IIT Bombay Research Hub for
Green Energy & Sustainability

GESH IITB

GESH IITB Annual Report 2024-25

Aug 2024 - July 2025


IIT Bombay Research Hub for
Green Energy & Sustainability

GESH IITB

Content

About GESH IITB

IIT Bombay Research Hub for Green Energy and Sustainability (GESH IITB) is dedicated to tackling global challenges in climate change and sustainable development. By driving innovation in green energy, sustainability, and climate solutions, we aim to bridge the gap between academic research and real-world application. Our mission extends to advancing education, fostering entrepreneurship, and enabling strong collaborations with industry, government and communities.

Verticals in action

Reserach

Training & Education

Campus Sustainability

Entrepreneurship

Media & Communications

Outreach & Partnership

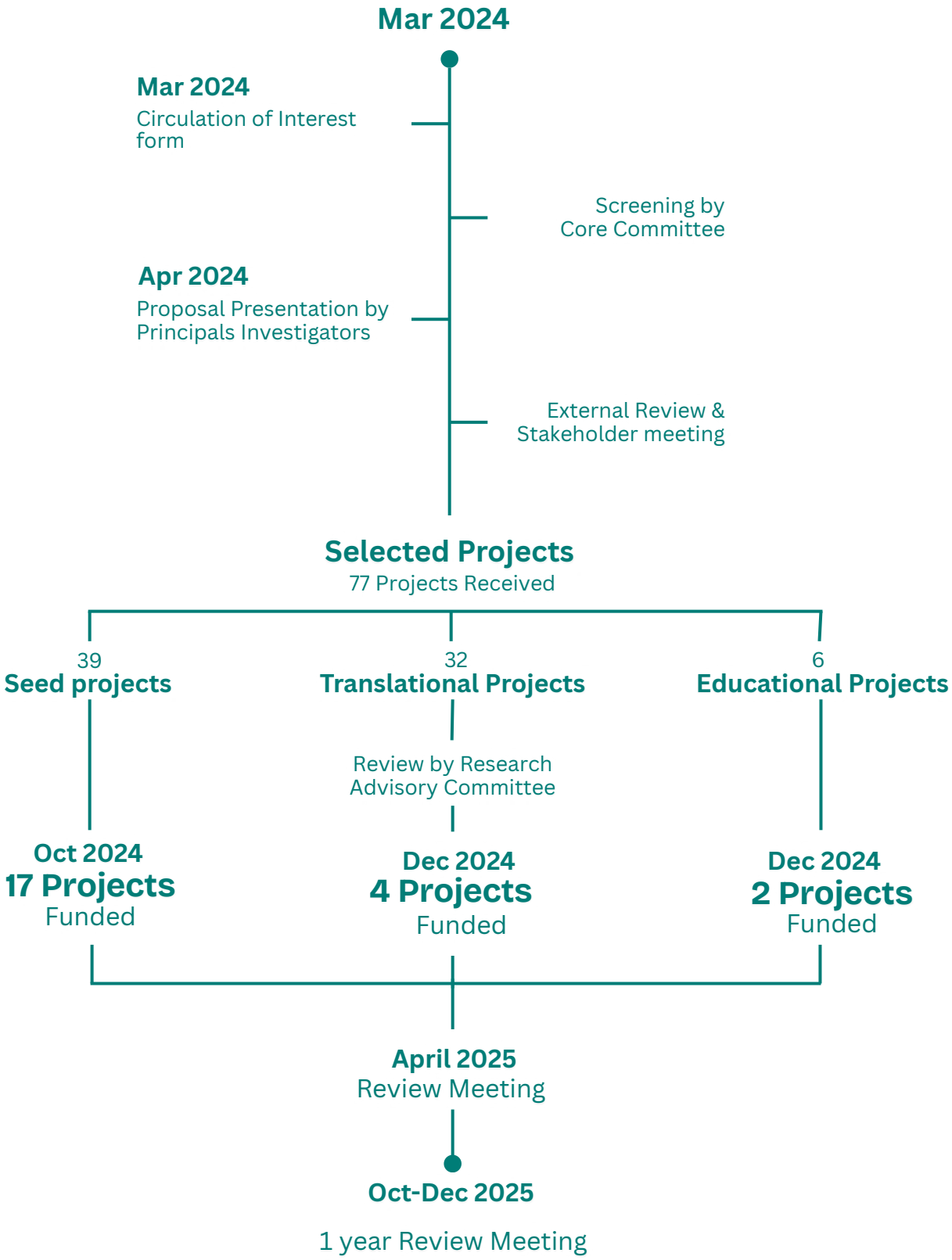
GESH IITB

GESH IITB
Research

The IIT Bombay Research Hub for Green Energy and Sustainability (GESH IITB) is a prominent platform dedicated to promoting interdisciplinary research and driving innovation in the fields of green energy, climate studies, and sustainability. Its mission includes advancing groundbreaking research, translational projects, and educational initiatives to develop impactful solutions in these areas. GESH IITB tackles essential challenges related to green energy, sustainability, and climate services through cutting-edge scientific exploration and collaborative efforts among academia, industry, and policymakers. Below are the ongoing GESH IITB Projects:

Timeline

GESH IITB Funded Faculty Initiated Projects

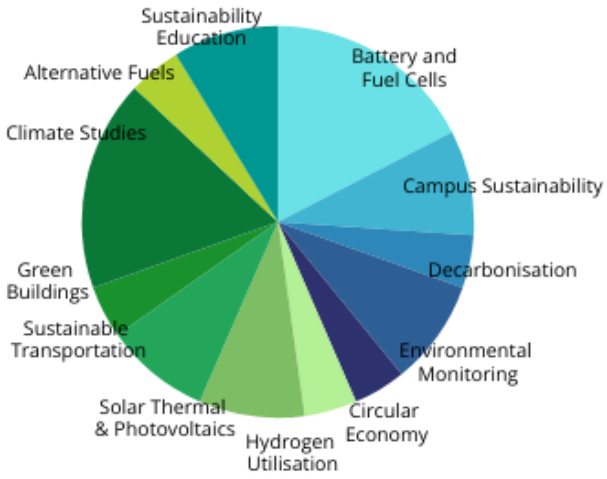


Focus Areas

Sustainable Transportation | Sustainable Infrastructure | Environmental Studies & Monitoring | Climate Science & Solutions | Food - Water Nexus | Batteries & Fuel cells

Solar Thermal & PV | Circular Economy | Alternative Fuels | Hydrogen | Materials | Decarbonization | Education

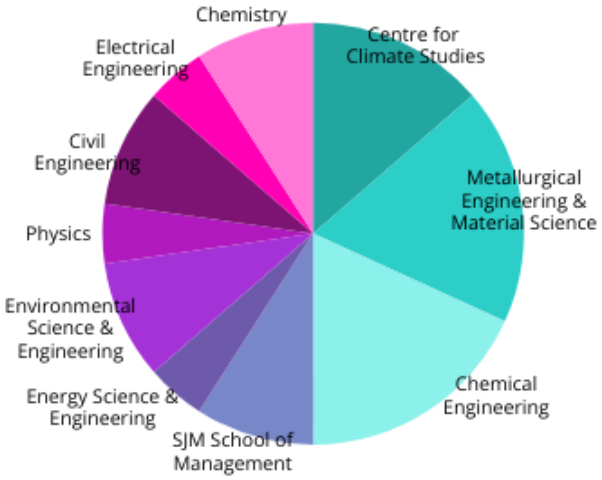
Domain wise distribution of Projects



DOMAIN	PROJECTS	KEY
Battery and Fuel Cells	4	
Campus Sustainability	2	
Decarbonisation	1	
Environmental Monitoring	1	
Circular Economy	1	
Hydrogen Utilisation	1	
Solar Thermal & Photovoltaics	2	
Sustainable Transportation	2	
Green Buildings	1	
Climate Studies	4	
Alternative Fuels	1	
Sustainability Education	2	

Department wise distribution of Projects

DEPARTMENT	PROJECTS	KEY
Centre for Climate Studies	3	
MEMS	4	
Chemical Engineering	4	
SJM School of Management	2	
Energy Science & Engineering	1	
Environmental Science & Engg.	2	
Physics	1	
Civil Engineering	2	
Electrical Engineering	1	
Chemistry	2	



Seed Funded Projects : 17

Tenure 1 -2 yrs

Seed Projects ignite innovation by nurturing early-stage ideas into impactful solutions. They foster creativity, collaboration, and growth, laying the foundation for transformative advancements.

No.	Title	Focus Areas
1	**Towards a unified physics-based understanding of seasonal and extreme monsoon rainfall for their reliable projections** PI: Dr. Akshaya Nikumbh, Centre for Climate Studies Co PI: Dr. Angshuman Modak, *Centre for Climate Studies*	Climate Change, Environmental Studies
2	**Development and Assessment of Health/ Environment-friendly and Sustainable 'Aqueous Processed' Cathodes Na-ion battery** PI: Dr. Amartya Mukhopadhyay, *Metallurgical Engineering & Materials Science*	Batteries & Fuel Cells
3	**An aqueous-nonaqueous all-iron redox flow battery** PI: Dr. Arindam Sarkar, *Chemical Engineering*	Batteries & Fuel Cells
4	**Cultivating Change in Campus Food Waste Management: Seeding Sustainability using Stakeholder Analysis and Nudge Theory** PI: Dr. Arti D. Kalro, *Shailesh J. Mehta School of Management* Co PI: Dr. Santosh Noronha, *Chemical Engineering*	Environmental Studies, Campus Sustainability
5	**Greenhouse gas reduction potential of an ammonia-diesel dual fuel engine** PI: Dr. Asish Kumar Sarangi, *Energy Science & Engineering*	Alternative Fuels

No.	Title	Focus Areas
6	**Deconvoluting anode and cathode potentials in a commercial cell using micro-reference electrode** PI: Dr. Bharatkumar Suthar, Chemical Engineering	Batteries & Fuel Cells
7	**Recycling of Li-ion Battery Scrap and Recovering Valuable Metals** PI: Dr. Jayasree Biswas, *MEMS* Co PI: Dr. Deepoo Kumar, Dr. Viswanathan Nurni, & Dr. Amartya Mukhopadhyay, *MEMS*	Circular Economy
8	**Democratizing Air Quality Data by Advancing Responsive Low-cost Sensor-based Local Monitoring to Support Communities Health and Air Quality Management** PI: Dr. Manoranjan Sahu, *Environmental Science & Engineering*	Environmental Studies
9	**Feasibility, reliability and life estimation of IC engine materials in the presence of H fuel** PI: Dr. Nagamani Jaya Balila, MEMS Co PI: Dr. Prita Pant, Dr. Tanushree Chowdhury, MEMS	Hydrogen Utilisation
10	**Smart photonic coatings for green energy applications** PI: Dr. Parinda Vasa, *Department of Physics* *Co PI: Dr. Rajiv Dusane, MEMS*	Solar Thermal & Photovoltaics
11	**Developing a context-sensitive accessibility evaluation model for first and last-mile connectivity for pedestrians and bicyclists around transit stations in Mumbai** PI: Dr. Sangram Krishna Nirmale, *Civil Engineering* *PI: Dr. Vedagiri Perumal, Civil Engineering*	Sustainable Transportation

No.	Title	Focus Areas
12	**WBG-based 15-min ultra-fast charger for accelerating growth of light-electric vehicles in India** PI: Dr. Shiladri Chakraborty, *Electrical Engineering*	Batteries & Fuel Cells
13	**Decarbonisation of iron and steel manufacturing by replacing CO with hydrogen as a reductant for iron oxides – a study on the controlling mechanisms** PI: Dr. Somnath Basu, *MEMS* *Co PI: Dr. Manish M. Pande, Dr. Indradev Samajdar, & Dr. Ajay S. Panwar, MEMS*	Decarbonisation
14	**Electrochemical Extraction of Lithium from Seawater** PI: Dr. Srinivasan Ramakrishnan, *Department of Chemistry* *Co PI: Dr. Mahesh Tirumkudulu, Chemical Engineering*	Batteries & Fuel Cells
15	**Framework and development of a digital twin for the residential building** PI: Dr. Venkata Santosh Kumar Delhi, *Civil Engineering*	Green Buildings
16	**Tools and datasets to identify precursors of extreme weather events to inform climate resilience in India** PI: Dr. Vishal Dixit, *Centre for Climate Studies* *Co PI: Dr. Akshaya Nikumbh, Centre for Climate Studies*	Climate Studies
17	**Experimental Analysis of the PCM integrated buildings for occupant's thermal comfort & Energy savings** PI: Dr. Anish Modi, *Energy Science & Engineering*	Green Building

Translational Funded Projects : 4

Tenure 3-5 yrs

Translational projects bridge the gap between innovative research and real-world application, transforming scientific discoveries into impactful solutions. They drive progress by turning ideas into tangible benefits that improve lives and advance industries.

No.	Title	Focus Areas
1	**Affordable solar-thermal desalination by synergizing systems design with nanomaterial coatings** PI: Dr. C. Subramaniam, *Department of Chemistry* Co PI: Dr. Sandip K. Saha, *Mechanical Engineering*	Solar Thermal & PV
2	**Complete water quality monitoring system for physicochemical parameters and pollutants, by automated, real-time, remote measurement of waterbodies** PI: Dr. Rajdip Bandyopadhyaya, *Chemical Engineering* *Co PI: Dr. Maryam Shojaei Baghini, Electrical Engineering* *Dr. Sibi Raj B Pillai, Electrical Engineering* *Dr. Subhankar Karmakar, Environmental Science & Engineering*	Environmental Monitoring
3	**A Flood Information System to Spatially Map the Flood Resilience at a National-scale** PI: Dr. Subhankar Karmakar, *Environmental Science & Engineering* *Co PI: Dr. Subimal Ghosh, Civil Engineering*	Climate Studies
4	**Climate and Weather Smart Agricultural Water Management System** PI: Dr. Subimal Ghosh, *Centre for Climate Studies* *Co PI: Dr. Raghu Murtugudde, Dr. Karthikeyan Lanka, Centre for Climate Studies*	Food and Water

Educational Projects : 2

Tenure 2 yrs

Translational projects bridge the gap between innovative research and real-world application, transforming scientific discoveries into impactful solutions. They drive progress by turning ideas into tangible benefits that improve lives and advance industries.

No.	Title	Focus Areas
1	**Sustainability Action Lab** PI: Dr. Trupti Mishra, *SJMSOM/IDP in Climate Studies* *Co PI: Dr. Anjali Sharma, Centre for Policy Studies*	Environment & Sustainability, Climate Service and Solution
2	**Sustainability Education for Industry Leaders and Managers: Course Design and Content Development** PI: Dr. Yogendra Shastri, Chemical Engineering *Co PI: Dr. Pradip Kalbar, Environmental Science & Engineering* *& Dr. Trupti Mishra, SJM School of Management*	Sustainability

Publications

01 **Specific crystallographic site occupancy induced water-stability: Towards facilitating 'aqueous processing' of 'layered' Na- transition metal oxide cathodes for Na-ion batteries',**
published in the Journal of Materials Chemistry A 13 (2025) 5807 – 5820
By *Prof. Amartya Mukhopadhyay*

02 **Shilin, A. and Karmakar, S.: Unveiling Heat Vulnerability Across India: A Multi-Method Analysis of District-Level Indicators in the Context of Climate Change.,**
EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-10921, https://doi.org/10.5194/egusphere-egu25-10921, 2025.
By *Prof. Shubhankar Karmakar*

03 **Dev, I., Chakraborty, A., and Karmakar, S.: A Comprehensive Socioeconomic Vulnerability Analysis Using Robust DEA Technique at the Finest Resolution of Sub-District Scale in Entire Maharashtra State of India: Identifying Significant Vulnerability Drivers,**
EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-14777,
By *Prof. Shubhankar Karmakar*
https://doi.org/10.5194/egusphere-egu25-14777, 2025.

04 **V. Chavan et al.: "Direct Microstructural Observations and Atomistic Simulations on Hematite to Magnetite Reduction",**
Acta Materialia (2025)
By *Prof. Somnath Basu*

05 **Dreamsy Manchanda and Parinda Vasa presented their paper titled "A broadband plasmonic light harvester with improved electric field localization"**
at CLEO/Europe-EQEC 2025, organized by the European Physical Society, held from 23–27 June 2025 in Munich, Germany
By *Prof. Parinda Vasa*

06 **Three-Phase Matrix-Based High-Power AC-DC Fast Charger for Low-Voltage Electric Vehicles",**
T. Mahesh, S. Barman, and S.Chakraborty, IEEE ECCE Asia 2025.
By *Prof.Shiladri Chakraborty*

Patent

01 **Patent filed: Autonomous, Wireless Real-Time Water Quality Monitoring System** (Indian patent, filing date: 05-06-2025, application no. 202521054390)
By *Prof. Rajdip Bandhopadhyay*

Industry Projects

Sponsored Research

Deloitte Shared Services India LLP- Ongoing
Title: Water Availability Assessment of Key Industrial Hubs in India

Consultancy

Godavari Biorefinery Pvt Ltd- Ongoing
Title: Review of the LCA study

Appaluav Adhani Exim Pvt Ltd- Ongoing
Work: GHG Accounting
ABI Showatech Pvt Ltd- Ongoing
Work: GHG verification and CO_2 reduction suggestions

Government Projects

Sponsored Research

Department of Telecommunications- Submitted
Title: Conducting a Study on the Indian Telecom Industry's Contribution to Sustainable Development and Circular Economy

ANRF-PAIR - Granted (GESH Facilitated, 100cr funding to institute)
Title: Partnerships for Accelerated Innovation and Research (95 Faculties and 8 Universities)

Other Ongoing Initiatives

Donor Project : Region Specific Water Conservation and Irrigation Management
Phase 0 of water sustainability project has been initiated
Chhindwara field visit (12-14 Sept) is planned and bookings done

CSR Projects *Awaiting approval*
2 proposals for Mercedez-Benz (final board approval under process)
Initial concept note for Rainmatter Foundation

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Training & Education

The Education and Training vertical at GESH IITB serves as a hub for knowledge dissemination and skill-building in Green Energy, Sustainability and Climate Services and Solutions. It focuses on designing and delivering high-quality training programs, workshops, and courses tailored to meet the evolving needs of individuals and organizations.

Through collaborations with industry experts, faculty, and researchers, GESH IITB ensures its offerings remain relevant and impactful. By introducing innovative academic and executive courses aligned with emerging trends, the vertical aims to cultivate a deeper understanding of sustainability principles and empower participants to drive meaningful change.

Timeline

Training & Education

2025

Jan 16–18, 2025
NavUrja Nirman Executive Training Programme

Feb 24 – Mar 1, 2025
Nav Urja Nirman Phase 1: Strategic & Policy Aspects for Solar and Wind Power

Mar 17–21, 2025
Renewable Energy and Green Building Strategies

Mar 24–26, 2025
The Role of Markets in India's Energy Transition

27th May 2024
Nav Urja Phase 2

06 June
NextGen@IITBombay Residential Summer School Program

Sept 2025
Nav Urja Training Program

Training Program

NavUrja Nirman Executive Training Programme

January 16–18, 2025
Faculty Coordinator: Prof. Zakir Rather

The first installment of the flagship NavUrja Nirman programme of IOCL delivered foundational and advanced insights into India's renewable energy landscape to senior executives from IOCL. Topics ranged from techno-economic evaluations to policy and regulatory frameworks for solar and wind power plants. Sessions were conducted by Prof. Zakir Rather, Prof. Santanu Bandyopadhyay, Prof. Narendra Shiradkar, Prof. Venkat Ramadesigan and Mr. Manoj Srivastava. Participants also toured IITB's cutting-edge research labs focused on solar PV and grid integration.

Nav Urja Nirman Phase 1: Strategic & Policy Aspects for Solar and Wind Power

February 24 – March 1, 2025
Faculty Coordinator: Prof. Zakir Rather

Phase 1 of the 18-Day Nav Urja Nirman was conducted which addressed the evolving policy landscape, grid dynamics, investment strategies, and storage technologies of Solar and Wind energy systems. Through interactive lectures, live demonstrations, and lab visits, IOCL professionals gained a comprehensive view of the policy–tech–market nexus driving India's clean energy transition. Esteemed speakers included Prof. Zakir Rather, Prof. Haripriya Gundimeda, Mr. Sudhanshu Bansal, Mr. Rahul Nalawade, Mr. Aumkar Borgaonkar, Dr. Parthasarathi Mukhopadhyay.

Renewable Energy and Green Building Strategies

March 17–21, 2025
Faculty Coordinator: Prof. Gurubalan Annadurai

Focusing on the built environment's role in sustainability, this training covered net-zero building design, life cycle analysis, energy-efficient systems, and grid-aligned architecture for executives of IOCL. Hands-on sessions using Design Builder Software and a field visit to Project Vivaan (Net Zero Building by Team Shunya) brought theory to life. Eminent speakers included Prof. Gurubalan Annadurai, Prof. Anish Modi, Prof. Anjali Sharma, Prof. Siddavatam Ravi Prakash Reddy, Mr. Sreekanth P K, Prof. Narendra Shiradkar, Prof. Trupti Mishra, Prof. Pavan Kumar Hari, Prof. Anupama Kowli, Mr. Jiten Prajapati, and Mr. Prabhat Sharma.

The Role of Markets in India's Energy Transition

March 24–26, 2025
Faculty Coordinator: Prof. Anupama Kowli

This advanced programme conducted in collaboration with IEX Academy explored the evolution of electricity markets, demand forecasting, and power exchange mechanisms. With deep-dive sessions led by Prof. Anupama Kowli, Prof. S.A. Soman, Mr. Rajeev Gajbhiye, and the Power Anser Lab (PAL), participants examined market design and trading platforms. Guest insights from Mr. Rohit Bajaj (JMD, IEX), Mr. Sudhir Bharti (IEX) provided a real-world understanding of IEX operations.

Nav Urja Training Program : Phase 2

June 23- July 05 2025
Faculty Coordinator: Prof. Zakir Rather

Phase 2 of the 18-Day Nav Urja Nirman Training Programme (June 23 – July 5, IIT Bombay) delivered 124+ hours of expert-led learning on solar PV design and reliability, wind turbines and offshore platforms, grid integration and forecasting, energy storage and modeling tools, and renewable energy policy and trading mechanisms.
Participants engaged in case-based discussions, lab sessions at IIT Bombay's Fuel Cell, Energy Systems, and Heat Pump Labs, and a field visit to Tulyachapada village, witnessing a successful solar-powered irrigation initiative developed with Pragati Pratishthan and Gram Oorja Solutions Pvt. Ltd.

NextGen@IITBombay Residential Summer School Program

July 01 - 05 2025

Organized by Educational Outreach, IIT Bombay, with sessions by GESH IITB, the programme introduced students (Grades 8–12) to sustainability, AI, robotics, biosciences, and more. Highlights included a talk by Prof. Chetan Singh Solanki on sustainable living, a Sustainable Habit Tracker challenge, the interactive Climate Karma Game, and a guided Sustainability Tour of IIT Bombay's greywater plant, composting pit, Team Shunya building, and solar PV installations. The week concluded with reflections and a look at career pathways in sustainability — turning awareness into action and inspiring future climate champions.

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Campus Sustainability

IIT Bombay is a residential campus with a current population of almost 25000 (including floating mass). The campus is a habitat of several native and seasonal biological species. The campus is spread over 489 acres out of which ~50% is green cover. Due to an increase in demand for hostels, housing and academic facilities, construction activities are also going on. In order to ensure sustainable development, the campus sustainability is given focus with GESH facilitating the activity.

Timeline

Campus Sustainability

Aug 2024
STARS studying and data collection

Sept 2024
Proposal for Gasifier plant

Oct 2024
Base data collection - Water & Energy

Dec 2024
Approval for Gasifier

Dec 2024
PAN IIT visit

Jan 2025
Campus sustainability Policy released

Feb 2025
Gasifier plant started at Staff canteen

Mar-Apr 2025
Formation of Awareness committee for water energy & Solid waste management

Apr 2025
Proposal for water meter procurement

Apr 2025
Net Zero Roadmap

Apr 2025
Data collection for QS world ranking in sustainability

May 2025
Campus Sustainability Conclave

May 2025
Pelletization plant started

May Jun 2025
IIT Visits

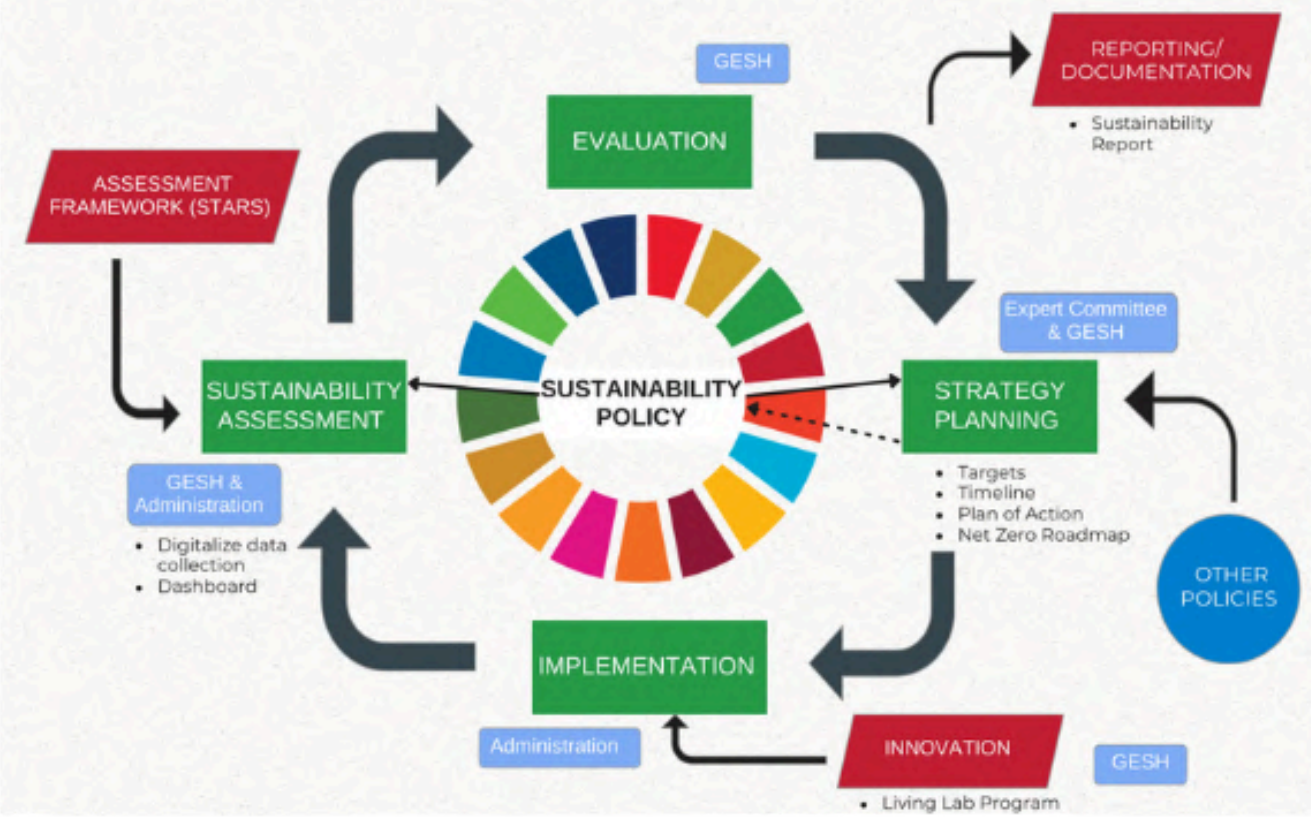
July 2025
Proposal for expansion of Gasifier

Aug 2025
Sustainability Champions for Department

Baseline Data Collection

GESH IITB is adopting a systematic approach to assess campus sustainability to collect baseline data using the Sustainability Tracking Assessment and Rating System (STARS) framework for global benchmarking and the IGBC Green Campus Rating system for the Indian context. GESH appointed consultant for STARS reporting.

The data collection and assessment involves collecting data from various stakeholders, identifying gaps, utilizing tools, and developing a dashboard to monitor KPIs like water, power, and waste management. This initiative is supported by entire IITB Community with students bodies (Sustainability Cell, Team Shunya, Team Zero Waste, Energy Club, Others) institute admin. faculty & staff members campus residents and alumni.



Sustainability Policy

IIT Bombay has framed a Campus Sustainability Policy to guide its journey towards becoming a Net Zero campus. The policy addresses key areas such as energy, water, waste, biodiversity, sustainable mobility, infrastructure, and safety, while also emphasizing education, research, and governance. It applies to students, faculty, staff, and residents, ensuring that sustainability is a shared responsibility across the community. The policy is aligned with the global Sustainable Development Goals and sets clear directions for responsible resource use. It will be periodically reviewed to track progress and refine future actions.

Sustainable Cooking

Turning Waste into Energy at IIT Bombay

Biomass Pelletization Plant IIT Bombay processes its garden waste, like leaves, twigs, and organic matter, into biomass pellets using a dedicated pelletization plant. Operating at 2 tons per shift per day, the plant has already produced over 5 tons of clean-burning pellets. With a calorific value of 16–18 MJ/Nm³, these pellets are a green alternative to LPG and other fossil fuels. The pellets produced are used internally to cook food at the staff canteen.

Gasification-Based Decentralized Cooking.
Prof. Sandeep Kumar and Prof. Sanjay Mahajani started the "Gasifier-based cook-stoves to manage garden waste" project funded by the Tata Centre for Technology and Design (TCTD). The gasifier was developed in multiple iterations by engaging different possible applications and stakeholders. The system was tested on environmental aspects at labs by PhD scholars, as well as fire safety and operational safety in the field by experts. In-house developed downdraft gasifier converts biomass pellets into producer gas (CO, H2, CH4), fueling a premix burner. The resulting thermal energy generates steam for cooking in the campus staff canteen. The gasifier was installed and started on 26th Feb 2025. Over a month of systematic study shows a 10 kg/day LPG reduction.
The steam produced is used to boil rice, dal, potatoes, and milk, showcasing how clean energy can meet institutional partial cooking needs.

By significantly lowering carbon emissions , gasifiers contribute to both environmental and public health goals. They also support cost savings and generate biochar as a useful byproduct for soil enrichment. Integrating gasifiers into campus kitchens not only promotes zero-waste and circular economy principles, but also strengthens our commitment to sustainable, decentralized energy solutions aligned with broader net-zero goals.

Plastic Waste
Plans to shred and pelletize non-recyclable dry waste with biomass. Lab trials show positive gas yields and efficiency.
This initiative demonstrates a scalable, eco-friendly path forward, reducing carbon emissions, lowering fuel costs, and setting a blueprint for other institutions to implement.

Campus Sustainability Conclave

May 14th, 2025

GESH IITB convened a first-of-its-kind Campus Sustainability Conclave, bringing together academic leaders and administrators from premier institutions in Maharashtra. Held at the VMCC Board Room, the conclave marked a milestone in efforts to build a collaborative, contextual, and action-oriented approach to campus sustainability in India.

The conclave was conceived in response to a growing recognition: while campuses are ideally positioned to lead by example on sustainability, efforts remain fragmented, confined to departmental silos or temporary student initiatives. In the context of India's net-zero plans and increased youth engagement, the conclave focused on aligning sustainability efforts across institutions.

The event was initiated by a keynote address from Prof. Shireesh B. Kedare, Director of IIT Bombay. Prof. Kedare emphasised the urgent need to integrate sustainability into the DNA of campus operations and culture. Framing his address around the "3 A's – Awareness, Action, and Adaptability", he called for a mindset shift—not just among students and faculty, but across the entire institutional ecosystem.

A series of presentations from participating institutes offered a window into the diverse approaches to campus sustainability across Maharashtra. Presenters included representatives from the Indian Institute of Management (IIM) Mumbai, Veermata Jijabai Technological Institute (VJTI), Visvesvaraya National Institute of Technology (VNIT), University of Mumbai, Institute of Chemical Technology (ICT), KJ Somaiya College of Engineering, and IIT Bombay. Each shared implemented projects and initiatives around water conservation and wastewater reuse, solid waste and plastic reduction programs, green infrastructure and energy audits, and curricular innovations and student-led campaigns.

The highlights of the conclave was a roundtable discussion, chaired by Prof. Munish Chandel, which sparked deep conversations on the systemic shifts required for campuses to become sustainability leaders.

Notably, the discussion emphasised the importance of student involvement, not just as volunteers or participants, but as co-creators and drivers of long-term change. The need for educational reforms, including better sustainability curricula and exchange programs, was also highlighted.

The conclave culminated with consensus on several high impact outcomes:

- Creation of a digital knowledge repository to archive and share campus strategies, policies, and learnings.
- Formation of a regional sustainability working group, comprising nominated representatives from each participating institute.
- Co-development of a contextualised sustainability framework suited to Indian institutional realities— enabling goal-setting, measurement, and benchmarking.
- Collaborative site visits to better understand and replicate successful initiatives.

In the closing remarks, Dr. Wazeem Nishad, COO, GESH IITB, urged the attendees to build on this momentum. “GESH can act as a catalyst,” he said, “but it is the shared responsibility and sustained engagement of all institutions that will define the long-term success of this initiative.”

The conclave marks the beginning of a new phase, where sustainability is no longer seen as a peripheral project, but as an integral, collective pursuit within academic institutions. By fostering peer learning, building collaborative frameworks, and engaging deeply with both students and policy stakeholders, the conclave laid the foundation for a regional movement—one that can influence national policy and global practice alike.

Sustainability QS Rankings

GESH IITB took the responsibility of completing the sustainability baseline data collection and analysis of IITB, this was submitted for QS World Rankings. IIT Bombay has made a remarkable leap in the ranking for Sustainability, improving its score from 52.5 in 2025 to 75.2 in 2026. This achievement reflects the collective commitment of faculty, staff, students, and campus residents to embed sustainability across the institute. GESH, in collaboration with the Dean IPS Office, supported the Dean Strategy Office in data collection and reporting for the ranking. The improvement highlights the campus-wide adoption of sustainable practices—from energy and waste management to curriculum and community engagement. A key driver of this progress has been the Net-Zero Roadmap developed by GESH, guiding IIT Bombay’s long-term strategy for reducing emissions and promoting responsible resource use. While the rise in rankings is a milestone, the institute views it as the beginning of a longer journey. Sustainability at IIT Bombay is an evolving mission—driven by innovation, collaboration, and purpose. The campus continues to serve as a living lab, leading by example toward a greener, more sustainable future.

Inter IIT Visits -IIT Jodhpur, IIT Indore & IIT Madras

The team visited IIT Madras, IIT Jodhpur, and IIT Indore to learn about their sustainability initiatives and share experiences. The visits focused on energy, waste, water, and green campus practices, providing useful insights for strengthening sustainability efforts at IIT Bombay.

Awareness Committee

The Awareness Committee at IIT Bombay includes faculty, administrative offices, operational bodies, students, and residents, working together to build awareness on campus sustainability. It organizes campaigns, workshops, and outreach programs on energy, water, waste, and biodiversity. This year, the committee introduced the “10 Great Ideas” call to invite proposals from all stakeholders for new sustainability initiatives. An awareness video on food waste reduction in hostels is also being developed to address this critical issue. These efforts help strengthen participation across the community and support IIT Bombay’s sustainability goals.

Draft Net Zero Roadmap

GESH IIT Bombay has developed a draft Net Zero Roadmap to guide the institute’s long-term sustainability journey in line with IIT Bombay's Sustainability Policy. The draft outlines strategies for energy efficiency, renewable energy adoption, water conservation, waste reduction, sustainable mobility, biodiversity, and emission reductions. It sets phased targets for achieving Net Zero in energy, water, waste, and emissions, while engaging all campus stakeholders in the process. The draft will serve as a foundation for further discussion, refinement, and implementation in the coming years.

Water Audit - Pilot Basis

IIT Bombay has initiated a pilot water audit by procuring and installing meters at selected locations on campus. The objective is to track water consumption, identify inefficiencies, and develop strategies for conservation. Insights from this pilot will guide future planning and support campus-wide water efficiency initiatives.

Student Bodies

Team Zero

Faculty advisor: **Prof. Sandeep Kumar, Department of Energy Science & Engineering**

Team Zero Waste is a student-led initiative at IIT Bombay dedicated to driving sustainability on campus and beyond. We focus on making sustainable practices actionable through a combination of technology, data-driven policy, and behavioural change campaigns. With the support of IIT Bombay's Green Energy and Sustainability Hub (GESH), we have launched several impactful projects that sit at the intersection of policy and real-world implementation.

Key initiatives include:

1) Sustainable Event Management

In collaboration with GESH living lab fellows, Team Zero Waste developed a 14-vertical framework to guide waste reduction across events of all scales on campus. Under this framework, some key actions have been implemented in:

- Sustainable Pilots at IITB's Events: We partnered with events like Green Hydrogen Reality Check (GHRC), Tatva (ESED's flagship festival), and Energy Day to pilot and refine sustainable practices in real-time.
- Electrifying Posters: Under the guidance of Prof. Subramanian, we conducted a Life Cycle Assessment (LCA) comparing traditional plastic flex banners with digital LED screens to quantify environmental impact.
- Glass Bottles for Events: With GESH's financial support, we procured ~150 reusable glass bottles for Energy Day to eliminate the use of disposable paper cups, setting a precedent for future sustainable event practices.

2) Food Waste Reduction in Messes

Waste, with GESH's facilitation, established a collaboration with Prof. Aarti Kalro and her students to tackle food waste on campus. As part of this initiative:

Stakeholder Mapping: We conducted interviews across all hostel messes to understand food waste patterns and pain points.

Data-Driven Insights: The insights will feed into a more structured and scalable system for tracking and mitigating food waste in student messes.

3) Life Cycle Assessment of the IIT Bombay Biogas Plant

GESH provided access to critical operational data for conducting a comprehensive Life Cycle Assessment (LCA) of the campus biogas plant. This analysis aims to:

Evaluate the environmental impact of the biogas facility.

Benchmark the plant's performance against traditional waste treatment systems.

Provide actionable insights to scale and replicate biogas initiatives across similar institutions.

Team SHUNYA

Faculty advisor: Prof. Venkata Santosh Kumar Delhi

In a shared commitment to advancing sustainability on campus, GESH and Team SHUNYA have joined forces on several impactful initiatives. Through the collaborative efforts, energy audits were successfully conducted for Hostels 15 and 16, providing valuable insights into energy consumption patterns and areas for efficiency improvements. Team SHUNYA also calculated greenhouse gas (GHG) emissions for key events organized by GESH, promoting greater awareness and accountability around environmental impact. Additionally, Team SHUNYA extended its support to GESH in hosting a PAN-IIT consortium event to deliver a meaningful and well-organized platform for sustainability dialogue. This ongoing partnership exemplifies how inter-team collaboration can lead to meaningful progress toward a greener campus and beyond.

Sustainability Cell

Faculty advisor: Prof Vishal Dixit, Climate Studies

The Sustainability Cell at IIT Bombay is a student-driven initiative committed to making the institute a model of sustainability. Our mission is to foster awareness, drive behavioral change, and implement impactful policy and technological innovations that align with global sustainability goals. By collaborating with the administration, faculty, and students, and most importantly GESH, we aim to integrate sustainability into every aspect of campus life. Few key collaborations with GESH this tenure:

- The Cell along with GESH conducted IIT Bombay's first comprehensive assessment under the STARS 3.0 framework, analyzing over 500 parameters across academics, operations, and community engagement. We are performing preliminary analysis while identifying areas for improvement.
- The Cell developed an intuitive carbon footprint calculator tailored for IITB students. Incorporating over 100 parameters across Scope 1 (direct emissions), Scope 2 (indirect emissions from electricity), and Scope 3, this tool helps individuals understand their environmental impact. Along with GESH, students from IDC, and Prof. Pankaj Jhunja, we are integrating the calculator into a seamless application.
- Apart from that, we worked with several smaller proposals with GESH like energy monitoring system, Tetra Pak recycling, AQI monitoring, rainwater harvesting, etc

GESH IITB

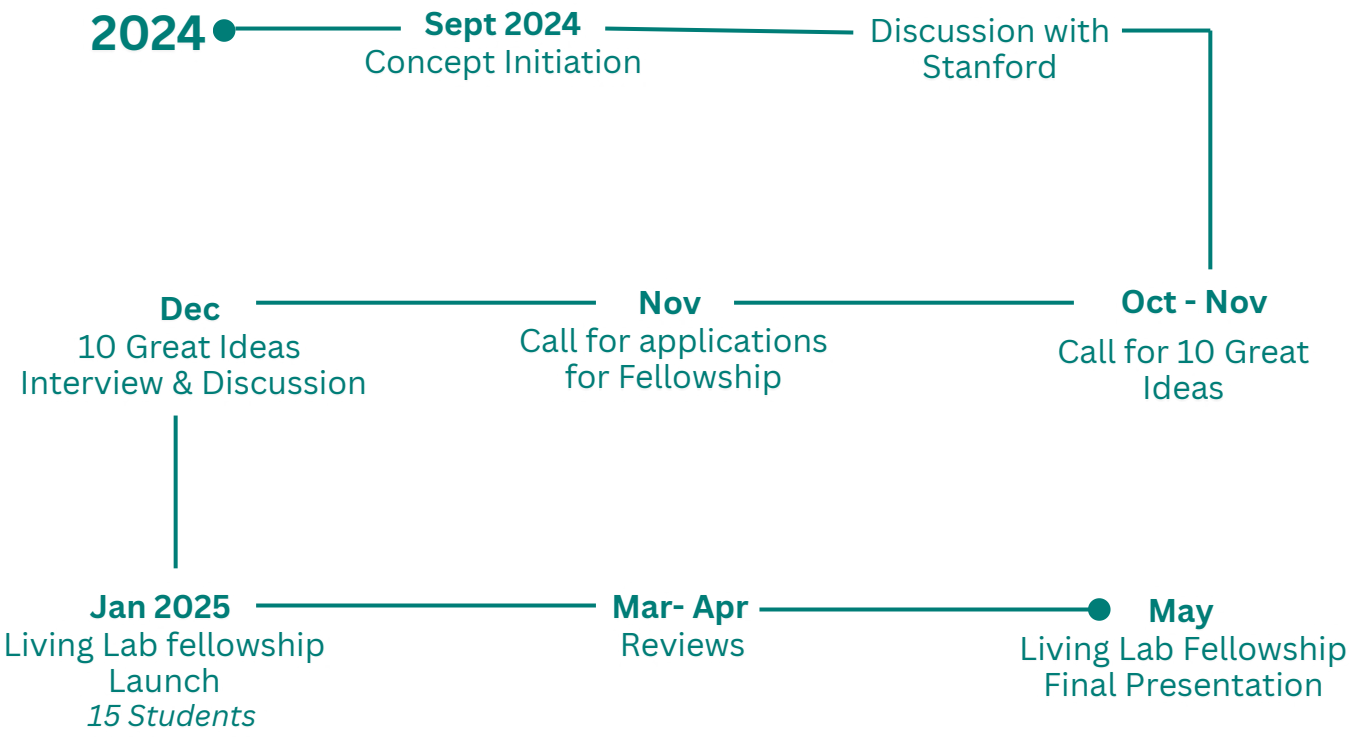
GESH IITB

Living Lab Program

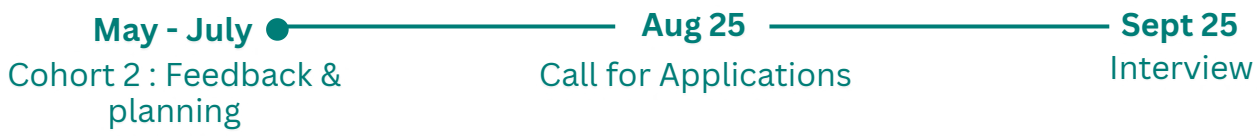
The GESH IITB Living Lab Program turns the campus into a dynamic site for real-world experimentation and learning. This flagship program welcomes ideas and participation from the entire IITB community — students, faculty, staff, and collaborators — to co-create and implement impactful sustainability solutions starting from the campus-to be taken to the world.

Timeline

GESH IITB Living Lab Program : Cohort 1



GESH IITB Living Lab Program : Cohort 2



GESH IITB Living Lab Projects 2025

No.	Fellows	Project Title	Project Description
1	Himank Gupta & Rishul Nayak	Green Cup: Interhostel Sustainability Competition	Designed and implemented an interhostel competition to promote sustainability, using a credit-based scoring system grounded in key performance indicators tailored to hostel operations.
2	Neha Keshri	Biogas Plant: Techno-Economic & Environmental Feasibility	Conducted a comparative analysis of the techno-economic and environmental feasibility of the existing biogas plant versus conventional composting systems.
3	Riddhi Agarwal & Sukriti Sanawar	ReCycle Café: Sustainable Bicycle Transportation on Campus	Developed a model for managing unclaimed bicycles on campus, aimed at reducing cycle waste and promoting sustainable transportation practices.
4	Shreyas Kulkarni & Surabhi Gupta	A General Sustainability Course for the Campus	Designed a comprehensive introductory course on sustainability concepts and practices, tailored for first-year students at IIT Bombay.
5	Utprabh Pama	Biodiversity Mapping and Carbon Footprint Assessment at IIT Bombay	Assessed the carbon footprint of IIT Bombay to evaluate its environmental impact and determine if the campus is carbon neutral, positive, or negative.

No.	Fellows	Project Title	Project Description
6	Vaibhav Chand & Tanmai Choudhary	Sustainable Event Planning at IIT Bombay	Created a practical toolkit to help students and faculty organize eco-friendly events, focusing on waste reduction and sustainable resource usage.
7	Achintya Bhobe & Kamran Ilahi	Water Demand Mapping and Audit	Carried out a detailed water demand assessment for hostel and academic buildings, contributing to efficient water resource management at the IIT Bombay campus.
8	Sanskriti Shukla & Saumya Yadav	Hostel Food Waste Management	Developed a toolkit to reduce food waste in hostels, engaging students and mess staff in sustainable food waste management practices.
9	Vaibhav Chand & Tanmai Choudhary	Sustainable Event Planning at IIT Bombay	Created a practical toolkit to help students and faculty organize eco-friendly events, focusing on waste reduction and sustainable resource usage.

The GESH IITB Living Lab Program for Campus Sustainability concluded on a high note with a vibrant closing event held on 02 May 2025 that showcased the impactful work carried out by the Living Lab Cohort 1 Fellows during their fellowship period (Jan - Apr 2025) The event featured the final presentations by GESH Fellows, where they showcased their projects aimed at advancing campus sustainability to an audience of faculty members, members of operational bodies, residents and other stakeholders. The presentations were followed by a felicitation ceremony for the Fellows, graced by Prof. Vedagiri (Dean IPS).

Impactful Projects from GESH Living Lab Cohort 1
Over the course of the program, the Fellows worked on transformative projects that are already showing potential for long-term institutional impact. Some key highlights include

01 **No Banner Policy: Transition from PVC Banner to Digital Screens**

02 **Green Cup Competition: Piloting Interhostel Competition for Sustainability**

03 **Water Demand Mapping & Auditing: GIS-based Water Demand Maps of IITB Campus**

04 **Standard Operating Procedure for Sustainable Events**

05 **Recycle Cafe: Refurbishment Model for Unclaimed Cycles (Now Repedal)**

Campus Tour for Sustainability

13th February 2025 for the GESH Living Lab Fellows

This engaging initiative aimed to increase awareness among fellows about the existing sustainability practices on campus, helping them identify systemic gaps and define the scope for their Living Lab projects.

Fellows had the opportunity to explore key sustainability infrastructures, including the Greywater Treatment Plant, Composting Unit, Waste Segregation Plant, Biogas Plant, Team Shunya Building, Biodiversity Zones, Gasification Plant, and the Rooftop Solar PV System. Each stop offered valuable insights into real-world applications of sustainable technologies and campus-level interventions.

The tour proved to be an eye-opener, fostering deeper understanding and sparking meaningful discussions around potential innovations. A heartfelt thanks to all the facility teams and volunteers whose guidance and expertise made this tour an impactful learning experience

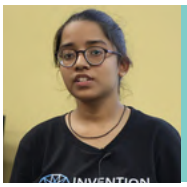
GESH IITB Living Lab Fellows

SHREYAS ATUL KULKARNI
3rd year UG
Department of Energy Science & Engineering

RISHUL NAYAK
3rd year UG
Department of Economics

SURABHI GUPTA
4th year UG
Department of Mechanical Engineering

HIMANK GUPTA
4th year UG
Department of Economics



NEHA
4th Year Dual Degree
Environmental Science & Engineering

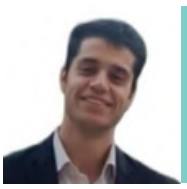
UTPRABH PAMA
3rd year UG
Environmental Science and Engineering

RIDDHI AGARWAL
4th Year UG
Department of Chemical Engineering

SUKRITI SANAWAR
1st year, M.Tech
CSRE Department

SANSKRITI SHUKLA
1st Year PG
C-TARA

ACHINTYA BHOBHE
2nd Year MTech
MEMS



TANMAI CHOUDHARY
2nd Year MBA
SJMSOM

VAIBHAV NARENDRA CHAND
3rd Year Dual Degree Program
Environmental Science and Engineering

KAMRAN ILAHI
3rd Year PhD
Department of Civil Engineering

ANATHAKRISHNAN B
3rd Year MSc PhD
Department of Energy Science & Engineering

SAUMYA YADAV
4th year MSc PhD
Environmental Science and Engineering Department (ESED)

GESH IITB

GESH IITB
Entrepreneurship

The Entrepreneurship Vertical at GESH connects students and researchers with the entrepreneurial ecosystem at IIT Bombay. Through challenges, hackathons, startup bootcamps, and learning programmes, we provide pathways to test and grow impactful ideas. Our initiatives bridge innovation with real-world application, enabling teams to move from concepts to startups.

Projects

Greenovate

June 05 2025

To mark World Environment Day 2025, GESH IITB—alongside the Centre for Climate Studies, Environmental Science & Engineering Department (ESED), Desai Sethi School of Entrepreneurship (DSSE), and Institute Innovation Council (IIC)—hosted Greenovate 2025, a student innovation showcase addressing key environmental challenges. The event featured over 20 early-stage solutions in areas such as clean technology, circular economy, water systems, waste management, and carbon mitigation. Innovations ranged from compostable food packaging and decentralized greywater treatment to upcycled materials and digital scrap exchange platforms. Winners SusPak: Compostable trays from bagasse and wood pulp GreyCycle: Modular greywater treatment solution Runners-Up Ecoard Board: Packaging from invasive water hyacinth ScrapXchange: Peer-to-peer scrap and surplus material platform An expert jury comprising Dr. Vivek Dalvi, Ms. Jayshree Nayak, Dr. Rosa Lyngwa, and Dr. Junaid Dar provided feedback and guidance to all teams. Greenovate stood out as a platform not just for ideas—but for launching tangible, scalable solutions for a sustainable future.

SLP - Supervised Learning Project

Aug 2025 *Upcoming*

GESH IITB, in collaboration with the Industrial Energy Assessment Cell (IEAC), IIT Bombay, is exploring the launch of a semester-long, hands-on credit program for UG students (3rd year and above). The initiative aims to provide students passionate about sustainability with real-world exposure through energy and GHG audits across the IIT Bombay campus and select industries.

Global Sustainbility Challenge

Aug 2025 Upcoming

IIT Bombay is in discussions with renowned institutions and youth-focused nonprofit organizations to launch a Global Sustainability Challenge (GSC).
Envisioned as a university-led initiative, the GSC will bring together students from around the world to collaborate on critical sustainability challenges. The proposed annual competition aims to foster innovative solutions and create meaningful impact in both local and global communities.

HPCL Hackathon

Aug 2025 Upcoming

HPCL in collboration with GESH IITB aims to organise a hackathon on decarbonize refinery operations and accelerate the Net-Zero journey. The proposed challenge aims to invite innovative, scalable, and disruptive solutions to shape a sustainable refinery future and foster collaboration between industry and academia.

GESH IITB

GESH IITB

Outreach & Partnership

The Outreach and Partnership vertical of the Green Energy and Sustainability Hub (GESH IITB) serves as a dynamic platform to foster collaboration, innovation, and knowledge sharing among diverse stakeholders in the sustainability space. By organizing engaging events such as panel discussions, roundtables, conferences, and workshops, this vertical aims to bridge the gap between academia, industry, policymakers, and startups. GESH IITB's Outreach and Partnership vertical drives impactful conversations and accelerates the transition toward a sustainable, energy-efficient future.

Timeline

Outreach & Partnership Activities

2024

27th May 2024
Sustainable Chemical Manufacturing Seminar

28th May 2024
Sustainability In Chemical Engineering Curriculum - Workshop

7th Jun 2024
Workshop on Solar OASIS Project & Solar Technologies for Rural India

7th June 2024
CSO Roundtable on Supply Chain Sustainability

14th Jun 2024
IITB CSR Conclave - GESH IITB Stall

13th Aug 2024
Micro-Nanoplastics and Environmental Impact Symposium

3rd Sept 2024
Guest Lecture Sustainability & Digitalization in the Chemical Industry

23rd Sept 2024
Guest Lecture on Addressing Riverine Plastic Pollution

3rd Oct 2024
Seminar on Battery Reuse, Repurpose, and Recycling

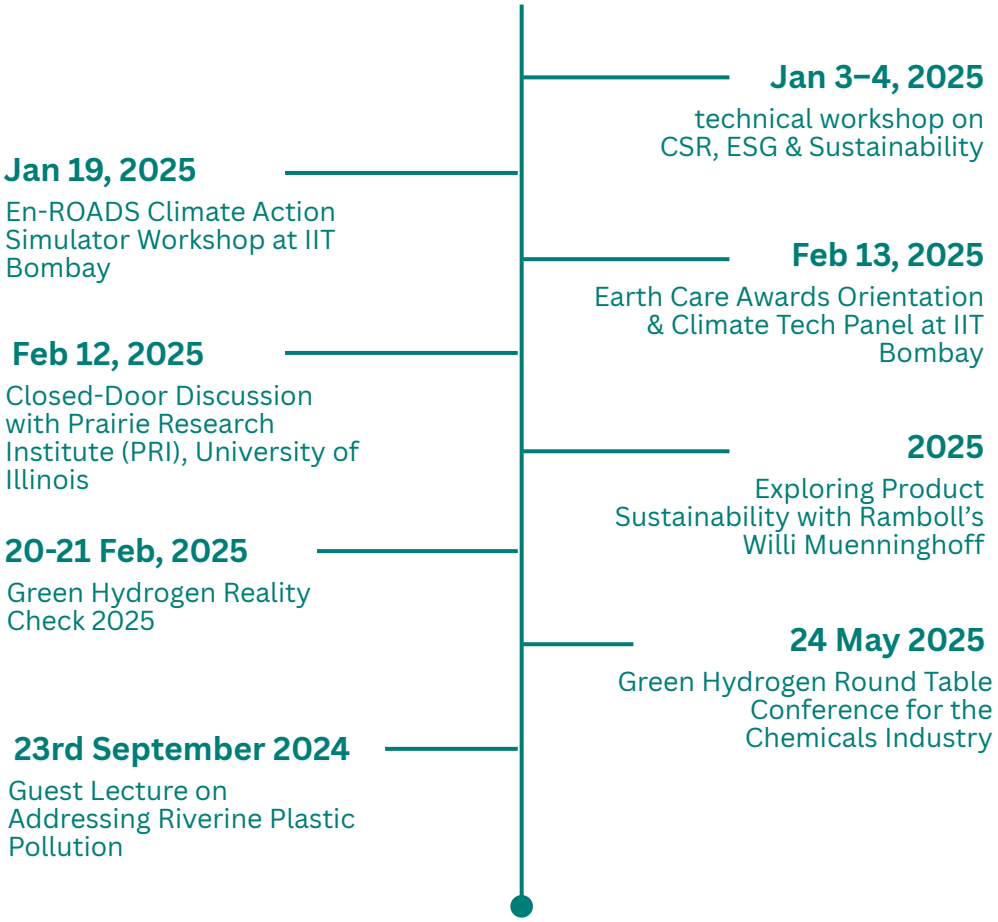
4th - 6th Oct 2024
National Meeting on Sodium (-ion) Batteries (NMSB)

8th Oct 2024
Carbon Reset Summit: South Asia's First Carbon Summit

18th Nov 2024
Summit on Sustainability

27th Nov 2024
Sustainability Synergy Meeting

18th Dece 2024
GESH IITB Sustainability Conclave



Outreach and Partnerships in Action

Sustainable Chemical Manufacturing - Seminar

27th May 2024

The Sustainable Chemical Manufacturing Seminar united industry and academia to explore innovations and challenges in green chemistry. Esteemed speakers shared insights, while sustainable practices like eco-friendly kits, fabric banners, and carbon offsetting highlighted environmental responsibility.

Sustainability In Chemical Engineering Curriculum - Workshop

28th May 2024

We hosted a one-day workshop on Incorporating Sustainability Concepts in the Undergraduate Chemical Engineering Curriculum. With 30+ participants from academia and industry, the workshop featured panel discussions, breakout sessions on courses and case studies, and ideas on enhancing sustainability education. Led by Prof. Yogendra Shastri, the event generated valuable insights for developing impactful teaching materials and fostering collaboration between academia and industry.

Solar OASIS Project & Solar Technologies for Rural India - Workshop

7th June 2024

In collaboration with SUNRISE, we hosted a workshop on the Solar OASIS project in Khuded village, Maharashtra, focusing on solar technologies for rural India. Experts from Indian and UK institutions, including Swansea University, Cambridge University, TISS, IISc, & more, shared insights on solar advancements and sustainable solutions. Discussions covered cutting-edge research, practical applications, and scaling strategies. The event highlighted the importance of academia-industry-government partnerships in transforming rural communities through solar power.

CSO Roundtable on Supply Chain Sustainability

7th June 2024

Ia Roundtable on Supply Chain Sustainability brought together industry leaders, CSOs, and IITB faculty to discuss sustainable practices and challenges. Moderated by Dr. Prasad Modak, the event featured insights from Prof. Sanjay Mahajani, Prof. Trupti Mishra, and Prof. Pankaj Dutta on industry-academia collaborations. Panelists, including Dr. Mritunjay Chaubey and Prabodha Acharya, deliberated on integrating sustainability into business frameworks, addressing challenges, and exploring financial benefits, driving actionable solutions forward.

IITB CSR Conclave - GESH IITB Stall

Date: 14th June 2024

GESH IITB participated in the IITB CSR Conclave, showcasing cutting-edge research and presenting a catalog of 44 green energy and sustainability projects for CSR funding. The event brought together industry leaders, scholars, and CSR practitioners to explore investment opportunities, foster collaborations, and discuss sustainable business practices. Through insightful discussions, workshops, and networking, the conclave sparked innovative ideas and strengthened partnerships, driving social change and advancing sustainability efforts nationwide.

Micro-Nanoplastics and Environmental Impact Symposium

13th August 2024

The symposium featured experts like Tom McDonald (University of Manchester) and IIT Bombay faculty, discussing the impact of micro and nanoplastics. It advanced dialogue on their generation, transport, and solutions, addressing critical health and environmental challenges posed by plastic pollution.

Guest Lecture Sustainability & Digitalization in the Chemical Industry

3rd September 2024

On September 3, 2024, Dr. Helmut Winterling, President of Group Research at BASF, delivered an insightful lecture on sustainability and digitalisation in the chemical industry. He emphasized the need for circular economy practices, bio-feedstock transitions, and leveraging digital R&D to achieve climate neutrality. The event highlighted innovative approaches like methane pyrolysis and plastic waste recycling as critical enablers for a sustainable future.

Guest Lecture on Addressing Riverine Plastic Pollution

23rd September 2024

We hosted Dorine Poelhekke and Samo Simonian from The Ocean Cleanup, who shared insights on combating plastic pollution. They highlighted their two-pronged approach of halting riverine plastic flow and removing ocean legacy plastics using innovative interceptor technologies. The lecture emphasized the critical role of global collaborations in tackling this pressing issue.

Seminar on Battery Reuse, Repurpose, and Recycling

3rd October 2024

GESH IIT Bombay hosted a seminar on October 3, 2024, focusing on innovative strategies for battery reuse, repurpose, and recycling to support India's e-mobility goals. Discussions highlighted the need for robust battery testing systems, sustainable recycling technologies, and academia-industry collaboration to advance battery circularity. The event underscored the importance of self-reliance in critical minerals and promoting a circular economy.

National Meeting on Sodium (-ion) Batteries (NMSB)

4th - 6th October 2024

The 1st National Meeting on Sodium-Ion Batteries (NMSB-1), hosted by GESH IIT Bombay and the Advanced Batteries & Ceramics Laboratory, brought together over 250 participants nationwide. Highlights included 28 expert lectures, 42 research posters, and pivotal discussions on advancing Na-ion battery technology. The launch of the Battery Research Society of India (BRS) website further bolstered collaboration and knowledge sharing.

Carbon Reset Summit: South Asia's First Carbon Summit

8th October 2024

The South Asia Carbon Summit, co-hosted by CarbonCrew and GESH IITB, spotlighted the transformative role of Carbon Dioxide Removal (CDR) technologies. Key highlights included India's leadership potential, corporate-driven CDR innovations, and the rise of Indian startups in the sector. The summit emphasized collaboration between academia and industry to accelerate climate action.

Summit on Sustainability

18th November 2024

GESH IIT Bombay participated as a knowledge partner in the Summit on Sustainability, co-organized by The Energy Consortium - IIT Madras and Pollution Control India. Prof. Sanjay Mahajani, Professor-in-Charge at GESH IITB, contributed as a panellist, sharing strategies for empowering sustainable initiatives through collaboration and action. The event underscored new opportunities for accelerating sustainability efforts and fostering partnerships for a greener future.

Sustainability Synergy Meeting

27th November 2024

The IIT Bombay Sustainability Synergy Meeting, held on November 27, 2024, brought together stakeholders to advance sustainability through innovation, interdisciplinary collaboration, and actionable campus initiatives. Key highlights included discussions on "Living Labs" for eco-friendly innovation, presentations on cutting-edge research in renewable energy and materials, and sustainability-focused initiatives by student bodies. The meeting underscored IIT Bombay's commitment to embedding sustainability across research, education, and campus operations, laying the foundation for impactful societal contributions.

GESH IITB Sustainability Conclave

18th December 2024

The GESH IITB Conclave showcased the collective commitment of IITs to sustainability and net-zero campuses through innovation and collaboration. Representatives from IIT Delhi, IIT Dharwad, IIT Madras, and others shared best practices in energy, waste, water management, biodiversity, and awareness initiatives.

Industry insights on digitalization, net-zero roadmaps, and science-based targets highlighted the need for academia-industry partnerships. The conclave proposed the creation of pan-IIT green offices, standardized sustainability toolkits, and real-time dashboards. By fostering green event protocols and sharing models with other institutes, IITs aim to lead sustainability efforts, driving impactful changes for a greener and innovative future.

CSR, ESG & Sustainability on Workshop

January 3–4, 2025

GESH IIT Bombay, in collaboration with SJMSOM, conducted a technical workshop on CSR, ESG & Sustainability. The event featured expert-led sessions on sustainability assessment using OpenLCA, ESG data integration, and BRSR reporting frameworks. Speakers from Mahindra Group, SGX Group, and academia explored ESG-linked financial disclosures, life cycle thinking, and carbon accounting. Participants engaged in hands-on modules and panel discussions focused on embedding sustainability into corporate strategy and operations. The workshop fostered interdisciplinary dialogue, offering actionable insights for professionals and researchers. We thank all contributors for making this initiative a success and afforestation—and observe real-time impacts on global temperature, energy demand, and air quality. Led by Johann Fernandes, co-founder of climateXcapital, the workshop challenged teams to design pathways to restrict warming to 1.5°C. A bonus session featured “Daybreak,” a cooperative climate board game, offering a fun, systems-thinking approach to global sustainability challenges.

En-ROADS Climate Action Simulator Workshop at IIT Bombay

January 19, 2025

the Energy Club at IIT Bombay hosted an En-ROADS Climate Action Simulator Workshop in collaboration with Climate Interactive and MIT Sloan Sustainability Initiative. The interactive session enabled participants to simulate climate policies—like electrification, carbon pricing, and afforestation—and observe real-time impacts on global temperature, energy demand, and air quality. Led by Johann Fernandes, co-founder of climateXcapital, the workshop challenged teams to design pathways to restrict warming to 1.5°C. A bonus session featured “Daybreak,” a cooperative climate board game, offering a fun, systems-thinking approach to global sustainability challenges.

Earth Care Awards Orientation & Climate Tech Panel at IIT Bombay

February 13, 2025

GESH IIT Bombay hosted a dynamic session on February 13, 2025, featuring an orientation for the JSW–TOI Earth Care Awards and a panel on "Technology Development and Entrepreneurship in Climate Studies." The orientation guided students on crafting impactful climate solutions under the Young Climate Champions Programme. The panel explored cutting-edge tools—AI, IoT, satellite tech, and big data—enabling innovation in renewable energy, carbon capture, and climate-smart agriculture. Speakers emphasized the importance of venture funding, enabling policies, and entrepreneurial ecosystems in scaling climate-tech solutions. The event spotlighted tech-driven pathways to accelerate India's green transition.

Closed-Door Discussion with Prairie Research Institute (PRI), University of Illinois

February 12, 2025

GESH IIT Bombay hosted a focused interaction with the Prairie Research Institute (PRI), University of Illinois Urbana-Champaign, on February 12, 2025. The session explored PRI's translational sustainability research across areas like water systems, energy transitions, and environmental resilience. Key discussions centered on collaborative opportunities in applied research, project-based student exchange programs, and co-developing educational modules. The dialogue highlighted synergies between PRI and IIT Bombay's research priorities, laying the groundwork for joint initiatives in climate innovation, circular economy, and data-driven sustainability solutions. The exchange offered a promising platform for global academic-industry partnerships.

Exploring Product Sustainability with Ramboll's Willi Muenninghoff

GESH IIT Bombay hosted a thought-provoking session with Willi Muenninghoff, APAC Director – Health Science, Ramboll Korea, on "The Complexity of Product Sustainability." Willi highlighted the shift from carbon-centric goals to a broader sustainability framework encompassing zero pollution, biodiversity, and circular economy. Drawing from the EU Green Deal and evolving global regulations like CSRD and CBAM, he emphasized the increasing importance of data-driven lifecycle assessments, regulatory preparedness, and cross-sector collaboration. With rich industry insights and global perspectives, the session helped participants understand the multifaceted challenges industries face in ensuring truly sustainable products.

Green Hydrogen Reality Check 2025

20-21 February, 2025

IIT Bombay, supported by HSBC, successfully hosted a two-day reality check on 20th–21st February 2025 at the VMCC, highlighting the transformative potential of green hydrogen in shaping a sustainable future. The event featured expert keynotes and plenary talks on technology and policy, engaging panel discussions on green financing, governance, and industry-academia collaboration, and poster presentations showcasing cutting-edge hydrogen research from across India. Participants had the opportunity to connect with industry leaders, policymakers, researchers, and innovators driving the green hydrogen revolution, making it a landmark gathering in the pursuit of a sustainable energy transition.

Green Hydrogen Roundtable for Chemical Industry

24 May 2025

the Green Hydrogen Roundtable for Chemical Industry 2025 convened at Indian Institute of Technology, Bombay, brought together hydrogen consuming chemical manufacturers, hydrogen producers, consulting firms, policymakers and other leaders to discuss on the possibilities and challenges to convert existing hydrogen users in the chemical sector to green hydrogen at scale. Organised by GESH IITB, and Indian Institute of Chemical Engineers - Mumbai Regional Centre (MRC), with Indian Chemical Council (ICC) as industry partner and supported by Hindustan Petroleum Corporation Limited , Bharat Petroleum Corporation Limited and Jay FineChem Private Limited. The discussion focused on key aspects of green hydrogen deployment at chemical scale — including real Capex/Opex, progress toward price parity, required subsidies or gap funding, and incentives to accelerate adoption. It also explored ways for regulators, financiers, and producers to collaborate in derisking the transition.

IITB CSR Conclave - GESH IITB Stall

06 June 2025

GESH IITB was proud to present and highlight the Living Lab Program for Campus Sustainability during the IIT Bombay Annual CSR Conclave held at VMCC. The highlight was our triangulated approach of bringing together research, education and campus operations for advancing sustainability of IIT Bombay. The various projects under the living lab program were highlighted including-

1. Ongoing and completed sustainability focused projects
2. The GESH IITB living lab fellowship that works with students and campus community together, building sustainability leadership and improving campus sustainability
3. Various pilot projects such as pelletization and gasification plant

GreenCo Summit Hyderabad

GESH IITB's booth titled "Sustainable Action Lab", showcased breakthrough research and implementation models from IIT Bombay, led by Prof. Trupti Mishra. The lab highlighted collaborative efforts in sustainability strategy, showcased IIT Bombay's commitment to sustainability through action-oriented research and multi-stakeholder engagement.

The lab is anchored on four core pillars

1. Facilitating industry-academia collaboration to co-create scalable climate solutions
2. Supporting policy and decision making through evidence-based insights.
3. Building and disseminating knowledge across sectors and stakeholders.
4. Providing action learning opportunities for students, preparing future sustainability leaders.

Dr. Wazeem Nishad, COO, GESH-IITB, also gave a talk emphasizing how academic institutions like IIT Bombay are key enablers in developing cutting-edge solutions for low-carbon industrial transitions, including carbon capture, energy storage, green materials, and systems innovation. The summit provided an excellent opportunity to engage with sustainability leaders across sectors and reinforce the role of research-driven innovation in India's green transformation.

GESH IITB

GESH IITB

Media & Communications

Newsletters

GESH IIT B has been publishing quarterly newsletter to expand the quality of work

Newsletter 1 - January

The Research Hub for Green Energy and Sustainability at IIT Bombay (GESH IITB) is an initiative committed to addressing the global climate crisis. By fostering innovation in green energy and sustainability, we aim to bridge the gap between academic research and real-world applications while promoting education, entrepreneurship, and industry collaboration. Our mission is to empower the next generation of leaders to tackle environmental challenges with creativity and multi-disciplinary

Link - Newsletter 1

Newsletter 2 - April

This issue (April 2025) showcases the Hub's progress in addressing global challenges through sustainable innovation and real-world application. From pioneering research and immersive training programs to campus-wide sustainability initiatives and industry partnerships, this edition reflects our commitment to accelerating climate solutions from lab to land.

Link - Newsletter 2

Newsletter 3 - July

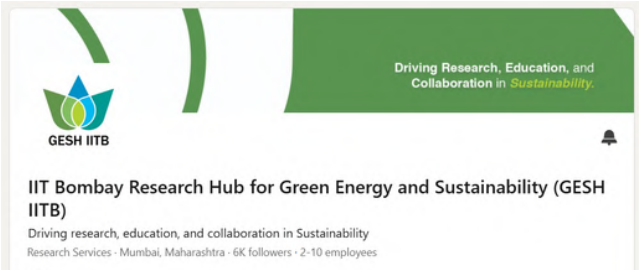
In this edition, we bring you insights into GESH IITB's work in the domain of sustainability. From contributing in IIT Bombay's remarkable 20+ rise in the QS World Ranking under sustainability criteria, to leading conversations on the future of energy through the Green Hydrogen Roundtable, organizing impactful training programs, and engaging in inter-IIT collaborations to advance campus sustainability - GESH IITB continues to move the needle forward.

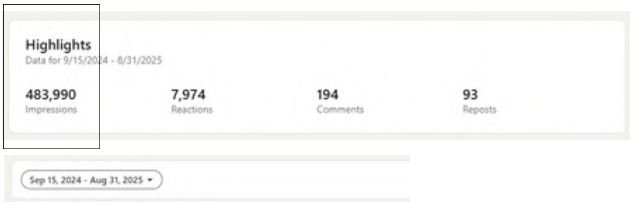
Link - Newsletter 3

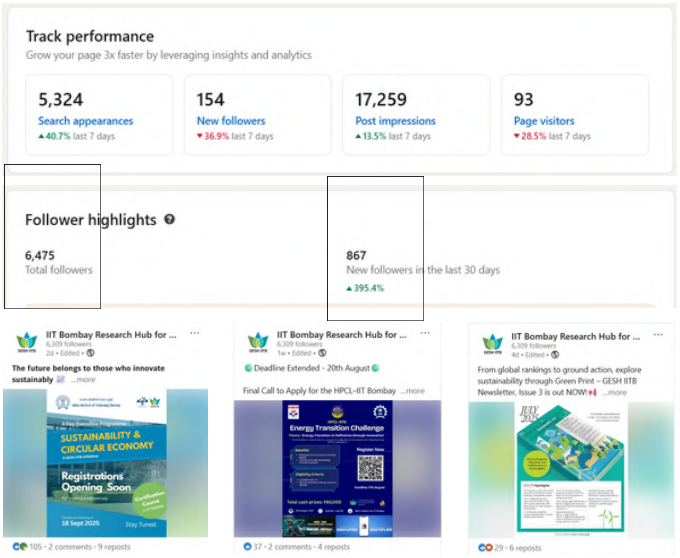
Social Media

LinkedIn

The LinkedIn aimed to expand its reach among the working professionals, Faculties, associated members, and Stakeholders to widespread the active work happening at GESH and in domain of sustainability. Currently GESH stands with almost 7k followers and 50k+ Impressions per month.

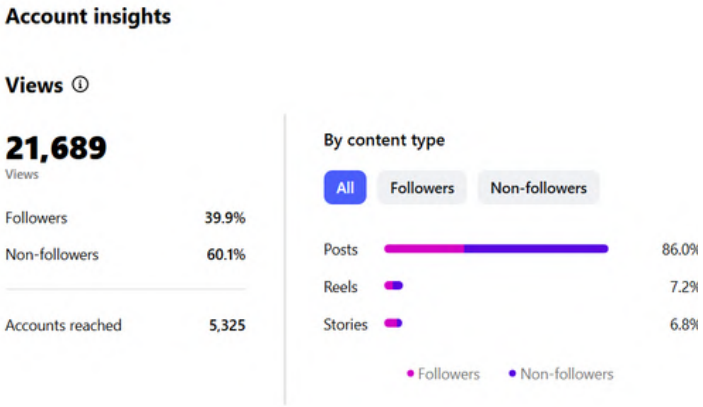






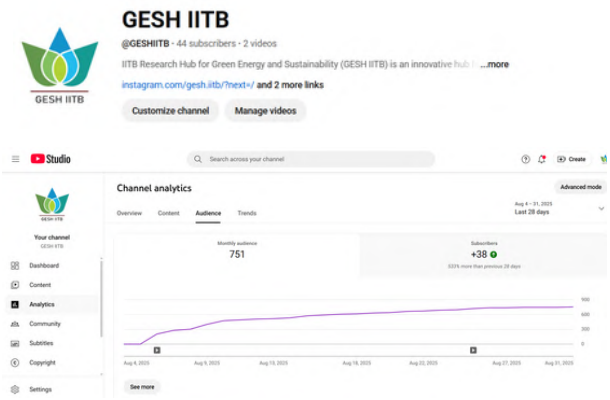
Instagram

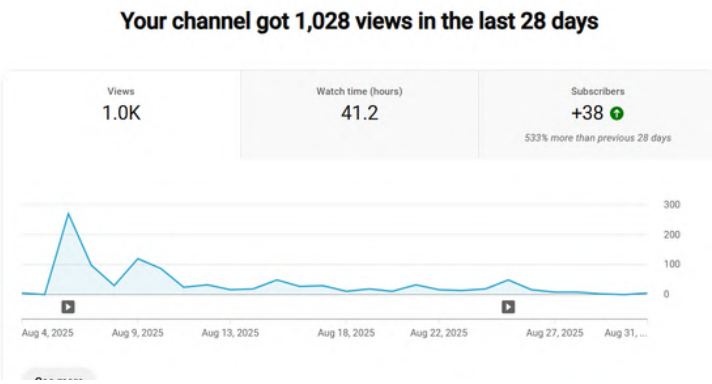
The Instagram of GESH IITB aims to target the youth and collaborate with other social media channels on instagram in same category. The handle also aims to publicise the current events, seminars, workshops associated with GESH IITB.



Youtube

The YouTube channel aims to spread awareness of GESH IITB projects through Long form content in content category of documentation, Awareness and podcast in our future endevours.



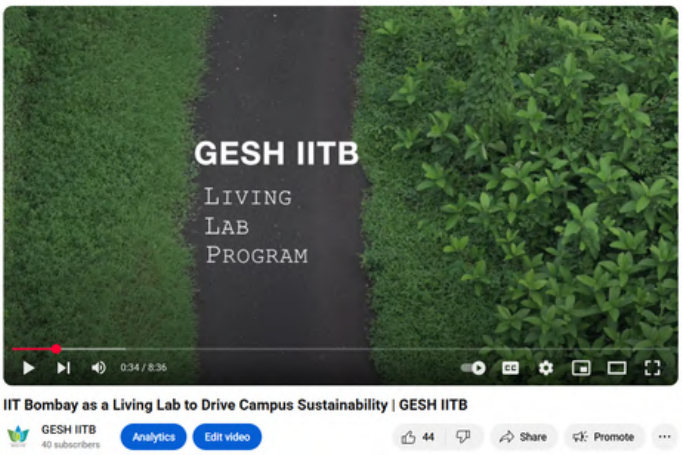


Launch of Living Lab Video - Youtube

The YouTube channel was initiated with the publish of GESH IITB's Flaghship program Living Lab program Video on youtube in Long form and Short form Teaser.

Link to full video

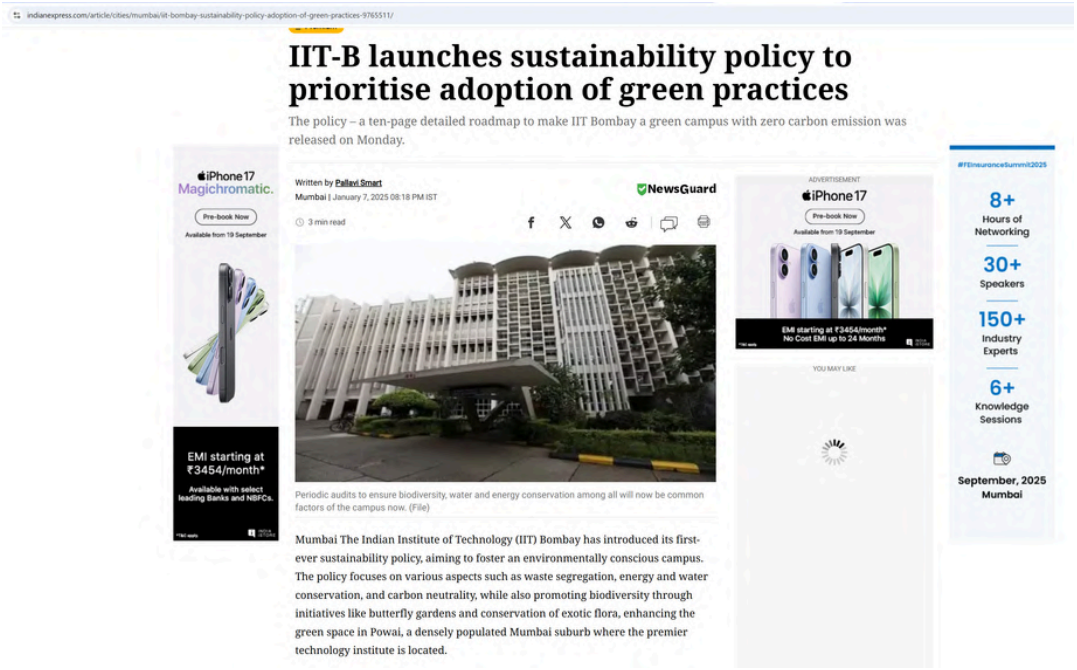
Link to teaser video



Press Releases

Media Coverage -GESH IITB

INDIANEXPRESS



indianexpress.com/article/cities/mumbai/iit-bombay-sustainability-policy-adoption-of-green-practices-9765511/

IIT-B launches sustainability policy to prioritise adoption of green practices

The policy – a ten-page detailed roadmap to make IIT Bombay a green campus with zero carbon emission was released on Monday.

Written by Pallavi Smart
Mumbai | January 7, 2025 08:18 PM IST

NewsGuard

3 min read

Periodic audits to ensure biodiversity, water and energy conservation among all will now be common factors of the campus now. (File)

Mumbai The Indian Institute of Technology (IIT) Bombay has introduced its first-ever sustainability policy, aiming to foster an environmentally conscious campus. The policy focuses on various aspects such as waste segregation, energy and water conservation, and carbon neutrality, while also promoting biodiversity through initiatives like butterfly gardens and conservation of exotic flora, enhancing the green space in Powai, a densely populated Mumbai suburb where the premier technology institute is located.

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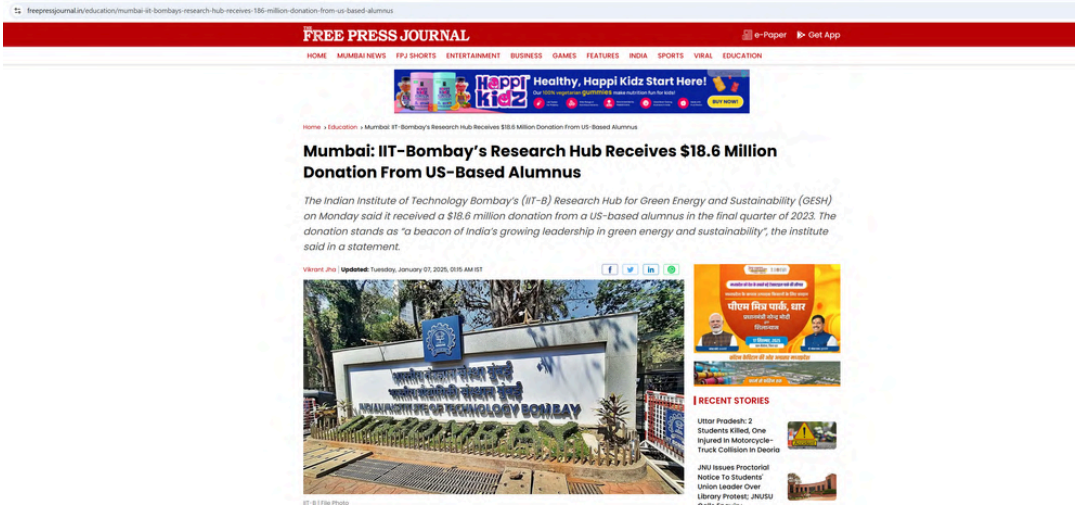

freepressjournal.in/education/mumbai-iit-bombays-research-hub-receives-186-million-donation-from-us-based-alumnus

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Home › Education › Mumbai: IIT-Bombay's Research Hub Receives $18.6 Million Donation From US-Based Alumnus

Mumbai: IIT-Bombay's Research Hub Receives $18.6 Million Donation From US-Based Alumnus

The Indian Institute of Technology Bombay's (IIT-B) Research Hub for Green Energy and Sustainability (GESH) on Monday said it received a $18.6 million donation from a US-based alumnus in the final quarter of 2023. The donation stands as "a beacon of India's growing leadership in green energy and sustainability", the institute said in a statement.

Vikrant Jha | Updated: Tuesday, January 07, 2025, 01:15 AM IST

Mumbai: The Indian Institute of Technology Bombay's (IIT-B) Research Hub for Green Energy and Sustainability (GESH) on Monday said it received a $18.6 million donation from a US-based alumnus in the final quarter of 2023. The donation stands as "a beacon of India's growing leadership in green energy and sustainability", the institute said in a statement.

The green energy initiative by IIT-B aims to expand academic research, bridge it with real-world applications, and foster innovation through interdisciplinary collaboration among academia, industries, and regulatory bodies.

"It aims to enhance the talent pool in sustainability, addressing global challenges like climate change and environmental degradation, helping position India as a global leader in sustainable energy solutions," the institute said.

According to Director of IIT-B, Prof. Shireesh Kedare, GESH serves as a platform to unify expertise across IIT-B and beyond, driving India's ambitions in green energy through research, education, and capacity building.

"The vision of GESH IIT-B is to support the transition to green energy (environment-friendly and sustainable energy sources) and sustainability through research, education and capacity building, with academia, industry, regulators and other stakeholders. GESH commitment extends to advancing sustainability, climate services, solutions, and related domains.," he said.

"One of GESH's early successes has been the overwhelming response to its call for research proposals on green energy and sustainability with almost 75+ responses, with 22 research projects funded, marking a significant step forward in advancing sustainability-focused research," according to the institute. These projects, IIT-B added, span fundamental, translational, and educational areas.

"The hub is currently developing industry-tailored training programs, focusing on green energy and sustainability. Plans are underway to expand these initiatives to cultivate a new generation of sustainability leaders equipped to address emerging challenges," the statement said, adding that a new course — Sustainability Theory to Action — has been initiated at the institute wherein 150+ hours of industry training has been approved to be initiated in the coming months.

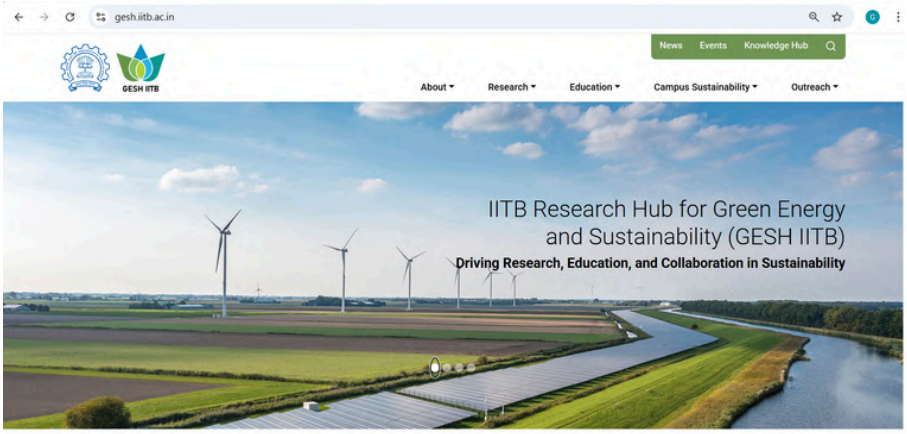
GESH Office Visibilty

Building Logo

To strengthen GESH IITB's presence on the campus, building logo signage and directional signage were strategically installed. These enhancements ensure greater visibility, making the facility easier to locate while reinforcing the identity and prominence within the campus landscape.

Direction Logo

Website



Driving research, education and collaboration in sustainability.

The GESH IITB website, initially hosted on a cloud server, was later migrated to the IITB server to strengthen its digital presence and reinforce its association with the institute's official infrastructure.

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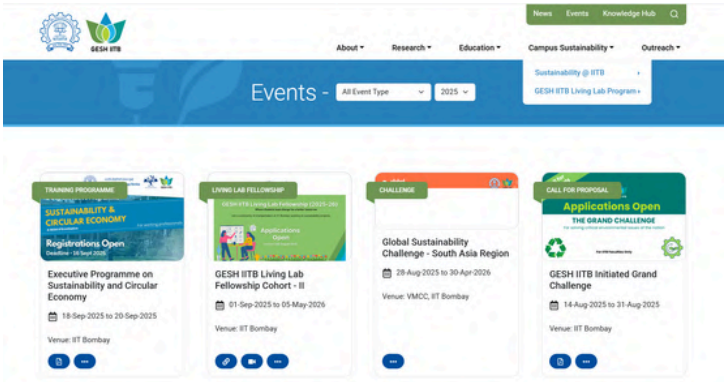
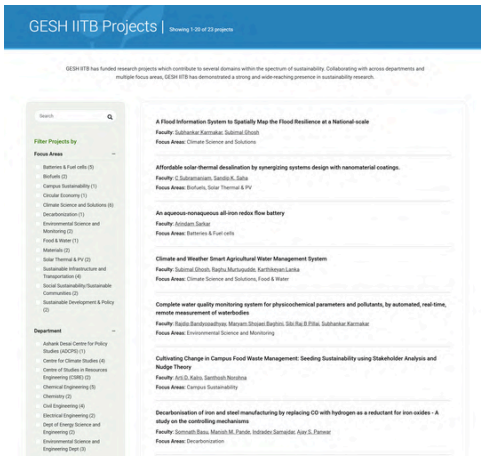
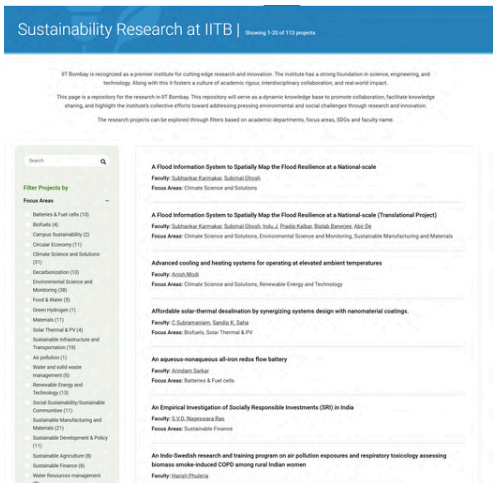


Repositories on Website



IIT Bombay is a premier institute popular for its contribution is research and innovation. GESH IITB has compiled and designed a repository with all the sustainability research within the institute. The research projects span across 16 focus areas and 10 departments contributing to multiple domains within sustainability of the environment.



GESH IITBombay has funded 23 research project which contribute to sustainability of the environment. These projects are from multiple departments and focus areas, marking a significant contribution to making a greener and sustainable future.

GESH IITB

GESH IITB

TEAM

Advisory Committee

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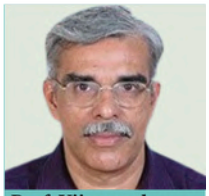
Former Director, IIT Bombay

Mr. Ashish Goel
President, InTech Energy DBA Sanalife

Dr. Arun Majumdar
Dean, Stanford Doerr School of Sustainability



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Dean-R&D, IISER Tirupati

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Global Vice President & Head, UPL Limited

Prof. Satish Agnihotri
Policy Studies/ CTARA, IIT Bombay

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Dean Strategy, IIT Bombay

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Head, DSSE, IIT Bombay

Prof. Subimal Ghosh
Head, Centre for Climate Studies, IIITB

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Head, ESED, IIT Bombay

Prof. Manaswita Bose
Head, DESE, IIT Bombay

Prof. Mahesh Tirumkudulu
Head, Chemical Engineering, IITB

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Professor-In-Charge Chemical Engineering

Prof. Amartya Mukhopadhyay
Metallurgical Engineering & Material Science

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Professor, Department of Chemical Engineering, IIT Bombay

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Department of Chemical Engineering
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Professor,
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Department of Chemistry
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Environmental Science and Engineering Department
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Pune

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Assistant Vice President (Program)
Society for Innovation & Entrepreneurship -SINE
IIT Bombay

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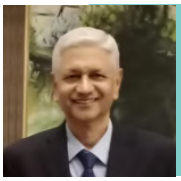
Professor
Department of Civil Engineering
IIT Bombay



PROF. RAJIV DUSANE

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Metallurgical Engineering & Material Science Dept.
IIT Bombay

PROF. SATISH B AGNIHOTRI

Associate Faculty
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&
CTARA
IIT Bombay

PROF. TAPANENDU KUNDU

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Department of Physics
IIT Bombay

Operational Team

Dr. Wazeem Nishad
Chief Operating Officer
GESH IITB

Dr. B. A. Vijayasree
Program Manager - Research

Dr. Vivek Dalvi
Asst. Program Manager - Research

Ms. Matrika Ghimiray
Asst. Program Manager
Training & Education

Mr. Prabodh Gadkari
Asst Program Manager
Campus Sustainability

Mrs. Radha Kale
Administrative Manager

Mr. Sandeep Gaikwad
Senior Graphic Designer -Media & Communications

Dr. Chitra Pandey
Senior Associate
Outreach & Partnership

Ms. Jaya K
Senior Associate
Entrepreneurship

Ms. Vaishnavi
Associate -
Training & Education

Mr. Sreejesh S.
Project Technical Assistant - Campus Sustainability

Ms. Devanshi Parekh
Project Associate - Research

Mr. Shivam Singh
Associate -
Media & Communiation

Ms. Rupali Nayal
Associate -
Training & Education

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Senior Administrative Assistant

Ms. Nisha Kharat
Administrative Assistant

Mr. Gulab Birare
Office Assistant

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May to July (IITB Students)

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AE 3rd UG

Akash Nikam
ME 3rd UG

Anurag Pachgade
ESED 3rd UG

Athena Stephen
ESED 3rd UG

Dipti Meshram
AE 2nd UG

Fenny Shah
Chemistry 1st UG

Mudrika Gupta
CE 2nd UG

Ritesh Ahirwar
Chemical 2nd UG

Parth Maheshwari
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J Sai Charan
MEMS 2nd UG

Shashwat Gakre
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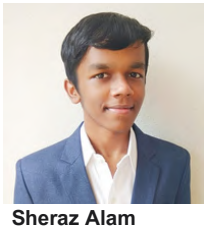

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Khushi
Chemistry 2nd UG

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CE 1st UG

IIT Bombay Research Hub for
Green Energy & Sustainability

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IIT Bombay Research Hub for
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Contact Us

Second floor, Old CESE building, Opposite VMCC, IIT Bombay

gesh.iitb.ac.in +91222159-6301 office.gesh@iitb.ac.in