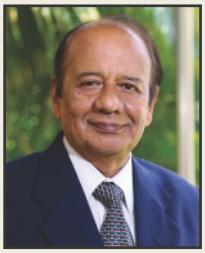
Bharat Ratna Prof. C. N. R. Rao Laboratory of Materials Science

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 aims to conduct world class research in the area of novel energy and functional materials for diverse applications.

Materials Science and Catalysis

Materials science division works in the frontier areas such as novel catalysts for green chemical processes, functional energy nanomaterials and novel material design. It has the state-of-the-art research facility and high caliber scientists working not only on novel materials synthesis but also on their applications in the area of catalysis, adsorption, sensors, photoluminescence, solar energy conversion etc. Apart from academic research, the faculty have also taken up industry sponsored projects to develop catalyst and processes for various transformations.

Faculty



Dr. Anand B. Halgeri
Director PhD: Bangalore Uni.
Post Doc. Uni. of Tokyo, Japan
Former Sr. Vice president IPCL & Reliance
Research: Heterogeneous Catalysis

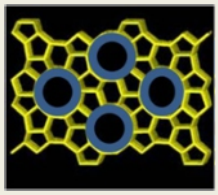
Dr. Ganapati V. Shanbhag
Associate Professor & HOD
PhD: NCL, Pune Post Doc. KAIST, Korea
Research: Heterogeneous Catalysis

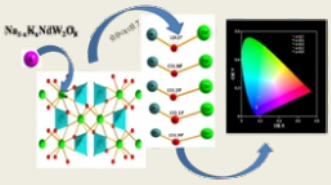
Dr. Sanjeev P. Maradur
Associate Professor
PhD: Shivaji University
Post Doc: KAIST and CNU, Korea,
University of Oklahoma, USA
Research: Heterogeneous Catalysis

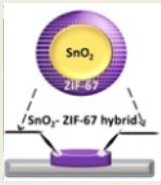
Dr. D. H. K. Murthy
Assistant Professor
PhD: TU Delft, the Netherlands
Postdoc: AIST Japan and NTU Singapore
Research: Solar Energy Conversion & Spectroscopy

Areas of Research

Heterogeneous catalysis; Shape selective acid-base catalysis; Novel catalytic materials design; Mesoporous catalysts; Hierarchical zeolites; Heteropoly metalates; Porous polymers; Heterogenization of homogeneous catalysts; Conversion of biomass platform chemicals; CO_2 transformation into value-added chemicals & fuels; Conversion of gas to liquids.







Functional inorganic nanomaterials as applied to photoluminescence, photocatalysis, gas sensing, H_2 generation, Solar cells, 2D materials for opto-electronics, crystallographic studies, metal-organic-frameworks, hybrid nanomaterials.

Major Research Highlights

- More than 100 research publications since 2011 in high impact journals including Applied Materials & Interfaces (ACS), Chemical Communications (RSC), Chemical Engineering Journal (Elsevier), Chemistry: A European Journal (Wiley), Catalysis Science & Technology (RSC), Journal of CO2 Utilization (Elsevier), Dalton Transactions (RSC), PCCP (RSC), Crystal Growth & design (ACS), Inorganic Chemistry (ACS), ChemCatChem (Wiley), New Journal of Chemistry (RSC), Applied Catalysis A (Elsevier), Catalysis Today (Elsevier), RSC Advances, Chemical Engineering Science (Elsevier)
- The Average impact factor (from JCR) of these journals is ~3.5
- 2 US patents were granted in a collaborative project and 5 book chapters have been published. 21 Best presentation awards were received by students in national and international conferences till mid 2020.
- 17 industry sponsored projects and 8 from Govt. agencies have been executed.
- A technology was successfully developed for the synthesis of aromatics by novel catalyst in an industry sponsored project.

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. Udupi A. Ramgopal
Associate Professor & Dean Academics
Ramalingaswamy Fellow (2011-2015)
PhD: IISc, Bengaluru
Post Doc: NCI/NIH, AECOM, USA

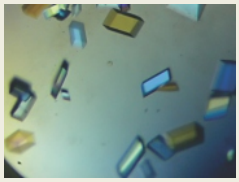
Molecular and Structural Biology

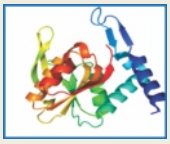
Dr. Ananda K.
Associate Professor
PhD: Mangalore University
Post Doc: AECOM, USA

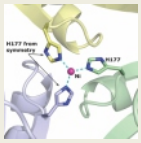
Microbiology and Biochemistry

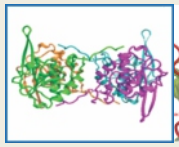
Areas of Research

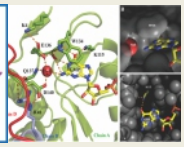
Structure based functional characterization of key molecules of biological and medicinal importance.





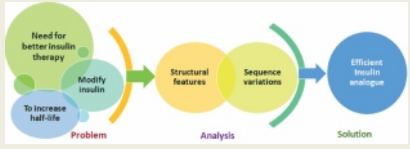


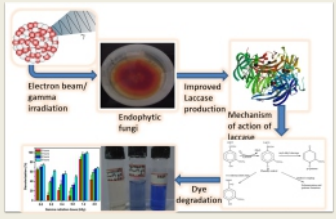


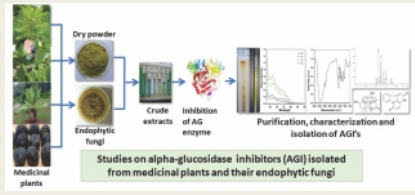


Structure guided modification of T-cell costimulatory molecules to generate lead biologics to treat autoimmune disorders and cancer

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







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 40 research publications to its credit, four PhD degrees were awarded and six 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.

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.)

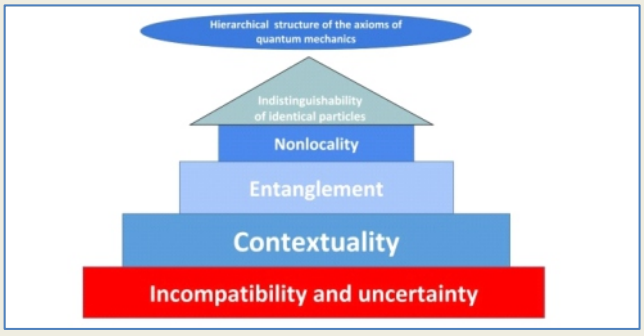
Faculty

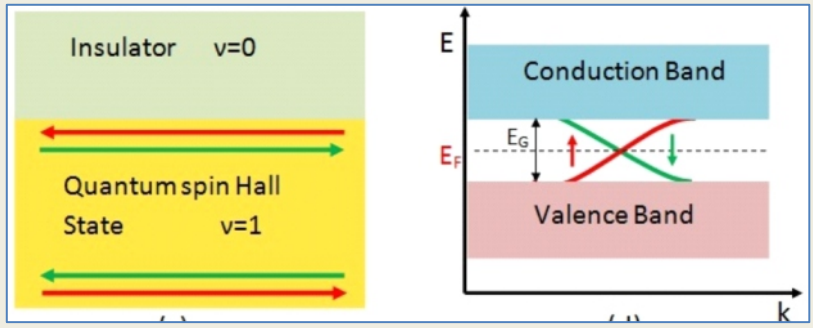
Dr. Sujit Sarkar
Associate Professor
PhD: SINP, Kolkata
Post Doc: BIU, Israel, WIS, Israel
Visiting Scientist: MPE, Germany

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: Quasi-eternal non-Markovian channels and resource theory
- Interplay of symmetry and topology of Kitaev spin chain under interaction
- Practical counterfactual quantum cryptography
- 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 100 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

Poornaprajna Analytical Center

Poornaprajna Analytical Center (PAC) is available for all researchers from academic institutions and industry to characterize their samples. Below mentioned are the instruments 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 (N2 sorption, BET), Simultaneous Thermal analyzer (TGA/DTA/DSC) (Perkin Elmer)

Industry Sponsored Projects

18 projects during 2010-2020

Government Sponsored Projects

23 projects during 2010-2020

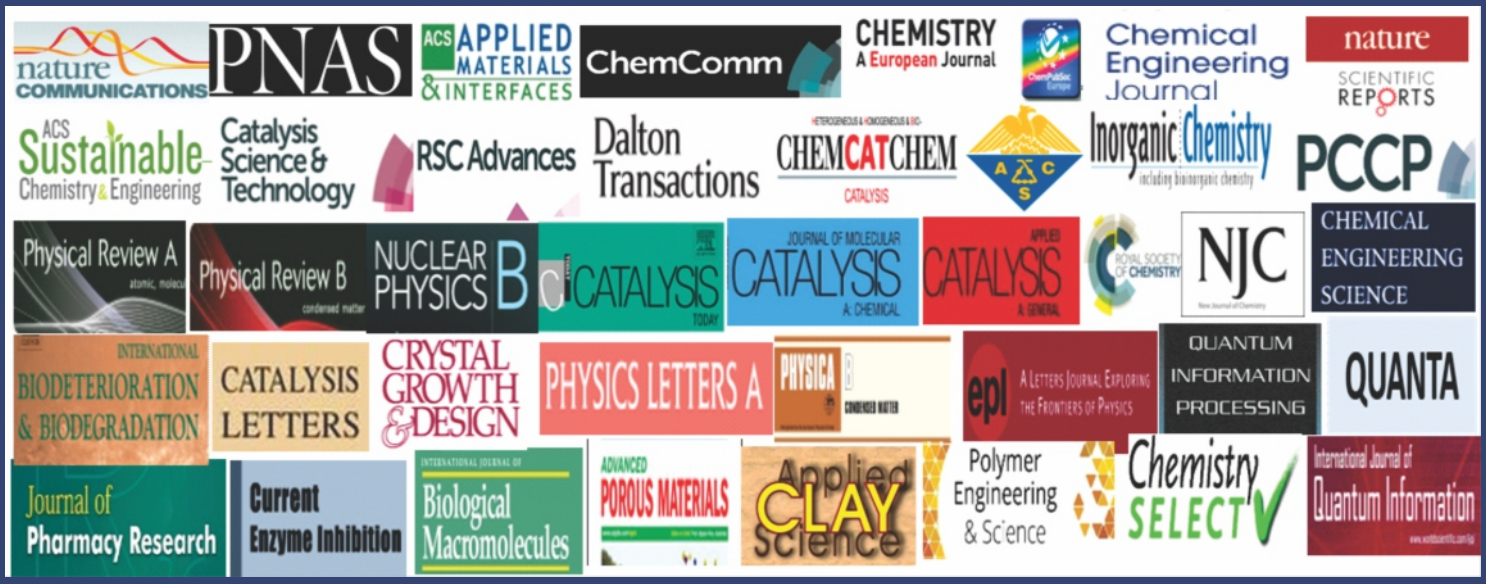
Scientific Collaborations

- The faculty of PPISR have international collaborations with reputed institutes like Albert Einstein College of Medicine New York USA; Karlshure Institute of Technology Germany; Oakridge National Laboratory (ORNL) USA and University of Newcastle Austrailia.
- The institute has MOU with many institutes for collaborative research like Argonne National Laboratory Chicago, Indo-Korea Science & Technology Center Bengaluru, IIT- Madras Chennai, Central University Gulbarga, SIT Tumkur, MSRIT Bengaluru, Nagarjuna College of Engineering and Technology Bengaluru.
- The research groups of PPISR have academic research collaborations with many national institutes like IISc Bengaluru, JNCASR Bengaluru, RRI Bengaluru, NIT Suratkal, MIT Manipal, IIT Ropar, IIT Rajastan, Bose Institute Kolkota, JIIT Noida, VBU Hazaribag, NCL Pune, IIT Kharagpur and Central University Kerala.

Major Achievements

Research Publications

Over 300 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 on 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


Fluorescence Spectrophotometer


Chemisorption instrument


Surface area analyzer


Gas Sensing Analyzer


Atomic Absorption Spectrometer


UV-Vis Spectrophotometer


FT-IR Spectrophotometer


Gas Chromatographs


TGA/DTA/DSC


High Performance Liquid Chromatography


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


Glass batch reactors

Biological Sciences Facilities


ELISA plate Reader


Rotary Evaporator


Nano Drop


Cold centrifuge


PCR

Green Features of PPISR

The architecture and surroundings of the institute includes several green and sustainable features in its 27-acre campus. It has 48 kW capacity solar photovoltaic cell panels to reduce the demand on conventional energy. The buildings are designed to decrease energy consumption by using natural day light and reduced dependence on artificial light. All the rooms are adequately cross ventilated and smoke and HC gas detectors have been installed. The picturesque campus and blossoming green environment with more than 5000 trees make it free from pollution.

Photo Gallery

Plaque award by GTC USA for a technology development in 2012

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

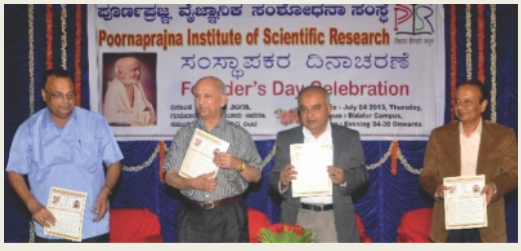
Workshop on "Modern science and ancient insights on reality", sponsored by ICPR

Address by Bharat Ratna Prof. C. N. R. Rao at Founder's Day 2015

HPCL team visit for review meeting

Plaque award by GTC USA in 2014

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



Annual Founder's day celebrations

Summer School for undergraduate students

Out-reach programme for high school students

More than 200 distinguished scientists / technologists visited the institute and have given lectures

Research Advisory Committee

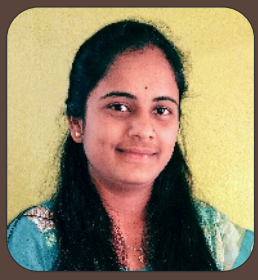
Prof. G. U. Kulkarni	President, JNCASR, Bengaluru
Prof. T. N. Guru Row	Professor, SSCU, IISc, Bengaluru
Prof. S. Natarajan	Professor, SSCU, IISc, Bengaluru
Prof. Chandrabhas Narayana	Professor, CPMU, JNCASR, Bengaluru
Prof. S. Ramakumar	Professor, IISc, Bengaluru
Prof. Udaykumar Ranga	Professor, MBGU, 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. Anand B. Halgeri (Member Secretary)	Director, PPISR

Administrative Staff

Mr. Kishore L. Gaikwad
Sr. Administrative Officer

Mr. Nagarajan R.
Accounts Officer

Mrs. Latha Srinivasan
Sr. Secretary to Director



Mrs. Nandini S.
Secretary to FA

We at PPISR