



Poornaprajna Institute of Scientific Research

PROMOTED AND MANAGED BY ADMAR MUTT EDUCATION FOUNDATION (AMEF)
Recognised by Dept. of Scientific & Industrial Research (DSIR) Govt. of India & MAHE, Manipal

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Newsletter

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In the news

- ★ Dr. Bhavana Kulkarni was successfully defended her PhD viva-voce examination and obtained doctoral degree from MAHE, Manipal in 2024.
- ★ Two industry projects sponsored by SABIC were successfully completed by Dr. Ganapati Shanbhag's group during 2024.
- ★ Several Govt. projects sponsored by DST, SERB, BRNS were successfully ongoing by Dr. R. Srikanth, Dr. Naresh Nalajala and Dr. Sujit Sarkar groups.
- ★ Four best presentation awards were received by Ph.D. students/faculty in 2024 at National and International conferences.
- ★ The Institute has published 26 research papers in highly reputed international journals and one US patent and one Indian patent has been filed this year.
- ★ Two MOUs were signed with well-known Institutes like QDit Labs and Institute of Wood Science & Technology (IWST), Bengaluru.
- ★ Dr. Ganapathi V. Shanbhag received the prestigious recognition of Fellow of Royal Society of Chemistry (FRSC) London in 2024 for his contributions in the area of Chemical Sciences.



H. H. Shree Eeshapriya Theertha Swamiji, Chairman



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



H. H. Shree 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

From the Director's Desk



It is my great pleasure to present the 15th volume of the "Newsletter," which highlights the activities and achievements of PPISR during 2024. This year, we continued our pursuit of excellence, reaching new milestones in both academic and sponsored research projects. The year began with challenging projects with SABIC Agri-Nutrients Company and SABIC Research and Technology Private Limited. Both projects were successfully completed b/y year-end. Additionally, four projects were initiated sponsored by DST-SERB on quantum physics, topological states of quantum matter, and hydrogen production through sunlight harvesting.

In 2024, the institute published 26 research papers in prestigious international journals and filed two patents. One of our doctoral students, Ms. Bhavana Kulkarni, who conducted her research under the guidance of Dr Sanjeev P. Maradur, submitted her PhD thesis to MAHE and was awarded her PhD in September 2024. Ms. Asha Devi, working under the mentorship of Dr Naresh Nalajala, received the DST-Inspire fellowship.

Dr Ananda, faculty member and two doctoral students, Mr. Harsha and Ms. Meghana, received awards for best oral/poster presentations at national and international conferences. Dr R. Srikanth was invited to serve as an Expert Member on the Expert Committee of the Karnataka Science and Technology Academy (KSTA), and Dr Ganapati V. Shanbhag was honoured as a Fellow of the Royal Society of Chemistry (FRSC), London, for his contributions to chemical sciences at PPISR. During this tenure, 33 research interns from various colleges and universities carried out research with our faculty as part of their MSc projects, leading to co-authored publications. We signed two MOUs with reputed organizations namely QDit Labs and ICFRE-IWST, to foster collaborative research and scientific exchange. Several events were successfully conducted, including PPISR's Annual Day Celebration, National Science Day, Founder's Day, Chemistry Day, and an outreach program titled "Today's Science for Tomorrow's Scientists," for students of all five Poornaprajna Education Centers' in Bengaluru. Furthermore, PPISR has introduced three new certificate programs in 2024: the Poornaprajna Post-Doctoral Fellow (PPDF), the Poornaprajna Senior Research Fellow (PSRF), and the Poornaprajna Junior Research Fellow (PJRF) programs. On the whole, the year 2024 was challenging, highly productive and successful. I would like to attribute all these achievements to excellent work carried by our team faculty members, students and staff members. I also would like to express my deep gratitude to H. H. Shree Eeshapriya Theertha Swamiji and AMEF management for their continuous support, encouragement and guidance to achieve these successful milestones.

Dr. A. B. Halgeri

Editorial



2024 evidenced to be a very productive year for PPISR across numerous fields. A total of seven sponsored projects, encircling both industry and government collaborations, were successfully executed. Moreover, the institute successfully completed two industry sponsored projects and five projects were ongoing with government partnerships. This year a total of 26 publications were published in high-impact journals, accompanied by the filing of one international and one national patent. Significant recognition was succeeded with four best presentation awards at national and international conferences. Furthermore, a faculty from PPISR received a prestigious FRSC recognition, for his contributions in the area of Chemical Sciences in 2024. The outcome of these achievements made 2024 the most successful year since the institute's commencement, manifest by the bestowal of one Ph.D. degree. This issue explores into the research highlights of each group operating in varied scientific areas, including publications, research activities, important events, and milestones at PPISR. As the editor of this issue, I take an enormous proclivity in conferring a sight into the comprehensive scenery of research activities, scientific accomplishments, and events that extended at PPISR all over the year 2024.

Dr. Naga Suresh Enjamuri



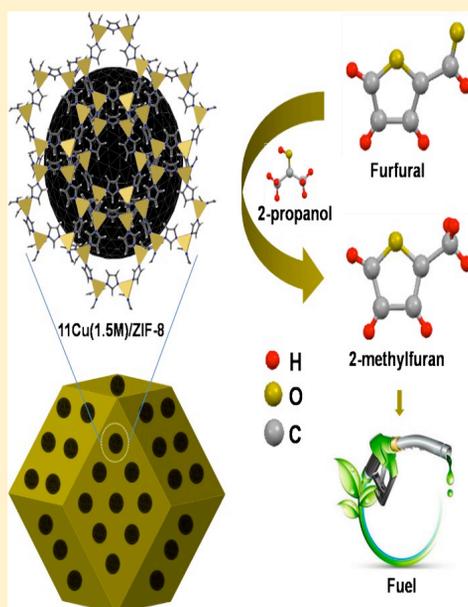
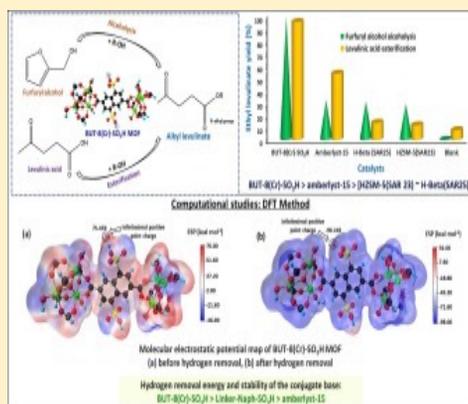
Dr. Ganapati Shanbhag's group works in frontier areas of heterogeneous catalysis for the design of novel and efficient catalysts for processes such as chemical fixation of CO₂ to make valuable chemicals such as methanol, carbonates, carbamates and substituted urea, conversion of biomass by-products like furfural and levulinic acid into value-added chemicals, pore engineering of zeolites for shape-selective catalysis and gas adsorption. Till 2024, the group has published over 50 research articles in internationally reputed journals, 4 book chapters and 4 patents. Two students received best presentation awards at national conferences this year. A one year of industry project sponsored by SABIC has been conducted successfully by this group and another project on novel agronutrients has been initiated. Overall, the group could achieve significantly in sponsored and academic research programmes due to the hard work of all the researchers involved.

Dr. Sanjeev Maradur's group continues to work on MOF catalysis and a recent work on Tandem hydrogenation/hydrogenolysis of furfural to 2-methylfuran over multifunctional metallic Cu nanoparticles supported ZIF-8 catalyst. The major findings have been published in *Bioresource Technology Journal* (2024), Elsevier Publishing Group. Also, the group continued to work on metal organic framework catalysis for the upgrading of bioderived alcohols: selective synthesis of organic carbonates over acid-modulated MIL-101 (Cr) MOF catalyst which has been published in *Industrial & Engineering Chemistry Research Journal* (2024) ACS Publishing Group. Dr. Maradur and his group continued research collaborations with scientists from Christ University, REVA University, Indian Institute of Science Bengaluru (IISc), Jawaharlal Nehru Centre For Advanced Scientific Research (JNCASR) and Manipal Academy of Higher Education. 5 Masters students worked under the guidance of Dr. Maradur for the MSc internship. A two-year long industry sponsored project by Sravathi AI, Bengaluru has been successfully completed in March 2024. Maradur submitted a research proposal to SERB SURE grant in association with Dr. Mahesh Bhat, Poornaprajna College Udupi during March 2024. Also couple of proposals for industry sponsorship as been submitted during September 2024. Ms. Bhavana Kulkarni

defended her thesis viva-voce on 23rd September 2024 and awarded Ph.D. Mr. Sumit and Mr. Rakshith joined Dr. Maradur's group to peruse their PhD program. No of publications from the group: 8, Book Chapter:1.

Dr. Naresh Nalajala's research group mainly focused on "SHAPECAT" at PPISR is to unravel the structure-property relationships of shape-engineered nanohybrid materials. One of the objectives of SHAPECAT is to design and develop the well-integrated shape-engineered nanohybrids. SHAPECAT is aiming at the sustainable production of green hydrogen from sunlight harvesting (photocatalysis). SHAPECAT foresees to explore the underline scientific knowledge on conversion of green house gas emissions (for e.g., CO₂, CH₄ etc.), stable and abundant molecules (for e.g., N₂) to value added chemicals (for e.g., methanol, ethanol and ammonia) from sunlight harvesting. Further, SHAPECAT focus is to understand the sensing behavior of the shape-engineered nanohybrids towards different target gases (H₂, CO₂, CH₄, CO, SO₂, NO₂ etc). Our efforts towards understanding the sensing of H₂ gas using phase-engineered TiO₂ led our student to achieve best presentation award at prestigious national conference held at CMPA-24, Manipal University. In collaboration (as CO-PI) with Dr. Suresh Kalidindi (as PI) at Central Tribal University of Andhrapradesh.

We are pursuing BRNS sponsored project on Design and Development of Gas sensors based on Semiconductor Oxides- Crystalline Framework Hybrids (SO@CFs) for Wide Range Dynamic Hydrogen Sensing.



Research Highlights – Materials Science & Catalysis Division

Currently, SHAPECAT is pursuing the objective of design and development of rooftop photocatalyst panels for solar H₂ generation and value-added chemicals” which is funded by SERB-SRG; the work is under progress on 1 m² photocatalyst panel reactor for large scale H₂ generation. Also, SHAPECAT is successful with DST-Inspire Ph. D. fellowship by Ms. Asha Devi with research objective of shape-engineered nanomaterials for solar H₂ generation and value-added chemicals from sunlight harvesting. Thus far, SHAPECAT guided fourteen master student research projects on “nanomaterials for sensor and photocatalytic applications including hydrogen generation”. The lead of SHAPECAT has submitted various research proposals to DST, VGST and SERB for funding to accomplish novel scientific and technological findings in the regime of synthesis of solar fuels and chemicals from sunlight harvesting. Currently, SHAPECAT is leading with three Ph. D. students at PPISR.

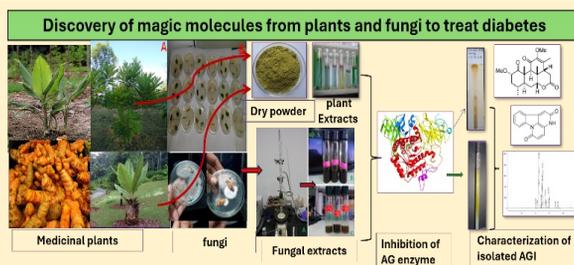
Dr. Naga Suresh Enjamuri's group i.e., “CO₂BIOCAT” is mainly focused on catalytic processes for the conversion of CO₂, biogas, and biomass-derived compounds into value-added fuels and chemicals. Currently our group is working on “Direct Conversion of Wet-Waste Derived Carboxylic Acids to Sustainable Aviation Fuels”. 6 Masters students were trained under the guidance of Dr. Naga Suresh for their MSc internship project. At present, Dr. Naga Suresh is handling industry sponsored project with SABIC Research and Technology Pvt. Ltd., Bengaluru (Oct.2024-Dec.2024). Dr. Naga Suresh was submitted research proposal to Prime Minister-Early Career Research Grant (PM-ECRG). Dr. Naga Suresh was also submitted several research proposals for industry sponsored projects (1) M/s Jeevan Chemicals Pvt Ltd., Gujarat (as a PI) and (2) Excel Tech Pune (as a Co-PI). Recently, Mr. Basavaraj joined as a Research Fellow in his group.

Research Highlights – Biological Sciences Division

In the Biological Sciences Division, we are engaged in various innovative studies, including the design of proteins to create lead molecules for therapeutic purposes, and the bioconjugation of therapeutically important proteins to enhance their half-life. Our research also involves the discovery of novel anti-diabetic and anti-bacterial metabolites from plant and microbial sources. We are exploring the potential of proteins secreted by endophytic fungi in the degradation of lignin, industrial dyes, and antibiotic

molecules. Additionally, we focus on mitigating phytoplasma infection in sandalwood using potential endophytic fungi, and examining the biological activities of synthetic compounds and chemically modified polymers.

Dr. Ananda K. lab in Biological Sciences, doctoral programs are abuzz with exciting research endeavors. We currently have one student engaged in groundbreaking work, focusing on the discovery of novel natural inhibitors for Type-2 diabetes. Additionally, this student is exploring the various applications of mushrooms as nutritious food, neurostimulators, immune boosters, and potential anti-diabetic and anticancer agents, especially after the preparation of their nanoparticles. Joining us recently, a second doctoral student is delving into the realm of insulin conjugates as long-acting insulin analogues, derived from mutant insulin. This student is also working on the expression of zinc-free insulin in a eukaryotic system, alongside the in-vitro, in-vivo, and in-silico characterization of mutant insulin. Another doctoral student this year, who will focus on the biodegradation of plastics using bacteria and fungi. This student will also research biogas production from waste vegetables and fruits through the use of microorganisms. Moreover, our faculty members have initiated a range of independent projects that may evolve into future doctoral endeavors. These projects include the preparation of supplements for growth media and storage media to ensure the safe and long-term storage of animal cells, microbes, and sperms. The faculty is also investigating the anti-microbial and anti-diabetic activities of synthesized compounds and working on the mitigation of phytoplasmas and other pathogenic fungi using endophytic fungi. Notably, all these projects will be carried out using our existing facilities without the need for additional budget allocations this year. Furthermore, our division has been proactive in its research output, with one Indian patent application filed in collaboration with MIT Manipal and six research publications in international peer-reviewed journals



Research Highlights – Theoretical Sciences Division

Dr. R Srikanth's and Dr. Sujit Sarkar's groups works on various research areas of theoretical sciences. The area of research interest: (1) Physics at Planck Scale (2) Quantum error correcting codes and decoherence-free subspaces (3) 100 Years of Ising Model (4) Quantum channels, memory and information backflow (5) Topological Transition on Conformal Manifold for Quantum Ising Model with Longer Range Interaction (6) Quantum networks and going beyond Bell nonlocality (7) Time Crystal (8) Application of ML/AI in Solar astrophysical data analysis. Our group research involves, apart from the faculty, our research associate Dr Vijay Pathak (PhD, IISER Thiruvananthapuram), PhD student Mr Sanjoy Dutta (MSc, Burdwan University) and our newly joined PhD student Mr Shubhdeep Gangopadhyay (MSc, Burdwan University).

1. Vaishnavi B.J., Rajashekhar Vaibhava K.M., Sujith S., Harsha M., Meghana A., Vetrivel R., Shanbhag G.V. The influence of catalyst structure on acidic strength of $-SO_3H$ groups for alkyl levulinate synthesis from biomass-derived feedstocks using sulfonic acid functionalized flexible MOF catalyst (2024) *Chemical Engineering Journal*, 491, 151724.
2. Jha R. K., Manikandan M., Prabu M., Vineeth N. R., Dharmalingam P., Archana R., Harsha M., Shankar S. R., Bhatte K., Raja T. Temperature-Controlled Hydrothermal Synthesis of α - MnO_2 Nanorods for Catalytic Oxidation of Cyclohexanone (2024) *ChemPlusChem*, 89(7) e202300589.
3. Vaishnavi B.J., Shanbhag G.V. Catalytic hydrogen generation from biomass and its derivatives (2024) *Handbook of Emerging Materials for Sustainable Energy*, pp. 547 – 568 (Book Chapter)
4. Kulkarni B. B., Kanakikodi K. S., Churipard S. R., Maradur S. P. Mesoporous polymers for the catalytic conversion of biomass platform molecules to value-added chemicals (2024) *Handbook of Emerging Materials for Sustainable Energy*, pp. 493 - 526 (Book Chapter)
5. Nalajala N. Shape-controlled bimetallic nanostructures for electrochemical oxidation of liquid fuels (2024) *Bimetal: Formation, Properties and Applications*, pp. 1 - 25 (Book Chapter)
6. Kulkarni B. B., Maradur S. P., Tandem hydrogenation/hydrogenolysis of furfural to 2-methylfuran over multifunctional metallic Cu nanoparticles supported ZIF-8 catalyst (2024) *Bioresource Technology*, 402, 130805.
7. Kulkarni B. B., Velagala S. K. R., Maradur S. P. Upgrading of Bioderived Alcohols: Selective Synthesis of Organic Carbonates over Acid-Modulated MIL-101 (Cr) MOF Catalyst (2024) *Industrial and Engineering Chemistry Research*, 63 (22), pp. 9761 – 9771.
8. Kanakikodi K.S., Kulal N., Subramanya K.S., Puneeth kumar M.S., Kulkarni B. B., Shanbhag G. V., Maradur S.P. Effect of morphology and their oxygen vacancies of nanostructured CeO_2 catalyst for carboxymethylation of biomass-derived alcohols (2024) *Molecular Catalysis*, 552, art. no. 113667.
9. Shetty A., Sunil D., Rujiralai T., Maradur, S.P., Alodhayb A. N., Hegde G. Sustainable carbonaceous nanomaterial supported palladium as an efficient ligand-free heterogeneous catalyst for Suzuki-Miyaura coupling (2024) *Nanoscale Advances*, 6 (9), pp. 2516 – 2526.
10. Lopis A.D., Choudhari K.S., Sai R., Kanakikodi K.S., Maradur S.P., Kulkarni S.D. Co^{2+} -laddered heterojunction a next-generation solar-photocatalyst: Unusually improved activity for the decomposition of pharmaceuticals, dyes, and microplastics (2024) *Materials Research Bulletin*, 176, 112836.
11. Molahalli V., Soman G., Bhat V.S., Jyothi MS., Sirimahachai U., Maradur S.P., Padova P.D., Chattham N., Hegde G. Renewable Musa Sapientum derived porous nano spheres for efficient energy storage devices (2024) *Nano Express*, 3, 035006.
12. Lopis A.D., Choudhari K.S., Kulkarni B.B., Maradur S.P., Kulkarni S.D. pH independent adsorption: Reusable zinc-ferrite nanospheres for the selective recovery of dyes from binary mixtures (2024) *Journal of Water Process Engineering*, 66, 106013.
13. Menon K., Lopis A.D., Choudhari KS., Kulkarni B.B., Maradur S.P., Kulkarni S.D. Scavenger-free solar photocatalytic degradation of Textile Dyes and Antibiotics using magnetically separable bi-junctional photocatalyst (2024) *Materials Research Bulletin*, 181, 113074.
14. Pallavi K., Sumit B., Sandip S., Maradur P.S., Supale A. Synthesis of tetrahydrobenzo[b]pyran derivatives using a novel zirconia supported sodium hexamolybdochromate(III) catalyst (2024) *Reaction Kinetics, Mechanisms and Catalysis*, 138, 873-888.
15. Rao S.S., Kundapura S.V., Dey D., Palaniappan C., Sekar K., Kulal A., Ramagopal U.A. Cumulative phylogenetic, sequence and structural analysis of Insulin superfamily proteins provide unique structure-function insights (2024) *Molecular Informatics*, 43, e202300160.
16. Dwarakanath D., Kulal A., Basappa B., Xi Z., Pandey V., BR B., Gaonkar S.L. Synthesis, computational studies and evaluation of benzisoxazole tethered 1,2,4-triazoles as anticancer and antimicrobial agents (2024) *Journal of Molecular Structure*, 1308, art. no. 138070.
17. Gupta S., Puttaiahgowda Y.M., Kulal A. Unveiling the effectiveness of antimicrobial BPJ polymer coatings in enhancing microbial resistance (2024) *Materials Advances*, 5, 5855-5869.
18. Kanth S., Puttaiahgowda Y.M., Kulal A. Synthesis and Characterization of Functionalized Starch by Grafting Pyridine for Use in Antimicrobial Applications (2024) *Starch*, 76, 2300121.
19. Gupta S., Puttaiahgowda Y.M., Kulal A. Development and evaluation of antimicrobial PVC-grafted polymer for enhanced paint applications (2024) *RSC advances*, 14, 25669-25677.
20. Dwarakanath, D., Nayak, Y.N., Kulal, A. Pandey, S., Pai, K. S. R., Gaonkar, S. L. In vitro and in silico insights into antimicrobial and anticancer activities of novel imidazo[2,1-b][1,3,4]thiadiazoles (2024) *Scientific Report*, 14, 31994.
21. Dash N.R., Dutta S., Srikanth R., Banerjee S. Concatenating quantum error-correcting codes with decoherence-free subspaces and vice versa (2024) *Physical Review A*, 109 (6), art. no. 062411.
22. Rao V.N., Utagi S., Pathak A., Srikanth R. Protocols for counterfactual and twin-field quantum digital signatures (2024) *Physical Review A*, 109 (3), art. no. 032435.
23. Gulati V., Jagadish V., Srikanth R., Dorai K. Experimental realization of quantum non-Markovianity through the convex mixing of Pauli semigroups on an NMR quantum processor (2024) *Physical Review A*, 109 (4), art. no. 042419.
24. Kartik Y.R., Kumar R.R., Sarkar S. Critical scaling of a two-orbital topological model with extended neighboring couplings (2024) *Scientific Reports*, 14 (1), art. no. 4504.

Publications (2024)

25. Utagi S., Banerjee S., Srikanth R. On the eternal non-Markovianity of non-unital quantum channels (2024) *International Journal of Quantum Information*, 22 (01), 2350039.
26. Kumar R.R., Sarkar S. A Quantum Field Theoretical Study of Correlated Quantum Ising model with Next-Nearest-Neighbour Interaction (2024) *Brazilian Journal of Physics*, 54, 206.

Patents filed (2024)

1. Catalyst for carbon dioxide hydrogenation to methanol and method of preparation thereof, (2024) US Application number: US20240326024A1, Inventors: S. Kotni, G. Valavarasu, G. V. Shanbhag, R. Vetrivel, A. B. Halgeri, S. Sujith, C. N. Mallannavar and K.M.R Vaibhava (filed by HPCL; outcome of collaborative project)
2. Poly(vinyl chloride)-G-1-(2-aminoethyl piperazine) polymer for antimicrobial paint composition and its method of preparation thereof, (2024) Indian Patent Application (No. 202441017114) filed by MAHE Manipal, and inventors are Dr. Yashoda M. Puttaiahgowda (MIT, Manipal) , Dr. Ananda Kulal (PPISR, Bengaluru) and Ms.Sonali Gupta (MIT, Manipal).

Highlights of Research Activities

- ❖Dr. Maradur delivered a keynote talk at the “International Conference on Nanotechnology Addressing the Convergence of Materials Science, Biotechnology and Medical Science” (IC-NACMBM-2024) to 12th February -2024 at Centre for Interdisciplinary Research (CIR), D. Y. Patil Education Society (Deemed to be university), Kolhapur, India.
- ❖Dr. Ganapati V. Shanbhag was invited as a speaker for National Workshop on Futuristic Catalysts and Catalytic Processes (NWFCPP-2024)" during February 15–16, 2024 organized by Central University of Kerala, Kasargod, Kerala. He gave a talk on “Chemical fixation of CO₂ by converting into value added chemicals using heterogeneous catalysts.”
- ❖Dr. Ganapati V. Shanbhag delivered an invited lecture for the MSc Chemistry students of The Oxford College of Science, Bengaluru on 26th Feb. 2024 on “Catalysis and its role in the eco-friendly synthesis of fuels and chemicals.
- ❖Dr. Maradur delivered a talk on “Metal-Organic Frameworks (MOFs) Catalysis for Valorization of Biomass-Derived Chemicals" at Faculty Development Program on 'Innovations in Material Science and Analytical Techniques' BMS Institute of Technology & Management, Yelahanka, Bengaluru on 14th March 2024.
- ❖Dr. Ananda K Associate Professor visited Niranthara Scientific Solutions Pvt. Ltd, Bengaluru along with Dr. Sanjeev Maradur, PPISR Bengaluru and Dr. Naresh Nalajala, PPISR, Bengaluru for a collaborative project proposals related to coconuts and its utilization for different purposes like pest control, fertilizer etc. on March 20,2024
- ❖Dr. Sujit Sarkar attended “Indian Statistical Physics” meeting in the first week of April for three days, where he presented a talk on Conformal Field Theory.
- ❖Dr. Shanbhag was invited as subject expert in the interview panel for the recruitment process of a Chemistry faculty at Department of Chemistry, R V College of Engineering, Bengaluru on April 22, 2024
- ❖Submission of Ms. Bhavana’s PhD Thesis: MS. Bhavana completed her PhD work and submitted her thesis to MAHE on 29th April 2024. During her PhD tenure she has published 4 First author publications, One book chapter and 5 co-author publications to her credit.
- ❖Dr. Ananda K Associate Professor, appointed as External examiner for the Department of Microbiology, Yenepoya University, Mangalore and conducted practical exams and evaluated on 08-05-2024.
- ❖Dr. Shanbhag was invited as synopsis evaluator for PhD synopsis of 11 students of CNMS, Jain University, Bengaluru and attended virtually on May 9, 2024.
- ❖Dr. Naresh Nalajala delivered an invited lecture at National Seminar on “Recent advancement in Materials” organized by Government Degree College for Women, Khammam, Telangana.
- ❖Dr. Naresh Nalajala delivered an invited lecture as resource person for Faculty Development Program on “Recent Innovations in Green and Sustainable Energy” organized by Dayananda Sagar College of Engineering, Bangalore.
- ❖Dr. Naresh Nalajala has been Invited as resource person for national conference on “Trends in Multidisciplinary Research: Applications and Challenges” organized by Department of Science, M S Ramaiah College of Arts, Science and Commerce from 15/05/2024-16/05/2024. Delivered lecture on “Shape Can Serve the Survival: A Journey Through Catalytic, Electrocatalytic and Photocatalytic Applications” on 16/05/2024.
- ❖Dr. Naresh Nalajala has been invited as speaker for one day symposium on “Catalysis and Renewable Energy for Sustainable Development Goals (SDGs)” in honour of Dr. C. S. Gopinath superannuation by CSIR-NCL Pune. He delivered a lecture on “Hydrogen: A buzz molecule for sustainable future” on 27/06/2024.
- ❖Dr. Ananda K, Associate Professor, attended as Subject expert and evaluated biannual presentation of 08 PhD Scholars of Department of Biotechnology, REVA University, Bangalore on July 30, 2024.
- ❖Dr. Ananda K Associate Professor, appointed as External examiner for the Department of environmental Sciences, Mangalore University, Mangalore and evaluated MSc Projects and Theory examination papers on August 17, 2024.

Highlights of Research Activities

- ❖ Dr. Sujit Sarkar presented two seminars, one in Conformal Field Theory and other in Quantum Field Theory in the Physics Department of Burdwan University.
- ❖ Dr. Ananda K Associate Professor, submitted proposal for the Animal studies in collaboration with Mangalore University was approved by the Institutional Animal Ethics Committee, Mangalore University, September 10, 2024.
- ❖ A research collaboration with Prof. Balaji Jagidhar, IPC, Indian Institute of Science, Bengaluru has been initiated by Dr. Maradur's group during September 2024 to work on vapor phase catalysis screening. Catalyst will be synthesized at IISc and catalyst screening will be done at PPISR.
- ❖ Dr. R Srikanth has been invited by Karnataka Science and Technology Academy (KSTA), Dept. of Science and Technology, Govt. of Karnataka, to be an Expert Member in the Expert Committee on "Quantum Technologies for Karnataka". Furthermore, under the aegis of KSTA, a talk on "Quantum Correlation: from Weirdness to Applications" on 11th September 2024.
- ❖ Dr. R Srikanth presented a seminar on modern cosmology at the symposium "Science and Spirituality Dialogue" held at Swami Sivananda Ashram, Ahmedabad on 16 September 2024.
- ❖ Dr. Ganapati V. Shanbhag gave an invited talk at "National conference on "Catalysis for Energy, Environment and Sustainability (CEES-2024) and 3rd CO₂-India Network Annual Meet" on 18th-20th September, 2024 at CSIR-IICT, Hyderabad.
- ❖ Ms. Chaitra N M, Mr. Sujith S and Mr Harsha M attended and presented Poster of her at "National conference on "Catalysis for Energy, Environment and Sustainability (CEES-2024) and 3rd CO₂-India Network Annual Meet" on 18th -20th September, 2024 at CSIR-IICT, Hyderabad.
- ❖ Ms. Bhavana completed her PhD open Defense on 23rd September 2024. Dr Kalpana Maheria, SVNIT Surat, Dr. Nitin Kumar Shetty, MAHE were present during the defense viva. She has been awarded PhD on 25th September 2024.
- ❖ Dr. Maradur gave an invited talk on "Metal-Organic Frameworks (MOFs) Catalysis for Valorization of Biomass-Derived Chemicals" on 25th September 2024 at the Five days Faculty Development Program On "Green Technologies towards Sustainable Future Science and Technology" at Ramaiah Institute of Technology Bengaluru.
- ❖ Dr. R Srikanth presented an invited talk on "Quantum nonlocality, quantum network correlations, and cryptography" under the aegis of the DRDO Sponsored Seminar on "Quantum Cryptography : Unleashing Secure Communication" held at Christ (Deemed to be University), Kengeri Campus on Oct 3, 2024
- ❖ Dr. Naga Suresh presented the work done during Oct.-Nov.2024 in online project review meeting with SABIC team which was held on 20th November 2024.
- ❖ Dr. Naga Suresh delivered a chief guest speech for Annual Exhibition inaugural program of Poornaprajna Primary School, Yelahanka on 29th November 2024.
- ❖ Dr. Maradur had been invited as the Chief Guest on 13th December 2024 for the "Science Forum Inauguration". at Tontadarya College of Engineering, Gadag. Dr. Maradur gave a talk on Advances in Science and Technology and their impact on human lives.

Activities In The Institute

Ph.D. Degree Award

Dr. Bhavana B. Kulkarni.: Dr. Bhavana B. Kulkarni was awarded PhD on "Studies on Metal-Organic Frameworks (MOFs) Catalysis for Valorization of Biomass-Derived Chemicals" by Manipal Academy of Higher Education (MAHE), Manipal on September 25, 2024 under the guidance of Dr. Sanjeev P. Maradur.



DST-Inspire Fellowship

Ms. Asha Devi, who is working under the guidance of Dr. Naresh Nalajala has been awarded DST-Inspire fellowship. She is the second Inspire student from our institute.



Industry and Government Sponsored Projects

During 2024, 7 sponsored projects were executed by PPISR. Dr. Shanbhag's two industry projects sponsored by SABIC Research and Technology Pvt. Ltd, Bengaluru (1) Next Generation Cellulose Based NP Fertilizers was successfully completed (2) Synthesis of sulfates and carbonates from phosphogypsum and silicates via carbon dioxide mineralization was successfully completed. (3) Dr. Naresh Nalajala's ongoing project is sponsored by SERB, DST under the SRG on "Design and development of rooftop photocatalyst panels for solar H₂ generation and value-added chemicals". Another project (4) by Dr. Naresh (CO-PI) on Semiconductor Oxide-Crystalline Framework Hybrid Gas Sensors: Advancing Hydrogen Detection Across a Wide Dynamic Range is ongoing project. (5) Dr. Sujit Sarkar's ongoing project is sponsored by DST on "Emergence of quantum criticality for hermitian and non-hermitian topological state of quantum matter". (6) Dr. Srikanth's project sponsored by DST on "Designing of devices and protocols for quantum hacking and secure communication" is ongoing project. (7) Another project sponsored by Dr. Srikanth's sponsored by SERB on "Qubit and higher-dimensional nonunitary noninvertible quantum dynamical maps: geometry and the relation to quantum non-Markovianity" is ongoing project.

Shree Ram Pranprathishta Celebration

The Pran Prathishtapan programme of Shree Rama was celebrated at Bidalur Campus on the day of Ram Mahotsav at Ayodhya by rendering Pooja for Lord Rama on 22nd January 2024. Participation of Students and Staff of PPISR on the occasion of celebration.



PPISR Annual day celebrations

The Annual Day Celebration of PPISR for the year 2024 was organised at the Bidalur Campus on February 13, 2024 in the noble presence of the chairman H. H. Shree Eeshapriya Theertha Swamiji along with the Director Dr. Anand B. Halgeri, Financial Advisor Shri P. Sreenivasa Rao and the Dean Dr. Ganapati V. Shanbhag. The programme began with the invocation followed by the welcome address by the Director. Then there was the light of



knowledge spread around through the lighting of the lamp by H. H. Shree Swamiji with the enlightenment of "Tamahssomaah: Jyothirgamayah." After the lighting of the lamp, there was a PPT presentation on the overall progress of the year 2023 by Dr. Ganapati V. Shanbhag. Further, it was followed by the release of the Newsletter - 2024 by H. H. Shree Swamiji.

Felicitation of Dr. Rajappan Vetrivel

One of the honorary professor of PPISR Dr. Rajappan Vetrivel, who has been associated with PPISR on the project of Sravathi AI, has volunteered to donate a sum of Rs. 2,50,000/- to the institute and handed over the cheque to the chairman. This amount will be deposited and the earnings out of it will be utilized to honour the best students of the institute through awards in the future. For this commendable feat, Dr. Vetrivel was honoured by the chairman H. H. Shree Eeshapriya Theertha Swamiji on February 13, 2024 .



PPISR Activity Forum in New Dimension- DRISHTI

The PPISR Activity Forum which was formed by former PhD students has been continued with a new dimension from the present students under the name: "DHRISHTI -2024" was officially inaugurated by H. H. Shree Eeshapriya Theertha Swamiji. As a mark of literature identification, the members of PPISR including the students, faculties and staff members will contribute to the literary intellect apart from the scientific activities and it will be displayed for the benefit of the readers.



Fellow of Royal Society of Chemistry (FRSC) Recognition

Dr. Ganapati V. Shanbhag, Dean (Academics) and HOD, Materials Science and Catalysis Division, PPISR received the prestigious recognition of Fellow of Royal Society of Chemistry (FRSC) London in September 2024 for his contributions in the area of Chemical Sciences. He has been working in the area of heterogeneous catalysis, adsorption, synthesis of fine and specialty chemicals, petrochemicals and agrochemicals for more than 16 years post his PhD at CSIR-NCL, Pune.



PPISR Founder's Day conference

Founders Day 2024 was celebrated on July 4, 2024, at PPISR Bidalur campus. Sri. Subramanya Katti, the Managing Director of Hongirana Energy Private Limited was the Chief Guest of the day. Dr. Anand B. Halgeri, Director of PPISR presided over the function along with Dr. Ganapati V. Shanbhag (Dean (Academics) PPISR). The Program had began with an invocation by Ms. Ashadevi, Research Scholar, MS&CD. Dr. Anand B. Halgeri, the Director, welcomed the gathering and addressed them. In his address he briefly explained about the various activities and the achievements of PPISR for all these many years. Followed by the welcome address, lighting of the lamp was performed by the dignitaries. Then, Dr. Ganapati V. Shanbhag gave an overview of the progress of the institute. He spoke in elaborate about the founder Chairman H. H. Sri Vibudhsha Theertha Swamiji. Later on, the chief guest delivered a lecture after inaugurating the founder's day for the year 2024. Sri. Subramanya Katti, gave a technical and inaugural talk on "Bio fuels, A key transmission fuel". He spoke about the demands of fuel in India as well as globally and where we can contribute to the society by finding some innovative research works on biofuel. After his talks, the vote of thanks for the inaugural session was conclude by Dr. Sanjeev P. Maradur, Associate Professor, MS & CD, PPISR. After the tea break the, technical session began. Dr. Ganapati V. Shanbhag, Dean, HOD & Associate Professor, Materials Science and Catalysis Division chaired the session. Finally, Dr. Ananda K, in his concluding remarks recalled all the activities of the whole day program and thanked every speakers, all participants and those who were directly or indirectly involved to make this event a successful one.



Lab Safety Session and Fire Safety Demonstration

A safety concerned lecture was organized by Dr. Sanjeev P. Maradur, Associate Professor, MS & CD and safety in-charge, for the newly joined students and interns at the PPISR Campus on February 19, 2024. The lecture included the safety measure at the Laboratories and living place, handling of chemicals, measure of safety related to fire etc.,

After the lecture, a Fire Safety demonstration was also organized near the animal house for all members of the institute. This demo included the operation of Fire extinguishers at times of crises and how to use the cylinder while operating. Overall, a useful session on safety and fire accidents. Also, the Fire Audit report for the year 2023-24 was made.

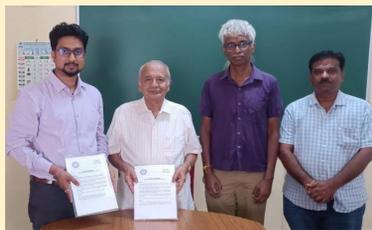


Best presentation awards

1. Ms. Bhavana Kulkarni received the "Best Research Scholar Award" for the year 2023-2024 during the Annual day programme-2024 on 13th February 2024 at PPISR.
2. Mr. Sujith S received the "Best Seminar Award" for the year 2023-2024 during the Annual day programme-2024 on 13th February 2024 at PPISR.
3. Mr. Harsha M., won a "First prize" in *Best Poster presentation award* during National workshop on "Futuristic Catalysts and Catalytic Processes" organized by Central University of Kerala, Kasargod during February 15-16, 2024.
4. Ms. Meghana H K received the Best ORAL Presentation Award at National Conference on "Catalysis for Energy Environment and Sustainability" and the 3rd CO₂ India Network organized by CSIR-IICT, Hyderabad under the aegis of Catalysis Society of India from 18-20, September 2024 .
5. Dr. Ananda K (Dean & Associate Professor, Biological Sciences Division) Received FIRST PRIZE under ORAL PRESENTATION AWARD in an International conference "The Role of Fungi in Sustainable Development: From Exploration to Application" conducted by the Association of Fungal Biologists (AFB-CON 2024) on October 23-25, 2024.
6. Ms. Asha devi received "Best Oral Presentation Award" during the prestigious national conference on condensed matter physics and applications (CMPA-2024) conducted by MAHE, Manipal on December 13-14, 2024.

MOU signed with QDit Labs and ICFRE-IWST Bengaluru

On June 6, 2024, PPISR signed a MoU with QDit Labs to foster collaboration in advanced research and technology development. The MoU was signed by Prof. A. B. Halgeri, Director of PPISR, and Dr. R. Srikanth on behalf of PPISR, while Mr. Animesh Aaryan and Prof. Sathesh K represented QDit Labs. Subsequently, on December 17, 2024, another significant MoU was signed between PPISR and ICFRE- IWST, Bengaluru.



Dr. Ananda K. represented PPISR during this signing.

Outreach activities for Poornaprajna High School Students

In order to create interest in basic science in young minds, PPISR has taken up an initiative of outreach program with a theme **"Today's Science for Tomorrow's Scientists"** for Poornaprajna School students since 2013. This year, students of IX standard from five Poornaprajna Schools in Bangalore visited PPISR one day each as a part of the outreach program to be held for 5 days from 11-15th November 2024. Dr. Sanjeev P. Maradur served as the coordinator, and a team of doctoral students showcased a range of experiments from different departments. All the students were taken for a laboratory visit and given explanation of the research facilities that are available in the institute. Nearly 515 students and 20 teachers participated in this programme. Overall, the response was overwhelming and all the teachers requested to conduct this programme in the near future too.



Independence Day Celebration

PPISR celebrated Independence Day with great enthusiasm on August 15, 2024. The event began with the ceremonial hoisting of the national flag by Dr. A. B. Halgeri, Director of PPISR and the Chief Guest for the occasion. Dr. Halgeri also delivered an inspiring address, emphasizing the values of freedom, responsibility, and progress. Following the speech, sweets were distributed and breakfast was served to all attendees. The celebration concluded with a collective effort under the "Swachh Bharat Abhiyan" initiative, where faculty members, research scholars, and staff actively participated in cleaning laboratories, workspaces, and collecting plastic waste from open areas across the campus.



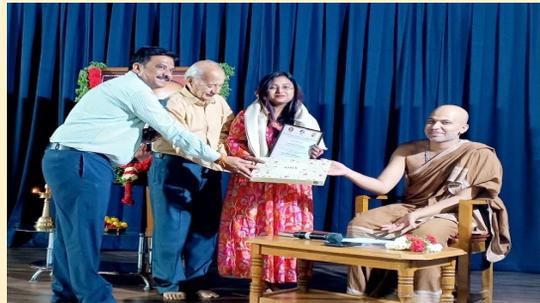
Retirement of Mr. Kishore L. Gaikwad

PPISR bid a heartfelt farewell to Mr. Kishore on August 30, 2024, in recognition of his dedicated service. Mr. Kishore served the institute with commitment and integrity for nearly 15 years as an Administrative and Senior Administrative Officer. Even after his retirement, he graciously continued to contribute for an additional two years. His unwavering support and administrative acumen have been instrumental in the smooth functioning of PPISR. The farewell function, held in his honor, was a gesture of gratitude for his invaluable contributions to the institution.



AMEF Board of Trustees Meeting

The Admar Mutt Education Foundation (AMEF) Board of Trustees convened on November 20, 2024, to deliberate on key matters pertaining to PPISR. During the meeting, Dr. A. B. Halgeri presented a comprehensive overview of the institute's recent research accomplishments. The trustees expressed great appreciation for the impressive progress and achievements across various scientific disciplines at PPISR. The meeting was presided over by H. H. Shree Eeshapriya Theertha Swamiji, Chairman of AMEF. Additionally, in a special gesture of recognition, Dr. Bhavana was felicitated by H. H. Shree Eeshapriya Theertha Swamiji during the Annual General Body Meeting of the Poornaprajna Institutions held on November 21, 2024.



National Science Day celebrations

PPISR proudly celebrated National Science Day on March 1, 2024, under the inspiring theme "Science and Technology Advancements." The event commenced with a warm welcome address by Dr. Ananda K. The occasion was graced by the presence of the Director, Dr. A. B. Halgeri, and Chief Guest Dr. Nagesh Kini, Co-founder and CTO of Vimano Inc., alongside Dr. Ganapati V. Shanbhag, Dean of Academics and Head of Department, who also served as the event coordinator. The inaugural session featured a compelling keynote by Dr. Nagesh Kini on "Developing Businesses Based on Cutting-Edge Technologies." This was followed by thought-provoking presentations by Dr. Urmi Bandyopadhyay on "Lysosome in Novel Nutrient Homeostasis" and Mr. Animesh Aryan on "Interfacing Quantum Information Science and Technology." The celebration brought together faculty, students, and distinguished guests, fostering an engaging environment of scientific exchange and inspiration.



Chemistry Day celebrations

To commemorate the birth anniversary of Acharya Prafulla Chandra Ray, revered as the Father of Chemistry in India, PPISR organized a special Chemistry Day celebration on August 2, 2024. The event paid tribute to Acharya Ray's pioneering contributions to science and education. The highlight of the program was the inaugural lecture delivered by the Chief Guest, Dr. Gururaj M. Shivashimpi, Founder and CEO of SudhiShubhaChemSynthons LLP, Bengaluru, who spoke on "The Role and Challenges in Science and Technology." The celebration also featured an insightful presentation by Ms. Asha Devi K.S., a dedicated doctoral student, titled "Acharya and Chemistry," which shed light on the profound legacy of Acharya Ray. The event was a fitting homage to a legendary scientist whose work continues to inspire generations.

Visit of Scientists from SABIC Research and Technology, Ltd.

On August 9, 2024, PPISR had the privilege of hosting Dr. Sadeq Raeid, Lead Scientist at SABIC, Saudi Arabia, and Dr. Ravi Hegde, Lead Scientist at SABIC Research and Technology Ltd., India. The esteemed guests visited the institute to review the progress of two ongoing collaborative projects and to explore the state-of-the-art research facilities at PPISR. Their visit not only strengthened the ongoing partnership but also provided valuable insights and direction for future scientific advancements.



Invited talks

Throughout 2024, PPISR hosted a series of enlightening invited lectures and webinars delivered by esteemed experts across diverse scientific domains. On July 11, 2024, Prof. Ranga Rao G. from the Department of Chemistry at IIT Madras visited the Bidalur research campus and presented an impactful talk on “Urgency and Newer Ways of Generating Green Hydrogen.” Dr. Keshavaraj A., Technology Team Leader at SABIC (a Saudi Aramco Company), shared his personal and professional insights through a lecture titled “My Journey in Industrial R&D and My Learning.” Prof. Nabyendu Das from the Department of Physics at The LNM Institute of Information Technology, Jaipur, delivered an in-depth lecture on “Higher-Order Topology and Bulk-Boundary Correspondence in a Two-Dimensional SSH Model.” Additionally, Dr. Timmanna Bennur, Senior Group Leader at Eurofins Advinus Pvt. Ltd., captivated the audience with his talk on “Drug Discovery and Development.” These sessions served as valuable platforms for knowledge exchange, fostering academic and industrial collaboration.



PPISR offers M.Sc. Internship training programme / Certificate Courses

Internship at PPISR

Nearly 33 M.Sc. students from various universities/colleges including Mangalore University, Mount Carmel College, Dr. A. V. Baliga College of Arts and Science (Kumta), and St. Aloysius College (Mangalore) successfully completed their M.Sc. project work at PPISR. Guided by the institute's esteemed faculty across all three major areas of science, these students gained valuable hands-on research experience and exposure to a vibrant scientific environment.



Certificate Courses

PPISR introduces 3 new certificate courses for aspiring research scholars, research fellows and graduates in various domains of research available at PPISR.

- (1) Poornaprajna Junior Research Fellow Certificate (PJRFC)
- (2) Poornaprajna Senior Research Fellow Certificate (PSRFC)
- (3) Poornaprajna Post-Doctoral Fellow Certificate (PPDFC)

For any queries, contact: coordinator@ppisr.res.in

Visitor's Views

PROF. K.SESHAN, FACULTY SL2 TECHMNN TWENTE, THE NETHERLANDS:

Spent a wonderful day at the institute. Met lots of enthusiastic young researchers who want to work on socially relevant research topics. Have promised to interact and give feed back. All the best.

PROF. G. RANGA RAO, Professor at IIT, Madras:

PPISR has good research facilities for Materials Science, Heterogeneous Catalysis and Biology. A good institute started in Bengaluru to tap the scientific ideas from the younger generation. A good institution indeed. Appreciate my senior colleague Dr. Halgeri for nurturing this institute well.

Dr. MOHAMMED BELAL HAIDER, SCIENTIST, CSIR-IIP, DEHRADUN:

Had a great day in the institute. Eager young minds are doing great job in research. The campus is wonderful and is eco-friendly. The laboratory facilities are excellent with the amazing research working on the projects. Direct relevant to the nation's interest. I wish all the very best and hope for the many collaborative projects.

Dr. GURURAJ M. SHIVASHIMPI, SUDHISHUBHA CHEMSYNTHONS BANGALORE:

First of all, I am thankful to Director and faculty to invite for the “Chemistry Day” function. The function was very good, celebrating birth anniversary of Prof. P. C. Ray. The research labs are well equipped with many important instruments.

Also, the research work. Students gave nice presentation. Dr. Maradur gave nice lecture of Chemistry industry history in India.

Poornaprajna Analytical Center (PAC)

Instruments available for external users for sample analysis

Chemisorption instrument [TPD (NH₃/CO₂), H₂-TPR, N₂O-Chemisorption, BEL]; Physisorption instrument (BET Surface area, porosity, BEL); FTIR Spectrophotometer (Bruker); Atomic Absorption Spectrophotometer (Perkin Elmer); UV-Vis Spectrophotometer (Perkin Elmer); Fluorescence Spectrophotometer (Agilent); Mechanical property testing (Grain crush strength; Attrition resistance).

Contact: Dr. Sanjeev P. Maradur ; email: pac@ppisr.res.in ; sanjeevpm@ppisr.res.in

For more information visit our website

<https://ppisr.res.in/content/poornaprajna-analytical-center>

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