



## DSIR - CRTDH CONCLAVE 2023

Common Research and Technology Development Hubs (CRTDHs) are labs and pilot facilities established nationwide by the Department of Scientific and Industrial Research (DSIR). These hubs facilitate the MSMEs and startups to undertake new and improved product and process development and skill enhancement activities. IIT Gandhinagar has one such DSIR - CRTDH Lab on Chemical Processes, which is one of the important initiatives for chemical industries in Gujarat. Their annual DSIR - CRTDH Conclave 2023 and 10 years of CRTDH scheme was hosted at IITGN. This year's conclave centered on "Viksit Bharat Abhiyan - Empowering MSMEs & Startups," a crucial initiative by IITGN's DSIR-CRTDH Lab, was conducted on Nov 6<sup>th</sup> and 7<sup>th</sup>, 2023. The event had technical sessions, technology exhibitions, and notable talks covering themes like Environmental Interventions, New Materials/Chemical Processes, Affordable Healthcare, Electronics/Renewable Energy, and Low-cost Machining.



## PROJECT FUNDING

PI/Mentor	Discipline	Project Title	Agency Name
Abhishek Bichhawat	Computer Science & Engineering	Verifying Security Properties of Group Messaging Protocols	Centre Franco-Indien pour la Promotion de la Recherche Avancée (IFCIPAR/ CEFIPRA)
Dhiraj Devidas Bhatia	Biological Engineering	Co-delivery of Methotrexate and RELA siRNA using Nanoscale DNA Tetrahedrons and Folate Liposomes to Synergistically Target Synovial Macrophages in Rheumatoid Arthritis	Gujarat State Biotechnology Mission (GSBTM)
Vimal Mishra	Civil Engineering	A Real time 2D flood inundation forecasting system for the Brahmaputra River basin using Hydrologic- Hydro dynamic and statistical dynamical approaches	Indian Institute of Tropical Meteorology (IITM)
Gopinadhan Kalon	Physics	Probing Ion Transport and Osmotic Energy Harvesting through Sub-nm Channels in Two-Dimensional Metal-Organic Frameworks	Indian National Academy of Engineering (INAE)
Dhiraj Devidas Bhatia	Biological Sciences and Engineering	Programmable DNA-Peptide Hybrid Nanodevices for High-Throughput Bioimaging: From Single Molecules to Live Cells and Tissues	Ministry of Education - Scheme for Transformational and Advanced Research in Sciences (MoE - STARS)
Udit Bhatia	Civil Engineering	Channel Maintenance: Civil Engineering for SWAYAM PRABHA	Ministry of Education (Direct-To-Home (DTH)) Swayam Prabha)
Krishna Kanti Dey	Physics	Bioactive Microbubbles as Autonomous Targeted Drug Delivery Carriers	Ministry of Education - Scheme for Transformational and Advanced Research in Sciences (MoE - STARS)
Bhaskar Datta	Chemistry	Selective Recognition of G-Quadruplexes by a Smart Dye for preventive approach and early detection of Silicosis	Science & Engineering Research Board - Core Research Grant (SERB - CRG)
Iti Gupta	Chemistry	Synthesis of water soluble sustainable photo-catalysts consisting of 3-D porphyrin array with adamantane bridge	Science & Engineering Research Board - Core Research Grant (SERB - CRG)
Indranath Sengupta	Mathematics	Projective closure of affine monomial curves	Science & Engineering Research Board - Core Research Grant (SERB - CRG)
Abhishek Bichhawat	Computer Science & Engineering	Understanding and Ensuring the Privacy of User Data	Science & Engineering Research Board - Start-up Research Grant (SERB - SRG)
Harmeet Singh	Mechanical Engineering	Local and global contact problems in elastic rods	Science & Engineering Research Board - Start-up Research Grant (SERB - SRG)

Jaison A Manjaly	Humanities and Social Sciences	Social Action and Policy Lab and UNICEF Partnership 2023-25	United Nations Children's Fund (UNICEF) Gujarat State Office
Manish Kumar	Civil Engineering	Site-specific response spectra and compatible ground motions for Kunjwani to Sidhra, and Domel to Katra sections of National Highway 44 under Bharatmala Pariyojna	APCO Infratech Private Limited
Iti Gupta	Chemistry	Synthesis and characterization of photosensitizer molecule for potential application in retinal cancer	Biotech Vision Care Private Limited
Amit Arora	Materials Engineering	Consultancy for material identification for imports	Directorate of Revenue Intelligence (DRI)
Pranab Kumar Mohapatra	Civil Engineering	Dam break flow analysis for the Rawatbhatta site of NPCIL	Indian Institute of Technology Kharagpur
Amit Arora	Materials Engineering	Identification or the source of corrosion in carbon steel pipes and mitigation methods	Larsen & Toubro (L&T) Limited
Sriharitha Rowthu	Materials Engineering	Feasibility study to fabricate ZnO blocks in an indigenous manner	Elmex Controls Pvt. Ltd.
Manish Jain	Creative Learning Initiative	Madhya Pradesh Council of Science & Technology	Madhya Pradesh Council of Science & Technology (MPCST)
Sushobhan Sen	Civil Engineering	Assessment of stretches of NH-47 from KM 60.000 to KM 105.000 in Gujarat	National Highway Authority of India (NHAI), Ahmedabad
Biswajit Saha	Chemical Engineering	Modification of PCM to improve heat transfer and reduce the time of thermal storage	Prompt Innovations Private Limited
Manish Jain	Creative Learning Initiative	Sarva Shiksha Abhiyan	Samagra Shiksha, Uttar Pradesh
Gaurav Srivastava	Civil Engineering	Exploration of fire alarm and detection system technologies and codes and standards	Shah Bhogilal Jethalal & Bros.

## AWARDS AND FELLOWSHIPS



**Prof Projesh Nath Choudary**, Assistant Professor, Mathematics, has been awarded the **Indian Mathematical Society's Subhash Bhatt award** for the year 2023 in recognition of his paper titled "Characterizing total positivity: Single vector tests via linear complementarity, sign non-reversal, and variation diminution" published in the Bulletin of the London Mathematical Society.

**Prof Vimal Mishra**, Professor, Civil Engineering, has been elected to the **Indian Meteorological Society Fellowship**, in recognition of his outstanding contributions to meteorology and allied fields of science and technology.



**Kishalay Raj**, MTech Student, Materials Engineering was awarded the **Reliance Foundation Postgraduate Scholar Award**.



**Ashwin Rajeev**, MTech student, Biological Sciences and Engineering, and **Narayana G**, MTech student, Materials Engineering were selected for the **JAIST-**

**IITGN double degree program**.



**Rishiraj Adhikary**, PhD student, Computer Science and Engineering was recognised as a finalist for **UbiComp Gaetano Borriello Outstanding Student Award**.



**Pratiksha Ramesh** and **Subhankar Raha**, MTech students, Biological Sciences and Engineering were awarded the **Deutscher Akademischer Austauschdienst (DAAD) Scholarship**.



## CONTINUING EDUCATION PROGRAMME (IITGN-X)

Event/Program Name	Event Date	Discipline/Centre/Institute and Funding Agency
Conclave: DSIR - CRTDH Conclave 2023: Viksit Bharat Abhiyan: Empowering MSMEs & Startups	November 5, 2023	Jointly organised by the Department of Scientific and Industrial Research (DSIR) and IITGN
Conference: 3rd International Conference on Nanomaterials in Biology	November 19, 2023	Jointly organised by Science and Engineering Research Board (SERB), Council of Scientific & Industrial Research (CSIR), Royal Society of Chemistry (RSC), Tokyo Chemical Industry, Soft Materials Research Society (SMRS) Jaipur and IITGN
Conference: International Congress on Computational Mechanics and Simulation (ICCMS 2023)	December 20, 2023	Jointly organised by Wabtec Corporation and IITGN

Meeting: Organizing First Australia-India Education and Skill Council meeting at IIT Gandhinagar	November 6, 2023	Jointly organised by Ministry of Education and IITGN
National wildlife week celebration and awareness program (For wildlife conservation and sustainable development)	October 4, 2023	Dr Kiran C Patel Centre for Sustainable Development (KPCSD), IITGN
Short Course: Geospatial Technology for Archaeological and Heritage Studies	November 7, 2023	Archaeological Science Centre, IITGN
Short Course: The Lakshadweep Archipelago: Past, Present and Future	December 4, 2023	Jointly organised with The Habitats Trust, Nature Conservation Foundation and IITGN
Short Course: Artificial Intelligence and Machine Learning for Materials Science	December 11-15, 2023 (online)	Jointly organized by Global Initiative of Academic Networks (GIAN) and IITGN
Symposium: Global Modernities and Modernisms in Art, Philosophy and Literature	November 20, 2023	Humanities and Social Science Department, IITGN
Training Program: IITGN-ISAC Certified National Cybersecurity Scholar Program	August 24, 2023 (Online) and November 24, 2023 (Offline)	Jointly organised by Information Sharing and Analysis Center (ISAC) and IITGN
Webinar: Recent Advances in the History and Archaeology of South Asia	October 20, 2023	Archaeological Sciences Centre, IITGN
Workshop: Fiber Reinforced Plastics Specialist Course	October 9, 2023	Jointly organised by Composites Excellence Center of Asia (CECA), Vadodara and IITGN
Workshop: Metro Fire Safety & Egress	November 27, 2023	Jointly organised by Fire Safe Build India (FSBI) and the Centre of Safety Engineering, IITGN

## PATENTS

Title	Inventors	Status
A System and a Method for Monitoring Physical Activities and Physiological Signals	Saha, Biswajit; Verma, Ravi Prakash; Sahu, Prateekshya Suman	Filed
Carbon Quantum Dots and a Process for Preparation Thereof	Bhatia, Dhiraj; Yadav, Pankaj	Filed
Cis-5-Substituted Alkyl Diarylprolinol Silyl Ether Organocatalysts and a Process of its Preparation	Appayee, Chandrakumar; Singh, Suraj; Kumar, Rohtash; Dubey, Navneet Nandgopal	Filed
A System of Wearable Devices for Predicting Freezing of Gait and Pre-Assisting a User	Lahiri, Uttama; Pallavi, Priya; Raghuvanshi, Ankita	Filed
Hydrogel Flap for Wound Healing and Method of Fabrication Thereof	Dhanka, Mukesh; Vithalani, Hitasha; Dave, Harshil	Filed
A Process for Preparation of Titanium Oxide Nanoparticles	Roy, Remiya; Mittireddi, Ravi; Teja Prajapati, Deepak; Panda, Emila	Filed
Substituted 1,2-Dihydro-3h-Pyrazolo[4,3-C]Quinolin-3-one as Atr Kinase Inhibitors	Kirubakaran, Sivapriya; Ravi, Srimadhavi; Shaik, Althaf; Barui Sugata	Granted
An Automated Story-Creation and Story-Telling Platform	Pradeep, Raj; Sujata, Sinha; Lahiri, Uttama	Granted
Flame Retardant Composition and a Process for Preparing the Same	Jasuja, Kabeer; Kumar Das, Saroj	Granted
System for Detecting Variations in Motor Movements	Shah Vrutangkumar, Vinodkumar; Palanthandalam-Madapusi, Harish J	Granted

## MoUs

### DEAKIN UNIVERSITY, AUSTRALIA

A five-year MoU has been signed between IITGN and Deakin University to establish a cooperative relationship with the aim of developing and fostering academic links. The two parties will include faculty/staff collaboration in research and teaching in areas of common interest; general academic collaboration; development and implementation of student mobility programs and faculty/staff-student exchange programs, etc.

### TECHFAB (INDIA) INDUSTRIES LIMITED, INDIA

TechFab (India) Industries Limited and IITGN have established

an MoA for CSR funding to establish the TechFab Indian Initiative on Geotechnical Engineering and Geosynthetics at IITGN. The initiatives will include top-up fellowships for PhD scholars, research fellowships to young faculty and research staff, travel support for conferences, support to conduct capacity-building workshops, short courses, R&D activities and infrastructure, etc.

### FULCRUM - CAPITALISING CSR

An MoU has been signed between IITGN and Fulcrum - Capitalising CSR to provide financial support to students from economically disadvantaged backgrounds. Through the collaboration, both parties will develop a scholarship program for IITGN students with financial needs.

## SAMAGRA SHIKSHA, TELANGANA

IITGN and Samagra Shiksha have signed an MoU to transform the school education landscape across Telangana. As per the agreement, the Creative Learning Initiative will conduct various in-person and virtual STEM education activities, workshops, and training programs. To facilitate these initiatives, they will provide STEM kits developed in the regional language. Additionally, support will be provided by IITGN to create a CCL Lab at Hyderabad.

## MAJOR FACILITIES

### HIGH TEMPERATURE TRIBOMETER WITH IN-SITU PROFILOMETER

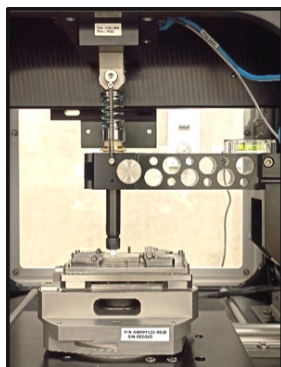
(Model: Multi-Function Tribometer MFT – 5000 by Rtec-Instruments)

The system provides data on friction and wear characteristics for interacting bodies in relative motion, encompassing rotary (ball on disc, pin on disc) and reciprocating (flat on flat, ball on flat, cylinder on flat) configurations. The lower modules for rotary and reciprocating motions can operate within a range of 1 rpm to 5000 rpm and 0.5 Hz to 80 Hz. Two types of force sensors are available, capable of measuring both applied normal and frictional forces. The first type has a range of 1 N to 200 N, while the second type spans from 10 N to 5000 N. The system also allows for high-temperature



trials, accommodating dry conditions up to 1000 °C and lubricated conditions up to 500 °C for rotary configurations. Additionally, the system is equipped with a 3D white light interferometer, facilitating the examination of wear morphology and the quantification of wear volume.

The instrument is installed in the Functional Materials Laboratory (AB 11, Room 105). For further details, please contact Professor Sriharitha Rowthu ([sriharitha.rowthu@iitgn.ac.in](mailto:sriharitha.rowthu@iitgn.ac.in)).



### STEREO ZOOM MICROSCOPE WITH DIGITAL CAMERA

(Model: LeicaM205C)

The LeicaM205C is a Stereo Zoom Microscope with FusionOptics technology that provides an optical resolution of 0.952 $\mu$ m and a zoom of 20.5:1. The microscope has one light beam path that delivers an image with the highest possible resolution, while the other provides an image with maximum depth of field. It has a zoom range of 7.8 $\times$ –160 $\times$ , objectives from 0.63 $\times$ –5 $\times$ , and a resolution up to 1050lp/mm resolution (with 2.0x objective). The microscope has a high resolution, a better depth of field, and generates 3D images.

The instrument is installed in the Mineral



## DIRECTORATE GENERAL - FIRE SERVICES, CIVIL DEFENCE & HOME GUARDS (DG - FS, CD & HG)

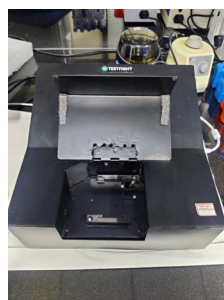
IITGN has signed an MoU with DG-FS, CD & HG to undertake joint programs and activities in the broad area of Fire Engineering with the aim to promote research, development, and capacity building, thus contributing to building a Fire Safe India. The initiatives to be undertaken include exchange programs for faculty, staff, and students; joint R&D and entrepreneurship activities; etc.

Physics Lab (AB 12, Room 206). For further details, please contact Professor Rajkrishna Dutta ([raj.dutta@iitgn.ac.in](mailto:raj.dutta@iitgn.ac.in)).

### SPECTROFLUOROPHOTOMETER

(Model: TPFA7222022 by TestRight Nano Systems Private Limited)

The instrument is a spectrofluorophotometer with the functionality of both a spectrophotometer and a spectrofluorometer. The spectrofluorometer component utilizes the fluorescent properties of optical samples, providing information about their concentration, kinetics, and chemical properties. The instrument's spectrophotometer component measures the amount of photons (the intensity of light) absorbed after it passes through the sample



solution and gives information about a sample's concentration and absorbance spectra. This can be used for various quantitative analyses, including optical density, transmittance, degradation kinetics, etc. The instrument utilizes the UV-visible spectrum with wavelength ranging from 250 to 900 nm with a resolution of 1.8 nm.



The instrument is installed in the Stem Cell and Tissue Engineering Lab (AB 6, Room 207). For further details, please contact Professor Dhiraj Bhatia ([dhiraj.bhatia@iitgn.ac.in](mailto:dhiraj.bhatia@iitgn.ac.in)).

### MULTISPECTRAL DRONE

(Model: BDS\_0004 - Bajrang Drone series by DTPC Technologies)

The BDS\_0004 drone, with a wide variety of payload options, is capable of fulfilling a wide variety of tasks, including Surveillance, Photography/Videography, 2D/3D Mapping, Small Payload Delivery, Multispectral Data Collection, Thermal Data Collection, etc. It has a full carbon-fiber foldable frame with a LOS range of up to 15



km. It has full HD 1080p 60fps digital video and telemetry streaming capability. Its primary payload is a 4K Digital Camera with 6x zoom mounted on a 3-axis Gimbal. The secondary payload is a MicaSense RedEdge-P MultiSpectral Camera. The drone has a take-off weight of 5.75 Kg with both Primary and Secondary Payloads attached.

The instrument is installed in the Core Description and Drone Lab (AB 12, Room 203). For further details, please contact Professor Shanmuganathan Raman ([shanmuga@iitgn.ac.in](mailto:shanmuga@iitgn.ac.in)) and Pankaj Khanna ([pankaj.khanna@iitgn.ac.in](mailto:pankaj.khanna@iitgn.ac.in)).