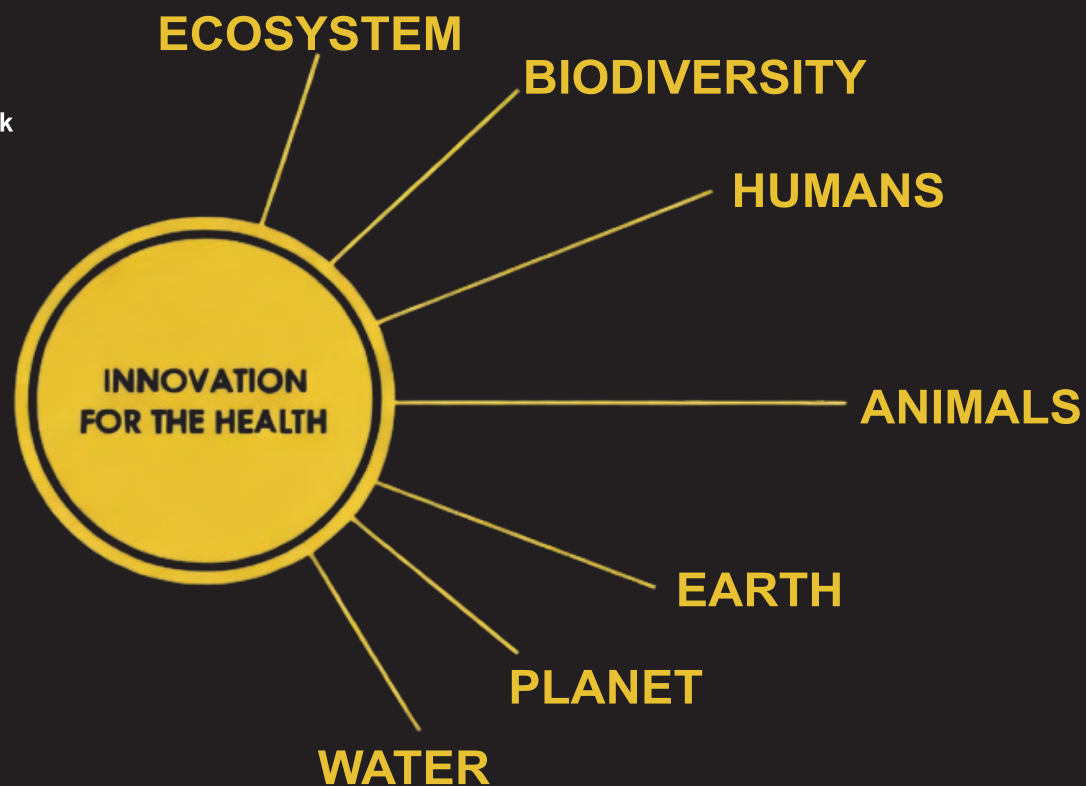




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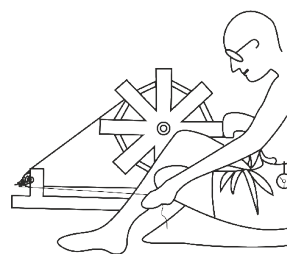
GYTI 2024

Gandhian Young Technological Innovation Awards

TECHNOLOGICAL INNOVATION

by Young Creative Minds

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Gandhian Young Technological Innovation Awards

GYTI - 2024

Gandhian Young Technological Innovation Awards (GYTI)



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Introduction

The Honey Bee Network Gandhian Young Technological Innovation (HBN GYTI) Award celebrates the ingenuity, passion, and creativity of young student innovators addressing societal challenges through science and technology. It is organized every year by Honey Bee Network anchored and managed by SRISTI in collaboration with numerous HBN volunteers. HBN GYTI serves as a prestigious platform that encourages students to push the boundaries of innovation across diverse fields, including healthcare, agriculture, energy, environment, material science, food etc.

These awards are open to undergraduate, postgraduate, and doctoral students from recognized academic institutions in India, promoting affordability, sustainability, and real-world applicability of technological solutions. Awards include the projects on technical edge, frugal solution under 'More from less for more people (MLM)' category and social applications. HBN GYTI not only recognizes outstanding projects but also provides mentorship and public recognition, offering innovators the opportunity to scale their ideas and create an impact on the society. Winning innovations have the potential to attract further grants, investments, and partnerships, encouraging the development of a pipeline for larger initiatives.

During the last year, we received 560 entries of which 412 were eligible in different disciplines of life science and engineering. Maximum entries (73) were in biomedical engineering; the coverage included 111 universities and institutions from 25 states and Union Territories of the country. These

entries were sent to three to five reviewers to ensure that a rigorous peer review process is followed to recognise the budding talent in a most fair and transparent manner. After the online review, another round of offline review was held at IIT Delhi, like in previous years thanks to the extraordinary support from Prof. PVM Rao, then Dean, IIT Delhi. We received the active cooperation of 201 reviewers from different institutions, universities and some industries as well. We are grateful to the reviewers for sharing their recommendations in an objective manner. The conflict of interest was completely avoided.

A total of 11 entries are recognised for the Award from five states across India. Karnataka (mainly IISc) contributed the highest number of entries with five, followed by Telangana and Maharashtra with two entries each. West Bengal and Jharkhand recorded one entry each, reflecting a diverse geographical participation.

A total of 60 entries are recognised under the Appreciation category from states and regions across India. This number is unusually large this year due to significant improvement in the quality of entries. Maharashtra recorded the highest participation with eleven innovations, followed by New Delhi with eight innovations. Karnataka and Telangana contributed six innovations each, while Punjab, Uttar Pradesh, and Uttarakhand shared four innovations each. Assam, Gujarat, Odisha, and West Bengal have three innovations each, Tamil Nadu contributed two innovations, and Jammu and Kashmir, Jharkhand, and Kerala recorded one innovation

each, indicating broad nationwide participation.

Given enormous effort involved in the mobilisation, shortlisting, review and final selection of the student innovations, we are proposing to evolve an inter-institutional platform for the purpose. Idea is to institutionalise these awards for say, next hundred years so that young student innovators continue to receive awards or fellowship of say, Academy of Inclusive Innovations and Knowledge Augmentation (AIKA) and become HBN GYTI awardees.

We invite reputed private, public and civil society organizations to join hands in this noble task. We are very proud that many of the HBN GYTI awardees supported by SRISTI have set up their own ventures, occupy faculty positions in reputed institutions in India and abroad, have published papers in top journals, filed patents, and received many other awards and grants/investments. Just as we are often the first to recognise grassroots innovations which later have been recognised nationally and globally, in the domain of student led innovations also, we are often the first to recognise the innovative potential of the technology youth of India.

We are also grateful to Prof. Ram Gopal Rao, VC, BITS-Pilani group of Institutions, Prof. Sanket Goel, BITS Hyderabad, Prof. Devendra Deshmukh, IIT Indore and hundreds of reviewers from IITs, IISc, JNCsAR, CSIR, DBT, ICMR, ICAR and other universities and Institutions besides GIAN.

We can not express enough thanks to NPL Director, Prof. Venu Gopal Achanta and his team comprising Shri Ajeet Singh and Dr. Sumit Mishra and numerous other staff who helped in ensuring smooth running of Award Function

We are very happy that Prof Manoj Dhar, AcSIR is considering the possibility of supporting this initiative and so also Prof Ram Gopal Rao. We hope other well-wishers will also join this initiative.

We must thank GYTI team at SRISTI led by Chetan Patel, Swasti Dhagat, Ramesh Patel and other team members.

We thank all the students who year after year submit their entries and help make this platform vibrant and viable for helping country become self-reliant in most important areas of technology inclusion. We also appeal to all the student awardees in the past and now to consider supporting this platform after they take up responsible position of repute in their life or found their own ventures. We are planning to start HBN GYTI alumni association to pursue various missions of Honey Bee Network including ensuring that fruit of Science, Technology and Innovation reach the last person in the line, as Gandhi ji always stressed in Antyodaya.

With our best wishes to all the winners and also to those who participated in the competition. We regret a little delay in having the function due to human resource constraints.



Prof. Anil K Gupta
CSIR Bhatnagar Fellow 2018-21
Founder, Honey Bee Network, SRISTI, GIAN & NIF
Visiting Faculty, IIMA & Academy Professor, AcSIR

Acknowledgements:

We extend our heartfelt congratulations to all the awardees and student innovators who achieved distinction in this highly competitive and rigorously reviewed process. Your accomplishments reflect exceptional dedication, creativity, and perseverance, and the recognition you have earned stands as a testament to the quality and impact of your innovative ideas. We also sincerely acknowledge and commend those students whose submissions were not selected for awards. By sharing your ideas through the Techpedia.in platform, you have contributed to a culture of open innovation that is essential for building a compassionate, collaborative, and economically developed society. The Honey Bee Network and SRISTI extend their best wishes to all participants for continued success in their future endeavors.

The review process for HBN GYTI–2024 was conducted through a robust and transparent multi-stage evaluation. All submissions underwent online assessment by multiple subject-matter experts coordinated by the Techpedia team at SRISTI, followed by a final round of evaluation of shortlisted entries by experts at IIT Delhi. We express our deep gratitude to all the reviewers whose time, expertise, and thoughtful inputs were instrumental in ensuring the credibility and smooth execution of the awards.

We extend our sincere gratitude to all the SRISTI team members who worked tirelessly, day and night, throughout the entire HBN GYTI review

process and up to the award ceremony. We gratefully acknowledge Mr. Chetan Patel, Dr. Swasti Dhagat, Mrs. Sumitra Patel, Mr. Ramesh Patel, Mr. Mayursinh Chavda, Ms. Zinkal Rathod, Mrs. Alka Raval, Mrs. Bhoomi Shah, Mr. Ayush Patel, Mr. Harsh Patel, Mr. Sagar Panchal, and the dedicated volunteers, whose commitment, coordination, and perseverance were instrumental in the successful execution of this initiative. We also thank all other colleagues at SRISTI for their unwavering cooperation and unconditional support, which together made the HBN GYTI–2024 Awards a true reflection of teamwork and shared purpose. We would also like to extend our heartfelt gratitude to the staff of GIAN, as well as to all the well-wishers of the Honey Bee Network, for their support and encouragement.

Highlights:

The Gandhian Young Technological Innovation (GYTI) Award 2024 received an exceptional response, with approximately 560 submissions across 32 disciplines. Participation was open to undergraduate, postgraduate, and doctoral scholars in the fields of life sciences and engineering, representing institutions from across the country. Entries were received from institutions across the country, including 168 from various Indian Institutes of Technology (IITs), 23 from various National Institute of Technology (NITs), 16 from Indian Institute of Science (IISc) Bengaluru, 18 from Birla Institute of Technology and Science (BITS)-Pilani, 18 from APJ Abdul Kalam Technological University, 17 from CSIR laboratories, and 6 from Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR). Students from various universities, Institute of Chemical Technology, and engineering colleges across the country applied for the award.

Following a comprehensive evaluation conducted by eminent professors and scientists from leading institutes, 71 entries were shortlisted. Among the shortlisted entries, IIT Bombay accounted for 8, while IIT Delhi contributed 7. Both IISc Bangalore and BITS Pilani had 6 entries each. Institutions including IIT Kharagpur, JNCASR, IIT Kanpur, NIT Rourkela, and IIT Gandhinagar secured 3 entries apiece.

A total of 2 entries were selected from IIT Dhanbad, IIT Ropar, IIT Hyderabad, National Chemical Laboratory, IIT Jammu, and Gauhati University. In addition, several universities and research organizations namely the Manipal Academy of Higher Studies, CFTRI, Panjab University, IIT BHU, NIPER Guwahati, IIT Madras, Maulana Abul Kalam Azad University of Technology, IIITDM Tamil Nadu, Savitribai Phule University, BR Ambedkar NIT Jalandhar, Homi Bhabha National Institute, University of Mumbai, and IIT Palakkad each contributed 1 entry. This distribution highlights the broad engagement of leading academic and research institutions across India in advancing innovation and technological development.

AWARDS

Healthcare Technology

Biomaterials:

Ankitha S at Manipal Academy of Higher Education developed a novel biphasic calcium phosphate (BCP) bone filler using an innovative one-pot synthesis to control HAP/ β -TCP ratios. Integrated with biocompatible polymers, this flexible composite enables minimally invasive treatment for irregular defects. In vivo studies confirmed its efficacy in repairing critical cortical bone and facilitating tissue remodeling.

Biosensors:

Amaan Dash and his team at IIT Kharagpur introduced a zero-cost, fabrication-free strategy using fold-creases to engineer paper flow. This technique enhances capillary action, preventing clogging and accelerating transport. Leveraging this, they developed a rapid, reagent-free hematocrit sensor, enabling accessible, equipment-free anemia screening suitable for resource-limited settings.

Deepak Sharma at IISc Bengaluru develops a bio-inspired artificial olfaction system integrating nanostructured semiconductor sensors with neuromorphic computing. By combining scalable sensor arrays with LSTM algorithms, the work achieved 98% gas classification accuracy. Furthermore, a custom 64×64 molecular memristor crossbar array demonstrated 14-bit analog storage and ~460-fold energy reduction compared to digital systems, establishing a robust pathway for energy-efficient cognitive sensing.

Disease Diagnostics and Detection:

To address multidrug-resistant infections, Sonal Fande at BITS developed

a fully automated, portable electrochemical platform for *E. coli* detection and antibiotic susceptibility testing. Integrating microfluidics with gold nanoparticle-functionalized electrodes, the device screens four antibiotics in just five hours. This point-of-care innovation significantly reduces turnaround time compared to standard methods, aiding effective management of antimicrobial resistance.

Mahrukh Arif Mir at IIT Bombay developed a portable, low-cost device for Sick Cell Anemia screening that measures blood viscosity using a slide-on-slide smearing technique. This single-drop method accurately distinguishes between normal, trait, and disease samples and monitors Hydroxyurea therapy efficacy, offering an accessible, personalized diagnostic tool for resource-limited settings without specialized equipment.

Drug Delivery System:

Velmurugan K (BITS) developed "Ampat," a patented 3D-printed corneal patch to treat fungal keratitis. Addressing the instability of off-label drops, Ampat remains stable for two months at room temperature. In vivo tests confirm it matches commercial efficacy while drastically reducing dosing frequency from 12 times to once daily, significantly improving patient compliance.

Robotics in Biomedicine:

Ashish Siddharth (IIT Dhanbad) developed a Six-Degrees-of-Freedom robotic system employing rotational needle insertion to improve ocular surgery. Validated through ex vivo experiments, this technique achieved a 48.5% reduction in insertion force and 35.92% faster penetration at 100 rpm, significantly minimizing tissue deformation and enhancing precision compared to conventional static needles.

Civil Engineering:

Prerana Krishnaraj (IISc) investigates the liquefaction behavior of geocell-reinforced sands to address seismic risks. She innovatively used 3D

printing to fabricate scaled geocells for rigorous cyclic triaxial and shaking table tests. Complemented by FLAC3D numerical modeling, her research quantifies how geocell reinforcement significantly reduces liquefaction potential, establishing sustainable ground improvement strategies.

EV Charging systems and batteries:

Himanshu Bhusan Sandhibigraha and his team at IISc Bengaluru, have developed a reconfigurable multi-port EV charging system to address voltage standardization challenges. Their modular 10 kW prototype uniquely adapts to charge either three electric 2/3-wheelers or one 4-wheeler. This scalable, interoperable solution offers a cost-effective infrastructure approach supporting India's sustainable mobility goals.

Biplab Patra (JNCASR) introduces a novel carbon-coated NASICON anode (NaVAlNb/C) for Sodium-ion batteries, addressing Lithium scarcity and performance limitations. This scalable innovation achieves exceptional fast-charging (80% in 6 minutes) and robust stability (95% retention over 5000 cycles), offering a high-power, industrially viable solution for next-generation grid and electric mobility applications.

Environmental Engineering:

Saumya Agrawal at IIT Bombay developed biodegradable electrospun nanofibers using banana peel waste, offering a sustainable, circular alternative to HEPA filters. Achieving >98% filtration efficiency and capturing VOCs, these reusable filters maintain performance over three cycles. Additionally, the extraction byproducts were utilized to increase soil water retention capacity by 55%.

APPRECIATION

Additive Manufacturing:

Rajdeep Singh Devra at IIT Gandhinagar developed a decentralized, filamentless granule-fed 3D printing system to recycle plastic waste locally.

By utilizing an auger screw extruder to print directly from shredded plastic chips, the device eliminates expensive filament manufacturing, reducing printing costs by over 90%. This low-cost solution empowers communities to convert waste into useful products, fostering a circular economy.

Agricultural Engineering

Aquaculture:

Supporting India's Blue Revolution, Saquib Sarosh at IISc, Bengaluru, optimized a packed-bed biofilm reactor (PBBR) for Recirculating Aquaculture Systems (RAS). Achieving a record nitrification rate of $800 \text{ g N m}^{-3} \text{ d}^{-1}$, the system maintains ammonia $<1.1 \text{ mg L}^{-1}$. This high-efficiency, water-saving solution overcomes traditional farming constraints, enabling sustainable, high-density aquaculture and enhancing economic viability for farmers.

Crop Monitoring:

To address the limitations of manual dendrometry in agriculture, Ravi Prakash Verma and Prateekshya Suman Sahu at NIT Rourkela developed a waterproof, stretchable piezoresistive sensor for real-time fruit growth monitoring. Fabricated using a graphene-silicone paste, the sensor offers high sensitivity (2050) and durability, capable of detecting minute growth variations (0.04% resolution) without disrupting development. Integrated with IoT for remote data acquisition, this non-invasive tool provides critical insights into how environmental factors like fertilizer and sunlight affect crop yield.

Post-harvest Management:

To combat significant postharvest potato losses from dry rot, Rittika Ray at IIT Roorkee developed a low-cost electronic nose (e-nose). By analyzing specific volatile emissions, the device detects infections within 1–2 days—well before symptoms become visible—providing a rapid, non-destructive

solution for effective disease management in storage.

To address post-harvest losses in the booming floriculture market, Sachin Shinde at CFTRI developed a cost-effective, chemical-free freshness keeper paper using natural bioactive extracts. Specifically designed for cut roses, this innovation extends shelf life by an additional 8–10 days during cold storage and transport, ensuring freshness for up to 20 days and boosting export viability.

Batteries:

To address the challenge of end-of-life lithium-ion batteries, Shally Gupta at IIT Delhi developed a sustainable hydrometallurgical recycling process using a biodegradable Deep Eutectic Solvent (DES). Utilizing a bifunctional solvent of ethylene glycol and tartaric acid, the method achieves over 95% metal extraction and ~99% selective recovery of critical metals (Li, Ni, Co, Mn) without external precipitants. This scalable approach supports circular economy goals by enabling the effective re-synthesis of cathode materials.

Akash Lata and Anuj Kumar at IIT Jammu developed a high-capacity aqueous Zinc-Ion Battery (ZIB) utilizing a rGO–V₂O₅–SiO₂ hybrid nanocomposite cathode. By synergizing the high conductivity of rGO and V₂O₅ with the water adsorption capabilities of silica, the system optimizes Zn²⁺ ion intercalation within its 3D nanorod structure. This pouch-type battery achieves a remarkable specific capacity of 890 mA h g^{-1} and maintains stability in 12V series stacks, offering a promising solution for large-scale energy storage.

Biomedical Engineering

Biopolymers in Healthcare:

To advance wound care, Doyel Ghosal at IIT Delhi engineered a sprayable, multi-ion-releasing hydrogel (Alg-Fib-PLA-nCMB) that mimics

endogenous healing mechanisms. By encapsulating calcium, copper, and zinc nanoparticles within an alginate-fibrin matrix, the system ensures controlled ion release, significantly accelerating tissue regeneration, angiogenesis, and wound closure in vivo compared to commercial alternatives.

To address the limitations of current Osteoarthritis treatments, Anwesha Mukherjee at IIT Ropar developed a novel dual crosslinked injectable hydrogel system using GelMA and kappa-carrageenan. Designed to mimic the native extracellular matrix, this formulation encapsulates PLGA nanoparticles to release anti-inflammatory factors, significantly enhancing cartilage regeneration and stem cell viability. The lyophilized, water-activated powder offers a shelf-stable, non-surgical, and cost-effective therapeutic solution for managing joint degradation.

Biosensors:

To address widespread microcystin contamination from cyanobacterial blooms, Atindra Kanti Mandal, Tathagata Pal and Ravada Satish Kumar at IIT Bombay developed a handheld EIS-based immunosensor. Utilizing gold nanoparticle-modified electrodes, the device achieves a detection limit of 0.1 µg/L, meeting WHO standards. This low-cost solution enables rapid, on-site monitoring of toxins in water and biological fluids.

Abhishek Kumar at BITS developed a low-cost, smartphone-integrated electrochemiluminescence platform for non-invasive diabetes monitoring using sweat and urine. Utilizing laser-induced graphene biosensors, the device detects glucose, lactate, and uric acid in under five minutes. With a custom Android app and a device cost of Rs 600, it offers a painless, rapid alternative to invasive finger-pricking.

Priyanka Garg and her team at BRIC-NABI developed "B-SMART," a smartphone-integrated biosensor for rapid foodborne pathogen detection. Utilizing aptamer-graphene oxide interactions on a PMMA microfluidic

chip, the device simultaneously detects *S. typhimurium*, *E. coli*, and *P. aeruginosa*. This AI-powered, point-of-care tool provides quantitative results in just 45 minutes, ensuring food safety.

Devices:

Ekta Srivastava at IIT Kanpur developed "Electroband," an rGO-functionalized, NGF-loaded nanofibrous nerve wrap to treat nerve injuries. By combining this biomimetic scaffold with brief in-situ electrical stimulation, the study achieved 80% recovery in electrophysiological signals and muscular strength in rats within eight weeks, demonstrating a highly effective combinatorial therapy.

Dhruba Dhar at IIT Kharagpur developed a frugal, lithography-free breast tumor-on-chip platform using hydrogel molding to replicate 3D tumor pathophysiology. By co-culturing MDA-MB-231 cells and HUVECs, this accessible device eliminates complex fabrication needs, offering a physiologically relevant, low-cost solution for screening anti-cancer drugs in resource-constrained settings.

Ankur Jaiswar, Sayanta Goswami, Debayan Dasgupta at IISc Bengaluru developed biocompatible helical nanorobots functionalized with upconversion nanoparticles (UCNPs) to overcome deep-tissue imaging limitations. Synthesized via Glancing Angle Deposition, these magnetically navigable robots successfully measured rheological properties in live mouse peritoneal fluid. This platform enables real-time deep-tissue sensing, targeted drug delivery, and microsurgery.

Sonali Naik at CSIR-NCL developed 3D-printed, degradable tracheal splints using functionalized polycaprolactone (PCL) to treat airway disorders. Featuring iodinated PCL for X-ray visibility, these biocompatible splints exhibit high porosity and tailored degradation. Micro-CT and computational simulations validated their mechanical strength and airflow dynamics, demonstrating their potential for effective tracheal repair.

Neha Yadav and her team at IIT Kanpur developed "PRuCSor," a handheld device integrated with a paper-based screen-printed sensor chip (sP2-chip) for rapid antimicrobial resistance testing. By measuring bacterial impedance changes, the system determines resistance profiles in under five minutes, offering a portable, smartphone-connected solution for effective antibiotic stewardship.

Soumyajit Sarkar and team at IIT Bombay developed a modular, multimodal neurovascular imaging platform for small animals using speckle-based techniques. Integrating LSCI and M-DCT, this plug-and-play device enables non-invasive, deep-tissue monitoring without skull removal. Validated for functional activation, it offers a cost-effective, scalable solution for longitudinal neurovascular and systemic research.

Jasirali PK at NIPER Guwahati developed a mask-free Laser Scribed Graphene (LSG) sensor interfaced with a paper disc (P-LSG) for bilirubin detection. Requiring only 20 μL of sample, this enzyme-free platform detects bilirubin (1–750 μM) with high specificity. Its portability and 60-day stability make it ideal for non-invasive monitoring in resource-limited and pediatric settings.

Md Modassir Firdaus at IIT Gandhinagar developed a 3D-printable, tendon-driven flexible robot for navigating curved anatomical cavities like the colon. Utilizing a novel "rolling disk chain" design, it achieves constant-curvature bending for non-traumatic navigation. Validated in cadaver trials, this cost-effective device expands robotic endoscopy capabilities for complex gastrointestinal interventions.

To combat the high mortality rate of cervical cancer in resource-limited settings, Dipak Thorat at SMBT College of Pharmacy, Savitribai Phule Pune University developed a low-cost, disposable self-sampling device. Designed for painless home use, the device features a rotating knob that spins a soft brush to collect precise samples, while a safety stopper prevents injury. This innovation bypasses the need for clinical visits and

speculums, making early detection accessible, affordable, and culturally acceptable for women in rural and tribal areas.

To improve stroke management, Susweta Das at IIT Bombay developed a non-invasive Diffuse Correlation Spectroscopy (DCS) system for continuous monitoring of the Anterior Cerebral Artery (ACA). By positioning a custom probe on the glabella, the device utilizes near-infrared light to detect cerebral blood flow changes. Validated during functional tasks, this system overcomes the limitations of current Doppler tools, offering a reliable solution for bedside hemodynamic monitoring.

To democratize transdermal drug delivery, Aneesh Risbud and Animith Srimani at IIT Bombay developed a cost-effective, high-speed desktop fabrication system for microneedles. Utilizing a single 2D laser scan over an unconstrained photopolymer resin bath, this technology rapidly produces customizable templates. These templates are used to create biodegradable microneedles for painless insulin delivery, offering a scalable, self-administrable solution for diabetes management in resource-limited rural areas.

To address the limitations of electromyography in upper limb prosthetics, Anne Tryphosa Kamatham at IIT Jammu developed OCTAvUS, a wearable ultrasound system. Utilizing an 8-channel PZT transducer array and a compact transceiver, the system captures deep muscle mechanics by processing signal envelopes via an STM32 microcontroller. Achieving 95.6% gesture classification accuracy, this low-complexity innovation offers a reliable, wearable solution for enhanced prosthetic control and musculoskeletal rehabilitation.

Diagnostics:

Shraddha Vilas Sonavane at Homi Bhabha National Institute addressed the need for accessible diagnostics for liver and bone disorders by developing a low-cost, paper-based ratiometric fluorescence sensor for Alkaline

Phosphatase (ALP). Utilizing a supramolecular assembly of a pyrene-based dye and cationic polymer modulated by ATP, the sensor detects ALP activity via a distinct fluorescence shift from monomer to aggregate emission. This portable, "lab-on-paper" device eliminates the need for complex equipment, providing a sensitive and scalable solution for point-of-care testing in resource-limited settings.

To diagnose conditions like pancreatitis and pancreatic cancer linked to trypsin dysregulation, Shreya Yatish Garge at University of Mumbai developed a portable, cost-efficient fluorescence turn-off biosensor. Utilizing Aggregation-Induced Emission (AIE) chemistry between tetraphenylethylene (C-TPE) and protamine sulfate, the sensor detects trypsin via the enzymatic hydrolysis of aggregates, which quenches fluorescence. With a detection range of 0–21.45 nM and validation in human urine, this simple, scalable platform offers a reliable solution for early-stage point-of-care diagnostics.

To address rising kidney disease risks, Srividhyasakthi Vijayakumar at IISc, Bengaluru developed "Aqua Sense Kit," a non-invasive, real-time hydration monitor using Bioimpedance Spectroscopy. Validated against commercial devices, it achieves high accuracy ($r=0.94$) and superior robustness to skin variations. This affordable wearable enables continuous monitoring, offering early warnings for dehydration-linked health issues.

To address the lack of accessible chronic disease monitoring, Nishchitha N K at BITS developed "Health-sense," a frugal, handheld biosensing platform optimized for liver disorders. Integrating microfluidics with nanoparticle-enhanced electrochemical chips, this IoT-enabled device offers real-time detection using minimal blood samples. With affordable (₹20) replaceable sensors and mobile connectivity, it brings lab-grade diagnostics to homes and rural clinics, transforming preventive healthcare management.

To address the high cost and centralization of Hepatitis C Virus (HCV)

diagnostics, Ranamay Saha and his team at IIT Kanpur developed a rapid, low-cost electronic detection system. Replacing standard fluorescence-based qPCR, this method synthesizes cDNA from viral RNA and labels it with gold nanoparticles. By utilizing dielectrophoresis (DEP) to specifically concentrate the targets, the system detects infection through significant impedance reductions, providing an easily integrable solution for peripheral screening.

Immunotherapy:

To address the toxicity and accessibility challenges of current Multiple Myeloma immunotherapies, Aalia Khan at IIT Bombay developed India's first indigenous, humanized BCMA-directed CAR-T therapy. Unlike murine-derived variants, this humanized construct exhibits superior persistence and significantly reduced inflammatory cytokine release. Validated by complete tumor eradication in animal models without systemic toxicity, this safer, durable innovation has advanced to Phase I clinical trials.

Nanomedicine:

Divya Pareek and team at IIT BHU developed "GlyNPs-Nanomed," a polymeric nanomedicine based on glycine and acryloyl chloride for treating inflammatory disorders like Rheumatoid Arthritis. Validated via computational, in vitro, and in vivo studies, this standalone therapeutic effectively reduces key inflammatory markers, offering rapid recovery within 7–15 days comparable to commercial drugs.

Chemistry:

Saikat Ghosh and Angshuman Das at JNCASR developed a biomimetic strategy coupling enzymatic cycles with nucleotide-templated polymerization. This mutually coupled mechanism establishes the first feedback-driven supramolecular polymerization, where assemblies enhance enzymatic activity. This approach enables precise control over

one-dimensional polymer synthesis, expanding the design space for biomedical applications.

Shivshankar Prasad and his team at IIT Dhanbad developed a sustainable method for producing 2,5-furandicarboxylic acid (FDCA) from 5-hydroxymethylfurfural (HMF) using Ni-Co oxide bimetallic catalysts. The optimized NiCo (3:1) catalyst achieved an 84.9% FDCA yield at 50°C in just 50 minutes, utilizing tert-butyl hydroperoxide as an oxidant. This stable and recyclable catalyst offers a promising route for producing PEF, a superior biodegradable alternative to petroleum-based PET.

Energy solutions:

Ravi Kumar Yakala and his team developed a highly efficient Bidirectional Wireless Power Transfer (BWPT) system for EVs, enabling both charging (G2V) and energy feedback to the grid (V2G). Featuring optimized circular coils and robust control strategies, the system maintains stability under misalignment and load variations while complying with international safety standards.

Akanksha Sharma and her team at IIT Gandhinagar developed a quantum technology-driven photocatalytic platform for decentralized green hydrogen generation, inspired by photosynthesis. Using nanoparticle-assisted silane hydrolysis, the system produces hydrogen and valuable by-products from water and waste under natural sunlight. Scalable and safe, this low-cost innovation offers a sustainable energy solution for rural India without requiring high-pressure storage.

To combat the efficiency loss in solar panels caused by rising temperatures, Parkavi Valaguruven at IIITDM, Tamil Nadu developed a flexible Thermoelectric Generator (TEG) integrated with a photothermal layer. By coating cellulose fabric with Black TiO₂-engineered with oxygen vacancies to absorb near-infrared light—the system effectively captures solar heat. This innovation not only dissipates heat to cool the panel but also converts

it into electricity, generating 194 mV and achieving 6.1% efficiency, paving the way for more sustainable energy utilization.

To valorize agricultural waste by-products, Debarun Banerjee at IIT Delhi developed a hydrogen-free catalytic process converting furfural into 2-methylfuran (2-MF), a high-octane green gasoline additive. Using a photoreduction-activated Cu–Re catalyst, the method employs catalytic transfer hydrogenation with renewable solvents, eliminating the need for pressurized hydrogen and enabling decentralized, sustainable fuel production.

To advance solar fuel production, Guguloth Venkanna and Shreya Singh at IIT Delhi developed heterostructure photocatalysts engineered to minimize electron-hole recombination. Integrated with vacuum pressure swing adsorption for CO₂ capture, this system efficiently converts industrial emissions into liquid fuels like methanol, establishing a sustainable, solar-driven carbon cycle.

Clean Energy:

To address the scalability limitations of current radiative cooling technologies, Prasanna Das at JNCASR developed a robust MgO-PVDF nanocomposite coating. Achieving 96.3% solar reflectance via Mie scattering and near-unity emissivity, this scalable solution lowers surface temperatures by 7–13°C below ambient, offering a cost-effective, energy-free method for cooling buildings and infrastructure.

Waste to Energy:

To address the growing plastic waste crisis, Nishant Markandeya and his team at CSIR-NCL developed an integrated, scalable strategy for the chemical recycling of PET, PC, textile, and multilayer packaging waste. Utilizing a catalyst-free, solvent-assisted depolymerization method, they achieved 100% conversion of PET and PC, recovering valuable monomers like BPA and BHET. Validated at a 3 kg scale, this approach effectively

separates complex waste streams, offering a robust pathway toward a circular economy and a waste-free environment.

Joydeepa Taran and Rajarshi Bhar at IIT Kharagpur developed an integrated "waste-to-wealth" technology converting carbon-captured microalgal biomass into high-value ceramics. By combining derived biocarbon with recycled silicon carbide (rSiC), they successfully 3D printed complex Silicon-infiltrated Silicon Carbide (SiSiC) geometries for heat exchangers. This circular economy approach transforms carbon emissions and industrial waste into advanced functional materials, aligning with national sustainability missions.

Sangeetha V at IIT Palakkad developed a self-powered, decentralized system for resource recovery from source-separated urine to address the high water footprint of conventional sanitation. Utilizing Urine Air Permeable Cells (UAPCs) and solid-liquid separation, the integrated unit generates electricity and recovers vital nutrients (N, P, K) as fertilizer. Additionally, biochar-based purification enables on-site water reuse for flushing, eliminating transport costs and supporting a circular economy.

Environmental Engineering:

To address the limitations of traditional amine absorbents, Yogendra Kumar Mishra and his team at IIT Madras developed nanoparticle-enhanced nanoformulations (NF-1 and NF-2) for carbon capture. Leveraging Brownian motion and micromixing, these formulations increased absorption by 10–15% and capture rates by 20–60%, particularly at higher temperatures. Validated in pilot studies, the approach offers superior recyclability and thermal stability, presenting a cost-effective solution for post-combustion capture.

Water treatment:

Jashaswinee Swain at BITS developed a Graphene Oxide (GO)-coated stainless-steel mesh for gravity-driven oil-water separation. Exhibiting

superhydrophilicity and underwater superoleophobicity, the membrane achieves >99% efficiency in diverse environments. It demonstrates exceptional durability, retaining performance over 30 cycles and 150 days of harsh immersion, offering a robust solution for industrial wastewater treatment.

To combat ecological disasters caused by oil spills and industrial discharge, Biswajit Dehingia at Gauhati University fabricated a low-cost graphene-modified melamine sponge (rGO-MS). Synthesized via a simple dip-coating and thiourea treatment process, this highly hydrophobic sponge (contact angle $\sim 145^\circ$) exhibits exceptional mechanical durability and an absorption capacity of 79–149 g/g. With separation efficiencies reaching 99.9% and recyclability up to 20 cycles, it offers an economical, scalable solution for cleaning up oils and organic solvents from water bodies.

Environmental Monitoring:

To address the threat of emerging contaminants like Diclofenac (DCF), Vikram Wanjari and his team at IIT Bombay developed a novel electrochemical sensor using Polyethersulfone-based Laser-induced Graphene (PES-LIG). Leveraging the highly porous nature of PES-LIG, the sensor utilizes spontaneous adsorption to achieve superior sensitivity ($0.2774 \mu\text{A}\mu\text{M}^{-1}$) and a detection limit of $0.4 \mu\text{M}$ compared to standard polyimide platforms. This one-step, low-cost fabrication method offers a scalable solution for precise pollution monitoring in wastewater.

Food Technology

Nutrition:

To address the rising prevalence of diabetes and anemia, Ganga Kishore S at NIT Rourkela developed a Millet-based rice analogue (MBRA) using extrusion technology. Composed of pearl millet, sorghum, and parboiled rice, the MBRA mimics conventional rice but offers a low glycemic index

(41.28) and enhanced iron content (0.153 mg/g), providing a nutritious, culturally acceptable staple alternative.

Packaging:

To address biopolymer limitations, Sumona Garg at IIT Hyderabad developed a multifunctional hydrogel film combining sugarcane-top lignin and chitosan, crosslinked with cyclic phosphate. This innovation achieves superior water resistance, complete UV-shielding, and a 41-fold increase in tensile strength, offering a durable, agro-waste-derived sustainable alternative to petroleum-based food packaging.

To address the demand for chemical-free food packaging, Pradeep Kumar at IIT Roorkee developed a mineral-based ethylene scavenger using Sillimanite and Bentonite clay mixtures. Leveraging the high surface area and pore volume of these minerals, the composite achieved up to 84% ethylene adsorption, offering an effective, natural solution for extending the shelf life of fruits and vegetables.

To address global food loss and the limitations of conventional preservatives, Prachi Jain at IIT Roorkee developed an innovative plant-based, moisture-activated oxygen scavenging system. Composed of Acacia catechu and food-grade calcium carbonate, the system activates in humid environments to generate an alkaline medium, facilitating catechin oxidation that reduces oxygen levels to 0–2%. This metal-free, cost-effective solution offers a safe, microwave-compatible alternative for extending the shelf life of high-moisture foods.

Post-Harvest Technology:

Chingakham Ngotomba Singh and his team at NIT Rourkela developed a novel Mobile-Based Zero Energy Cooling Unit to preserve perishables during transport. Utilizing a composite matrix for evaporative cooling, the hybrid system operates via wind-induced airflow during transit and

solar power when stationary. It maintains 16–18°C and 89–95% humidity, significantly reducing post-harvest losses and carbon emissions without relying on fossil fuels.

Sensor in Food Science:

Anurag Kashyap at Gauhati University addressed the need for detecting formaldehyde (a common food adulterant) by developing a highly selective room-temperature gas sensor using a tin oxide-reduced graphene oxide (rGO-SnO₂) composite. Synthesized via a cost-effective wet chemical method, the sensor detects formaldehyde levels as low as ≈33 ppb with rapid response (35s) and recovery (10s) times. Validated by Density Functional Theory and lab-scale tests on fish, this stable device offers a promising non-invasive solution for monitoring food safety.

Health care :

To address the widespread rise in depression and anxiety, Debayan Ghosh and his team at Maulana Abul Kalam Azad University of Technology proposed a privacy-focused mobile application designed for those hesitant to seek professional help. The app identifies the root causes of user distress and recommends tailored activities to improve mental well-being. By incorporating a reward system to encourage engagement, this affordable tool aims to reduce self-harm risks and enhance overall productivity and happiness.

Material Science:

Manas Thakur at IIT Ropar developed functionally graded Polymer Matrix Sand Composites (PMSCs) to enhance ballistic resistance cost-effectively. By tailoring sand content across layers, they created a hard erosion zone and a tensile energy-absorption zone. Experimental and simulation results confirm that optimizing particle distribution significantly improves multi-hit capabilities, offering a sustainable alternative to traditional sandwich cores.

Nanoscience Technology:

Harsh Mishra at IIT Hyderabad addressed the critical trade-off between scalability and qubit quality in quantum computing. Acknowledging that current 2D scaling often degrades coherence, they developed a novel integration method for large superconducting qubits. This approach maintains the high fidelity essential for error correction while enabling the mass production necessary for practical quantum computers.

Textile Engineering:

To address the limitations of conventional stab-resistant armor (bulkiness, poor protection against sharp tips), Jyotirmoy Das at IIT Delhi developed a hybrid armor system combining Kevlar®, Shear Thickening Fluids (STF), and a novel flexible ceramic coating. By layering untreated, STF-treated, and ceramic-coated fabrics, this integrated design blunts knife edges and dissipates impact energy while preserving flexibility. The resulting lightweight armor offers superior protection and mobility compared to traditional high-density laminates.

Smart materials:

To enhance structural health monitoring, Sudhanshu Singh at Dr. B. R. Ambedkar National Institute of Technology Jalandhar created a piezoresistive sensor using reduced graphene oxide and chitosan-coated glass textiles. This flexible innovation enables real-time detection of strain and damage via resistance changes, providing a durable, multifunctional safety solution for aerospace and automotive industries.

Wearable Technologies:

To combat heat stress for outdoor workers and two-wheeler riders, Ayush Pradip and Arul Amit Jain at IIT Roorkee developed a wearable cooling system based on the thermoelectric (Peltier) effect. Initially designed as a battery-powered jacket, the system utilizes compact modules and

a water-based radiator to actively remove body heat, ensuring consistent cooling unlike passive garments. Validated for thermal comfort on moving vehicles, this patented, scalable technology can be adapted for helmets and safety vests to support delivery personnel, police, and agricultural workers.

To advance portable gait analysis, Suraj Singh and Jovanpreet Singh at IIT Delhi developed "Smart Socks" integrating textile-based capacitive sensors with a high-precision electronic module. Capable of withstanding washing and repeated loading, these sensors map plantar pressure with clinical precision. Validated with 99% accuracy against gold-standard labs, the system offers a low-cost, reliable tool for monitoring walking patterns and rehabilitation progress.

To power flexible wearable electronics, Himanshi Awasthi at BITS developed a rapid, room-temperature method for synthesizing boron-doped laser-induced graphene (B-LIG) on paper and cloth. By utilizing a blue-light laser and boric acid, this technique creates P-type graphene with doubled conductivity and tripled electrochemical performance. This frugal, eco-friendly process enables the scalable fabrication of high-performance supercapacitors for less than one rupee per square cm.

CONTENTS

GYTI AWARDS 2024	Page No.
1. Rapid hematocrit estimation using a fold-crease induced fast flowing paper sensor	02
2. Reconfigurable 2/3/4-wheeler electric vehicle charger.....	03
3. Fast charging and long cycle life sodium-ion batteries for large-scale grid storage.....	04
4. Biologically inspired electronic nose: Innovations and developments	05
5. A robotic-assisted equipment and method for ocular drug delivery with needle twisting capability.....	06
6. Liquefaction susceptibility evaluation of sand reinforced with 3d printed geocells	07
7. 3D printed amphotericin B-loaded biomimetic polymeric corneal patch (ampat).....	08
8. Novel method for synthesizing biphasic bioceramics: in vivo insights into bone healing	09
9. A smearing device for blood viscosity measurement enabling detection of sickle cell anemia	10
10. A closed loop sustainable air filter development from waste banana peel.....	11
11. Rapid, multiplexed, point-of-care device for simultaneous detection of multiple pathogen and antimicrobial resistance	12
 GYTI APPRECIATION 2024	
12. A process for fabrication of an electrically conductive aligned nanofibrous scaffold	14
13. Portable EIS-based biosensor for the detection of microcystin-LR residues in environmental water bodies and simulated body fluids	15
14. Frugal design and development of a biomimetic tumor on-chip platform for precise drug screening	16
15. Development of NIR-enabled nanorobots for deep tissue imaging and real-time disease sensing in living animals.....	17
16. Revolutionizing filtration: Plasma-treated graphene oxide coated mesh for enhanced durability and oil-water separation efficiency	18
17. Feedback-driven enzymatically coupled controlled self-assembly of small molecules for biomedical applications	19
18. Smartphone-enabled miniaturized electrochemiluminescence platform for non-invasive detection of diabetes complication biomarkers	20
19. Misalignment tolerant control of a bidirectional wireless power transfer system for electric vehicle charging	21
20. Mobile-based zero energy and sustainable energy cooling unit for perishable fruits and vegetables.....	22
21. Development of low glycemic index millet based rice analogue for sustainable food systems	23
22. Decentralized plastic recycling through filament-free 3D printing: Transforming waste into high-quality products and driving the circular economy	24
23. Polymer matrix sand composites for enhanced ballistic impact resistance	25
24. Vertical integration technology for scalable quantum computing system.....	26
25. Photo-catalytic substrate for producing green hydrogen and process thereof	27

26.	High-rate packed bed biofilm reactor for robust and efficient nitrification in recirculating aquaculture systems	28
27.	Emerging paradigm shifts in floriculture industry: A way forward for a sustainable active packaging solution for prolonging the freshness and shelf life of fresh produce	29
28.	Low-cost portable biosensor for non-invasive early detection of potato dry rot diseases in their asymptomatic stages	30
29.	B-SMART: Bacteria Sensing through Mobile Aptamer Recognition Technology	31
30.	Breathe easy-the future of airway splints.....	32
31.	PRuCSor: A portable chemiresistive reader with sp2-chip for point-of-care diagnosis of antibiotic resistance to combat AMR	33
32.	Aqua sense kit: IoT-enabled non-invasive human hydration monitor	34
33.	Modular multimodal speckle imaging platform for non-invasive cerebral blood flow studies in small animals: innovative device for advancing pre-clinical research	35
34.	Novel polymeric nanomedicine for potential treatment of inflammatory diseases.....	36
35.	Paper interfaced LSG device for noninvasive detection of bilirubin from urine sample.....	37
36.	Development of flexible robot for transanal minimally invasive intervention	38
37.	An integrated process for precipitant-free highly selective recovery of valuable metals from end-of-life lithium-ion batteries using a green deep eutectic solvent	39
38.	Chemogel superabsorbent formulation for efficient carbon capture	40
39.	An aqueous rechargeable and high-capacity zinc ion battery	41
40.	Production of biopolymer precursor from biomass derived 5-hydroxymethyl furfural (HMF) using NiCo oxide catalyst	42
41.	Development of a sustainable process for depolymerization of polymer wastes	43
42.	AI -driven mental health solutions for Gen Z challenges	44
43.	Adsorption-enhanced sensitivity for electrochemical sensing of diclofenac by polyethersulfone-based laser-induced graphene	45
44.	Manufacturing of 3D printed SiSiC ceramic prototypes using sustainable raw materials, as customized bio-carbon obtained from microalgal biomass of carbon sequestration process and optimized recycled sic from industrial waste	46
45.	Moisture-activated oxygen scavenger based on Acacia catechu for active food packaging: a plant-based alternative	47
46.	Smart wearable cooling device	48
47.	Impedance spectroscopy-based detection of Hepatitis C viral RNA from clinical samples	49
48.	Integrated photovoltaic-thermoelectric hybrid system	50
49.	Vaginal cells self-sampling medical device for early detection of cervical cancer	51
50.	Functionalized graphene derivative for non-invasive detection of formalin in adulterated fish	52
51.	Advanced stab resistant armour through strategic integration of ceramics and shear thickening fluids	53
52.	Electro-mechanical behavior of self-sensing glass textile-based multifunctional sensor for in-situ structural health monitoring	54

53. Hydrogen-free catalytic conversion of agricultural wastes into green gasoline additive.....	55
54. Development of a mechanically robust and highly water-resistant cyclic phosphate crosslinked lignin-chitosan hydrogel for active food packaging applications	56
55. Rapid-acting sprayable hydrogel for advanced wound healing	57
56. Solar light assisted conversion of captured CO ₂ from industrial flue gases to value-added chemical fuels.....	58
57. Filter paper-based fluorescence sensor for affordable and precise alkaline phosphatase diagnostics	59
58. A cost-effective fluorescence biosensor for rapid and sensitive trypsin detection: Advancing point-of-care diagnostics.....	60
59. A biomimetic injectable hydrogel for therapeutic management of osteoarthritis	61
60. Non-invasive continuous monitoring of anterior circulation cerebral blood flow.....	62
61. Closed loop sanitation: Self powered technology for water recovery and fertiliser production from source separated urine.....	63
62. Ultra-emissive MgO-PVDF polymer nanocomposite paint for passive daytime radiative cooling.....	64
63. Smart socks for comprehensive gait analysis: Detection of ortho-neuro pathology through wearable sensor technology	65
64. A mineral and clay-based ethylene scavenger for fruits and vegetable packaging application	66
65. Facile and cost-effective fabrication of graphene-based hydrophobic sponge for efficient oil/water separation.....	67
66. Development of a novel humanized BCMA-directed CAR for multiple myeloma: Robust activity and low toxicity in preclinical studies	68
67. Indigenous process and machine for rapid fabrication of biocompatible microneedles.....	69
68. Health-sense: a mobile and reliable liver diagnostics for chronic disease.....	70
69. Ultrafast laser-doped P-type graphene: Flexible B-LIG for advancing energy storage devices	71
70. Piezoresistive sensors for real-time fruit growth monitoring in smart farming.....	72
71. A wearable ultrasound system for control of prosthetic devices.....	73

Annexures

(a) Honey Bee Network	II
(b) SRISTI	IV
(c) Techpedia	VII
(d) GIAN.....	X
(E) List of Reviewers	XIV
(F) List of GYTI Awardees (2012-2023)	XXII



GYTI 2024 AWARDS



Amaan Dash

Rapid hematocrit estimation using a fold-crease induced fast flowing paper sensor

Amaan Dash

Indian Institute of Technology, Kharagpur

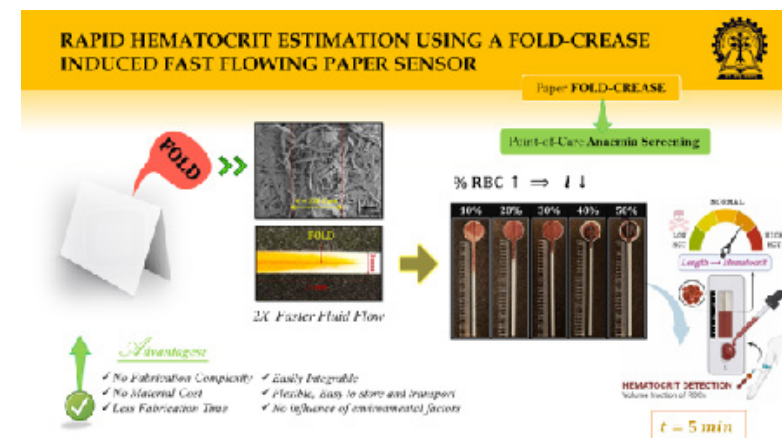
Guide:

Prof. Sunando DasGupta

Paper-based platforms are widely explored for point-of-care diagnostics due to their biocompatibility, low cost, and ease of use, yet their performance remains constrained by fixed pore structures and uncontrolled wicking. These limitations lead to delayed flow, clogging, nonspecific absorption, and high evaporative losses—issues that become especially severe during blood analysis and hinder clinical translation. Here, we introduce a zero-cost, fabrication-free strategy that overcomes these constraints by engineering paper flow using simple fold-creases. The crease generates a modified pore structure that enhances the capillary network, enabling significantly faster, and controlled fluid transport. This requires no added materials, instruments, or technical expertise, ensuring exceptional accessibility and scalability. Fold-creased regions enhance analyte transport, shorten analysis time, reduce evaporation, and remain stable across environmental variations while enabling multiple pore size distribution within a single device. Collectively, this establishes fold-crease-engineered paper as a robust, eco-friendly platform for large-scale, resource-limited diagnostics.

Anaemia affects 20–30% of the global population and often remains undiagnosed until severe due to nonspecific symptoms, underscoring the need for early and accessible testing. Current hematocrit measurement depends on automated analyzers and trained personnel, limiting its use in remote or resource-limited settings. To address this gap, we developed a novel, equipment-free hematocrit sensor that utilizes fold-creased paper channels

for rapid and reliable blood assessment. The engineered crease architecture creates larger, interconnected pores that accelerate blood flow and prevent clogging, enabling measurements within 5 minutes. Anaemic samples, characterized by reduced viscosity, wick farther along a printed scale, allowing clear visual differentiation without reagents, storage requirements, or operator training. As the first demonstration of fold-crease-engineered paper diagnostics, this platform can support routine on-site anaemia screening, improves healthcare accessibility, reduces the prevalence of severe anaemic conditions, and provides a scalable approach to addressing the nationwide burden of anaemia.



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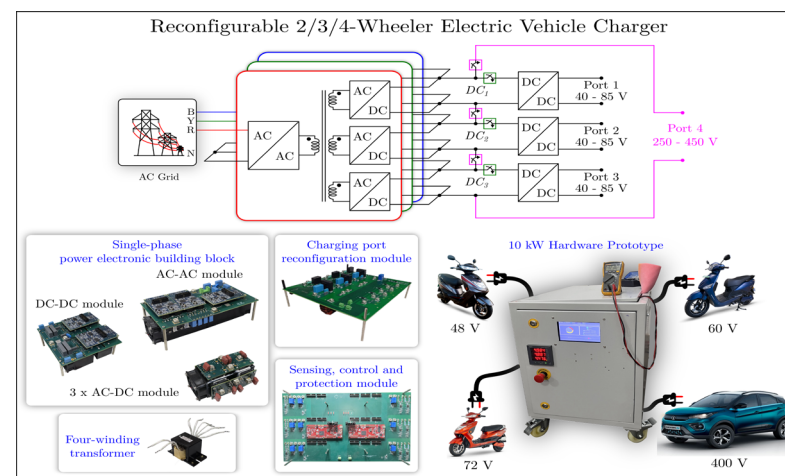
Reconfigurable 2/3/4-wheeler electric vehicle charger

Himanshu Bhusan Sandhibigraha
Indian Institute of Science, Bengaluru

Guide:
Dr. Vishnu Mahadeva Iyer

The transportation sector is a major contributor to global energy-related greenhouse-gas emissions, responsible for nearly 23% of the total. Accelerating the transition to electric mobility is therefore crucial for reducing emissions, enhancing air quality, and improving energy security. In 2025, global EV sales have reached almost 20 million, with the global EV stock expected to reach 420 million by 2030. In India, adoption is also rising rapidly, with nearly 3 million EVs already in operation, and electric 2/3-wheelers accounting for over 70% of new sales. This rapid growth has intensified the demand for scalable, interoperable, and cost-effective public charging infrastructure. However, the lack of standardization in battery voltage and current ratings across vehicle types presents a major challenge. Electric 2/3-wheelers typically use <100 V batteries, while electric 4-wheelers use 250–450 V batteries, with some models reaching 800 V. A brute-force approach to accommodate all vehicles at a charging station requires installing multiple proprietary chargers, increasing capital costs, maintenance effort, and space requirements. A unified charging architecture that adapts to the diverse needs of all vehicle classes is therefore essential. To address this, a reconfigurable multi-port EV charging system has been developed. The charger is capable of independently charging three electric 2/3-wheelers (40–85 V) or reconfiguring to charge a single electric 4-wheeler (250–450 V). Built from single-phase power-electronic building blocks, the modular architecture makes the charger compatible with both home (single-phase) and public (three-phase) charging environments. A high-TRL 10 kW

hardware prototype with an HMI and automation features has been constructed and extensively validated, demonstrating efficient operation, seamless reconfiguration, and independent port control. By addressing interoperability, scalability, and cost-effectiveness, the proposed system offers a sustainable, future-ready approach to EV charging and supports India's Viksit Bharat 2047 vision for clean, self-reliant mobility.





Biplab Patra

Fast charging and long cycle life sodium-ion batteries for large-scale grid storage

Biplab Patra

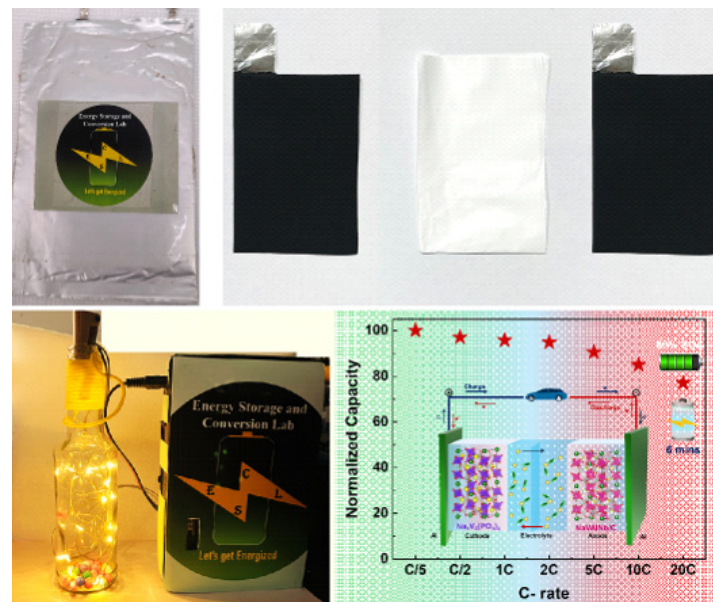
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Guide:

Prof. Premkumar Senguttuvan

Lithium-ion batteries (LIBs) dominate portable electronics and electric mobility due to their high energy and power densities. However, their large-scale deployment is constrained by lithium scarcity, high cost, and geopolitical supply risks. Sodium-ion batteries (SIBs) offer a viable alternative owing to the natural abundance and low cost of sodium, yet their development is hindered by the lack of high-performance anode materials. Hard carbon, the current commercial anode, suffers from low volumetric energy density, poor rate capability, low initial Coulombic efficiency, and high risk of sodium plating during fast charging. This underscores the urgent need for advanced intercalation-type anodes capable of fast Na^+ diffusion, high capacity, and long cycle life. NASICON frameworks, despite their structural robustness and rapid ion transport, remain underexplored as SIB anodes. Conventional NASICON anodes such as $\text{Na}_3\text{V}_2(\text{PO}_4)_3$ (NVP) and $\text{NaTi}_2(\text{PO}_4)_3$ (NTP) fail to deliver the desired combination of low voltage and high capacity. Our earlier work on an “empty” NASICON $\text{Nb}_2(\text{PO}_4)_3$ anode achieved $\sim 150 \text{ mAh g}^{-1}$ at $\sim 1.2 \text{ V}$ via multivalent Nb-redox activity, but its cycling stability was limited. Introducing Na^+ at the Na(1) site through V3+ substitution ($\text{Na}_{1.5}\text{V}_{0.5}\text{Nb}_{1.5}(\text{PO}_4)_3$) improved structural integrity, achieving 89% retention over 500 cycles. Building on this, we report $\text{NaV}_{0.25}\text{Al}_{0.25}\text{Nb}_{1.5}(\text{PO}_4)_3/\text{C}$ (NaVAlNb/C), a novel carbon-coated NASICON anode synthesized via a scalable, water-based sol-gel assisted solid-state route. Alivalent Al^{3+} substitution generates Na-ion vacancies and enhances sublattice disorder, improving ionic transport, while carbon coating and

nanosizing enhance electronic conductivity. The anode delivers 80 mAh g^{-1} at 20°C and 95.2% retention over 5000 cycles. In a full cell with $\text{Na}_4\text{V}_2(\text{PO}_4)_3$, it achieves 6493 W kg^{-1} power density and 81% retention over 3000 cycles. Notably, the full cell can be recharged to 80% state-of-charge within just 6 minutes, demonstrating exceptional fast-charging capability. This innovation overcomes key limitations of conventional SIB anodes, offering a fast-charging, long-life, and industrially scalable solution for grid and mobility applications.





Deepak Sharma

Biologically inspired electronic nose: Innovations and developments

Deepak Sharma

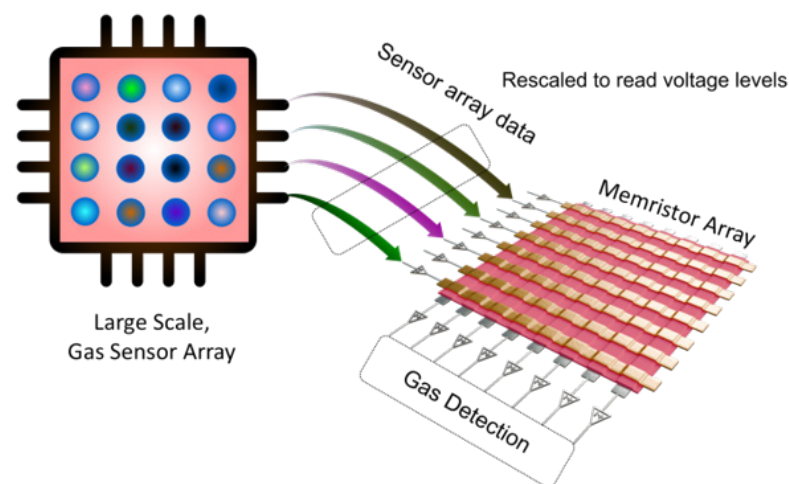
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Guide:

Prof. Navakanta Bhat

The olfactory system exemplifies a remarkably sophisticated biological framework for recognizing and processing diverse chemical stimuli. Inspired by this natural paradigm, the present work integrates semiconductor technology, material engineering, mixed-signal electronics, and brain-inspired computing to design artificial architectures capable of advanced gas detection and neuromorphic computation. Initial efforts concentrated on fabricating interdigitated electrode structures on silicon and flexible substrates, enabling conductivity modulation upon molecular adsorption. Wet-chemistry synthesis of varied compositions enhanced orthogonal selectivity, ensuring analyte-specific responses with minimal cross-interference. Comprehensive characterization using XRD, Raman, XPS, AFM, FTIR, UV-Visible, SEM, and TEM elucidated adsorption-desorption kinetics at concentrations approaching parts per billion. Additionally, a humidity sensor employing 0D/2D heterostructures achieved millisecond-scale response and recovery, mitigating environmental fluctuations. Subsequent phases addressed scalability through unfolded crossbar arrays comprising 16 and 64 sensors, broadening detection capabilities via engineered nanostructures, oxides, nanoparticles, quantum dots, and heterostructures. Data-driven approaches incorporated artificial neural networks for classification and concentration prediction, achieving >92% accuracy and mean square error $<1e-3$. Sequential LSTM models further improved accuracy to 98%, demonstrating robust algorithmic adaptability for multidimensional datasets. The final stage advanced neuromorphic computing by constructing

a 64×64 memristor crossbar array utilizing molecular complexes. A custom mixed-signal circuit board delivered nanosecond electrical pulses and high-precision acquisition (>15 effective bits) across 64 parallel channels. Each memristor functioned as a programmable synapse, storing up to 16,520 analog states (14-bit equivalent) without selectors. This architecture demonstrated high-resolution computation with ~460-fold lower energy consumption compared to conventional digital systems. Collectively, the project establishes a multidisciplinary pathway toward artificial olfaction and energy-efficient neuromorphic platforms.





Ashish Siddharth

A robotic-assisted equipment and method for ocular drug delivery with needle twisting capability

Ashish Siddharth

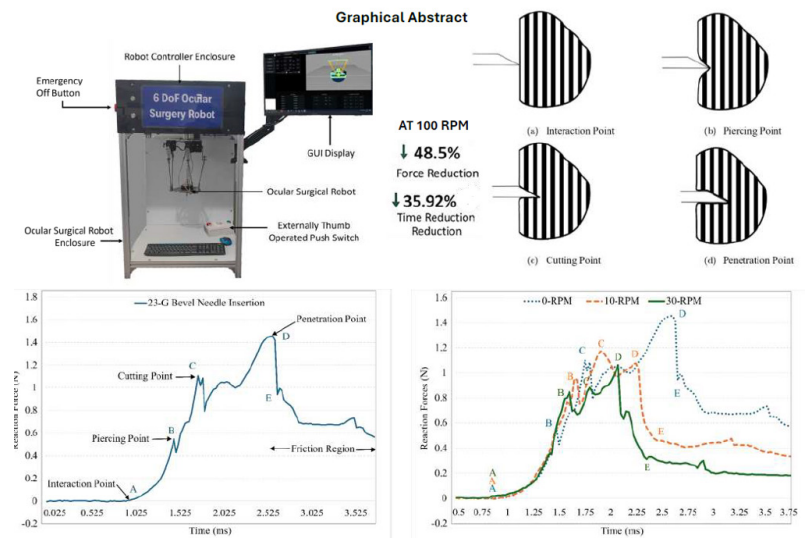
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Guides:

Dr Arun Dayal Udai, Dr. Ajay Bhandari

Conventional needle insertion often encounters high insertion forces, prolonged penetration times, multiple insertions and deviations in the needle's trajectory. These issues can lead to tissue deformation, patient discomfort, and reduced surgical precision, which are especially concerning in delicate ocular procedures. To overcome these limitations, the concept of incorporating rotational motion into ocular surgery and intravitreal drug delivery was introduced. Preliminary studies on rotating needle insertion demonstrated that applying controlled rotation during penetration effectively reduces friction between the needle and surrounding tissue. Rotation distributes the applied forces more evenly, decreasing the buildup of localised stress at the needle-tissue interface. This reduction in resistance not only minimises tissue damage but also increases the precision of needle placement. Additionally, saccade motion has been shown to enhance drug dissolution within the vitreous humour, thereby improving the therapeutic efficiency of intravitreal treatments. Further inspiration for this technique arose from industrial applications, where rotary mechanisms are commonly used to minimise resistance in cutting and drilling processes. Translating this principle into biomechanics led to the development of a Six-Degrees-of-Freedom parallel robotic system equipped with controlled needle-twisting capabilities tailored specifically for ocular surgery. The robotic system addresses key procedural needs, such as reduced insertion force, quicker penetration times, and improved tool accuracy. It integrates features such as dynamic virtual fixture setting for the Remote

Centre of Motion and precise calibration of surgical tool tips. The system's performance was validated through ex vivo experiments on goat eyes, with insertion forces measured using an ATI Nano 43 sensor. Quantitative results confirmed that rotational needle insertion significantly decreases tissue resistance, resulting in faster penetration. At 100 rpm, the maximum insertion force decreased by 48.5%, and the penetration time was reduced by 35.92%.





Prerana Krishnaraj

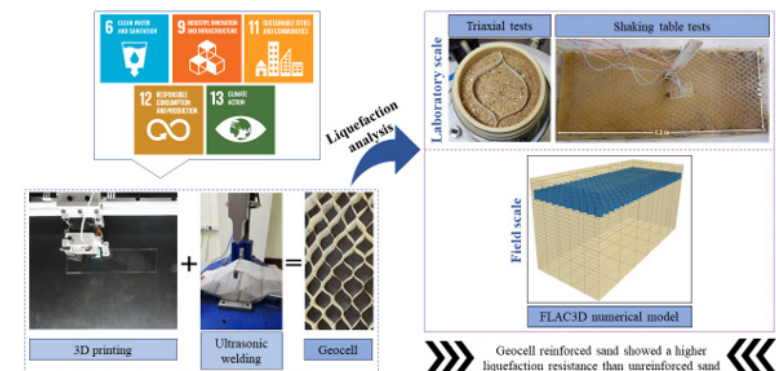
Liquefaction susceptibility evaluation of sand reinforced with 3d printed geocells

Prerana Krishnaraj
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Guide:
Prof. Gali Madhavi Latha

The unprecedented construction boom of the recent past has led to a severe shortage of suitable land, prompting the adoption of cutting-edge ground improvement technologies. One of the most sought-after ground improvement techniques is the use of geosynthetics, which offers sustainable, economical, and cleaner solutions for various geotechnical applications. Geosynthetics also play a crucial role towards the fulfilment of these United Nations Sustainable Development Goals (UN SDG): SDG 6, SDG 9, SDG 11, SDG 12, and SDG 13. Geocells are a class of geosynthetics that are widely used due to their three-dimensional interconnected cellular structure. While the behaviour of the geocell-reinforced soils under static and cyclic loads is well-studied, their liquefaction response remains unclear. The shear strength loss during liquefaction causes catastrophic damage to life and properties as witnessed during the 2001 Bhuj earthquake. Despite the importance of this topic, a significant research gap exists in the literature regarding the liquefaction behaviour of the geocell-reinforced sands. This study aims to bridge this gap and provide a comprehensive understanding of the liquefaction behaviour of the geocell-reinforced sands. The high tensile strength and large physical dimensions of the commercial geocells question their applicability for lab-scale testing conditions. This limitation was overcome by complementing the 3D printing technology with ultrasonic welding. This enabled the successful indigenous fabrication of the honeycomb shaped geocells with varying tensile strength, surface texture, and physical dimensions. Preliminary element-scale liquefaction studies were

conducted using cyclic triaxial tests. This provided valuable insights into the behaviour of the geocell-reinforced sand during pre-liquefaction, liquefaction and post-liquefaction stages. Building upon the element-scale findings, the research was expanded to model scale shaking table studies on geocell-reinforced sand beds. The study was further augmented by numerical modelling using FLAC3D to simulate the behaviour of the field-scale geocell-reinforced sand beds. Based on experimental and numerical studies, specific insights into the liquefaction potential of geocell-reinforced studies are gained and the quantitative benefits of geocell reinforcement in reducing the likelihood of liquefaction in sands are established.





Velmurugan K

3D printed amphotericin B-loaded biomimetic polymeric corneal patch (ampat)

Velmurugan K

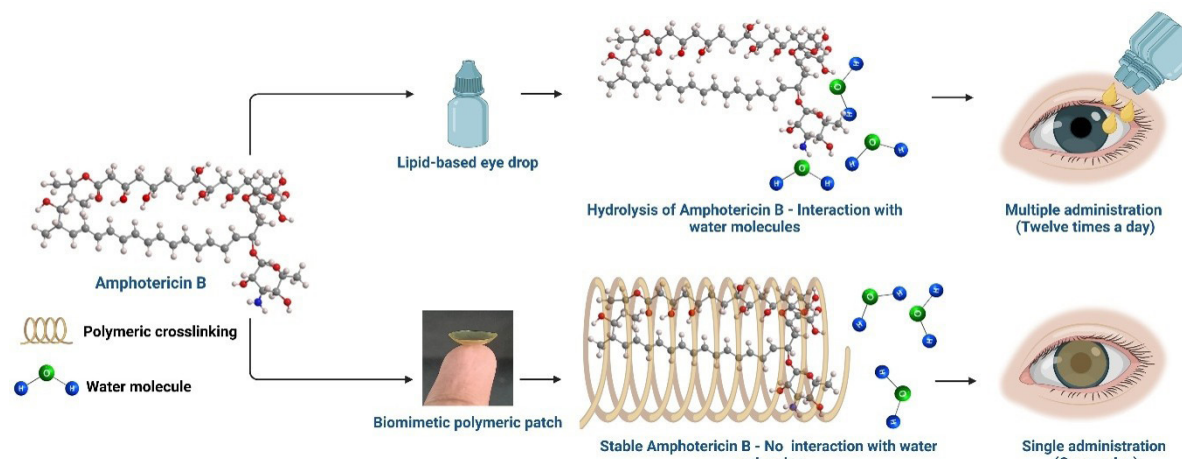
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Guide:

Prof. Nirmal J

Amphotericin B eye drops (reconstituted from lyophilized Amphotericin B formulation indicated for intravenous use) is used off-label for fungal keratitis. However, the reconstituted formulation is stable only for a week, even after refrigeration. Moreover, a high dosing frequency makes it an inconvenient treatment practice. The current innovation (patent No. IN202111058587) aims to develop a stable Amphotericin B-loaded biomimetic polymeric corneal patch (Ampat) using 3D printing. Hydroxypropyl methylcellulose and chitosan were used to formulate Ampat, which was then characterized for its physical and mechanical properties. The stability studies were performed in different conditions and protected from light. Further, the therapeutic efficacy of Ampat

was evaluated against *Candida albicans*-induced fungal keratitis using ex vivo and in vivo efficacy models. Amphotericin B in Ampat was found to be stable at room temperature (25 °C) and refrigerated conditions for at least two months. Computer simulations showed that the hydrolysis was a major degradation mechanism of Amphotericin B and was reduced when loaded in the polymeric corneal patch. The ex vivo and in vivo studies show that Ampat was as efficacious as the marketed Amphotericin B formulation but with a reduced administration frequency (1 vs 12 times per day). The present study demonstrated Ampat as a potential alternative to reconstituted lipid-bound eye drops to treat fungal keratitis.



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Ankitha S

Novel method for synthesizing biphasic bioceramics: in vivo insights into bone healing

Ankitha S

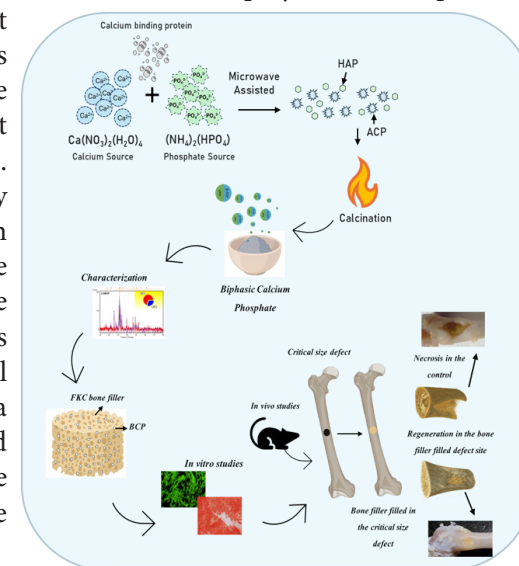
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Guides:

Dr. Bhisham Narayan Singh, Dr Shyamsunder N Bhat

Bone tissue engineering addresses critical challenges in repairing and reconstruction of bone tissue defects caused by trauma, diseases, or surgical interventions. This project focuses on developing a novel biphasic calcium phosphate (BCP) based bone filler for orthopaedic applications. The filler offers a versatile solution for filling bone defects, enhancing cancellous and cortical bone regeneration, facilitating fracture healing and tissue remodelling. The core component of the material is a novel biphasic calcium phosphate (BCP) with integrated hydroxyapatite (HAP) and beta-tricalcium phosphate (β -TCP) phases synthesized through an innovative one-pot process. This method ensures a controlled ratio of HAP/ β -TCP, tailored to meet the specific requirements of different bone defects. HAP provides biocompatibility and osteoconductivity, while β -TCP contributes to bioresorbability and osteoinductivity, offering a balanced approach for effective bone regeneration. By fine-tuning the HAP/ β -TCP ratio, the material can be adapted for various clinical needs, such as load-bearing or non-load-bearing applications. To enhance functionality, BCP is integrated with biocompatible polymers, creating a composite. This polymeric component enhances flexibility and adaptability for minimally invasive applications. The composite filler can be applied to irregularly shaped bone defects, eliminating the need for complex surgeries and providing a more efficient and patient-friendly approach to bone repair. The bone filler was extensively evaluated for the material's structure, porosity, and surface topography. Physicochemical analyses confirmed the phase purity, crystallinity, and chemical composition of the bioceramics. Cytocompatibility

and bioactivity studies examined the material's ability to support mesenchymal stem cells proliferation, and osteogenic differentiation. In addition, in-vivo studies were done on rat femur to assess the material's regenerative ability. Histological and micro-CT analyses confirmed its potential to repair critical cortical bone tissue defects and facilitate bone formation, integration, and remodeling over time. The bone filler represents an innovative advancement in bone tissue engineering, addressing the limitations of existing bone graft substitutes, such as mechanical mixing of pre-synthesized HAP and β -TCP, handling challenges and lack of customization. The integration of bioceramics and polymeric components in a convenient form promises to revolutionize the management of bone defects. Its functionally optimized design and comprehensive evaluations pave the way for its adoption in clinical practice, offering a highly effective, and minimally invasive solution for bone regeneration.





Mahrukh Arif Mir

A smearing device for blood viscosity measurement enabling detection of sickle cell anemia

Mahrukh Arif Mir

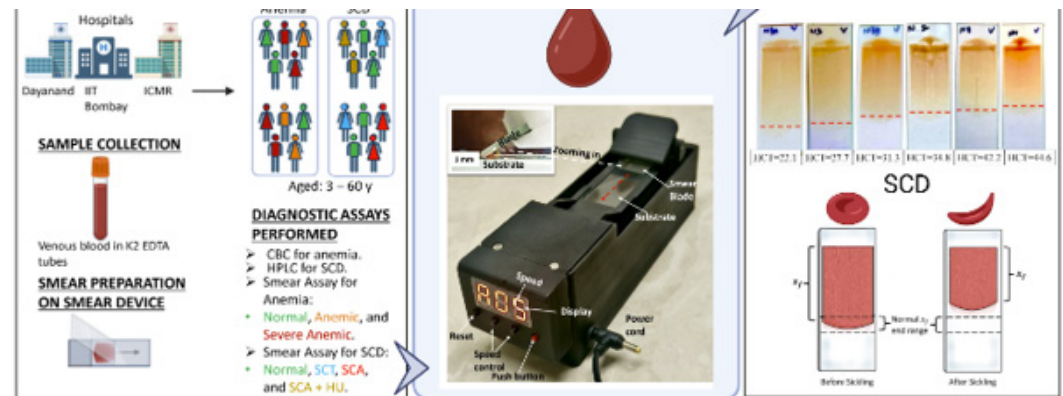
Indian Institute of Technology, Bombay

Guide:

Dr. Mahesh S Tirumkudulu

Sickle cell anemia (SCA) is a genetic blood disorder caused by the polymerization of hemoglobin S (HbS) in low-oxygen conditions. This process creates stiff and sickle-shaped red blood cells. These changes significantly affect how blood flows, particularly by increasing its thickness. Traditional diagnostic methods like HPLC, electrophoresis, and molecular tests are very accurate but need specialized labs and trained staff. This makes them hard to access in areas where SCA is common and resources are limited. To bridge this gap, we introduce a portable, low-cost device that can measure whole blood viscosity from just one drop of blood. This allows for quick and on-site screening of sickle cell disease. The device uses a carefully controlled slide-on-slide smearing method. A drop of blood spreads between glass slides set at a fixed angle, creating a thin film. The length of this film is determined by the balance between viscous drag and surface tension forces. As viscosity increases, the length of the smear decreases. We measure this length to find viscosity values that agree with those from standard rheometry tests. When blood samples from SCA patients undergo chemical deoxygenation with sodium metabisulfite, they show a significant increase in viscosity (over 100%). In contrast, normal samples show little change, while samples with sickle cell trait (SCT) show a moderate increase (around 40%). These viscosity thresholds help

clearly distinguish between normal, SCT, and SCA samples without needing special supplies or optical testing. Beyond screening, the technique provides diagnostic value for personalized medicine, particularly for patients undergoing hydroxyurea (HU) therapy. HU increases fetal hemoglobin (HbF) and improves cell deformability, reducing viscosity. Our measurements show that HU-treated SCA patients exhibit significantly lower viscosity increases (~70%) than untreated SCA samples, offering a quantitative physiological marker of treatment efficacy. This enables longitudinal monitoring of therapy response, patient-specific dosage optimization, and more informed clinical decision-making—addressing the known variability in HU outcomes across individuals. This method provides two diagnostic functions by allowing viscosity-based screening for both sickle cell disease and anemia using one device.





Saumya Agrawal

A closed loop sustainable air filter development from waste banana peel

Saumya Agrawal

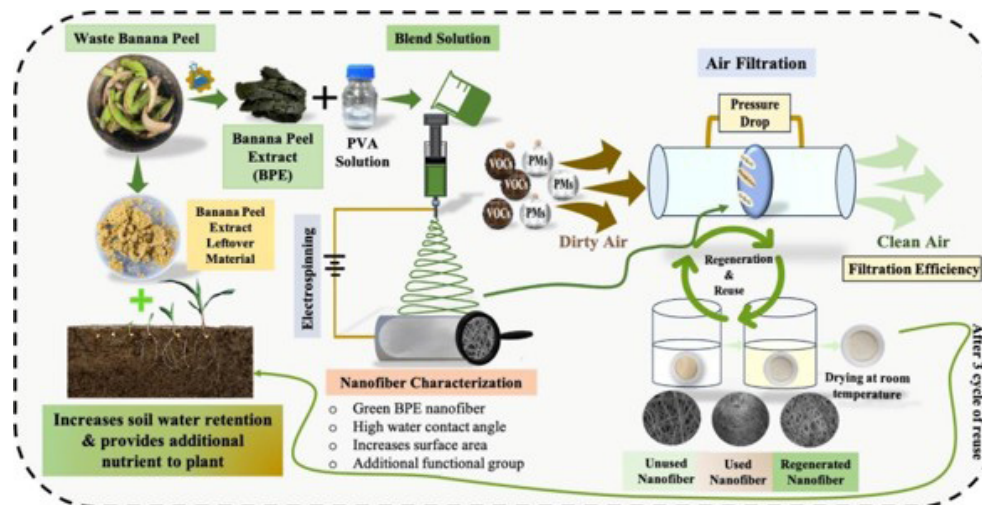
Indian Institute of Technology, Bombay

Guide:

Dr. Tabish Nawaz

Indoor air pollution has a significant impact on both human health and the environment. Humans suffer the greatest health burden due to inefficient combustion technologies and polluted fuels. Therefore, air filtration is essential for a healthy and prosperous household. This study aims to develop a sustainable approach for fabricating biodegradable electrospun nanofibers (ENs) from banana peel waste, providing a closed-loop circular solution and a potential alternative to non-biodegradable HEPA air filters. The banana nanofiber showed efficient results with minimum pressure drop (156-160 Pa), highest filtration efficiency (>98%), capturing VOCs from the air, and a quality factor (Qf) ranging between 1.0

and 1.2 Pa-1. The addition of banana peel extract to the polyvinyl alcohol solution enhanced nanofiber properties, including a decrease in nanofiber diameter, reduced hydrophilicity, increased surface area, and the incorporation of additional functional groups, particularly in air filters. Without loss of nanofiber morphology, we have demonstrated successful regeneration and reuse of the banana peel nanofiber filter up to 3 cycles. The filtration efficiency of the fabricated banana nanofiber is comparable to that of the conventional HEPA filters. Banana peel extraction leftover material was used to improve soil water-holding capacity, showing an approximately 55% increase in soil water retention capacity.





Sonal Fande

Rapid, multiplexed, point-of-care device for simultaneous detection of multiple pathogen and antimicrobial resistance

Sonal Fande

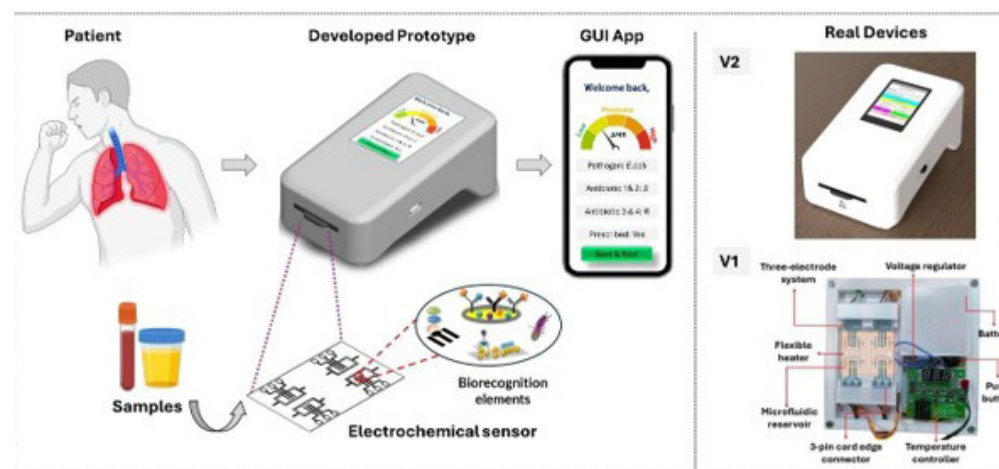
Birla Institute of Technology & Sciences Pilani,
Hyderabad Campus

Guides:

Prof. Sanket Goel, Prof. D. Sriram

Rapid, cost-effective detection of microbial infections at the point of care (POC) remains a critical need in modern healthcare, particularly as commensal bacteria, such as *Escherichia coli* (*E. coli*), evolve into multidrug-resistant pathogens. *E. coli*, a Gram-negative bacterium, is widely found in humans, animals, and environmental reservoirs and is associated with various infections, including diarrhoea, bacteraemia, and, notably, urinary tract infections (UTIs). Concurrently, the increasing prevalence of antibiotic resistance poses a major clinical challenge. Thus, rapid and accurate detection of pathogens and their antimicrobial susceptibility is essential for early management of antimicrobial resistance. However, conventional diagnostics are often costly, labour-intensive, and have a lengthy turnaround time. To address these limitations, this study presents a fully automated, portable, multiplexed electrochemical platform for the selective detection of pathogen and antibiotic susceptibility testing (AST). A miniaturized Indium tin oxide (ITO) three-electrode system, functionalized with gold nanoparticles, is used for the sensitive detection of various pathogen. The immunosensor was developed by immobilizing pathogen specific monoclonal antibodies on the functionalized gold surface. The platform achieved a detection limit of 1.67×10^7 CFU/mL for *E. coli*, operating within a concentration range of 2.76×10^7 to 3.0×10^{10} CFU/mL. The

developed platform simultaneously tests four antibiotics within a five-hour period, compared to the 2–5 days required by standard methods. Further, integrated microfluidic reservoirs, a battery, and an on-chip heating module onto the compact handheld platform allow on-chip bacterial incubation and real-time analysis. This fully automated, portable platform holds significant potential for point-of-care applications, offering a rapid, sensitive, and multiplexed diagnostic solution that addresses the growing risk of antimicrobial resistance and improves patient outcomes.





GYTI 2024 APPRECIATION



Ekta Srivastava

A process for fabrication of an electrically conductive aligned nanofibrous scaffold

Ekta Srivastava

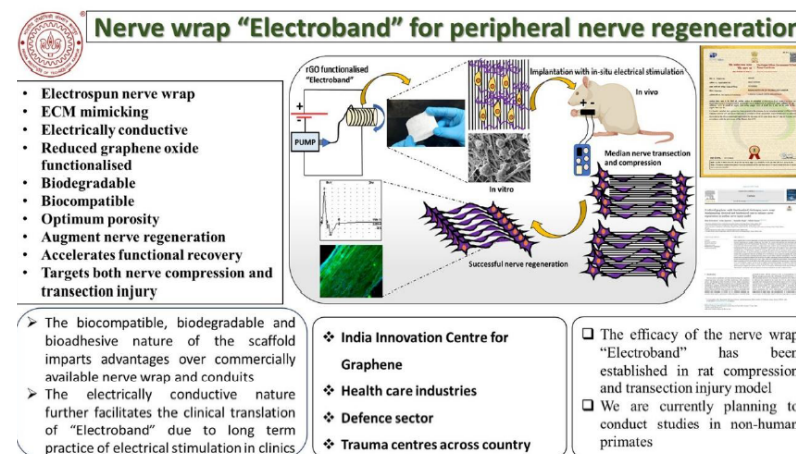
Indian Institute of Technology, Kanpur

Guide:

Dr. Ashok Kumar

Nerve injuries lead to severe impairment of target tissue and standard treatment approaches from surgery to electrical stimulation are complex, yielding only brief relief. The current study addresses such limitations with reduced graphene oxide (rGO) functionalized “Electroband”. We attempt to conjugate electrical cues in the nerve wrap with in-situ electrical stimulation in a median nerve injury model in rats, underlining the significance of combinatorial therapy for nerve regeneration. “Electroband” targets three critical aspect of nerve regeneration: neuroprotection, neuroregeneration and neuroplasticity at single stroke. The nanofibrous extracellular matrix mimicking nature of “Electroband” assisted in reconciling the injured niche by preventing anoikis, exerting neuroprotective effect as depicted with aligned growth of compressed nerve fibers. The rGO functionalization coupled with intraoperative electrical stimulation of 3 V @ 20 Hz for 10 min aided in propelling the injured nerve to denervated target, prompting fascicular growth of nerve fibers, targeting neuroplasticity. The nerve growth factor incorporation enhanced the bioactivity of scaffold, augmenting regeneration leading to exuberant growth and myelination of nascent nerve tracts. These results led to significant improvement in electrophysiological recordings with 30–32 mV CMAP value (80% recovery) in combinatorial therapy group as compared to 10–11 mV in negative controls and 13–15 mV in animals with individual therapy. We therefore, report 80% regain in muscular

strength within 8 weeks of implantation with combinatorial therapy as assessed with behavioural paw gripping and scratch tape assay. Thus, we successfully demonstrated the pre-clinical efficacy of “Electroband”, reducing the time and frequency of electrical stimulation currently in clinical practice.





Dhruba Dhar

Frugal design and development of a biomimetic tumor on-chip platform for precise drug screening

Dhruba Dhar

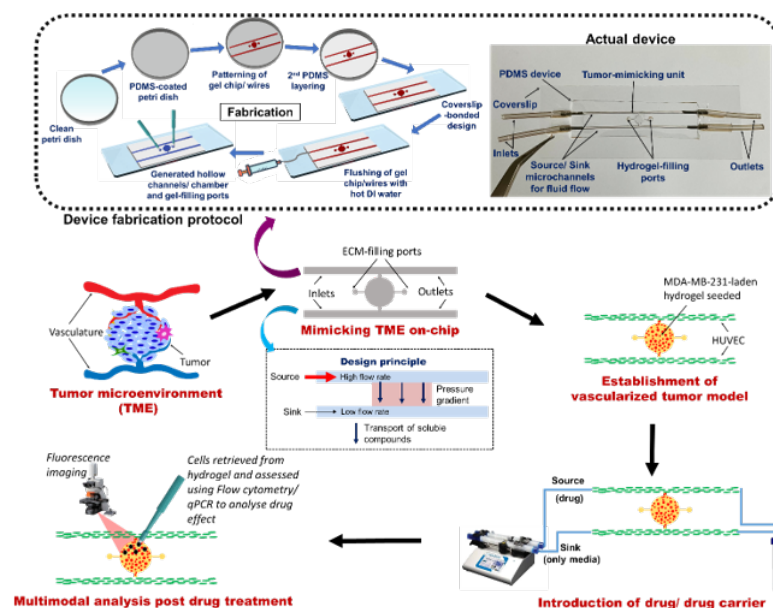
Indian Institute of Technology, Kharagpur

Guides:

Prof. Jyotirmoy Chatterjee, Prof. Soumen Das

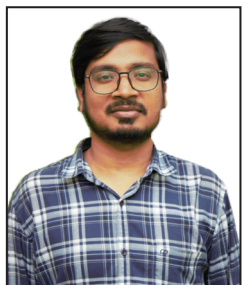
This study introduces the development of a breast tumor-on-chip (ToC) platform utilizing a frugal, lithography-free, and clean-room-free hydrogel molding technique. The developed platform effectively replicates essential 3D pathophysiological conditions of tumors, which are inadequately modeled by traditional 2D cell culture systems or animal models. Moreover, the fabricated device offers a low-cost and frugal alternative to existing on-chip platforms developed using conventional techniques, such as photolithography or 3D printing, thereby eliminating the need for sophisticated instrumentation, clean-room facilities, trained personnel, and expensive materials. Additionally, the proposed design provides a straightforward method for filling cancer cell-laden hydrogel (for mimicking the extracellular matrix), specifically within the tumor compartment. By gradually introducing hydrogel through the gel filling ports into the chamber using a simple micropipette, leakage into adjacent microchannels (which mimic the adjacent blood vessels) can be effectively prevented, thus offering a simple yet effective on-chip platform for resource-constrained settings. This approach offers a significant advantage over conventional on-chip platforms, which often require the fabrication of micropillars or channels with submicron dimensions ($\sim 2 \mu\text{m}$) between the tumor compartments and blood vessel-mimicking microchannels, typically necessitating the use of advanced techniques such as photolithography. Furthermore, to establish a functional breast tumor-on-chip model, MDA-MB-231 breast cancer cells were embedded in an extracellular matrix-mimicking hydrogel matrix and cultured in

the hydrogel chamber, while HUVECs were cultured in parallel microchannels to recreate the in vivo tumor pathophysiology. The platform was further used to assess the drug delivery potential of a model drug delivery system, providing a physiologically relevant and precise approach to drug screening. Ultimately, this work represents the first attempt to design and fabricate a cost-effective ToC platform using hydrogel molding for evaluating the anti-cancer efficacy of novel or repurposed drugs and drug delivery systems.



Other Contributors:

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Sayanta Goswami



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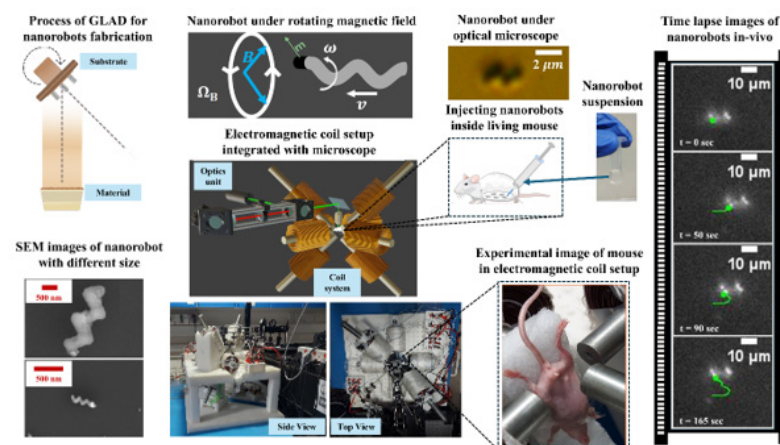
Development of NIR-enabled nanorobots for deep tissue imaging and real-time disease sensing in living animals

Ankur Jaiswar, Sayanta Goswami, Debayan Dasgupta
Indian Institute of Science, Bengaluru

Guide:
Prof. Ambarish Ghosh

The motivation for this work comes from Feynman's 1959 lecture, "There's Plenty of Room at the Bottom," where he described small mechanical systems entering the body to extract information. Nanorobots are tiny machines with strong medical potential, capable of performing tasks where conventional drugs face limitations. They offer possibilities for diagnostics, tissue repair, targeted drug delivery, and minimally invasive microsurgery, reaching deep tissues that are inaccessible to larger robots or human surgeons. Real-time visualization is essential for using nanorobots inside the body. While imaging methods like MRI, CT, PET, and SPECT exist, they are complex and have several limitations. Optical imaging provides high-resolution, cell-level visualization with minimal biological risk but remains challenging in deep tissue due to strong light scattering. To address this, we developed helical nanorobots ranging from a few hundred nanometres to several microns using biocompatible materials through Physical Vapor Deposition with Glancing Angle Deposition. Upconversion nanoparticles (UCNPs) with NIR excitation and emission were attached to enable deep-tissue visualization. These UCNPs nanorobots were successfully imaged through tissue-mimicking phantoms and real tissues at depths of a few millimetres. Using these capabilities, UCNPs nanorobots were employed to sense heterogeneous and crowded microenvironments in living animal. A magnetic manipulation system capable of applying larger forces was developed to overcome high drag, enabling nanorobot navigation in the biological system. Their surface can also be functionalized with chemical groups to enhance the motion in a charged and heterogeneous tissue-

like media. Biophysical properties of living tissues change within seconds, requiring rapid sensing methods. We used a frequency-modulation method to estimate the rheological properties of peritoneal fluid in a living mouse. Nanorobots were injected into the peritoneal cavity and visualized along with the magnetic manipulation, allowing rapid rheological measurements based on their dynamic response. This study demonstrates the capability of UCNPs nanorobots for rapid rheological measurements inside living animals, leveraging their optical and magnetic properties. Furthermore, the nanorobots' ability to swim through hard tissues, combined with different surface functionalization's, opens new opportunities for futuristic therapeutic applications, including cancer treatment, targeted drug delivery, and micro/nano surgery.





Jashaswinee Swain

Revolutionizing filtration: Plasma-treated graphene oxide coated mesh for enhanced durability and oil-water separation efficiency

Jashaswinee Swain

Birla Institute of Technology & Sciences Pilani,
Hyderabad Campus

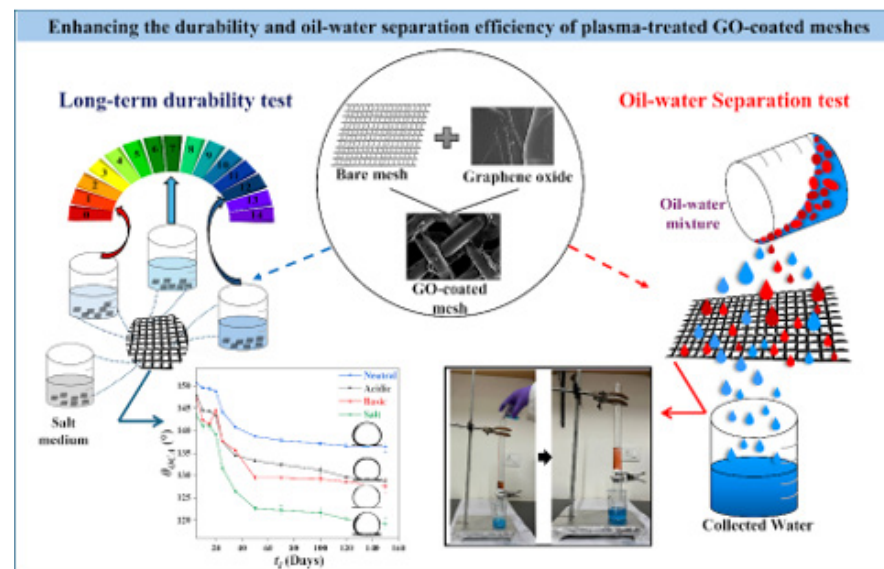
Guide:

Prof. Nandini Bhandaru

Superhydrophobic and superhydrophilic surfaces have recently attracted significant attention due to their exceptional properties. Graphene Oxide (GO) nanoparticles are particularly interesting for oil-water separation due to their hydrophilicity in air and underwater superoleophobicity, making them useful in coatings and water purification applications. The development of an efficient oil-water separation mechanism is one of the most persistent challenges for the growing industrial discharge of oil wastewater and oil spills. The primary objective of this work was to fabricate a GO-coated membrane for efficient oil-water separation.

Additionally, the study aimed to investigate the long-term durability of the fabricated membrane. Using a simple dipping coating technique facilitated by an intermediate two-step O₂ plasma treatment, a stainless-steel mesh was coated with GO, ensuring effective adhesion. The resulting membrane exhibits excellent efficiency and recyclability in separating oil-water mixtures under various conditions, including neutral, hot, acidic, and saline environments. It maintains an efficiency of over 99% for different oil-water separation mixtures. Even after 30 cycles, the separation efficiencies for all types of mixtures exceeded 94%. The selective permeation of water and prevention of oil passage through the mesh are attributed to the superhydrophilic and oleophobic properties of GO, respectively, with gravity serving as the driving force for separation. Furthermore, long-term durability studies were conducted by continuously immersing coated

meshes in various pH media and salt solutions. The underwater oil contact angle was measured at different immersion times over 150 days, demonstrating sustained oleophobic properties. This study not only highlights the practicality of GO-coated meshes for oil-water separation applications but also establishes a systematic approach for assessing their long-term performance in harsh conditions, thereby addressing crucial durability concerns for industrial applications.





Saikat Ghosh



Angshuman Das

Feedback-driven enzymatically coupled controlled self-assembly of small molecules for biomedical applications

Saikat Ghosh, Angshuman Das

Jawaharlal Nehru Centre for Advanced Scientific Research,
Bengaluru

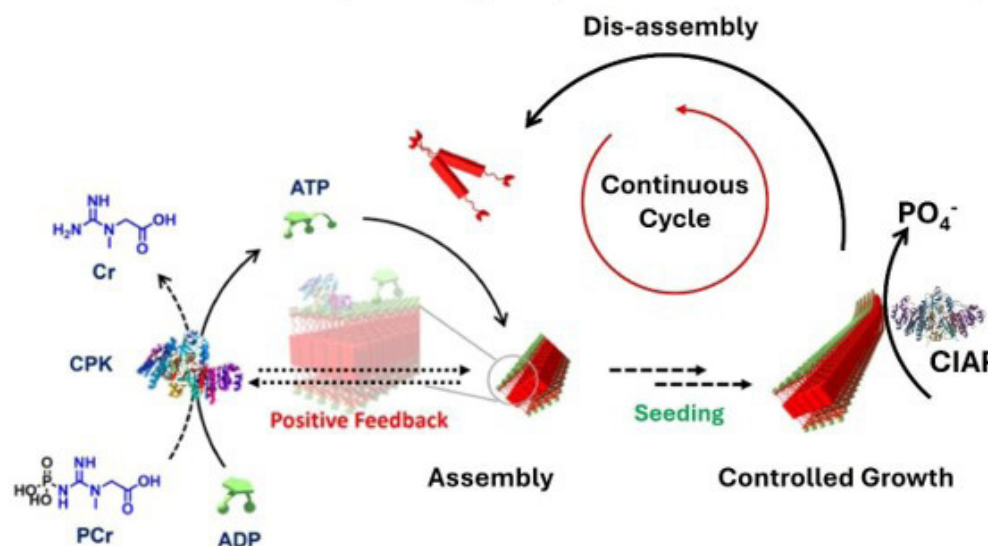
Guide:

Prof. Subi J. George

Nature regulates molecular self-assembly through enzymatic reactions and feedback mechanisms, enabling highly controlled processes such as cytoskeletal polymerisation. Translating such precision into synthetic systems remains challenging, particularly in achieving predictable control over the size and dispersity of supramolecular assemblies. In this work, we introduce a biomimetic strategy that couples an enzymatic reaction cycle with nucleotide-templated cooperative polymerization of small molecules. The enzyme generates a nucleating template that triggers assembly,

while the resulting supramolecular structures, in turn, enhance enzymatic activity through a positive-feedback loop. This mutually coupled mechanism represents the first demonstration of feedback-driven, enzymatically regulated supramolecular polymerization. Our approach offers a powerful route to synthesise controlled, one-dimensional supramolecular polymers using a template-driven method that significantly expands the design space for biomedical applications.

Feedback-driven Enzymatically Coupled Controlled Self-assembly





Abhishek Kumar

Smartphone-enabled miniaturized electrochemiluminescence platform for non-invasive detection of diabetes complication biomarkers

Abhishek Kumar

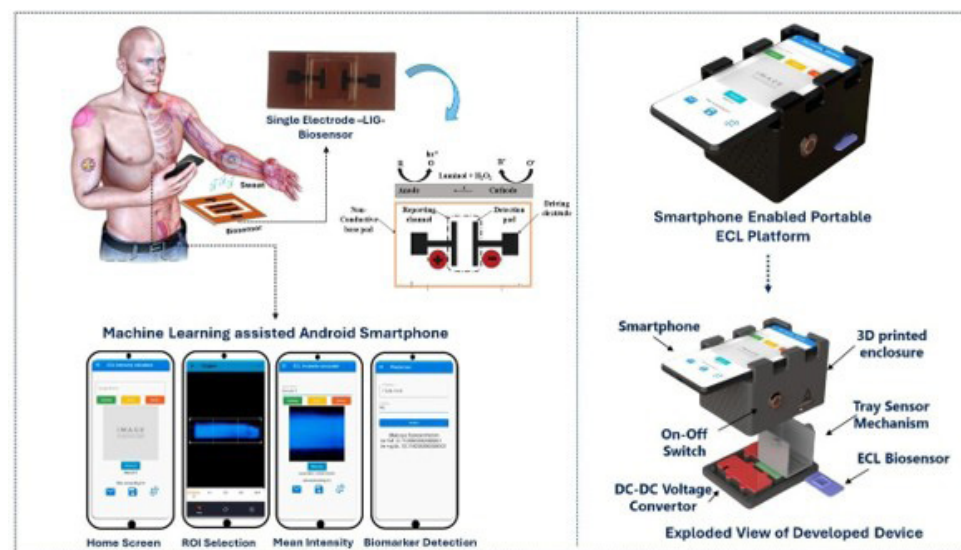
Birla Institute of Technology & Sciences Pilani,
Hyderabad Campus

Guide:

Prof. Sanket Goel

Point-of-care testing (POCT) diagnostic methods, such as glucometers, have improved diabetes management with rapid diagnostics at the patient site. However, most current POCT methods rely predominantly on finger-pricking methods to measure blood glucose levels, which causes discomfort to the patient due to invasiveness and poses the risk of bacterial infection. To address this challenge, we have developed a smartphone-integrated point-of-care system based on an electrochemiluminescence technique to monitor biomarkers of diabetes complications in sweat and urine samples, offering a painless and infection-free approach. The developed system comprises a 3D-printed outer shell with a designated area for smartphone placement, a DC-DC buck-boost converter, an on-off switch, and a USB connector. In addition, the developed platform utilizes a laser-induced graphene-fabricated biosensor, which was further modified with gold nanoparticles and immobilized with enzymes to achieve high accuracy and selectivity. The developed platform is integrated with an in-house developed Android mobile application (G.U.I.) that provides functionalities to process the captured signal, calculate biomarker concentrations based on the emitted signal intensity, and offer prompt decisions to the user regarding their metabolic health. The device operates with a minimal sample volume (50 μL) and demonstrates detection ranges of 10 μM to 10 mM, 10 μM to 2.5

mM, and 10 μM to 1 mM, a limit of detection of 27 μM , 20 μM , and 10.9 μM , respectively, for glucose, lactate, and uric acid. The developed system can detect biomarkers in less than 5 minutes with high accuracy and sensitivity. However, the standard testing turnaround time in the clinical laboratory is more than 8 hours. The entire cost of the developed system is Rs 600, excluding the cost of a smartphone, and a single test costs around Rs 10. The development of the smartphone-integrated ECL platform promises improved personalized healthcare management, remote monitoring, and early disease detection.





Ravi Kumar Yakala

Misalignment tolerant control of a bidirectional wireless power transfer system for electric vehicle charging

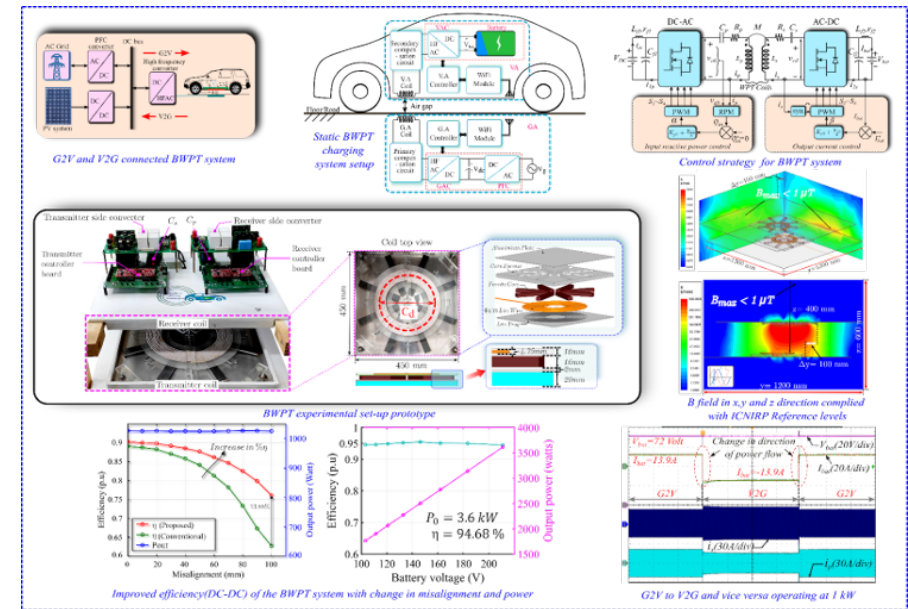
Ravi Kumar Yakala
Indian Institute of Technology, Delhi

Guide:
Prof. Sumit Kumar Pramanick

The rapid adoption of electric vehicles (EVs) is central to global efforts toward sustainable energy and reducing carbon emissions. This work presents a bidirectional wireless power transfer (BWPT) system for EV charging, designed to be highly efficient, reliable, and robust under misalignment and load variations. Wireless charging provides a seamless “park-and-charge” experience, enhancing convenience, accessibility, and compatibility across diverse charging standards. A key innovation of this research is enabling bidirectional power flow, allowing EVs to draw energy from the grid (G2V) and supply surplus energy back (V2G), supporting grid stability, reducing the need for stationary storage, and contributing to more intelligent energy management. The system design combines optimized inductive coil structures with advanced control strategies. Circular coils are optimized using 3D simulations to maximize energy transfer efficiency, reduce weight, copper usage, and losses, and ensure compliance with SAE J2954 standards and ICNIRP guidelines. A unified control approach guarantees stable bidirectional power flow, maintaining high efficiency even under challenging misalignment conditions. The proposed BWPT system demonstrates strong potential for practical EV charging applications, meeting real-world demands by combining optimized magnetic design, compliance with international safety standards, and robust control under misalignment and variable load conditions. This research presents a comprehensive framework for

designing and controlling BWPT systems, advancing wireless EV charging technology, and contributing to a sustainable, resilient, and energy-efficient future, with both societal and technological impact.

Other Contributors:
Dr. Debi Prasad Nayak





**Chingakham
Ngotomba Singh**

Mobile-based zero energy and sustainable energy cooling unit for perishable fruits and vegetables

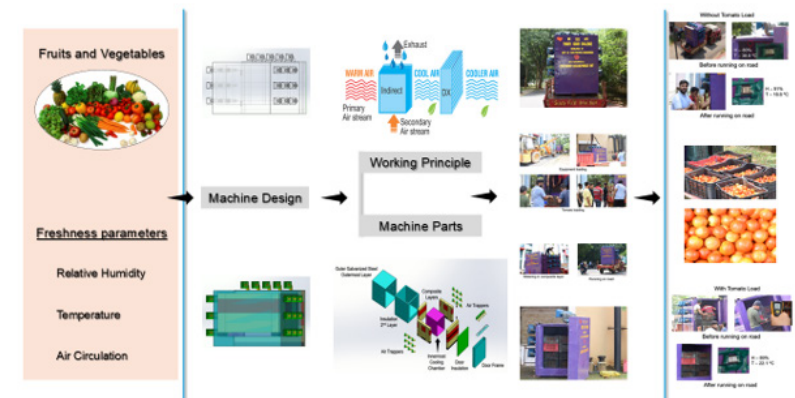
Chingakham Ngotomba Singh
National Institute of Technology, Rourkela

Guide:
Dr. Madhuresh Dwivedi

This study presents a novel Mobile-Based Zero Energy Cooling Unit designed to provide a sustainable, low-cost, and energy-independent solution for preserving perishable fruits and vegetables during transportation and short-term storage. The system integrates evaporative cooling and thermodynamic heat-transfer principles to maintain an optimal microclimate of 16 – 18 °C and 89 – 95% relative humidity, thereby significantly reducing post-harvest losses in regions with limited or unreliable electricity. The cooling chamber consists of a three-layer galvanized steel structure, incorporating a composite matrix of charcoal, fibers, and snowflake-like material that facilitates high water-holding capacity, enhanced evaporative efficiency, and prolonged cooling duration. The novelty lies in its hybrid operation zero energy during movement and solar-powered cooling when stationary. Wind-induced convective airflow during transit accelerates moisture evaporation, enabling fully passive cooling, while a solar-powered fan supports air circulation during stationary phases, forming a hybrid zero-energy and solar-assisted operational mode. The unit's Integrated Cooling Effect (ICE) arises from its improved air-flow dynamics, high moisture-retention composite materials, and insulated design, delivering superior performance compared to conventional evaporative coolers. Its modular, durable, and vehicle-mountable configuration enables application across tractors, pickups, and small transport vehicles, making it highly suitable for smallholder farmers, mobile vendors, and emergency relief operations. Unlike traditional refrigeration systems dependent on electricity or fossil fuels, this innovation dramatically lowers

carbon emissions and operational costs while improving supply-chain resilience. The dual-mode capability offers a scalable, eco-efficient, and versatile cooling alternative that supports market accessibility, reduces food waste, and enhances the economic stability of farming communities. Its frugal yet scientifically robust design positions it as a transformative solution for sustainable post-harvest management in resource-constrained environments.

Other Contributors:
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Somnath Das





Ganga Kishore S

Development of low glycemic index millet based rice analogue for sustainable food systems

Ganga Kishore S

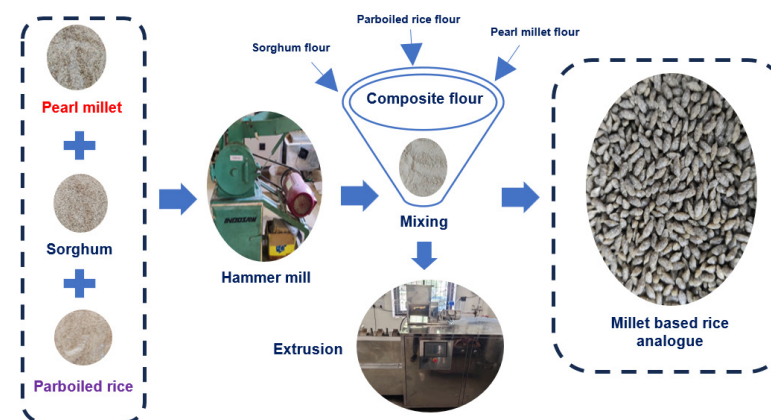
National Institute of Technology, Rourkela

Guide:

Dr. Madhuresh Dwivedi

The global prevalence of diabetes and iron deficiency anemia (IDA) continues to rise, posing major public health challenges, particularly in South Asian countries. India has more than 75 million individuals affected by diabetes, with projections expected to increase sharply in the upcoming decades. IDA remains the most widespread nutritional disorder globally, affecting 1.62 billion people. White rice, a staple food worldwide, lacks dietary fiber, micronutrients, and polyphenols due to milling, and its high glycemic index elevates postprandial glucose and insulin levels, increasing the risk of diabetes and IDA. As rice is deeply embedded in dietary habits, replacing it is impractical, creating a need for nutritionally superior alternatives that retain the sensory and functional qualities of rice. Addressing this gap, the present innovation focuses on the development of Millet based rice analogue (MBRA) formulated from pearl millet, sorghum, and parboiled rice using extrusion technology. This approach transforms nutrient-rich millets into rice-like granules that mimic the appearance, cooking behavior, and texture of conventional rice while enhancing nutritional value. Optimized extrusion conditions of 28% (w.b.) moisture content, 720 rpm screw speed, 420 rpm feeder speed, and 80°C die temperature yielded product attributes including 5.67% cooking loss, 942.82 s cooking time, 2.15% water solubility index, 7.09 g/g water absorption index, and a 6.81 water absorption ratio, with a desirability value of 0.86. The developed MBRA showed significant differences ($p < 0.05$) in proximate composition, physical characteristics, and textural properties compared to milled rice. It also exhibited lower crystallinity with

similar FTIR patterns and showed surface cracks under SEM. Notably, the MBRA displayed a low glycemic index (41.28) and an iron content of 0.153 mg/g, contributing to meeting daily iron requirements and lowering diabetes risk. However, further studies are required to improve the texture of the developed rice using pretreatments and natural hydrocolloids.





Rajdeep Singh Devra

Decentralized plastic recycling through filament-free 3D printing: Transforming waste into high-quality products and driving the circular economy

Rajdeep Singh Devra

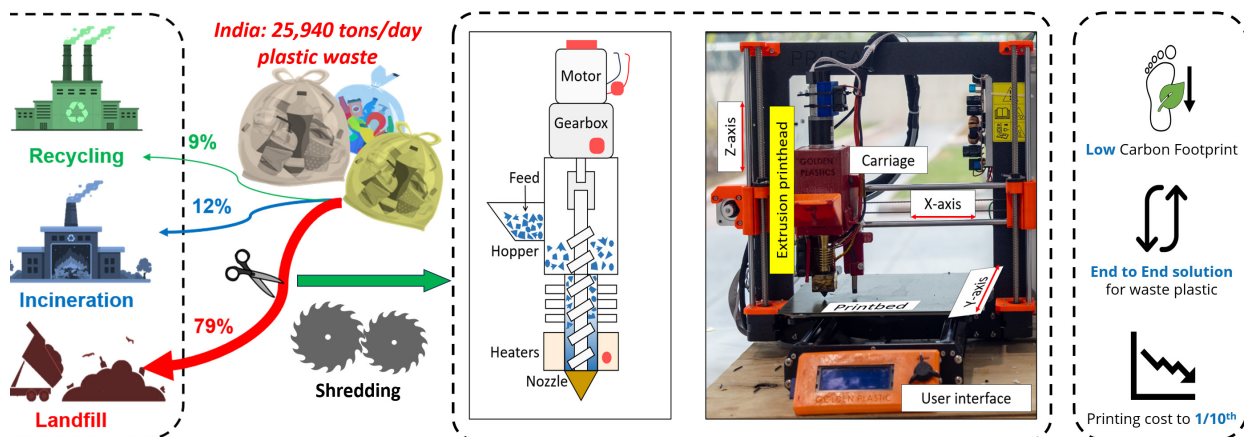
Indian Institute of Technology, Gandhinagar

Guides:

Dr. Amit Arora, Dr. Madhu Vadali

Plastic waste is one of the most persistent environmental challenges. India generates more than 25,000 tons of plastic waste daily, and over 80% of it remains unrecycled due to high processing costs, contamination, and economic limitations associated with centralized recycling. This highlights the need for decentralized, low-cost, and energy-efficient recycling systems that communities can easily adopt. To address this, we developed a novel filamentless granule-fed 3D printing system that utilizes plastic waste as its feedstock. Recycling is achieved through a combination of a shredder unit and our specially designed 3D printer. Waste plastic is cleaned, dried, and shredded into pieces measuring 2–3 mm. These pieces are fed into a motor-driven auger screw extruder that melts and deposits the material layer by layer to create useful objects. The system features a user-friendly interface that enables the printing of frugal products, including planters, organizers, utility parts, and décor items. Compared to centralized recycling, this approach eliminates the need for long-distance transport, complex sorting, and heavy machinery. It is significantly cheaper and suitable for small communities, schools, and workshops.

Unlike traditional 3D printers that rely on virgin plastic filament, costing approximately ₹1500/kg, our system utilizes shredded waste plastic or recycled granules, which are significantly less expensive at about ₹100/kg. This reduces printing cost by more than 90% and removes the energy required for filament manufacturing. Overall, this solution supports local recycling, reduces plastic pollution, and encourages community participation and responsible waste ownership. It provides a practical pathway toward a circular economy by converting waste into useful products and creating new opportunities for small-scale, sustainable manufacturing.





Manas Thakur

Polymer matrix sand composites for enhanced ballistic impact resistance

Manas Thakur

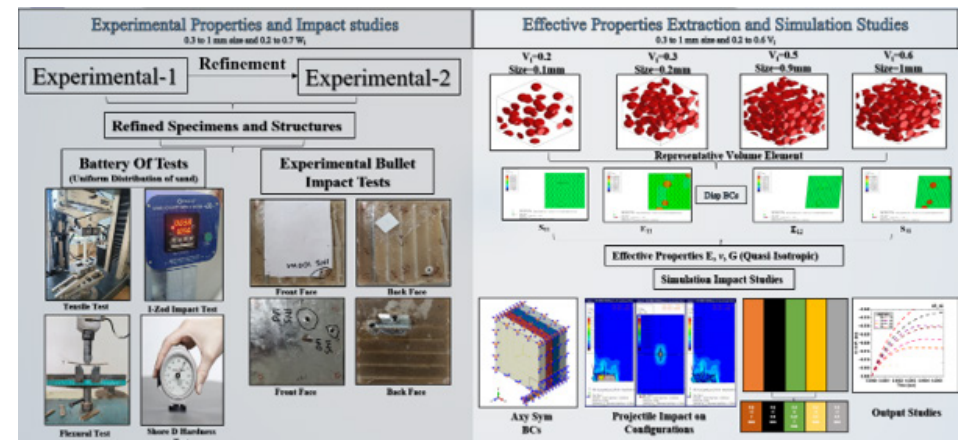
Indian Institute of Technology, Ropar

Guides:

Dr. Srikant Sekhar Padhee, Dr. Rajendra Kumar Munian

With the ever-increasing threat of ballistic impact, it is essential to provide a solution that is not only effective but also economical. A majority of studies contribute toward alternatives to monolithic structures by incorporating sandwiched cores, which are often prone to core crushing and delamination, limiting the multi-hit capabilities of the structure. In recent years, sand-based composites have emerged as a potentially cost-effective solution. In this ongoing effort, the current investigation aims to offer more robust protection against varied ballistic impacts and potential ballistic threats. This research investigates the enhancement of ballistic impact resistance in Polymer Matrix Sand Composites (PMSCs) through the inclusion of sand in a graded fashion, resulting in a tunable solution. The tailoring of various mechanical properties, such as modulus, impact strength, and hardness, enables different layers within a single structure, offering potential advantages as the projectile pierces through the thickness. The gradation creates a stepwise structure, with a prime base impact zone densely graded with inclusions that are brittle and hard enough to erode the projectile. Further gradation involves a less dense region providing tensile strength, which can reflect the tensile wave and reduce impact energy. In the study, composites were fabricated and subjected to a battery of tests, including tensile testing, Izod impact testing, and hardness testing, to comprehensively evaluate their mechanical and physical properties. Also, homogenized properties were extracted so as to critically observe

the PMSCs' behaviour upon variations in constituent elements, which are then utilised for developing different layers in a single structure. Simulation studies of varied gradation configurations are conducted, and the potential advantages of layering sequences are studied. Preliminary projectile impact studies provide initial insights into gradation performance. The experimental and simulation results reveal that varying the size and volume fraction of sand content markedly influences the mechanical properties and ballistic resistance of the composites, underscoring the potential of PMSCs as cost-effective and environmentally sustainable Composites for advanced ballistic protection applications.





Harsh Mishra

Vertical integration technology for scalable quantum computing system

Harsh Mishra

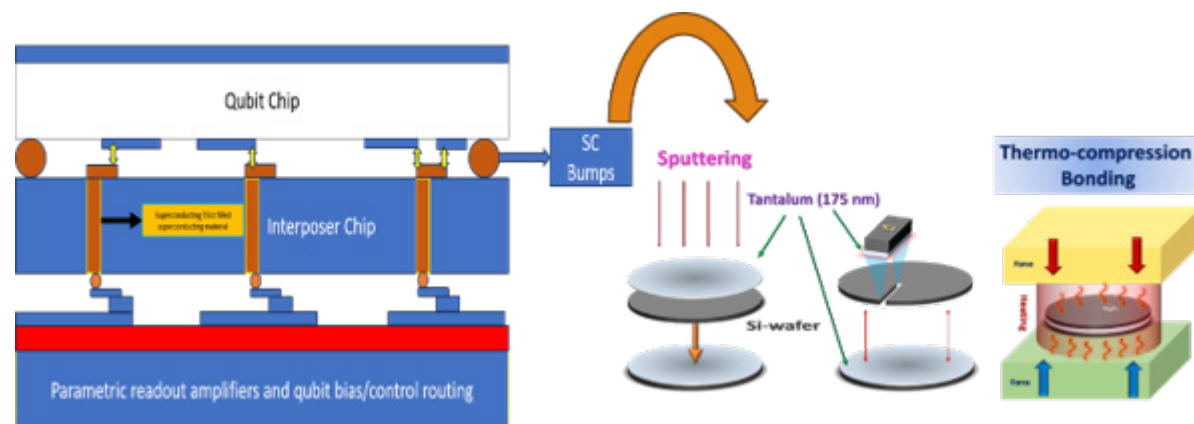
Indian Institute of Technology, Hyderabad

Guide:

Prof. Shiv Govind Singh

To build a practical quantum computer, one must produce and incorporate approximately 1 million qubits. The greatest hurdle lies in finding a technology that allows for precise control over two-level quantum systems while enabling mass production. While achieving a high quantity of qubits is crucial, the most critical factor is qubit quality, which is measured by the number of gate operations a qubit can perform during its coherence time (also known as its lifetime). Unfortunately, qubits are susceptible to environmental disturbances, leading to the degradation of their quantum states over time. To sustain the computation process, a minimum threshold for quantum error correction is required, which is approximately 1000 times the qubit time. While researchers

have managed to develop high-quality qubits, they have encountered limitations in terms of the number of qubits. The methodology to address this challenge is through scalability using 2D technology at the expense of larger chip sizes, increased complexity, and subsequently, a potential compromise in qubit quality. Therefore, the primary objective is to develop a method for integrating large superconducting qubits without compromising their quality, thus offering a promising pathway toward the realization of a useful quantum computer.



Other Contributors:
Sathish Bonam



Akanksha Sharma

Photo-catalytic substrate for producing green hydrogen and process thereof

Akanksha Sharma

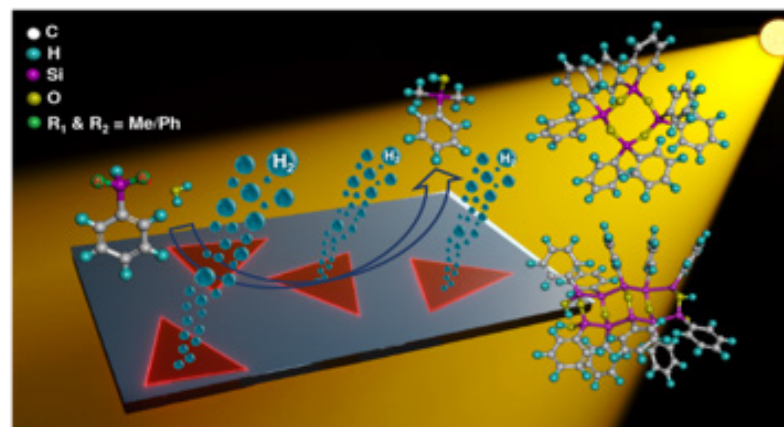
Indian Institute of Technology, Gandhinagar

Guide:

Dr. Saumyakanti Khatua

Access to clean and affordable energy remains a persistent challenge across India's remote and rural regions, where limited energy availability continues to restrict household activities, economic growth, and quality of life. Although solar photovoltaics are widely promoted as a renewable solution, their high installation cost, limited recyclability, and dependence on hazardous battery storage systems hinder their large-scale adoption. To build a more inclusive and sustainable energy framework aligned with India's vision of "Sabka Saath, Sabka Vikas," there is a critical need for decentralized, low-cost, and environmentally safe technologies. Inspired by natural photosynthesis, we present an innovative, quantum technology-driven, nanoparticle-assisted photocatalytic strategy to generate pure, ready-to-use green hydrogen directly under natural sunlight without any external bias or electricity input. Here, we establish nanoparticle-assisted photocatalytic silicon hydride (silane) hydrolysis as a highly efficient route for on-demand hydrogen production from water and organic waste materials. This reaction proceeds spontaneously under sunlight, producing not only hydrogen but also silanol and siloxanes as valuable industrial by-products, thereby enhancing the overall economic viability of the process. A key advantage of this platform is its high scalability. The system demonstrates a hydrogen generation capacity of up to 200 litres per square metre of catalyst area and can be expanded seamlessly by increasing the catalyst active surface area. This inherent scalability enables deployment ranging from individual households to entire community-level energy modules.

The ability to produce hydrogen safely and in situ eliminates the need for high-pressure storage, complex transportation, or grid connectivity, making it particularly suited for India's rural and isolated regions. Overall, this technology provides a transformative, affordable, and scalable pathway toward decentralized green energy production.



Other Contributors:

Dr. Gayatri Joshi,
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Saquib Sarosh

High-rate packed bed biofilm reactor for robust and efficient nitrification in recirculating aquaculture systems

Saquib Sarosh

Indian Institute of Science, Bengaluru

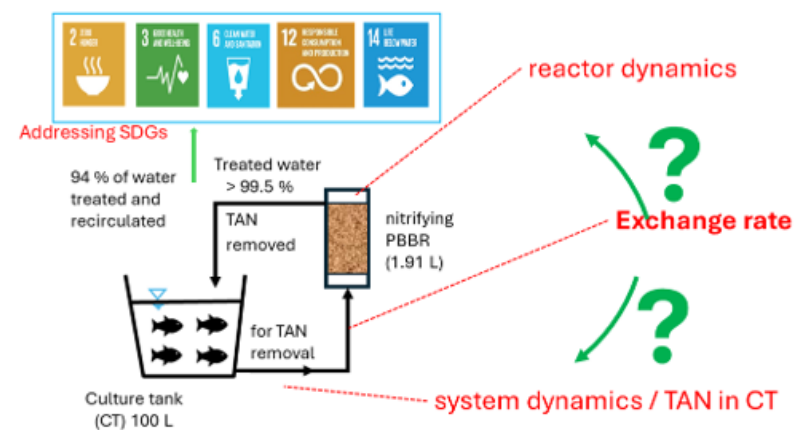
Guide:

Dr. Sreenivasan Ramaswami

India is currently undergoing a Blue Revolution, driven by the Government's Pradhan Mantri Matsya Sampada Yojana (PMMSY), which aims to boost fish production and exports while doubling farmers' incomes and generating employment. A key component of PMMSY is the adoption of Recirculating Aquaculture Systems (RAS), a sustainable, intensive-farming technology that conserves water, reduces land use, and enhances productivity and product quality. Traditional aquaculture practices use low stocking densities—e.g., catfish ponds yielding $\sim 5,600 \text{ kg ha}^{-1} \text{ yr}^{-1}$ (0.56 kg m^{-3} of fish), prompting a shift toward more intensive methods. This transition is constrained by water scarcity, nitrogen pollution, stringent environmental regulations, and rising land costs. RAS addresses these challenges by recirculating over 90 % of water daily, thus curtailing fresh-water withdrawal and waste discharge. Effective RAS operation hinges on a robust water-treatment chain: mechanical filters remove solids, while biofilters perform nitrification to eliminate ammonia. Maintaining total ammonia nitrogen (TAN) below 2 mg L^{-1} is critical for cultivating high-value species at high stocking densities, enhancing profitability. Intensive RAS generate considerable suspended solids, for which commercial drum-filter technologies are well-established. However, ammonia removal remains the bottleneck. Nitrification is best accomplished in biofilm or attached-growth reactors, with packed-bed biofilm reactors (PBBR) emerging as the most promising configuration after two decades of R&D, outpacing alternatives such as trickling filters and moving-bed reactors. Previous PBBR studies reported nitrification rates $< 100 \text{ g N m}^{-3} \text{ d}^{-1}$.

In contrast, this study demonstrates the feasibility of achieving robust, stable, and exceptionally high nitrification rates. Using a lab-scale simulated RAS, a nitrification rate of $800 \text{ g N m}^{-3} \text{ d}^{-1}$ was attained while keeping TAN under 1.1 mg L^{-1} . This breakthrough opens avenues for higher system intensities, cultivation of premium species, and improved economic viability of RAS in India.

A key operational parameter for system optimization is the water-volume exchange rate. Our experiments showed TAN removal efficiencies exceeding 99.5 % at an ammonium loading rate of $1,900 \text{ g N m}^{-3} \text{ d}^{-1}$, with extremely low effluent concentrations ($\text{NH}_4^+ < 1 \text{ mg L}^{-1}$, $\text{NO}_2^- < 0.5 \text{ mg L}^{-1}$) at an optimal water exchange rate of $14.4 \text{ vol day}^{-1}$. Despite its significance, research on the impact of water-exchange rates on nitrification remains scarce, highlighting a gap this work addresses.





Sachin Shinde

Emerging paradigm shifts in floriculture industry: A way forward for a sustainable active packaging solution for prolonging the freshness and shelf life of fresh produce

Sachin Shinde

Central Food Technological Research Institute (CSIR-CFTRI),
Mysuru

Guides:

Prof. Rajeshwar Shantayya Matche,
Dr. Sachin Rama Chaudhari

The globalized cut flower market valued was at US\$ 36400.65 million in 2022 and is expected to reach US\$ 45500.50 million by the end of 2027, growing at a CAGR of 4.65% during 2022-2027 (Source: Global Cut Flowers Market Research Report 2022 by GII). The increase in the production of cut flowers in the world especially in a country like India & the Indian floriculture market worth INR 267.9 billion in 2022 and is expected to reach a value of INR 780.27 billion by 2028, expected to grow at a CAGR of around 19.5% in the forecast period of 2023-2028 (Source: Expert research market report). The global floriculture export market has emerged as a major player in the cut flower industry. Fresh-cut flowers are perishable and have a limited shelf life & vulnerable to various postharvest losses. Spoilage that can significantly reduce their shelf-life & short postharvest shelf life is one of the most serious issues in cut flowers. Market losses in the cut flower owing to inefficient post-harvest facilities such as poor storage facilities, lack of cold storage & packhouse facilities, and inadequate transport facilities. Several technologies, such as ethylene blockage technology, pulsing solution, and, are commercially used to extend the shelf life of cut flowers. Some of these conventional technologies are expensive & not convenient, and handy to use for storing flowers. The major concern of cut flowers is during transportation & export of the cut flowers. It is very important to maintain the quality and freshness of the cut stage of flowers during post-harvest operations, from harvesting in the field to the flower reaching the customer. In view of this situation, the present project analyses the role of shelf life, freshness, quality, and post-harvest losses in cut flowers. To this end, the scope of

technology was to developed a cost-effective, chemical-free, natural bioactive extract-based freshness keeper paper specially for cut rose flowers, particularly for transportation, cold storage, logistics, and export. During the export and transportation time cut rose flower shelf life will be in the range of 10-12 days at a storage condition of 2-4 °C but with the applicability of developed freshness keeper paper extend the shelf life by additionally 8-10 days which means shelf life can be achieved now 18-20 days. Thus, the proposed freshness keeper paper directly impacts reducing the postharvest losses of cut flowers and enhances the shelf life and quality of cut flowers. The increased shelf life can play an important role in transportation and in the cold supply chain indirectly will export. Therefore, the scope of developed freshness keeper paper can be useful to Indian florists as well as other countries and more specifically to that import, and export cut flowers florists, and can play a significant role in transportation, storage, retailers, wholesalers, resellers, malls, and roadside vendors, etc.





Rittika Ray

Low-cost portable biosensor for non-invasive early detection of potato dry rot diseases in their asymptomatic stages

Rittika Ray

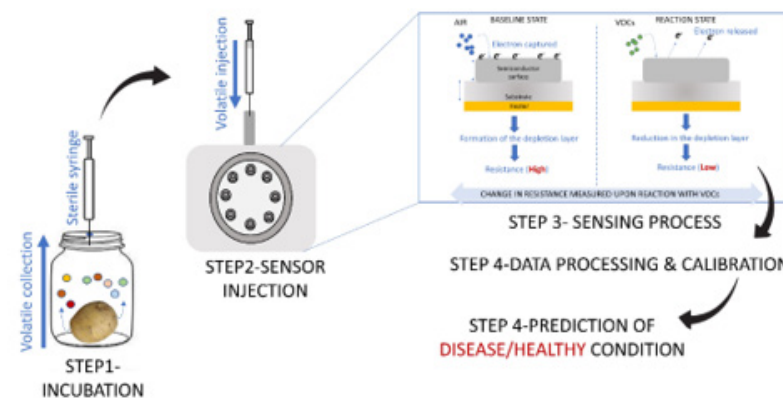
Indian Institute of Technology, Roorkee

Guide:

Prof. Debabrata Sircar

Potato (*Solanum tuberosum* L.) is a staple crop globally, with India being the second-largest producer. Potatoes are typically harvested in India between February and March and stored for up to six months to meet market demand. However, postharvest storage is highly susceptible to diseases like soft rot and dry rot, accounting for a significant 20-30% annual loss in potato production. It is important that potatoes are of high quality for both local consumption and export markets, and farmers typically sort and grade diseased potatoes manually before storage. Manual methods, however, cannot distinguish healthy tubers from infected tubers due to the absence of visible symptoms in early-stage infections. Our team has designed and fabricated a low-cost electronic nose (e-nose) sensor using metal oxide sensors capable of detecting dry rot in potatoes at the earliest stage of infection before symptoms appear. The e-nose distinguishes between healthy and dry-rot infected potato tubers based on the volatiles they emit. Dry rot is a severe postharvest disease that affects potatoes, but external symptoms begin to appear after the tubers have been cut open, typically 4-5 days after infection. Asymptomatic detection is important for timely disease management. In the e-nose sensor developed by our team, dry rot specific VOCs react with metal-oxide sensor array to produce electrical signals, which are analyzed by pattern recognition through principal component analysis (PCA) and partial least square discriminant analysis (PLSDA). Infections can be detected by this e-nose sensor within 1-2 days after exposure, long before visible symptoms appear. It provides a fast, nondestructive, and cost-effective way to detect dry rot in

potato storage, ensuring the health of stored tubers. Nanomaterial-based transducers that are capable of detecting biomarker volatiles specifically are currently being developed to increase the TRL of the technology. To generalize the biomarker, efforts are being made to analyze VOCs from a large number of potato varieties, to provide a large dataset of VOCs. This research was supported by a Core Research Grant (CRG/2020/003517 to D. Sircar) from the Science and Engineering Research Board (SERB), India. This is now known as the Anusandhan National Research Foundation (ANRF). Rittika Ray thanks SERB and MHRD, IIT Roorkee for funding her doctoral studies.





Priyanka Garg

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B-SMART: Bacteria Sensing through Mobile Aptamer Recognition Technology

Priyanka Garg

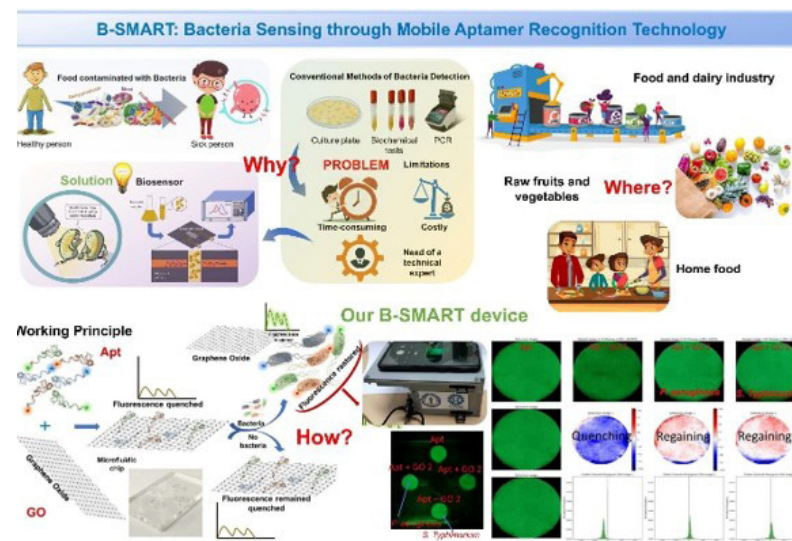
BRIC-NABI (National Agri-Food Biotechnology Institute),
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Guide:

Dr. Nitin Kumar Singhal

Foodborne pathogens have been causing detrimental harm to the global economy and human safety by contaminating processed foods. The reason for this intense situation lies in the huge gap between the detection of bacteria and the further treatment of processed foods. To solve this problem, we have developed a biosensor device and named it 'B-SMART', which is Bacteria Sensing through Mobile Aptamer Recognition Technology. This device employs aptamer and graphene oxide as the sensing material, whose interaction in the presence of bacteria resulted in a fluorescence change via Fluorescence Resonance Energy Transfer. This change in fluorescence can be recorded using a smartphone, and by using an AI algorithm and calculations, we can detect bacteria qualitatively and quantitatively within 45 minutes. In this invention, three aptamers labeled with fluorescent dye FAM against *S. typhimurium*, *E. coli*, and *P. aeruginosa* were used to develop a multiplexed detection assay. The electronically π -rich structure due to sp^2 hybridization of GO makes it a strong fluorescence quencher as a result of electron transfer from excited donors to the π orbital of carbon atoms. Thus, in the absence of target bacteria, aptamer stacks on GO sheets, thereby quenching the fluorescence of the fluorophores. When the target bacteria were added, the aptamers, due to their high binding affinities towards their respective target bacteria, would get separated and bind with the bacteria, thus regaining the fluorescence. To make a point-of-care detection device, microfluidics chips are used to provide an easy and cost-effective biosensing platform. A PMMA microfluidics chip with four wells for

probes and one sample well was developed for multiplexed detection of bacteria, where all three aptamers were labeled with FAM fluorophore. This provides the opportunity to develop a fast, cost-effective, efficient, and multiplexed detection device.





Sonali Naik

Breathe easy-the future of airway splints

Sonali Naik

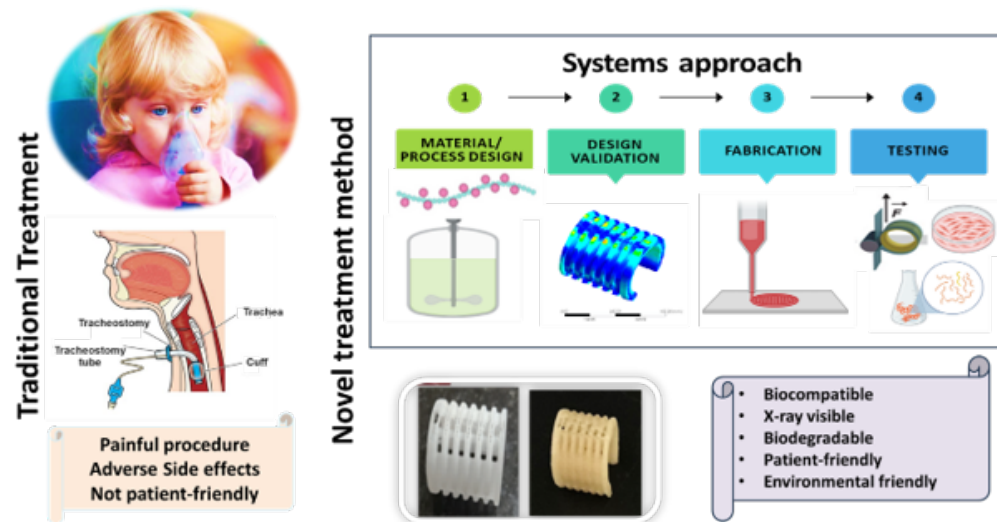
National Chemical Laboratory (CSIR-NCL), Pune

Guide:

Dr. S. Kiran

The trachea plays a critical role in respiration and airway protection but is susceptible to damage from pathological conditions such as stenosis, fistula, obstruction, and malacia. While existing treatment options are useful, they often have limitations, driving the need for innovative alternatives. This study introduces a novel approach using 3D printing technology to create hybrid degradable tracheal splints made of functionalized polycaprolactone (PCL). We synthesized and characterized various compositions of pectin-grafted PCL, lysine-modified PCL, and iodinated PCL to assess their physicochemical properties and test their suitability for 3D printing. The resulting materials demonstrated the potential for use as tracheal splints. Using CAD software, we created two distinct designs, which were then fabricated according to those specifications. Micro-computed tomography (micro-CT) imaging revealed splint porosities ranging from 60% to 90%, highlighting their intricate internal microarchitecture. Design verification was conducted through numerical simulations, based on finite element modeling (FEM), to evaluate mechanical properties and computational fluid dynamics (CFD) for assessing the airflow dynamics of the fabricated tracheal splints. Degradation studies indicated that the 3D-printed scaffolds exhibited >30% degradation over 35 days. In vitro, biocompatibility assessments confirmed

the scaffold's compatibility with biological systems. The iodinated PCL tracheal splints were found to be X-ray visible. These findings demonstrate the potential of functionalized PCL-based tracheal splints as a promising solution to overcome limitations in current treatments. This research paves the way for advanced biomaterials that could revolutionize patient care by offering more effective solutions for managing tracheal disorders.





Neha Yadav

PRuCSor: A portable chemiresistive reader with sp2-chip for point-of-care diagnosis of antibiotic resistance to combat AMR

Neha Yadav

Indian Institute of Technology, Kanpur

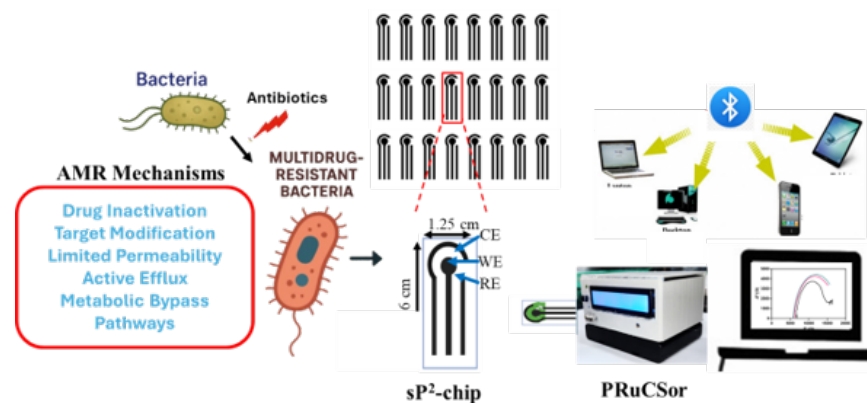
Guide:

Prof. Santosh Kumar Misra

Antimicrobial resistance is a growing global public health problem, primarily due to overuse, sub-optimal use and/or inappropriate use of antibiotics in human and veterinary medicine. Multidrug-resistant (MDR) bacteria, among which the ESKAPE pathogens are particularly critical, use a variety of resistance mechanisms, including reduced drug uptake, modification of target sites of antibiotics, and activation of efflux systems by multidrug transporters. The standard antibiotic susceptibility testing (AST) methods are resource-intensive, requiring substantial laboratory infrastructure, and are time-consuming and labor-intensive. There is an urgent need for rapid, sensitive, and decentralized diagnostic platforms supporting effective AMR management and timely therapeutic interventions.

To meet this challenge, we propose the design of a handheld Portable Readout Unit for Chemiresistive Sensor (PRuCSor) integrated with an inexpensive paper-based biosensing platform, the screen-printed sensor chip (sp2-chip). The system will detect impedance changes in antibiotic-resistant bacteria (ARB) after the application of single or multiple antibiotics under various environmental conditions, thus allowing for a quick determination of AMR profiles. The sp2-chip will monitor electrochemical changes related to resistance mechanisms in whole bacterial cells with minimal sample preparation. A small clinical sample can be applied to the chip, briefly incubated, and analyzed using PRuCSor, displaying the results both on an onboard LCD display and transmitting data to a smartphone through Bluetooth for point-of-use operation.

The setup aims to optimize cost, portability, and efficiency, reducing measurement times to below five minutes compared to standard AST procedures requiring 18-24 hours. By integrating electrochemical impedance measurements with advanced data-processing techniques, the system will provide an accurate identification of resistance levels against antibiotics like ampicillin and kanamycin, among many others that have been developed as novel redox-active agents. This fast, precise diagnostic capability can give way to long-term monitoring of AMR and thereby provide for enhanced antibiotic stewardship.



Other Contributors:
Animesh Kumar Soni



**Srividhyasakthi
Vijayakumar**

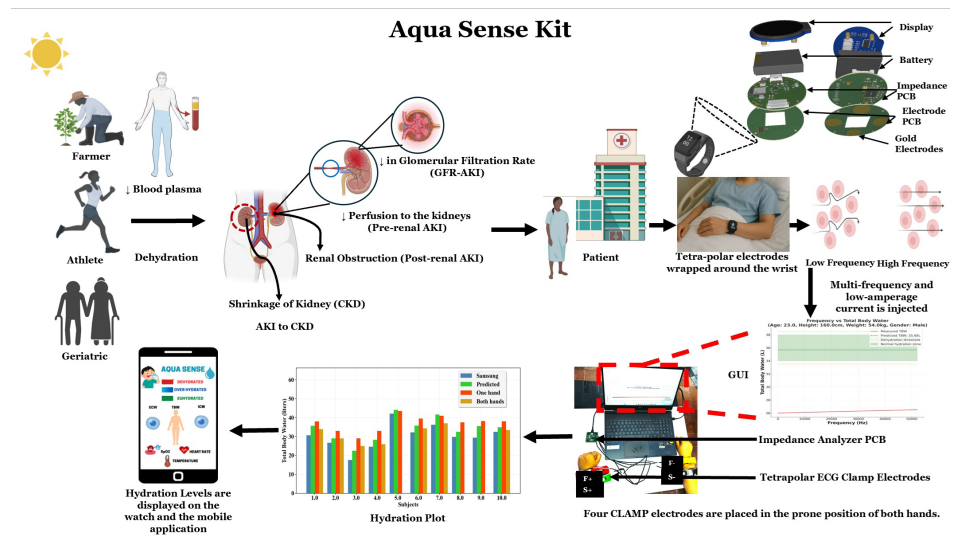
Aqua sense kit: IoT-enabled non-invasive human hydration monitor

Srividhyasakthi Vijayakumar
Indian Institute of Science, Bengaluru

Guides:
Dr. Hardik Jeetendra Pandya,
Dr. Swaminathan Sundararaman

The human body is composed of approximately 60% water. According to the survey on the Top 10 causes of death by the World Health Organization (WHO), kidney diseases have risen to the ninth leading cause of death. A recent Lancet Regional Health – Southeast Asia study reported that about 5.1 % of 3,350 agricultural workers in Tamil Nadu had Chronic Kidney Disease (CKD), linking prolonged heat exposure and dehydration as major causes. Current hydration assessments rely on invasive blood analysis or secondary, costly measures, such as isotope dilution (which takes 3-4 hours) and DEXA, which requires radioactive technologies. Aqua Sense Kit is a wearable, non-invasive hydration monitor based on Bioimpedance Spectroscopy (BIS), measuring Intra-Cellular Water (ICW), Extra-Cellular Water (ECW), and Total Body Water (TBW) in real-time. The Aqua Sense kit delivers a low-amperage, multifrequency current according to the IEC60601-1 standard via a tetrapolar wrist electrode configuration and measures impedance. The hydration indices of the Aqua Sense Kit were compared with those of the Samsung Galaxy Watch 4 and the Deurenberg prediction formula. Statistical analysis revealed a high correlation ($r = 0.94$) between the Aqua Sense Kit, Samsung Galaxy Watch 4, and the Deurenberg prediction formula. The two-hand measurement setup of the Aqua Sense Kit had the lowest mean absolute difference (MAD%) of 5.26% compared to the Deurenberg prediction formula. In addition, error analysis revealed that the device was

more robust than the shallow skin hydration alterations induced by moisturizer use, with error percentages of the Aqua Sense Kit significantly lower compared to those of the Samsung Galaxy Watch 4 readings. The initial findings verify the accuracy of the device, increased sensitivity to hydration alterations, and consistency across changing conditions, showing its applicability to continuous field and clinical monitoring. The technology enables continuous monitoring and provides early warnings.





Soumyajit Sarkar

Modular multimodal speckle imaging platform for non-invasive cerebral blood flow studies in small animals: innovative device for advancing pre-clinical research

Soumyajit Sarkar

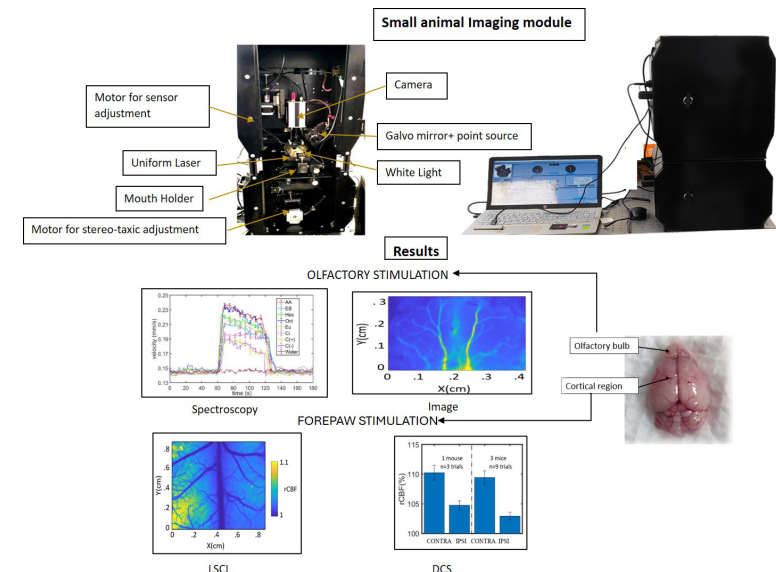
Indian Institute of Technology, Bombay

Guides:

Prof. Hari M. Varma, Prof. Nixon M. Abraham

We present a modular, multimodal small-animal neurovascular imaging platform designed for seamless, non-invasive monitoring of cerebral and systemic blood flow dynamics using speckle based techniques. The system integrates Laser Speckle Contrast Imaging (LSCI), Multi-Speckle Diffuse Correlation Tomography (M-DCT), and Diffuse Reflectance-based structural mapping into a single, plug-and-play experimental unit. Built on a novel topographic speckle-based approach, the device enables deep-tissue functional studies without the need for skull removal, significantly enhancing animal safety, reducing surgical burden, and improving the feasibility of longitudinal studies. Funded by WRCB and BIRAC-PACE, the platform replaces fragmented, ad-hoc laboratory setups with a fully engineered, alignment-free, and easily reconfigurable imaging environment, allowing researchers to switch modalities, wavelengths, and imaging depths within seconds. Modular optics, detachable illumination modules, and independent sensor blocks ensure that any damaged component can be replaced or repaired without affecting the overall system, ensuring high reliability and minimal downtime. Validated through olfactory bulb and somatosensory functional activation experiments, the system demonstrated robust sensitivity to fast neurovascular changes, supporting both high-resolution surface imaging and deeper hemodynamic mapping through intact scalp and skull. Flexibility in the field of view and working distance enables extension to whole-body small-animal studies, paving the way for cardiovascular, peripheral vascular, tumor perfusion, drug discovery research, and systemic inflammation monitoring.

Designed with frugality and scalability in mind, the platform substantially reduces cost by using shared optical paths, reconfigurable modules, and industrial-grade image sensors. Its architecture is inherently aligned with future translation—positioning the system as a precursor to portable and wearable human neurovascular monitoring devices. Overall, this innovation provides advanced small animal optical imaging by delivering more capability, deeper access, and safer experimentation—using fewer resources, simpler workflows, and a highly repairable modular design.



Other Contributors:

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Divya Pareek

Novel polymeric nanomedicine for potential treatment of inflammatory diseases

Divya Pareek

Indian Institute of Technology (BHU), Varanasi

Guide:

Prof. Pradip Paik

Acute inflammatory diseases require suitable medicine over the existing therapeutics. To overcome this issue, in this invention, polymeric nanomedicine for the treatment of inflammatory disorders has been developed. Nanomedicine (GlyNPs-Nanomed) of size ~150-200 nm, based on glycine and acryloyl chloride have been developed and proved it is an excellent anti-inflammatory component. To reduce the inflammation no further conventional commercially available drugs are required. A network pharmacology-based computational study has been executed to find out the genes and proteins responsible for the major inflammatory disease, for example, Rheumatoid Arthritis (RA). An in silico docking study was used to find out the targeted efficiency of the GlyNPs-Nanomed considering ten inflammation-specific markers such as IL-6, IL-1 β , TNF- α , TLR-4, STAT-1, MAPK-8, MAPK-14, iNOS, NF-K β and COX-2. The results revealed that the GlyNPs-Nanomed is an excellent anti-inflammatory agent similar to existing commercially available drugs such as Aspirin. In vitro inflammation activity of these GlyNPs-Nanomed has been checked by developing an inflammation condition by LPS in Raw 264.7 macrophages. Then the in vitro inflammation has been treated by GlyNPs-Nanomed. The treatment efficiency has been checked on specified immune markers (NO level, NF-K β , INF- γ , IL-6, IL-10, and TNF- α) and found that the GlyNPs-Nanomed is an excellent component in reducing the inflammation. The in vivo therapeutic response of GlyNPs-Nanomed, on pristane induced Rheumatoid arthritis (RA) model has been evaluated by measuring the cytokine and interferon levels responsible for the inflammation. The anti-inflammatory

efficiency of GlyNPs-Nanomed without using any additional drugs is found excellent. The novel GlyNPs-Nanomed is paramount for the potential treatment of inflammatory diseases within 7-15 days.



Invention highlight/ Deliverable of the invention: Gly NPs nanomedicined based on polymer nanoparticles for the treatment of inflammatory diseases without using any additional drugs.

Other Contributors:

Sukanya Patra,
Kirti Wasnik,
Prem Shankar Gupta,
Gurmeet Singh



Jasirali PK

Paper interfaced LSG device for noninvasive detection of bilirubin from urine sample

Jasirali PK

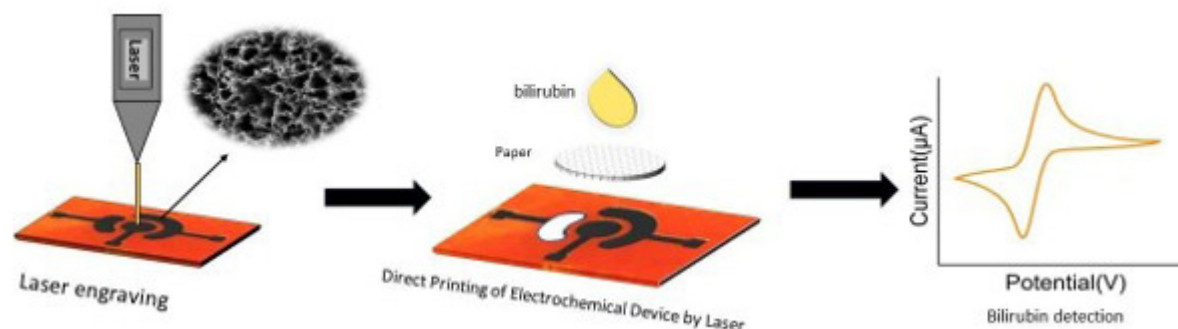
National Institute of Pharmaceutical Education and Research, Guwahati

Guide:

Dr. Saurabh Kumar

Laser Scribed Graphene (LSG) technique offers mask-free, binder-free patterning of porous, three-dimensional interconnected graphene, ideal for biomedical device development. Laser power during LSG fabrication directly affects material quality and properties. In this study, spectroscopic, surface morphology, and BET analyses were performed to evaluate the characteristics of LSG fabricated on a polyimide sheet at various power levels. To maintain structural integrity and minimize passivation steps, a simple paper disc is interfaced with the LSG electrodes for electrochemical kinetics and sensing studies. The paper interface LSG (P-LSG) electrodes demonstrated significant electrocatalytic activity for bilirubin, assessed by differential pulse voltammetry. Notably, the P-LSG electrode exhibited bilirubin detection across a concentration range of 1 μM to 750 μM , with two linear response ranges: one from 1 to 25 μM , featuring a sensitivity of 0.460 $\mu\text{A } \mu\text{M}^{-1}\text{cm}^{-2}$ and a detection limit of 1.18 μM ; and another from 25 to 750 μM , with a sensitivity of 0.168 $\mu\text{A } \mu\text{M}^{-1}\text{cm}^{-2}$ and a detection limit of 3.25 μM . Additionally, the device maintained high stability over 60 days without compromising sensitivity or selectivity. The P-LSG electrode significantly reduces fluid requirements to

20 μL . This miniaturized paper interface platform shows strong potential for analyte detection, especially for small samples such as sweat, tears, and pediatric specimens. LSG-based electrochemical biosensor developed in this study presents an effective platform for the non-invasive detection of bilirubin from urine. This sensor offers advantages, including portability, miniaturized design, and the elimination of complex modifications such as enzyme or nanomaterial functionalization on the electrode surface. With high selectivity and specificity for bilirubin, these features, combined with the ease of fabrication and cost-effectiveness of LSG electrodes, highlight the potential for rapid and reliable bilirubin monitoring in clinical and resource-limited settings.





Md Modassir Firdaus

Development of flexible robot for transanal minimally invasive intervention

Md Modassir Firdaus

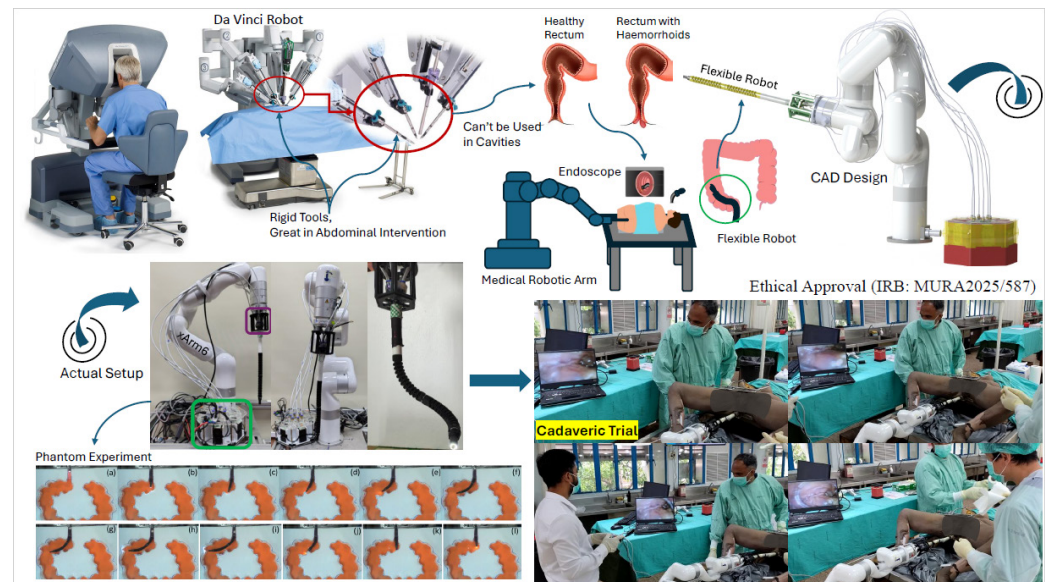
Indian Institute of Technology, Gandhinagar

Guide:

Prof. Madhu Vadali

Advancements in medical robotics have revolutionized minimally invasive surgery, enhancing precision, reducing surgeon fatigue, and minimizing patient blood loss, pain, and recovery time. While rigid robotic tools excel in abdominal procedures, they fall short in navigating curved anatomical cavities, such as the human colon or esophagus, limiting interventions in these regions. To address this gap, we introduce a novel tendon-driven flexible robot, designed for seamless integration with existing medical robotic systems and equipped with distal operating tools for precise navigation through tortuous pathways. The innovative design exploits the kinematics and behavior of a rolling disk chain, enabling constant-curvature bending that emulates rolling disk motion upon tendon actuation. This compact structure is 3D-printable to custom dimensions tailored to specific interventions, facilitating easy, cost-effective, and rapid manufacturing. Actuation is achieved via motors that pull and loosen tendons along the robot's length, allowing intuitive remote control for exploration and manipulation in complex anatomical landscapes. Initial validation, with ethical approval (IRB: MURA2025/587), through cadaveric trials demonstrated safe navigation to 200 mm depth, endoscope-like inspection in the human colon, and no adverse

events, confirming its efficacy for non-traumatic traversal. Future enhancements will incorporate multifunctional capabilities, including tissue suturing, cutting, and laser ablation, expanding its utility for therapeutic procedures in confined cavities. This platform promises to broaden the scope of robotic-assisted endoscopy, improving outcomes in gastrointestinal and respiratory interventions.





Shally Gupta

An integrated process for precipitant-free highly selective recovery of valuable metals from end-of-life lithium-ion batteries using a green deep eutectic solvent

Shally Gupta

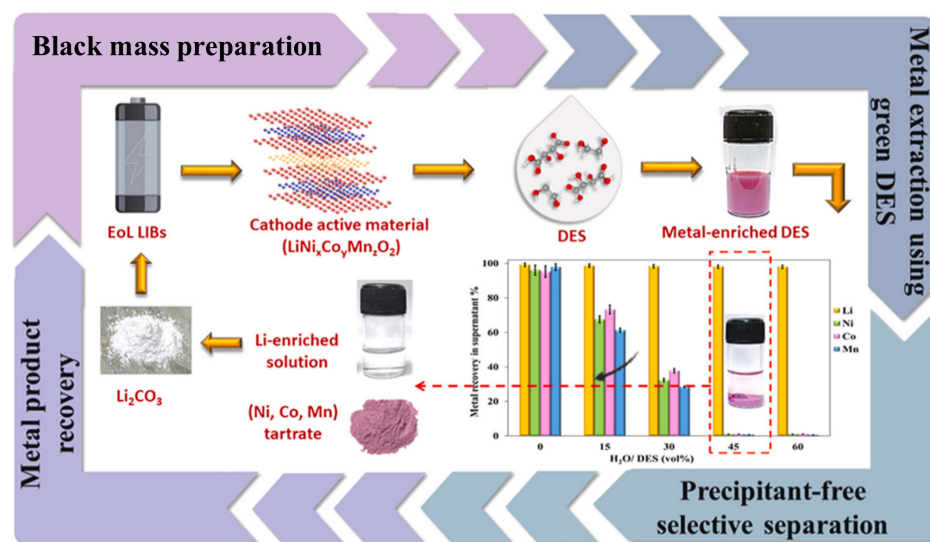
Indian Institute of Technology, Delhi

Guide:

Prof. Kamal Kishore Pant

End-of-life (EoL) lithium-ion batteries (LIBs) have garnered tremendous attention owing to their increased utilization in modern electronic devices and electric vehicles. LIB waste is a rich source of various critical metals, and the regulated disposal and recycling of this waste is a major challenge. Under the Battery Waste Management Rules (2022), India has also set specific recovery and reuse targets aiming for 60% material recovery from portable and electric vehicle batteries by 2026, and the incorporation of at least 20% recycled materials into the production of new batteries by 2030. Consequently, the development of efficient, sustainable, and scalable recycling technologies is essential not only to support circular economy initiatives but also to reduce dependence on imported strategic metals. The proposed innovation aims to provide a sustainable solution for recycling EoL LIBs via the hydrometallurgy technique. A biodegradable and bifunctional deep eutectic solvent (DES) composed of ethylene glycol and tartaric acid was synthesized, serving simultaneously as an extractant during the leaching process and as a precipitating agent for metal recovery. The proposed process includes: (i) collection, discharging, dismantling, and preparation of black mass from discarded LIBs, (ii) metal extraction from the black mass using the synthesized DES, (iii) precipitant-free, selective separation of transition metals as tartrate complexes employing water as the solvent followed by Li recovery as Li_2CO_3 , and (iv) re-synthesis of cathode active material for potential

reuse in LIBs. The results revealed extraction efficiencies of more than 95% for Li and transition metals (Ni, Co, and Mn) under the optimized process conditions. Moreover, Li and transition metals were selectively separated and recovered with an overall efficacy of ~99%. This process, therefore, establishes a sustainable, precipitant-free, DES-based hydrometallurgical approach for effective recovery of valuable metals from EoL LIBs.





Yogendra Kumar Mishra

Other Contributors:
Diksha Praveen Pathak

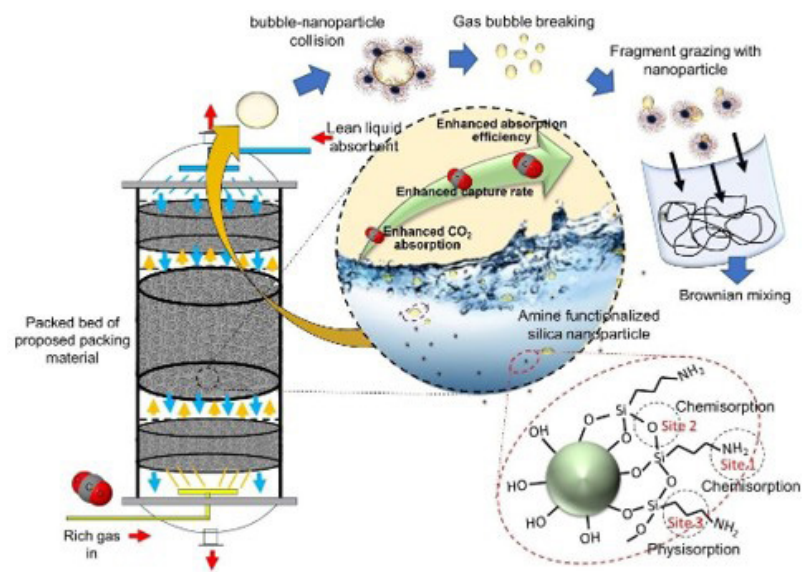
Chemogel superabsorbent formulation for efficient carbon capture

Yogendra Kumar Mishra
Indian Institute of Technology, Madras

Guide:
Prof. Jitendra Sangwai

Traditional amine-based absorbents are widely used for post-combustion carbon capture, but they face key limitations, including a low operational temperature range, high regeneration energy and costs, limited recyclability, and corrosion issues. This study examines the application of nanoparticles and additives to improve the recyclability and absorption performance of conventional amines through microgelation and blending. Two novel nanoformulations were developed: a monoethanolamine (MEA)-based system (NF-1) and a diethanolamine (DEA)-based system (NF-2). Both were tested in an interfacial contact reactor at 300 K and 320 K to assess their high-temperature performance. The nanoformulations showed a 10–15 % increase in CO₂ absorption and a 20–60 % improvement in capture rates, with particularly strong performance at 320 K. Recyclability tests indicated that the nanoformulations maintained higher loading capacity and thermal stability over three reuse cycles compared to conventional 30 wt% MEA/DEA solvents. The enhanced capture efficiency of NF-1 and NF-2 is attributed to Brownian motion-induced grazing, micromixing effects, and synergistic chemical interactions from the additives. Among the two, NF-1 demonstrated higher volumetric loading at equivalent concentrations, while NF-2 achieved greater molar absorption capacity and superior recyclability with efficient regeneration, as confirmed by NMR analysis. COSMO-RS simulations further supported the experimentally observed superior CO₂ absorption performance of DEA-based nanoformulations. Further pilot-scale investigations using industrial flue gas confirmed similar

trends, demonstrating that the proposed nanoformulations can be effectively applied for efficient and cost-effective CO₂ capture in post-combustion environments.





Akash Lata



Anuj Kumar

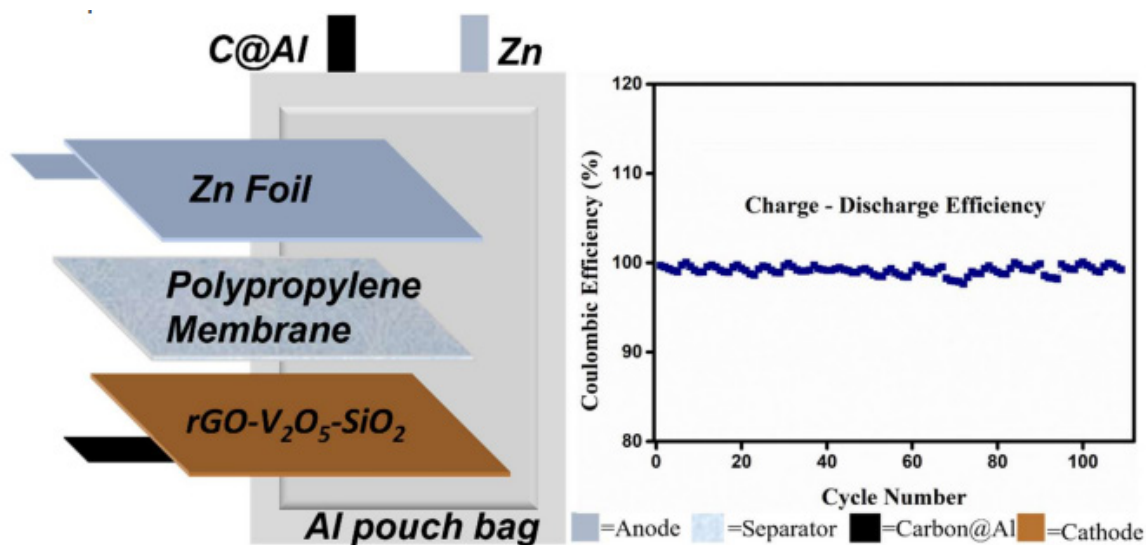
An aqueous rechargeable and high-capacity zinc ion battery

Akash Lata, Anuj Kumar
Indian Institute of Technology, Jammu

Guide:
Dr. Ravi Kumar Arun

An aqueous Zn-rGO-V₂O₅-SiO₂ pouch-type rechargeable zinc ion battery (ZIB) with a rGO-V₂O₅-SiO₂ hybrid nanocomposite as the cathode, Zn as the anode, and 0.5 M Zn (CF₃SO₃)₂ as the electrolyte. The rGO-V₂O₅-SiO₂ hybrid cathode, in the presence of an aqueous electrolyte, intercalated Zn²⁺ ions in its 3D layers due to the high surface area and porosity of the developed nanorod structures. Furthermore, the combined electrical conductivity of rGO and V₂O₅ with high water adsorption capacity of silica synergistically affects the charge-discharge rate and stability of the

ZIB. As a result, the aqueous rechargeable battery depicts a specific charge capacity of 640 mA h g⁻¹ at 200 mA g⁻¹ and a high-performance rate of 890 mA h g⁻¹ at 20 mA g⁻¹, which are further stacked in series to obtain a capacity of 502 mA h g⁻¹ at 12 V. The pouch cell configuration makes this battery a potential candidate for large-scale energy storage applications. This work describes a rechargeable rGO-V₂O₅-SiO₂ @Zn-ion pouch-type battery with high specific capacity and cycling stability for large-scale energy storage applications.





Shivshankar Prasad

Production of biopolymer precursor from biomass derived 5-hydroxymethyl furfural (HMF) using NiCo oxide catalyst

Shivshankar Prasad

Indian Institute of Technology, Dhanbad

Guides:

Prof. Suman Dutta, Prof. Ejaz Ahmad, Dr. Afaq Ahmad Khan

Sustainable production of chemicals from bio-renewable resources such as lignocellulosic biomass is essential to mitigate environmental issues, including plastic waste overburden and CO₂ emissions caused by the excessive use of fossil resources. 5-Hydroxymethylfurfural (HMF), a platform chemical derived from lignocellulosic biomass, is used for the production of 2,5-furandicarboxylic acid (FDCA). FDCA serves as a precursor for polyethylene furanoate (PEF), a biodegradable plastic that exhibits superior mechanical and gas-barrier properties compared to petroleum-based polyethylene terephthalate (PET). In this study, Ni-Co oxide bimetallic catalysts with varying Ni/Co ratios were prepared using the co-precipitation method. The physicochemical properties of the prepared catalysts were analyzed using powder XRD, BET, XPS, TEM, ICP-OES, CO₂-TPD, and H₂-TPR studies. Among the catalysts, NiCo (3:1) exhibited superior catalytic activity, achieving an FDCA yield of 84.9% at 100% HMF conversion under the optimized reaction conditions of 50 °C and 50 minutes in the presence of NaOH as the base and tert-butyl hydroperoxide (TBHP) as an oxidant. Additionally, reaction parameters, including time, temperature, catalyst amount, oxidant amount, base amount, and stirring speed, were optimized for better FDCA yields. Moreover, the FDCA yield and HMF conversion remained nearly unchanged after five successive catalytic

cycles. Characterization of the reused catalyst revealed no noticeable variations in its XRD pattern, morphology, oxidation states, or metal leaching, confirming its excellent stability and recyclability. The enhanced catalytic activity was attributed to the high concentration of lattice oxygen. The FDCA product was identified and quantified by high-performance liquid chromatography (HPLC) and further confirmed by high-resolution mass spectrometry (HR-MS).





Nishant Markandeya

Development of a sustainable process for depolymerization of polymer wastes

Nishant Markandeya

National Chemical Laboratory (CSIR-NCL), Pune

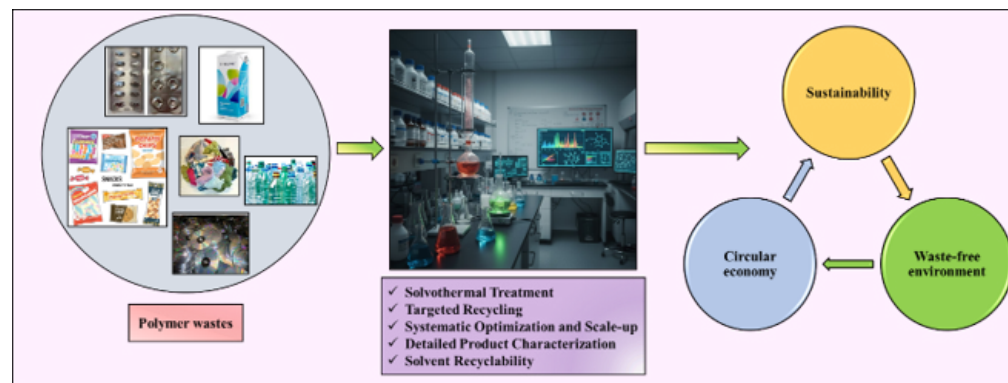
Guide:

Dr. Sanjay Kamble

This study presents an environmentally responsible strategy for polymer recycling and waste management, associated with the chemical recycling of Polyethylene terephthalate (PET), Polycarbonate (PC), textile waste and multilayer packaging materials. The overall goal of the work was to develop sustainable, efficient and scalable routes for recovering both monomers and polymers from diverse waste streams using solvent-assisted depolymerization and targeted separation and recycling. Initially, glycolytic process for waste Polyethylene Terephthalate (PET), a thermoplastic polyester used widely across packaging, textiles and electronics was depolymerized. Using ethylene glycol and a co-solvent, complete depolymerization was achieved within 1 h at 180–190°C. In view of the rapidly growing PET market, from \$37.21 billion in 2020 to a projected \$77.26 billion by 2028, the method was developed with industrial scale-up in mind and was successfully demonstrated at a 3 kg scale without loss of performance, supported by HPLC, DSC, NMR, FESEM and FTIR characterization. Following the same catalyst-free and solvent-assisted approach, further optimization of glycerol-based depolymerization of polycarbonate (PC) was carried out using RSM and a Box–Behnken design. High coefficient of determination (0.97 and 0.98) values were obtained for PC conversion (%) and BPA yield (%), with temperature, time and solvent ratios emerging as the most influential parameters.

Under optimized conditions, the process achieved 100% conversion and an 83% BPA yield. The work was further carried out to treat complex waste systems including mixed fabric waste (MFW) and multi-layered plastic (MLP) waste. Mixed fabric waste (MFW) was treated using targeted recycling approaches and the optimal sequence for the treatment of textile waste was determined which was further supported by DSC, FTIR and Mass Spectrometry analysis. The same principles were applied to multilayer packaging waste from chocolate and chips wrappers that enabled the separation of pure PP, PE and PET, with PET further converted to BHET via solvothermal depolymerization. Overall, these combined efforts show an integrated and scalable approach to treat different classes of polymer wastes with the overall aim of achieving circular economy and the waste-free environment.

Other Contributors:
Dr. Sunil Bhongale





Debayan Ghosh

AI-driven mental health solutions for Gen Z challenges

Debayan Ghosh

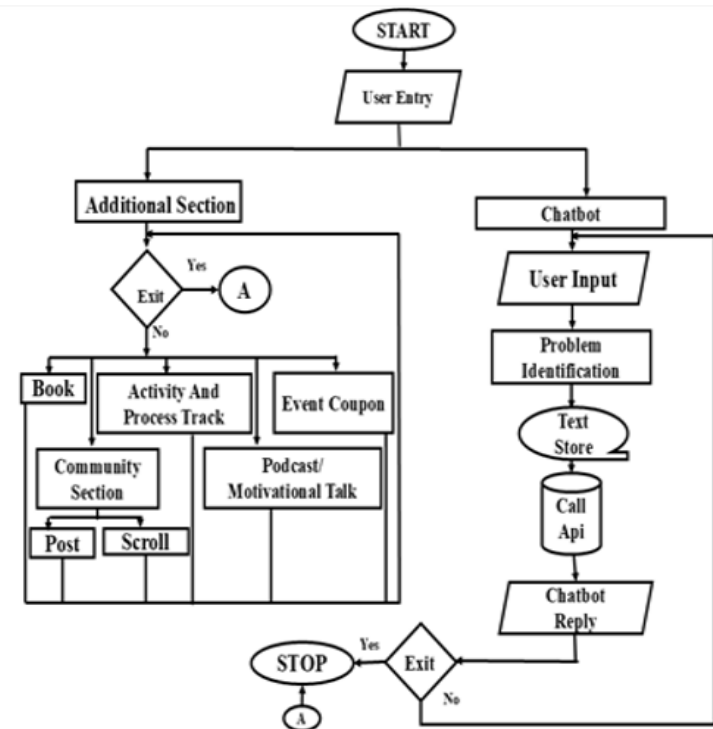
Maulana Abul Kalam Azad University of Technology,
Kolkata

Guide:

Ms. Rachita Ghoshhajra

Depression, anxiety and other mental maladies are at a peak in this generation. In fact, more than 80% of people all over the world are currently ailing from such issues. Most of them are also very shy to discuss such issues with close friends and relatives making it hard to go for professional help. Thus, more of such individuals engage in self injury and suicidal tendencies. One of the greatest problems is that many people do not appreciate what depression or mental health issues entail. People also tend to overgeneralize issues at hand without drilling deep to understand the cause of the problem. Thus, this paper aims to come up with a mobile device application for the users with mental health problems. At first the App will take user input with their problem statement. Then the application will attempt to search for the reason for such a situation. When the reason is found, the app will introduce activities intended to assist the improvement of the user's mental state. Since the augmentation of saturation is rather hard, a rewards system will be carried out, whereby a little reward is given for performing a task to create a proactive and active cycle. One of the objectives of this work is to keep the cost of the app affordable while respecting the user's privacy chiefly because this is one of the issues that deters a good number of people from accessing counselling services within their locality. Due to effective mental health services, it can be assured that the levels of productivity and happiness among individuals will also be enhanced.

Other Contributors:
Sulagna Chakrabarty





Vikram Wanjari

Adsorption-enhanced sensitivity for electrochemical sensing of diclofenac by polyethersulfone-based laser-induced graphene

Vikram Wanjari

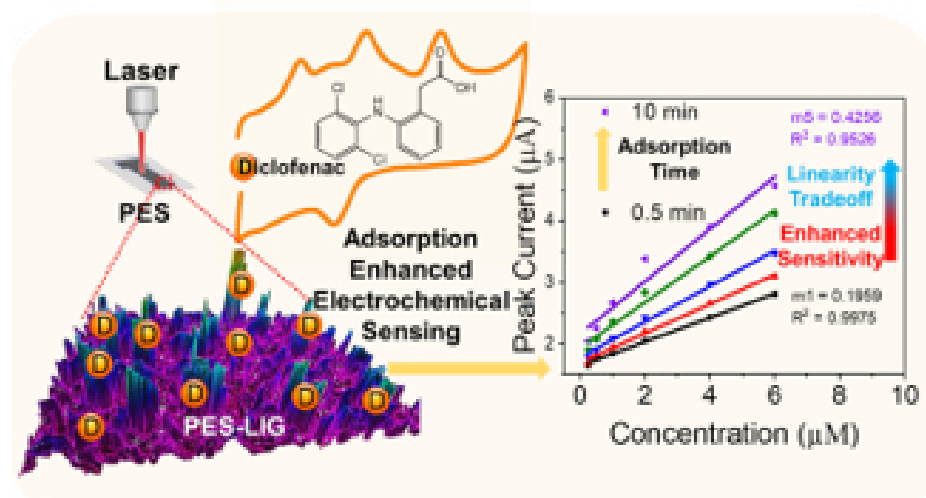
Indian Institute of Technology, Bombay

Guides:

Prof. Swatantra P. Singh, Prof. Siddhartha P. Duttagupta

Emerging contaminants are a matter of growing concern for environmental and human health and safety, requiring efficient and affordable sensing platforms. Laser-induced Graphene (LIG) is a novel material with a 3D porous graphene structure that can be fabricated in a simple one-step fabrication process. However, most LIG-based works in electrochemical sensors are limited to polyimide(PI)-based platforms, thus limiting the purview of properties of LIG dependent on the substrate-laser interaction. Diclofenac (DCF), a non-steroidal anti-inflammatory drug, is an emerging contaminant in water and wastewater that threatens aquatic and terrestrial life. Furthermore, LIG-based sensors have not been used to sense DCF. In this work, we demonstrate the spontaneous adsorption behavior of LIG towards DCF without applying any external potential. This spontaneous adsorption phenomenon can enhance the sensitivity per the characteristics of the tested water samples and permissible standards to be followed. Polyethersulfone-based LIG (PES-LIG) is found to be more responsive to laser irradiation than PI-LIG due to its highly porous surface and fibrous nature, imparting more electrochemical sites and adsorption area for DCF. These characteristics lead to a higher sensitivity of $0.2774 \mu\text{A}\mu\text{M}^{-1}$ towards DCF sensing for PES-LIG with a limit of detection of $0.4 \mu\text{M}$. The sensors were applied for DCF measurement in wastewater and tap water samples with appreciable selectivity. The specific adsorption behavior of LIG

towards DCF could pave the way for new pathways in emerging contaminant sensing and removal as well as for other applications. The easy-to-fabricate LIG platform also offers potential for low-cost and scalable electrochemical device fabrication for pollution monitoring in future.



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Pawan Kumar



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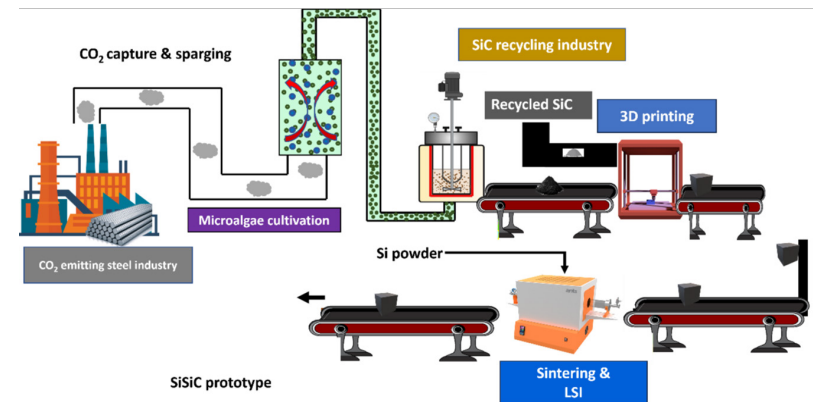
Manufacturing of 3D printed SiSiC ceramic prototypes using sustainable raw materials, as customized bio-carbon obtained from microalgal biomass of carbon sequestration process and optimized recycled sic from industrial waste

Joydeepa Taran, Rajarshi Bhar
Indian Institute of Technology, Kharagpur

Guides:
Prof. Brajesh Kumar Dubey, Prof. Chandra Sekhar Tiwary,
Dr. Ranjan Pradhan

This research successfully demonstrated an integrated, end-to-end technology chain connecting carbon capture and utilization via biomass valorization and advanced ceramic manufacturing. At the Indian Institute of Technology Kharagpur, the research focused on converting harvested carbon-captured microalgal biomass into high-value functional materials. The biomass underwent hydrothermal carbonization and pyrolysis to yield biocarbon with tenable physicochemical and microstructural properties optimized for advanced applications. The resulting biocarbon, when utilized alongside industry-sourced recycled silicon carbide (rSiC), established a resource-efficient and circular economic approach for 3D printed silicon-infiltrated silicon carbide (SiSiC) synthesis. A major innovation of the project involved developing additive manufacturing protocols for fabricating the 3D-printed ceramics. Employing direct ink writing, the research team designed and fabricated diverse geometries of green bodies from the biocarbon-rSiC composite for heat exchanger application. During this phase, the compatibility of various binders with the composite was systematically evaluated to enhance printability. Meticulous optimization of ink formulations and printing parameters ensured superior ceramic integrity and mechanical stability. Comprehensive thermal, mechanical, and microstructural characterizations validated the performance of the 3D-printed SiSiC, confirming the robustness and scalability of the manufacturing process for pragmatic industrial deployment. By effectively bridging academic research and industrial application,

the project showcased a sustainable and scalable pathway for transforming carbon emissions into value-added materials. It serves as a model for addressing critical environmental and resource challenges through integrated waste valorization, recyclability, and next-generation materials engineering. Upholding Gandhian ideals, the initiative fosters sustainability, minimizes industrial waste, and leverages renewable resources to generate practical and eco-conscious solutions, promoting the globalization of indigenous materials. Furthermore, it advances key national missions such as Atmanirbhar Bharat, Vocal for Local, Swachh Bharat Abhiyan, Make in India, and Startup India, while simultaneously contributing to the United Nations Sustainable Development Goals related to climate action, responsible consumption and production, and industry, innovation, and infrastructure.





Prachi Jain

Moisture-activated oxygen scavenger based on Acacia catechu for active food packaging: a plant-based alternative

Prachi Jain

Indian Institute of Technology, Roorkee

Guide:

Prof. Kirtiraj K. Gaikwad

Food loss remains a critical global challenge, with nearly 14% of food lost post-harvest and 17% at retail and consumer levels, significantly contributing to greenhouse gas emissions. Oxygen is a key driver of food spoilage, catalyzing oxidative rancidity, nutrient degradation, and microbial growth. Conventional iron-based oxygen scavengers, though widely used, pose issues such as metal contamination, incompatibility with sensitive foods, microwave instability, regulatory limitations, and negative consumer perception. To address these challenges, this research presents an innovative plant-based, moisture-activated oxygen scavenging system developed using Acacia catechu (catechu) and food-grade calcium carbonate. The system activates in humid environments inside food packages, generating an alkaline medium that enhances catechin-oxygen reactions, effectively reducing oxygen levels to 0-2% depending on storage conditions. Demonstrating capacities comparable to commercial scavengers (1-10 mL O₂/g), it significantly extends the shelf life of various high-moisture foods. This plant-based, cost-effective, metal-free solution enables sustainable and safer packaging, reduces food loss, and supports circular economy practices.





Ayush Pradip



Arul Amit Jain

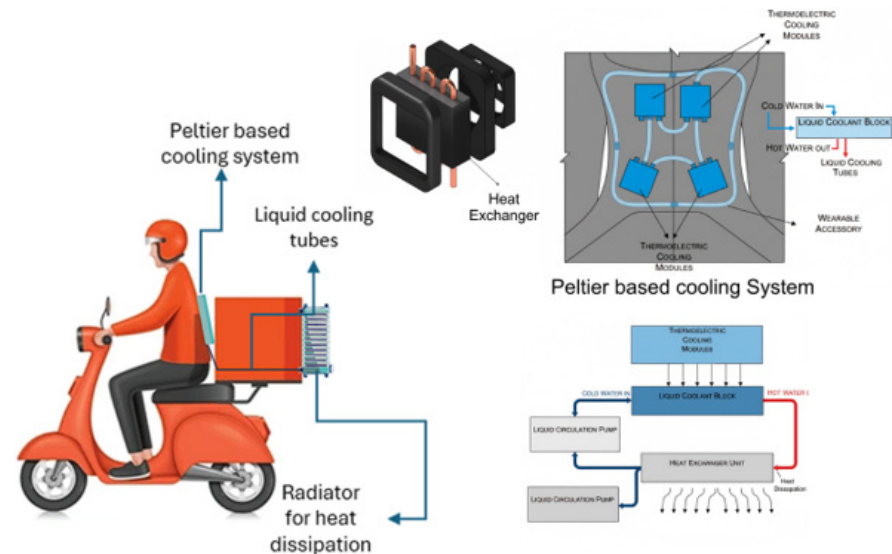
Smart wearable cooling device

Ayush Pradip, Arul Amit Jain
Indian Institute of Technology, Roorkee

Guide:
Prof. Ankit Bansal

Extreme heat has become a major challenge for individuals who work outdoors or travel long distances on two-wheelers, especially in humid regions of India. Delivery riders, traffic police personnel, and daily commuters are often exposed to temperatures that exceed safe limits, leading to discomfort, dehydration, and a decline in productivity. To address this growing problem, we have developed a wearable cooling system technology based on the thermoelectric (Peltier) effect, and our first application of this technology is a wearable cooling jacket designed for two-wheeler riders. The system uses compact thermoelectric modules coupled with a lightweight water-based radiator to actively remove heat from the user's body. This ensures steady cooling performance even in harsh weather conditions, unlike passive cooling garments that lose effectiveness over time. The jacket is powered by a portable battery pack and is designed to maintain comfort, mobility, and ease of use. The internal arrangement of components, airflow design, and control electronics have been optimized to balance cooling efficiency and power consumption. Initial testing on a moving two-wheeler has shown a noticeable improvement in perceived thermal comfort, demonstrating the potential of the system to reduce heat stress during long or high-temperature rides. A design patent for this wearable cooling system technology has been filed with the Indian Patent Office, reflecting its novelty and practical significance. While the first prototype focuses on two-wheeler riders, the technology

has broad future applications. It can be adapted for cooling helmets, neck bands, safety vests, and other wearable devices. It can also benefit delivery personnel, agricultural workers, police personnel, labourers, street vendors, and even army personnel who operate in extreme heat. Our goal is to make outdoor work safer, more comfortable, and more sustainable for millions facing rising temperatures across India.





Ranamay Saha

Impedance spectroscopy-based detection of Hepatitis C viral RNA from clinical samples

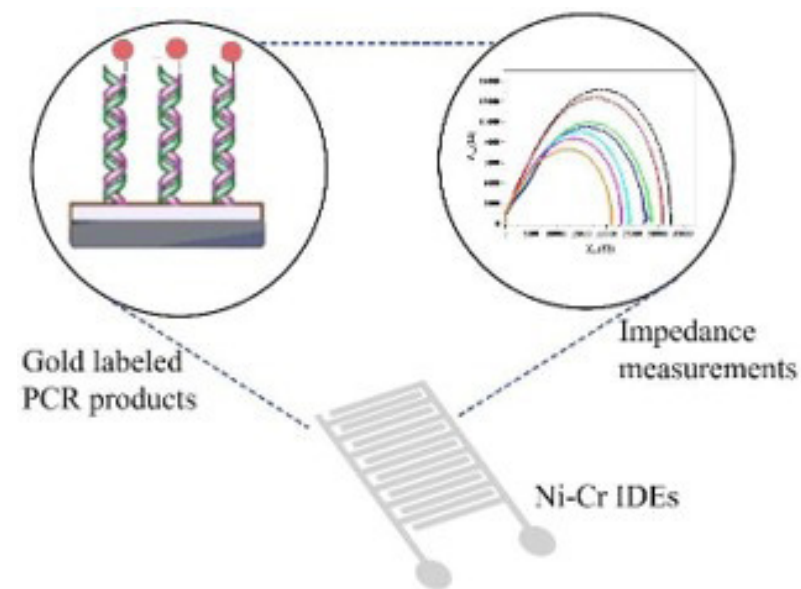
Ranamay Saha

Indian Institute of Technology, Kanpur

Guide:

Prof. Shantanu Bhattacharya

HCV infection is a serious public health problem and is an important cause of mortality and morbidity. Major bottleneck in achieving this goal is lack of diagnostics at the periphery. HCV infection is diagnosed by testing for antibody to HCV and then confirmation by HCVRNA testing. Most of the labs perform Quantitative PCR (qPCR) for the HCV RNA. Amongst various in vitro nucleic acid detection schemes, qPCR carried out through fluorescence-based detection is the most promising technique currently. However, qPCR is an expensive technique and hence this detection technique is slowly shifting towards electronic detection. Impedance-based detection provides fast detection in low cost due to its easy electronic integrability and lesser requirement of additional entities. The present research proposal focuses on development of a low-cost a highly integrable and fast electronic detection scheme for screening the presence of Viral RNA in clinical samples. cDNA is synthesized from the HCV-RNA through RT-PCR process. The sensitivity in the detection is enhanced by integrating gold nanoparticle labelling (inexpensive as compared to electronic/electrochemical labels) to the amplifying sequence and specifically capturing it through di-electrophoresis (DEP). It is found that the impedance values of the solution containing the DNA conjugates reduce significantly due to the presence of the AuNP-DNA conjugates and the DEP concentration step.



Other Contributors:

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Parkavi Valaguruven

Integrated photovoltaic-thermoelectric hybrid system

Parkavi Valaguruven

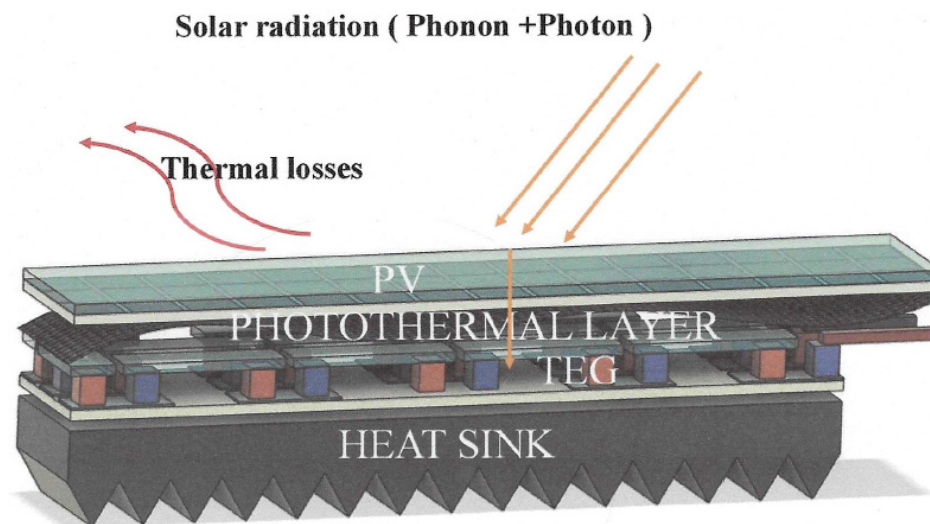
Indian Institute of Information Tehnology, Design and Manufacturing (IIITDM), Tamil Nadu

Guide:

Dr. Pandiyarasan Veluswamy, Dr. Jayabal K

Solar energy has emerged as one of the most prominent renewable sources of energy. However, the efficiency of Photovoltaic panel tends to reduce with the increasing temperature. They are approximately decreased by 0.45% per unit rise in cell temperature. This thermal retention not only reduces the energy conversion efficiency but also shortens the life span of PV panels. To address this, thermoelectric generators, a passive cooling technique is integrated with PV to reduce the heat from the panel. These devices not only dissipate heat but also convert heat into electric power generation. However, the conventional thermoelectric generators are rigid and its static design hinders mass production. Hence flexible thermoelectric generator is fabricated and integrated with PV panel to reduce the heat loss and to improve the overall energy conversion. Moreover, to reduce thermal resistance, incorporation of photothermal materials plays a crucial role in it. 2D metal oxides semiconducting material coated on cellulose fabric acts as photothermal layer. The outstanding properties of these semiconductor metal oxides including high thermal stability and excellent photothermal conversion efficiency enables them to absorb a wide range of solar wavelengths. The Photothermal layer captures and converts solar energy into thermal energy, which is then effectively harnessed by the TEG to generate additional electricity. For photothermal application TiO_2 a wide band gap material is most commonly chosen material

as they possess high oxidation ability, stability, low cost, high surface area, excellent charge transfer and readily available material. The tuning of wide band gap materials influences the enhanced performance of integrated PV-TEG devices. Thus, oxygen vacancy is created in TiO_2 to form Black TiO_2 which is capable to absorb near IR region. The integrated devices with photothermal layer of Black TiO_2 coated on cellulose fabric generates a power of 194 mV and 6.1% efficiency. Thus, the integrated approach enhances solar energy utilization and paves a way for low carbon future sustainable environment.





Dipak Thorat

Vaginal cells self-sampling medical device for early detection of cervical cancer

Dipak Thorat

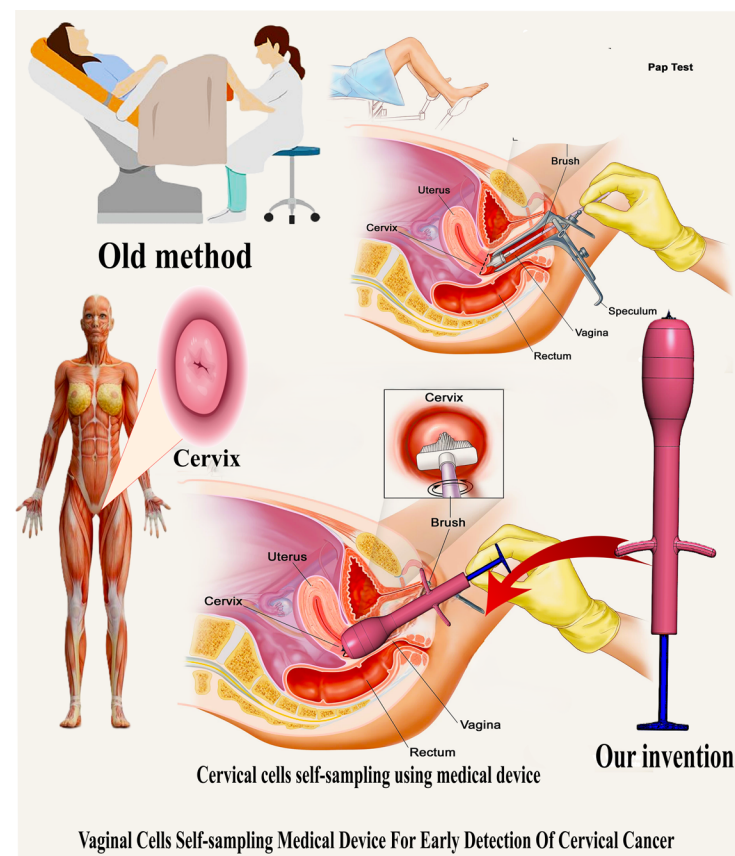
SMBT College of Pharmacy, Savitribai Phule Pune University

Guide:

Dr. Yogesh Ushir

Cervical cancer is the fourth deadliest cancer in women globally, with an estimated 6.6 lakh cases reported and 3.5 lakh deaths in 2022. In India, it causes approximately 1.23 lakh cases and 67,500 mortalities yearly. Most cervical cancers are caused by the human papillomavirus. HPV is a prevalent infection that spreads via sex, making early detection crucial. Although Pap and HPV tests are available, but due to high costs, limited access to healthcare, cultural stigma, and the pain of speculum insertion sometimes cause delays in diagnosis, particularly in tribal areas. To overcome these issues, we introduce a safe and simple vaginal device for cervical cancer screening at home. This device is unique, disposable and self-inserted, which makes cervical cancer screening effortless, hygienic and painless. It has a rotating knob that spins a soft brush in a clockwise direction to gather cells. This brush allows for more precise samples, while the stopper prevents bleeding and discomfort. The device allows women to collect cervical samples at home, reducing discomfort and stigma, saving money for poor people, and allowing mass production. Its basic design, which includes a stopper, brush, and rotatory knob ensures safe, user-friendly sample collecting. This technology makes cervical cancer screening more accessible in rural and tribal areas by minimising dependency on clinics and qualified persons. Early detection is becoming easier, saving lives, lowering mortality, and easing the burden on healthcare providers. Its low use of supplies and cheap cost promote sustainable, frugal healthcare. This self-sampling device transforms the screening process. It is simple to use, inexpensive, and accessible, allowing more women to diagnose cervical cancer early. It promotes

more health equity and a global fight against cervical cancer.





Anurag Kashyap

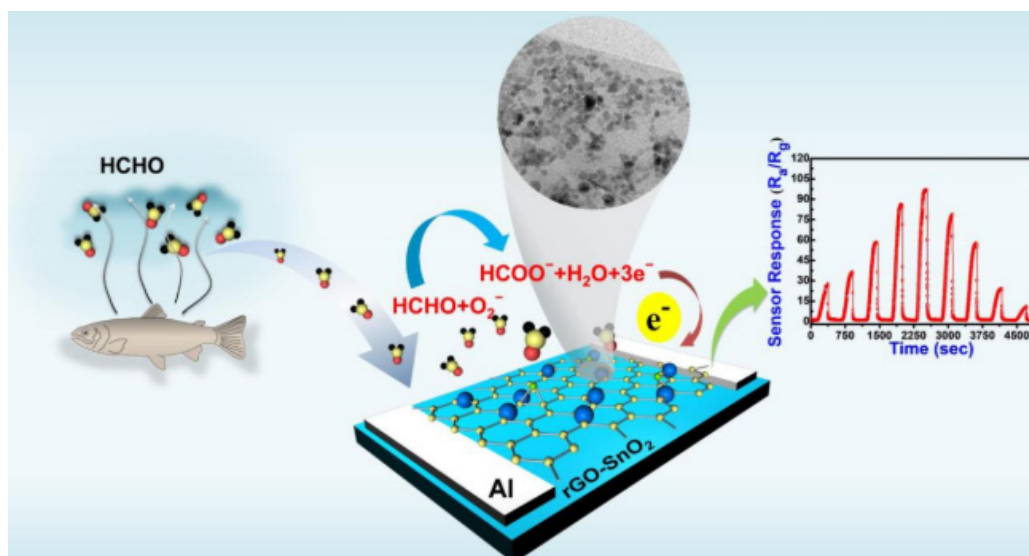
Functionalized graphene derivative for non-invasive detection of formalin in adulterated fish

Anurag Kashyap
Gauhati University, Guwahati

Guide:
Dr. Hemen Kumar Kalita

A highly selective formaldehyde (HCHO) gas sensor using tin oxide nanoparticles-reduced graphene oxide (rGO-SnO₂) composite has been fabricated and investigated for room-temperature sensing. The rGO-SnO₂ composite is synthesized by cost-effective wet chemical method. The fabricated sensor exhibits remarkable sensing performance, including a higher response, a low detection limit of ≈ 33 ppb (theoretical), good selectivity, and long-term stability. Furthermore, the effects of humidity level and calcination temperature have also been investigated. The response

and recovery times for 10 ppm HCHO vapour are found to be 35 and 10 s, respectively. The promising results in the lab-scale HCHO detection with pre-treated fish open up avenues for the non-invasive detection of HCHO in food adulteration. The density functional theory study is in good agreement with the experimental results. The electronic charge density differences of the rGO-SnO₂ composite in the proximity of HCHO show significant variation. In addition, the sensing mechanism of the rGO-SnO₂ composite toward HCHO has also been discussed.





Jyotirmoy Das

Advanced stab resistant armour through strategic integration of ceramics and shear thickening fluids

Jyotirmoy Das

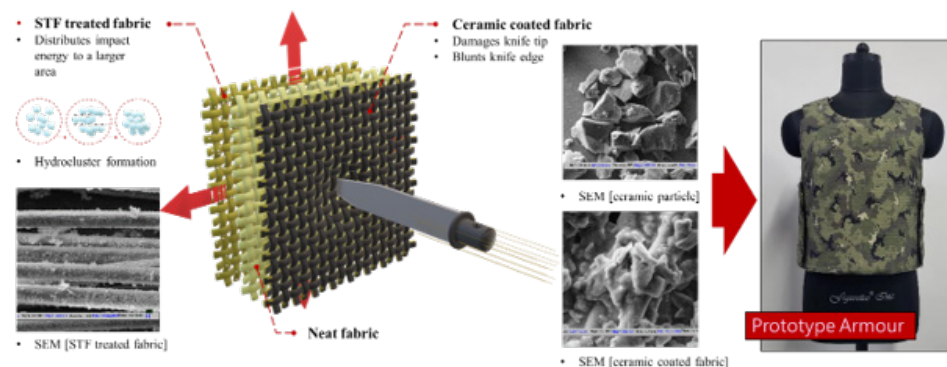
Indian Institute of Technology, Delhi

Guides:

Prof. Abhijit Majumdar, Prof. Bhupendra Singh Butola

The growing prevalence of knife and spike related assaults in law enforcement and correctional environments has intensified the demand for lightweight, high-performance stab-resistant armour. Conventional solutions are typically based on multilayer woven or unidirectional (UD) laminates of high-performance fibres such as Kevlar®, Dyneema®, and Spectra®. However, these systems often exhibit limited resistance to penetration of sharp knife tip, reduced flexibility, and high areal densities ($6.33\text{--}6.75\text{ kg/m}^2$), constraining wearer mobility. These armours are particularly inefficient, as the sharp knife blades cut yarns and penetrate the armours with ease, especially due to the high energy-density of stabbing impacts. Recent advancements aim to enhance fabric performance through nanoparticle incorporation, shear thickening fluids (STF), and ceramic coatings. STF, a non-Newtonian fluid that drastically increases viscosity beyond a critical shear rate, significantly improves inter-yarn friction and stress transfer under impact, thereby enhancing energy dissipation. Ceramic particle coatings can further increase stab resistance by blunting or chipping the knife tip and edge; however, conventional binders often reduce flexibility by immobilising yarns. This research introduces an integrated stab-resistant system that strategically combines neat Kevlar®, STF-impregnated Kevlar®, and a newly developed flexible ceramic coating technique. The novel coating method enables uniform deposition of hard ceramic particles while preserving fabric flexibility,

overcoming limitations of epoxy or polyurethane-based systems. By layering untreated, STF-treated, and ceramic-coated fabrics, the proposed architecture exploits multiple protection mechanisms, damaging the sharp knife edge, shear thickening phenomenon, and enhanced inter fibre friction while maintaining low stiffness and reduced weight. The resulting hybrid armour structure demonstrates the potential for significantly improved stab resistance with superior flexibility and reduced areal density compared to existing commercial solutions. This approach offers a promising pathway toward next-generation personal protective equipment that meets operational demands without compromising comfort or mobility.





Sudhanshu Singh

Electro-mechanical behavior of self-sensing glass textile-based multifunctional sensor for in-situ structural health monitoring

Sudhanshu Singh

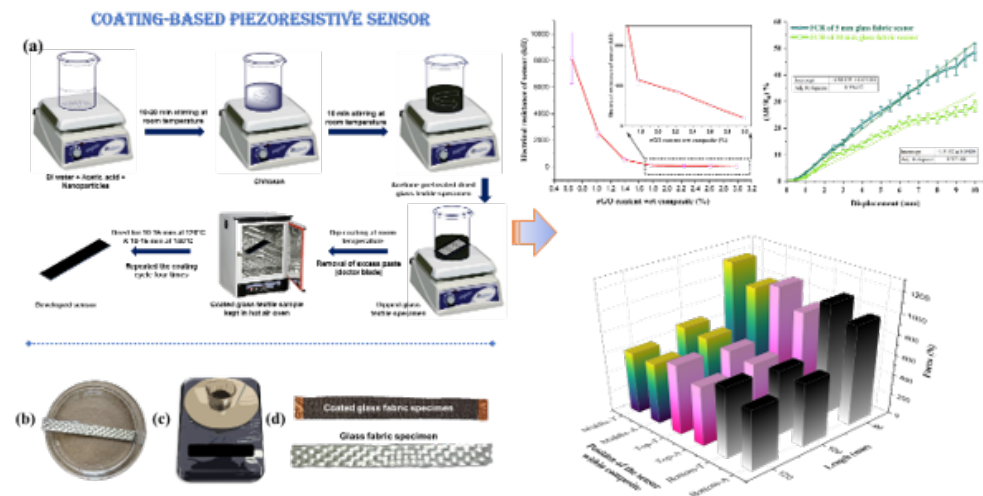
Dr. B. R. Ambedkar National Institute of Technology,
Jalandhar

Guide:

Dr. Zunjarrao Bapuso Kamble

This innovation presents a novel piezoresistive sensor leveraging reduced graphene oxide (rGO) and chitosan-coated glass textiles, tailored to advance structural health monitoring (SHM) systems. This sensor addresses significant limitations in conventional glass-fibre-reinforced composites, which are typically non-conductive and pose challenges in detecting and monitoring structural damage in real-time. Through a carefully optimised dip-coating process, glass textiles are coated with a conductive paste composed of rGO and chitosan, resulting in uniform coverage and robust adhesion. Chitosan serves a critical role as a binding agent, enhancing the dispersion of nanoparticles, improving electrical conductivity, and maintaining the necessary flexibility for sensor integration. Once embedded within composite laminates, these sensors become integral components for reliable SHM applications. Key technical features of this innovation include the formation of stable conductive pathways that deliver high sensitivity to strain, displacement, and physical damage. The sensors demonstrate remarkable versatility by functioning as force, pressure, weight, acceleration, or torque detectors, and their suitability for E-textile applications further widens their utility in smart textiles. Real-time monitoring capability is enabled by the sensor's ability to register resistance changes, providing quantitative feedback on strain or damage through simple measurement techniques such

as digital multimeters during composite deformation. The sensors also exhibit good durability and flexibility, maintaining consistent performance under repeated cyclic loading and making them robust for real-world deployment. Potential applications span the aerospace, construction, and automotive sectors, providing sustainable and cost-effective solutions for detecting structural damage, enhancing safety, and reducing maintenance costs. This innovation aligns with current industry trends focused on integrating multifunctional and intelligent materials into engineering and manufacturing systems for performance optimisation and resilience.





Debarun Banerjee

Hydrogen-free catalytic conversion of agricultural wastes into green gasoline additive

Debarun Banerjee

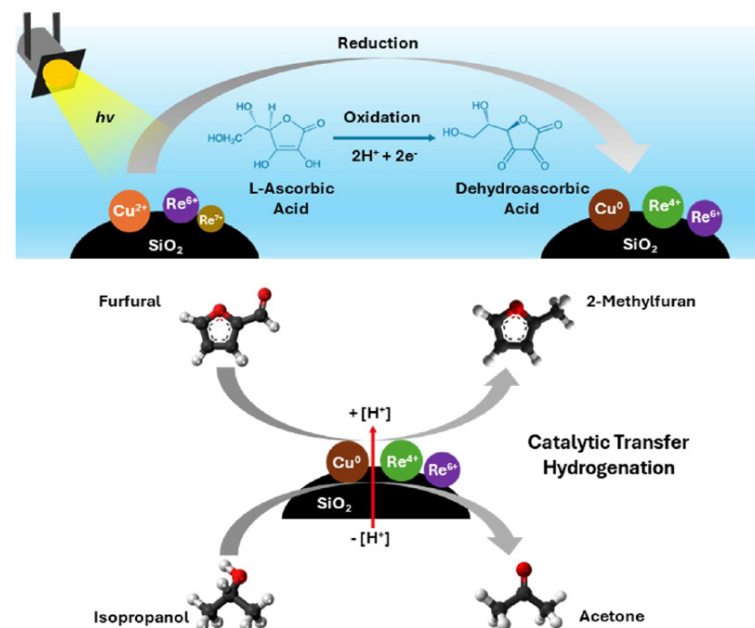
Indian Institute of Technology, Delhi

Guides:

Dr. Aloka Kumar Sahu, Prof. Sreedevi Upadhyayula

India produces millions of tonnes of agricultural residues every year, yet most of these lignocellulosic wastes are underutilized or burned, contributing to air pollution and carbon emissions. During biomass pretreatment in bioethanol plants, oxygen-rich intermediates such as furfural are generated as unavoidable by-products. These compounds are typically discarded or combusted despite their high carbon value, limiting the overall energy efficiency of biorefineries. At the same time, conventional upgrading of such intermediates into fuel molecules relies on high-pressure molecular hydrogen, which is expensive, fossil-derived, and infrastructure-heavy—contradicting the goals of green energy and rural decentralization. This project presents a hydrogen-free catalytic route to convert furfural and similar agricultural-waste-derived intermediates into 2-methylfuran (2-MF), a high-octane, energy-dense green gasoline additive. Our innovation is built around a photoreduction-activated Cu–Re heterogeneous catalyst, which we developed and validated through experimental studies, kinetic modeling, spectroscopic analysis, and DFT calculations. The catalyst is activated using light in a one-time pretreatment step, creating highly active Cu–Re interfacial sites without requiring molecular hydrogen at any stage, neither in catalyst preparation nor during reaction. The conversion proceeds via catalytic transfer hydrogenation (CTH) using a renewable hydrogen-donor solvent, enabling efficient deoxygenation under mild, atmospheric-pressure conditions. This eliminates safety and cost barriers associated with pressurized hydrogen systems. The resulting 2-MF product exhibits high blending potential with gasoline, providing a clean, renewable fuel additive derived

entirely from agricultural waste. The proposed technology can be integrated directly into existing bioethanol or biomass processing plants, converting low-value by-products into valuable green fuel components. With low energy demand, recyclable solvents, scalable catalyst synthesis, and compatibility with decentralized rural biorefineries, this hydrogen-free process offers a transformative pathway toward sustainable and self-reliant green energy in India.





Doyel Ghosal

Rapid-acting sprayable hydrogel for advanced wound healing

Doyel Ghosal

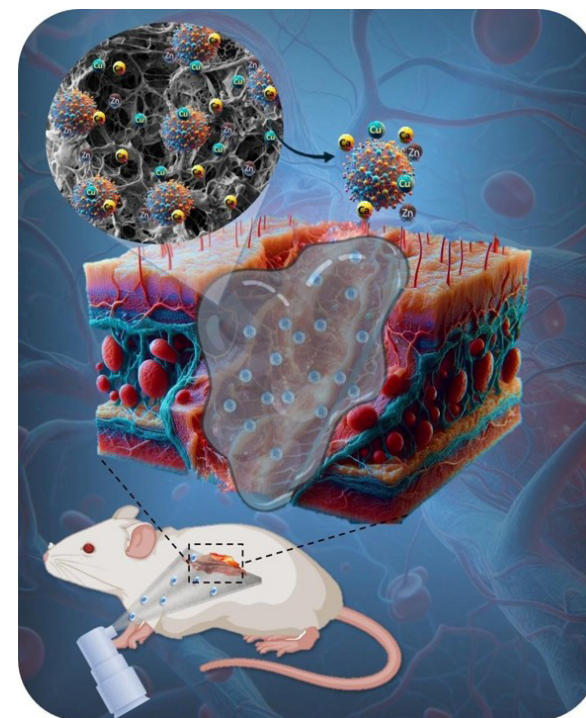
Indian Institute of Technology, Delhi

Guide:

Dr. Sachin Kumar B

Wound healing is a complex, multistage process regulated by endogenous biochemical cues, including the controlled release of metal ions that orchestrate inflammation resolution, tissue regeneration, and angiogenesis. While most existing wound care products rely on exogenous bioactive agents, this work introduces an alternative strategy that strengthens the body's natural healing mechanisms through a biomimetic, endogenous support system. In this study, we developed a sprayable, multi-ion-releasing hydrogel designed to emulate the body's intrinsic metal-ion-mediated repair pathways. The system integrates an Alginate-Fibrin (Alg-Fib) hydrogel matrix with polylactic acid (PLA) microcarriers encapsulating calcium, copper, and zinc nanoparticles, collectively termed Alg-Fib-PLA-nCMB. The engineered hydrogel exhibits controlled and sustained release of Ca^{2+} , Cu^{2+} , and Zn^{2+} at the wound site, enabling synchronized activation of key healing processes. These ions synergistically enhance fibroblast activity, promote antibacterial action, modulate oxidative stress, support macrophage M2 polarization, and facilitate collagen deposition and neovascularization. Sprayability assessments confirmed uniform deposition and easy application, making the system suitable for irregular wound geometries. In vivo evaluation using a full-thickness rat wound model demonstrated that Alg-Fib-PLA-nCMB significantly accelerates wound closure compared to a leading commercial formulation (Midstress spray). Histological analysis further revealed improved granulation tissue formation, enhanced epithelialization, reduced inflammation, and more mature vascular and extracellular matrix structures in wounds

treated with the developed hydrogel. Overall, this multi-metal-ion delivery platform represents a next-generation wound management strategy that leverages biomimetic cues to restore natural healing pathways. The promising outcomes highlight Alg-Fib-PLA-nCMB as a potent, clinically translatable candidate for advanced wound care applications.





Guguloth Venkanna



Shreya Singh

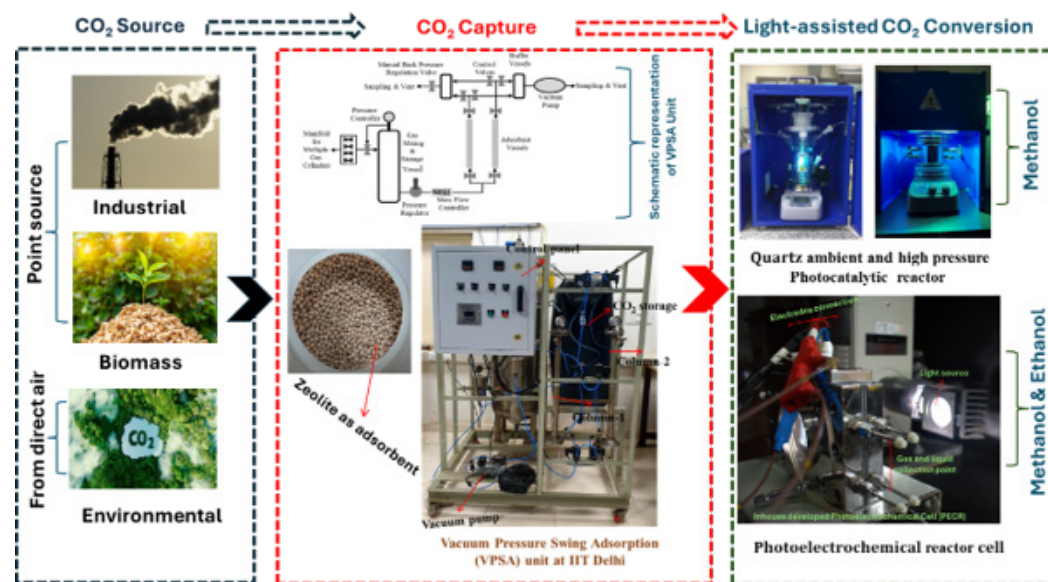
Solar light assisted conversion of captured CO₂ from industrial flue gases to value-added chemical fuels

Guguloth Venkanna, Shreya Singh
Indian Institute of Technology, Delhi

Guide:
Prof. Kamal Kishore Pant

As the global energy crisis intensifies, photo(electro)catalysis is becoming an important technology for harnessing solar energy and reducing climate change impacts. This field faces challenges such as the quick recombination of photo-generated electron-hole pairs and limited efficiency in materials with low band gaps. Our work introduces a new approach using heterostructure photocatalysts to improve the efficiency and sustainability of this technology. Our team has developed heterostructure catalysts by carefully adjusting the electronic and structural properties of each component. This design helps keep the photo-generated electron-hole pairs apart, boosting the activity of the catalysts far beyond what individual components can achieve. The main focus of our research is to adjust these catalysts to enhance their effectiveness, specifically for producing liquid fuels like methanol and ethanol. An essential part of our system is integration with the CO₂ capture technology that uses vacuum pressure swing adsorption with commercial zeolites. This method captures CO₂ efficiently from industrial flue gases. The captured CO₂ is then released and converted into valuable products through our advanced photo(electro)catalytic process. By turning captured CO₂ into chemical fuels, we use solar energy more

effectively and help create a sustainable cycle of carbon use, marking a significant step forward in renewable energy technologies.





Shraddha Vilas Sonavane

Other Contributors:
Dr. Shrishti Pandey

Filter paper-based fluorescence sensor for affordable and precise alkaline phosphatase diagnostics

Shraddha Vilas Sonavane

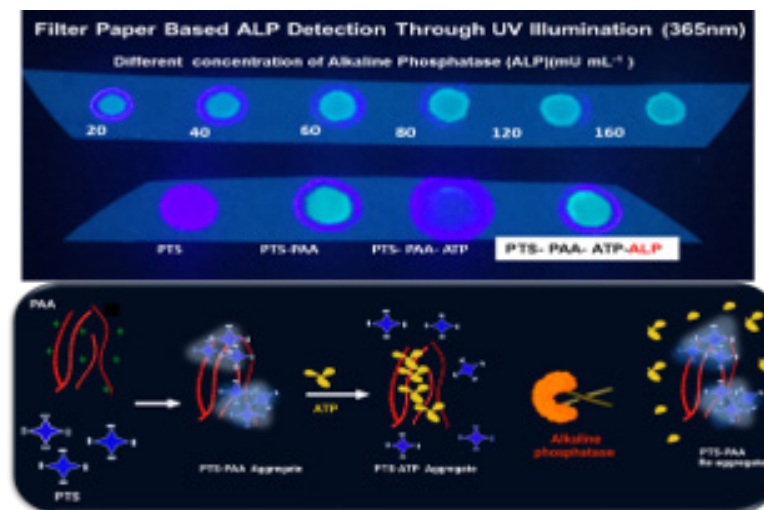
Homi Bhabha National Institute, Mumbai

Guide:

Dr. Prabhat K. Singh

This project introduces a low-cost, paper-based ratiometric fluorescence sensor for the detection of alkaline phosphatase (ALP), an essential biomarker associated with liver dysfunction, bone disorders, and various metabolic conditions. The innovation leverages a supramolecular assembly between an anionic pyrene-based dye (PTS) and a cationic polymer (PAA), modulated by adenosine triphosphate (ATP), to achieve a fluorescence-based detection mechanism. In the presence of ALP, ATP undergoes enzymatic hydrolysis, triggering a reversible fluorescence shift from monomer (385 nm) to aggregate emission (500 nm), enabling real-time and quantitative monitoring of ALP activity. The sensor is embedded on filter paper, creating a robust, portable, and user-friendly platform suitable for point-of-care applications. This format eliminates the need for sophisticated equipment and is especially suited for low-resource settings. The dual-emission, ratiometric fluorescence output enhances analytical reliability by mitigating environmental interferences such as pH or temperature variations, unlike conventional single-emission assays. The platform demonstrates excellent sensitivity, with a detection limit of 63.3 $\mu\text{U/mL}$ and a linear range up to 150 mU/mL under laboratory conditions. Though validation in serum is pending, the sensor's strong performance in simulated environments highlights its potential for clinical applications. Importantly, the fabrication involves no synthesis steps and uses readily available, eco-friendly materials, making the product highly scalable and economically viable. This technology addresses critical limitations in current ALP diagnostics, including high cost, poor portability, and lack

of sensitivity in complex samples. It also offers modularity for adaptation to other enzymatic biomarkers. Overall, the innovation provides a sustainable, accessible, and high-impact solution for early disease detection and decentralized healthcare delivery.





Shreya Yatish Garge

A cost-effective fluorescence biosensor for rapid and sensitive trypsin detection: Advancing point-of-care diagnostics

Shreya Yatish Garge

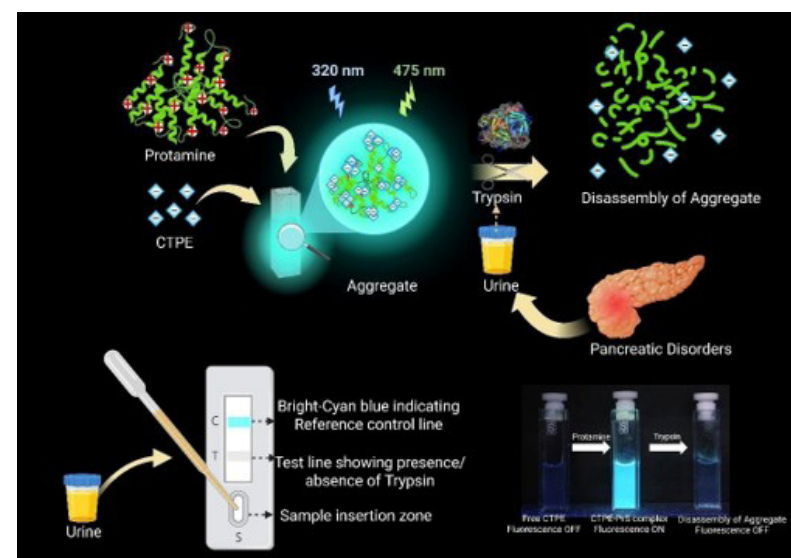
University of Mumbai, Mumbai

Guide:

Dr. Prabhat Kumar Singh

Trypsin is a key digestive serine protease whose dysregulation is closely associated with severe clinical conditions, including pancreatitis, cystic fibrosis, biliary cirrhosis, and pancreatic cancer. Sensitive and selective detection of trypsin is therefore essential for early diagnosis and effective clinical intervention. This work presents a highly sensitive, portable, and cost-efficient fluorescence turn-off biosensor that employs Aggregation-Induced Emission (AIE) for rapid trypsin detection. The sensing platform utilizes a water-soluble anionic derivative of tetraphenylethylene (C-TPE) as the AIE-active fluorophore and protamine sulfate (PrS) as the trypsin-responsive substrate. Initially, C-TPE forms electrostatically driven aggregates with polycationic PrS, resulting in enhanced fluorescence emission. Upon enzymatic hydrolysis of PrS by trypsin, these aggregates disassemble, producing a measurable fluorescence quenching signal that enables real-time monitoring. Comprehensive photophysical characterization, including UV-Vis absorption, steady-state fluorescence, and time-resolved fluorescence decay, confirms the robustness of the sensing mechanism. The biosensor exhibits a linear detection range of 0–21.45 nM, outperforming conventional approaches such as ELISA, piezoelectric sensing, and surface plasmon resonance in terms of simplicity, cost, and sensitivity. High selectivity toward trypsin over other enzymes underscores the system's reliability for complex biological environments. A major strength of this platform lies in its ease of fabrication; the use of commercially available C-TPE eliminates extensive synthetic procedures, enhancing scalability and affordability. The biosensor's practical utility was

further validated using human urine samples, demonstrating strong performance across varying urine matrices and highlighting its suitability for point-of-care diagnostics. This innovation offers substantial societal benefits by enabling accessible, early-stage detection of trypsin-related disorders, particularly in resource-limited settings. Overall, the developed AIE-based fluorescence biosensor provides a sensitive, specific, and portable alternative to existing diagnostic technologies, with significant potential for clinical translation and widespread adoption.





Anwesha Mukherjee

A biomimetic injectable hydrogel for therapeutic management of osteoarthritis

Anwesha Mukherjee

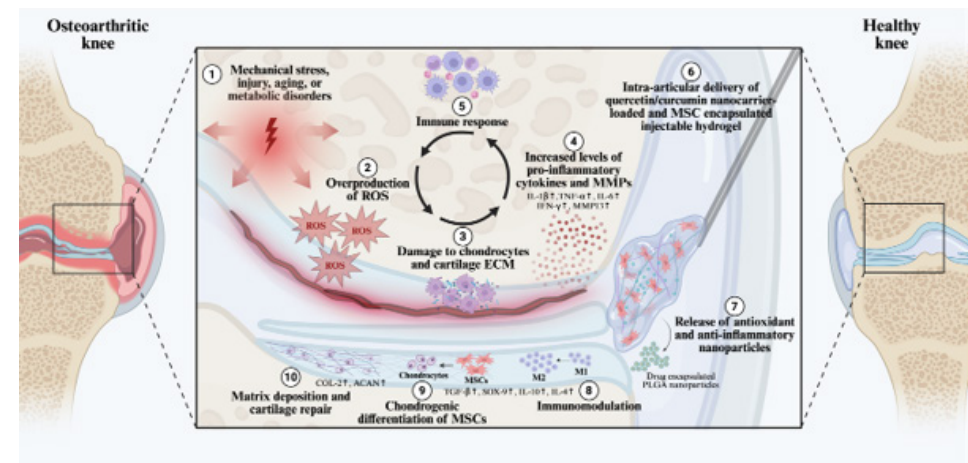
Indian Institute of Technology, Ropar

Guide:

Dr. Bodhisatwa Das

Osteoarthritis is one of the most prevalent musculoskeletal disorders, affecting approximately 654.1 million individuals worldwide, including approximately 38.9% of the Indian population. The management of this condition with NSAIDs, corticosteroids, and surgical approaches offers symptomatic relief; however, these measures are limited by their inability to stimulate tissue repair and their considerable side effects. To address these challenges, a novel dual crosslinked injectable hydrogel system containing a semi-synthetic photocurable hydrogel known as gelatin-methacryloyl (GelMA) and kappa-carrageenan has been developed. This hydrogel mimics the native ECM of cartilage and encapsulates PLGA nanoparticles that release anti-inflammatory factors for cartilage repair with an appropriate immune response. Preclinical studies demonstrated enhanced cartilage regeneration, increased viability of human mesenchymal stem cells (hMSCs), and mitigated inflammatory response in rats with monosodium iodoacetate-induced OA. In this research, an original off-the-shelf formulation is proposed, which should be used as a comprehensive approach for OA patients without any surgical intervention. The lyophilized formulation ensures ease of storage and application, thereby reducing the management costs of OA while avoiding complicated medical procedures. The powdered hydrogel formulation, which can be activated by applying sterile water, provides convenience and sterility, which are important attributes of product that is

to be used in a clinical setting. This innovation, which integrates biomaterials and nanotechnology, is anticipated to significantly improve the therapeutic outcomes of OA patients globally.





Susweta Das

Non-invasive continuous monitoring of anterior circulation cerebral blood flow

Susweta Das

Indian Institute of Technology, Bombay

Guide:

Prof. Hari M Varma

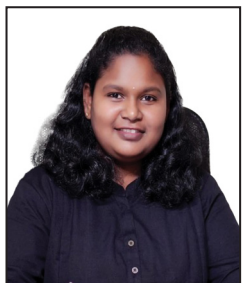
Stroke is one of the leading causes of death and long-term disability in our country. During the first 48–72 hours after a stroke, it is critical to monitor blood flow in the affected brain regions to guide medical decisions and prevent further damage. However, current tools for bedside monitoring of cerebral blood flow (CBF) like Transcranial Doppler face limitations such as attenuation from the skull bones and operator dependency making it unsuitable for unattended and continuous bedside CBF monitoring, specifically of the Anterior Cerebral Artery or ACA. We address these limitations with our in-house developed Diffuse Correlation Spectroscopy (DCS) system to non-invasively monitor the CBF in the ACA. The ACA supplies blood to the cortical areas of the brain responsible for leg movements therefore a stroke in the ACA can result in deficits such as weakness or paralysis in the contralateral leg or foot. Our system comprises a near-infrared laser source, single-photon avalanche diode detector, autocorrelator hardware, and a custom optical probe containing source and detector optical fibers. In our earlier works, we employed DCS to measure CBF responses to cognitive tasks and voluntary apnea in healthy subjects. Building upon this we conducted a pilot study on five healthy volunteers, in collaboration with a neurosurgeon, Dr. U S Srinivasan, to assess ACA blood-flow changes during leg-engaging functional tasks wherein the probe is positioned over the glabella to sample the blood flow from ACA (Institution Ethical Committee approval

obtained). Across all subjects, DCS consistently detected increased CBF during leg exercises, demonstrating the feasibility of targeted vascular monitoring. Our next step is to translate this system to the clinics for continuous bedside monitoring of CBF in stroke patients. An intuitive graphical interface will also be incorporated to provide clinicians with clear, real-time visualization of CBF dynamics.



Other Contributors:

Dr. Soumyajit Sarkar,
Dr. Murali K,
Dr. U. S. Srinivasan



Sangeetha V

Closed loop sanitation: Self powered technology for water recovery and fertiliser production from source separated urine

Sangeetha V

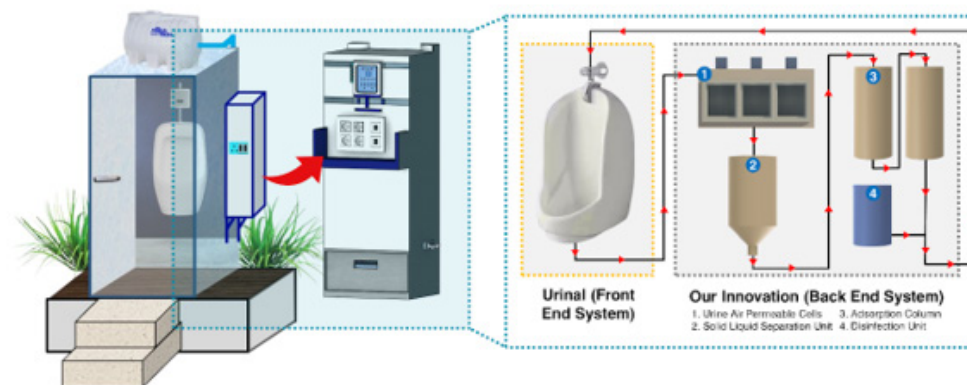
Indian Institute of Technology, Palakkad

Guide:

Dr. Praveena Gangadharan

Human excreta (urine) management consumes significant fresh water and energy. Every single toilet flush consumes 6 to 10 litres of fresh water and 0.002 to 0.1kWh of energy. This practice depletes fresh water that is urgently required for potable use in water stressed regions. Urine, constitute only 1% of total wastewater volume. But contributes 50% of phosphorus (P), 70-90% of nitrogen (N), and 75% of potassium (K) to its nutrient load. Therefore, source-separated urine is a reservoir of nutrients required for plant growth. It also has high ionic strength, making it an excellent electrolyte for generating energy. Moreover, urine has 95% water. Recognizing this opportunity, we have come up with an integrated and self-powered technology to recover resources (water, nutrients, and energy) from urine. Our innovation comprises urine air permeable cells (UAPCs), solid liquid separation (SLS) unit, biochar-based adsorption columns, and disinfection unit. The UAPCs facilitate energy production and nutrients are recovered as fertiliser in the SLS unit. The adsorption column removes colour, odour, and other organic constituents. Disinfection unit ensures pathogen removal and the recovered water can be reused for flushing. Our innovation is self-powering, modular, compact, and portable. It can

be fit downstream of urinals to recover water and nutrients. The recovered water is used for toilet flushing and the nutrients is used for plant crops. Therefore, it offers water reuse opportunity with zero operating cost at the source itself. Our technology eliminates the conveyance infrastructure to transport urine to centralised treatment facilities and its associated energy costs. Our integrated strategy conserves critical resources and establishes a paradigm shift from centralised to decentralised approaches.





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Prasanna Das

Ultra-emissive MgO-PVDF polymer nanocomposite paint for passive daytime radiative cooling

Prasanna Das

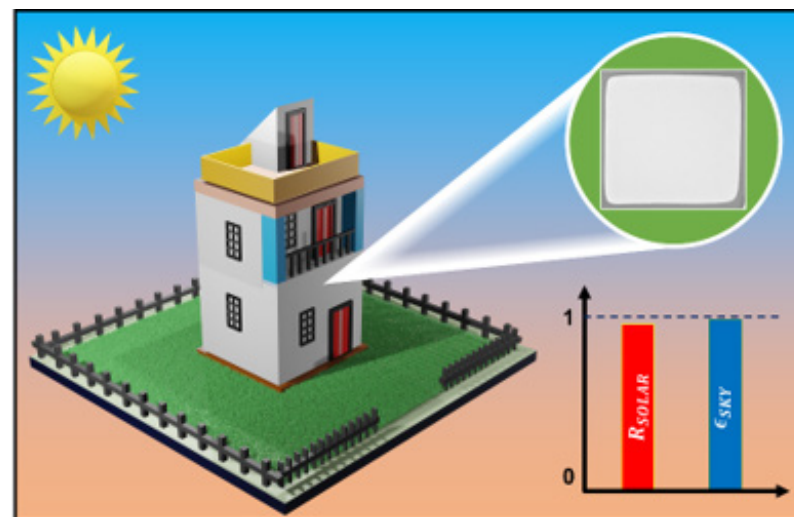
Jawaharlal Nehru Centre for Advanced Scientific Research,
Bengaluru

Guide:

Prof. Bivas Saha

Passive daytime radiative cooling (PDRC) offers an energy-free and environmentally friendly pathway to reduce heat load in buildings and mitigate urban heat island effects. However, most existing radiative cooling devices rely on complex multilayer structures or metallic back-reflectors, limiting their scalability and suitability for household and outdoor applications. Single-layer polymer nanocomposites, while simpler, often suffer from high material cost, mechanical fragility, and insufficient cooling performance arising from low emissivity. In this innovation, we developed an ultra-white and ultra-emissive magnesium oxide–polyvinylidene fluoride (MgO-PVDF) nanocomposite coating that overcomes these limitations and delivers exceptional cooling performance under direct sunlight. The optimized MgO-PVDF metamaterial, incorporating ~50 nm dielectric nanoparticles, achieves a high solar reflectance of 96.3% through efficient Mie scattering and a near-unity mid-infrared emissivity of 98.5% within the atmospheric transmission window (8–13 μm), enabled by anharmonic multiphonon Mg-O vibrations and PVDF's characteristic polymer modes. Field tests conducted in Bangalore demonstrate a consistent sub-ambient cooling of $\sim 7^\circ\text{C}$ and a maximum temperature drop of 13°C relative to ambient conditions, outperforming commercially available white paints by approximately 3°C . The nanocomposite is fabricated using a low-cost, scalable, solution-based process and exhibits excellent mechanical robustness, hydrophobicity, and strong adhesion when coated on diverse substrates such as concrete pavers, wood, and

ceramic tiles. Its superior cooling power, theoretically estimated at $\sim 100\text{ W/m}^2$ under peak solar irradiation, is supported by both spectroscopic characterization and thermal modeling. This innovation provides a practical and high-performance radiative cooling solution tailored for equatorial, Southeast Asian, Middle Eastern, and African climates. With its simplicity, durability, and low production cost, the MgO-PVDF nanocomposite paint holds strong potential for widespread adoption in building envelopes, transportation, solar module cooling, and other climate-resilient applications.





Suraj Singh



Jovanpreet Singh

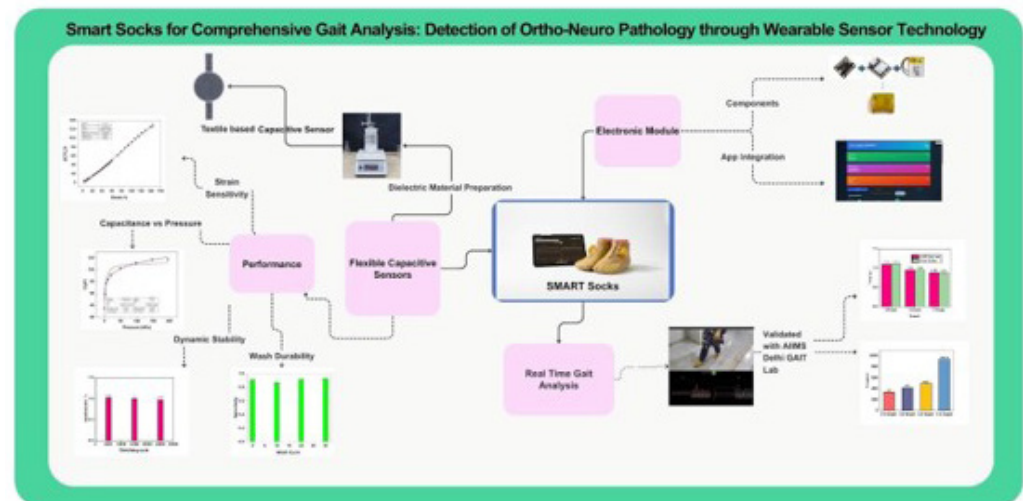
Smart socks for comprehensive gait analysis: Detection of ortho-neuro pathology through wearable sensor technology

Suraj Singh, Jovanpreet Singh
Indian Institute of Technology, Delhi

Guides:
Dr. Ashwini K. Agrawal, Dr. Manjeet Jassal

This project presents Smart Socks, a wearable gait-analysis system developed using advanced textile-based capacitive sensors and a compact, high-precision electronic module. The sensors are constructed using a multilayer textile structure comprising two conductive electrodes and a polymer-coated dielectric fabric layer. The sensors perform up to 30 wash cycles and 25,000 loading and unloading cycles, demonstrating stability suitable for continuous wearable use. The electronics module integrates a 16-bit Capacitance-to-Digital Converter (Cap-DAC) with a resolution of ± 5 fF, a shield driver for noise protection, BLE communication, and a rechargeable battery, all within a compact enclosure. This combination enables the system to measure extremely small pressure variations under the foot with clinical precision. The sensors are integrated into the socks, which are customised for the sensors. The sensors are attached at specific points corresponding to specific pressure points in the plantar. Gait data was collected from multiple healthy participants at various walking speeds. The Smart Socks system consistently captured clean, periodic gait cycles. For example, at 5 km/h, measurements from different participants showed stance time values within a narrow band (around 673–824 ms) and swing time values around 270–333 ms. The closeness of these values across individuals highlights the system's high repeatability, stable measurement response,

and low signal drift. Such consistency is essential for detecting abnormalities, since deviations from this stable range can indicate irregular gait behaviour. Pressure mapping also showed clear load patterns, such as heel-dominant loading, followed by M1, M2, and midfoot, which aligns with normal gait biomechanics. This confirms that the sensors accurately detect both temporal and spatial characteristics of walking. When compared with measurements from the AIIMS Delhi Gold-Standard Gait Lab, Smart Socks demonstrated an agreement of approximately 99%, indicating high accuracy and reliability. Overall, Smart Socks provide a portable, low-cost, and clinically meaningful solution for gait monitoring, early abnormality detection, and rehabilitation assessment.





Pradeep Kumar

A mineral and clay-based ethylene scavenger for fruits and vegetable packaging application

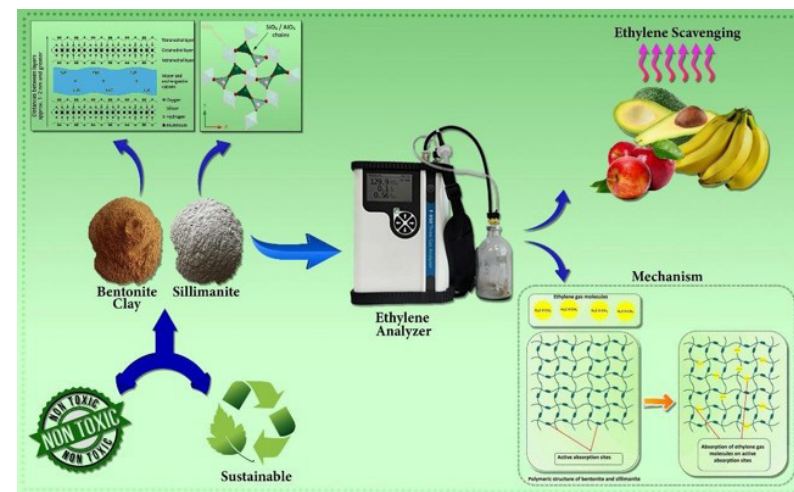
Pradeep Kumar

Indian Institute of Technology, Roorkee

Guide:

Dr. Kirtiraj K. Gaikwad

Natural and chemical-free material in food packaging applications has gained interest globally with increasing demand for human health and environmental concerns. The present research aimed to develop a mineral and clay-based ethylene scavenger by mixing Sillimanite (Al_2SiO_5) and Bentonite ($\text{Al}_2\text{H}_2\text{O}_6\text{Si}$) at different ratios to protect the deterioration of fruits and vegetables. The samples were prepared in different proportions of Sillimanite and Bentonite on a weight basis and named SL/BT (100:0), SL/BT (80:20), SL/BT (70:30), and SL/BT (50:50). The ethylene adsorption capacity of the samples was studied for 21 days under three conditions, i.e., $29\pm 3^\circ\text{C}$ and $55\pm 3\%$ RH, 25°C and $75\pm 2\%$ RH, 55°C , and $99\pm 1\%$ RH. The scanning electron microscopy (SEM) result determines the average particle size of sillimanite (80-100 nm) and bentonite (80-110 nm). Brunauer-Emmett-Teller (BET) result shows the surface area and pore volume of the sillimanite (8.42 m^2/g and 0.039 cc/g) and bentonite (20.765 m^2/g , 0.073 cc/g), higher surface area and pore volume result in higher ethylene adsorption. FTIR was performed to analyze the functional group changes after ethylene adsorption. The samples kept at $29\pm 3^\circ\text{C}$ and $55\pm 3\%$ RH showed the highest ethylene adsorption capacity of 84 %. From the above study, the mineral clay-based material can effectively enhance the shelf life of fruits and vegetable packaging.





Biswajit Dehingia

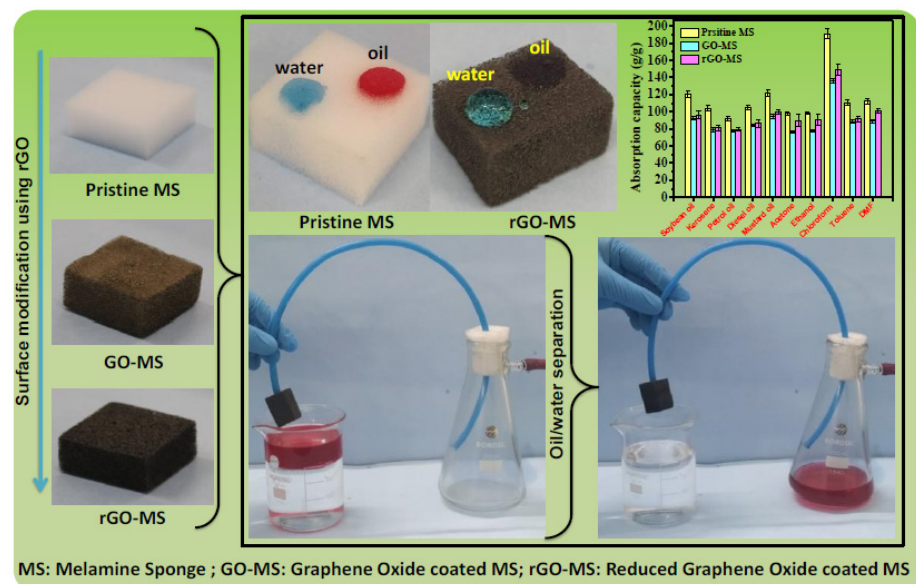
Facile and cost-effective fabrication of graphene-based hydrophobic sponge for efficient oil/water separation

Biswajit Dehingia
Gauhati University, Guwahati

Guide:
Dr. Hemen Kumar Kalita

Water contamination due to the accidental release of oil spills and the discharge of industrial wastes into water bodies is considered an ecological disaster worldwide. At present, it is imperative to establish a low-cost method for the efficient separation of oils from water to address this problem. Here, a facile and cost effective approach to fabricate graphene modified melamine sponge (MS) is reported (rGO-MS) for efficient oil/water separation. The pristine MS is dip coated with graphene oxide (GO) followed by post treatment with thiourea to obtain the final rGO-MS with enhanced hydrophobic behavior. The water contact angle of the prepared rGO-MS is about $\sim 145^\circ$, which signifies its excellent hydrophobic character. The prepared rGO-MS shows excellent mechanical integrity with no significant deformation in its shape after applying load on it for 500 cycles. Only 10 % of deformation occurred after 100 cycles of the pressing-releasing cycle by hand. The rGO-MS shows excellent absorption capacity for various oils such as soybean oil, kerosene, petrol, diesel, mustard oil and organic solvents such as acetone, ethanol, chloroform, toluene and DMF (Dimethylformamide). The rGO-MS has an absorption capacity in the range of ~ 79 -149 g/g, with enhanced recyclability up to 20 numbers of cycles for various oils and organic solvents. Moreover, the

sponge shows high separation efficiency of 99.9 % for kerosene, diesel and petrol oil. For soybean oil and mustard oil, the separation efficiency is about ~ 97.0 % and ~ 95.4 % respectively. The use of very less expensive material with ease of fabrication technique will lead to the large scale production of the rGO-MS, which will help in the efficient oil/water separation process very economically.





Aalia Khan

Development of a novel humanized BCMA-directed CAR for multiple myeloma: Robust activity and low toxicity in preclinical studies

Aalia Khan

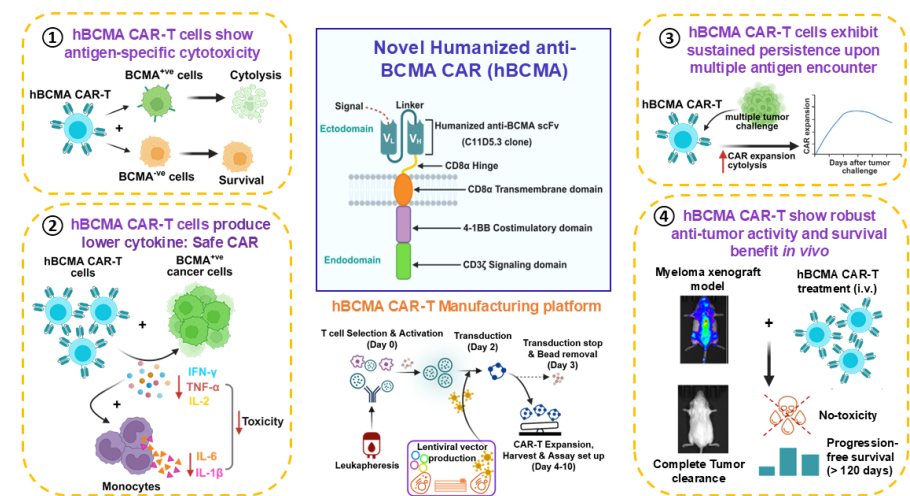
Indian Institute of Technology, Bombay

Guide:

Dr. Rahul Purwar

Multiple Myeloma (MM) remains an incurable hematologic malignancy, and patients with relapsed or refractory disease continue to face limited access to advanced immunotherapies. Although BCMA-directed CAR-T therapy has redefined global standards of care, several challenges including treatment-related inflammatory toxicities [cytokine release syndrome (CRS) and neurotoxicity], relapse due to poor therapeutic persistence, limited accessibility, and prohibitive manufacturing costs must be addressed to extend these therapeutic benefits to a broader patient population. Motivated by this critical clinical and national need, we developed India's first indigenously engineered, humanized BCMA-directed CAR, designed to deliver safer and more durable therapeutic responses at an accessible scale. We generated a panel of humanized CAR constructs and evaluated them across molecular, functional, and translational parameters. Across these datasets, hBCMA CAR emerged as the most promising candidate. The hBCMA CAR exhibited stable surface expression, robust proliferation, antigen-specific killing of BCMA⁺ tumor cells, and superior persistence upon repeated antigen stimulation, indicating improved long-term therapeutic potential. Unlike murine-derived CARs, which often trigger excessive inflammation, the hBCMA CAR-T cells led to markedly reduced inflammatory cytokine profile including diminished induction of key CRS-associated cytokines, which highlights its fundamentally

safer design. In animal models, hBCMA CAR-T cells achieved complete tumor eradication, significantly extended survival, and displayed no systemic or organ-specific toxicities, whereas murine CAR-T-treated animals experienced relapse and early mortality. Overall, hBCMA represents a major indigenous breakthrough—a humanized, safer, and more durable anti-BCMA CAR engineered to overcome long-standing therapeutic barriers in India and beyond. Its compelling preclinical performance has supported its advancement into a Phase I clinical trial.



"Born in India, built for the world"—homegrown anti-BCMA CAR-T now in Phase I to fight r/r Myeloma

Other Contributors:

Dr. Atharva Ajay Karulkar



Aneesh Risbud



Animith Srimani

Other Contributors:

Kiran Bhole, Rajendra Arya,
Sweta Rout, Dr Suman Pahal

Indigenous process and machine for rapid fabrication of biocompatible microneedles

Aneesh Risbud, Animith Srimani

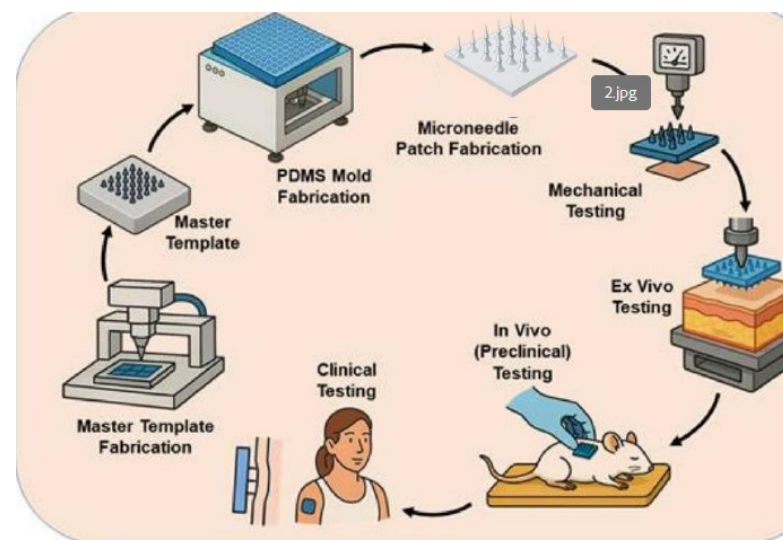
Indian Institute of Technology, Bombay

Guides:

Prof. Prasanna S. Gandhi, Prof. Pravin Vemula

Microneedles are revolutionizing transdermal drug delivery, offering painless and minimally invasive alternatives for applications like vaccine administration, insulin delivery, and cosmetic treatments. Despite their potential, existing fabrication methods such as LIGA and two-photon polymerization are expensive, complex, capital intensive, thereby restricting widespread adoption, particularly in resource-limited settings like rural India. This project addresses these limitations through the development of a cost-effective, high-speed microneedle fabrication technology. Technology enables the rapid creation of microneedle templates (with controlled needle shapes including necking) using a single 2D laser scan over an unconstrained photopolymer resin bath. Innovation highlights include a desktop microneedle printing machine fabricating reproducible and scalable template needle arrays in a few minutes. Systematic adjustments in laser power, exposure time, printing plane position, and resin formulation allow customization of needle size, adhesion, shape and strength. An in-house designed XY stages with precise control and a tilt stage mechanism simplifies the fabrication process. Other features include adaptive laser power control, and embedded programming with GUI for standalone machine. Post-fabrication processes, including UV curing, heat, and plasma treatments, have been standardized to improve mechanical strength and adhesion of microneedle templates. TMPTA microneedle templates from our machine have been successfully used to create (using existing methods) PDMS molds, which were further utilized to fabricate biodegradable polyacrylic acid (PAA) microneedles. The technology is being refined for

animal trials, focusing on diabetes management. The innovation is tailored for transdermal delivery of medications, particularly for addressing diabetes care. The microneedles allow for controlled, sustained release of insulin, reducing dependency on conventional injections. This is especially valuable in rural areas where patients can benefit from self-administration with limited healthcare support. This project introduces a transformative approach to developing microneedle drug delivery solutions, leveraging home grown fabrication process to overcome limitations of the existing methods, opening new possibilities for painless drug delivery and improved healthcare access globally.





Nishchitha N K

Health-sense: a mobile and reliable liver diagnostics for chronic disease

Nishchitha N K

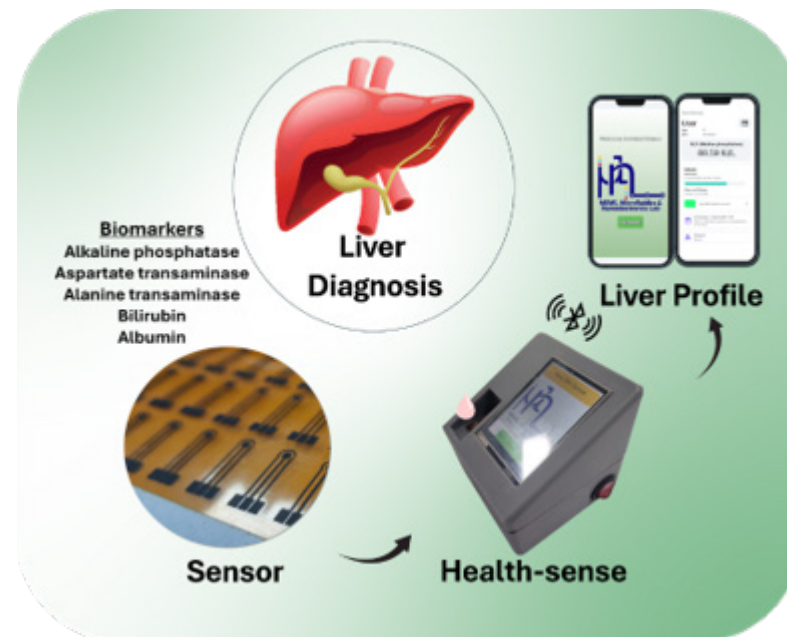
Birla Institute of Technology & Sciences Pilani,
Hyderabad Campus

Guide:

Prof. Sanket Goel

Health is fundamental to the quality of life, and healthcare sustains and improves it. An efficient healthcare system extends beyond the treatment of diseases by emphasizing early diagnosis and continuous management of health conditions. Ensuring timely access to medical services enhances life expectancy, improves quality of life, and contributes to social and economic development. The rise in unfamiliar diseases and lifestyle disorders has recently made accessible, efficient, and user-oriented healthcare devices an integral part of daily life. Despite this, traditional health-monitoring devices limit their usability for home care, bedside applications, or emergencies. This has led to increased demand for sensors that can effectively capture biochemical information from blood, similar to the functionality of glucometers. To address these gaps, Health-sense has been developed as an innovative, frugal, and handheld biosensing platform designed for real-time monitoring of chronic diseases, particularly liver disorders. The device integrates microfluidic sample handling with an electrochemical sensing chip fabricated through a simple in-situ process using metal nanoparticles and biological elements for high sensitivity and selectivity. The system requires only microlitre-level sample volumes and uses low-cost, ₹20 replaceable sensor chips, making diagnostics both minimally invasive and affordable. Equipped with IoT connectivity, Health-sense seamlessly interfaces with a mobile application for real-time data visualization and secure sharing, enabling individuals and caregivers to monitor health at home, during emergencies, or in remote settings. Its compact and reusable design makes it ideal

for government healthcare centres, rural clinics, and bedside use. With ongoing development of sensor chips for bilirubin, ALT, AST, alkaline phosphatase, phosphates, and ascorbic acid, Health-sense has the potential to evolve into a versatile diagnostic ecosystem. By bringing laboratory-grade testing closer to the community, this innovation aims to transform preventive healthcare and improve early disease management in underserved populations.





Himanshi Awasthi

Ultrafast laser-doped P-type graphene: Flexible B-LIG for advancing energy storage devices

Himanshi Awasthi

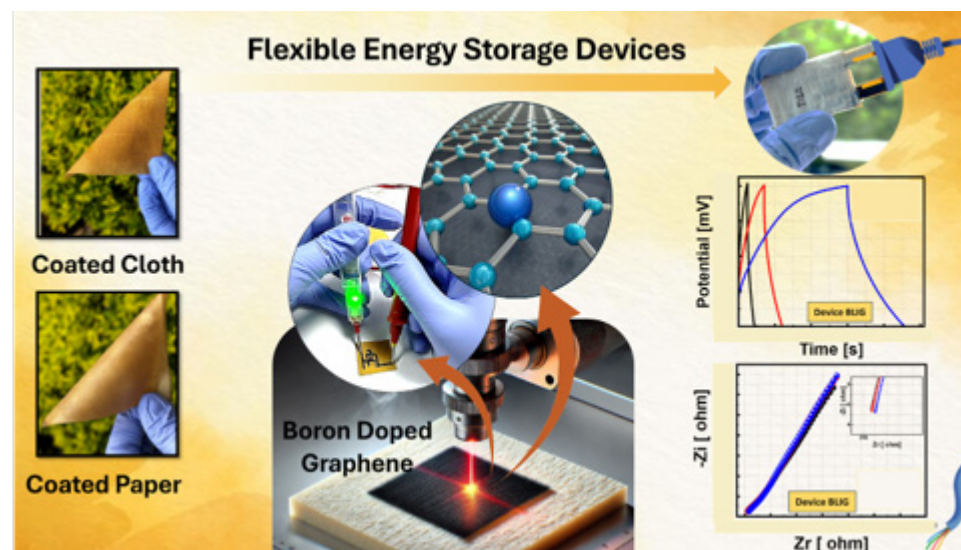
Birla Institute of Technology & Sciences Pilani,
Hyderabad Campus

Guide:

Prof. Sanket Goel

The rapid growth of wearable technologies, particularly electronic textiles, demands flexible, lightweight, and low-cost energy-storage systems capable of powering emerging smart applications. This work introduces a simple, room-temperature, laser-assisted method for synthesizing boron-doped laser-induced graphene (B-LIG) directly on everyday substrates such as paper and cloth. By incorporating boric acid during laser processing, boron atoms are uniformly integrated into the graphene lattice, forming P-type graphene with enhanced structural, electrical, and chemical characteristics. This direct-writing approach overcomes the limitations of conventional graphene doping techniques, which typically require complex equipment, high temperatures, and costly raw materials. Boron doping significantly improves the defect density, porosity, and ion-accessible surface area of the material, resulting in a near 2 times increase in electrical conductivity and approximately 3 times enhancement in electrochemical performance compared to undoped LIG. These improvements facilitate faster ion transport, higher charge-storage capability, and better cycling behaviour, making B-LIG a promising candidate for next-generation flexible supercapacitors used in wearable electronics. The environmentally friendly synthesis requires no toxic chemicals and can utilize low-cost or waste substrates, lowering material expenses by almost

tenfold. With only a blue-light laser as the primary equipment, B-LIG can be fabricated rapidly, within minutes, at a cost of less than one rupee per square cm. This frugal, energy-efficient process minimizes resource consumption, simplifies production, and enables easy scalability. This innovation offers a high-performance, affordable, and sustainable pathway for developing flexible energy-storage devices, creating greater value from fewer resources, and expanding accessibility for widespread societal benefit.





Ravi Prakash Verma



Prateekshya Suman Sahu

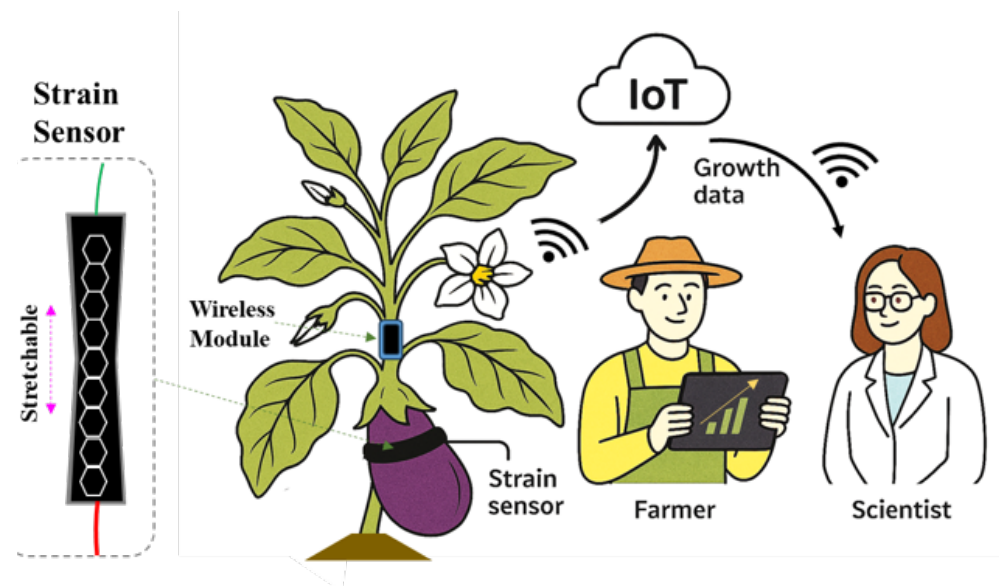
Piezoresistive sensors for real-time fruit growth monitoring in smart farming

Ravi Prakash Verma, Prateekshya Suman Sahu
National Institute of Technology, Rourkela

Guide:
Dr Biswajit Saha

Accurate and continuous monitoring of fruit and plant growth is crucial for evaluating chemical influences, optimising agricultural productivity, estimating crop yields, and determining optimal harvest periods. Conventional dendrometry techniques depend on frequent manual measurements, which may disrupt natural growth patterns and offer limited resolution, making them inadequate for capturing rapid growth variations. To address these limitations, we have developed a waterproof, stretchable, and highly sensitive piezoresistive sensor designed for real-time fruit growth monitoring in outdoor environments. The sensor is fabricated using a graphene-silicone-based screen-printable paste (GSiCP) and exhibits exceptional performance characteristics, including high sensitivity (2050), significant stretchability (125%), and robust durability (5000 cycles). It is capable of detecting minute growth variations with a resolution of 0.04%, enabling precise measurement of even very slow growth rates. The non-invasive nature of the GSiCP sensors allows continuous monitoring without affecting natural fruit or plant development. Additionally, their hydrophobic properties ensure reliable operation under varying environmental conditions. In this study, the sensors were utilised to monitor the growth of brinjal (eggplant) over 15 days in a field setting. Integration with

Internet of Things (IoT) technology enabled remote acquisition of real-time growth data. The developed sensing platform offers valuable insights into the effects of fertilisers, sunlight exposure, pH levels, and temperature on fruit development, providing a powerful tool for agricultural researchers and practitioners.





**Anne Tryphosa
Kamatham**

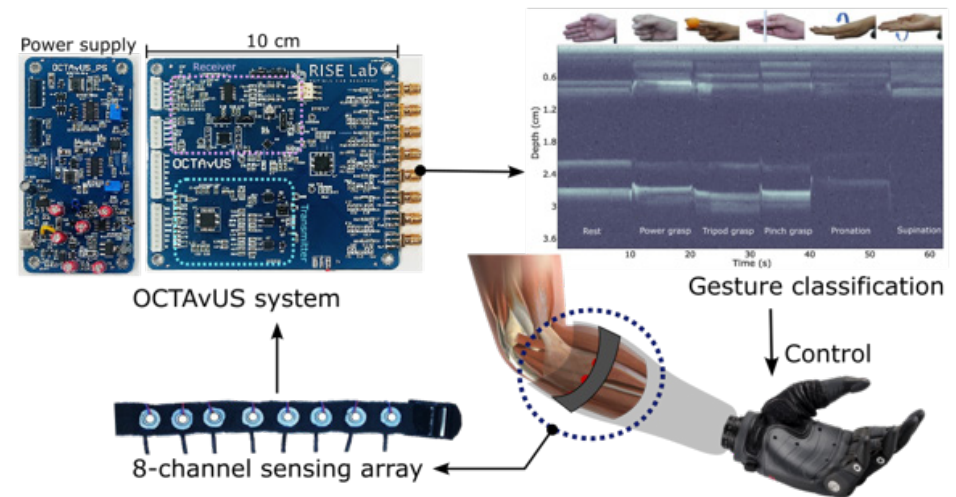
A wearable ultrasound system for control of prosthetic devices

Anne Tryphosa Kamatham
Indian Institute of Technology, Delhi

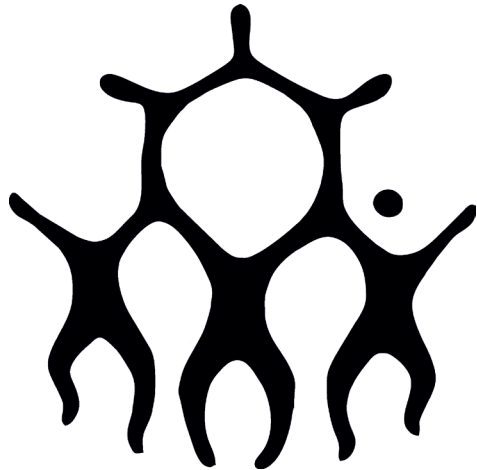
Guide:
Prof. Biswarup Mukherjee

Upper limb loss significantly impedes daily activities and imposes physical, psychological, and socioeconomic challenges on individuals with amputation. In India, most common upper limb prosthesis are passive, or body powered prostheses offering minimal functionality. Multi-articulated prostheses can partially restore the function but require accurate detection of user's volition. Conventional surface electromyography (sEMG) could only measure the superficial muscle activity and is prone to muscle-cross talk, noise, and motion artifacts reducing reliability during real-world use. Ultrasound imaging enables visualization of the muscle activity from deeper muscles, capturing the mechanical outcome of the movement intention. However, traditional B-mode systems are too bulky for integration into prostheses and need to be significantly downsized to achieve wearability. In this work, we developed a wearable ultrasound system (OCTAvUS), comprising an 8-channel transducer array and a transceiver. The sensing array has eight Lead Zirconate Titanate (PZT) transducer elements driven by the high-voltage pulses generated by the transmitter. The receiver comprises a low noise amplifier, and an envelope detector to eliminate the high frequency components of the RF signal thereby significantly reducing the overall hardware, and data processing complexity. The signal envelope was sampled at 2.5 MSPS by an STM32 microcontroller's on-

board ADC and transmitted to the computer over UART resulting in a frame rate of 12 frames-per-second. We also developed a sonomyography signal-driven gesture classification algorithm to demonstrate dynamic muscle activity measurement. A gesture classification experiment involving one non-disabled participant for classifying eight gestures resulted in an overall classification accuracy of 95.6 %. This system shows the potential for wearable ultrasound-based sensing systems for improving the functionality of the upper limb prosthetics and can be extended to other areas involving musculoskeletal assessment and rehabilitation.



Honey Bee Network



Honey Bee Network

The Honey Bee Network (HBN) is a social movement sustained by a large number of volunteers. It pioneered the culture of open innovation long before the term became popular. For the past 38 years, it has stood at the forefront of protecting the knowledge, resources, and rights of people who are economically poor but rich in wisdom.

Its core aims are (i) fostering cross-pollination of ideas and promoting lateral learning among creative individuals and communities, (ii) overcoming the anonymity of grassroots innovators and other knowledge holders, (iii) ensuring that any use of their knowledge is shared back with them in their local language, and (iv) guaranteeing that if profits or income are generated from their knowledge, a fair and just share returns to the people. The network has promoted creativity and green grassroots genius across several countries. Through its volunteers, it has facilitated the documentation of over 45,000 ideas, innovations, and traditional practices, along with numerous student projects. Over time, the Honey Bee

Network has incubated a series of institutions to support grassroots innovators. It gave birth to the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), the Grassroots Innovation Augmentation Network (GIAN), and the National Innovation Foundation (NIF), while also inspiring many national and international innovation policies. Today, HBN serves as a global platform where like-minded individuals—innovators, farmers, academicians, policymakers, entrepreneurs, and non-governmental organizations (NGOs)—come together to respect, recognize, and reward grassroots innovations. Volunteers play a vital role in scouting innovators, supporting and mentoring them, and helping disseminate their innovations widely.

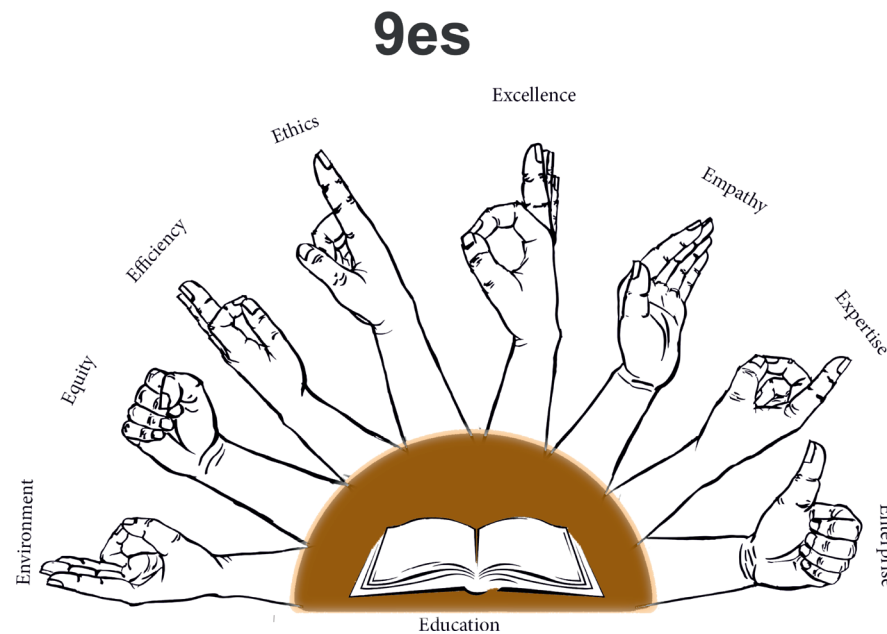
The key areas of engagement:

- Scouting, spawning, and supporting innovations and outstanding traditional knowledge at the grassroots. It links formal and informal science, seeks to validate and add value to sustainable innovative technologies, promotes creativity among children, and pursues learning from grandparents, particularly centenarians, about viable and green traditional knowledge.
- Promoting innovations and creativity among grassroots farm and non-farm workers, communities, and women's groups engaged with culture, folk art, school and college technical education, and institutions (particularly common properties or community-managed) for the conservation of biodiversity and natural resources.
- Mentoring individual innovators in various sectors and connecting them with each other and informal sector innovators. Lobbying for policy and institutional changes in support of grassroots creativity and innovations at regional, national, and international levels.
- Supporting knowledge and intellectual property rights (IPR) of economically

poor people and young inventors, while encouraging them to share their knowledge with other self-employed individuals as part of Technology Commons. The transfer of people's knowledge to firms is facilitated on fair and just licensing terms with benefit-sharing.

- Linking innovators with formal research and development (R&D) institutions, markets, communication networks, and media, so that more people are inspired to find solutions to societal problems. SRISTI (www.sristi.org) and GIAN (www.gian.org) provide institutional support to the Network, along with other volunteers.

Linking technology students with small industries, entrepreneurs, and the informal sector through techpedia.in, while facilitating the Gandhian Young Technological Innovation (GYTI) Awards by SRISTI, the Honey Bee Network has also been creating the world's largest open-source pool of sustainable solutions developed independently by people and made accessible to communities worldwide. It brings out the Honey Bee quarterly newsletter, a unique voice of creative and innovative grassroots communities in different languages, and continuously motivates commercial organizations as well as public systems to become more empathetic in providing extremely affordable services and products to common people.



SRISTI (www.sristi.org)

INTRODUCTION:



SRISTI, which means creation in Sanskrit, was established in 1993 to support the activities of the Honey Bee Network (1987–88) in recognizing, respecting, and rewarding creativity at the grassroots level. As a developmental voluntary organization, SRISTI strengthens the spirit of creativity and innovation among knowledge-rich but economically poor individuals and communities. It builds bridges between informal and formal science, protects

the intellectual property rights of grassroots innovators, and

contributes to conserving and augmenting biodiversity along with associated knowledge systems.

For the past 33 years, SRISTI has supported eco-friendly solutions to local problems scouted, spawned, and spread by Honey Bee Network volunteers. It also nurtures ecopreneurs engaged in conserving biodiversity, common property resources, cultural diversity, and educational innovations.

SRISTI is committed to backstopping the five pillars of the Honey Bee Network:

- [1] Educational innovations by school and college students, teachers, and other stakeholders.
- [2] Institutional innovations at community and other levels in managing natural and other resources.
- [3] Cultural creativity to foster curiosity, collaboration, and compassion through art, literature, and crafts.

- [4] Technological innovations and traditional knowledge addressing human, animal, plant, and ecosystem health.
- [5] Policy reforms to generate frugal innovations for sustainable development at all levels, with specific reference to youth, children, women, and the elderly.

Essentially, SRISTI aims to improve access for knowledge-rich but economically poor people to both informal and formal institutional resources, thereby triggering a self-reliant development process rooted in Gandhian ethics and principles.

OBJECTIVES:

Systematic documentation, dissemination, and value addition of green grassroots innovations, along with support for biotechnological innovations by communities, technology students, and others, for a sustainable future.

BIODIVERSITY

- Providing intellectual property rights protection and risk capital support.
- Extending support for in-situ and ex-situ conservation of local biodiversity and associated knowledge systems.
- Empowering knowledge-rich but economically poor people by adding value to their innovations, traditional knowledge, and associated biological diversity, including microbial diversity.
- Linking formal and informal science to enrich both knowledge systems, while building databases of innovations by farmers, artisans, mechanics, technology students, teachers, and other social innovators.
- Providing early-stage risk capital and mentoring support to grassroots innovators, students, and other mavericks to scale up their products and

services based on grassroots innovations through commercial or non-commercial channels. Embedding the insights gained from grassroots innovations into formal educational, policy, and institutional systems to expand the conceptual, cognitive, institutional, and policy space available to these innovations.

INITIATIVES:

BIRAC's BioNEST

Sanctuary of Innovation, Incubation and Entrepreneurship

(SIIE) SRISTI-BioNEST is an innovation and grassroots traditional knowledge-based business incubator, funded by BIRAC (Biotechnology Industry Research Assistance Council, Department of Biotechnology, Government of India). It supports innovations arising from out-of-the-box thinking, traditional knowledge, grassroots-level knowledge systems, and ideas contributed by university students and even children, enabling successful product development and commercialization. Both formal and informal sector innovations are nurtured. The incubator caters to diverse sectors including biotechnology, biological sciences, environmental sciences, food technology, medical science and technology, nanotechnology, pharmacy, rural development, and other allied areas. Currently, 28 incubatees are being supported at SIIE-SRISTI BioNEST.

CHILDREN'S CREATIVITY:

The Children's Creativity and Co-creation Workshops aim to empower children not only to identify and articulate their own problems but also to recognize and attempt to solve the problems of socially disadvantaged segments, individually and collectively. These workshops engage children in addressing the social challenges faced by communities, thereby mobilizing the creative potential of children worldwide. The objective is to overcome persistent social inertia in emerging regions and, at times, even in advanced societies. It is hoped that many of these children will grow into empathetic, creative, and compassionate leaders

of the future, committed to building an inclusive and sustainable society.

INSHODH - "TEACHERS AS TRANSFORMERS"

Teachers as Transformers is an initiative of the Educational Innovations Bank (EI Bank), partnered with SRISTI and the Honey Bee Network, and based at the Ravi J. Matthai Centre for Educational Innovation, Indian Institute of Management Ahmedabad (RJMCEI-IIMA). EI Bank serves as a clearinghouse for effective educational innovations developed and implemented by elementary school teachers working within the public system. Teachers in the public system continue to play a vital role in ensuring education for marginalized sections of society. Despite the growing share of private sector enrolment, socio-economically disadvantaged groups will remain dependent on this system in the foreseeable future. However, the quality and educational outcomes of the public system have often been criticized for falling short of desirable standards. EI Bank recognizes that top-down reform is necessary but not sufficient. Learning from teachers who have succeeded despite constraints common to many, valorizing and supplementing their work, and converting it into a resource can expose educators to a solution-augmenting approach to local educational reform and inspire them to improve outcomes.

SHODH SANKAL

The concept of Shodh Sankal (a chain of experimenting farmers) was initiated by SRISTI in 1996 to create a lateral learning environment among grassroots innovators. The idea was to bring together experimenting farmers to discuss the results of trials they had undertaken on their own to address various local problems. Such discussions not only enhance the esteem for local knowledge systems but also accelerate the process of technological change in regions where formal technology generation has not been very successful—such as dry regions, mountainous areas, and other disadvantaged zones.

SOCIAL INNOVATION FUND

The main objective of the Social Innovation Fund (SIF) is to provide mentoring,

financial support, fabrication, validation, and value addition facilities in labs, fields, and R&D institutions for nurturing creativity in culture, education, technology, and governance.

SRISTI INNOVATIONS

A Section 8 company was established with the objective of strengthening the capacity of grassroots inventors, innovators, and ecopreneurs in conserving biodiversity and developing eco-friendly solutions to local problems. It is engaged, inter alia, in documentation, experimentation, research, development, and diffusion of sustainable technologies and institutions. The company now hosts the BioNEST incubator, in addition to publishing HBN newsletters and other books in Hindi, Gujarati, and English. It also develops commercialization products, ensuring that a fair share of benefits returns to the knowledge-providing communities.

Other Activities:

SATTVIK FOOD FESTIVAL:

SATTVIK is a festival that celebrates traditional nutritious food and associated knowledge systems. It was started fourteen years ago at IIMA to provide market-based incentives for conserving agro-biodiversity and to create demand for rarely or less cultivated, nutritionally rich crops and varieties, thereby stimulating their cultivation. In regions with low rainfall, minerals in the soil do not leach much, and hence crops grown there—such as millets, sorghum, and pulses—are rich in nutritional value. The paradox of development is that the food consumed by the rich is often nutritionally poor, while the food grown by the poor in disadvantaged regions is nutritionally rich. SATTVIK aspires to bring these lesser-known but nutrient-rich foods from various states to the plates of urban communities, encouraging healthier food habits and lifestyles. The festival also seeks to motivate farmers to cultivate more nutrition-rich crops, thereby helping them augment their incomes. <http://sattvik.sristi.org/>

SHODHYATRA

Shodhyatra is a journey into some of the remotest areas of the country to discover

knowledge, creativity, and grassroots innovations. Initiated by SRISTI, it is founded on the belief that the hardships and challenges of natural surroundings are prime motivators of creativity and innovation. The journey seeks to unearth traditional knowledge and grassroots innovations while fostering mutual exchange and sharing of wisdom.

Knowledge and practices pooled during various Shodhyatras are shared back with villagers in subsequent journeys, along with access to the databases of the Honey Bee Network. Women and children are actively involved, showcasing their ecological knowledge through recipe competitions and children's contests. Over the past 27 years, 53 Shodhyatras have been organized, covering all the states of the country. <https://www.sristi.org/shodhyatra/>

SRISTI LAB:

SRISTI believes that adding value to indigenous knowledge will help local communities coexist with biodiversity by reducing primary extraction and generating long-term benefits. This approach aims to enhance sustainable resource use and support livelihood systems. To achieve this, SRISTI conducts research-based activities.

The rationale behind establishing the Sadbhav SRISTI Sanshodhan Natural Products Laboratory was to create a facility that transforms local knowledge and resources into value-added products. This initiative includes developing processing facilities in rural regions rich in natural resources.

The work at SRISTI lab focuses on validating and adding value to grassroots innovations and traditional practices. We aim to develop eco-friendly, non-chemical options for pest management and animal healing. Additionally, we prioritize generating and sharing wealth with grassroots innovators by distributing financial benefits from the commercialization of new products and technologies to local innovators and communities. This initiative includes creating products for both non-commercial and commercial distribution, organizing entrepreneurs, and bridging the gap between informal and formal knowledge through scientific discipline. Throughout this process we also ensure capacity building of local communities and skill development for students. More at <http://www.sristi.org/sristi-lab/>

TECHPEDIA (www.techpedia.in)

Techpedia, an initiative of SRISTI, aims to place the problems of micro, small, and medium enterprises (MSMEs), the informal sector, grassroots innovators, and other social sectors on the agenda of young technology students across the country. For the past sixty years, India has not utilized much of the technological output of millions of students—but this apathy will continue no more. Can a knowledge society really afford to ignore the immense talent distributed across thousands of polytechnics, diploma, and degree colleges of engineering, pharmacy, medical science, agriculture, and related fields? SRISTI is providing a platform for industry and academic institutions to collaborate, co-create, and foster distributed and horizontal frugal innovations.

Goals of Techpedia:

Promotion of originality among technology students is ensured by making it impossible for them to repeat what has already been done before. This is possible only when they can access and identify prior work. Techpedia hosts 204,000 technology projects completed by about 600,000 students from more than 600 colleges across India.

- Connecting technical students with the problems of informal, unorganised sectors and grassroots innovators.
- Harnessing collaborative potential of students across disciplines and colleges to solve persistent problems in both formal and informal sectors.
- Exploring the kho kho (relay) model of product development, where one student group advances a solution to a certain stage and the next group, from the same or another department, builds upon it to take it forward.
- Posing challenges for students to address unsolved societal problems. Gandhiji had announced an award of 7,700 pounds (Rs 100,000) to redesign the charkha (spinning wheel). Today, the value of this prize would exceed Rs 10 crore. Industry associations, government, and others can offer attractive prizes for solving long-standing problems.

- Developing high-tech capabilities through network platforms so that India becomes a hub for high-tech outsourcing in the future, rather than serving only low-tech needs.
- Promoting both IPR-protected and open-source technology, with the eventual goal of developing techpedia.in into an online virtual sanctuary of innovations, not just an incubator.
- Creating a real-time online National Mentoring Network (NMN) to harness the skills, insights, and experiences of senior tech experts for mentoring young students, along with remote reverse mentoring by young start-ups and students.
- Encouraging innovations through the SRISTI Social Innovation Fund, recently established to promote frugal and extremely affordable socially useful ideas.
- Leveraging policy and institutional changes to make the innovation ecosystem more responsive to societal needs and the aspirations of young talent.
- Organizing summer schools to address specific social challenges, enabling young students to overcome institutional inertia by developing new prototypes to eliminate child labour, enhance women's safety, and support the autonomy of physically challenged individuals.
- Building global linkages so that collaborative open-innovation models pioneered by the Honey Bee Network are further diffused among student communities worldwide.

Summer School on Inclusive Innovations

SRISTI has been engaging with children to tap their creativity in addressing unmet social needs for over 33 years. Across the world, children are often treated as recipients of sermons rather than as sources of ideas.

The children's creativity workshops are organized to view societal inertia through the eyes of children. They are empowered to conduct research, identify unmet social needs, and suggest solutions. Later, engineering and other students take up some of these ideas, along with others, to fabricate solutions for addressing these problems. The purpose is to generate extremely affordable solutions within three weeks that improve the quality of life of poor children, women, workers, and other disadvantaged social segments. Some solutions developed during the summer school may not be fully finished, but opportunities are provided to participants or external designers to complete them in the following months, in partnership with potential users.

Even if certain problems remain unsolved, there will be a better appreciation of the pathways that do not lead to resolution. SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions) has organized this Summer School on Inclusive Innovation through an open, reciprocal, and responsible framework guided by the Honey Bee Network philosophy. It is hoped that young students will learn not to be patient with inertia, sharpening their perceptions to transition from samvedana to srijansheelta—an empathetic way of creative problem solving.

For example, a palm leaf broom maker must beat the leaves on a wooden plank mounted with nails to tear them into fine fibres, a task that drains much of the energy of women who generally perform it. Similarly, hundreds of thousands of tribals must crack mahua nuts to extract seeds for oil, while construction workers carry bricks on their heads, straining their necks and spines. Women in Saurashtra and other regions often get hurt while harvesting fruits from cactus-like opuntia growing on field bunds, and amla harvesting in forests frequently involves cutting branches rather than simply collecting the fruits.

These and many other problems have been mobilized by the Honey Bee Network to challenge young people to design solutions that overcome the indifference or inertia of formal design and technology institutions.

Every institution in the country must take responsibility for mapping unmet social needs in their hinterland and addressing them through student projects and summer or winter schools. As with every initiative of the Honey Bee Network, it

may take years before policy and institutional reforms follow. Yet, the structure of governance in any society cannot remain indifferent to the persistent problems of disadvantaged people for too long.

Email: summerschool@sristi.org ; website: ss.sristi.org

IGNITED MIND

In memory of Dr. A.P.J. Abdul Kalam, the Honey Bee Network, SRISTI, and GIAN have jointly organized an annual competition of innovative ideas by students. The Dr. A.P.J. Abdul Kalam Children Ignited Mind Creativity and Innovation Award accepts entries from students up to class 12, as well as from school dropouts. This award seeks to foster a culture of Samvedna among children, encouraging them to find solutions to local problems and address unmet social needs. The idea is to make children aware of the problems and hardships faced by common people in their daily lives—issues that many have learned to adjust to and accept. It is believed that if children begin to grow impatient with social inertia at an early age, they are more likely to bring about creative and compassionate changes in society as they mature.

SITARE BIIS: Opportunity for technology students to work on grassroots innovations

SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions), in collaboration with BIRAC (Biotechnology Industry Research Assistance Council, Department of Biotechnology, Government of India), had been organizing a three-week SITARE BIIS (Students Innovations for Translation & Advancement of Research Explorations – Biotech Innovation Ignition School) since 2017 for validating, value-adding, and product development around grassroots innovations. BIIS aimed to develop solutions for grassroots applications for humans, animals, and agriculture, including herbal technologies, medical devices, and microbial applications.

Due to the COVID-19 pandemic, BIIS was conducted as a webinar (BIIS-5: June 8–June 27, 2020; BIIS-6: September 22–October 12, 2020; BIIS-7: December

1–December 21, 2020; BIIS-8: January 25–February 14, 2021; and BIIS-9: May 20–June 9, 2021). The prime focus was to build the capacity of primarily undergraduate students to develop skills in phytochemistry, pharmacognosy, extraction, separation of compounds, microbial diversity screening, pest control, and the development of extremely affordable solutions for farmers, livestock keepers, pastoralists, and human applications, along with training in patents, biostatistics, and ethical guidelines for work on grassroots knowledge and innovations.

The topics for the online BIIS course were designed around the following fields, and as part of the webinar, projects were assigned to students in five action-research areas drawing upon the Honey Bee Network Database:

- Pharmacognosy/Phytochemistry – SRISTI's grassroots database contains many traditional knowledge practices as well as contemporary innovations from across the country. These projects involved validation and value addition to such practices. A few examples were presented here: Honey Bee Database (sristi.org in Bing).
- Soil Microbiology – SRISTI maintains a microbial diversity bank containing over 8,000 organisms (bacteria, fungi, and actinomycetes) isolated from soil samples collected during ShodhYatras (learning walks for scouting and sharing innovations and local practices) in different parts of the country (ShodhYatra). Extensive screening of these microbes was conducted for novel human, animal, and agricultural applications.
- Veterinary Medicine – Validation of traditional practices for improving livestock health, nutrition, and productivity.
- Agriculture – Validation of grassroots practices through trials in the lab, on stations, and in the field for product development and improvement.
- Medical Devices – Value addition and product development of open-source projects listed on the Summer School website (<http://summerschool.sristi.org/>), or medical devices for human and animal healthcare, as well as for addressing other unmet social needs.

Grassroots Innovation Augmentation Network (GIAN)



One of the major reasons grassroots innovations have not been able to scale up in many regions and sectors is the lack of handholding support to reduce transaction costs in leveraging linkages with investors and entrepreneurs. Grassroots innovators often cannot prepare or present a business

plan, nor can they construct scenarios under different assumptions of demand, subject to varying capacities for fabrication, manufacturing, or development of other products and services.

GIAN (Grassroots Innovations Augmentation Network) was set up in 1997 as a follow-up to the International Conference on Creativity and Innovations at Grassroots (ICClG) held at IIMA, in collaboration with SRISTI and the Honey Bee Network. Its purpose was to strengthen the “golden triangle” of rewarding creativity by reducing ex-ante and ex-post transaction costs for innovators, investors, and entrepreneurs. This was achieved through operating principles such as never asking innovators to come to the office, but instead providing support at their doorstep, and organizing financial, intellectual property, product, business development, and dissemination support.

With a small team and limited funds, GIAN achieved an admirable track record. It shared the Best Incubator Award with IIT Madras, conferred by the then President Dr. A.P.J. Abdul Kalam in 2003 under the Department of Science and Technology. The model of GIAN was later scaled up in 2000 in the form of the National Innovation Foundation (NIF).

GIAN has an independent board and a small team of professionals experimenting with new models of incubation, innovation, and inculcation of experimental ethics at different levels in society.

Genesis

Being a pioneer is never easy. Expectations from pioneers are always higher, and with no template to follow, much of the learning takes place by doing.

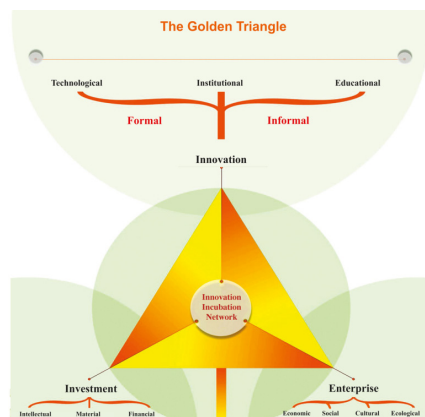
GIAN was set up in collaboration with the Gujarat Government, IIMA, and SRISTI, along with volunteers from the Honey Bee Network, as a follow-up to the International Conference on Creativity and Innovations at Grassroots (ICClG) held at IIMA. Its only assets were the commitment of the state government to support grassroots innovations in becoming entrepreneurial, access to SRISTI’s Honey Bee Network Database of innovations by common people, and the guidance and support of IIMA faculty and students.

Receiving the Best Incubator Award in 2002, jointly with IIT Madras, from the then President Dr. A.P.J. Abdul Kalam, validated its purpose. India’s first grassroots innovation incubator had proven to be a viable pathway for reducing transaction costs of innovators, investors, and entrepreneurs. The “golden triangle” for rewarding creativity—now well known—summarizes GIAN’s mission: handholding grassroots innovators in their journey to become social and/or economic entrepreneurs.

Over time, GIAN expanded its scope of work. It now engages with women’s groups, tribal communities, students of ITIs and polytechnics (particularly women’s polytechnics), as well as farmers. It operates across all sectors of human survival, adding value to people’s knowledge in collaboration with other Honey Bee Network institutions such as SRISTI and NIF.

GIAN has an independent board that includes three additional chief secretaries from the agriculture, industry, and rural development departments, independent industry representatives, faculty from IIMA, the Director of EDI, and the Directors of IIMA and NID as permanent invitees.

Mission



GIAN aims to sustain the spirit of innovation, encourage experimentation, and nurture creativity at the grassroots level among knowledge-rich but economically poor people, students, mechanics, workers, and young start-ups by contributing to the creation of a knowledge network. This network empowers innovators, prevents the erosion of traditional knowledge systems, recognizes and augments contemporary innovations, and facilitates the diffusion of grassroots green innovations through

commercial as well as non-commercial public, private, and voluntary channels.

Objectives

- To identify socially, economically, and ecologically viable innovations from the Honey Bee Database that are amenable to scaling up, prototype development, and diffusion, with or without further value addition.
- To participate in the process of value addition undertaken by other research organizations in grassroots innovation so that eventual scaling up can be achieved effectively.
- To mobilize resources from regional, national, and international private, public, and other organizations, as well as high net-worth individuals, to strengthen the ecosystem of grassroots innovations.
- To undertake market research, project development, and provide design, IP-related, and entrepreneurial support, along with assistance in protecting intellectual property.
- To influence policy at both micro and macro levels, making it more responsive

to the needs and expectations of green innovators, thereby fostering a society that is more inventive and accommodative of local knowledge systems, innovations, and practices.

- To publicize innovations and products through exhibitions, Shodhyatras, media, and workshops.
- To organize entrepreneurial development workshops in collaboration with expert institutions for innovators.
- To trigger a rural development process that offers an alternative model of poverty alleviation in a fair, just, and dignified manner through local resources and knowledge.

What does it do?

GIAN provides product development, business planning, innovation augmentation through design and development, dissemination, and entrepreneurship support. It supports farmers and artisans, primarily in the informal sector across Gujarat, Maharashtra, and Goa. At the same time, it can mobilize innovations from other regions for application in these states and disseminate innovations from this region to other parts of the country.

Recently, GIAN began working with students of ITIs and polytechnics, as well as school children. It has established community innovation labs in a government primary school in Ahmedabad and has also experimented with a community food and nutrition lab to help poor communities—and others—derive greater nutrition from available food materials for a healthier future. Despite economic growth, many regions in India continue to suffer from high levels of anaemia among women and malnutrition among children, challenges that GIAN seeks to address through such initiatives.

How can you support GIAN?

Besides CSR and other forms of funding support, GIAN welcomes professionals for short-term sabbaticals, internships, and apprenticeships with innovators

or incubators. It also values remote mentoring support, exposure opportunities for its staff, infrastructural assistance, mobile food and nutrition labs for women, community innovation labs, and sponsorships for summer and winter schools on inclusive innovation to address unmet social needs, as well as Shodhyatras.

GIAN further seeks to collaborate with SRISTI in offering online courses in different languages on how to invent and innovate. It also aspires to organize mobile exhibitions, establish a stationary centre for inclusive innovations, publish books, and collaborate in bringing out the Honey Bee Newsletter, started 29 years ago, in multiple languages.

Trust, transparency and accountability

GIAN is committed to upholding the highest standards of ethical responsibility in managing resources and other non-material contributions. It welcomes opportunities for social audits, allowing the communities it works with to evaluate its functioning and various contributions.



LIST OF REVIEWERS



Reviewer's list

No.	First Name	Organization
1	Prof. Aniruddha B Pandit	Vice Chancellor, Institute of Chemical Technology, Mumbai
2	Dr. Santha Kumar G	Senior Scientist, CSIR-Central Building Research Institute, Roorkee
3	Dr. Abhilash K R	Scientist, National Centre for Sustainable Coastal Management, Chennai
4	Dr. Ravi Prakash	Scientist, ICAR-Central Institute of Post-Harvest Engineering and Technology, Ludhiana
5	Dr. R Siva Chidambaram	Scientist, CSIR-Central Building Research Institute, Roorkee
6	Dr. Humaira Athar	Scientist, CSIR-Central Building Research Institute, Roorkee
7	Prof. Abhijit Majumdar	Professor, Indian Institute of Technology, Delhi
8	Prof. Arul Scaria	Professor, National Law School of India University, Bengaluru
9	Prof. Subhankar Paul	Professor, National Institute of Technology, Rourkela
10	Dr. Tamilvanan S	Professor, National Institute of Pharmaceutical Education and Research, Guwahati
11	Prof. Jayanta Halder	Professor, Jawaharlal Nehru Centre For Advanced Scientific Research, Bengaluru
12	Prof. Shoumitra Das	Professor, Jawaharlal Nehru Agricultural University, Jabalpur
13	Prof. Vandana B. Patravale	Professor, Institute of Chemical Technology, Mumbai
14	Prof. Ravindra V. Adivarekar	Professor, Institute of Chemical Technology, Mumbai
15	Prof. Ravindra D. Kale	Professor, Institute of Chemical Technology, Mumbai
16	Prof. Naveen Kumar	Professor, Indian Institute of Technology, Roorkee
17	Prof. Partha Roy	Professor, Indian Institute of Technology, Roorkee
18	Prof. Gopinath Packirisamy	Professor, Indian Institute of Technology, Roorkee
19	Prof. Vimal Kumar	Professor, Indian Institute of Technology, Roorkee
20	Prof. Jitendra Sangwai	Professor, Indian Institute of Technology, Madras
21	Prof. Benny Raphael	Professor, Indian Institute of Technology, Madras
22	Prof. Sirshendu De	Professor, Indian Institute of Technology, Kharagpur
23	Prof. Bhim Charan Meikap	Professor, Indian Institute of Technology, Kharagpur
24	Prof. Dipak Kumar Goswami	Professor, Indian Institute of Technology, Kharagpur
25	Prof. Soumen Das	Professor, Indian Institute of Technology, Kharagpur
26	Prof. Nishant Chakravorty	Professor, Indian Institute of Technology, Kharagpur
27	Prof. J Ramkumar	Professor, Indian Institute of Technology, Kanpur

28	Prof. Neeraj Jain	Professor, Indian Institute of Technology, Jodhpur
29	Dr. Subha Narayan Rath	Professor, Indian Institute of Technology, Hyderabad
30	Prof. Pranab Goswami	Professor, Indian Institute of Technology, Guwahati
31	Prof. Debasish Das	Professor, Indian Institute of Technology, Guwahati
32	Prof. Dibakar Rakshit	Professor, Indian Institute of Technology, Delhi
33	Prof. Sandeep Kumar Jha	Professor, Indian Institute of Technology, Delhi
34	Dr. Jayanta Bhattacharyya	Professor, Indian Institute of Technology, Delhi
35	Dr. Neetu Singh	Professor, Indian Institute of Technology, Delhi
36	Prof. Ravikrishnan Elangovan	Professor, Indian Institute of Technology, Delhi
37	Prof. Ashok K Ganguli	Professor, Indian Institute of Technology, Delhi
38	Prof. Pramod Khadilkar	Professor, Indian Institute of Technology, Delhi
39	Prof. Amit Shukla	Professor, Indian Institute of Technology, Delhi
40	Prof. Kedar Khare	Professor, Indian Institute of Technology, Delhi
41	Prof. Apurba Das	Professor, Indian Institute of Technology, Delhi
42	Prof. PVM Rao	Professor, Indian Institute of Technology, Delhi
43	Prof. Avijit Chatterjee	Professor, Indian Institute of Technology, Bombay
44	Prof. Swati Patankar	Professor, Indian Institute of Technology, Bombay
45	Dr. Rohit Srivastava	Professor, Indian Institute of Technology, Bombay
46	Prof. Chandramouli Subramaniam	Professor, Indian Institute of Technology, Bombay
47	Prof. Pradeepkumar P. I.	Professor, Indian Institute of Technology, Bombay
48	Prof. P. S. Gandhi	Professor, Indian Institute of Technology, Bombay
49	Prof. V. S. Raja	Professor, Indian Institute of Technology, Bombay
50	Prof. Prasanna Kumar S Mural	Professor, Indian Institute of Technology, Bombay
51	Prof. Suparna Mukherji	Professor, Indian Institute of Technology, Bombay
52	Prof. B K Chakrabarty	Professor, Indian Institute of Technology, Bombay
53	Prof. Kavitha Arunachalam	Professor, Indian Institute of Technology Madras
54	Prof. Navakanta Bhat	Professor, Indian Institute of Science, Bengaluru
55	Prof. SP Arun	Professor, Indian Institute of Science, Bengaluru
56	Prof. Rakesh Rawal	Professor, Gujarat Biotechnology University, Gandhinagar
57	Prof. P. Sankar Ganesh	Professor, Birla Institute of Technology and Sciences-Pilani,-Pilani, Hyderabad

58	Prof. Manoj Kumar	Professor, Birla Institute of Technology and Sciences-Pilani, Pilani
59	Dr. Amrita Chatterjee	Professor, Birla Institute of Technology and Sciences-Pilani, Goa
60	Dr. Reena Cheruvalath	Professor, Birla Institute of Technology and Sciences-Pilani, Goa
61	Prof. Reena Cheruvalath	Professor, Birla Institute of Technology and Sciences-Pilani, Goa
62	Dr. Ketan Rajawat	Professor, Indian Institute of Technology, Kanpur
63	Prof. Sanket Goel	Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
64	Prof. Pratyosh Shukla	Professor and Head, Banaras Hindu University, Varanasi
65	Prof. Sabyasachi Mishra	Professor & Head of Department, National Institute of Technology, Rourkela
66	Prof. Mahesh Chabbaria	Principal, LM College of Pharmacy, Ahmedabad
67	Dr. Arunkumar P	Principal Scientist, CSIR-Central Food Technological Research Institute, Mysuru
68	Dr. Abhijeet Ashok Salunke	Orthopedic Oncosurgeon, Gujarat Cancer Research Institute, Ahmedabad
69	Dr. Chandan Kumar Jha	Founder, Galanto Innovations Private Limited, Gandhinagar
70	Dr. Vishweshwaraiah Prakash	Former Director, CSIR-Central Food Technological Research Institute, Mysuru
71	Dr. Avijit Bansal	Fellowship Director, All India Institute Of Medical Sciences, New Delhi
72	Prof. Shashi Bala Singh	Emeritus Scientist, Indian Council of Medical Research, New Delhi
73	Prof. Hari Niwas Mishra	Emeritus Professor, Indian Institute of Technology, Kharagpur
74	Dr. Premnath Venugopalan	Director, Venture Centre, National Chemicals Laboratory, Pune
75	Prof. Alok Dhawan	Director, Centre for Biomedical Research, Lucknow
76	Dr. Taslimarif Saiyed	Director and CEO, Centre for Cellular and Molecular Platforms, Bengaluru
77	Prof. Devendra Deshmukh	Dean Education Outreach, Indian Institute of Technology, Indore
78	Mr. Vaibhav Shitole	Co-founder, Iota Design & Innovations Lab Pvt. Ltd., Ahmedabad
79	Prof. Rajeshwar Shantayya Matche	Chief Scientist, CSIR - Central Food Technological Research Institute, Mysuru
80	Dr. Hetal A Joshi	Associate Professor, Vishwakarma College of Engineering, Gandhinagar
81	Dr. Madhuresh Dwivedi	Associate Professor, National Institute of Technology, Rourkela
82	Dr. Jitender Madan	Associate Professor, National Institute of Pharmaceutical Education and Research, Hyderabad
83	Dr. Saurabh Srivastava	Associate Professor, National Institute of Pharmaceutical Education and Research, Hyderabad
84	Dr. Subham Banerjee	Associate Professor, National Institute of Pharmaceutical Education and Research, Guwahati
85	Dr. Rakesh Kumar Tekade	Associate Professor, National Institute of Pharmaceutical Education and Research, Ahmedabad
86	Dr. Pallab Bhattacharya	Associate Professor, National Institute of Pharmaceutical Education and Research, Ahmedabad
87	Dr. Shibu Chameettachal	Associate Professor, Kasturba Medical College, Manipal

88	Dr. Kedar Kulkarni	Associate Professor, Institute of Chemical Technology, Mumbai
89	Dr. Siva Mohan Reddy	Associate Professor, Indian Institute of Technology, Roorkee
90	Dr. Kaustav Chatterjee	Associate Professor, Indian Institute of Technology, Roorkee
91	Dr. Jayeeta Mitra	Associate Professor, Indian Institute of Technology, Kharagpur
92	Dr. Debashree Guha Adhya	Associate Professor, Indian Institute of Technology, Kharagpur
93	Dr. Santosh K Misra	Associate Professor, Indian Institute of Technology, Kanpur
94	Dr. Subhajit Roy	Associate Professor, Indian Institute of Technology, Kanpur
95	Dr. Subrahmanya Swamy Peruru	Associate Professor, Indian Institute of Technology, Kanpur
96	Dr. Indranil Banerjee	Associate Professor, Indian Institute of Technology, Jodhpur
97	Dr. Raviraj Vankayala	Associate Professor, Indian Institute of Technology, Jodhpur
98	Dr. Abhijeet Joshi	Associate Professor, Indian Institute of Technology, Indore
99	Dr. Samit Bhattacharya	Associate Professor, Indian Institute of Technology, Guwahati
100	Dr. Pranab Kumar Mondal	Associate Professor, Indian Institute of Technology, Guwahati
101	Dr Saumyakanti Khatua	Associate Professor, Indian Institute of Technology, Gandhinagar
102	Dr. Vineet Vashista	Associate Professor, Indian Institute of Technology, Gandhinagar
103	Dr. Mrinalini Pandey	Associate Professor, Indian Institute of Technology, Dhanbad
104	Dr. Deepak Joshi	Associate Professor, Indian Institute of Technology, Delhi
105	Dr. Jay Dhariwal	Associate Professor, Indian Institute of Technology, Delhi
106	Dr. Srinivasan Venkataraman	Associate Professor, Indian Institute of Technology, Delhi
107	Dr. Lakshmi Narayan Ramasubramanian	Associate Professor, Indian Institute of Technology, Delhi
108	Dr. Nitya Nand Goswami	Associate Professor, Indian Institute of Technology, Delhi
109	Dr. Arnab Dutta	Associate Professor, Indian Institute of Technology, Bombay
110	Dr. Swatantra Pratap Singh	Associate Professor, Indian Institute of Technology, Bombay
111	Dr. Alka Hingorani	Associate Professor, Indian Institute of Technology, Bombay
112	Dr. Ashwini Kumar Sharma	Associate Professor, Indian Institute of Technology Roorkee
113	Dr. Arnab Jana	Associate Professor, Indian Institute of Technology Bombay
114	Dr. Sanjeev Kumar Mahto	Associate Professor, Indian Institute of Technology (BHU), Varanasi
115	Dr. Deepak Kumar	Associate Professor, Indian Institute of Technology (BHU), Varanasi
116	Dr. Hardik J Pandya	Associate Professor, Indian Institute of Science, Bengaluru

117	Dr. Uma S. Dubey	Associate Professor, Birla Institute of Technology and Sciences-Pilani, Pilani
118	Prof. Bandhan Bandhu Majumdar	Associate Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
119	Dr. Nirmal J	Associate Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
120	Dr. Pragya Komal	Associate Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
121	Dr. Arkamitra Kar	Associate Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
122	Dr. Pragya Komal	Associate Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
123	Prof. Satish Kumar Dubey	Associate Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
124	Dr. Mithun Mondal	Associate Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
125	Dr. Amit Asthana	Associate Professor and Head, National Institute of Pharmaceutical Education and Research, Hyderabad
126	Dr. Arpita Saha	Assistant Professor, Visvesvaraya National Institute of Technology, Nagpur
127	Mr. Anubhab Pal	Assistant Professor, North Eastern Regional Institute of Science and Technology, Nirjuli
128	Dr. Pallab Datta	Assistant Professor, National Institute of Pharmaceutical Education and Research, Kolkata
129	Dr. Neelesh Kumar Mehra	Assistant Professor, National Institute of Pharmaceutical Education and Research, Hyderabad
130	Dr. Sudhagar S	Assistant Professor, National Institute of Pharmaceutical Education and Research, Guwahati
131	Dr. Pawan Kumar Porwal	Assistant Professor, National Institute of Pharmaceutical Education and Research, Guwahati
132	Dr. Roshan M Borkar	Assistant Professor, National Institute of Pharmaceutical Education and Research, Guwahati
133	Dr. Debleena Bhattacharya	Assistant Professor, Marwadi University, Rajkot
134	Dr. Bhisham Narayan Singh	Assistant Professor, Manipal School of Life Sciences, Mahipal
135	Dr. Swarup Roy	Assistant Professor, Lovely Professional University, Phagwara
136	Dr. Bodhisatwa Das	Assistant Professor, Indian Institute of Technology, Ropar
137	Dr. Yadagiri Dongari	Assistant Professor, Indian Institute of Technology, Roorkee
138	Dr. Deepak Kumar Ojha	Assistant Professor, Indian Institute of Technology, Roorkee
139	Dr. Greeshma Thrivikraman	Assistant Professor, Indian Institute of Technology, Madras
140	Dr. Anmol Pahwa	Assistant Professor, Indian Institute of Technology, Madras
141	Dr. Shantanu Pradhan	Assistant Professor, Indian Institute of Technology, Madras
142	Dr. Gourav Dhar Bhowmick	Assistant Professor, Indian Institute of Technology, Kharagpur
143	Dr. Kanishka Bhunia	Assistant Professor, Indian Institute of Technology, Kharagpur
144	Dr. Somdeb Bose Dasgupta	Assistant Professor, Indian Institute of Technology, Kharagpur
145	Dr. Nikita Dewangan	Assistant Professor, Indian Institute of Technology, Kharagpur
146	Dr. Ananta Kumar Sarkar	Assistant Professor, Indian Institute of Technology, Kharagpur

147	Dr. Amandeep Jindal	Assistant Professor, Indian Institute of Technology, Kharagpur
148	Dr. Atul Jain	Assistant Professor, Indian Institute of Technology, Kharagpur
149	Dr. Archana Shukla	Assistant Professor, Indian Institute of Technology, Kharagpur
150	Dr. Indranath Chakraborty	Assistant Professor, Indian Institute of Technology, Kharagpur
151	Dr. Raj Kumar Manna	Assistant Professor, Indian Institute of Technology, Kharagpur
152	Prof. Kaushal Desai	Assistant Professor, Indian Institute of Technology, Jodhpur
153	Dr. Ankur Gupta	Assistant Professor, Indian Institute of Technology, Jodhpur
154	Dr. Bhivraj Suthar	Assistant Professor, Indian Institute of Technology, Jodhpur
155	Dr. Vijai Laxmi	Assistant Professor, Indian Institute of Technology, Indore
156	Dr. Kousik Sarathy Sridharan	Assistant Professor, Indian Institute of Technology, Hyderabad
157	Dr. Althuri Avanthi	Assistant Professor, Indian Institute of Technology, Hyderabad
158	Dr. Anirban Dasgupta	Assistant Professor, Indian Institute of Technology, Guwahati
159	Dr. Ravindra Kumar Jha	Assistant Professor, Indian Institute of Technology, Guwahati
160	Dr. R. K. Mittal	Assistant Professor, Indian Institute of Technology, Guwahati
161	Dr. Biswajit Saha	Assistant Professor, Indian Institute of Technology, Gandhinagar
162	Prof. Mukesh Dhanka	Assistant Professor, Indian Institute of Technology, Gandhinagar
163	Dr. Narsing K Jha	Assistant Professor, Indian Institute of Technology, Delhi
164	Dr. Saptarishi Basak	Assistant Professor, Indian Institute of Technology, Delhi
165	Dr. Sachin Kumar B	Assistant Professor, Indian Institute of Technology, Delhi
166	Dr. Naveen Kumar Singh	Assistant Professor, Indian Institute of Technology, Delhi
167	Dr. Priya Vashishth	Assistant Professor, Indian Institute of Technology, Delhi
168	Dr. Akash Johry	Assistant Professor, Indian Institute of Technology, Delhi
169	Dr. Richa Gupta	Assistant Professor, Indian Institute of Technology, Delhi
170	Dr. Vivekanandan Perumal	Assistant Professor, Indian Institute of Technology, Delhi
171	Dr. Neeta Kanekar	Assistant Professor, Indian Institute of Technology, Bombay
172	Dr. Najeeb Shariff Mohammad	Assistant Professor, Indian Institute of Technology, Bombay
173	Dr. Darshan S. Shah	Assistant Professor, Indian Institute of Technology, Bombay
174	Dr. Arnav Bhavsar	Assistant Professor, Indian Institute of Technology Mandi.
175	Dr. Vishal Mishra	Assistant Professor, Indian Institute of Technology (BHU), Varanasi
176	Dr. Gayathri Pillai	Assistant Professor, Indian Institute of Science, Bengaluru

177	Dr. Aditya Sadhanala	Assistant Professor, Indian Institute of Science, Bengaluru
178	Dr. Pandiyarasan Veluswamy	Assistant Professor, Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram
179	Dr. Neelam Kungwani	Assistant Professor, Gujarat Biotechnology University, Gandhinagar
180	Dr. Hemen Kumar Kalita	Assistant Professor, Gauhati University, Guwahati
181	Dr. Hare Ram Singh	Assistant Professor, Birla Institute of Technology, Mesra
182	Dr Vinti Agarwal	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Pilani
183	Dr Sharda Tripathi	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Pilani
184	Dr Ankit Jain	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Pilani
185	Dr. Ankur Bhattacharjee	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
186	Dr. Aritra Chatterjee	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
187	Dr. Srinivasa Prasad	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
188	Dr Dinesh Rano	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
189	Dr. Kamalesh Kumar	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
190	Dr. Srinivasa Prasad k	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
191	Dr. Nitish Kumar Gupta	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
192	Dr. Sayantan Chakraborty	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
193	Dr. Ponnalagu R N	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
194	Dr. Ponnalagu R N	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Hyderabad
195	Dr Jayadevan K P	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Goa
196	Dr. Ravindra Giriraj Bhardwaj	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Dubai
197	Dr. Elakkiya R	Assistant Professor, Birla Institute of Technology and Sciences-Pilani, Dubai
198	Dr. Shrinivasa D J	Assistant Professor, Banaras Hindu University, Varanasi
199	Dr. Subodh Bishnoi	Assistant Professor & Centre Incharge, Agricultural Research Station, Sriganganagar
200	Dr. Pavar Sai Kumar	Senior Research Associate, Birla Institute of Technology and Sciences-Pilani, Hyderabad
201	Dr. Khairunnisa Amreen	Women Scientist, Birla Institute of Technology and Sciences-Pilani, Hyderabad



LIST OF GYTI AWARDEES (2012 - 2023)

List of GYTI Awardees (2012 - 2023)

GYTI Award 2012

Sr.	Title	Student Name	Institute Name	Supervisor Name
1	Tiles Measurement and Grade Classifying Equipment	Deep M. Bhimani	Government Engineering College, Rajkot	Dr. C. H. Vithalani
2	Multi Desire Wheelchair	Pratik Gandhi, Chintak Dholakia	L.D. College of Engineering, Ahmedabad	Prof. B. H. Parmar
3	Incense Stick Maker	Keshav G	Indian Institute of Technology, Gandhinagar	Dr. Murali Damodaran
4	LPG based Refrigerator	Chintan Patel, Mayank D Patel, Mayank Patel and Biren Patel	Laljibhai Chaturbhai Institute of Technology, Mehsana	Prof. Y. L. Raol, Prof. A. B. Patel
5	Domestic Refrigerator with Water Heater	Dhruv Patel	Gandhinagar Institute of Technology, Gandhinagar	
6	LPG based Refrigerator	Jainil Bhatt, Dhruvin Kagdi, Tirth Jani, Kunjal Jadav	LDRP-ITR College, Gandhinagar	Prof. Tushar Patel
7	Jeevan Dhara Hand Pump with Integrated Filtering System	Kirti Ranjan	Indian Institute of Technology, Kharagpur	
8	Automobile Air Conditioning using Engine Exhaust	Harish Umashankar Tiwari	Pimpri Chinchwad College of Engineering, Nigdi, Pune	Prof. G. V. Parishwad
9	Design, Synthesis & Evaluation of Novel Steroidal Aromatase Inhibitors in Breast Cancer	Dr. Prafulla M. Sabale	Parul Institute of Pharmacy, Vadodara	
10	Image, Speech Recognition and Speech Synthesis for physically disabled	Saurabh Saket	Bhutta College of Engineering, Ludhiana	Dr. Inderdeep Singh Grewal
11	Smart Grid Forecasting Technique	V S K Murthy, Baliye palli	Indian Institute of Technology, Bombay	

12	Ultra Sensitive, Low Cost Hand Held Explosive Detector System	Neena Avinash Gilda	Indian institute of Technology, Bombay	Prof. V. Ramgopal Rao, Prof. Dinesh K. Sharma, Prof. Maryam S. Baghini
13	A Tsunami Warning System using Ionospheric Measurements	Jhonny Jha	Indian Institute of Technology, Bombay	Prof. Krishna Sudhakar
14	Vardaan: Stair Climbing Wheelchair	Shanu Sharma	Indian Institute of Technology, Kanpur	Dr. J. Ramkumar, Prof. Shatrupa Thakruta Roy, Dr. Satyaki Roy
GYTI Award 2013				
1	Electronic Support System for Physically disabled(Deaf & Dumb)	Margie Ashok Joshi	C.K. Pithawalla College of Engineering and Technology, Surat	Prof. Dipti Patel
2	Saral Parikshan - An Advancement in Cutting Edge Technology for Rural Area to Detect Vitamin B12 for Pernicious Anemia	L. Sagaya Selvakumar	Council of Scientific & Industrial Research-Central Food Technological Research Institute, Mysore	Prof. M. S. Thakur
3	E-diagnoser: An Advanced Low Cost Patient Monitoring Watch	Libin Varghese, Pillai Sareesh, Shibin Joseph, Adarsh.S, Chithira Jacob, Nithya Merin, Anoop.P	Amal Jyothi College of Engineering, Kottayam	Prof. Reshmi V
4	Hydro-Operated Square-Bottom Paper And Jute Bag Making Machine	Anirudh Thakur	Lala Lajpat Rai Institute of Engineering and Technology, Moga	
5	Nano finishing of Freeform Surfaces of Prosthesis Knee Joint Implants	Sidpara Ajay Muljibhai	Indian Institute of Technology, Kanpur	Prof. V. K. Jain, Prof. V. K. Suri, Prof. R. Balasubramanian
6	Digital Pen	Kalpesh Wani	Visvesvaraya National Institute of Technology, Nagpur	
7	Multifunctional Nano-in-Micro Alginate Microspheres for Biosensing, Drug Delivery and MRI	Rashmi Dilip Chaudhari	Indian Institute of Technology, Bombay	Prof. Rohit Srivastava

8	Highly Gas Impermeable Elastomeric Rubber-Rubber Blend Nano Composites	Ajesh K Zachariah	Mar Thomas College, Tiruvalla	Prof. Sabu Thomas
9	A Portable and Efficient Electronic Filter for Sub-Micron Particles from Fluids	Aswathi R Nair	Indian Institute of Science, Bangalore	Prof. Sanjiv Sambandan
10	Laser Ignited Internal Combustion Engine	Kewal Dharamshi	Indian Institute of Technology, Kanpur	Prof. Avinash K. Agarwal
11	Novel Stand-alone 1-Phase AC Generator for Rural Electrification using Renewable Energy	Sandeep Vuddanti	Indian Institute of Technology, Delhi	Prof. S. S. Murthy, Prof. Bhim Singh
12	Ultra Low Cost Tunable Nano Scale Patterns	NandiniBhandaru	Indian Institute of Technology, Kharagpur	Dr. Rabibrata Mukherjee
13	Vision for the Blind Using Ultrasonic Sensors	Santosh Kumar Bhandari	SRM, Kattankulathur	
14	Spectral Eye	Sai Vijay Gole, Saket Choudhary, Yashesh Gaur	IIT Madras, IIT Bombay, DA-IICT	
15	Automatic Fish Scaling Machine	M. Rajesh Kanna	Velammal College of Engineering and Technology, Madurai	Dr. P. Rajesh Kanna
16	Chetna - Celebrate Your Pregnancy	Keyur Sorathia	Indian Institute of Technology, Guwahati	Keyur Sorathia
17	VAJRA(vessel desk)	Raghunath P lohar	Ganesh Institute of Engineering	
18	SHE- Society Harnessing Equipment	Manisha Mohan	SRM University, Chennai	
19	Clubfoot Orthosis	Kanwaljit Singh	Indian Institute of Technology, Delhi	Dr. P. M. Pandey
20	The Third Eye	Naveen Kumar Rai	Indian Institute of Technology, Guwahati	Dr. Amit Sethi
21	Reactor & Catalyst development for oxygen evolving step in Sulfur-Iodine cycle for Hydrogen production	Kishore Kondamudi	Indian Institute of Technology, Delhi	Dr. Sreedevi Upadhyayula
22	Apparatus for Making Silk Fiber Based Lamellar Biomaterials to Solve Problem of Lower Back Pain	Maumita Bhattacharjee	Indian Institute of Technology, Delhi	Dr. Sourabh Ghosh, Prof. Alok R Ray

GYTI Appreciation 2013				
23	Ambulatory Health Network App	Jayesh Vrujlal Khasatiya	Narnarayan Shastri Institute of Technology, Jetalpur	Prof. Ankita Shah
24	Re-arranging Unused Contacts in Mobile Phones for Quick Access	Bala Vishnu R	Kongu Engineering College, Erode	Prof. P. Natesan
25	Development Bamboo-epoxy nano composites for manufacturing of helmets and other structural applications	Vivek Kumar	Indian Institute of Technology, Delhi	Dr. Sanat mohanty
26	Mosquitocidal Endotoxin from Vellore Poultry Farm Wastes	Bishwambhar Mishra	VIT University, Vellore	Dr. Suneetha Vuppu
27	Sancharak: A Cell-Phone for Blind People	Rohit Bharkat Kumar Singh	Padmabhushan Vasantdada Patil Pratishthan College of Engineering	Dr. K. T. V. Reddy
28	Target Oriented Niosome Based Delivery of an Antitubercular Drug, Development and Characterization	Gyanendra Singh	Indian Institute of Technology Banaras Hindu University, Varanasi	Prof. Shubhini Saraf
29	Semi-Automatic Rubber Tapping Machine	G. R. Malarmannan	Velammal College of Engineering and Technology, Madurai	Dr. P. Rajeshkanna
30	Cow Dung based Microbial Fuel Cells (CDFCs) to Light up Indian Villages	Vishnu Jayaprakash	University of California, Berkeley	Prof. T. S. Natarajan
31	Development of a Geo-hazard Warning Communication System	Devanjan Bhattacharya	Indian Institute of Technology, Roorkee	Dr. Jayanta Kumar Ghosh, Dr. Narendra Kumar Samadhiya
32	Prognosis of Pre-Diabetes and Type 2 Diabetes Based on the Non-Invasive Estimation of Blood Glucose Using Infrared Thermography against the Bio-Marker	Sivanandam S	SRM University	Dr. M. Anburajan
33	Saree cutting machine for mat making handlooms	Alap Kshirsagar	Indian Institute of Technology, Bombay	Prof. Suhas Joshi

34	Hybrid Classifier for Marine Vessel based on Propulsion	Piyush Aggarwal	Jaypee Institute of Information Technology University, Noida	Prof. Mukta Goyal
35	Design of a Smart Automotive Ventilation System for Parked Vehicles	Gaurav Kumar Jaiswal	Vellore Institute of Technology, Vellore	Dr. Vasudevan R.
36	Snippets-Memory Aid for People With Disability	Devender Goyal	Indian Institute of Technology, Hyderabad	Dr. Kshitij Marwah
37	Graphics Model for Power Systems in CIM Framework and Design of Online Web-based Network Visualizations and Integration of Control Center Applications	Gelli Ravi kumar	Indian Institute of Technology, Bombay	Prof. S. A. Khaparde
38	Cross Linked Antibacterial Hydrogel	Mr. Chakavala Soyeb Rafikbhai	Anand Pharmacy College, Anand	Dr. Nirav V Patel, Dr. Tejal R. Gandhi
39	Robotic Dredger	Amit Dinanath Maurya	Indian Institute of Technology, Bombay	Prof. C. Amarnath
40	Comprehensive Protection from Electrocution	RAMDAS M U	Vidya Academy of Science and Technology, Thrissur	Dr. Sudha Balagopalan, Prof. Mary P Varghese
41	High Performance Cooking Stove	Mayur Rastogi	Indian Institute of Technology, Kharagpur	Prof. S Ray
42	Self-Cleaning Functional Molecular Material	M. B. Avinash	JNCASR, Bangalore	Dr. T. Govindaraju
GYTI Awards 2014				
1	Performance Enhancement of Microthruster using Nano-engineered MEMS Structure for Long Term Space Mission	Pijus Kundu	Indian Institute of Technology, Kharagpur	Prof. T. K. Bhattacharyya, Prof. Soumen Das
2	Parichaya - a Low-cost Medical Device to Increase Adherence among Tuberculosis Patients in Rural Assam	Himanshu Seth	Indian Institute of Technology, Guwahati	Prof. Keyur Sorathia
3	A Simple and Cost Effective Retrofitting to Improve the Thermal and Combustion Performance of Traditional Cook Stoves	Vijay Hanmant Honkalaskar	Indian Institute of Technology, Bombay	Prof. Upendra Bhandarkar

4	Bio mimicked Polymer Surfaces Exhibiting Super hydrophobic and Anti-Reflective Properties	Srinadh Mattaparthi	Indian Institute of Technology, Hyderabad	Prof. Chandra Shekhar Sharma
5	A Low Cost Cardiovascular Diagnostic Instrument For Rural Healthcare	Sushanth Poojary	Indian Institute of Technology, Bombay	Prof. Santosh Noronha
6	Low-cost Diagnosis of Pneumonia	Abhishek Khanolkar	Indian Institute of Technology, Madras	Dr. Vikram Shete
7	Development and Pilot Testing of Nano-Sized Tio2 Based Photocatalytic Oxidation Technology For Controlling Vocs	Indramani Dhada	Indian Institute of Technology, Kanpur	Prof. Mukesh Sharma
8	Microfluidic Immunosensor	Ramchander Chepyala	Indian Institute of Technology, Kanpur	Prof. Siddhartha Panda
9	Laser light Based Fully Computerized automated breast Cancer and Muscle Screening System development	Samir Kumar Biswas	Indian Institute of Science, Bangalore	Prof. K. Rajan
10	Injectable silk Fibroin Hydrogel for Tissue Engineering and Drug Delivery	Surojeet Das	Indian Institute of Technology, Guwahati	Dr. Biman B. Mandal
11	Fabrication of Stable Liquid Crystal Based Biosensor	Arun Prakash Upadhyay	Indian Institute of Technology, Kanpur	Dr. Sri Sivakumar
12	Paper-pencil Based self-pumping and Self-breathing Fuel Cell	Ravi Kumar Arun	CSIR-Central Mechanical Engineering Research Institute, Durgapur	Prof. Suman Chakraborty
13	Development and Evaluation of Women Friendly Vaginal In Situ Hydrogel for Sperm Immobilisation.	Dr. Vaishali Thakkar	Anand Pharmacy College, Anand	Dr. Tejal R. Gandhi
GYTI Appreciation 2014				
14	Voice Activated Safety App	Mithila Harish	Vellore Institute of Technology, Vellore	Prof. Monica Subashini M
15	Integrated Circuit (IC)-based Flexible Electronic Devices and Displays (ICFEDD)	Prakash Kodali	Indian Institute of Science, Bangalore	Sanjiv Sambandan

16	Android application for women safety	Akhil Aggarwal, Shubham Jindal, Siddharth Garg, Rajan Nagpal	Indian Institute of Technology, Delhi	Dr. Rajesh Prasad
17	Microwave Coplanar Sensor System for Detecting Contamination in Food Products	Makkattary Shaji	Indian Institute of Technology, Kanpur	Dr. M. J. Akhtar
18	Amsler Grid Test	Jagjeet Singh	Indian Institute of Technology, Guwahati	Anthony Vipin Das
19	Inhalable Multiparticulate Carrier Systems for Sustained and Targeted Delivery of Isoniazid	Dr. Sanjay Tiwari	Indian Institute of Technology, Varanasi	Dr. B. Mishra
20	Wireless Communication and Security System Embedded Safety Helmet	M. Sivagurunathapandian	Easwari Engineering College, Chennai	Dr. N. S. Bhuvaneswari
21	Cost Effective Vegetable Chiller for Rural Small Farmers	Vishnu Padmanaban	Amrita School of Engineering, Coimbatore	Dr. M. Elangovan
22	Jaivik Prakash: A Simple Tool for Detection of Hazardous Materials and Sanitary Condition at Rural Level	Rajeev Ranjan	CSIR-Central Food Technological Research Institute, Mysore	Prof. M. S. Thakur
23	Concept of Breaker Dipeptides and Its Application in Alzheimer's Amyloid Disruption	Nadimpally Krishna Chaitanya	Indian Institute of Technology, Guwahati	Dr. Bhubaneswar Mandal
24	3D model Generation from 2D X-Ray Images	Vikas Dhruwdas Karade	Indian Institute of Technology, Bombay	Prof. B. Ravi
25	Identification of Safest Path using Crime Records	Puneet Singh	Indian Institute of Technology, Kanpur	Prof. Bhiksha Raj, Prof. Rita Singh
26	Laser Technology Detects Hidden Materials: Applications to Security and Medicine	Sanchita Sil	Indian Institute of Science, Bangalore	Prof. Siva Umapathy
27	Open Source E-Mailing System for the Visually Impaired	Aakash Anuj	Indian Institute of Technology, Kharagpur	Prof. Anupam Basu
28	Development of Microbial Fuel Cells with Improved Performance	Jayesh Manohar Sonawane	Indian Institute of Technology, Bombay	Prof. Prakash Chandra Ghosh

29	Fabrication of Organic Thin Film Transistor using Single Drop of Organic or Hybrid Insulator, Conductor and Semiconductor Materials	Gunda Manideep	Indian Institute of Technology, Kanpur	Dr. Monica Katiyar
30	Adsorptive Removal of Phenolic Compounds Using Mixed Matrix Membrane of Cellulose Acetate Phthalate and Alumina Nanoparticle	Raka Mukherjee	Indian Institute of Technology, Kharagpur	Prof. Sirshendu De
31	Ultra-High Actuation in a Carbon Nanotube Actuator	Prarthana Gowda	Indian Institute of Science, Bangalore	Prof. Abha Mishra
32	A Transceiver for Satellite Based Communication during Emergency Using TV White Spaces	Rajan Kapoor	Indian Institute of Technology, Patna	Dr. Preetam Kumar
33	Macrophage-specific Targeting of Mannose-functionalized Biodegradable Polymeric Nano particles of Some Anti-leishmanial Drugs- Development, Optimization and Efficacy Evaluation	Pramila Chaubey	Indian Institute of Technology (BHU), Varanasi	Prof. Brahmeshwar Mishra
34	Stampede Control Using Image Analysis Technology	S. Vidya Sagar	Kongu Engineering College, Erode	Prof. D.Leela
35	Synthesis and Design of Indigenous Polycentric Knee for Transfemoral Prosthesis	Anand T.S.	Indian Institute of Technology, Madras	Dr. Sujatha Sreenivasan
36	Highly Stable Metallic Nano particle-Semiconductor Hetero structures via Click Chemistry for Photoelectro/ Photocatalytic Applications	Arun Prakash Upadhyay	Indian Institute of Technology, Kanpur	Dr. Sri Sivakumar
37	Novel Algal Bioreactor for Wastewater Treatment And Bio fuel (Lipid) Production	Durga Madhab Mahapatra	Indian Institute of Science, Bangalore	Dr. T V Ramachandra, Dr. H N Chanakya
38	Care Mother-Mobile Pregnancy Care	Shantanu Pathak	INHS Asvini, Mumbai	Prof. Vaibhav Tidke
39	Paper and Pencil Micro Fluidic Device for Point-of-Care diagnostics	Ranabir Dey	Indian Institute of Technology, Kharagpur	Prof. Suman Chakraborty

40	Touchpad for Malignant Tumour (Epithelial) Detection and Imaging	Sritam Parashar Rout	Indian Institute of Technology (BHU), Varanasi	Prof. Anoop Jayaram
BIRAC GYTI Award 2015				
1	RIGHTBIOTIC: The Fastest Antibiotic Finder	Shivani Gupta	Birla Institute of Technology & Science University, Pilani	Dr. Suman Kapur
2	Redefined Spoon for Parkinson's Patient	Dhyey Mayank kumar Shah, Eepsit Tiwari, Rajesh Patidar	Indian Institute of Technology, Gandhinagar	Prof. Bhaskar Bhatt, Prof. Harish P. M.
3	Development of a Powerful New Antibiotic That Kills All Drug-Resistant Bacteria	Venkateswarlu Yarlagadda, Padma Akkapeddi, Goutham B Manjunath	Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)	Prof. Jayanta Haldar
4	Real Time Wound Management System Wound Segmentation & Analysis using Image Processing on Mobile Platform (Android)	Abhiraj Gupta	Manipal Institute of Technology, Manipal	
SRISTI GYTI Award 2015				
5	Sway: The Rhythm Within	Janhavi Joshi	MIT Institute of Design, Pune	Prof. Sanjay Jain
6	Double Disk Ultrasonic Assisted Magnetic Abrasive Polishing Device	Prateek Kala	Indian Institute of Technology, Delhi	Dr. Pulak Mohan Pandey
7	Development of Shape Controlled Palladium Structures as Electrocatalysts for Fuel Cell Applications	Kranthi Kumar Maniam	Indian Institute of Technology, Madras	Dr. Raghuram Chetty
8	Reduced Converters and Brushless Generators Based Standalone Microgrid for Rural Electrification	Krishan Kant	Indian Institute of Technology, Delhi	Prof. Bhim Singh
9	Novel Nanozyme Technology for Combating Oxidative Stress Related Disorders	Amit Ashok Vernekar	Indian Institute of Science, Bangalore	Prof. G. Mugesh

10	FLEXICAST: A Breathable, Washable and Customized Cast For Immobilization of Fractured Limb	Jamdade Nikhil Kailas, Pankaj kumar K. Chhatrala, Devanshi Saksena	Indian Institute of Science, Kanpur	
11	Novel Technique for Energy Generation Coupled with Treatment of Wastewater and Resource Recovery Using E-Waste As Electrode Material In Microbial Fuel Cell	Praveena Gangadharan, Jaganathan Senthil nathan	Indian Institute of Technology, Madras	Dr. Indumathi M Nambi
12	Evaluation of Blood Pressure and Arterial Compliance by the Radial Arterial Pulse Pressure Waveform obtained using Fiber Bragg Grating Pulse Recorder	Sharath Umesh	Indian Institute of Science, Bangalore	Prof. Sundarrajan Asokan
13	Targeting Lymphatics to Treat HIV Using Lipid Based Formulations	Rashmi Jain, Vivek Makwana, Komal Patel	B. V. Patel PERD Centre, Ahmedabad	Prof. Amita Joshi
14	TAPARCH: A Visually Challenged People Footwear	Krishna Sai	Gitam University, Visakhapatnam	
15	Valproic Acid Prevents Progression of the Diabetic Nephropathy: Elucidation of Molecular Mechanisms and Proof of Concept for Promising Therapeutic Usefulness	Sabbir Khan	National Institute of Pharmaceutical Education and Research (NIPER), S.A.S. Nagar	Dr. Gopabandhu Jena
16	Gift of New Abilities	Shiva Kumar H R	Indian Institute of Science, Bangalore	Prof. A. G. Ramakrishnan
SRISTI GYTI Appreciation 2015				
17	Recyclable Porous Sheets for Low-Cost Water Filter	Abhishek Gandhi	Indian Institute of Technology, Delhi	Prof. Naresh Bhatnagar
18	TEDKIT- An Audio Tactile Storybook for Visually Impaired Children	Ankita Gulati	Indian Institute of Technology, Delhi	Prof. M. Balakrishnan
19	Food Vending Machine for Schools	Subrahmanya Shridhar Shetty	NMAM Institute of Technology, Nitte	Prof. Pradeep Kanchan

20	Nano emulsions as a Vehicle for Delivery of Omega-3 Fatty Acids for Serum and Tissue Lipids	D. Sugasini	CSIR-Central Food Technological Research Institute, Mysore	Dr. B. R. Lokesh
21	Rapid Non-Invasive Diagnostics Kits for Diabetics Patients to Check Glucose Level Thrice a Day	Yadav Vijay Dukhran	Institute of Chemical Technology, Mumbai	Dr. Prajakta Dandekar Jain
22	Injection Mouldable Polymeric Composite Based Passive Polycentric Knee Joint	S. Arun	Indian Institute of Technology, Guwahati	Dr. S. Kanagaraj
23	A Novel Process To Commoditize Carbon Dioxide Gas Into Fuels And High Value Nutraceuticals At Commercially Viable Scale	Dilip Singh, Preeti Mehta, Ravi P. Gupta	DBT-IOC Centre for Advance Bio Energy Research, Faridabad	Dr. D. K. Tuli
24	Development of X-ray Visible Polymers via In Situ Iodination-Crosslinking for Non-Invasive Real Time Imaging	Paulomi Ghosh, Arun Prabhu Rameshbabu	Indian Institute of Technology, Kharagpur	Dr. Santanu Dhara
25	Affordable Power-Assist For Wheelchair	Sri Priya Kalidoss, Karthikeyan S D, Viveksarda	Indian Institute of Technology, Madras	Dr. Sujatha Srinivasan
26	Utilization of Marine Algae As Substrate And Methanogen Inhibitor In Microbial Fuel Cell	Rajesh P P	Indian Institute of Technology, Kharagpur	Prof. M. M. Ghangrekar
27	Prashamana- A Smart Hospital Bed	Toshib Bagde, Jamdade Nikhil Kailas	Indian Institute of Technology, Kanpur	Dr. Ramkumar Janakarajan
28	Linearly Polarised Planar Inverted F-Antenna For Global Positioning System And Worldwide Interoperability for Microwave Access Applications	Mayank Agarwal	Indian Institute of Technology (BHU), Varanasi	Dr. Manoj K. Meshram
29	Use of High Nutrient, Low Cost Natural Materials for Preparation of Well-Engineered Emulsions for Variety of Applications	Lad Virang kumar Nanubhai	Sardar Vallabhbhai National Institute of Technology, Surat	Prof. Z. V. P. Murthy

30	Clubfoot deformity measuring device	Kanwaljit Singh Khas	Indian Institute of Technology, Delhi	Dr. P. M. Pandey, Prof. Alok. R.Ray
31	Virtual Reality Based Minimally Invasive Surgical Simulator with Haptics Feedback	M.S. Raghu Prasad, Abhijit Biswas	Indian Institute of Technology, Madras	PROf. Manivannan M
32	Electrospun Cellulose Acetate Nanofibers for Female Hygiene Applications	Shital Yadav, Illa Mani Pujitha, Tulika Rastogi	Indian Institute of Technology, Hyderabad	Dr. Chandra Shekhar Sharma
33	One Drug to Cure Them All	Chandradhish Ghosh	Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore	Dr.Jayanta Haldar
34	Fabrication of Nano Object Imaging Probe Using Simple & Fast Hydro -Mechanical Etching Technique	Fazle Kibria	University College of Science & Technology	Dr. Rajib Chakraborty
35	Agriculture	Abitha R	Indian Institute of Science, Bangalore	Dr. H. N. Chanakya
36	Rapid diagnosis of brain injury-A novel approach using citrate-capped gold nano particles	Srishti Agarwal	Indian Institute of Technology, Hyderabad	Dr. Anindya Roy
37	Biodegradable LiposAu Nanoparticles for photothermal ablation of Cancer	Aravind Kumar Rengan, Amirali B. Bukhari	Indian Institute of Technology, Bombay	Dr. Rohit Srivastava
38	Biomechanical Investigation of Extracorporeal Irradiation and Reimplantation Therapy in Malignant Bone Tumours	Sakshi Chauhan	Indian Institute of Technology, Delhi	Dr. Anamika Prasad, Dr. Shah Allam khan
39	Suchi-Ahvana	Pratik Raj, Deepak Nagar, Kewal Chand Swami	Pandit Dwarka Prasad Mishra Indian Institute of Information Technology, Design & Manufacturing, Jabalpur	
40	Development of Membrane Technology for Industrial Progress, Societal Benefit and Environmental Safety	Siddhartha Moulik, Dr. Sundergopal Sridhar, Y. V. L. Ravikumar, M. Madhumala, Dasari Manjunath	CSIR - Indian Institute of Chemical Technology, Hyderabad	Dr. S. Sridhar

41	Methane Sensing Module: From Concept to Prototype	Anwesha Mukherjee, Pavan Kumar R, Goutam PrasannaKar, Sanjay Rao A, Vaibhav V Rao	Indian Institute of Science, Bangalore	Dr. Abha Misra
42	Energy Efficient Robust Controller for Autonomous Underwater Vehicle	Meenakshi Sarkar	CSIR - Central Mechanical Engineering Research Institute, Durgapur	Dr. Sambhunath Nandy
43	Inch Worm Mechanism for Solar Panel Cleaning Robot	Bhivraj Suthar	Indian Institute of Technology, Delhi	Prof. Sudipto Mukherjee
BIRAC GYTI Award 2016				
1	Simple Low- cost Bioactive Titanium Foam via Novel Route for Skeletal Tissue Reunion	Kausik Kapat	Indian Institute of Technology, Kharagpur	Prof. Santanu Dhara
2	Flexible Biodegradable Anti-Microbial New Advanced Form of Intra Uterine Contraceptive Device (IUCD)	Bhuvaneshwaran Subramanian, Selvakumar M Dibyendu Gouri	Indian Institute of Technology, Kharagpur	Dr. Sujoy K Guha
3	Automated Opto-Fluidic Microscope for Cellular Diagnostic Testing	Veerendra Kalyan Jagannadh, Jayesh V. Adhikari, Albina L. Nirupa, Rashmi S, Bindu Bhat	Indian Institute of Science, Bangalore, Karnataka	Dr. Sai Siva Gorthi
4	3D Printed Hydroxyapatite Tray for Segmental Mandibular Bone Reconstruction By Stem Cell Delivery for Oral Cancer Patients	Sanskrita Das, Dr. Pravesh Mehra	Indian Institute of Technology, Delhi	Dr. Sourabh Ghosh
5	NStomoz – Vascular anastomosis assist device	Anand Parikh	Indian Institute of Technology, Madras	Prof. Venkatesh Balasubramanian, Dr. V B Narayanamurthy
6	Wearable Drug Delivery Device Based on Microneedles For Efficient Management of Chemotherapy Induced Nausea And Vomiting (CINV) and Nausea And Vomiting in Pregnancy (NVP)	Bhushan N Kharbikar	Indian Institute of Technology, Bombay	Prof. Rohit Srivastava

7	Automatic Urine and Fecal Disposal System	Neenu Jose, Athul K.Raj, Athira K.R, Neenu P	Sahrdaya College of Engineering and Technology, Kodakara	Prof. Jinu Sebastian
8	Device for Intrapartum Materno-Fetal ZCare	Vichal P M	BMS College of Engineering, Bangalore	Prof. Appaji M Abhishek
9	Rapid Endotoxin Entrapment and Detection on Surface- engineered Glass Substrates	Sachin Kumar, Prasanta Kalita, Ruchika Sharma, Nitish Goel	Indian Institute of Technology, Delhi	Dr. Shalini Gupta
10	Near Infra-Red light Activable Iron(III) Complex as a Remarkable and Organelle- Targeted Anti- Cancer Agent for the Photodynamic Therapy Application	Aditya Garai	Indian Institute of Science, Bangalore	Prof. A. R. Chakravarty
11	Energy efficient Combined Process of Microbial Fuel Cell (MFC) and Membrane Bioreactor (MBR) For High Efficiency And Reliable Treatment Of Organic Waste Water	Sreemoyee Ghosh Ray, Gourav Dhar Bhowmick	Indian Institute of Technology, Kharagpur	Prof. M. M. Ghangrekar
12	A Novel Compound Restores Obsolete Antibiotics to NDM-1 Superbugs	Divakara SS Murthy, Uppu, Goutham B Manjunath, Padma Akkapeddi	Jawaharlal Nehru Centre For Advanced Scientific Research (JNCASR), Bangalore	Prof. Jayanta Halder
13	Development of a Novel, Non- Biological Pyrogen/Micro Cellular Components Detection Technique for Purification and Dehydrogenation of Water.	Yadav Vijay Dukhran, Rohan Chhabra, Nikhil Kalane, Anomitra Dey, Tejal Pant, Ratnesh Jain	Institute of Chemical Technology, Mumbai	Dr. Prajakta Dandekar Jain
14	A Compact Microwave Sensor for Characterization of Radomes and Dielectric Signature Detection of Materials in 3G and 4G GSM Bands	Abhishek Kumar Jha	Indian Institute of Technology, Kanpur	Dr. M. J. Akhtar
15	Development of Portable Device Based on Polarized Fluorescence for Detection Of Cervical Pre- Cancer	Bharat Lal Meena, Seema Devi, Asima Pradhan, Kiran Pandey, Asha Agrawal	India Institute of Technology, Kanpur	Prof. Asima Pradhan

SRISTI GYTI Awards 2016				
16	X-Niff: Microcantilever Based Electronic-Nose Platform for Airborne Chemical Vapor Sensing	Gaurav Gupta, Vijay Shrinivas Palaparthi, Shambhulingayya Ningayya Doddapujar, Pallabi Das	Indian Institute of Technology, Bombay	Prof. Valipe Ramgopal Rao
17	Design of an Innovative Retrofitted Tricycle for a Disabled Person	Pushkaraj Sonawane	Maharashtra Institute of Technology, Pune	Prof. Pushkaraj D. Sonawane, Prof. Sandip T. Chavan
18	Soya Nuggets - A novel Drug Delivery Vehicle	Utkarsh Bhutani	Indian Institute of Technology, Hyderabad	Dr. Saptarshi Majumdar
Hari Om Ashram Prerit Dr. Amulya K.N. Reddy GYTI Award 2016				
19	Air-Assisted Electrostatic Sprayer (AAESS)	Manoj Kumar Patel	Academy of Scientific and Innovative Research (AcSIR-CSIO), Chandigarh	Prof. C. Ghanshyam
20	High Altitude Wind Energy Using Kite- A revolution in Renewable Energy	Roystan Vijay Castelino	Srinivas Institute of Technology, Merlapadavu, Mangaluru	Prof. Lokesh B
21	Low Cost Sanitary Napkin Disposal Machine	Aiswarya Paramadathil	Adi Shankara Institute of Engineering and Technology, Kalady	
22	Design And Development of Semi- Automatic Flower Knotting Device	C. Cornelius Durai, S. Lakshmana Raja, S. Sriram	Velammal College of Engineering and Technology, Chennai	Dr. G. Senthil Kumar
23	Automatic Sugarcane Juicer	Nilkantha Dashrath Gadakh	K. K. Wagh Institute Of Engineering Education and Research, Nashik	
GYTI Appreciation 2016				
24	An Indigenous Oxygen Dosing Device To Conserve Oxygen Using Patient MonitoringSystem	Srividhya Sakthi	Sri Ramakrishna Engineering College, Coimbatore	
25	Neuronal Cells Produced From Non-Neuronal Cell Line UsingWalnut Oil	Dr. Varsha Singh	Chitkara University, Chandigarh	

26	Cost effective self-stabilizing smart hand held platform (spoon/pen) for elderly or Parkinson's disease patients	Debjyoti Chowdhury	Heritage Institute of Technology, Kolkata	Dr. Madhurima Chattopadhyay
27	Paper Microfluidic Chip	Avishek Barla Sameer Sharma	Indian Institute of Technology Madras	
28	Multimechanistic Polymer Based Novel Drug Eluting Stent Coating	Dr. Govinda Kapusetti, Ms. Shiva Kalyani Adepu	National Institute of Pharmaceutical Education and Research, Ahmedabad	Prof. Kiran Kalia
29	Harnessing Micro Air Jets for Spraying Viscous Non-Newtonian Fuels	Manisha B. Padwal, Prof. D. P. Mishra	Indian Institute of Technology, Kanpur	Prof. D. P. Mishra
30	Paper Based Resistive Touch-pad For Electronic Applications	Mitradip Bhattacharjee	Indian Institute of Technology, Guwahati	Dr. Dipankar Bandyopadhyay
31	Nano Material Based Flexible Aqueous Power Cell for Energy Conversion and Storage (Self-Charging and Flexible Aqueous Power-Cell)	Vinay Gangaraju	Visvesvaraya Technological University, Belgaum	Prof. Dinesh Rangappa, Dr. D. S. Prasanna
32	Handicap Support Device	Vishrut Bhatt, Sumanth Mudaliar, Joshi Ashay, Dave Kaushal	L J Polytechnic, Ahmedabad	Prof. Harshul Bhrambhatt
33	Biobased Adhesive Formulation for Construction Applications	Neelima Tripathi	Indian Institute of Technology, Guwahati	Dr. Vimal Katiyar
34	CHECKit – A low cost mobile OMR system	Rahul Patel	Institute of Engineering & Technology, Lucknow	Prof. Mehul Raval, Prof. Dhruv Gupta
35	Green flexible conducting paper from edible bacteria derived 3D nanocellulose matrix and polyaniline	Divya Anand	Indian Institute of Technology, Hyderabad	Dr. Mudrika Khandelwal
36	Latex (Natural Rubber) Carry Backpack	Ajin Omanakuttan	Amal Jyothi College of Engineering, Kanjirappally	Prof. Abi Varghese
37	Bio-Inspired Flapping Near Surface Underwater Vehicle	Mannam Naga Praveen Babu	Indian Institute of Technology, Madras	Prof. Krishnankutty. P

38	E-Droid Meter	Bitu C. Ghoniya, Shruti B. Patel, Jigisha M. Karangiya, Jinal N. Modi	Sarvajanik College of Engineering & Technology, Surat	Dr. Urmi Desai
39	Design and development of multipurpose Electric cycle	Patel Krunal, Brijesh patel, Prashant Solanki, Jigar parmar	Shri Satasangi Saketdham, Vadsama	Dr. Sandip Godse
40	Cost Effective Mechanical Testing Equipment For Characterising Creep Behaviour Of Materials Under Combined Tension-torsion Loading	Vineesh K P	Indian Institute of Technology, Kharagpur	Prof. Vikranth Racherla
41	Application Of Nano Material to Analyze The Strength Of Concrete	Dhrafani Ishita Mayurkumar	College of Engineering, Rajkot	Prof. Hitesh Rameshchandra Ashani
42	mSleep - Measure your Sleep	Shuchita Gupta, Yashovardhan Sharma	Indraprastha Institute of Information Technology, Delhi	Dr. Vinayak Naik
43	Straut AERO : Solar Industrial Hot Air Generator	Sharad Parekh	Universal College of Engineering & Technology	Dr. Nilesh Bhatt

BIRAC GYTI Award 2017

1	White Light Emission from Vegetable Extracts	Dr. Vikram Singh	Indian Institute of Technology, Madras	Prof. Ashok Kumar Mishra
2	Rotary Ultrasonic Bone Drilling	Dr. Vishal Gupta	Indian Institute of Technology, Delhi	Dr. Pulak M. Pandey
3	A Novel Hybrid System for Textile Dye Waste Water Treatment.	Bhaskar Bethi	National Institute of Technology, Warangal	Dr. Shirish Hari Sonawane
4	Revealed: Dual functional characteristics of Escherichia coli outer membrane protein Wzi and its implications in the design of novel antibiotics	Shivangi Sachdeva, Narendar Kolimi	Indian Institute of Technology, Hyderabad	Dr. Thenmalarchelvi Rathinavelan
5	Targeted Theranostic Nanomedicines for Brain Cancer Therapy	Sonali, Rahul Pratap Singh, Poornima Agrawal	Banaras Hindu University, Varanasi	Dr. M.S. Muthu, Prof. B. L. Pandey
6	Blood Quality Assessment Using Digital Holographic Microscopy	Mandeep Singh, Azhar Muneer	Indian Institute of Technology, Delhi	Dr.Kedar Khare, Dr. Sarita Ahlawat

7	STERI-FREEZ: Flash Freeze Sterilization	Saugandha Das, Archit Devarajan	Institute Of Chemical Technology, Mumbai & Ramnivas Ruia Junior College, Mumbai	Prof. Padma V. Devarajan, Prof. Vasihali Kavishwar
8	Prophylactic Transdermal Patch Against Neurotoxin Poisoning In Biological Warfare Situations.	Subham Banerjee	Defence Research Laboratory, Tezpur & Birla Institute of Technology, Mesra.	Prof. Pronobesh Chattopadhyay, Prof. Animesh Ghosh
9	Low cost and field-portable smartphone platform water testing kit for detection and analysis of contaminants in drinking water	Iftak Hussain, Kamal Uddin Ahamad	Tezpur University, Assam	Dr. Pabitra Nath
10	Near Infrared Fluorescence Probes for Diagnosis of Alzheimer's disease	K Rajasekhar, Kavita Shah	Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore	Prof. T. Govindaraju
11	Low Cost Automated Handheld Melamine Detection Device (for Testing Melamine in Milk)	Dhiraj Indana, S.C.G. Kiruba Daniel, Varun S., Prateek Katore	Indian Institute of Science, Bangalore	Dr. Sai Siva Gorthi
12	NeuroBuds - Brain Wave Mapping Smart Earphones	Nitin Vasanth	Cochin University of Science & Technology, Kochi	Prof. Unni A M
13	Affordable and Rapid Paper-based Test Kits for Antimicrobial Susceptibility Assays	Shantimoy Kar, Tarun Agarwal, Shubhanath Behera, Varun Varma	Indian Institute of Technology, Kharagpur	Prof. Suman Chakraborty, Prof. Tapas K. Maiti
14	Portable biosensing platform based on conducting polymer decorated optical fiber for bacteria as well as heavy metal sensing in tap water	Sutapa Chandra, Arvind Dhawangale, Rosna Binish	Indian Institute of Technology, Bombay	Prof. Soumyo Mukherji
15	Affordable Kit for Cervical Cancer detection.	Appidi Tejaswini, Syed Baseeruddin Alvi, Anurag Meena	Indian Institute of Technology, Hyderabad and Indian Institutes of Technology, Bombay	Dr. Aravind Kumar Rengan, Dr. Rohit Srivastava
16	Non-invasive, Point-of-care Diagnostic System for Early Detection of Oral Cancer using Digital Infrared Thermal Imaging	Manashi Chakraborty, Santanu Patsa, Nishat Anjum	Indian Institute of Technology, Kharagpur	Dr. Sudipta Mukhopadhyay, Prof. Swapna Banerjee, Dr. Sourav Mukhopadhyay, Prof. Jay Gopal Ray

GYTI Award 2017				
17	A Virtual Reality (VR)-based Immersive Simulator For Endoscopy Training	Shanthanu Chakravarthy	Indian Institute of Science, Bangalore	Prof. G. K. Ananthasuresh
18	Navyo-The Smart Glove	Madhav Aggarwal, Mohd. Suhail, Bhavesh Pachnanda	Delhi Technological University, Delhi	Prof.Vikas Rastogi
19	A Novel Bio-engineering Approach to Generate an Eminent Surface Functionalized Template for the Selective Detection of Female Sex Pheromone of Certain Agriculturally Hazardous Pests	Parikshit Moitra, Deepa Bhagat, Rudra Pratap	Indian Institute of Science, Bangalore & Indian Association for the Cultivation of Science, Kolkata	Prof. Santanu Bhattacharya
20	ANUBHAV - AN EFFICIENT WRITING TOOL FOR VISUALLY IMPAIRED	Sachin N P, Vimal C	Indian Institute of Technology, Kanpur	Prof. Shantanu Bhattacharya
21	Swayam - Passively Stabilized Communication Satellite	COEP Satellite Initiative	College of Engineering, Pune	Dr. M.Y. Khaladkar, Dr. B.B. Ahuja
22	Indigenous Technology of Soft Body Armour for Defence Applications Using 3D Woven Aramid Fabrics	Animesh Laha	Indian Institute of Technology, Delhi	Prof. Abhijit Majumdar
GYTI Appreciation 2017				
23	Affordable paper microfluidic device for blood glucose and cholesterol detection	Avishek Barla,Abrar Ali Khan, Sameer Sharma, Vijay Anand, Nitish Kumar Singh	Indian Institute of Technology, Madras	Dr. Vignesh Muthuvijayan
24	Never Ending Learning of Sound	Ankit Parag Shah, Rohan Badlani, Benjamin Elizalde, Anurag Kumar	National Institute of Technology, Surathkal	Prof. Bhiksha Raj Ramakrishnan

25	OCR++: A Robust Framework For Information Extraction from Scholarly Articles	Mayank Singh, Barnopriyo Barua, Priyank Palod, Manvi Garg, Sidhartha Satapathy, Samuel Bushi, Kumar Ayush, Krishna Sai Rohith, Tulasi Gamidi	Indian Institute of Technology, Kharagpur	Dr. Pawan Goyal, Dr. Animesh Mukherjee
26	Paper-based Device For Rapid Detection Of Dengue	Sanjay Kumar, Pulak Bhushan	Indian Institute of Technology, Kanpur	Prof. Shantanu Bhattacharya
27	Trolley Straw Baler by Ram Compressing Mechanism with Traction Force	Ramalingam.PI, M. Prakash, M. Prabhu, C. Logesh, Jayaprakash.P.S	Panimalar Institute of Technology, Anna University, Chennai	Prof. R.Vigithra
28	Enhancement of Distribution System performance using HVAC Boost Converter and Fuzzy Controller	Anusha Vadde	M S Ramaiah University of Applied Sciences, Bangalore	Prof. V.S.N Sitaram Gupta .V
29	Design of a Mechanical Device (Nanorobot) for Diagnosis and Removal of Plaque from Human Heart Artery System	Mallikarjunachari G	Indian Institute of Technology, Madras	Dr. Pijush Ghosh
30	“Electrolithography”- A Novel Nano Patterning Technique Using Electric Field Induced Material Transport	Santanu Talukder	Indian Institute of Science, Bangalore	Prof. Rudra Pratap, Dr. Praveen kumar
31	Cost Effective Inspection System For Automated Large Scale Cocoon Quality Assessment	Prasobh Kumar P. P.	Indian Institute of Science, Bangalore	Dr. Sai Siva Gorthi, Prof. C. R. Francis
32	Industrial Production of Poly (lactic Acid) based Biodegradable Films with Highly Improved Gas Barrier Properties for Food Packaging Application: A Potential Candidate to Replace Conventional Synthetic Polymers	Akhilesh Kumar Pal	Indian Institute of Technology, Guwahati	Dr. Vimal Katiyar

33	Fish inspired propulsion for remotely operated surface ships and underwater vehicles	Mannam Naga Praveen Babu	Indian Institute of Technology, Madras	Prof. P. Krishnankutty
34	Development And Characterization Of Smart Nanocarriers For Oral Insulin Delivery	Ashish Kumar Agrawal	National Institute of Pharmaceutical Education and Research, Mohali	Prof. Sanyog Jain
35	Design & Development Of Automated Five Axis CNC Ball End Magnetorheological Finishing Machine	Dilshad Ahmad Khan, Faiz Iqbal, Zafar Alam	Indian Institute of Technology, Delhi	Dr. Sunil Jha
36	Grid Interactive Solar PV Based Water Pumping Using BLDC Motor Drive	Rajan Kumar	Indian Institute of Technology, Delhi	Prof. Bhim Singh
37	A Mechanism for Toilet Seat Sanitation	Arvind Pujari, D V S S SKushal Kumar Reddy, Shashwat Jain, Subham Kumar Sahana, Tanay Garg	Indian Institute of Technology, Madras	Dr. Anil Prabhakar
38	Design of Highly Efficient and Inexpensive Membrane Equipment as Import Substitutes for Demineralized Water Production and Hemodialysis	Harsha Nagar, Shaik Nazia, M. Madhumala, Y.V.L. Ravi Kumar	CSIR-Indian Institute of Chemical Technology, Hyderabad	Dr. S. Sridhar
39	Portable Geo-specific Water Filtration Bottle	Ramesh Kumar, Anupam Chandra	Indian Institute of Technology, Madras	Prof. Thalappil Pradeep
BIRAC GYTI Award 2018				
1	Point of Care Nano Diagnostic Kit for Brucellosis	Rohit Shivaji Pawar	Institute of Chemical Technology, Mumbai	Prof. Vandana B. Patravale
2	Miniaturized Fluorescence adapter for Fluorescence Sputum Smear Microscopy using bright-field microscope	Vikas Pandey	Indian Institute of Technology, Delhi	Dr. Ravikrishnan Elangovan
3	A multipurpose low cost biological air purifier	Mrs. Neeta Ganesh Wagle	Dr. D.Y. Patil Vidyapeeth, Pune	Prof. Neelu N. Nawani

4	Nano Spermicide: A Dual Acting Aid for Prevention of Unintended Pregnancy and Unprotected Sexual Intercourse Associated HIV	Amit Mirani	Institute of Chemical Technology, Mumbai	Prof. Vandana B. Patravale
5	A Low-Cost Disposable Microfluidic Biochip for malaria diagnosis	Brince Paul K	Indian Institute of Technology, Hyderabad	Dr. Shiv Govind Singh
6	Smartphone-based impedimetric disposable biosensor for detection of cardiac biomarkers	Debasmita Mondal, Sourabh Agrawal	Indian Institute of Technology, Bombay	Prof. Soumyo Mukherji
7	Decellularized corneal matrix (DCM) based injectable hydrogel for strengthening cornea matrix in severe Corneal Keratoconus	Shibu Chameettachal	Indian Institute of Technology, Hyderabad	Dr. Falguni Pati
8	Super Resolution Ultrasonic Imaging (SUI)	Kiran Kumar Amireddy	Indian Institute of Technology, Madras	Dr. Krishnan Balasubramanian, Dr. Prabhu Rajagopal
9	Understanding the design principles of protein nanosensor to combat multidrug resistant enterobacteriaceae	Abhishek Narayan	Indian Institute of Technology, Madras	Dr. Athi Narayanan N
10	A novel strategy to block malaria transmission	Divya Beri	Indian Institute of Science, Bangalore	Prof. Utpal Tatu
11	Design and Development of Phase Change Material (PCM) based Milking cum Cooling Pail	Ravi Prakash	National Dairy Research Institute, Karnal	Dr. Menon Rekha Ravindra, Dr. M. Manjunatha
12	An Alternative Technology to Produce Biomass-Based Food Grade Flavors, Fuels and Value Added Chemicals	Shelaka Gupta	Indian Institute of Technology, Delhi	Dr. M. Ali Haider
13	Nano based soil conditioner for agricultural application	Pallabi Das, Kasturi Sarmah	Tezpur University, Tezpur	Dr. Sanjay Pratihar, Dr. Satya Sundar Bhattacharya
14	SNAP - A RAW images' based setup that can calculate nutrient concentration in leaves	Ekdeep Singh Lubana	Indian Institute of Technology, Bombay	Dr. Maryam Shojaei Baghini
15	Rolling Water Purifier - Roll Pure	Ramesh Kumar	Indian Institute of Technology, Madras	Prof. T. Pradeep

GYTI Award 2018				
16	Battery-less IoT Sensing Nodes	Anandarup Mukherjee	Indian Institute of Technology, Kharagpur	Dr. Sudip Misra
17	Road Accident Detection using Perceptual Attributes of Video	Sinnu Susan Thomas	Indian Institute of Technology, Kanpur	Prof. Sumana Gupta, Prof. Venkatesh K. S.
18	Feasibility Study of Wireless Power Transfer Using Metamaterial	Amit kumar Baghel	Indian Institute of Technology, Guwahati	Sisir Kumar Nayak
19	Design of Low Cost Infrared Vein Detector	Trivikram Annamalai	Institute of Chemical Technology, Mumbai	Prof. Purba Joshi, Prof. B. K. Chakravarthy
20	Window Solar Cooker	Avinash Prabhune	Indian Institute of Technology, Hyderabad	Prof. B. K. Chakravarthy
21	Magnetic tool for nano finishing the holes, vertical and horizontal surfaces	Girish Verma	Indian Institute of Technology, Delhi	Prof. Pulak Mohan Pandey
22	Origgon - A Social Search Engine	Abhik Saha, Harshit Jain	Indian Institute of Technology, Hyderabad	
23	A novel low cost polyvinyl alcohol-Nafion-borosilicate membrane separator for microbial fuel cell treating distillery wastewater	Bikash Ranjan Tiwari		Prof. M. M. Ghangrekar
GYTI Appreciation 2018				
24	3D bioprinted skin scar model for drug and cosmetic testing	Shikha Chawla	Indian Institute of Technology, Delhi	Dr. Sourabh Ghosh
25	A Non-contact Optical Device for Online Multiplexed Monitoring of Diseases of Military Importance in Fragile and Conflict-Affected Settings	Probir Kumar Sarkar		Prof. Samir Kumar Pal
26	Performance Evaluation and Process Optimization for Production of Ready-to-Eat Therapeutic Food Paste in Pilot Scale Unit	Rakesh Kumar Raigar	Indian Institute of Technology, Kharagpur	Prof. H N Mishra
27	3D-NuS: A Web Server for Automated Modeling and Visualization of non-canonical 3-Dimensional Nucleic Acid Structures	L Ponoop Prasad Patro	Indian Institute of Technology, Hyderabad	Dr. Thenmalarchelvi Rathinavelan

28	Eco-Friendly Water Retention Natural Polymer	Narayan Lal Gurjar	Maharana Pratap University of Agriculture & Technology, Udaipur	Prof. S. M. Mathur
29	New generation periscope fruit picking device	Tania Dutta	Birla Institute of Technology & Science-Pilani	
30	Nano-biosensor and methods for detecting potassium ion concentration	Jaymin Kanubhai Jadav	Junagarh Agricultural University, Junagarh	Dr. B. A. Golakiya
31	Development of Graphene Coated Conductive Fabrics based Smart Wearable Body Warmers for Defense and Medical Applications	Nagarjuna Neella	Indian Institute of Science, Bangalore	Prof. K. Rajanna
32	Buzzing Band	Saka Naveena	Jawaharlal Nehru Technological University, Hyderabad	Dr. Ravuri Viswanadhan
33	Brain wave nerve excitation for physically disabled	Sarath S, Shilpa M Biju, Nanda Kiran, Hridhya Jolly K, Shilpa P Prasad, Midhun Raj, Sachin Suresh	A.P.J. Abdul Kalam Technological University, Thiruvananthapuram	Dr. Sunil Jacob
34	A computational alternative to analyze and understand Ebola virus pathogenesis in human	Abantika Pal	Indian Institute of Technology, Kharagpur	Dr. Pralay Mitra
35	Open Source Augmented Reality Wearable Smart Assist Device for Blind	Sarang Nerkar		Prof. Steve Mann
36	White Cane - A Virtual Assistant for the Visually Impaired	Barnopriyo Barua	Indian Institute of Technology, Kharagpur	
37	Ionic movement bases desalinators	Ravindranath Ragunathan		Dr. S.Anbumalar
38	Rapid Cervical Cancer Detection Using Neuromorphic Hardware	Narayani Bhatia	Indian Institute of Technology, Delhi	Dr. Manan Suri
39	Design And Development Of Intelligent And Robust Grid Integrated Solar PV System With Improved Power Quality For Roof Top Applications Especially For Abnormal Indian Distribution Feeder	Amresh Kumar Singh	Indian Institute of Technology, Delhi	Prof. Bhim Singh

40	Cerium impregnated activated carbon composite as a filtering material for fluoride removal from groundwater	Mahipal	Indian Institute of Technology, Patna	Dr. Trishikhi Ray Choudhury
41	Loco-Pilot Vision Enhancement System: TRINETRA (Third eye) for Indian Railways	Anand Kumar K.S.	Indian Institute of Technology (BHU), Varanasi	Dr. R. K. Saket, Dr. R. Rajendran
42	Katha	Ritika Singh		Dr. Koumudi Patil
43	Aadharv - A Multi Utility Assistive Device For Elders And People With Mobility Impairment	Vimal C	Indian Institute of Technology, Kanpur	Dr. J. Ramkumar
44	Augmentative Rehabilitation of SCI and Stroke Patients	Kashif Sherwani	Other	Dr. Neelesh Kumar
45	Detection of hydrocarbons by laser assisted paper spray ionization mass spectrometry (LAPSIMS)	Pallab Basuri	Indian Institute of Technology, Madras	Prof. T. Pradeep
46	An indigenous technology for development of cost-effective and energy-efficient engine intake air filters	Ajay Kumar Maddineni	Indian Institute of Technology, Delhi	Prof. Dipayan das
47	Smartphone based portable low-cost continuous wave Doppler Ultrasound system	Biswabandhu Jana	Indian Institute of Technology, Kharagpur	Prof. Swapna Banerjee, Prof. Goutam Saha
48	SIT: Smell Your Health	P. Sri Lekha	Jawaharlal Nehru Technological University, Hyderabad	Dr. Pushpa Kotipalli
49	On Board Diagnostic Data Analysis System (OBDAS)	Archit Agarwal	University of Petroleum and Energy Studies, Misrapatti	Dr. Rajesh Singh
50	NOWAH (No Waste at Household) Technology - A novel, sustainable, smart and complete treatment technology for both Faecal sludge and Organic waste management	Anu Rachel Thomas	Indian Institute of Technology, Madras	Prof. Ligy Philip
51	Bioelectric toilet: A novel approach for treatment of human waste and generating onsite electricity for lighting toilets	Indrasis Das	Indian Institute of Technology, Kharagpur	Prof. M. M. Ghangrekar

SITARE GYTI Award 2019				
1	Novel Hybrid Technology for Bioseparation	Jayeshkumar Sevantilal Mevada	Institute of Chemical Technology, Mumbai	Prof. Aniruddha B. Pandit
2	Development of engineered E.coli for high-throughput drug screening against Malaria and Kala-azar	Preeti Yadav	Jawaharlal Nehru University, Delhi	Dr.Shailja Singh, Dr. Swati Garg, Dr.SoumyaPati
3	Anti-pesticide dermal gel	Ketan Thorat, Subhashini Pandey	Institute For Stem Cell Biology and Regenerative Medicine, Bangalore	Dr. Praveen Kumar Vemula, Dr. Sandeep Chandrashekharappa
4	Yog-I - An affordable insulin pump for Type-1 diabetic patients in resource constrained settings	Deval Karia, Rohit S. Nambiar	Indian Institute of Science, Bangalore	Dr. Manish Arora
5	Magnetic-field actuated hybrid nanofiber scaffold and apparatus for 4D tissue engineering	Uday Kumar Sukumar, Vinay Kumar	Indian Institute of Technology, Roorkee	Dr. P. Gopinath
6	Modernization of traditional anti-malarial drug artesunate via nanomedicine approach.	Deepika Kannan, Nisha Yadav	Shiv Nadar University, Noida	Dr. Shailja Singh, Dr. Bimlesh Lochab, Dr. Soumya Pati
7	Revelation of G-quadruplex formation as a molecular basis of fragile X tremor/ataxia syndrome (FXTAS) leads to a new direction in the drug discovery	Yogeeshwar Ajjugal, Narendar Kolimi	Indian Institute of Technology, Hyderabad	Dr. Thenmalarchelvi Rathinavelan
8	Low-cost, easy-to-use, in-house developed electric cell impedance sensing (ECIS) system for studying the dynamic behaviour of the biological cell	Uvanesh K asiviswanathan	Indian Institute of Technology (Banaras Hindu University), Varanasi	Prof. Neeraj Sharma, Dr. Sanjeev Kumar Mahto
9	Growth factor free strategy for therapeutic neo-vascularization	Shivam Chandel, Abel Arul Nathan S	Indian Institute of Technology, Madras	Dr. Madhulika Dixit
10	Real Time Surrogate Visual Tracking of Lung Tumours for Effective Radiotherapy	Priya Singh, Darshan Ramesh Shet	Indian Institute of Technology, Kanpur	Prof. Venkatesh K Subramanian

11	Patient-specific spheroid-on-chip for cancer treatment: combinatory drug screening	Sharanya Sankar, Viraj Mehta	Indian Institute of Technology, Hyderabad	Dr. Subha Narayan Rath
12	Pneumatic Damping Prosthetic Leg For Above-knee Amputees	Muhammed Janish U, Abhijitnath A	MES College of Engineering, Kuttippuram	Prof. Padmakumar K
13	Actin Mimetic ATP Driven Controlled Supramolecular Polymerization	Ananya Mishra	Jawaharlal Nehru Centre For Advanced Scientific Research, Bangalore	Prof. Subi J. George
14	Image Analyzing Drying Patterns Of Blood And Plasma Droplets For The Rapid Detection Of Thalassaemia Carriers	Manikuntala Mukhopadhyay, Rudra Ray	Indian Institute of Technology, Kharagpur	Prof. Sunando Das Gupta, Prof. Maitreyee Bhattacharya
15	Development Of Rapid And Non-destructive Method For Detection Of Insect Infestation In Stored Cereal Grains	Gayatri Mishra, Ranjana Rani	Indian Institute of Technology, Kharagpur	Dr. H N Mishra, Prof. Shubhangi Srivastava
GYTI Award 2019				
16	Utilisation of Real-World Waste Plastic for the Production of Fuel Range Liquid Hydrocarbons using Two-step approach	Uma Dwivedi	Indian Institute of Technology, Delhi	Prof. K. K. Pant, Prof. S. K. Naik
17	Non- Catalytic Deep Desulfurization Process Using Hydrodynamic Cavitation	Nalinee B. Suryawanshi	CSIR-National Chemical Laboratory, Pune (CSIR-NCL), Pune	Dr. Vinay M. Bhandari
18	Dual action of SPIONS in effective removal of heavy metals and mosquito larvae from water	Roshini S. M, Karthika M, Lavanya Agnes Angalene J.	Sathyabama Institute of Science and Technology, Chennai	Dr. Antony V Samrot
19	Formic Acid-powered Ferrobots For Clean Energy Technology	Amit Kumar Singh, Saptak Rarotra, Viswanath Pasumarthi	Indian Institute of Technology, Guwahati	Prof. Dipankar Bandyopadhyay, Prof. Tapas Kumar Mandal
20	Early Diagnosis Of Osteoporosis Using Metacarpal Radiogrammetry And Texture Analysis	Anu Shaju Areeckal	National Institute of Technology, Surathkal	Prof. Suman David S
21	Novel and eco-friendly light weight thermal insulating ceramics from thermal power plant waste	Yogesh D. Urunkar, Chandrakant S. Bhogle	Institute of Chemical Technology, Mumbai	Prof. Aniruddha B. Pandit, Prof. J.B. Joshi

GYTI Appreciation 2019				
22	Artificial Biomarkers of Knee Osteoarthritis	Nikhil Gupta	Indian Institute of Technology, Delhi	Prof. Tapan Kumar Ghandhi, Dr. Alok Prasad
23	Developing Labscale Magneto-Mechanical Experimental Setup to Predict the Plaque Growth of Human Heart Coronary Arterial Layer System	Mallikarjunareddy Reddy Boreddy	Madanapalle Institute of Technology and Science, Angalla	Dr. Mallikarjunachari G
24	Development of low grain arsenic rice by the fungal arsenic methyltransferase via bio-volatilization	Shikha Verma, Pankaj Kumar Verma	CSIR - National Botanical Research Institute, Lucknow	Dr. Debasis Chakrabarty
25	Towards Application of Helical Nanorobots for Biomedical Applications.	Malay Pal, Debayan Dasgupta, Arijit Ghosh, Neha Somalwar	Indian Institute of Science, Bangalore	Prof. Ambarish Ghosh, Dr. Deepak K Saini, Prof. Ramray Bhatt
26	Development of improved biocatalysts for D-allulose production utilizing the low-cost agro-industrial residues	Satya Narayan Patel	Center of Innovative and Applied Bioprocessing, Ajitgharh	Dr. Sudhir P. Singh
27	Design and development of interlock mechanism based bio-compatible, user-friendly and cost-effective elbow disarticulation prosthesis	Mrutyunjay Maharana, Bhabani Shankar Nayak	Indian Institute of Technology Guwahati & All India Institute of Physical Medicine And Rehabilitation (AIIPMR), Mumbai	Dr. Sisir Kumar Nayak, Prof. Deepak P. Prabhu
28	Production of effective and low cost dapsone-phytochemical hybrid candidate for use in multidrug therapy against Mycobacterium leprae	Shasank Sekhar Swain	Institute of Medical Sciences and Sum Hospital (IMS and Sum Hospital), Bhubaneswar	Prof. Rabindra Nath Padhy, Prof. P. Sudhir Kumar
29	Proteasome Activation: A potential drug target for treatment of Parkinson's Disease.	Mohd Ahsan, P Chinmai	Indian Institute of Technology, Madras	Prof. Sanjib Senapati
30	A more accurate detection and intrinsic subtype classification of breast cancer using machine learning.	Bikash Ranjan Samal	Indian Institute of Technology, Kharagpur	Dr. Ranjit Prasad Bahadur

31	Fighting resistance in cancer cells due to bacterial infections with modular drug platforms: An idea towards personalized medicine	Rohini Singh	Indian Institute of Technology, Delhi	Prof. Shalini Gupta
32	Economical Paper-Strip For Early Stage Mastitis Disease Detection In Cow	Harika Chappa, Avisek Barla, Navin V Narayanan, Sudip Chakraborty, Ahila Yegappan	Sri Venkateswara Veterinary University, Tirupati	Prof. Y. Hari Babu
33	Anemia meter	Jeethu Raveendran	Amrita Vishwa Vidyapeetham University, Coimbatore	Dr. T. G. Satheesh Babu
34	Understanding Sequence-Disorder-Function Relationship of an Intrinsically Disordered Protein to Design Soil Salinity Sensor	Sneha Munshi	Indian Institute of Technology, Madras	Dr. Athi Narayanan N
35	A Simple, Non-invasive, Low Cost, Point of Care, Colorimetric Method, using Reactive Oxygen Species induced Lipid Peroxidative changes in Saliva, to Assess the Risk of Oral Pre-cancerous Lesions and Oral Squamous Cell Carcinoma in Chronic Smokers	Nikhiya Shamsher	Greenwood High International School, Bangalore	Prof. Aloysius D'Mello
36	Multifunctional Granulator (MFG) -A Multi functional device to prepare dried spherical granules	Rajendra Prasad Moturu	Andhra University College of Pharmaceutica Sciences, Visakhapatnam	Prof. K.V. Ramana Murthy
37	Audience response device for Deaf and mute classroom	Manasi Mishra	Indira Gandhi Delhi Technical University for Women, Delhi	Prof. S. RN Reddy
38	Development of Process Technology for Manufacture of RTD Carbonated Grain Beverage	Anjali Thakur, Pooja Pandey	Indian Institute of Technology, Kharagpur	Dr. H N Mishra
39	Manufacture of Micronutrient Fortified Rice Kernels through Extrusion Technology	Dalbhat Chandra Kant Genu, Jayshree Majumdar	Indian Institute of Technology, Kharagpur	Dr. H N Mishra

40	An Automated Panipuri Vending Machine	Abhijit Nath, Saurav Jyoti Sarma, Chandeeep S. Gogoi	Tezpur University, Tezpur	Prof. Polash Pratim Dutta
41	Fibonacci Series based Rectangular Microstrip Patch Antenna	Deven G. Patanvariya, Kalyan Sundar Kola	National Institute of Technology, Goa	Dr. Anirban Chatterjee
42	Smart Signalling And Interlocking System	S. Karthikeyan, S. Umasankar, Karthikeyan S.	M. Kumarasamy College of Engineering, Tamil Nadu	Dr. C. Ramesh
43	Bhu-goal : Predicting Moods Of India	Kartik Vij, Rahul Kinra, Rouble Gupta, Debarshi Ghosh	Chitkara University, Chandigarh	Dr. Nitin K. Saluja
44	Pyrophosphate and Metaphosphate as Next-generation Cathode Material for Energy Storage Devices	Ritambhara Gond, Krishnakanth Sada, Anshuman Chaupatnaik	Indian Institute of Science, Bangalore	Prof. Prabeer Barpanda

SITARE-GYTI Award 2020

1	A Portable Diagnostic Platform for Rapid Label-free Phenotyping of Breast Cancer	Anil Vishnu G K, Saeed Rila B.C., Arun Baby, Midhun C.Kachappilly	Indian Institute of Science, Bengaluru	Prof. Hardik J. Pandya, Prof. Annapoorni Rangarajan
2	Multipurpose Proctoscope	Siddhant Shrivastava, Dr. Arshad Ahmad, Dr. K S Venkatesh	Indian Institute of Technology Kanpur	Dr. J RamKumar
3	An Affordable and Easy-to-Use Optical Biosensor for Mannosylated Lipoarabinomannan (manLAM) in Urine for TB Diagnosis	Divagar M, Kuzhandai Shamlee J, Lakshmana Swamy V V	Indian Institute of Technology Madras	Dr. V. V. Raghavendra Sai, Dr. Vani Janakiraman
4	An Automated Cardiovascular Replicator for Online Assessment of Cardiac Assist Devices, Prosthetics and Beyond	Sumanta Laha, Pulak Ray, Aritra Rakshit	Indian Institute of Technology Kharagpur	Prof. Prasanta Kumar Das

5	Development of Poly-unsaturated Fatty Acid PUFA and Antioxidant Rich Vegetable Oil Powder for Healthy Hearta	Monalisha Pattnaik, Dr. Mousumi Ghosh	Indian Institute of Technology Kharagpur	Prof. Hari Niwas Mishra
6	A User Friendly, Affordable Device for Self Blood Microsampling for Diagnostics and Pharmaceutical Applications	Vaibhav Shitole	National Institute of Pharmaceutical education and Research Ahmedabad	Prof. Prasoon Kumar
7	Artificial Deep Learning Brain Actuated Lower Limb Exoskeleton For Paralysed	Vinoj P.G, Varun G Menon, Saira Joseph	SCMS School Of Engineering & Technology, Kerala	Dr. Sunil Jacob
8	Nanofiber Yarn Suture: A Medical Device	Arthi Sunil Richard	Indian Institute of Technology Madras	Dr.Rama Shankar Verma
9	Development of Electrochemical Impedence based Aptasensor for Semen sorting in Cattle	Sumit Kumar Singh	National Dairy Research Institute, Karnal	Dr. Sudarshan Kumar
10	A Novel, Low-cost, Non-invasive Eye Tracker Using Fiber Optic Sensora	Shweta Pant, Sharath U, Srivani Padma, Sumitash Jana, Varsha V	Indian Institute of Science, Bengaluru	Prof. Sundarrajan Asokan
11	Frustum CAM in Medical Ventilators	Prem Dakshin	Birla Institute of Technology & Science University, Pilani	Dr. Shashank Khurana
12	Continuous Monitoring of Gasotransmitters for Early Stage Management of Systemic Inflammatory Response Syndrome (SIRS) Using Microfluidics Platform	Ravindra Gaikwad	Indian Institute of Technology, Madras	Dr Ashis Kumar Sen
13	A Non-Electric and Affordable Surface Engineered Particle Based Point-of-Use Water Disinfection	Deepa Dixit	Indian Institute of Technology, Gandhinagar	Prof. Chinmay Ghoroi
14	Nanotechnology Based Intranasal Spray Formulation for the Effective Treatment of the Alzheimers Disease	Shivraj Vasantrao Naik	Institute of Chemical Technology, Mumbai	Prof. Vandana Bharat Patravale

SITARE-GYTI Appreciation 2020				
1	Real-time Ultrasound-Based Acoustic Parameter Imaging to Track Spatio-temporal Evolution of Hotspot in High Intensity Focused Ultrasound and Microwave Hyperthermia	Aliarshad Kothawala	Indian Institute of Technology Madras	Prof. Arun K. Thittai
2	Tannin-based Mouth Fresheners	Sonali Naik	National Chemical Laboratory, Pune	Dr. Kiran S
3	Development of Protocol of Commercial Cultivation of Nobel Wild Edible Mushrooms of Tripura, Northeast India and Evaluation of their Biological Properties	Sanjit Debnath	Tripura University, Agartala	Prof. Ajay Krishna Saha
4	A Low Cost Passive Microdevice for Platelet Rich Plasma PRP Separation from Human Blood	Vijai Laxmi,	Indian Institute of Technology, Bombay	Prof. Amit Agrawal, Prof. Suhas S. Joshi
5	Breath Volatile Organic Compound Detection Using Conducting Polymer Coated Chemiresistive Filter Paper Sensors	Aswathy M. Nair, Debasmita Mondal, Sourabh Agrawal	Indian Institute of Technology, Bombay	Prof. Soumyo Mukherji
6	Production of Bioactive Chicken IL-17A by Genetically Engineered Food Grade Lactic Acid Bacteria Lab : From Gene to Biomedical Application in Poultry	Aritraa Lahiri,	Indian Institute of Science Education and Research, Kolkata	Dr. Amirul Islam Mallick
7	Development of Sustainable Antimicrobial Wrapping Material from Biopolymers	Puja Kumari,	Indian Institute of Technology, Madras	Prof. Mukesh Doble
8	Crop Productivity and Related Value Addition Black Rice by Co-inoculation with Nanoembedded Mycorrhizal Fungus Piriformospora Indica Serendipita	Shubhangi Mahajan	Amity University, Noida	Prof. Ajit Varma
9	Colorimetric Yes/No Type Swab Based Detection of Pesticides on Agricultural Produce	Tathagata Pal,	Indian Institute of Technology, Bombay	Prof. Soumyo Mukherji

10	Development of Polymer Based Nano Medicine for the Treatment of Cerebral Malaria	Sukanya Patra, Himadri Medhi, Somedutta Maity	Indian Institute of Technology(BHU), Varanasi	Dr. Padip Paik
11	Smart Gloves for Assisted Physiotherapy	Krishna Sivanand, Deepika Gunasekaran	Kumaraguru College of Technology, Coimbatore	Dr. B.L.Lakshmi Meera
SRISTI-GYTI Award 2020				
1	An Inexpensive Deep Tissue Blood Flow Measurement System Using Low Frame Rate Camera	Murali K	Indian Institute of Technology, Bombay	Prof. Hari M Varma
2	A Novel CD4 cell Count Method for HIV Infected Patients Using a Hematology Analyzer	Rajesh Srinivasan, Vikram S, Niraj N Jadhav	Indian Institute of Science, Bengaluru	Prof. Sai Siva Gorthi
3	AbleFit: Wearable Device for Orthopedic and Neurological Disorders Patients	Gunjan Patel	Indian Institute of Technology, Madras	Dr. Sujatha Srinivasan Dr. Rajdeep Ojha
4	MOKSH-Convert Crop Waste into Wealth	Amrinder Singh, Gurditt Singh, Varinder Singh Nitika Dhingra	Chitkara University, Punjab	Dr. Nitin Saluja
5	A Method and a System for Remotely Controlled Manipulation of Nanomaterials in Fluids	Souvik Ghosh	Indian Institute of Science, Bengaluru	Prof. Ambarish Ghosh
6	Development of Patient Specific Customized Shape Vascular Stent by 3D Printing Technology	Jasvinder Singh, Gurminder Singh	Indian Institute of Technology, Delhi	Prof. Pulak Mohan Pandey
7	Sediment Microbial Fuel Cell as a Renewable Power Source in Remote Area	Jeetendra Prasad	Motilal Nehru National Institute of Technology, Allahabad	Prof. Ramesh Kumar Tripathi
SRISTI-GYTI Appreciation 2020				
1	Disposable Onsite kit for Discriminating Raw/ Synthetic/Pasteurized Milk Based on Alkaline Phosphatase Indicator	Kuldeep Mahato, Buddhadev Purohit, Ashutosh Kumar	Indian Institute of Technology, Guwahati	Dr. Pranjal Chandra

2	A Ready-to-use Haemostatic Bandage for Military and Civilian Trauma Care	Syed Muntazir Andrabi	Indian Institute of Technology, Kanpur	Prof. Ashok Kumar
3	Design of an Indigenous Atmospheric Water Generator for Economical Production of Drinking Water in the Water Scarce HILLY, rid and Coastal Regions	Bukke Vani, Sajja. S. Chandrasekhar, Dileep Kumar Fothedar, Mr. B. Govardhan Shiva Prasad Nandala, M. Madhumala, Karishma Mishra	Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad	Dr. Sundergopal Sridhar, Dr. Nivedita Sahu, Dr. Sugali Chandra ekhar, Mr. Mukkavilli Rama Krishna
4	Self-sustainable E-waste Recycling: Generating Wealth from Waste via Zero Discharge Technology	Prashant Ram Jadhao, Ramdayal Panda, Snigdha Mishra	Indian Institute of Technology, Delhi	Prof. K. K. Pant, Prof. K. D. P. Nigam Prof. Ejaz Ahmad
5	Smart, Flexible, and Multi-Functional Thermal and Energy Management Systems for Next-Generation Electronic Devices	Sri Ganesh Subramanian	Indian Institute of Technology, Kharagpur	Prof. Sunando Das Gupta, Prof. Justin A Weibel
6	Harvesting Delayed Fluorescence in Mn-doped Perovskite Quantum Dots Using Vibrationally Assisted Delayed Fluorescence (VADF)	Pradeep K R	Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru	Prof. Ranjani Viswanatha
7	Design of Acetone Breath Gas Analyzer in the Evaluation of Diabetes Mellitus	Ramji K.	SRM University Chengalpattu	Dr. U. Snekhalatha
8	Design and Development of Advanced CNC Micro-machining System	Ashish Kumar Sahu, Harish Kumar, Hardik Arvindbhai Patel, Jitin Malhotra	Indian Institute of Technology, Delhi	Prof. Sunil Jha
9	Not-IS : A Currency Identification Aid for the Visually Impaired in India	Sri Navya Kondaveeti	Indian Institute of Technology, Bombay	Prof. Swati Pal
10	Recovery of Lithium Cobalt and Manganese Values from Discarded Lithium-Ion Batteries	Singh Rahulkumar Sunil	Indian Institute of Technology, Roorkee	Dr. Nikhil Dhawan

11	Electrical Power Generation from Wet Textile	Sankha Shuvra Das, Vinay Manaswi Pedireddi	Indian Institute of Technology, Kharagpur	Prof. Suman Chakraborty, Prof. Aditya ndopadhyay, Prof. Partha Saha
12	Development of New Electro-mechanical Muscle Fatigue Measurement Device	Parth Joshi, Poojan Gajjar	Indian Institute of Technology, Jodhpur	Dr. Kaushal A. Desai, Dr. Prathamesh H Kamble
13	Highly Sensitive, Scalable Reduced Graphene Oxide with Palladium Nano-composite as Strain Sensor	Suresh Nuthalapati, Vijay Shirhatti, Vaishakh Kedambaiboole	Indian Institute of Science, Bengaluru	Prof. K Rajanna, Prof. M. M. Nayak
14	Development of Sustainable Mosquito Repellent Cum Multifunctional Textile using Microencapsulation of Essential oils	Nagender Singh	Indian Institute of Technology, Delhi	Dr. Javed N. Sheikh
15	Deposition Reactor Designed for Low cost Low-temperature Deposition of High-quality Oxides Films for Next Generation Electronics	Vivek Singh	Indian Institute of Science, Bengaluru	Prof. Sushobhan Avasthi
16	A Machine Learning Package to Design Novel Functional Glasses	Ravinder, Hargun Singh Grover, Suresh, Sourabh	Indian Institute of Technology, Delhi	Prof. N. M. Anoop Krishnan
SITARE-GYTI Award 2021				
1	An Intraoperative Probe for Brain Tumour Margin Delineation	Arjun B S	Indian Institute of Science, Bengaluru	Prof. Hardik J. Pandya
2	Microsensor Integrated Intubation Catheter for Chronic Airway management	Alekya B	Indian Institute of Science, Bengaluru	Prof. Hardik J. Pandya
3	Design and Development of Hollow Polymeric Microneedles for controlled drug/vaccine delivery	Pankaj Shivhare	Indian Institute of Technology Bombay	Prof. Rohit Srivastava
4	Environment Safe Antimicrobial Phytoabsorbent Pads For Sanitary & Hygiene Products	Deepika NP	JSS College of Pharmacy	Dr. B. Duraiswamy

5	Pro-Care: Prognostic point of care monitor for cardiovascular disease management	Ruchira Nandeshwar	Indian Institute of Technology, Bombay	Prof. Siddharth Tallur
6	Rapid detection of bilirubin using Cationic Multifluorescent Carbon Quantum dots as a fluorometric probe	Barkha Singh	Indian Institute of Technology, Bombay	Prof. Rohit Srivastava
7	Genetic characterization and development of endophytic Microbacterium based bioinoculant for rice blast disease management	Asharani Patel	Indian Agricultural Research Institute, Delhi	Dr. Aundy Kumar
8	Digitization of Manufacturing Process of Indian Sweetmeats with Tailored Functionality for Harnessing Food Safety and Quality	Sukirti	Indian Institute of Technology, Delhi	Dr. Jatindra K Sahu and Prof. Satyanarayan Naik
9	Development of process technology for instant soluble skim milk tablets	Siddharth Vishwakarma	Indian Institute of Technology, Kharagpur	Prof. Hari Niwas Mishra
10	Enriching Methane Content in Biogas through CO ₂ Conversion into Acetic Acid via Microbial Electrosynthesis	Moumita Roy	Indian Institute of Science Education and Research, Mohali	Dr. Sunil A Patil
SRISTI-GYTI Award 2021				
1	Lithography-less, Frugal and Scalable Microfluidic Device for Drug Discovery and Drug Screening Applications	Ketaki Bachal, Shital Yadav, Dr. Tanveer ul Islam and Makrand Rakshe	Indian Institute of Technology, Bombay	Prof. Abhijit Majumder, Prof. Prasanna Gandhi
2	Boron Analogs of Graphene as Alternative Nanoadditives for Fuels used in Space and Defence Applications	Harini Gunda	Indian Institute of Technology, Gandhinagar	Dr. Chinmay Ghoroi, Dr. Kabeer Jasuja
3	Battery Less Electrochemical Sensor for Quantification, Removal of Naringin and Determination of Maturity of Citrus Fruits	Arun Kumar Gupta	Tezpur University, Tezpur	Dr. Poonam Mishra Prof. PP Sahu

4	Development of Drop Impact Printing Technique: A Way Towards Clog Free Printing Technology	Chandantaru Dey Modak, Arvind Kumar and Dr. Abinash Tripathy	Indian Institute of Science, Bangalore	Dr. Prosenjit Sen
5	Development of Completely 3D printed Microfluidic Device with Reusable Bioelectrodes for Enzymatic Glucose Biofuel Cell Applications	Jayapiriya U S	Birla Institute of Technology and Science, Pilani (Hyderabad Campus)	Prof. Sanket Goel
6	Design and Development of a Low-cost Milk Tester	Moupali Chakraborty	Indian Institute of Technology, Kharagpur	Prof. Karabi Biswas
7	A Low-Cost Pocket-Sized Digital Microscope	Sanjeev Kumar	Indian Institute of Technology, Kharagpur	Prof. Pranab Kumar Dutta, Prof. Manjunatha Mahadevappa
8	Point-of-care Spinning Disc for Complete Blood Count (CBC)	Rahul Agarwal, Arnab Sarkar, Arka Bhowmik, Devdeep Mukherjee	Indian Institute of Technology, Kharagpur	Prof. Suman Chakraborty
9	Development of Light Weight Cost Effective Soft Body Armour using Indigenous Technology	Mukesh Bajya, Unsanhame Mawkhlieng	Indian Institute of Technology, Delhi	Prof. Abhijit Majumdar, Prof. B. S. Butola
SITARE-GYTI APPRECIATION-2021				
1	A low-cost Automated Bone Mill for Delivering Graft Particles of Definite Sizes	Jannu Rajeev Naren	S V S Group of Institutions, Mahabubnagar	Dr. R. Viswa Chandra
2	An Intelligent Hand Rehabilitation and Assessment System for Stroke Patients	Chandan Kumar Jha	Indian Institute of Technology, Gandhinagar	Dr. Arup Lal Chakraborty
3	Design and Development of Phased Array Applicator for Hyperthermia Treatment of Locally Advanced Breast Cancer	Divya Baskaran	Indian Institute of Technology, Madras	Dr. Kavitha Arunachalam

4	Nucleic Acid Testing Based Low-Cost Portable Rapid Diagnostic Device for Detecting Viral Pandemic Infection at the Community Level: from Saliva to Solution	Sujay Kumar Biswas	Indian Institute of Technology, Kharagpur	Prof. Suman Chakraborty
5	A Diagnostic Kit to Minimize Risks from the Micro-TESE Procedure While Differentiating Nonobstructive vs. Obstructive Azoospermia	Govindkumar Balagannavar	Institute of Bioinformatics and Applied Biotechnology, Bengaluru	Prof. Kshitish K Acharya
6	Design and Development of Post-Surgical Rehabilitation Device for Temporomandibular Joint Disorder Patients	Priyanshu Raj Shrivastava	Indian Institute of Technology, Jodhpur	Dr. Kaushalkumar Ashokbhai Desai
7	Ultra-Low Cost Instrumented Foot Pressure Insole for Gait Rehabilitation in Locomotor Dysfunction Among Differently-abled and Other Clinical Populations	Ashutosh Tiwari	Indian Institute of Technology, Delhi	Dr. Deepak Joshi
8	Microfluidic Immunosensor for Point-of-care-testing of Beta-2-microglobulin in Tear	Surjendu Maity	Indian Institute of Technology, Guwahati	Prof. Dipankar Bandyopadhyay, Dr. Dipankar Das
9	Processing of Citrus Limetta Seeds as Industrial Waste into Acaricidal Agents for Controlling Cattle Tick	Parag Jain	Columbia Institute of Pharmacy, Raipur	Dr. Ravindra Kumar Pandey, Dr. Trilochan Satpathy
10	Technological Transformation of the Integrated Biomass Conversion Process in the Rural Context for the Production of Handmade Paper from the Locally Available Common Reed Phragmites karka in Chilika Lake of Odisha	Falguni Pattnaik	Indian Institute of Technology, Delhi	Dr. Satyanarayan Naik, Dr. Vivek Kumar
11	A Point-of-Care Device for Heavy Metal Ion Detection in Body Fluids	Swetha Menon	Indian Institute of Technology, Madras	Dr. V. V. Raghavendra Sai
12	Neonatal Hearing Screening Headband for Brainstem and Cortical Response Extraction	Rathin Joshi	Indian Institute of Science, Bangalore	Dr. Hardik J Pandya

13	Wearable Interactive Parkinson's Disease Assistive Device (WIPAD)	Yogesh Singh	Indian Institute of Technology, Gandhinagar	Dr. Vineet Vashista
14	Targeting Plasminogen Activator Inhibitor-1 to Treat Skin Fibrosis	Isha Rana	Institute for Stem Cell Science and Regenerative Medicine, Bangalore	Prof. Colin Jamora
15	A Novel Approach to Cure the Chronic Diabetic Wounds	Akshay Hegde	Institute for Stem Cell Science and Regenerative Medicine, Bangalore	Prof. Colin Jamora
SRISTI-GYTI APPRECIATION-2021				
1	Osteoinductive Personalized Bone Grafts by 3D Printing of Novel Natural Fiberreinforced Composite for Maxillofacial Reconstruction	B. Sri Sai Ramya	Indian Institute of Technology, Hyderabad	Dr. Falguni Pati
2	Design and Development of a Trans Illumination Imaging to Detect Breast Malignancies and Correlation of Results with Mammograms	Chiranjib Bhowmick	Indian Institute of Technology, Kharagpur	Prof. Manjunatha Mahadevappa, Prof. Pranab Kumar Dutta
3	Development of a Novel Low Cost Non-thermal Process Technology for Preparation of Shelf Stable Sugarcane Juice	Dr. Hari Niwas Mishra	Indian Institute of Technology, Kharagpur	Chirasmitta Panigrahi
4	An Electrolithography Tool for High Throughput Pattern Generation	Sumit Kumar, Ebinesh Abraham	Indian Institute of Science, Bengaluru	Dr. Praveen Kumar Prof. Rudra Pratap
5	Modified Trickle Filter- A Solution to Water Crisis in India	Rishabh Shukla	Indian Institute of Technology, Delhi	Prof. Shaikh Ziauddin Ahammad
6	Efficient Deep Learning Technique for Automated Ischemic Stroke Detection Assisting Radio-diagnosis for Reperfusion Therapy	Anusha Vupputuri, Akshat Gupta	Indian Institute of Technology, Kharagpur	Dr. Nirmalya Ghosh
7	Greywater Sink for Potable and Non-potable Uses	Ankit Nagar, Md Rabiul Islam	Indian Institute of Technology, Madras	Prof. Thalappil Pradeep

8	An Indigenous Low-cost Smartphone Interfaced Handheld Potentiostat	Abhranila Das	Indian Institute of Engineering Science & Technology, Shibpur	Dr. Chirasree Roy Chaudhuri
9	An Affordable, Sensitive and Portable Electric Field Mediated Device Towards Label-free, Point of Care Disease Diagnostics	Bhaswati Chakraborty	Indian Institute of Engineering Science & Technology, Shibpur	Dr. Chirasree Roy Chaudhuri
10	Origami Microfluidic Microbial Fuel Cell (MFC) for Powering IoT Node with Cloud IoT Platform	Prakash Rewatkar	Birla Institute of Technology and Science Pilani, (Hyderabad Campus)	Prof. Sanket Goel
11	A Unipolar Coil Arrangement Method for Improving the Coupling Coefficient without Ferrite Material in Wireless Power Transfer Systems	Gautam Rituraj	Indian Institute of Technology, Guwahati	Prof. Praveen Kumar
12	Psychophysiological Monitoring of a Subject using Optical Respiration Rate Measurement System	Abhinav Gautam	Indian Institute of Technology (ISM), Dhanbad	Dr. Amitesh Kumar
13	Position Sensorless Permanent Magnet Brushless DC Motor Drive for Grid Interactive and Solar Powered Irrigation Pump	Aryadip Sen	Indian Institute of Technology, Delhi	Dr. Bhim Singh
14	A New Control Surface Auxiron for Aircraft and a Solar UAV Equipped with it	Vijay Shankar Dwivedi	Indian Institute of Technology, Kanpur	Prof. A. K. Ghosh, Prof. G. M. Kamath
15	Multifunctional Disperse Dyes	Ankit Kumar Singh	Indian Institute of Technology, Delhi	Dr. Javed Nabibaksha Sheikh
16	Metal-Organic Frameworks Functionalized Smart Textiles for Environmental Air Purification, Anti-odour, and Antimicrobial Applications	Hardeep Singh	Indian Institute of Technology, Delhi	Prof. Ashwini K. Agrawal Prof. Manjeet Jassal
17	Self-Disinfection Property for Repurposing of Personal Protective Masks	Shounak Roy, Praveen Kumar	Indian Institute of Technology, Mandi	Dr. Amit Jaiswal

18	Smart Polymer with Human Body Temperature Activation	Hema Garg	Indian Institute of Technology, Delhi	Dr. Bipin Kumar, Dr. Bijay P. Tripathi, Dr. Apurba Das
GYTI-2023 AWARDS				
1	Ultraportable device for soil nutrient quantification	Abhishesh Pal	Birla Institute of Technology and Sciences Pilani, Hyderabad Campus	Prof. Satish Kumar Dubey Prof. Sanket Goel
2	Nanocarbon enforced anisotropic musculo-responsive polymer carbon composite (MusCAMLR) for quick recovery of mechanically damaged skeletal muscles	Niranjan Chatterjee	Indian Institute of Technology, Kanpur	Prof. Santosh K. Misra
3	A Portable microfluidic device for detecting infectious diseases (SARS-CoV-2) and a method thereof	Natish Kumar, Monika Kumari	Indian Institute of Technology, Jammu	Dr. Ravi Kumar Arun Dr. Asha Chaubey
4	See your insulin: proposing a self-investigated insulin quality monitoring method	Shantanu Sen, Rafat Ali	Indian Institute of Technology Kanpur	Prof. Sandeep Verma
5	Paper-based point of care device for chronic kidney disease diagnosis	Divya	Indian Institute of Technology (BHU), Varanasi	Prof. Pranjal Chandra
6	Revolutionizing hospital mobility: The adaptive trolley E-drive system	A Arjun, Goutham Sai Krishna, Jayakrishnan C, Aparna Govind, Ayush Arun	Government Engineering College Barton Hill, Thiruvananthapuram	Dr. Anish K John Dr. Smita V, Dr. Arun Anirudhan V
7	Development and clinical validation of a multimodal probe for breast cancer margin assessment	Apurva Dahake, Arif Mohd Kamal	Indian Institute of Science, Bengaluru	Prof. Hardik Jeetendra Pandya
8	Persulfate enhanced ciprofloxacin removal from water by laser-induced graphene-based electroconductive ultrafiltration membrane	Najmul Haque Barbhuiya, Utkarsh Misra, Bhavana Kanwar	Indian Institute of Technology, Bombay	Prof. Swatantra P. Singh
9	Customer friendly smartphone-based portable optical device for determination of chemical spoilage of fish suitable for field analysis	Monica Yumnam	Tezpur University, Tezpur	Prof. Poonam Mishra Prof. Pabitra Nath
10	Novel method of plasma extraction from blood droplet	Uddipta Singha	Indian Institute of Technology, Bombay	Prof. Prasanna S. Gandhi

11	Antimicrobial hemostatic sponge: Point of care technology to cease haemorrhage and cure infection in traumatic injuries	Sudip Mukherjee	Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru	Prof. Jayanta Halder
GYTI-2023 APPRECIATION				
1	Development of “off the shelf” lyopreserved placental graft for diabetic foot ulcer management	Satarupa Sarkar	Indian Institute of Technology, Ropar	Dr. Atharva Poundarik
2	Design of a robotic manipulator for minimally invasive surgery	Amanpreet Singh	Indian Institute of Technology, Delhi	Dr. Jitendra P. Khatait
3	PRAGATI-Parkinson’s rehabilitation and assistance for gait using artificial intelligence	Ankita Raghuvanshi, Priya Pallavi	Indian Institute of Technology, Gandhinagar	Prof. Uttama Lahiri
4	Safety-enriched pouch/sachet cutter for FMCG rework	Gurdeep Singh	Indian Institute of Technology, Guwahati	Prof. Sougata Karmakar
5	AI and IoT-assisted water quality monitoring system for simultaneous detection of heavy metals	Sreerama Amrutha Lahari	Birla Institute of Technology and Sciences Pilani, Hyderabad Campus	Prof. R N Ponnalagu Prof. Sanket Goel
6	Vibe - wearable assistive and rehabilitation device for people with hearing impairment	Velmurugan S	Indian Institute of Technology, Madras	Prof. Anil Prabhakar
7	U-AST Kit: An easy to use, cheap, point of care method for the detection of urine infection along with antibiotic sensitivity profile	Maheshwari J. Behere	Central Salt & Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar	Dr. Soumya Halder
8	Colorimetric chemosensor for rapid detection of fluoroquinolone load in environmental water bodies, urine, and counterfeit drug testing	Tathagata Pal, Tennyson Mathai	Indian Institute of Technology, Bombay	Prof. Soumyo Mukherji
9	Development of EEG signal-controlled pneumatic medical bed for patients with severe motor disabilities	Ashish Siddharth, Manmohan Labh, Yalla Mark Vishal, Inampudi Sai Amith	Indian Institute of Technology (ISM), Dhanbad	Dr. Zafar Alam
10	4d Printing of smart materials for absorbable and deployable medical devices	Saswat Choudhury	Indian Institute of Science, Bengaluru	Dr. Kaushik Chatterjee Dr. Sonal Asthana

11	Development of low-cost technology for simultaneous arsenic and fluoride removal from groundwater for community drinking purposes	Hemant Goyal	Indian Institute of Technology, Roorkee	Prof. Prasenjit Mondal
12	Design of affordable surface decorated graphene oxide nanocomposites for label free prognosis of Alzheimer's disease	Sopan Nangare	H. R. Patel Institute of Pharmaceutical Education and Research, Shirpur	Dr. Pravin Onkar Patil
13	Complete recycling of E-waste using greener approach	Amrita Preetam	Indian Institute of Technology, Delhi	Prof. S.N. Naik Prof. K.K. Pant Prof. Vivek Kumar
14	Low cost, safe and high energy dense mechanically rechargeable zinc-air batteries for long-duration grid energy storage	Akhil Kongara, Gunjan Kapadia	Indian Institute of Technology, Madras	Dr. Aravind Kumar Chandiran
15	Technology for valorization of keratin waste to value added products	Payal Meghshyam Yelne	Institute of Chemical Technology, Mumbai	Prof. Aniruddha B. Pandit
16	Dhruva-A global navigation receiver chip for NavIC, GPS, Galileo and BeiDou	Vijaya Kumar Kanchetla	Indian Institute of Technology, Bombay	Prof. Rajesh Zele
17	Ikshana: An integrated system for adaptive stimulation treatment of urinary incontinence	Komal Shah	Indian Institute of Sciences, Bengaluru	Dr. Manish Arora
18	Novel biological clue assisting polymeric hydrogel mimic the cellular microenvironment and protect from oxidative stress for neuroregenerative applications	Kirti Wasnik	Indian Institute of Technology (BHU), Varanasi	Dr. Pradip Paik
19	Electrophysiology-on-a-chip device: A biomimetic test-bench for probing electrical field modulation of cancer metastasis	Sampad Laha	Indian Institute of Technology, Kharagpur	Prof. Suman Chakraborty
20	Phytonanogel shield: Precision care for psoriasis patients	Roshan Keshari	Indian Institute of Technology, Bombay	Prof. Rohit Srivastava Prof. Shamik Sen
21	Development of bacteriophage-chitosan microparticles for biofilm-mediated multidrug-resistant bacterial infections on burn wounds	Deepa Dehari	Indian Institute of Technology (BHU), Varanasi	Dr. Ashish Kumar Agrawal

22	Implementation of computational and machine learning techniques for the development of in silico tools and identification of novel leads for the treatment of Alzheimer's Disease	Ankit Ganeshpurkar	Indian Institute of Technology (BHU), Varanasi	Dr. Sushil Kumar Singh
23	Use and throw polymeric tooth cover for acute tooth ache and inflammation to proffer non-permanent relief	Vikas Choudhary	Ideal College of Pharmacy and Research, Mumbai	Dr. Shubhangi Kshirsagar Dr. Smita Takarkhede
24	An impedance-based liquid biopsy method for cancer screening and diagnosis using cfDNA as a biomarker	Tejal Dube	Indian Institute of Technology, Delhi	Prof. Manojkumar Rameteke
25	Multi-station multi-axis hybrid layered manufacturing system	Neel Kamal Gupta	Indian Institute of Technology, Bombay	Prof. K.P. Karunakaran
26	Development of affordable vaccines for multi-drug resistant diarrhea	Namrata Baruah	Indian Institute of Technology, Kanpur	Prof. Dharendra S. Katti

HBN Database Link and QR Code

	(1) http://honeybee.org/honeybee_database.php Methods of low-cost farming, animal husbandry and rural modification, published in the Honey Bee English Newsletter.
	(2) http://honeybee.org/honeybee_innovation.php More than four thousand farming, animal husbandry and rural modification practices are present in this database. This database is available in four languages namely Gujarati, Hindi, English and Tamil.
	(3) http://honeybee.org/plant_db.php There is an illustrated database of medicinal plants in which 250 plants and their uses have been mentioned. This database is available in four languages namely Gujarati, Hindi, English and Tamil.
	(4) https://techpedia.in/search_project.php This is a compilation of specific projects done by engineering students from across the country. More than two lakh projects are present in it.
	(5) https://techpedia.in/search-projects This database contains over four lakh abandoned and expired USPTO patents.

	(6) http://www.sristi.org/cpri/ This is a database Common Property Resource Institutions (CPRI).
	(7) http://www.inshodh.org Teachers from Gujarat and Maharashtra have invented new methods in teaching children. These experiments have been included in this database.
	(8) https://grid.undp.org.in/#3.01/22.82/82 This is a database on rural artisans, farmers and holders of traditional knowledge as well. This database has been created by the Honey Bee Network in association with UNDP.
	(9) https://gyti.techpedia.in/view-project/all/ This is a database of the projects of the GYTI Awards winners.



Honey Bee Network



www.sristi.org



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GYTI - Triggered Enterprises





Honey Bee Network

Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI)

Gandhian Young Technological Innovation (GYTI) Awards - 2023

15, 2024 10 PM to 5:00

