ANVESHANA

Nurturing Researchers for Tomorrow

PRAYOGA™
Research to Transform Learning

List of Projects
2025

www.prayoga.org.in/Anveshana

ANVESHANA

Nurturing Tomorrow's Researchers

With education being primarily coursework-based, students excel in environments where learning outcomes are known or certain. We need to provide opportunities and support students in acquiring the competencies necessary to become world-class researchers. This broadens their scope for exploration and fosters a culture of discovery within the educational framework.

The Anveshana program nurtures the next generation of researchers for the country. High School Students (grades 9-12) passionate about a career in science are encouraged to apply to this unique student-researcher program.

Students participate in research projects guided by senior researchers at Prayoga. They are introduced the process and products of science research, developing competencies necessary to become world-class researchers. This broadens their scope for exploration and fosters a culture of discovery within the educational framework.

Research builds capabilities to deal with unknown outcomes and the attitudes to deal with uncertain paths in acquiring knowledge.

Under the guidance of experienced researchers, students researchers of the Anveshana program are encouraged to conduct innovative scientific research under five areas of thematic research

Green Chemistry

Advanced and Functional Materials

Earth Sciences

Wellness

Food & Agriculture

For Prayoga, Anveshana is an Education Research Project. How does science research impact learning outcomes? Do the skills learnt during the research process affect students' attitudes toward science as a whole?

The impact of research in developing competencies and performance is assessed through this initiative which will help us evolve a framework to develop and nurture the next generation researchers for the nation.

The Anveshana program has resulted in the development of a scientific temperament among student participants. In the last four years, **20 scientific research projects have been completed with 60 students.**

A tangible product of research is the publications that summarize and present the many months of concerted research activity. Anveshana student researchers have become published authors in internationally recognized, peer-reviewed journals. The development of a scientific temperament among high school students is clear.

Anveshana 2025

This year, Prayoga is pleased to offer participants 16 scientific research projects, under 2 categories:

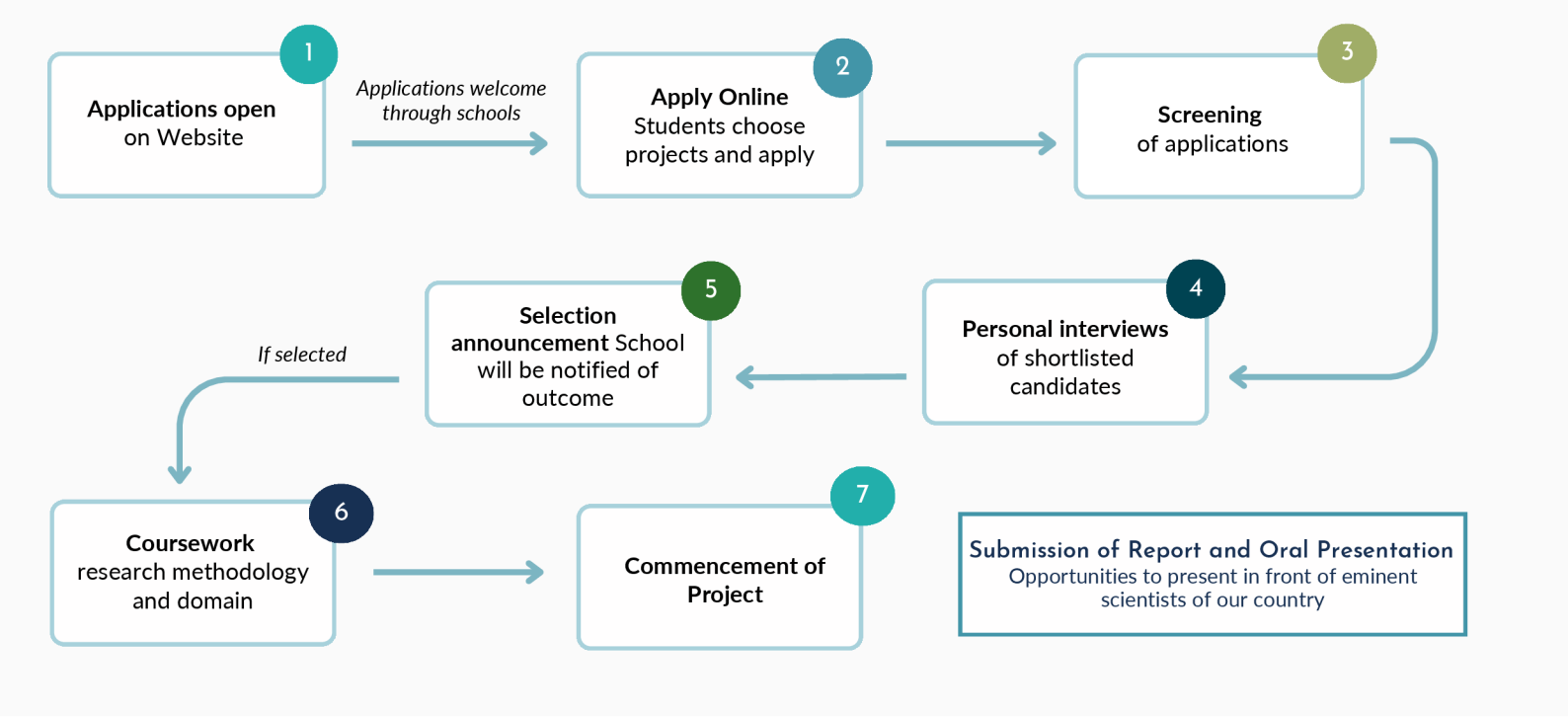
1. Experimental Projects

Projects in this category emphasize hands-on experimentation in the laboratory and are ideal for students who enjoy working with tangible processes, testing hypotheses, and collecting primary data.

2. Theoretical Projects

These projects are focused on computational and analytical methods using software and statistical tools. Students work with secondary data or simulated scenarios to draw insights. These projects do not involve any hands-on experiments in the lab.

Application Process



Note, applications are accepted through schools. The application form is available on the Anveshana page (www.prayoga.org.in/anveshana).The selected students are required to be on campus for the project duration.

Research Project Brief

ANV - PR - 021 - Wellness

Anveshana 2025

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Isolation, Screening, and Optimization of protease enzyme CPG2 Production by Bacterial Strains: A Step Towards Biomedical Applications

Carboxypeptidase G2 (CPG2) is a highly specialized protease with significant applications in biomedicine, particularly in cancer treatment and bioremediation. It cleaves terminal glutamate residues from folate and related molecules, making it crucial in enzyme-prodrug therapy. However, the availability of natural CPG2-producing bacterial strains remains limited, and current methods of enzyme production are cost-intensive and inefficient. This project aims to isolate novel bacterial species capable of producing CPG2, optimize their enzyme yield, and explore the enzyme's potential applications.

Mentors

Dr. Venkata Krishna B, Senior Researcher, Dept. of Biology, Prayoga

Ms. Shruthi Srinath Chakravarthy, Research Associate, Dept. of Life Sciences, Prayoga

Dr. Venkat Krishna B

Senior Researcher, Department of Biology

Dr. Venkata Krishna, an experienced biotechnologist with a Ph.D. from Visvesvaraya Technological University (VTU), has 13 years of teaching and research expertise. His work spans diverse fields, including enzyme applications, enzyme inhibitors, metabolites, and nanomaterials in food, health, biotechnology, and the environment. Dr. Krishna is also actively involved in science education research, exploring how early research exposure impacts students' skills and traits as budding researchers.

Ms. Shruthi Srinath Chakravarthy

Research Associate, Dept. of Life Sciences

Ms. Shruthi Srinath Chakravarthy is a Research Associate at Prayoga, specializing in biotechnology and therapeutics research. She holds a Master's in Biotechnology from Monash University, Australia. Previously, Shruthi worked as a Research Assistant at Exopharm Ltd., focusing on exosome isolation and downstream processing for drug delivery with AKTA-Pure FPLC systems. Shruthi has ICH-GCP training and contributed to collagen peptide research published during her undergraduate studies at CISAR labs.

Research Project Brief

ANV - PR - 022- Ecology and Environment

Anveshana 2025

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Production of Ethanol by Fungal Fungal Strains Pachysolen tannophilus and Saccharomyces cerevisiae Using Agricultural Waste

Bioethanol production from lignocellulosic biomass has garnered significant attention as a sustainable alternative to fossil fuels. However, much of the focus remains on conventional feedstocks like sugarcane and corn, which compete with food crops. South India generates large quantities of agricultural waste, such as banana pseudostems, coconut husks, and mango peels, which remain underutilized despite their potential as low-cost feedstocks for bioethanol production. One major limitation in lignocellulosic ethanol production is the inefficient utilization of all sugar components, particularly xylose, which often goes unused in traditional fermentation. The goal of this two-month study is to evaluate the feasibility of ethanol production from agricultural waste while optimizing pre-treatment and fermentation processes. This short-term project also explores the scalability of the process and its potential societal benefits.

Mentors

Dr. Venkata Krishna B, Senior Researcher, Dept. of Biology, Prayoga

Ms. Rakshitha N, Research Associate, Dept. of Biology, Prayoga

Dr. Venkata Krishna B

Senior Researcher, Dept. of Biology

Dr. Venkata Krishna, an experienced biotechnologist with a Ph.D. from Visvesvaraya Technological University (VTU), has 13 years of teaching and research expertise. His work spans diverse fields, including enzyme applications, enzyme inhibitors, metabolites, and nanomaterials in food, health, biotechnology, and the environment. Dr. Krishna is also actively involved in science education research, exploring how early research exposure impacts students' skills and traits as budding researchers.

Ms. Rakshitha N

Research Associate, Dept. of Biology

Ms. Rakshitha N is a Research Associate at Prayoga, specializing in Life sciences, she completed her M.Sc in Genetics from University of Mysore, Her academic project focussed on Type 2 Diabetes mellitus, with the two main Antioxidant genes under Oxidative stress conditions, Her current research at Prayoga emphasizes on Microbial cultures, extracting, isolating, characterization of compounds from plant extracts, chromatographic techniques and performing biochemical assays.

Research Project Brief

ANV - PR - 023 - Wellness

Anveshana 2025

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Chemical Profiling and Gut Health Impact of Lifestyle Products and Indian Herbs

Modern lifestyles have introduced a surge of chemically processed products into daily use, many of which may unknowingly compromise gut health. These changes, coupled with dietary shifts, have been linked to the rising prevalence of gastrointestinal issues and lifestyle-related disorders in India, particularly among young individuals. Recognizing the urgency of this challenge, this project aims to investigate the chemical composition of selected lifestyle products and assess their potential adverse effects on gut health. Simultaneously, the project will explore traditional Indian herbs for their protective and restorative effects on the gut. By combining analytical chemistry techniques with insights from traditional medicine, this project seeks to provide evidence-based recommendations for safer consumption practices and herbal alternatives.

Mentors

Dr. S. Athavan Alias Anand, Senior Researcher, Dept. of Chemistry, Prayoga

Ms. S. Harshitha, Research Associate, Dept. of Chemistry, Prayoga

Dr. S. Athavan Alias Anand

Senior Researcher, Dept. of Chemistry

Dr. S. Athavan Alias Anand is a Senior Researcher at Prayoga, specializing in synthetic organic chemistry and chemistry education research. He earned his Ph.D. in Chemistry from Annamalai University and has postdoctoral research experience from the Indian Institute of Science (IISc), Bangalore. His doctoral and postdoctoral research focused on designing and synthesizing potent drug candidates for anticancer and anti-tuberculosis, where he was involved in the multistep heterocyclic synthesis of active drug-like scaffolds.

Ms. S. Harshitha

Research Associate, Dept. of Chemistry

Harshitha S is a Research Associate at Prayoga, focusing on organic synthesis, reaction mechanisms, and spectroscopic techniques. She holds a Master of Science in Organic Chemistry from BMS College for Women, affiliated with Bengaluru City University, which she completed in October 2023. She interned at Stericon Pharma Pvt. Ltd. during her studies, gaining experience in Quality Assurance, Quality Control (Chemistry and Microbiology), Production Management, Sales, and Stores.

Research Project Brief

ANV - PR - 024 - Wellness

Anveshana 2025

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Analysis of Acrylamide Levels in Food Samples and Investigation of Mitigation Strategies

In recent years, acrylamide has emerged as a significant public health concern due to its potential carcinogenic and neurotoxic effects, particularly from dietary exposure. Formed during high-temperature cooking processes, it is commonly found in a variety of everyday foods, raising the need for effective mitigation strategies. This project aims to quantify acrylamide levels in commonly consumed foods and investigate how different cooking parameters (e.g., temperature, time, and pH) influence its formation. Additionally, the study will explore mitigation strategies such as adding food additives, altering cooking methods, or varying ingredients to minimize acrylamide content. The findings will provide practical recommendations to reduce acrylamide levels in food preparation.

Mentors

Dr. S. Athavan Alias Anand, Senior Researcher, Dept. of Chemistry, Prayoga

Ms. Asha C.H., Research Associate, Dept. of Chemistry, Prayoga

Dr. S. Athavan Alias Anand

Senior Researcher, Dept. of Chemistry

Dr. S. Athavan Alias Anand is a Senior Researcher at Prayoga, specializing in synthetic organic chemistry and chemistry education research. He earned his Ph.D. in Chemistry from Annamalai University and has postdoctoral research experience from the Indian Institute of Science (IISc), Bangalore. His doctoral and postdoctoral research focused on designing and synthesizing potent drug candidates for anticancer and anti-tuberculosis, where he was involved in the multistep heterocyclic synthesis of active drug-like scaffolds.

Ms. Asha C.H.

Research Associate, Dept. of Chemistry

Asha C H is a Research Associate at Prayoga specializing in organic synthesis, spectroscopy, and product development. She has a keen interest in coordination chemistry and catalysis. In 2022, she completed her M.Sc. in General Chemistry from Government College Kasaragod, affiliated with Kannur University. Asha expanded her research specialisation as a project intern at CSIR-NIIST Thiruvananthapuram on synthesizing novel nicotinonitrile-triphenylamine derivatives for organic electrochromic applications.

Research Project Brief

ANV - PR - 025 - Wellness

Anveshana 2025

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Identifying the bioactive ingredients of medicinal plant extracts and evaluating their antioxidant and antidiabetic efficacies

Medicinally important plant species exhibit a wide range of remedial and therapeutic activities due to the presence of bioactive components. For years, many of these plants have been utilized in our fight against mild or severe health conditions with astounding success. Unfortunately, not much is known about the compounds responsible for such actions or the mechanism of healing. To improve the efficacies of any potential drugs, it is critical to know the nature of the compounds and understand their mode of actions. In this study, one or more pharmaceutically important and locally sourced plant extract(s) will be studied in detail to reveal their chemical compositions and attempts will be made to identify and isolate the active ingredients. Moreover, biomedicinal potencies of the extracts and the active components will be tested in vitro using several biochemical and cellular assays to evaluate their antioxidant and antidiabetic activities.

Mentors

Dr. Subhadip Senapati, Senior Researcher, Dept. of Chemistry, Prayoga

Ms. Vagdevi Rao KC, Research Associate, Dept. of Biology, Prayoga

Dr. Subhadip Senapati

Senior Researcher, Dept. of Chemistry

Subhadip Senapati is a Senior Researcher at Prayoga Institute of Education Research (Bengaluru, India). Upon completing his M.Sc. from Indian Institute of Technology Madras (IITM), he earned his Ph.D. from Arizona State University in 2015 under the guidance of Dr. Stuart Lindsay. Later he pursued postdoctoral training under Dr. Paul S.-H. Park at Case Western Reserve University. At present, he is working on several academic and industrial challenges focused on green chemistry, biochemistry, and nanoscience. He is also actively involved in chemistry education research.

Ms. Vagdevi Rao KC

Research Associate, Dept. of Biology

Vagdevi Rao K C is Research Associate at Prayoga Institute of Education Research (Bengaluru, India), specializing in phytochemistry, microbiology, and plant- based medicines. She completed her Bachelor's program in chemistry, botany, and zoology and a diploma in medicinal and aromatic plants. Vagdevi then completed M.Sc. in Botany from the University of Mysore (Karnataka). Currently she is working on multiple projects encompassing the fields of microbiology and botany.

Research Project Brief

ANV - PR - 026 - Green Chemistry & Technologies

Anveshana 2025

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Imparting different colors to sustainable leather products using natural biodegradable materials

The leather industry is one of the biggest industries in India, primarily due to its variety of applications. However, leather industries are also known to cause a wide range of negative impacts – air pollution, water pollution, animal cruelty, and huge volume of water consumption. To counter these drawbacks, more sustainable and environment-friendly leather alternatives are being pursued. However, practical problems such as degradability, mechanophysical properties, texture, and colors of the materials remains a challenge. In this project, a wide range of environment-friendly chemicals and natural waste materials will be tested to impart different colors and leather-like texture to the composite materials. The physical and mechanical properties of these materials will be investigated to check their suitability as leather-like materials. Based on the appearances and properties, a few formulations will be selected to manufacture leather-based products.

Mentors

Dr. Subhadip Senapati, Senior Researcher, Dept. of Chemistry, Prayoga

Mr. Parikshit Kumar, Research Associate, Dept. of Physics, Prayoga

Dr. Subhadip Senapati

Senior Researcher, Dept. of Chemistry

Subhadip Senapati is a Senior Researcher at Prayoga Institute of Education Research (Bengaluru, India). Upon completing his M.Sc. from Indian Institute of Technology Madras (IITM), he earned his Ph.D. from Arizona State University in 2015 under the guidance of Dr. Stuart Lindsay. Later he pursued postdoctoral training under Dr. Paul S.-H. Park at Case Western Reserve University. At present, he is working on several academic and industrial challenges focused on green chemistry, biochemistry, and nanoscience. He is also actively involved in chemistry education research.

Mr. Parikshit Kumar

Research Associate, Dept. of Physics

Parikshit Kumar is a Research Associate at Prayoga, specializing in nanotechnology and nanomaterials for energy applications, sustainable materials development, and green chemistry and catalysis. He holds a B.Tech in Mechanical Engineering from BPUT, Orissa (2019), and an M.Tech in Green Energy Technology from Pondicherry University, Puducherry (2022). With prior industrial experience, Parikshit is undertaking both academic and industrial problems at Prayoga.

Research Project Brief

ANV - PR - 027 - Advanced & Functional Materials

Anveshana 2025

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Fabrication Of Electronic Components For Large Area Flexible Electronic Using Screen Printing.

The fabrication of thin films for advanced electronic devices involves a meticulous process aimed at producing high-quality, functional coatings vital for cutting-edge technologies. This multifaceted endeavor encompasses the selection of materials based on their unique electrical, optical, and structural properties. Through systematic parameter adjustments and post-treatment strategies, the methodology fine-tunes film quality, uniformity, and adhesion to substrates, seeking to achieve enhanced device performance. Comprehensive characterization using advanced analytical tools like X-ray diffraction and scanning electron microscopy elucidates the film's morphology, crystal structure, thickness, and optical/electrical characteristics, paving the way for correlating these properties with device functionality. This research aims to contribute to the evolution of electronic device technology by delineating a systematic approach to fabricate thin film devices tailored for diverse applications in the realm of advanced electronics and transient electronics.

Mentors

Dr. Omprakash S S, Researcher, Dept. of Physics, Prayoga

Mr. Adarsh V N, Research Associate, Dept. of Physics, Prayoga

Dr. Omprakash S S

Researcher, Dept. of Physics

Dr. Omprakash S.S. is a Researcher at Prayoga, specializing in the synthesis of nanomaterials for thin film coatings in both electronic device applications, such as thin film transistors (TFTs), sensors, memristors, supercapacitors, and batteries, and non-electronic applications like anti-reflection, anti-corrosion, and hydrophobic coatings.He completed his Ph.D. in 2020 at Mangalore University, focusing on fabricating amorphous metal oxides thin film transistors using custom-designed spin spray pyrolysis units.

Mr. Adarsh V N

Research Associate, Dept. of Physics

Adarsh V N is a Research Associate at Prayoga, specializing in thin film fabrication, memristors, flexible electronics, and green synthesis. He completed his master's degree in Electronic Science from Bangalore University focusing his dissertation on the synthesis of carbon nanotubes for supercapacitor applications, a project funded by the Karnataka State Council for Science and Technology (KSCST).

Research Project Brief

ANV - PR - 028- Advanced & Functional Materials

Anveshana 2025

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Research to Transform Learning

Fabrication of thermoelectric generator

The fabrication of thin films of advanced materials suitable for thermoelectric devices involves a meticulous process aimed at producing high-quality coatings essential for cutting-edge energy generation. This multifaceted endeavor encompasses the selection of materials based on their unique electrical, thermal, and structural properties. Through systematic parameter adjustments and post-treatment strategies, the methodology fine-tunes film quality, uniformity, and adhesion to substrates at higher temperatures to boost device performance. Comprehensive characterization using advanced analytical tools elucidates the film's morphology, crystal structure, thickness, and thermoelectric characteristics. This research aims to contribute to the evolution of electronic device technology by delineating a systematic approach to fabricating thin-film devices tailored for diverse applications in the realm of advanced electronics to enhance energy generation.

Mentors

Dr. Omprakash S S, Researcher, Dept. of Physics, Prayoga

Ms. Pooja V D, Research Associate, Dept. of Physics, Prayoga

Dr. Omprakash S S

Researcher, Dept. of Physics

Dr. Omprakash S.S. is a Researcher at Prayoga, specializing in the synthesis of nanomaterials for thin film coatings in both electronic device applications, such as thin film transistors (TFTs), sensors, memristors, supercapacitors, and batteries, and non-electronic applications like anti-reflection, anti-corrosion, and hydrophobic coatings.He completed his Ph.D. in 2020 at Mangalore University, focusing on fabricating amorphous metal oxides thin film transistors using custom-designed spin spray pyrolysis units.

Ms. Pooja V D

Research Associate, Dept. of Physics

Pooja V. Domanekar is a Research Associate at Prayoga, focusing on electromagnetic interference shielding, nanomaterials (specifically ferrites), and piezoelectric materials. Pooja graduated with a Master's degree in Physics from Kuvempu University Campus in Shankaraghatta, Shimoga District. During her master's studies, she conducted research on the synthesis and characterization of cobalt ferrite nanoparticles, utilizing combustion methods to optimize the production process.

Research Project Brief

ANV - PR - 29 - Advanced & Functional Materials

Anveshana 2025

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Synthesis of aligned metal oxide nanostructures by solution-based chemical method for sensing of biomolecules

An energy-efficient technique like microwave synthesis is employed for WO3 nanoparticles (NPs) in the solution phase and will be extended onto rigid and flexible substrates. The aligned growth of the WO3 in nearly vertical fashion on the pre-seeded substrate is achieved in a few minutes of MW irradiation time. The aspect ratio of aligned WO3 NPs will be tuned by varying reaction time or concentration of the tungsten precursor. Since the NPs are grown directly on the substrate, they are highly adhesive and can be utilized for sensing applications without the aid of any binders. Moreover, due to their nanostructure morphology and high electrochemical active surface area, they can be employed for the detection of biomolecules such as dopamine, uric acid, ascorbic acid etc.

Mentors

Dr. Ramya Prabhu B, Researcher, Dept. of Chemistry, Prayoga

Ms. Swetha N, Research Associate, Dept. of Chemistry, Prayoga

Dr. Ramya Prabhu B

Researcher, Dept. of Chemistry

Dr. Ramya Prabhu is a dynamic researcher at Prayoga with a Ph.D. in Material Chemistry, specializing in the synthesis and characterization of inorganic nanomaterials. Her work on shape and size-controlled syntheses of metalchalcogenide nanomaterials has gained recognition in various applications, from environmental sensing to electrocatalysis. She has been awarded the prestigious INSPIRE Fellowship by the Department of Science and Technology, GoI.

Ms. Swetha N

Research Associate, Dept. of Chemistry

Swetha N, a Research Associate at Prayoga, specializes in nanomaterials for catalysis, sustainable electronics, and water treatment. She holds a Master's in Nanoscience and Nanotechnology from the University of Madras (2020), focusing on nano-catalysis. Her expertise includes synthesizing metal oxide nanoparticles through advanced techniques and industrial research on enhancing food shelf life and lean six sigma projects.

Research Project Brief

ANV - PR - 030 - Advanced & Functional Materials

Anveshana 2025

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Development of Poly Lactic Acid- metal oxide polymer nanocomposites for biodegradable Piezoelectric devices

In the field of flexible electronics, piezoelectric materials have been receiving a lot of interest because of their capacity to transform mechanical strain into electrical energy. In this research work, a composite of polylactic acid with anisotropic metal oxide will be prepared.The synthesized material will be characterized by spectroscopic and microscopic techniques.A flexible device will be developed by varying the weight percentage of metal oxide and embedding it in polylactic acid.The efficiency of the piezoelectric sensor prototype will be investigated. Further its flexibility and biodegradability will be checked.

Mentors

Dr. Ramya Prabhu B, Researcher, Dept. of Chemistry, Prayoga

Mr. Nagarjuna M, Research Associate, Dept. of Chemistry, Prayoga

Dr. Ramya Prabhu B

Researcher, Dept. of Chemistry

Dr. Ramya Prabhu is a dynamic researcher at Prayoga with a Ph.D. in Material Chemistry, specializing in the synthesis and characterization of inorganic nanomaterials. Her work on shape and size-controlled syntheses of MoS2 and WO3 nanomaterials has gained recognition in various applications, from environmental sensing to electrocatalysis. She has been awarded the prestigious INSPIRE Fellowship by the Department of Science and Technology, GoI.

Mr. Nagarjuna M

Research Associate, Dept. of Chemistry

Nagarjuna M, a Research Associate at Prayoga, holds a BE in Polymer Science and Technology and an M.Tech in Material Science & Engineering from SJCE, Mysore. Before joining Prayoga, he worked as a Tyre Engineer at JK Tyres & Industries. His M.Tech project focused on enhancing the mechanical and tribological properties of NR for ABS capillaries.

Research Project Brief

ANV - PR - 031-Earth Sciences

Anveshana 2025

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Integrating Surface Water and Groundwater Interactions in the Rejuvenation of the Suvarnamukhi River, Bangalore South

Rivers are exposed to various industrial, agricultural, and domestic discharges, which significantly affect their water quality. In the case of influent rivers, these pollutants can indirectly impact the quality of shallow groundwater in nearby areas. Systematic water quality testing along the river's longitudinal profile can help identify specific point sources of pollution. Similarly, testing groundwater in wells located near these identified sources can reveal the extent of surface effluent infiltration into shallow groundwater through an influent river system. In this project, water samples from the Suvarnamukhi River and adjacent wells will be analyzed for key water quality parameters. This study highlights the interconnectedness of surface water and groundwater systems, emphasizing the risks posed by polluted rivers to aquifers. The project seeks to identify pathways of contamination, how pollutants from surface water infiltrate groundwater sources. Understanding these dynamics is crucial for ensuring the sustainability of drinking water resources, particularly in urbanizing regions like Bangalore.

Mentors

Dr. Ajit Singh, Principal Researcher, Dept. of Earth Sciences, Prayoga

Dr. Ajit Singh

Principal Researcher, Dept. of Earth Sciences

Dr. Ajit Singh, an accomplished Earth Science researcher, holds a doctorate from IIT Kanpur with 18 years of research and teaching experience. His areas of research includes River Science, Earth Surface Processes, Hydrology, and Climate & Tectonic. Project themes include River and Lake rejuvenation, Rainwater harvesting and Artificial recharge, Water quality assessment and its impact, Application of Remote Sensing & GIS in Geohazard assessment.

Research Project Brief

ANV - PR - 032 - Earth Sciences

Anveshana 2025

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Understanding possible Mineral-Microbe Interaction through Chemical and Microbiological Analysis in Milk-Fermentation Experiments

Understanding mineral-microbe interactions (MMI) is crucial for advancing biogeochemical insights that support a sustainable Earth. This Anvesana project takes an integrative approach, combining Earth and Biosciences, to explore MMIs through an innovative milk-fermentation experiment. The project will explore the role of minerals in vessels used during the milk-to-curd formation process. Participants will work closely with interdisciplinary teams in chemistry and microbiology laboratories, fostering a holistic understanding of cross-disciplinary research methods. The project emphasizes hands-on training in scientific data handling, programming using Python, and documenting findings in Google Docs and LaTeX environments.

Mentors

Dr. Biraj Borgohain, Researcher, Dept. of Earth Sciences, Prayoga

Mrs. Jayatha BC, Research Associate, Dept. of Biology, Prayoga

Dr. Biraj Borgohain

Researcher, Dept. of Earth Sciences

Dr. Biraj Borgohain, an Earth Sciences researcher with a PhD from the Indian Institute of Technology Bombay, brings over four years of teaching and research experience. His research interest spans soil carbon dynamics in agricultural ecosystems, strategies for reducing greenhouse gas emissions, mineral-microbe interactions to emulate nature's efficient processes for geoengineering applications, and the development of geoscientific open-source tools through computer programming.

Mrs. Jayatha BC

Research Associate, Dept. of Biology

Mrs. Jayatha BC holds a Master's degree in Botany from Mount Carmel College, Bengaluru and B.ed In Biological Science. Her research interests span fields such as Pharmacognosy, Phycology, Ethnobotany, Mycology and Taxonomy. At Prayoga, she is a research associate involved in domain and education research - with particular interest on the Dunning-Kruger effect. Her research work is based charctersization of secondary metabolites,aromatic and medicinal plants, comparative analaysis of plant speices based on different phytochemical evaluations.

Research Project Brief

ANV - PR - 033 - Advanced & Functional Materials

Anveshana 2025

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Analysis and prediction of air quality data in various cities in Karnataka using time series forecasting and machine learning techniques

Air quality levels are indicators of pollution, and ultimately of public and environmental health. In this project, we will use computational techniques like time series forecasting and machine learning to analyze air quality indicators across several cities in Karnataka. We will understand the mathematical fundamentals of time series analysis and the computational aspects of modeling and representing complex data. We will apply these to several years of data for air quality indicators like particulate matter, carbon dioxide, and so on. We will analyze historical trends, detect periodic patterns as well as anomalies using the computational tools of time series analysis and machine learning. We will use this information to predict future trends in air quality.

Mentors

Dr. Sai Harshini Tekur, Senior Researcher, Dept. of Physics, Prayoga

Ms. Somagutta Vennala, Research Associate, Dept. of Mathematics, Prayoga

Dr. Sai Harshini Tekur

Senior Researcher, Dept. of Physics

Dr. Sai Harshini Tekur is a physicist who completed her PhD from the Indian Institute of Science Education and Research (IISER) Pune and joined Prayoga after a couple of postdoctoral stints in India and Germany. She works on problems in quantum chaos and quantum computing, and other related aspects including the physics of many-body systems, random matrix theory and network science. She is also deeply interested in Physics Education Research and is working on innovations in teaching and learning strategies.

Ms. Somagutta Vennala

Research Associate, Dept. of Mathematics

Ms. Somagutta Vennala is a Research Associate with a deep interest in linear algebra as well as mathematics education. She completed her undergraduate studies at RJS First Grade College, affiliated with Bangalore University, and her Master of Science in Mathematics from Government Science College, Autonomous, Bangalore. Currently, she is conducting research in mathematics education, building on her academic foundation and passion for the subject.

Research Project Brief

ANV - PR - 034 - Advanced & Functional Materials

Anveshana 2025

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Economical Chiral Recognition of Amino Acids Using Chiral Nanomaterials

Tryptophan (Trp), an essential amino acid and serotonin precursor, exists as two enantiomers: D-Trp and L-Trp. Distinguishing these forms is traditionally achieved using methods like high-performance liquid chromatography (HPLC) and circular dichroism (CD), which are costly and require complex preparations. This project focuses on synthesizing chiral nanomaterials to enable chiral recognition through UV-visible spectroscopy. The synthesized nanomaterials will be characterized using advanced techniques and tested for their ability to distinguish amino acid enantiomers. This work aims to develop an efficient and scalable method for chiral recognition, contributing to biochemistry and pharmaceutical applications.

Mentors

Dr. Chetana Badala Viswanatha, Researcher, Dept. of Physics, Prayoga

Ms. Padmini K U, Research Associate, Dept. of Physics, Prayoga

Dr. Chetana Badala Viswanatha

Researcher, Dept. of Physics

Dr. Chetana Badala Viswanatha is an interdisciplinary researcher with a PhD in Physics from RPTU Kaiserslautern-Landau, Germany, and a Master's in Chemistry from Ruhr University Bochum, Germany. Her specialisation includes advanced photoemission techniques for studying metal-organic heterostructures, chirality transfer, spin-state switching, and chiral nanostructures, with applications in chiral recognition.

Ms. Padmini K U

Research Associate, Dept. of Physics

Ms. Padmini K. U. holds a Master’s degree in Physics from Maharani Cluster University, Bangalore. Her research interests include natural fiber composite materials, astrophysics, and nanoscience. As a Research Associate at Prayoga, she is specialising in the development and mechanical properties of silicone-natural fiber composites and contributing to advancements in sustainable materials.

Research Project Brief

ANV - PR - 035 - Wellness

Anveshana 2025

PRAYOGA™
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Detection of Microplastics in commercial Salt samples

Microplastics are one of the most important contaminants in the environment as well as in food samples. The presence of microplastics in landfills and water bodies are established. Salt is an indispensable ingredient in everyday food, obtained from the oceans, so the probability of finding microplastics in salts is very high. Identifying and characterizing microplastics in salt requires procedures and characterization tools to unambiguously determine microplastics both qualitatively and quantitatively. We have recently used non-invasive microscopic techniques for the detection of adulterants in food samples. These advanced optical imaging methods will be employed to detect microplastics in salts sourced locally.

Mentors

Dr. K. S. Naghabushana, Director Research, Prayoga.

Ms. Padmapriya Rajan, Research Associate, Department of Physics, Prayoga.

Dr. K. S. Naghabushana

Director Research

Dr. KS Nagabhushana has nearly 30 years of research experience and has a proven record in the fields of Natural Products Chemistry, Organic Synthesis, Organometallic Chemistry, Biotechnology, Nanomaterials, Food Chemistry, and Catalysis, with a focus on building interconnection of branches. He began his career as a CSIR fellow at VMSRF, Mysore University, and held senior research roles at global institutions, including Max-Planck Institute and IITB-Monash Research Academy.

Ms. Padmapriya Rajan

Research Associate, Department of Physics

Padmapriya Rajan is a Research Associate at Prayoga, specializing in Physics. She completed her undergraduate studies in Physics at PSG College of Arts and Science followed by a postgraduate degree in Physics from Bharathidasan University, Tiruchirappalli. During her master's program, she conducted a project in theoretical quantum mechanics and she also worked on High Energy Physics Phenomenology where she focused on weak decays of Hadrons. At Prayoga, she is working on authentication of food samples by non-invasive physical methods and other education research projects.

Research Project Brief

ANV - PR - 036 - Wellness

Anveshana 2025

PRAYOGA™
Research to Transform Learning

Synthesis of copper anacardate and use of them as catalysts for facile organic transformations: A Green Chemistry approach

Catalyst plays a very important role in the day-to-day activities of humans. More than 85% of the materials used commercially are created by catalysis. Some of the transformations need harsh conditions, and in certain instances, hazardous chemicals are utilized during the chemical transformations. Green chemistry principles call for reactions done using catalysts and using sustainable materials. If the reaction conditions can be made milder, it is even better. The researchers team wishes to bring about critical functional group transformations using milder and less harsher chemicals being utilized. A series of chemical reactions for functional group transformation would be performed, and optimal conditions for certain reactions would be established.

Mentors

Dr. K. S. Naghabushana, Director Research, Prayoga.

Mr. Arjun V, Senior Faculty, Department of Chemistry, Prayoga.

Dr. K. S. Naghabushana

Director Research

Dr. KS Nagabhushana has nearly 30 years of research experience and has a proven record in the fields of Natural Products Chemistry, Organic Synthesis, Organometallic Chemistry, Biotechnology, Nanomaterials, Food Chemistry, and Catalysis, with a focus on building interconnection of branches. He began his career as a CSIR fellow at VMSRF, Mysore University, and held senior research roles at global institutions, including Max-Planck Institute and IITB-Monash Research Academy.

Mr. Arjun V

Senior Faculty, Department of Chemistry, Prayoga.

Mr. Arjun. V is a senior faculty member of Chemistry at Prayoga with a Master's degree in General Chemistry from Kuvempu University Shivamogga and a Bachelor's degree in Education from Bangalore University. Backed with four years of experience in synthesis of pharmacologically active ingredients as well as key intermediary organic compounds, process development, scaling up of projects from milligrams to production levels, impurity synthesis and characterization, handling hazardous reactions under strict safety protocol, stability studies of API and finished pharmaceutical products.

For Anveshana Student-Researchers, the learning experience includes

- Exposure to Scientific Research in Contemporary Domains
- Experience the Joy of Discovery
- Expert Guidance from Prayoga Research Mentors
- Develop Reports with Opportunities for Publication
- Access to State-Of-The-Art Laboratory Facilities
- Interaction with Eminent Scientists

This is a unique opportunity for students interested in pursuing scientific research as a career to engage with senior researchers, explore their areas of interest and hone skills and competencies required to strive in a research and academic environment.

Anveshana is a program which has originated from a lot of experiments and thought processes which have been put in by the group at Prayoga. The emphasis would be to encourage these students to take up an innovation or for that matter a repeatable research program in such a way that their knowledge is improved in the particular area with respect to doing experiments and in theoretical evaluations. This therefore brings the students to a level where they can compete with researchers at higher levels.

Prof T N Guru Row
Professor Emeritus, IISc, Renowned crystallographer

Applications for Anveshana are open once a year between January and March.

To learn more about the program, visit: **www.prayoga.org.in/anveshana**

For further information and queries, contact: **anveshana@prayoga.org.in**

Prayoga is a not-for-profit organisation, registered under the Indian Trusts Act

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Prayoga is a recognised **Science and Industrial Research Organisation** by the **Government of India**

Survey No. 133, Ravugodlu, Bolare Post
Off Kanakapura Road, Bengaluru South
Bengaluru – 560 116

http://www.prayoga.org.in
+ 91 91489 83385