Center of Innovation, Incubation, Entrepreneurship, and Industry Relations (CIIEIR), Indian Institute of Technology (IIT) Indore

Corporate Social Responsibility Brochure

About IIT Indore

- IIT Indore is an institute of national importance established by the Government of India in 2009. IIT Indore is devoted to excellence in teaching, learning, and research.
- IIT Indore is rapidly expanding globally with an aim to internationalize its teaching and research portfolios with many foreign counties like USA, France, Europe, Japan, Australia, Greece, Sweden, Canada, Italy, Geneva, Korea, Taiwan, Belgium, South Africa, Switzerland, etc.
- IIT Indore welcomes Industry collaboration through Consultancy Projects, Corporate Social Responsibility (CSR) activities, and Scientific Social Responsibility (SSR) activities.

Institute Highlights:

NIRF Ranking : 13 (Engg. Category)
No. of Departments/Schools : 11
No. of Centers: 8
No. of Students : Over 2000
No. of Faculty Members: 168
No. of Research Project Staffs: 103
No. of Non-Teaching Staffs: 116
No. of Sponsored Projects : 431
No. of Patents : 80 filed & 11 granted
No. of Consultancy Projects : 206
No. of Research Publications: 4686
No. of Startups Incubated : 20+

Institute Objectives:

- Enhancement of academic, technological, and social outreach of the Institute through societal research, education, healthcare, sanitation, and rural development.
- Development of world class research and learning facilities for industries, teaching and research institutions.
- Skill development and scaling up the research and innovation towards the national requirements.
- To contribute to development of world class technological innovation in Engineering and Biomedical instrumentation, Defense, E-vehicles, alternate energy resources, etc.

About CIIEIR

CIIEIR IIT Indore is an umbrella setup at IIT Indore for fostering innovation & entrepreneurship, nurturing startups, and enhancing links with industry. It also administers a business incubator which provides ‘Start to scale’ support for technology-based entrepreneurship and facilitates the conversion of research activity into entrepreneurial ventures.

Vision: To transform knowledge and innovation into creation of successful entrepreneurs for society and contribute to nation building

Mission:

- **Developing innovation & entrepreneurship skills among students, staffs, and faculties.**
- **Mentoring incubated startups and assist them to progress from one stage of business development to other.**
- **Enhancing engagements with industries and public sector organization for research & development.**

Institute Facilities

Vikramshila Seminar Hall Complex, Takshashila Lecture Hall Complex, Nalanda Auditorium

Institute Facilities

Sophisticated Instrumentation Center (SIC)

Learning Resource Center (LRC)

Incubator Infrastructure

Cubicles, Office Space, and Board Room Facilities at CIIEIR for startups

Departments and Centers at IIT Indore

- Department of Computer Science and Engineering
- Department of Electrical Engineering
- Department of Mechanical Engineering
- Department of Metallurgy Engineering and Material Science
- Department of Civil Engineering
- Department of Biosciences and Biomedical Engineering
- Department of Astronomy, Astrophysics and Space Engineering
- Department of Mathematics
- Department of Physics
- Department of Chemistry
- School of Humanities and Social Sciences
- Center for Advanced Electronics
- Center of Futuristic Defense and Space Technology
- Center for Indian Scientific Knowledge Systems
- Center for Electric Vehicle and Intelligent Transport Systems
- Center for Rural Development and Technology
- Center of Innovation, Incubation, Entrepreneurship, and Industry Relations
- Computer and Information Technology Center
- DST FIST Center of Excellence in Gear Engineering

CSR Opportunities at IIT Indore:

- Corporate social responsibility (CSR) refers to a business practice that involves participation in initiatives which are beneficial to society. India companies are committed to undertaking CSR activities in accordance with the provisions of Section 135 of the Indian Companies Act, 2013 and related Rules. As per the notified rules, all private firms have to spend 2% of their average profit of the previous three years on CSR activities specified by the government.

- We have an assortment of 18 different innovative projects that are aligned to areas like:
  - National Heritage, Art and Culture
  - Healthcare and Public Hygiene
  - Education
  - Rural Development
  - Gender Equality and Women Empowerment
  - Disaster and Climate Resilience
  - Energy
  - Environmental Sustainability
  - Creative Livelihood Technologies
  - Engineering & Technology

Project Proposal CSR - 1

Area: Education, National Heritage, Art and Culture

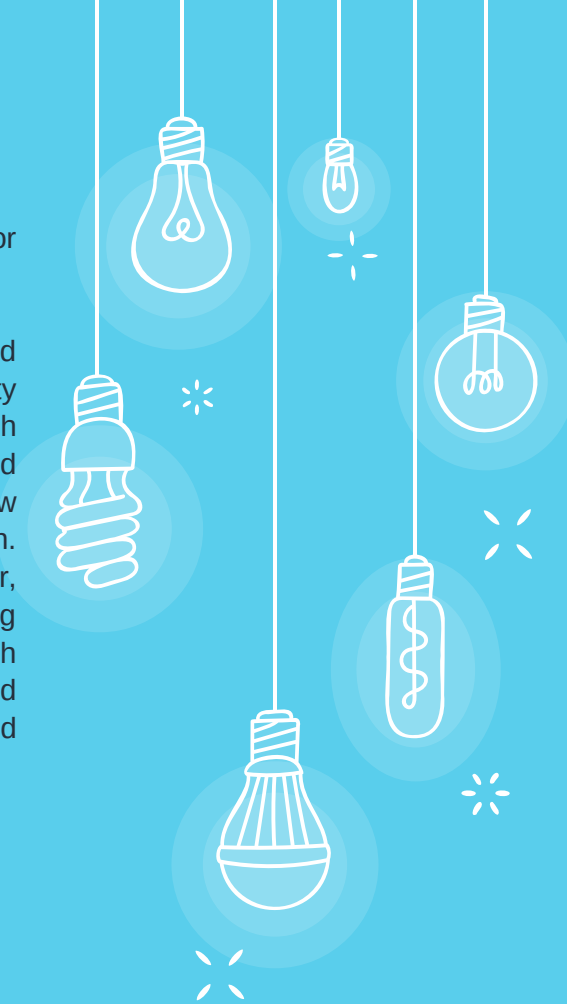
Name of the project: KSHIP (Knowledge Sharing in Publishing) An Open Access Platform for Multilingual Scholarly Publishing

Project Brief: KSHIP is an Open Access Publisher of peer reviewed open access books, journals and other forms of academic publishing. We are a part of Ubiquity Press's partner network of university open access publishing. The mission of KSHIP is two-fold: to solicit and publish original research monographs in Humanities, Social Sciences, Sciences and Engineering, and to host peer reviewed journals from academic societies primarily in India. KSHIP will have rigorous international peer review standards with an Advisory and Review Board that meets the highest standards of academic research. KSHIP will primarily publish academic and scholarly journals and monographs in English; however, one of the strategic goals of KSHIP is to initiate and sustain a multilingual scholarly publishing platform. To attain that goal, we have a two-pronged strategy: to solicit translations of research publications and to solicit and publish original monographs in Indian languages. As IIT Indore is based in Madhya Pradesh, we will begin with Hindi but will add other languages, as we expand and add experts from different languages on our team.

Total Fund Requirement: Rs. 1 Crore (Approximate) for editorial and commissioning staff.

Time for Completion: 2 years

Professor(s) In-charge: Dr. Nirmala Menon, Assistant Professor, School of HSS, IIT Indore,
Email : nmenon@iiti.ac.in Faculty Website



Project Proposal CSR - 2

Area: Energy

Name of the project: Energy

Project Brief: Our group is working on the cost effect and sustainable development of energy storage and conversion applications which includes, supercapacitor, H2 production, water remediation

Deliverables for energy storage.
1. Long term stability up to 10000 cycles
2. Energy density compatible to battery
3. Specific capacitance up to 1000 F/g

Deliverables for water remediation
1. Cost effective Nano material development
2. Cost effective and efficient Photocatalytic water purification.

Total Fund Requirement: Rs. 15 Lakhs each

Time for Completion: 3 years

Professor(s) In-charge: Dr. Rupesh Devan, Associate Professor, Department of MEMS, IIT Indore,
Email: rupesh@iiti.ac.in Faculty Website

Project Proposal CSR - 3

Area: Energy, Environmental Sustainability

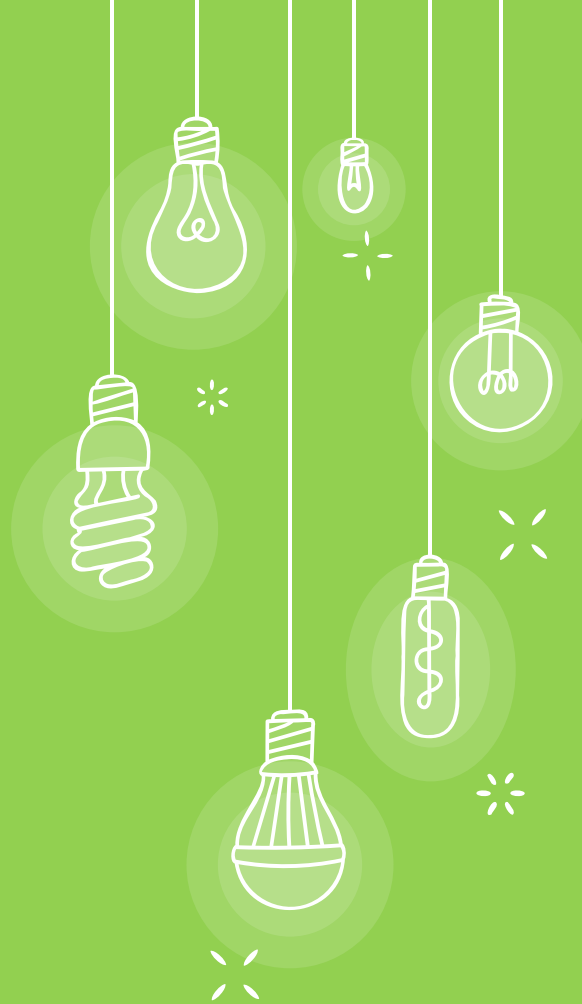
Name of the project: Development of High Efficiency Solar Cells

Project Brief: The solar cells with high efficiency and high stability will be developed under this scheme.
The Flexible solar cells development.
The solar cells will be highly stable in variation in temperature range.
Cost effective solar cells will be developed.
Expected efficiency will be about 20 %.
Non-toxic solar cells.

Total Fund Requirement: Rs. 50 Lakhs

Time for Completion: 3 years

Professor(s) In-charge: Dr. Parasharam M. Shirage, Associate Professor, Department of MEMS,
Email: pmshirage@iiti.ac.in, Faculty Website



Project Proposal CSR - 4

Area: Energy

Name of the project: : Development of Solid Electrolyte and Cathode Materials for Rechargeable Sodium Batteries

Project Brief: The issues of high cost and geographically concentrated deposits associated with the traditional metal-oxide cathodes for widely used lithium-ion batteries have accelerated the research into environmentally benign, inexpensive, and earth-abundant materials for use in next-generation battery technologies. Na-ion and Na-S batteries are particularly attractive for large-scale grid storage applications. Despite extensive explorations of various cathodes with high capacities, poor C-rate performance & capacity fading are still serious issues that impede the practical application of Na-ion and Na-S batteries. Poor Na-ion diffusion kinetics in layered & polyanion cathodes is one of the critical issues that causes low Coulombic efficiency and fast capacity fading in Na-ion batteries. Effective prevention of Polysulfide Shuttling, wherein the liquid-phase long-chain metal polysulfides migrate towards the anode and cause undesired side reactions, remains a pressing challenge in Na-S batteries. Thus, the development of novel cathode and solid electrolyte materials with faster Na-ion diffusion is of utmost importance. This project aims to develop high-energy-density all-solid-state rechargeable lithium metal batteries with long cycle life.

Main objectives of this project proposal include:

- Develop electrolytes having area-specific resistance (ASR) lower than 100 Ω·cm2 using NASICON-type ceramics.
- Study the effect of active fillers on the ionic conductivity, transference number, and electrochemical behaviour of thin (<100 μm) composite electrolytes.
- Fabrication of high-energy density Na-S cells by employing the developed ceramic-polymer composite as the solid electrolyte and identified high-voltage cathodes.
- A systemic study of ion transport in composite cathodes (cathode active material + solid electrolyte) to further optimize the fraction of electrochemically inactive electrolyte component.

Total Fund Requirement: Rs. 35 Lakhs

Time for Completion: 3 years

Professor(s) In-charge: Dr. Sunil Kumar, Assistant Professor, Department of MEMS, IIT Indore
Email: sunil@iiti.ac.in Faculty Website

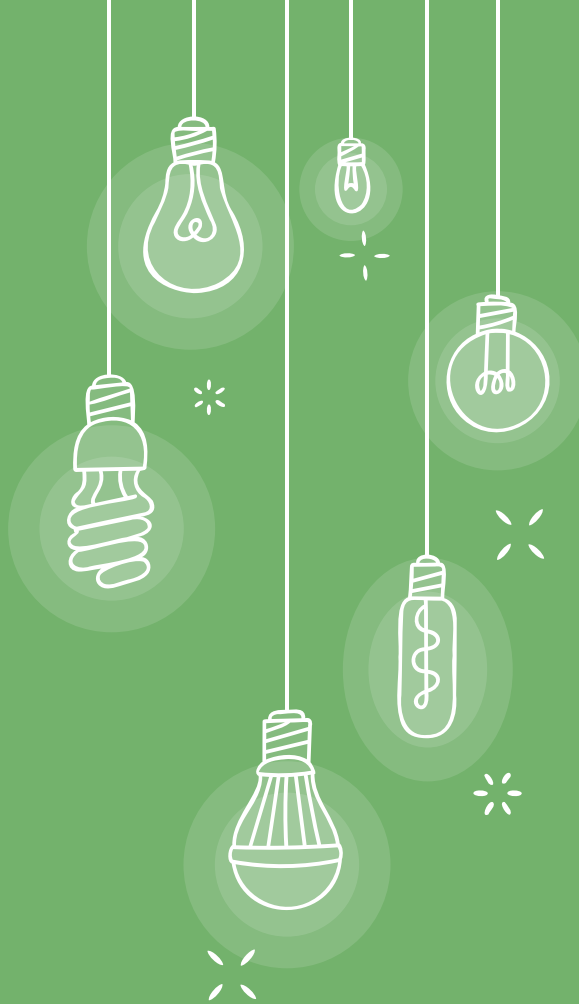
Project Proposal CSR - 5

Area: Health Care and Public Hygiene, Energy, Environmental Sustainability

Name of the project: Design and fabrication of bismuth-based perovskite nanostructured materials as a light absorber for solar cell applications.

Project Brief: The purpose of the current proposal is to prepare the perovskite solar cells using organometal halide CH3NH3PbX3 perovskite light absorber. Recently the CH3NH3PbX3 based perovskite solar cells have achieved the highest power conversion efficiency of 25.5% however the inherent toxicity of lead (Pb) and moisture sensitivity have limited their applicability. The selection of the suitable materials for the fabrication of the solar device is very important towards its selectivity as well as its biocompatibility. For this reason, significant research efforts are needed on finding alternatives having very high conductivity and stability while remaining non-toxic and environmentally friendly. Thus, the premise of the present proposal is to develop high-performance bismuth-based perovskite nanostructured materials having excellent light absorbing efficiency which can be used in solar cells through following objectives:

- Exploration of novel strategies to replace the current lead based light absorbers by employing bismuth-based perovskites as light absorbers.
- Variation in charge extraction layers, electron transport materials (ETL), hole transport materials (HTM) and different fabrication techniques to achieve high- performance lead-free perovskite solar cells.
- Fabrication of lead-free bismuth-based perovskite nanostructures for solar cells having unique device architectures (FTO/ETL/Perovskite/HTM/Au).

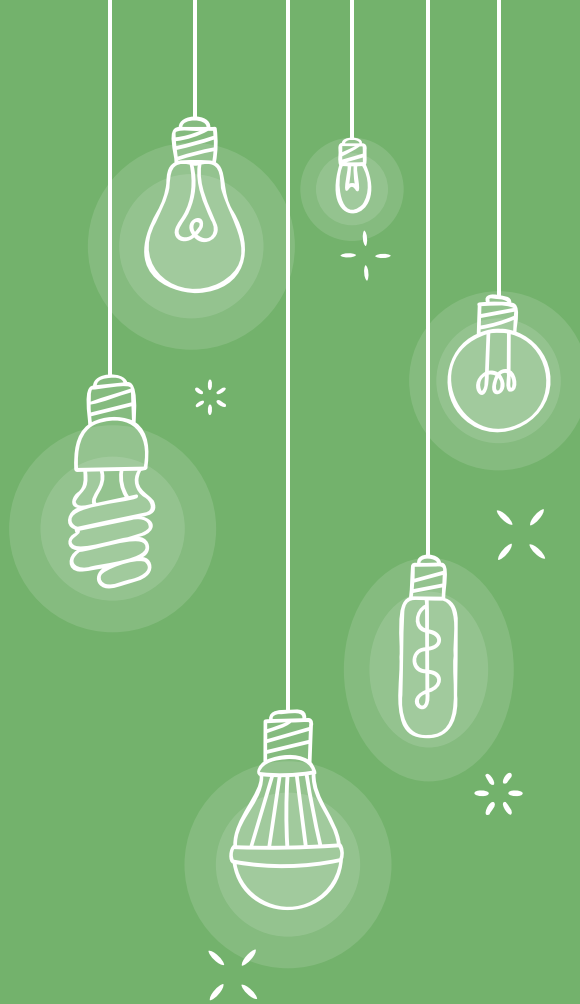


Importance of the proposed project in the context of status: In view of the national/international status of the subject matter of the present project, it can be expected that current proposal will surely lead the way of designing next generation PV system. The perovskite solar cells have been considered the most promising and efficient thin film solar cells as compared to the existing organic, polymer, quantum dot and dye sensitized solar cells. Therefore, perovskite solar cells have a potential to commercialization. However, the existing perovskite system suffering from low tolerance power against the air, moisture and water which ultimately vanishes their stability in a long term. Thus, the proposed work will eliminate the drawbacks of existing systems with veery high efficiency.

Total Fund Requirement: Rs. 80 Lakhs

Time for Completion: 3 years.

Professor(s) In-charge: Dr. Mobin Shaikh, Associate Professor, Department of Chemistry, Email: xray@iiti.ac.in Faculty Website



Project Proposal CSR - 6

Area: Education

Name of the project: Government school maintenance program in Chittorgarh, Rajasthan

Project Brief: This project undertakes the responsibility of the building/maintenance of toilets and supporting infrastructure (painting, furniture, fans, etc.) development in three different schools. The lists of school are as follow:

- Government. Senior Secondary School Bhagwanpura, Nimbahera, Chittorgarh-312614, Rajasthan.
- Government Senior Secondary School Binota, Nimbahera, Chittorgarh-312614, Rajasthan.
- Government Senior Secondary School Bambory, Chotisadri, Pratapgarh, Rajasthan.

I belong to the same area/villages; hence, I can monitor the progress and successful implementation of the project. This project will help all three schools students in various aspects. This is a grassroots level implementation of the project where the industry Corporate Social Responsibility (CSR) can be used in a fruitful manner.

Total Fund Requirement: Rs. 6 Lakhs

Time for Completion: 1 Year

Professor(s) In-charge: Dr. Satyanarayan Patel, Assistant Professor, Mechanical Engineering, IIT Indore,
Email: spatel@iiti.ac.in Faculty Website

Project Proposal CSR – 7

Area: Rural Development, Disaster and Climate Resilience, Energy, Environmental Sustainability, Creative Livelihood Technologies.

Name of the project: Estimation and delineation of vulnerable regions towards disaster compound extremes.

Project Brief: For an agriculture based developing economy like India climate change is a serious threat. India on one hand has a multifaceted and diverse climate scenario due its geography; on the other hand, faces huge challenges, existing and forthcoming, to maintain a healthy growth rate and sustainably fulfil the needs of its 1.3 billion people . This project sets out to establish an integrated monitoring and assessment framework for compound extremes across India for past and future. The project also aims to develop a state-of-the-art compound event monitoring and assessment framework of disaster events in Madhya Pradesh. To summarize, the project aligns with the vision of Disaster Management policy towards climate adaptation and aligns with National Action Plan on Climate Change.

Total Fund Requirement: Rs. 5 Lakhs

Time for Completion: 6-9 months.

Professor(s) In-charge: Dr Manish Kumar Goyal, Associate Prof and Dean, Civil Engineering, IIT Indore, Email: mkgoyal@iiti.ac.in, Faculty Website

Project Proposal CSR – 8

Area: Education, Rural Development, Unorganized sector workforce of India.

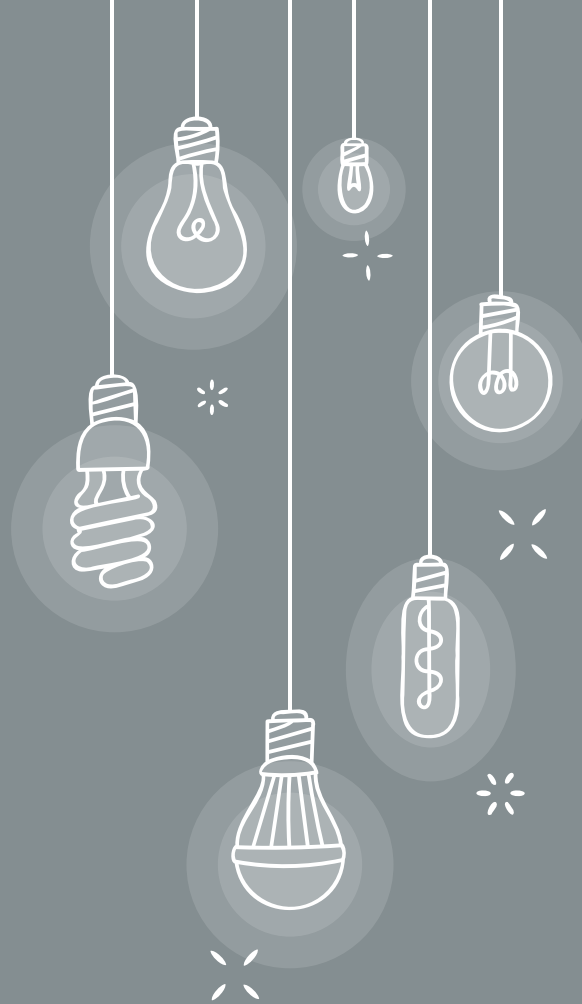
Name of the project: Organizing the Unorganized Sector of India.

Project Brief: India's 90% workforce, i.e., 450M people working in the unorganized sector, face issues in finding the best job opportunities and are not financially literate about savings, investing and credits, etc. We are make hiring and finance management ten times simple, more relevant, two times faster, and more efficient by providing personalized solutions for jobs and finances using AI/ML through an easy-to-use WhatsApp-like app.
Tentative Deliverables:-
100k+ users
3k+ recruiting partners
2k + regional partners
5 lakhs+ revenue
Fully Product Developed with finance features

Total Fund Requirement: 15 Lakhs

Time for Completion: 6 months

In-charge: Mr. Shiva Sharma, UG Student, Civil Engineering, Co-founder- MiBi (Incubated startup at CIIEIR IIT Indore), Email: mibi.pvt.ltd@gmail.com



Project Proposal CSR – 9

Area: Disaster and Climate Resilience, Environmental Sustainability.

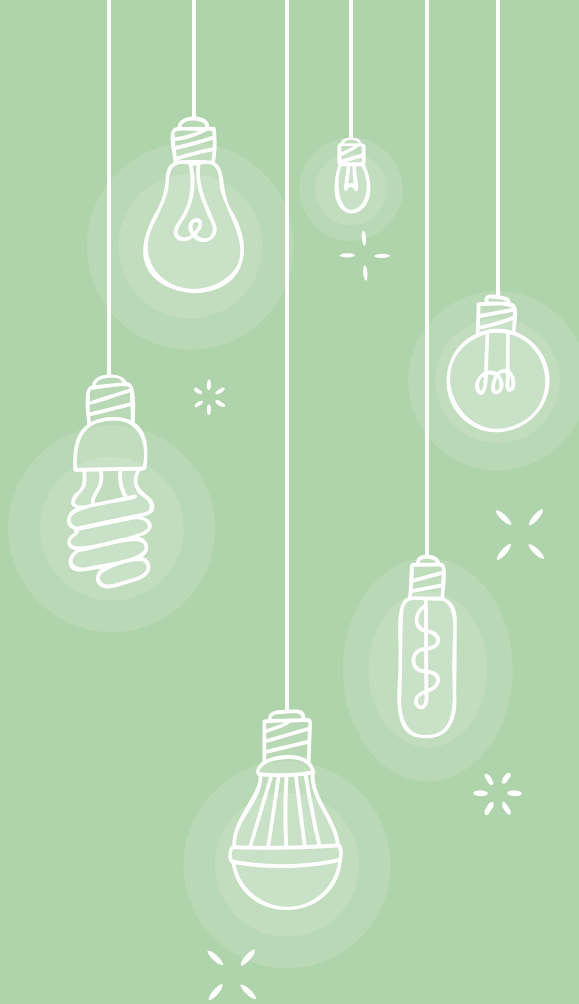
Name of the project: Development of Multi-hazard Disaster Risk & Resilience to Improve Disaster Resilience at City Level-for Indore City.

Project Brief: In the existing environment of climate change it is indispensable to understand the adverse impact for better and sustainable management and development. India as a developing country is more vulnerable than developed nations, due to adverse effects of extreme temperatures, extreme weather events, variable precipitation patterns, rising sea levels, food insecurity, and others. It includes data on hazards, vulnerabilities risk factors, exposures and risk governance etc. and development of Disaster Risk and Disaster Resilience matrix for Indore city.

Total Fund Requirement: Rs. 5 Lakhs

Time for Completion: 6 months

Professor(s) In-charge: Dr Manish Kumar Goyal, Associate Professor, Civil Engineering, IIT Indore, Email: mkgoyal@iiti.ac.in Faculty Website

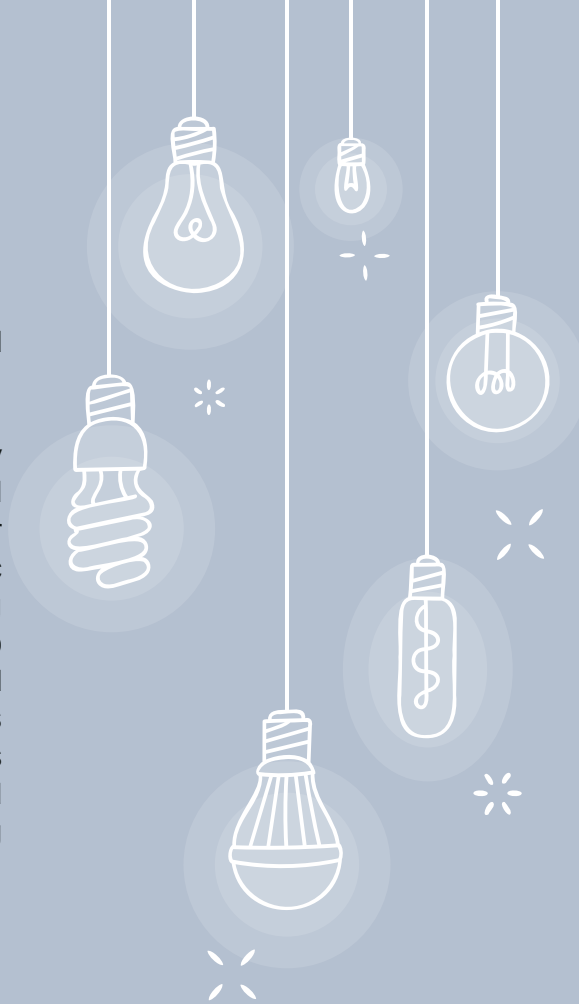


Project Proposal CSR – 10

Area: Rural Development, Disaster and Climate Resilience, Environmental Sustainability.

Name of the project: A novel approach to determine land subsidence using satellite images and field-based observations under climate change in major cities of Madhya Pradesh.

Project Brief: Land subsidence is a disaster phenomenon related to environmental geology wherein the regional surface altitude lowering caused by the natural or man-made factors. Land subsidence primarily occurs due to over drafting of groundwater from a certain type of rocks, for instance sedimentary and calcareous deposits. In several part of the world, many private and public buildings including underground infrastructures are severely damaged by land subsidence resulting into huge financial losses. Developing nations like India greatly depends on use of groundwater to cater its needs for human consumption, agricultural and industrial purposes. The need of ground water has significantly increased due to rapid urbanization and climate change. Therefore, it is necessary to investigate and detect the regions/ areas that are vulnerable to land subsidence. It is proposed to assess the possible menace of land subsidence for Madhya Pradesh using advanced remote sensing techniques. The study will assist in making effective policy decision and adapting strategies to minimize huge socioeconomic losses.



Key objectives are as listed follows:

a) Evaluate the influence of groundwater extraction on land subsidence.
b) Identify the vulnerable region subjected to land subsidence.
c) Estimating the economic losses due to the land subsidence in the near future.
d) To suggest mitigation strategies for land subsidence and minimize possible future damage in region.

Total Fund Requirement: Rs. 8 Lakhs

Time for Completion: 2 Years.

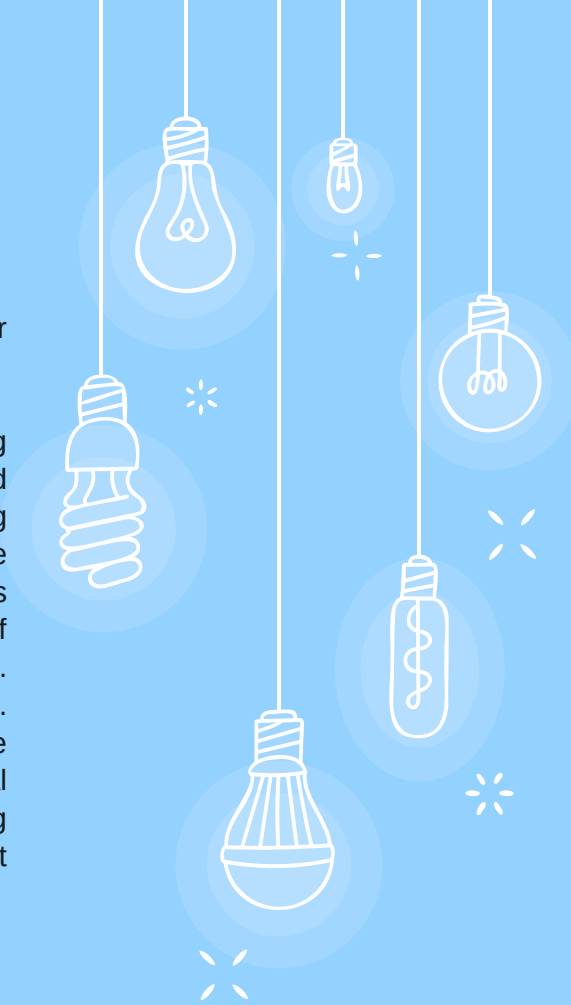
Professor(s) In-charge: Dr. Lalit Borana, Assistant Professor, Civil Engineering, IIT Indore,
Email: lalitborana@iiti.ac.in, Faculty Website

Project Proposal CSR – 11

Area: Rural Development, Energy, Environmental Sustainability.

Name of the project: Development of bricks by utilizing coconut and rubber waste and their characterization.

Project Brief: Bricks are extremely important building material and widely used in building construction, pavements, and other structural elements. The increasing amount of waste and problems associated with waste management has become one of the major concerns in developing countries like ours India. There is a need to mitigate the environmental impacts caused by these organic and inorganic waste materials by using them as raw construction materials. Tremendous efforts have been made to utilize the waste materials in various construction activities. The use of rubber in bricks imparts binding properties but it may alter the other significant properties of bricks. Coconut shell and fibers are strong having good crushing strength with a high abrasive resistance. Tons of coconut and rubber waste are produced every day in our country; hence it is easily available at low cost. The use of coconut fibers in bricks can impart adequate physical and mechanical properties as well as reduce the weight of bricks and the air pollution caused from open burning activities. Thus, the utilization of these materials in bricks can improve the properties as well as act as a sustainable and environment friendly approach to the disposal of these waste products.



The proposed project plan focusses on the use of rubber as partial replacement of sand and coconut coir as fiber in varying proportions in bricks and determine the effects on the properties of bricks. The aim of the study is to determine the optimum content of both the waste materials required for producing good quality bricks. Subsequently, it will generate employment as well as ecofriendly environment.

Total Fund Requirement: Rs. 9,95,000

Time for Completion: 18 Months

Professor(s) In-charge: Dr. Abhishek Rajput, Assistant Professor, Civil Engineering, IIT Indore
Email: abhishekrajput@iiti.ac.in, Faculty Website

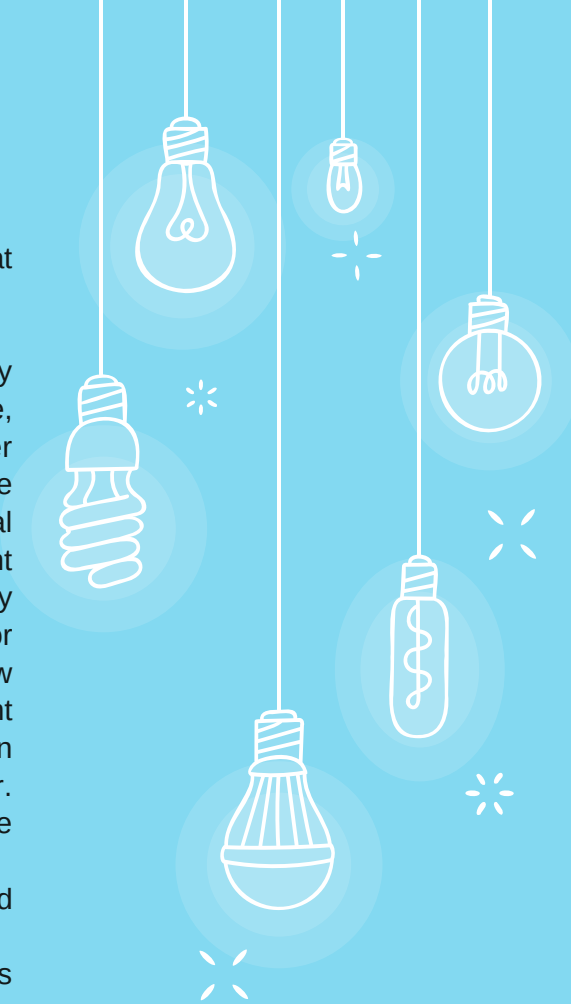
Project Proposal CSR – 12

Area: Rural Development, Energy, Environmental Sustainability.

Name of the project: Deep learning-based product for cost-effective quality evaluation of wheat grains.

Project Brief: One major hurdle faced by the agricultural sector has been the lack of grain quality evaluation tools that are accurate and time-effective but at the same time affordable. For instance, determination of the quality of pre-processed food grains is of utmost importance and a major decider in terms of the market acceptability, storage stability, processing quality and cost and finally the consumer acceptance. Among several indices of evaluating the quality of food grain, visual appearance i.e. physical condition and external morphology of the food grain is the chief assessment parameter for the condition of the grain. Current methods of evaluating the quality of food grains rely mostly on manual visual inspection or flat-bed scanners. Clearly, it is extremely challenging even for trained personnel in terms of accuracy, reliability and requires long time duration to inspect a few handfuls of grain samples. The limitation of current methods therefore necessitates the development of CPS based innovative strategies that syndicate the image detection-based machine vision systems to enable the quality evaluation of food grains in an automated, rapid and accurate manner. The proposed machine vision system to be developed will try to address the following three challenges, currently faced by the Indian agriculture sector:

- Replace conventional methods of sorting that are time-intensive (manual: 5 hrs., flat-bed scanners: 1 hr.)
- Low-cost solution for wheat grain sorting compared to the current state-of-the-art sorting machines (Sortex©) that are extremely expensive in excess of INR 50 lacs)



To cater to sorting of massive volume of wheat grains (India produces 275 million tons (MT) of food grains each year) which is portable and hence accessible to local stakeholders (farmers, food inspectors etc.); unlike Sortex© machines which are huge, have a large footprint and require dedicated installation infrastructure.

Objectives:

- In the Indian context, create a large image database of the damages in wheat grain refractions (heat damaged, fungal damage, frost damage etc.), which is not available in the open literature
- To develop a machine learning based predictive tool that combines the trained machine learning based image processing algorithm with optical imaging techniques that can detect and classify the wheat grain refractions with high-fidelity and allows rapid and accurate information about their external quality aspects.
- To develop a cost-effective, user-friendly and portable wheat grain quality (surface damage) assessment product that enables high fidelity sorting of wheat grains in terms of type and degree of grain damage. The analyzer will have a low turnaround time which is vital towards the automation of grain handling and grain evaluation equipment to be used by the wholesale dealers and end consumers

Deliverables:

- A robust image database of damaged wheat food grains. This is currently missing in the Indian context and is anticipated to be a benchmark database for the food quality grain repository.
- An artificial intelligence (AI) based GUI developed in this study will guide and enable the design and development of a low-cost scanner-cum-image analyzer for sorting of food grains
- Translating the ML-based GUI into a wheat grain sorting app

Total Fund Requirement: 200000
Time for Completion: 1 Year
Professor(s) In-charge: Dr. Ankur Miglani, Mechanical Engineering, IIT Indore
Email: amiglani@iiti.ac.in, Faculty Website

Project Proposal CSR – 13

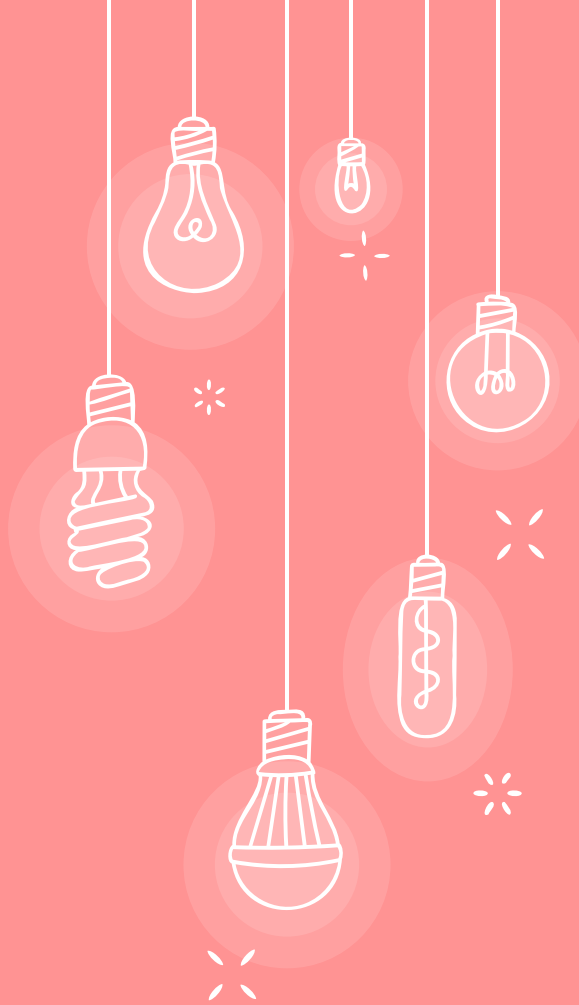
Area: Engineering and Technology

Name of the project: Semi-Autonomous Drones/UAVs for Monitoring and Identification with AI Features.

Project Brief: One of the first things that you notice on the SCAS Technology website is the tagline ‘Step towards Atma Nirbhar Bharat’. It’s a sentence that immediately conveys the uniqueness of SCAS’s product in its signature irreverent tone: the products are purely indigenous. The startup’s name “Swadeshi Circuit And System (SCAS) Technologies”, itself explains the motive of these products i.e. to promote Atmanirbhar Bharat.

Semi-Autonomous along with the swadeshi microprocessor-based drone is definitely a unique selling proposition, especially when so many competitors are having products that are dependent on exported processors and selling at such a high price. These products are definitely a pocket-friendly solution and affordable solution.

On exploring the uniqueness of the product, there is a lot of unlikeliness of this drone with respect to the present drone technology. The most important amongst them is the modular technology feature of this drone. Drones available in the market have a dedicated controller for specific applications. Thus, these drones are application-specific. The modular technology-based drone can be easily customized for multiple applications as per the customer’s choice.



For example, a photographic drone can be customized with high quality camera and image processing features where a military proposed drone can be equipped with high-end security features Along with this, a two-way data link to the ground station with over-the-air updates feature, up to a 10km range is also a desirable feature in current semi-autonomous drones. The easy configurability and on-air update feature of this device makes it unique from the rest of the drones on the market.

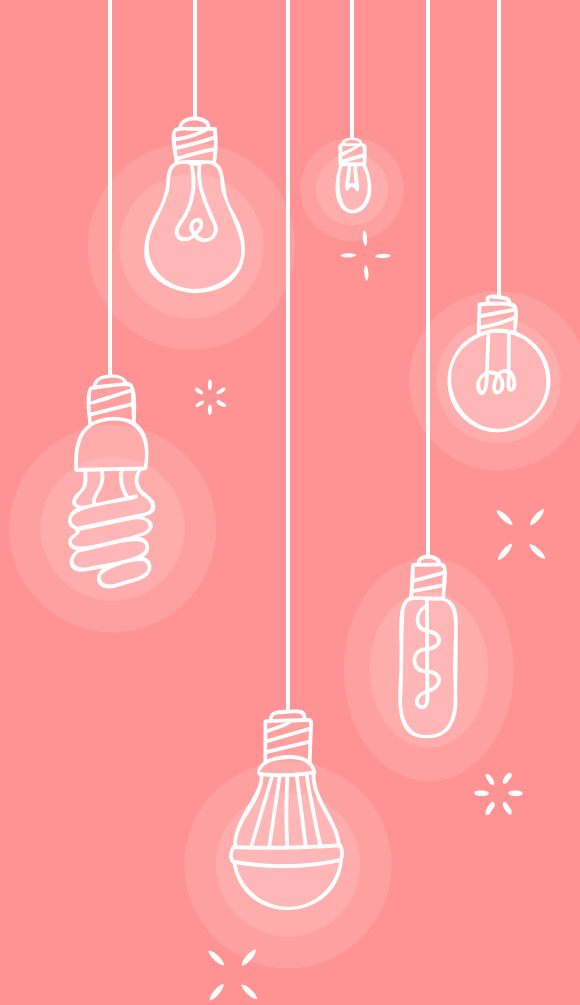
The novelty and the key difference of the SCAS technology drone with the market available drones are specified below:

1. Considering, one of the burning issues nowadays, “deforestation”. An on-air forest monitoring drone is the need of the hour. Day and Night vision cameras along with AI features to detect specific movement in the forest have made this drone a prominent choice for forest surveillance. No such advancement in drones is made and implemented yet.
2. Currently, there are very few semi-autonomous drones that are secure and reliable with respect to military applications. The high-end features of this drone is capable enough to prove itself at Warfield too.
3. AI-enabled image processing along with a solar charging feature makes this drone unique from other drones in the market. The solar charging feature adds to the drone’s operation time, i.e. it can be used continuously for 24 hours monitoring. Existing drones in the market last for 30mins to 1hr on a single charge.
4. The GPS-enabled flight control module is also a key feature of this drone and can widen it's application areas.

Above all, SCAS Technologies promise its customers an easily customizable, quality assured, and pocket-friendly product.

Total Fund Requirement: 25 Lakhs **Time for Completion:** 2 Years

In-charge: Mr. Gopal Raut, PhD scholar, Electrical Engineering, Co-founder - Scas Technology (Incubated startup at CIIEIR, IIT Indore), Email: phd1701102005@iiti.ac.in



Project Proposal CSR – 14

Area: Geographical Indications

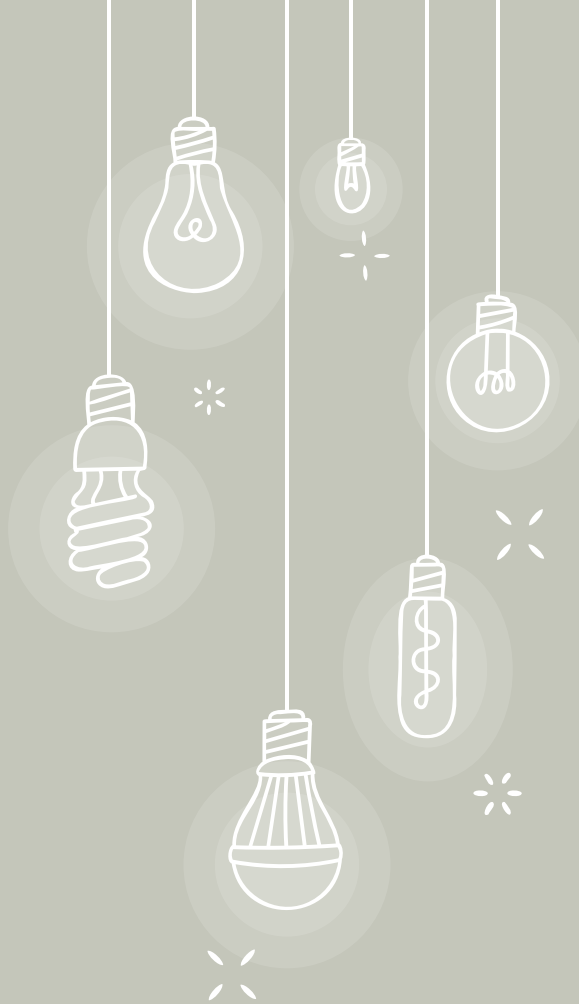
Name of the project: Case study of GI in promoting local artisans in Maheshwar.

Project Brief: This project aims to understand the role played be the Geographical Indication (GI) tag in promoting local economy. We will focus on cases of Maheshwari and Chanderi that received GI in M.P. The GI tag is expected to bring exclusiveness to the product by ensuring that fakes are removed from the markets. However, on ground this requires establishing brand and ensuring that margins are transferred to local artisans. We intend to study this process and challenges faced by producers in making the best of the GI tag.

Total Fund Requirement: Rs. 2 Lakhs

Time for Completion: 6 months

Professor(s) In-charge: Dr. Ruchi Sharma, Associate Professor, School of Humanities and Social Sciences, IIT Indore, Email: ruchi@iiti.ac.in Faculty Website



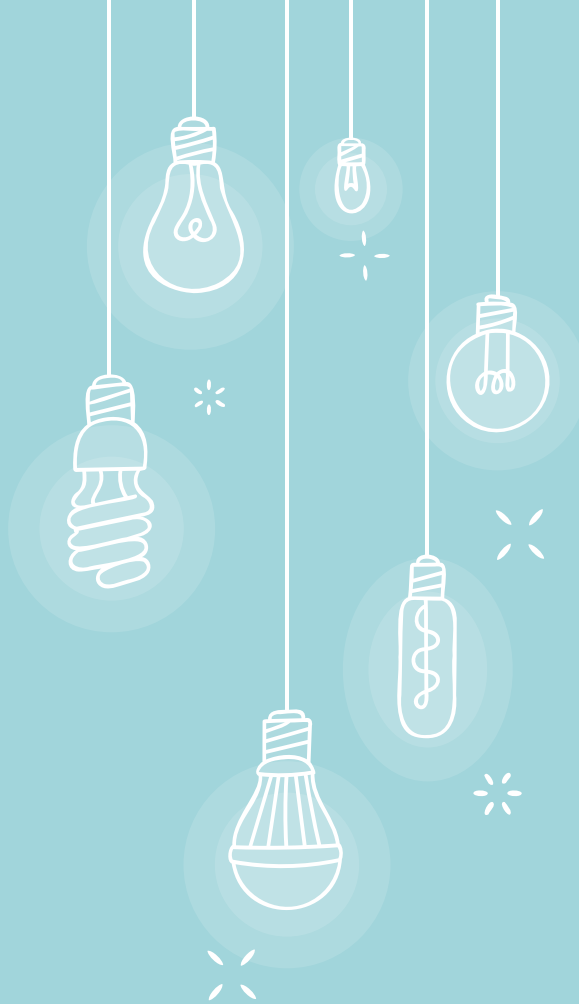
Project Proposal CSR – 15

Area: Health Care and Public Hygiene

Name of the project: Engineering of Biomimetic Inherent Antibacterial Hydrogel

Project Brief: Background: Bacterial infections are one of the major concerns in today's medical science. Even some of the bacterial infections may spread throughout the blood, causing a vital condition known as sepsis. It is also well known that gram positive S. aureus and gram negative E. coli are common source of bacterial infections which may lead to hospitalizations. Further, bacterial infections delay the healing of wound, especially for chronic wound. The microbial contaminations due to the biomaterial implantations are also a major challenging problem which leads us to design a material possessing inherent antibacterial properties. Now, most of the available antibacterial materials are costly and consist of silver (Ag) ions. Therefore, developing of cost effective, easy to synthesize, inherent antibacterial materials are highly demanding in wound dressing, 3D-bioprinting and skin regeneration.

A. K. Das group at IIT Indore is involved with the synthesis and preparation of various biomimetic hydrogels. The hydrogels are constituted from biomolecules which lowers the risk of toxicity. The objectives of current study include: (i) Screening of antibacterial efficacy of synthesized biomimetic hydrogels against Gram-positive and Gram-negative bacteria, (ii) Determining the minimum inhibitory concentrations (MIC) and mode of action of antibacterial hydrogels.



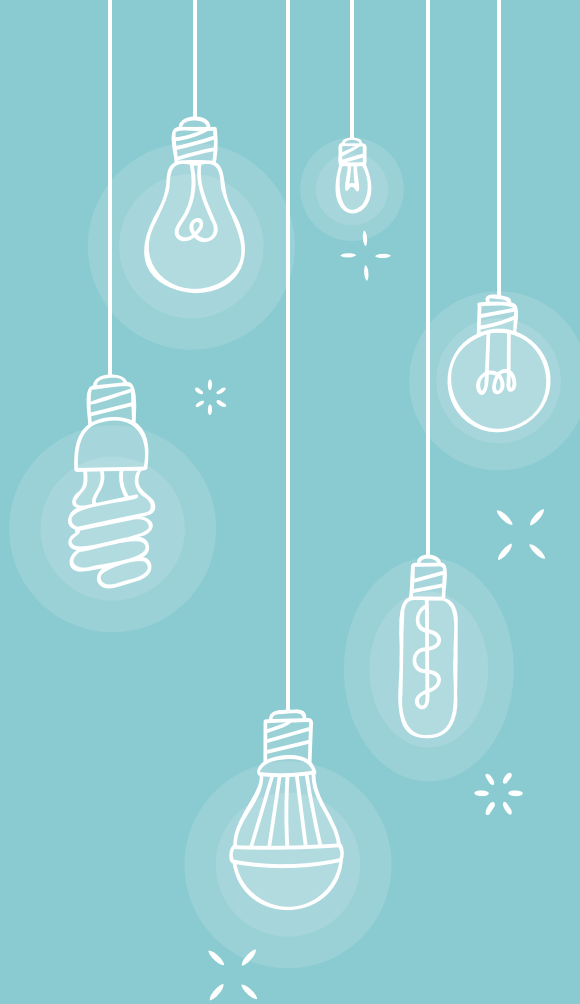
Deliverables: The in vitro antibacterial screening of various hydrogels is the primary goal of the research. The second and important goals of the project are to establish the mechanism and mode of action of antibacterial efficacy of peptide-based hydrogels which will be used for further structural manipulation for the better bactericidal results.

Societal impact: The inherent antibacterial hydrogel will bear both economic and social impact on technological fight against the bacterial infections diseases. We hypothesize that the proposed hydrogel may directly apply on the common skin infections caused by bacteria. Upon successful outcome of the project, we believe that in near future the novel inherent antibacterial hydrogel materials can be commercially available.

Total Fund Requirement: Rs 8 Lakhs

Time for Completion: 18 months

Professor(s) In-charge: Dr. Apurba K Das, Associate Professor, Department of Chemistry, IIT Indore, Email: apurba.das@iiti.ac.in Faculty Website



Project Proposal CSR – 16

Area: Rural Development, Energy

Name of the project: High Value Energy Extraction through Low-Cost Technologies.

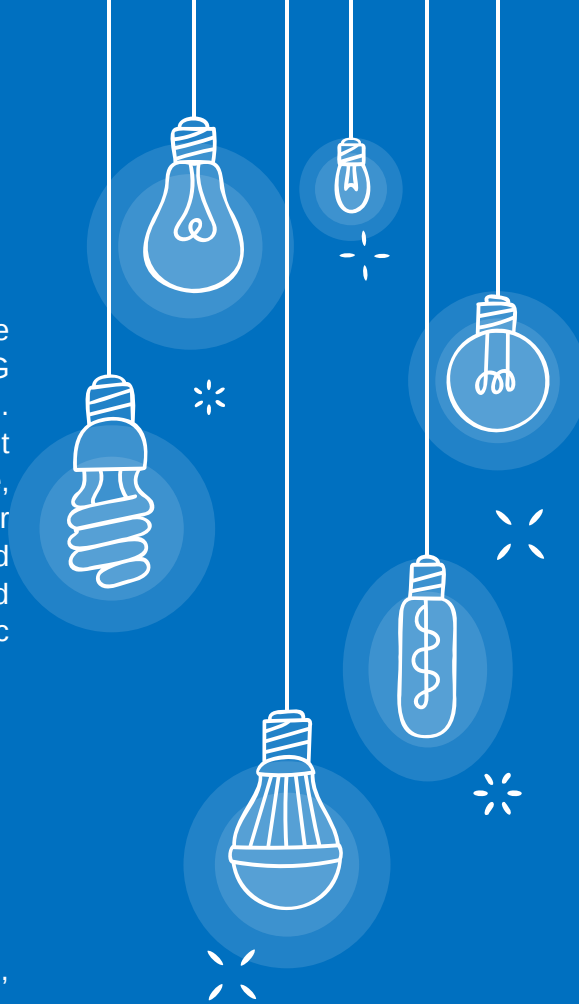
Project Brief: We are startup working in the field of solid /liquid waste management and energy. One of our projects of collecting sewer gases from septic tank through a grid and converting it into CNG has won funding support from Department of Science and Technology through IIIT, Allahabad. We are working on rural version of the same. Biogas can be generated from all organic matter, be it farm waste, animal waste or human waste. Rural India has ample availability of organic waste, manpower to work on and space to process. We are working on some low-cost technologies for generation, filtration, compression and storage so that all such organic resources can be processed into high value product. We have also started some groundwork in Indian village near Sanawad District, Khargone. Relatively pure and compressed form of biogas to CNG can help in economic upliftment and employment generation in rural India.

We humbly seek CSR funding support for this circular economic activity which benefit to all concern.

Total Fund Requirement: 5 Lakhs

Time for Completion: 6 months

In-charge: Mr. Arvind Chaure, CEO - Padmapriya Technovat Pvt. Ltd. (Incubated startup at CIIEIR, IIT Indore), Email: arvindchaure89@gmail.com



Project Proposal CSR – 17

Area: Environmental Sustainability, Creative Livelihood Technologies

Name of the project: Greenhouse Thermophilic Composting Technology for Sustainable Management of Municipal Solid Waste.

Project Brief: In the present times, safe and effective disposal of municipal solid waste (MSW) is a major challenge. Management of MSW has become one of the crucial issues for Urban Local Bodies (ULBs) all over the world. Providing good solid waste management (SWM) services and ensuring financial sustainability of the system continues to be a major challenge in cities of developing countries. India generates about 1,58,878 metric tonnes of solid waste per day out of which (21.08%) is treated while the remaining 68.92% is dumped in the landfill. Dumping of garbage at the current rate without any treatment would require about 1240 hectares of landfill area per year. Sustainable SWM measures are henceforth the need of the hour for a better, clean, healthy, and safe environment. Generally, MSW generated from the Indian cities comprises biodegradable and non-biodegradable fractions with the major portion of organic waste (up to 60%) and is essentially an important resource that needs to be recovered. Proper segregation of organic, inorganic, plastic and electronic fraction can lead to utilize these fractions as a resource/ feedstock for energy and material recovery & recycling for value-added products. Encapsulation of inorganic fractions for developing unique environmental materials with applications as structural material, thus utilizing these resources will address in proper management of MSW. Solid wastes of organic origins along with non-biodegradable plastics are a potential feedstock for the production of liquid biofuels as well as bio-based products.

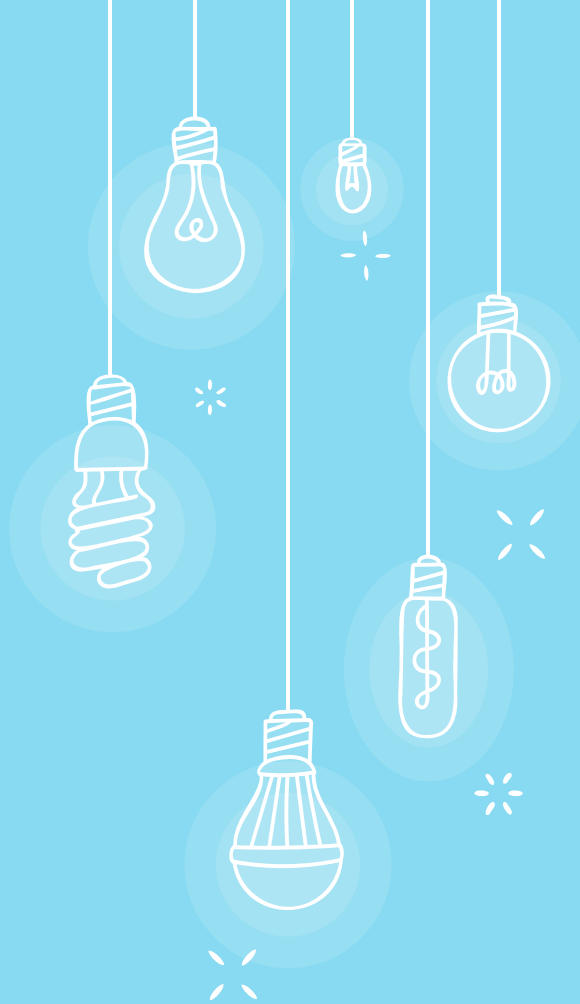
The scope of the proposed project is to address the resource recovery option for the organic fraction of MSW through implementation of biochemical process of thermophilic composting. This will facilitate the commercial scale production of agricultural grade compost from the unattended and neglected MSW. This technology majorly relies on a renewable source of energy i.e. solar energy and utilizes the principle of passive solar heating to raise the temperature within thermophilic range (45oC to 60oC). In laboratory conditions this technology has successfully produced the compost from the mixture of organic fraction of municipal solid waste (OFMSW), agricultural waste (AW) and fly ash (FA) within 14 days. With the successful implementation of this project three major problems that the society is currently facing could be addressed that are poorly managed organic waste, stubble burning of agro residues mainly due to unavailability of buyers and humongous amount of fly ash generated from the combustion of coal in the thermal power plants (TPPs).

Apart from these several additional benefits could be availed from the project like massive reduction in the GHG emissions, opportunity of employment generation and inclusion of informal waste pickers into formal waste management sectors.

Total Fund Requirement: 73 Lakhs (approx.)

Time for Completion: 24 Months

Professor(s) In-charge: Dr. Ashootosh Mandpe, Assistant Professor, Civil Engineering, IIT Indore, Email: as_mandpe@iiti.ac.in, Faculty Website



Project Proposal CSR – 18

Area: Education

Name of the project: Developing Tinkering Labs at a High School Located Near IIT Indore

Project Brief:
Tinkering labs are dedicated workspaces in schools aimed at cultivating innovation skills and creative ideas amongst high school students studying from classes IX to XII. This lab will comprise state-of-the-art equipment such as electronic devices, microcontroller, robotics, sensors, drones, communication systems, etc. which are helpful to introduce students to various upcoming technologies such as Internet-of-Things (IoT), 5G/6G Communications, Cyber Physical System (CPS), etc. In addition to equipment, students will also be provided access to various coding and machine learning tools to improve the programming skill, which is the most essential skill for 21'st century students. This lab will be set up at a high school deprived of various advanced facilities, preferably in rural areas, located near IIT Indore and the basic criteria for selecting such school will be that they should have not received any other funding for setting similar labs. So the main objective of this project in developing a tinkering lab is to prepare high school students from rural background for better future, which will eventually strengthen India's workforce.

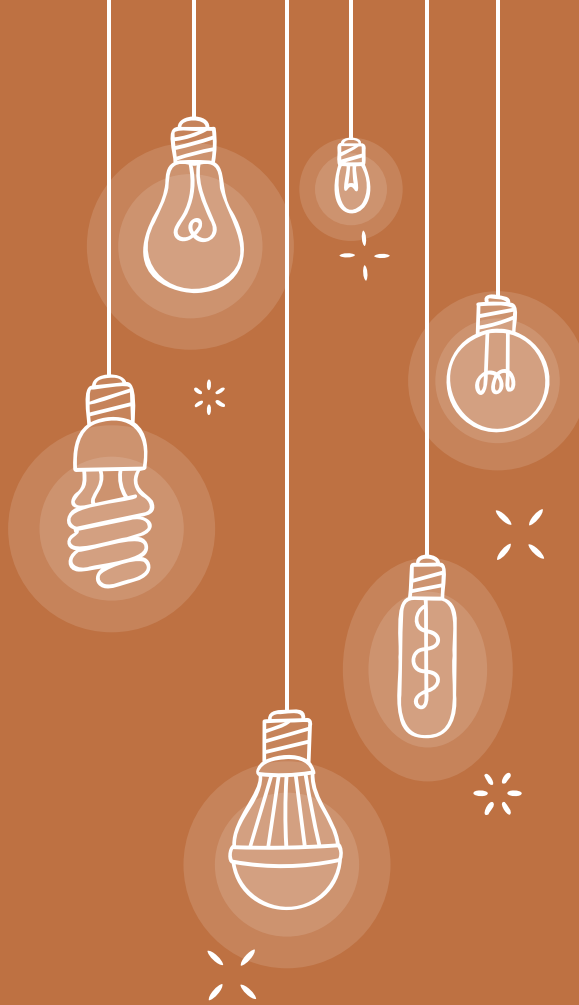
Total Fund Requirement: Rs. 5 Lakhs

Time for Completion: 9 months.

Professor(s) In-charge: Dr. Swaminathan R, Assistant Professor, Department of EE, IIT Indore
Email: swamiramabadran@iiti.ac.in Faculty Website

IIT Indore CSR Project Bank Accounts Details

- Institution’s Account Name: Registrar IIT Indore
- Bank Account No.: 1476101027440
- IFSC Code: CNRB0006223
- MICR Code: 452015026
- Branch Code: 6223 (Simrol IITI Campus Branch)
- SWIFT Code: CNRBINBBXXX
- Branch: Canara Bank IIT Indore Simrol Campus.
- PAN: AAAAI7115H
- GSTIN : 23AAAAI7115H1Z2
- MCA - CSR No.: CSR00014873
- PFMS Unique Code: IITIND



Contact Us:

- Office of Center of Innovation, Incubation, Entrepreneurship, and Industry Relations (CIIEIR)
- 7th Floor, Abhinandan Bhawan, IIT Indore
- Email: ciieiroffice@iiti.ac.in
- Phone No: 0731-660-3514
- Mobile No: 8128997227
- Website: http://ciieir.iiti.ac.in/