



BITS Pilani
Pilani Campus

Grants Consultancy & Industrial Research Division NEWSLETTER

Volume 4

(October 2024- September 2025)



FROM THE DESK

Message from the Director

Dear Faculty, Staff, and Students,

Greetings!

Research has always been one of the defining strengths of BITS Pilani, and it is the collective passion and dedication of our academic community that continues to transform ideas into meaningful impact. Every research project undertaken, every industry partnership established, and every innovation translated into practice contributes to our shared vision of advancing knowledge and addressing societal challenges.



The successful execution of major initiatives such as **FIST**, **SATHI**, **BioCyTiH**, and **DBT Builder** reflects not only the trust reposed in our institution by leading funding agencies but also the calibre and commitment of our researchers.

The **Grants, Consultancy, and Industrial Research (GCIR)** Office remains an integral partner in this endeavour. From identifying funding opportunities and facilitating collaborations to supporting proposal preparation and ensuring compliance with institutional and sponsor requirements, the GCIR team is committed to enabling researchers at every stage of their journey.

As you explore this edition of the newsletter, I hope it serves not only as a reflection of our recent accomplishments but also as an inspiration for the possibilities that lie ahead. Together, let us continue to nurture a culture of excellence, innovation, and collaboration that reinforces BITS Pilani's position as a globally recognized institution for research and knowledge creation.

I extend my sincere appreciation to all our faculty members, researchers, staff, and students for their invaluable contributions and wish you continued success in your pursuit of excellence.

Prof. Sudhirkumar Barai

Director, BITS Pilani, Pilani Campus

Message from Associate Dean, GCIR

Dear Colleagues and Researchers,

Greetings from the **Office of Grants, Consultancy, and Industrial Research (GCIR)**!

Innovation thrives where curiosity meets commitment, and the past year has once again demonstrated the remarkable strength of our research community. It is our privilege to present the research highlights of **BITS Pilani, Pilani Campus**, for the period **October 2024 to September 2025**—a celebration of the ideas, collaborations, and discoveries that continue to shape our institution's journey of excellence.



This year has witnessed significant milestones across sponsored research, consultancy, and intellectual property. Our researchers have secured competitive funding from distinguished national and international agencies, reaffirming the confidence placed in the quality and relevance of research at BITS Pilani. Our partnerships with industry have grown stronger, translating innovative ideas into real-world solutions through impactful consultancy projects.

Behind every project and every collaboration lies the passion, perseverance, and ingenuity of our faculty, students, research scholars, and staff. Their unwavering pursuit of excellence has not only expanded the frontiers of knowledge but has also strengthened BITS Pilani's standing as a centre for research, innovation, and societal impact.

May these accomplishments inspire us to dream bigger, collaborate further, and continue creating knowledge that enriches society and shapes the future. Together, let us build on this momentum and write the next chapter of research excellence at **BITS Pilani, Pilani Campus**.

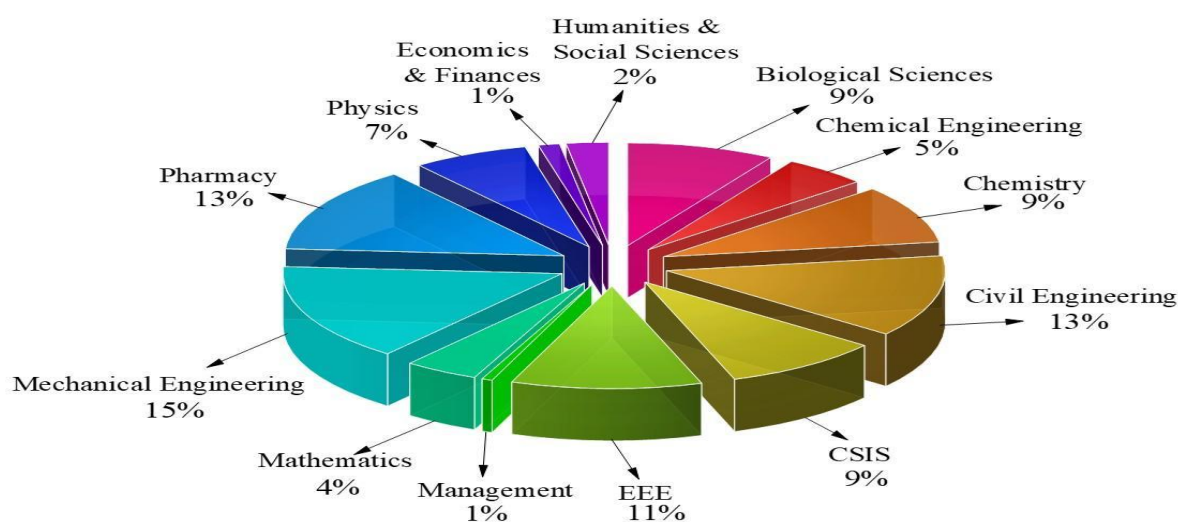
Prof. Raj Kumar Gupta, Professor

Department of Physics, BITS Pilani, Pilani Campus

Department/Institute wide Ongoing Sponsored Research Projects

Institute Wide	Project title: National Mission on Interdisciplinary Cyber Physical Systems-NMICPS (BiocyTIH) Funding Agency: Department of Science and Technology (DST) Sanctioned Amount: ₹1250000000
Institute Wide	Project title: DBT-BUILDER -University of Birla Institute of Technology and Science Pilani, Pilani Campus Interdisciplinary Life Science Programme for Advanced Research and Education in Epigenetics and Genome editing Funding Agency: Department of Biotechnology (DBT) Sanctioned Amount: ₹90180320
Institute Wide	Project title: Sophisticated Analytical and Technical Help Institutes (SATHI) Funding Agency: Department of Science and Technology (DST) Sanctioned Amount: ₹697000000
Department Wide	Project title: Funds for Improvement in Science and Technology (FIST) Funding Agency: Department of Science and Technology (DST) Sanctioned Amount: ₹20300000 Department: Pharmacy
Department Wide	Project title: Funds for Improvement in Science and Technology (FIST) Funding Agency: Department of Science and Technology (DST) Sanctioned Amount: ₹5500000 Department: Computer Science and Information Systems

Department wide ongoing projects (in %) as on September 2025



Total Amount of Ongoing Projects: Rs. 260.37 Crore

Government Sponsored Research Projects Sanctioned during October 2024-September 2025



Project Title: *Design of Automated Robotic System For Nozzle Closure Bonding Of Ce20 Engine*

Funding Agency: *Indian Space Research Organization (ISRO)*

Sanctioned Amount: ₹45,00,000

Name of PI: *Prof. B K Rout*

Designation: *Professor*

Department: *Mechanical Engineering*



Project Title: *Study of effects of gas flow oscillations on the performance of domestic gas meters*

Funding Agency: *Bureau of Indian Standards (BIS)*

Sanctioned Amount: ₹8,40,000

Name of PI: *Prof. Aneesh A.M.*

Designation: *Assistant Professor*

Department: *Mechanical Engineering*



Project Title: *Li-S Next-generation Electrolytes using accelerated Materials Discovery LISA*

Funding Agency: *Department of Science and Technology (DST)*

Sanctioned Amount: ₹ 8,18,000

Name of PI: *Prof. Tribeni Roy*

Designation: *Assistant Professor*

Department: *Mechanical Engineering*

Name of Co-PI: *Prof. Partha Sarathi Addy*

Project Title: *From Farm to Filament: Extracting Innovative 3D Printing Materials from Agricultural Residues*

Funding Agency: *Department of Science and Technology (DST)*

Sanctioned Amount: ₹ 23,21,660

Name of PI: *Prof. Tribeni Roy*

Designation: *Assistant Professor*

Department: *Mechanical Engineering*

Name of Co-PI: *Prof. Radha Raman Mishra & Dr Manoj Nikam*

Abstract 1: A major threat to human communities and wildlife habitats is global warming, with global temperatures predicted to rise by 1.5 degrees by 2050. Road transport contributes a major share of this through tailpipe emissions. Therefore, countries worldwide are adopting the usage of electric vehicles (EVs) powered by Li-ion batteries for transportation and thereby aiming to achieve net-zero emissions. Increasing the range of EVs is a key requirement for replacing fuel vehicles. In this sense, lithium sulfur batteries (Li-S) are rapidly gaining importance in the field of high energy storage devices owing to their high theoretical specific capacity (1672 mAh/g) compared with other cathode materials, making them feasible for potential applications in EVs. Furthermore, sulfur is an abundant element in the earth's crust as opposed to critical raw materials being used in Li-ion batteries (Cobalt, Manganese etc.) and the price of sulfur (about \$150/ton) is almost two orders of magnitude cheaper than current cathode materials used in LIBs. Despite several advantages, the commercialization of Li-S is currently limited owing to material challenges, low power densities (<1 kW/kg), low cycle life (~200 cycles), low electrical conductivity of sulfur, shuttle effect, lithium anode corrosion and significant volume change during cycling. Most of these issues are dramatically influenced by the nature of the

cell electrolyte. This work aims to exploit this influence to develop high performance Li-S batteries by finding optimal electrolytes using accelerated materials discovery.

Abstract 2: We have developed natural fiber-reinforced filament using ABS and Nylon-6 as base materials and 3D printed specimens using these materials. Visual inspection of surface finish for 3-D printed specimens using Nylon-6 filament and ABS filament were found to be polished and glossy; however, for natural fiber-reinforced specimens, it was found to have a matte finish. From a mechanical property's perspective, it was found that natural fiber-reinforced ABS 3-D printed specimens outperformed virgin ABS both in terms of Young's modulus as well as the yield strength.



Project Title: *Process design and integration of RDF/biomass gasification to cement plant calciner to enhance alternative fuel utilization in Indian cement industry*

Funding Agency: *National Council for Cement and Building Materials (NCCBM)*

Sanctioned Amount: ₹ 5,15,424

Name of PI: *Prof. Pratik N Sheth*

Designation: *Professor*

Department: *Chemical Engineering*

Project Title: *Conducting audit of City Action Plans in line with the guidelines of National Knowledge Network (NKN) & Institute of Reputes (IoRs) under National.*

Funding Agency: *Rajasthan State Pollution Control Board (RSPCB)*

Sanctioned Amount: ₹7,50,000

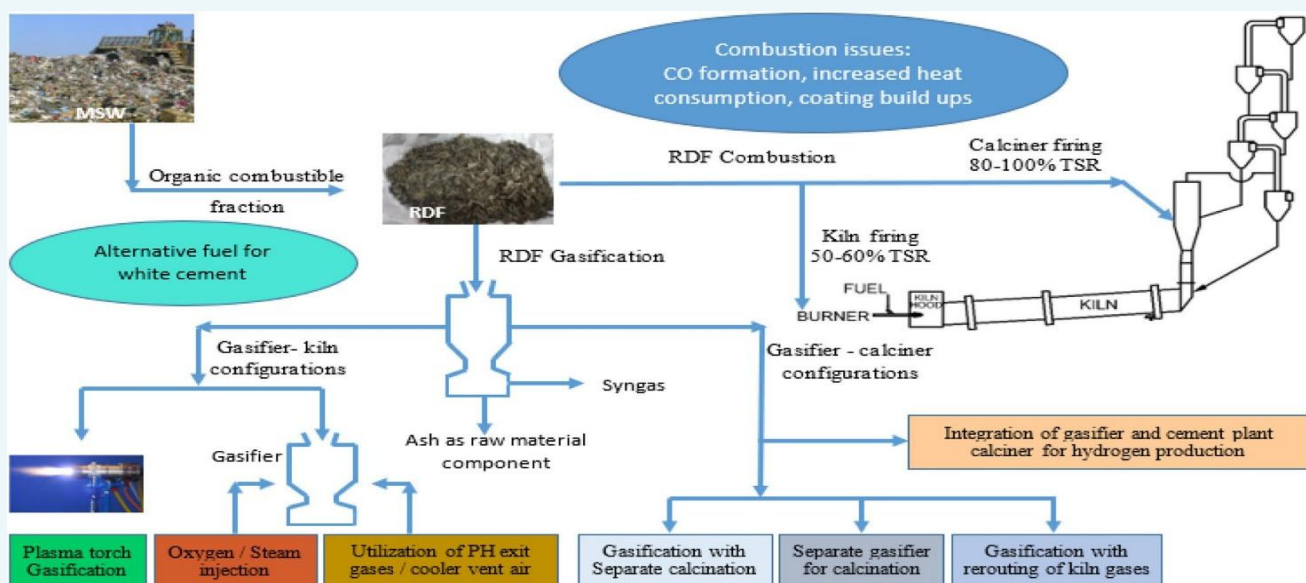
Name of PI: *Prof. Pratik N Sheth*

Designation: *Professor*

Department: *Chemical Engineering*

Name of Co-PI: *Prof. Anupam Singhal*

Abstract 1: The Indian cement industry, considered one of the most energy-efficient globally, utilizes coal and petcoke as its main fuels; thereby, energy costs generally account for 35-45% of total cement production costs. However, it is continually looking towards alternative fuels to reduce its dependence on conventional fuels. Many Indian cement plants are using RDF/biomass as direct fuel sources. RDF heterogeneity, high moisture(30-35%), low calorific value (2000-3000kcal/kg), high ash content(30-40%), and high chloride(1-3%) lead to operational problems in cement rotary kilns when enhancing TSR. Gasification is a process of converting RDF/biomass to syngas by combustion in an oxygen-deficient environment. Gasification technology can be a boon to white cement plants where an alternative fuel is not yet established, due to its impact on the whiteness of cement. This research aims to design a gasifier for RDF/biomass gasification and to conduct experimental and modelling studies to co-process syngas in a cement plant calciner.



Abstract 2: A field verification audit was conducted in Alwar and Kota City as part of the NCAP project. A total of 11 sites in Alwar and 24 sites in Kota were visited, primarily focusing on activities related to paving, plantation, and road maintenance, which are vital to urban sustainability and pollution control. In Kota, the verification focused on the city's southern side (9 sites) and the northern part of Kota (15 site visits), primarily related to paving, road maintenance, plantation, and infrastructure review. The data verification on the PRANA portal, as well as all relevant work orders and bills, was also conducted. The audit findings indicate that the implementation of these components was generally smooth, with adequate allocation of resources and adherence to project timelines. Additionally, the work demonstrated a satisfactory level of planning and execution, making a positive contribution to the overall goals of the NCAP initiative.



Project Title: *Assessing the Impact of the Jal Jeevan Mission: A Comprehensive Study of Water Accessibility, Quality, and Socio-Economic Outcomes in Rural Assam*

Funding Agency: *Indian Council of Social Science Research (ICSSR)*

Sanctioned Amount: ₹ 8,00,000

Name of PI: *Prof. Natasha Hazarika*

Designation: *Assistant Professor*

Department: *Humanities and Social Sciences*

Name of Co-PI: *Prof. Sailaja Nandigama*

Abstract: The study evaluates the large-scale implementation of the Jal Jeevan Mission (JJM) by examining how beneficiaries, local authorities, and implementing agencies perceive its effectiveness, addressing gaps in earlier narrow assessments. It investigates socio-economic outcomes- time savings, reduced healthcare costs, and improved education and employment opportunities- along with changes in water quality and waterborne disease prevalence post-JJM. Conducted in three underserved districts of Assam (Dibrugarh, Cachar, Dhemaji), the study uses a mixed-methods approach combining government secondary data, stratified household surveys (480 households per district), interviews, and focus group discussions. Descriptive and inferential methods, supported by qualitative triangulation, will generate an integrated assessment of JJM's performance. The findings aim to strengthen policy by identifying implementation bottlenecks, highlighting equity gaps, and informing more effective targeting, monitoring, and resource allocation. By offering evidence-based insights, the study will support refinements in rural water governance and guide scalable improvements in similar regions across India.



Project Title: *Detailed research study of solar thermal energy application (for medium temperature application (150 °C - 400 °C)) in Indian cement industry*

Funding Agency: *National Council for Cement and Building Materials (NCCBM)*

Sanctioned Amount: ₹ 3,54,000

Name of Investigators: *Prof. Manoj Kumar Soni*

Designation: *Professor*

Department: *Mechanical Engineering*

Project Title: *Design of an Alternate Fuel Dryer for Cement Plants by utilizing waste heat of Cooler ESP.*

Funding Agency: *National Council for Cement and Building Materials (NCCBM)*

Sanctioned Amount: ₹ 3,54,000

Name of PI: *Prof. Manoj Kumar Soni*

Designation: *Professor*

Department: *Mechanical Engineering*



Project Title: *Mechanobiology of circulating tumor cells and microfluidics: A new frontier for cancer research*

Funding Agency: *Department of Science and Technology-CEFIPRA (DST-INDO-FRENCH)*

Sanctioned Amount: ₹ 25,00,000

Name of PI: *Prof. Suvanjan Bhattacharyya*

Designation: *Assistant Professor*

Department: *Mechanical Engineering*

Project Title: *Addressing Thermal Challenges under marine conditions: The Impact of Roll, Pitch, and Yaw motion and ship-induced Vibration on Heat Exchanger Performance in a ship*

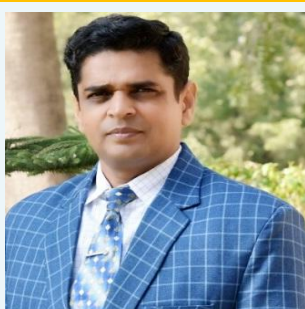
Funding Agency: *Science and Engineering Research Board (SERB)*

Sanctioned Amount: ₹ 23,25,992

Name of PI: *Prof. Suvanjan Bhattacharyya*

Designation: *Assistant Professor*

Department: *Mechanical Engineering*



Project Title: *Designing of Fodder Pellets using locally available leaves: An approach to doubling farmers income*

Funding Agency: *National Bank for Agriculture and Rural Development (NABARD)*

Sanctioned Amount: ₹ 26,18,000

Name of PI: *Dr. Sushil Yadav*

Designation: *Senior Veterinarian*

Department: *Pharmacy*

Name of Co-PI: *Prof. Srikanta Routroy*

Abstract: The project titled "Design of Fodder Pellets Using Locally Available Leaves: An Approach to Doubling Farmer Income" aims to address the challenges faced by farmers in feeding livestock while boosting their income. By utilizing locally available leaves and crop residues, the project proposes the development of cost-effective, nutrient-rich fodder pellets. This sustainable approach not only reduces greenhouse gas emissions associated with burning but also offers farmers an additional income stream from crop residues. In addition, the project includes training programs for farmers, budding entrepreneurs, and other stakeholders, equipping them with the knowledge and skills to produce and market fodder pellets. The development of these fodder pellets supports environmental sustainability, improves livestock feeding practices, and contributes to the broader goal of enhancing farm profitability and doubling farmer income. This innovative solution addresses both ecological and economic challenges in agriculture



Project Title: *Leveraging Diet and Modifiable Risk Factors to combat Metabolic Syndrome (MetS): Multi-omics Mechanistic approach to Validate Calorie Restriction Mimetics (CRMs) for Pharmacological and Nutritional interventions*

Funding Agency: *The Indian Council of Medical Research (ICMR)*

Sanctioned Amount: ₹ 19,50,932

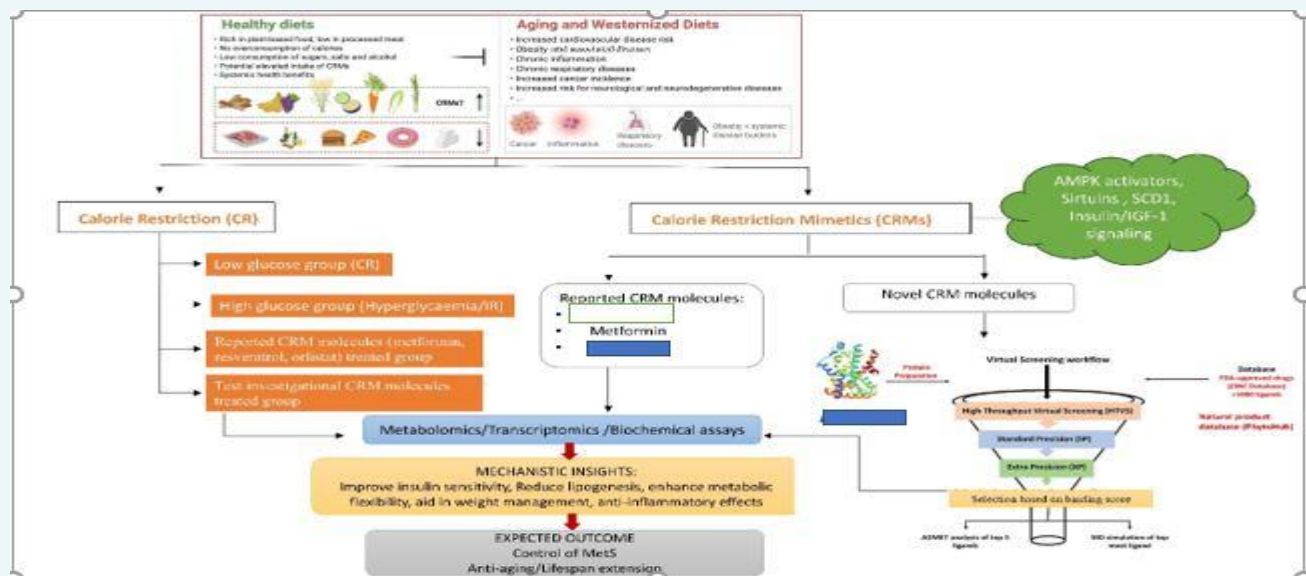
Name of PI: *Prof. P R Deepa*

Designation: *Professor*

Department: *Biological Sciences*

Name of Co-PI: *Prof. S. Murugesan, Prof. Pankaj Kumar Sharma*

Abstract: Metabolic Syndrome (MetS) is a cluster of related non-communicable disorders (Diabetes, CVDs, Obesity, hypertension) that leads to NAFLD/NASH and cancers, which have overlapping risk factors – insulin-resistance and hyperlipidemia, and are influenced by diets. Calorie restriction (CR), that involves reduced caloric-intake without malnutrition, is beneficial. Calorie restriction mimetics (CRMs) emulate these advantages without significant dietary changes (e.g. Metformin) that modulate sirtuins, AMPK, mTOR pathways. While promising in preclinical studies, the efficacy/safety of CRMs in humans require further molecular investigation. Suitable experimental models of insulin resistance-obesity-NAFLD will be used with dynamic microenvironment to test and functionally validate the efficacy/mechanistic pathways of CR/CRMs (reported/novel). Using targeted HTVS-docking-simulations of standard ligand databases, novel CRMs will be identified. The ‘-omics’ analysis will reveal disease-specific gene/metabolic deregulations as potential “biomarkers” for preventive strategies, to control MetS and risk of co-morbidities, and the therapeutic effect of CRMs.



Project Title: *Development of antibiotic nanoformulation for the prevention and treatment of udder infection in dairy animals*

Funding Agency: *DST Rajasthan (DST)*

Sanctioned Amount: ₹ 14,31,000

Name of PI: *Prof. Anil Jindal*

Designation: *Associate Professor*

Department: *Pharmacy*



Project Title: *Fluorescent probes for bioimaging of potential biomarkers in parkinson's disease*

Funding Agency: *DST Rajasthan (DST)*

Sanctioned Amount: ₹ 18,61,000

Name of PI: *Prof. Bharti Khungar*

Designation: *Professor*

Department: *Chemistry*

Abstract: Parkinson's disease (PD), the second most prevalent neurodegenerative disorder, arises from complex pathological processes and remains difficult to diagnose and treat in its early stages. As global populations age, the incidence of PD continues to rise, underscoring the urgent need for innovative tools that enable timely detection and improve therapeutic outcomes. In recent years, fluorescent probes have emerged as powerful bioimaging tools capable of visualizing biological events with high sensitivity, nondestructive operation, and excellent spatial resolution. These attributes make fluorescent probes particularly valuable for monitoring dynamic biochemical changes involved in neurodegeneration. This proposal aims to develop and validate novel fluorescent probes for the selective detection of reactive oxygen and nitrogen species in cellular and animal models of PD. By enabling real-time visualization of oxidative and nitrosative stress, the proposed probes are expected to advance mechanistic understanding of PD pathology and support the development of early diagnostic strategies. Ultimately, this research seeks to contribute new molecular imaging tools that can facilitate improved monitoring, intervention, and therapeutic innovation in Parkinson's disease.



Project Title: *Study of a Prion Dynamics model in the presence of Interferon and Chaperone*

Funding Agency: *DST Rajasthan (DST)*

Sanctioned Amount: ₹ 14,18,400

Name of PI: *Prof. Rajesh Kumar*

Designation: *Associate Professor*

Department: *Mathematics*

Name of Co-PI: *Prof. Kapil Kumar Choudhary*

Abstract: In this work, we will study a prion dynamics model with interferon and pharmacological chaperone. Prions are infectious proteins. These infectious agents are responsible for fatal diseases known as Scrapie for sheep, Creutzfeld–Jacob or Kuru for humans and Bovine Spongiform Encephalopathy (BSE) for cattle. These treatments (interferon and pharmacological chaperone) are useful in suppressing the growth of prion population. According to the nucleated polymerization theory, there are two essential forms of prions, one of them is non-infectious monomer PrP^{C} and the other is an infectious polymer PrP^{Sc} . These polymers are very stable above a critical size z_0 and have a trend to attach the non-infectious monomers and transform them into the infectious form. Also, when PrP^{Sc} polymers break into smaller proteins below z_0 , they respond like normal prion proteins. Inclusion of chaperone and interferon leads to an interesting physical problem due to its impact on prion population. Pharmacological chaperones may be used to treat PrP^{C} monomers. Once a PrP^{C} monomer has been treated, it will be immune from PrP^{Sc} until it dissociates from the pharmacological chaperone. Our main motivation is to study prion dynamics problem with double treatment and discuss the effect of these treatments on prion population.



Project Title: *Study of usage and implementation of published Indian standards in Banking and Financial Services Sector*

Funding Agency: *Bureau of Indian Standards (BIS)*

Sanctioned Amount: ₹ 5,25,000

Name of PI: *Prof. Byomakesh Debata*

Designation: *Assistant Professor*

Department: *Economics and Finance*

Name of Co-PI: *Prof. Rahul Arora & Prof. Krishna M.*

Abstract: Standardization is essential for strengthening efficiency, interoperability, and risk management in the banking and financial services sector. Despite the availability of several published Indian Standards relevant to this domain, limited empirical evidence exists on their actual usage and implementation. This BIS-funded study, conducted by BITS Pilani, examines the awareness, adoption, and practical applicability of 57 published Indian Standards across banks, financial institutions, FinTech firms, and related stakeholders. Using a mixed-methods approach, the study combines systematic desk research with primary data collected through surveys and interviews. The findings reveal significant challenges such as limited awareness, operational constraints, technological inconsistencies, and gaps between existing standards and sectoral needs. Benchmarking with international best practices further highlights opportunities for improvement. The study delivers a comprehensive gap analysis and provides evidence-based recommendations for revising current standards and developing new

ones. The outcomes contribute to strengthening India's financial standardization framework and enhancing sectoral efficiency and resilience.



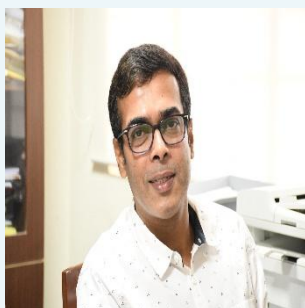
Project Title: *Between Ritual and Theater: Swang Performance in Buksa Tribal Tradition*
Funding Agency: *Indian Council of Social Science Research (ICSSR)*
Sanctioned Amount: ₹ 15,00,000
Name of PI: *Prof. Prateek*
Designation: *Assistant Professor*
Department: *Humanities and Social Sciences*



Project Title: *An Integrated Free Space and Underwater Optical Quantum Communication System.*
Funding Agency: *Department of Telecommunication (DOT)*
Sanctioned Amount: ₹ 55,83,050
Name of Investigators: *Prof. Syed Mohammad Zafaruddin*
Designation: *Associate Professor*
Department: *Electrical and Electronics Engineering*



Project Title: *Large Scale Deployment and Scaling uP of Power Assisted Hybrid E-Trike for People with Disability PAH E-TRIKE Phase II*
Funding Agency: *Department of Science and Technology (DST)*
Sanctioned Amount: ₹ 30,05,600
Name of PI: *Prof. Sachin Belgamwar*
Designation: *Associate Professor*
Department: *Mechanical Engineering*



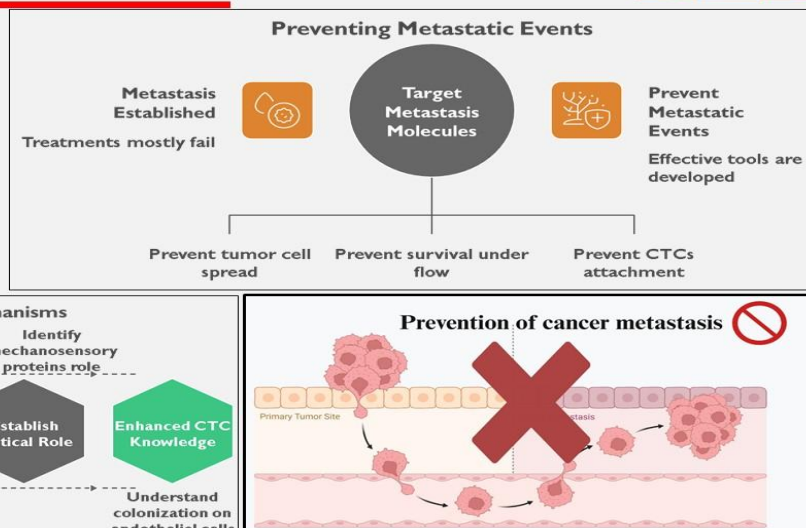
Project Title 1: *Deciphering molecular crosstalk between cancer and endothelial cells crucial to mesenchymal to epithelial transition (MET) and colonization of circulating tumor cells*
Funding Agency: *Department of Biotechnology (DBT)*
Sanctioned Amount: ₹ 52,02,160
Name of PI: *Prof. Rajdeep Chowdhury*
Designation: *Professor*
Department: *Biological Sciences*
Name of Co-PI: *Prof. Syamantak Majumder*

Abstract: Lack of appropriate models often hinders understanding of processes involved in circulating tumor cell (CTC) attachment to endothelium. Herein, microfluidic systems offer a great platform for studying the metastatic sequence of events. We developed human vessel-mimicking endothelial cell (EC)-coated 3D-printed channels generating in vivo-like hemodynamics. Interestingly, liver cancer cells, when subjected to laminar flow, showed adherence to the endothelial monolayer, forming a microthrombus. An induction of epithelial to mesenchymal transition (EMT) and over-expression of Yes Associated Protein (YAP) were observed in flowing CTCs, but endothelium-arrested CTCs reflected a contrasting MET phenotype alongside elevated Rac1 level. Additionally, an increased expression of Notch downstream-effectors and Integrin β 3 were observed in ECs interacting with CTCs. We propose to understand this complex crosstalk governing CTC adhesion under differential flow & further identify molecules to target metastasis.

Summary

Rationale:

Once metastasis is established, treatments mostly fail to show durable responses. Herein, our proposed study plans to target the molecules found to be involved in the **dissemination of tumor cells**, **survival under vascular flow**, and **attachment of CTCs**, which can provide leads towards subsequent development of effective tools preventing the metastatic events.



Project Title: *An investigation on alpha2B adrenergic receptor blockage together with pharmacological cold mimicking against insulin resistance and related metabolic complications*

Funding Agency: *Anusandhan National Research Foundation (ANRF)*

Sanctioned Amount: ₹ 59,90,400

Name of PI: *Prof. Pragyanshu Khare*

Designation: *Assistant Professor*

Department: *Pharmacy*

Abstract: Metabolic complications are a growing health concern globally and in India. Similarly, a concurrent increase in climate temperature in combination with modern temperature-controlled housing warrants an even deeper understanding of the thermal contribution to the increasing crises of metabolic disorders in the Indian context. Environmental temperature has a significant influence on the metabolic rates of organisms, a phenomenon intricately linked to factors such as body mass, life stage, activity level, and local climate. Cold exposure below the thermoneutral zone has emerged as a promising therapeutic strategy despite certain adaptive thermoregulatory mechanisms that undesirably impart a positive energy balance, a known hurdle in the context of metabolic disorders. While thermal cold sensation promotes negative energy balance through nonshivering thermogenesis-induced energy expenditure, it also results in positive energy balance due to heightened food intake and comfort-seeking behaviour (Saltykova et al., 2018). Similarly, pharmacological agents that mimic cold stimulation have also been shown to increase energy expenditure (Khare et al., 2018 & 2019; Sankina et al., 2024). However, they have also been found to reduce glucose uptake in brown adipose tissue (Sankina et al., 2024). We hypothesise that blocking these two phenomena, along with pharmacological cold mimicking, may show an additive effect in metabolic complications. The completion of this project will lead to the development of novel, more tolerable options to counteract the increasing incidence of metabolic complications and can also open a new area of research for targeting other metabolic diseases based on knowledge of thermoregulation.



Project Title: *Chemo-photothermal therapy for skin cancer using surface-active ionic liquid-assisted nanogel of gossypol: A non-invasive, multi-pronged delivery approach*

Funding Agency: *Anusandhan National Research Foundation (ANRF)*

Sanctioned Amount: ₹ 50,54,400

Name of PI: *Prof. Ankit Jain*

Designation: *Assistant Professor*

Department: *Pharmacy*



Project Title: *Development of a Vision-Language Model for in situ Plant Health Diagnosis Using Visual and Soil Information*

Funding Agency: *Anusandhan National Research Foundation (ANRF)*

Sanctioned Amount: ₹ 5423054

Name of PI: *Prof. Asish Bera*

Designation: *Assistant Professor*

Department: *Computer Science and Information Systems*

Abstract: With the advent of machine learning (ML) and deep learning (DL), several intelligent techniques are devised for crop stress detection. Generally, stressed crops reflect structural visual variations in leaf color, texture, or inconsistent lesion compared to healthy plants. To solve this, vision- based ML/DL methods are effective in extracting complex features from leaf images, yet, they lack proper interpretability to understand decision-making processes. So, integration of ML/DL model with a large language model (LLM), called vision-language model (VLM) that boosts recognition performance endowed with proper details in natural languages is essential. The key aspects causing agricultural stress will be studied by a VLM. A multimodal database will be developed including for analyzing plant growth. The new dataset will be used for training and validating the proposed model by VLM. A smartphone application that will assist rural farmers to diagnose plant stress with explanation will be developed.



Project Title: *Exploring androgen signalling in Oral cancer: a mechanistic approach to address gender bias and develop targeted therapy*

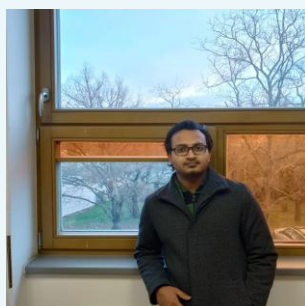
Funding Agency: *Anusandhan National Research Foundation (ANRF)*

Sanctioned Amount: ₹ 71,90,064

Name of PI: *Prof. Soumitra Ghosh*

Designation: *Assistant Professor*

Department: *Biological Sciences*



Project Title: *Gravitational waves from binaries in generic orbits.*

Funding Agency: *Anusandhan National Research Foundation (ANRF)*

Sanctioned Amount: ₹ 23,36,400

Name of PI: *Prof. Sajal Mukherjee*

Designation: *Assistant Professor*

Department: *Physics*



Project Title: *Unravelling Ultra-Relativistic Symmetries: Connecting Horizons and Flat Bands*

Funding Agency: *Anusandhan National Research Foundation (ANRF)*

Sanctioned Amount: ₹ 27,49,232

Name of PI: *Prof. Aritra Banerjee*

Designation: *Assistant Professor*

Department: *Physics*

Abstract: The proposal's main goal is to learn more about the structure and applications of Carrollian symmetries in Physics. Broadly defined, these symmetries are ultralocal/ultrarelativistic limit of relativistic scenarios. Intrinsically speaking, Carroll theories appear naturally on any null hypersurface, including black hole horizons and asymptotic null boundaries of flat space. But serendipitously, not only in theories in quantum gravity, Carroll symmetries emerge in diverse physical situations including quark-gluon plasma, Flat Bands in condensed matter physics, Magic superconductivity of Bilayer graphene, theory of Fractons and Hall effects etc. This proposal aims to understand the fundamental nature of these symmetries and some intriguing novel applications of the same in a synergistic manner. These in turn, are expected to start more in-depth explorations into the wonderful world of Carroll.

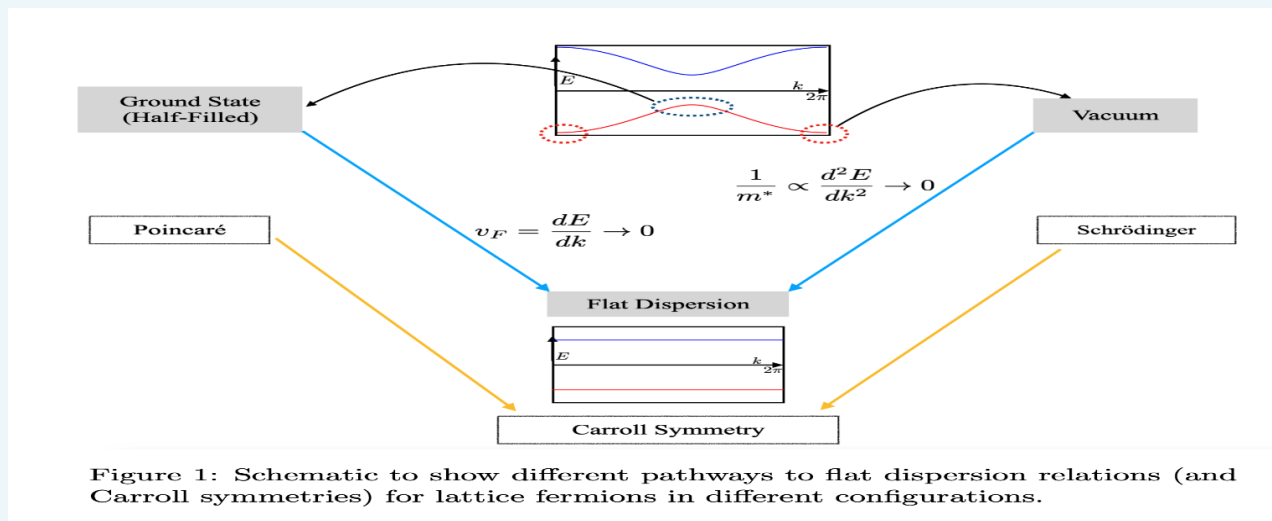


Figure 1: Schematic to show different pathways to flat dispersion relations (and Carroll symmetries) for lattice fermions in different configurations.



Project Title: *Digitization of Environmentally Sustainable Practices of the Bishnoi Community for wider Knowledge Dissemination and Effectiveness*

Funding Agency: *Department of Science and Technology (DST)*

Sanctioned Amount: ₹ 38,31,028

Name of PI: *Prof. Sushila Shekhawat*

Designation: *Professor*

Department: *Humanities & Social Sciences*

Name of Co-PI: *Prof. R Swarnalatha, and Prof. Rayson K Alex*

Abstract: Heritage is an essential component of any country as it stands for its unique identity as a signifier of the unity in diversity concept propounded as an innate part of our philosophy. Heritage conservation has both tangible and intangible aspects to it and the study would mainly focus on the intangible heritage such as the Embedded Ecologies of the Bishnoi Tribe considered to be one of the foremost communities in the country who have been practicing environmental conservation, holistic science and resource management since the fifteenth century. The proposed research would make a website wherein the entire discourse propounded by this community in heritage conservation practices would be digitized and can be used as a policy document highlighting the science of heritage conservation taken up as a religious activity by this community.



Project Title: *Documenting Sushma Swaraj's Diplomatic Journey (2014-2019): Reflections on her Decision Making*

Funding Agency: *Indian Council of Social Science Research (ICSSR)*

Sanctioned Amount: ₹ 15,00,000

Name of PI: *Prof. Veena R*

Designation: *Assistant Professor*

Department: *Humanities & Social Sciences*

Name of Co-PI: *Prof. Sushila Shekhawat and Prof. Sangeeta Sharma*

Abstract: Women have historically been underrepresented in international relations due to male dominance in the field. However, recent decades have witnessed women reshaping global diplomacy. This project examines Sushma Swaraj, India's External Affairs Minister (2014–2019), whose innovative use of social media and emphasis on accessibility earned her the title of a “people’s minister.” Her diplomacy foregrounded humanitarianism and enhanced India’s soft power abroad. Using post-colonial femininity as a framework, the study explores how Swaraj embodied a distinctly Indian feminine identity—leveraging traditional gender expectations as a source of authority. By analyzing her speeches, foreign visits, and policy initiatives, the project examines how her leadership style reflected a non-hegemonic, human-centered approach that departed from masculinist foreign policy models. It argues that Swaraj’s tenure not only redefined diplomatic norms but also contributed to transforming gender dynamics within Indian foreign policy and post-colonial political leadership.



Project Title: *Climate Change, Water Sustainability, and Women's Environmental Behaviors & Practices: A Case Study from Arid Rajasthan*

Funding Agency: *Indian Council of Social Science Research (ICSSR)*

Sanctioned Amount: ₹ 10,00,000

Name of PI: *Prof. Geetilaxmi Mohapatra*

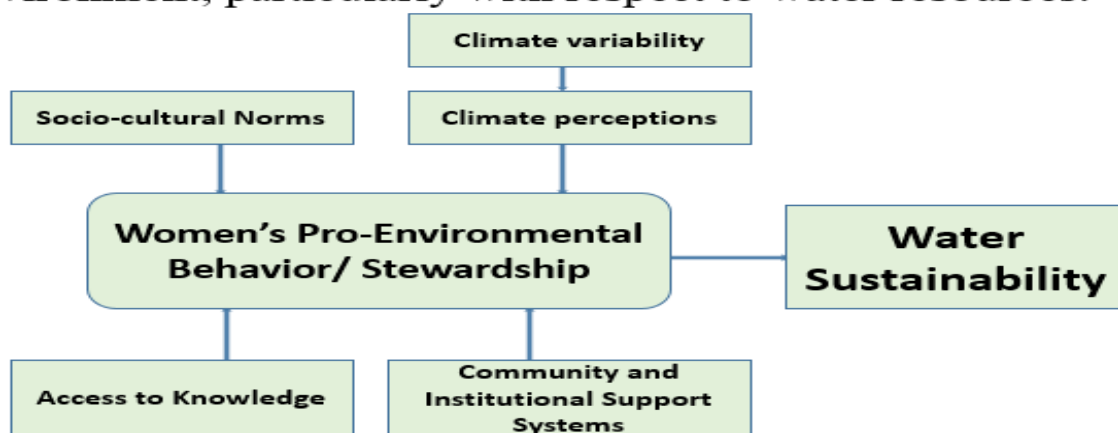
Designation: *Associate Professor*

Department: *Economics & Finance*

Name of Co-PI: *Dr. Hemlata Manglani*

Abstract: Water, the life-sustaining resource on which all organisms depend, is under threat worldwide. Access to clean and safe water remains a challenge within countries. Women play the primary role in ensuring the availability and various aspects of water resource management, including accessing, managing, and sustaining these resources for the proper utilization of water for drinking and non-drinking purposes for their families. Studies have shown that the outcomes are more sustainable and equitable when women are actively involved in water governance. Specifically, women’s water stewardship (WS) and guardianship should be increasingly recognized as a critical aspect of sustainable water resource management, considering the consumption level and water knowledge they possess (Anderson et al., 2013), where WS refers to taking social responsibility in managing water resources (UNIDO, 2023). Integrating women into these policies not only leverages their unique insights and leadership but also ensures that conservation efforts are more inclusive and effective. As Carmi et al. (2019) argue, transforming women into proactive agents of water sustainability, rather than passive recipients of limited resources, can significantly improve the efficacy of water conservation initiatives. To achieve SDG 6 and ensure the sustainability of water resources, it is essential to enhance women’s water knowledge management and incorporate it in the decision-making process to deliver efficient water management policies (Tong et al., 2017). Thus, the study aims to examine the role of women’s knowledge of water sustainability, their attitudes towards sustainable water practices, and their water conservation practices in selected water-scarce arid districts of Rajasthan. Furthermore, it aims to identify the significant determinants of water conservation activities among women that can inform the development of effective policies for water demand management.

Achieving water sustainability requires understanding the physical dynamics of water and the intricate interplay between human knowledge, attitudes, and behaviors regarding the environment, particularly with respect to water resources.



Industrial/Consultancy Sponsored Projects October 2024- September 2025



Project Title: *Validation of Fund price forecasting model*

Funding Agency: *Quantum Advisors Pvt Ltd*

Sanctioned amount: ₹ 15,36,360

Name of PI: *Prof. Gaurav Nagpal*

Designation: *Assistant Professor*

Department: *Management*

Abstract: The proposal's main goal is to learn more about the structure and applications of Carrollian symmetries in Physics. Broadly defined, these symmetries are ultralocal/ultrarelativistic limit of relativistic scenarios. Intrinsically speaking, Carroll theories appear naturally on any null hypersurface, including black hole horizons and asymptotic null boundaries of flat space. But serendipitously, not only in theories in quantum gravity, Carroll symmetries emerge in diverse physical situations including quark-gluon plasma, Flat Bands in condensed matter physics, Magic superconductivity of Bilayer graphene, theory of Fractons and Hall effects etc. This proposal aims to understand the fundamental nature of these symmetries and some intriguing novel applications of the same in a synergistic manner. These in turn, are expected to start more in-depth explorations into the wonderful world of Carroll.



Project Title: *Development of Medical Devices*

Funding Agency: *Pregna International Ltd*

Sanctioned Amount: 14,00,000

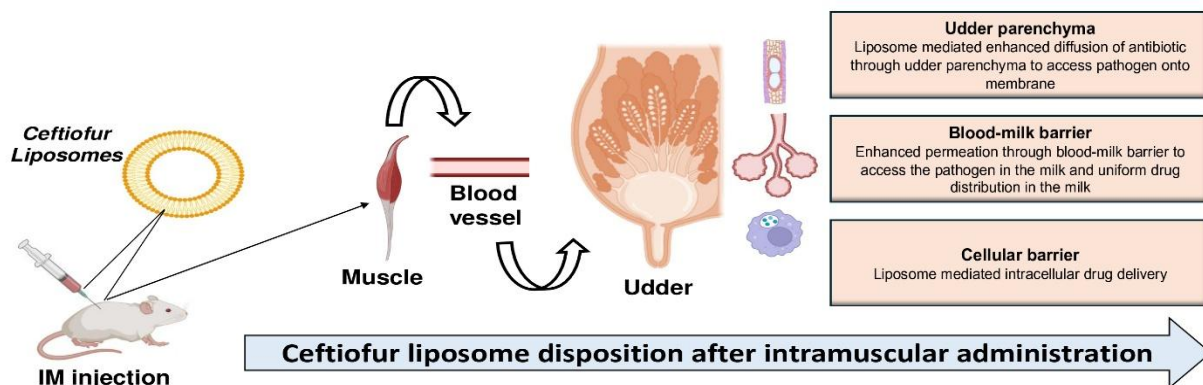
Name of PI: *Prof. Anil Jindal*

Designation: *Associate Professor*

Department: *Pharmacy*

Abstract: Animal mastitis is the most serious and prevalent bacterial infection in dairy animals which increases the economic burden on the farmers and caretakers. The major economic losses are due to a decrease in milk quality and quantity, increased culling rate and disease treatment costs which are also borne by the poor caretakers. Moreover, it also increases the threat to public health due to the consumption of poor quality milk. In mastitis, the microorganisms reside in the milk in the mammary gland of the animals, onto the udder membrane and inside the udder phagocytic cells of animals. Uniform distribution of the antibiotic in the animal udder is essential to attain the desired antibiotic concentration, which could not be attained by the present mastitis therapy. We, therefore, propose the development of ceftiofur nanoformulation which upon intramammary/intramuscular administration, could enhance the drug concentration within the udder phagocytes and permeation of the drug to the udder.

Liposome mediated drug delivery to infected animal udder



Project Title: *Anti-obesity activity of leaf and stem bark Mahanimba: In silico, In-vitro and exploratory clinical study*

Funding Agency: *All India Institute of Ayurveda*

Sanctioned Amount: ₹ 2,55,000

Name of PI: *Prof. Paul Atish Tulshiram*

Designation: *Associate Professor*

Department: *Pharmacy*



Project Title: *Rotor Balancing through Digitalization @Digital Twin*

Funding Agency: *Siemens*

Sanctioned Amount: ₹ 20,93,910

Name of PI: *Prof. Ashutosh Bhatia*

Designation: *Associate Professor*

Department: *Computer Science and Information Systems*



Project Title: *"Experimental Investigation of Condenser Tubes with Micro-, Mini-, and Macro-Sized Fins for Two-Phase Immersion Cooling"*

Funding Agency: *Experiqs*

Sanctioned Amount: ₹ 5,83,000

Name of PI: *Prof. Aneesh A M*

Designation: *Assistant Professor*

Department: *Mechanical Engineering*



Project Title: *Compotional Delineation, Process Optimization and Characterization of selected marketed products*

Funding Agency: *Anta Capital Holding Private Limited*

Sanctioned amount: ₹ 17,92,694

Name of PI: *Prof. Deepak Chitkara*

Designation: *Associate Professor*

Department: *Pharmacy*



Project Title: *Evaluation of CSS Schemes in Package 6- Drinking water and sanitation sector*

Funding Agency: *Ipsos Research Pvt Ltd*

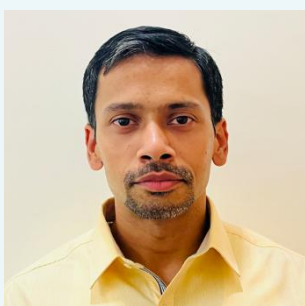
Sanctioned Amount: ₹ 5,00,000

Name of PI: *Prof. Leela Rani*

Designation: *Associate Professor*

Department: *Management*

Abstract: Focus on ‘impact evaluation’ study based on sectoral and scheme-level analysis with primary and secondary research involving evaluation of key indicators pertaining to water supply and sanitation, physical and financial progress of schemes, and gap assessment to identify issues with corresponding recommendations. The focus was on two flagship programs of Govt. of India in rural areas – Jal Jeevan Mission (JJM) and Swatch Bharat Mission (SBM). The coverage was for pan India. The project was carried out by Deloitte Touché Tohmatsu India LLP (DTTILLP) in consortium with Ipsos Research Private Limited (IPSOS) and Technical collaboration with BITS Pilani.



Project Title: *Generative AI for skill development*

Funding Agency: *GUS Global Services Pvt LTd*

Sanctioned Amount: ₹ 5,90,590

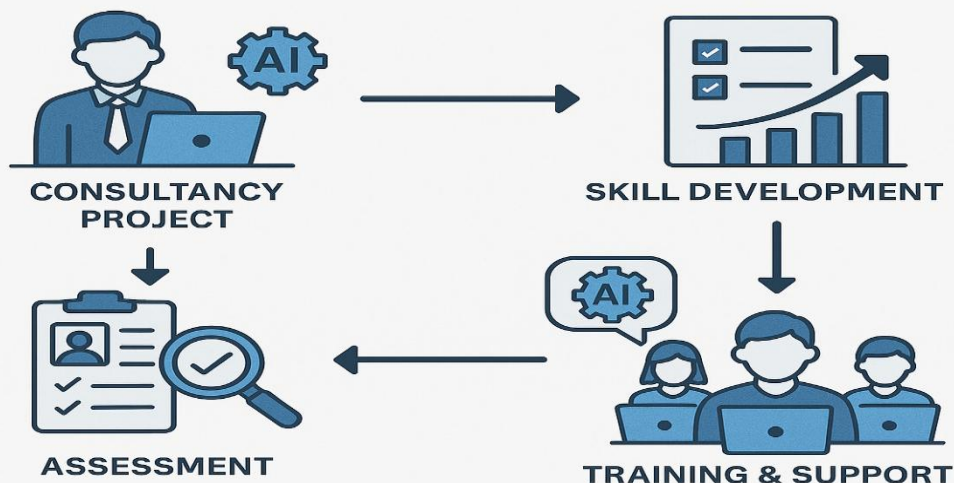
Name of PI: *Prof. Achint Nigam*

Designation: *Assistant Professor*

Department: *Management*

Abstract: The funded consultancy project, titled “Generative AI for Skill Development”, aims to enhance workforce capabilities in leveraging Generative AI tools for educational and business applications. Led by Prof. Achint Nigam from Management Department at BITS Pilani, Pilani campus, the project involves a comprehensive assessment of employees’ current GenAI proficiency, identification of critical skill gaps, and development of targeted training modules. The engagement includes in-person training sessions, soft skill development for effective GenAI usage, and three months of virtual support to ensure sustained impact. Deliverables comprise a need-assessment report, customized training programs, and a post-training effectiveness report. The project is structured around key milestones: gap analysis, upskilling delivery, and post-training oversight. By integrating advanced AI techniques into professional workflows, the initiative seeks to foster innovation, improve productivity, and build future-ready competencies within client organizations.

Generative AI for Skill Development



Project Title: *Energy data analysis and energy savings*

Funding Agency: *Global Energy Management & Solutions*

Sanctioned Amount: ₹ 22,08,960

Name of PI: *Prof. Hitesh Datt Mathur*

Designation: *Professor*

Department: *Electrical and Electronics Engineering*



Project Title: *Design optimization of Composite Compressed Air Energy Storage (CAES) Pressure Vessel*

Funding Agency: *Siemens Energy IN Ltd*

Sanctioned Amount: ₹ 22,89,200

Name of PI: *Prof. Rajesh Kumar*

Designation: *Associate Professor*

Department: *Civil Engineering*



Project Title: *AI for Banking, Finance and Insurance domain*

Funding Agency: *Impactsure Technologies Pvt Ltd*

Sanctioned Amount: ₹ 33,57,975

Name of Co-PI: *Prof. Jagat Sesh Challa*

Designation: *Assistant Professor*

Department: *Computer Science and Information Systems*

Name of PI & Co-PI: *Prof. Aruna Malapati and Prof. NL Bhanumurthy*

Abstract: The project explores recent AI tools in various applications across the Banking, Finance, and Insurance sectors. The work involves utilising Agentic AI techniques, such as RAG and fine-tuning, to perform various analytics and ML tasks on unstructured documents related to the Banking and Government sectors.



Project Title: *15 Minute Interval Day-Ahead Solar Generation Forecasting with ML-Driven Weather and Inverter Analytics*

Funding Agency: *Avaada Energy Pvt Ltd*

Sanctioned Amount: ₹ 41,34,240

Name of PI: *Prof. Sumanta Pasari*

Designation: *Associate Professor*

Department: *Mathematics*

International Research Projects October 2024- September 2025



Project Title: *A Human-Computer Interaction Study Exploring the Impact of GenAI on Undergraduate and Graduate Students Employability in India*

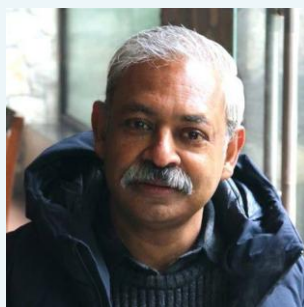
Funding Agency: *Institute of International Education, Inc Newyork*

Sanctioned Amount: ₹ 29,56,713

Name of PI: *Prof. Shibani Khanra Jha*

Designation: *Associate Professor*

Department: *Civil Engineering*



Project Title: *Smart design advisor for extrusion of impact energy absorber for battery using generative AI*

Funding Agency: *Mercedes Benz Research & Development India Pvt Ltd*

Sanctioned Amount: ₹ 24,75,000

Name of PI: *Prof. Navneet Goyal*

Designation: *Senior Professor*

Department: *Computer Science and Information Systems*



Project Title: *Empowering the workforce to gain critical employability skills in Electric Vehicle Technologies through Indo-UK bilateral partnership*

Funding Agency: *British Council*

Sanctioned Amount: ₹ 31,92,345

Name of PI: *Prof. Tribeni Roy*

Designation: *Assistant Professor*

Department: *Mechanical Engineering*

Name of UK-PI: *Prof. Jianping Zhang*

Name of Co-PI: *Prof. Svetlana Tretsiakova , Prof. Hitesh Datt Mathur and Prof. Rajesh Mehrotra*

Abstract: The transition to electric mobility is central to achieving the net-zero goals of both India and the United Kingdom. However, this transformation is constrained by a significant shortage of skilled professionals who can drive innovation, manufacturing, maintenance, and sustainable growth in electric vehicle (EV) technologies. This project aims to address this critical skills gap by developing a comprehensive Indo-UK Industry-Academia collaborative framework focused on education, training, curriculum development, and knowledge exchange in the EV sector. Through a 12-month partnership between Ulster University (UK), BITS Pilani (India), and leading industrial partners including Log9 Materials, Khageshvara Aviation Technology Pvt. Ltd., and EcoCycle Innovations Pvt. Ltd., the project will co-create novel, industry-aligned curricula, conduct hands-on technical workshops, offer internships on live industrial projects, and design short-term certification modules and advanced courses in EV technologies. The initiative will empower students, early-career researchers, and professionals with cutting-edge skills required for the rapidly evolving EV landscape. The project further strengthens international mobility and cooperation by enabling expert exchanges, joint seminars, research dissemination, and multi-stakeholder engagement aligned with SDG 4 (Quality Education), SDG 7 (Affordable and Clean Energy), and SDG 13 (Climate Action). By nurturing a diverse and inclusive learning ecosystem, the collaboration will enhance employability, foster innovation, and build a sustainable pipeline of EV specialists. Ultimately, this project will create a long-term, scalable model for industry-ready workforce development and contribute meaningfully to the clean transportation goals of both nations.



Project Title: *Sustainable cooling and heating in India*

Funding Agency: *Norwegian Ministry of Foreign Affairs (MFA)*

Sanctioned Amount: ₹ 95,50,000

Name of PI: *Prof. M S Dasgupta*

Designation: *Senior Professor*

Department: *Mechanical Engineering*

Abstract: The INDEE3 project advances sustainable heating and cooling solutions in India by promoting the adoption of natural refrigerants, enhancing cold chain efficiency, and reducing greenhouse gas emissions. Access to efficient, climate-friendly thermal energy systems has become critical amid rising temperatures and increasing food security concerns. In India, up to 40% of food production is lost due to inadequate cold chain infrastructure, especially for perishable commodities like fruits, vegetables, and seafood. INDEE3 aims to accelerate India's transition toward low-carbon technologies through improved refrigerant lifecycle management and energy-efficient solutions across the food, seafood, and building sectors. Building on the achievements of the INDEE+ initiative, the project aligns with global climate commitments such as the Kigali Amendment and EU F-gas regulation. SINTEF leads contributions in sustainability modelling, energy systems, and process optimization, with SINTEF Ocean and SINTEF Energy focusing respectively on the fisheries/dairy sectors and industrial heating and cooling technologies.



Project Title: *Developing AI models for identifying multiple retinal diseases based on fundus images. Ensuring compatibility with multiple*

Funding Agency: *Seva Foundation*

Sanctioned Amount: ₹ 11,47,500

Name of PI: *Prof. Sundaresan Raman*

Designation: *Associate Professor*

Department: *Computer Science and Information Systems*

Abstract: Retinal disorders such as Diabetic Retinopathy (DR), Age-related Macular Degeneration (AMD), Glaucoma are among the leading causes of preventable blindness worldwide. Despite the availability of treatments, many patients remain undiagnosed due to the high cost of diagnostic tools, limited access to ophthalmologists, and inadequate screening coverage in low resource settings. With advancements in AI and the availability of non-mydratic retinal cameras, this project aims to develop an affordable and deployable AI-based system for early retinal disorder detection that works across multiple imaging devices. The project aims in developing AI models for identifying multiple retinal diseases based on fundus images. Ensuring compatibility with multiple non-mydratic retinal cameras, it will implement model for the robust detection of the health of a retina, and deliver a lightweight, cost-effective system for offline/online use.

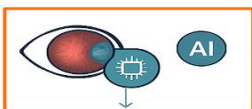
AI-Based Multi-Disease Retinal Analysis from Fundus Images

Affordable, portable AI system for early detection of multiple retinal diseases.

Motivation and Retinal diseases

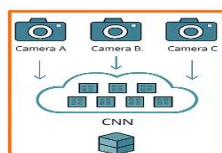
(DR, AMD, Glaucoma, Cataract)

Causes preventable blindness - need for affordable AI-based screening solution

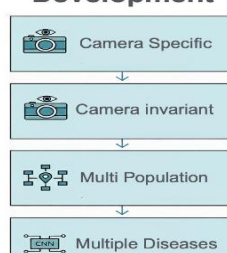


Data Preparation

Fundus images collected from multiple cameras, demographics and datasets ODIR, Messidor, RFMID, etc.

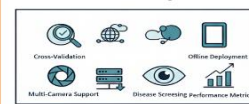


Model Development

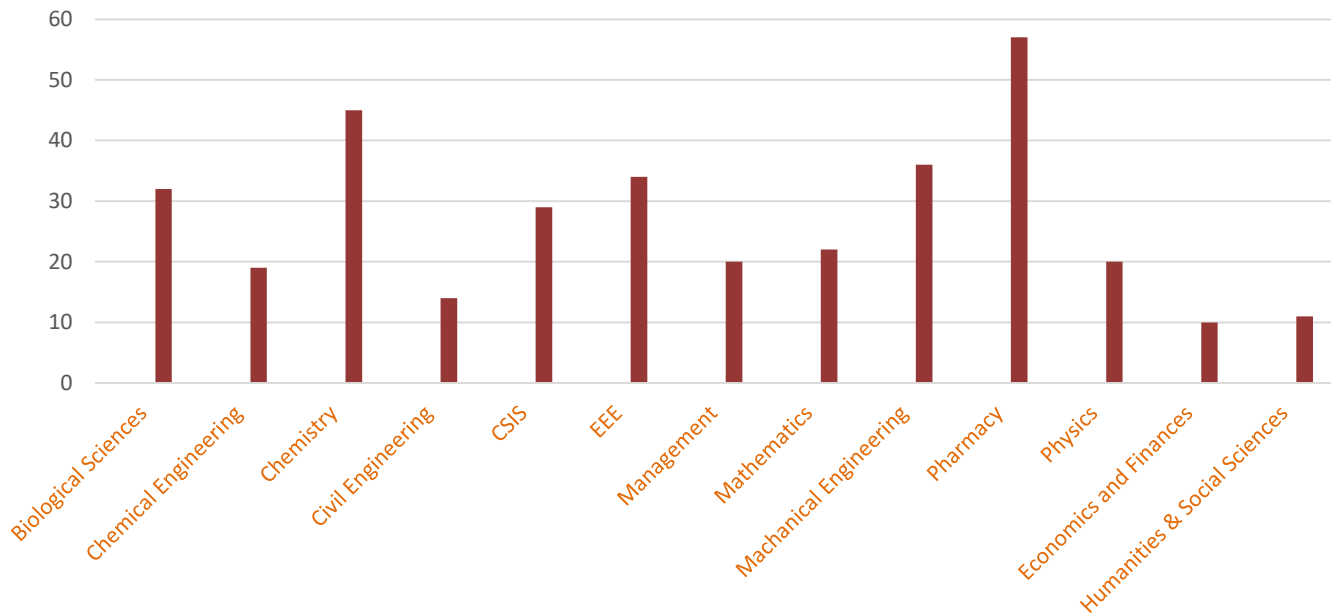


Validation & Outcome

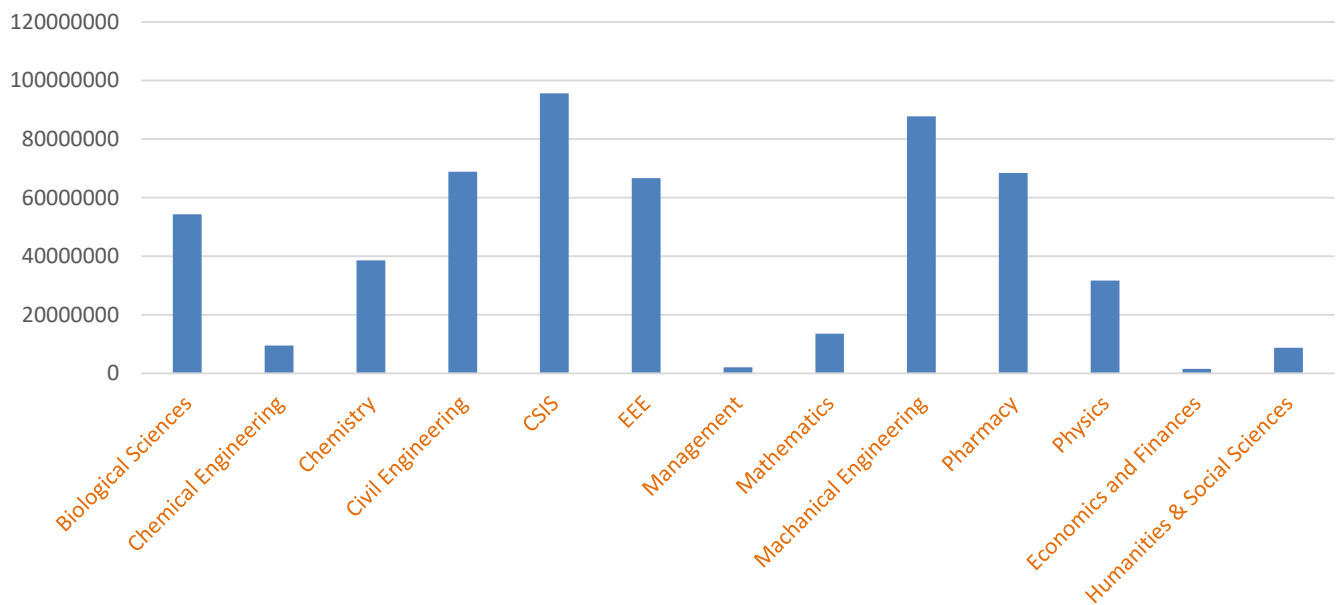
Validation on multiple camera datasets, Cloud Deployable for early retinal disease screening



Department wide completed projects (September- October 2025)



Department wide sanctioned amount (in lakhs) for ongoing projects as on September 2025



Patents Granted

Patentee: Birla Institute of Technology and Science, Pilani

Application No.: 201811029517

Title: A Pervious Bio-Concrete Water Filter

Date of Grant: 18-11-2024

Inventors Name: Rajiv Gupta/ Prabhat Kumar Jha

Patentee: Birla Institute of Technology and Science, Pilani

Application No.: 202011011674

Title: Adsorbent Material and Preparation Thereof

Date of Grant: 07-03-2025

Inventors Name: Kar Soumya/ Gupta Rajiv

Patentee: Birla Institute of Technology and Science, Pilani

Application No.: 202011024478

Title: Pharmaceutical Composition For Treating Obesity

Date of Grant: 16-04-2025

Inventors Name: Paul Atish Tulshiram/ Ginson George/ SNC Sridhar/ Pracheta Sengupta

Patentee: Birla Institute of Technology and Science, Pilani

Application No.: 202011039994

Title: Architecture-Independent Virtual Machine For Parallelization of Clustering Algorithms

Date of Grant: 29-07-2025

Inventors Name: Islam Saiyedul/ Balasubramaniam Sundar S/ Goyal Navneet/ Jain Aayushmaan

Patentee: Birla Institute of Technology and Science, Pilani

Application No.: 202011044309

Title: Method And System For Controlling A Unified Power Quality Conditioner With Distributed Generator

Date of Grant: 19-03-2025

Inventors Name: Ashish Patel/ Hitesh Datt Mathur

Patentee: Birla Institute of Technology and Science, Pilani

Application No.: 202111022557

Title: Computer-Implemented Method For Detecting and Sanitizing Potentially Malicious Code and Computing Device Thereof

Date of Grant: 26-11-2024

Inventors Name: Amit Dua/ Shashank Gupta

Patentee: Birla Institute of Technology and Science, Pilani

Application No.: 202111035889

Title: Device For Detecting Methanol Concentration In Alcoholic Beverages

Date of Grant: 25-10-2024

Inventors Name: Hazra Arnab/ Bindra Prateek

Patentee: Birla Institute of Technology and Science, Pilani

Application No.: 202211002812

Title: Method of In-Situ Synthesis of Zn/Gr-Zno Nanocomposite

Date of Grant: 19-02-2025

Inventors Name: Owhal Ayush/ Pingale Ajay Dadabhau / Belgamwar Sachin Ulhasrao/ Rathore, Jitendra Singh

Useful links of GCIR

Link to apply for New Project Proposal to Government/Industry Funding Agencies

[R&I Intranet - GMS](#)

Link to take Administrative Approval for procurement (Equipment, Consumables Etc.)

[Online Approval System](#)

Link to Access e-copy of the Newsletters

<https://www.bits-pilani.ac.in/pilani/srcd/newsletter>

Link to access e-copy of the SOP 2024

<https://www.bits-pilani.ac.in/pilani/sponsored-research-and-consultancy-srcd>

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