



TO CATALYSE INDO-GERMAN
STRATEGIC R&D PARTNERSHIPS

About IGSTC

The Indo-German Science & Technology Centre (IGSTC), a joint initiative by the Department of Science & Technology (DST), Government of India and the Federal Ministry of Education and Research (BMBF), Government of Germany was established to facilitate Indo-German R&D networking through substantive interactions among

government, academia/research system and industries, thus fostering innovation for overall economic and societal developments in both the countries. Through its various funding programs, IGSTC intends to catalyse innovation centric R&D projects by synergising the strength of research/ academic institutions and public/private industries from India and Germany.

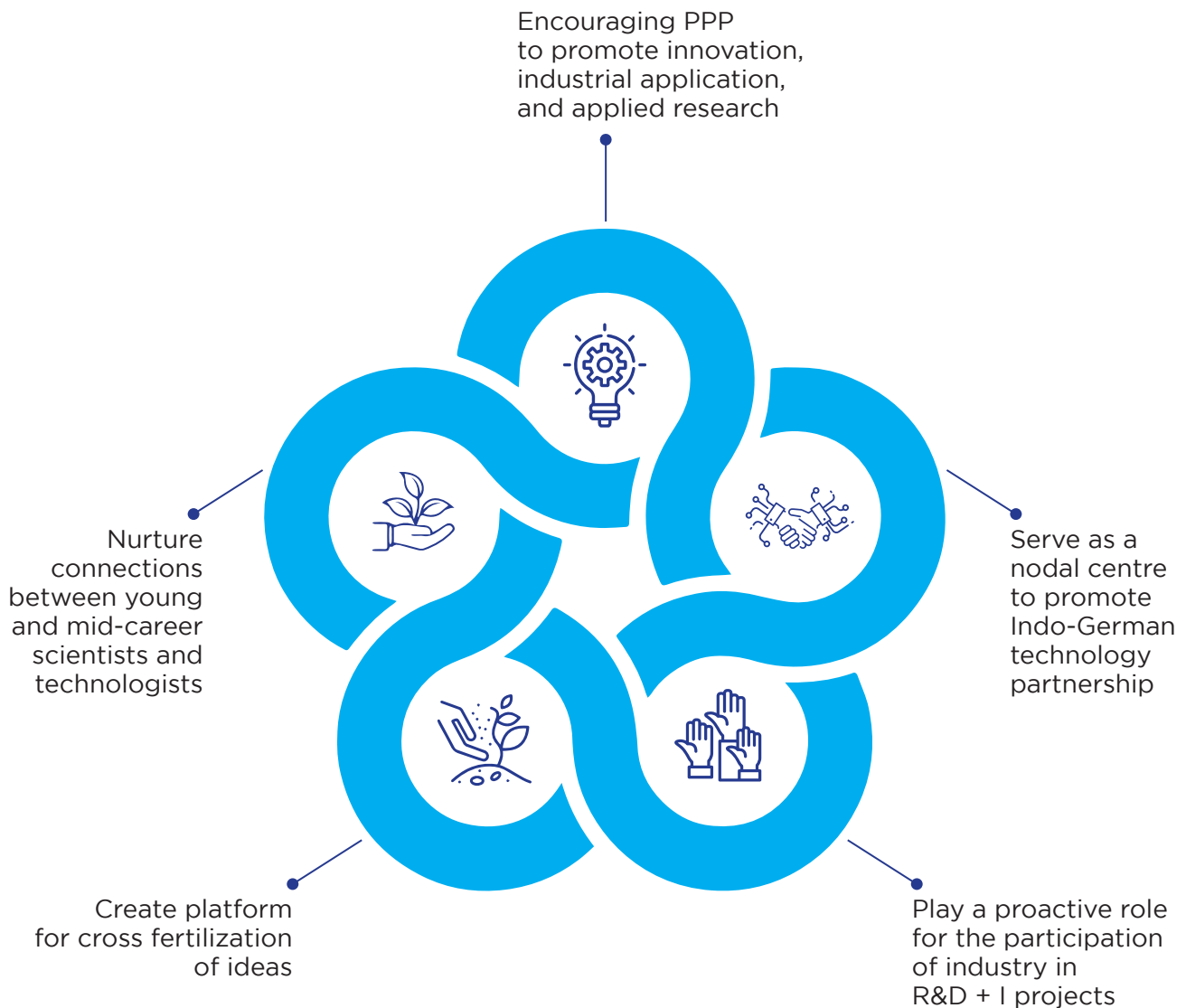


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16th Governing Body Meeting



The 16th Governing body meeting of IGSTC was held on 22nd November 2023 at Dresden, Germany.

The GB comprises of Mr S K Varshney (DST & Indian Co-Chair), Ms Kathrin Meyer (BMBF & German Co-Chair), Prof Neelima Gupta (Sagar University), Dr Michaela Wilhelm (University of Bremen), Dr Martin Goller (BMBF), Dr Tata Narasinga Rao (ARCI), Dr Raju C Kadam (Bharat Forge Ltd.), Mr Kaspar Mayer (German Embassy, New Delhi), Mr Rohit Kumar, (nominated by the AS & FA, DST), Dr Julien Vayssiere (nominee of Mr Clas Neumann, SAP). Dr Ulrike Wolters (BMBF) was present in the meeting as member secretary and Dr Rajiv Kumar as representative of DST). From IGSTC, Mr R Madhan (Director), Dr P V Lalitha, Mr R Varadarajan, Mr Hans Westphal (DLR-PT), Ms Doerte Merk (DLR-PT), Dr Ludwig Kammesheidt (DLR-PT) & Ms Sara Sabzian (DLR-PT) participated in the meeting.

The GB focused holistically on IGSTC's activities, status and updates on different programmes including 2+ 2 projects, Workshop, and various networking fellowships.



9th Finance Committee Meeting



The 9th Finance Committee (FC) meeting took place on 20th November 2023 in hybrid mode at DLR-PT office, Berlin.

The FC comprises of Mr Vishvajit Sahay (Additional Secretary & Financial Advisor, DST and Indian Co-Chair), Dr Ulrike Wolters (BMBF and German Co-Chair), Dr Martin Goller (BMBF) & Dr Sibashisa Dash (DST). Mr Rohit Kumar (DST), Dr Rajiv Kumar (DST, in place of Dr Sibashisa Dash) and Mr Pravin Kumar Gupta (Financial consultant, IGSTC) were present as special invitees in the meeting. Mr R. Madhan (Director), Mr R Varadarajan, Dr P V Lalitha,

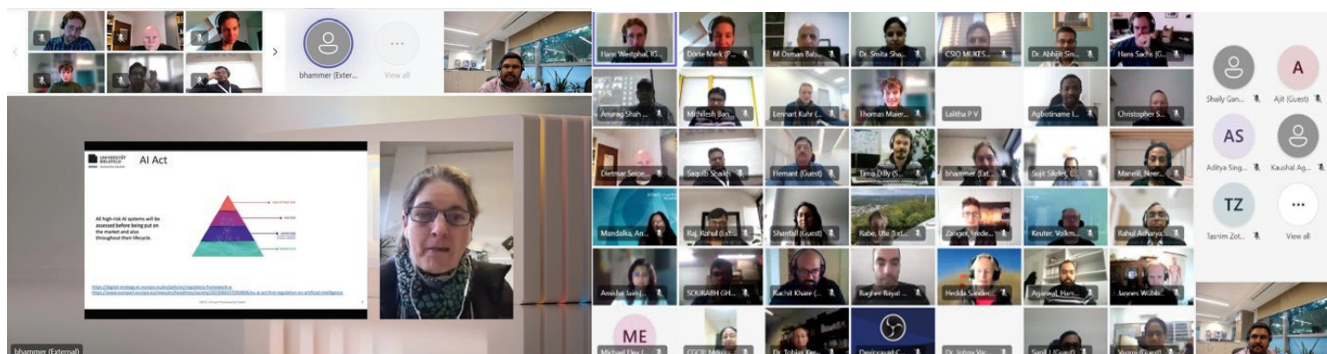
Mr Pankaj Kothari (all from IGSTC), Mr Hans Westphal (DLR-PT/IGSTC), Ms Sara Sabzian (DLR-PT/ IGSTC), Dr Ludwig Kammesheidt (DLR-PT/ IGSTC) and Ms Doerte Merk (DLR-PT/IGSTC) also attended the meeting.

Discussion was held and decisions taken on financials, audit report and budget estimates for IGSTC.



2+2 Projects

2+2 Projects Promotional Event of 2+2 Call 2024



The next 2+2 Call 2024 on thematic area “AI for Sustainability” with the following subtopics is expected to launch on January / February 2024.

1. AI assisted understanding of extreme weather events
 - Climate models informing agriculture production systems and agricultural management practices
 - AI based extreme events detection and understanding
2. Ethical & Fair AI, e.g., bias free AI (avoiding transfer context, algorithmic focus and emergent bias), privacy compliant AI (e.g. anonymising implicit social structural data)
3. Infrastructure planning
 - AI across disciplines to model and plan sustainable and climate resilient cities
 - rural/agricultural land use planning

To promote the Call and engage potential stakeholders, IGSTC organised a virtual promotional event on 8th December 2023. The event was inaugurated by Mr R Madhan, Director, IGSTC with a brief on the objective of the Call. Prof Barbara Hammer, University of Bielefeld delivered the keynote talk followed by presentation of Dr Abhijit Sinha Roy, Narayana Nethralaya Foundation, Bangalore and Prof Frederik Zanger, Karlsruhe Institute of Technology, sharing their experience of building project consortium, handling 2+2 projects & suggestions to the prospective applicants. The event was concluded by an intense Q&A session and a brief outreach on bilateral funding opportunities available at IGSTC. More than 350 researchers from academia and industries from both the countries participated in the event.



Effect-based Monitoring demonstrates Efficiency of Electrically-driven Water Treatment Processes to Remove Salts and Micropollutants from Process Water (EffectroH₂O): Consortium meeting & Inauguration of Pilot Plant at CETR, Tiruppur

IGSTC 2+2 project EffectroH₂O aims to improve process water treatment in the textile industry to reduce harmful toxicological effects on the environment using capacitive deionization (CDI), which can be used especially for highly concentrated brines and advanced oxidation processes to remove organic dyes from industry effluents. The novel treatment technologies are being tested in a pilot plant after development in the laboratory. The technology aims to address the challenges posed by complex industrial effluents, offering a sustainable and efficient solution aligning with the SDG Goals 6,12,13 & 14 to ensure clean water, responsible consumption and production, improving the well-being of life on land and water, and ensuring climate action by adopting low carbon technology. The Effectro H₂O team has recently organised



an in-person consortium meeting at Tiruppur, Tamil Nadu on 30th November 2023. Researchers from IIT Madras, India, Goethe University & RWTH Aachen from Germany and the industry partners Eurofins and Tamil Nadu Water Investment Company (TWIC) participated to discuss progress, challenges, and future directions of the project. The inauguration event of ECOOP pilot plant at Kunnankalpalayam CETP on 1st December 2023 was organised. The event was graced by the presence of Shri T Christuraj, District Collector of Tiruppur, and Mr R Madhan, Director, IGSTC. During the event a live demonstration of the Pilot plant was shown. The event engaged key stakeholders including local industry engineers and operators, highlighting the environmental impact of dye waste, intermediates, and Chlorine by products.



Multi-axis multi-material wire arc additive manufacturing (MAMM-WAAM) - Consortium Meeting in Germany

The team of IGSTC 2+2 project MAAM-WAAM from IIT Guwahati visited Germany during 16th October to 15th November 2023 to work with the German industrial and Academic partners on hands on training of CAM package and further discussion of algorithm development for MAMM-WAAM system collectively with Module Works. On 6th November, the delegation participated in the consortium meeting organised by RWTH Aachen. During this visit, the researchers from IIT Guwahati, RWTH Aachen and Module Works visited FormNext (one of the largest metal 3D Printing exhibitions) on 8th Nov 2023 and interacted with the Wire - Arc



Additive Manufacturing machine tool developers.

The visit had a fruitful outcome and the team could exchange a lot of ideas on finalizing the design of the MAMM-WAAM system and further investigations has been scheduled on the parts produced. The team has also come up with an invention for repairing heavily damaged metal sheets, depositing exotic materials in an open environment, and creating functionally graded structures. The MAAM-WAAM team also discussed on filing the joint patent from the project in the consortium meeting.



Indo German project on development of biodegradable implants (INGERBDIAM) – Consortium Meeting in Germany

An Indian project delegation from ARCI Hyderabad consisting of Dr. Kaliyan Hembram and Mr. Manish Tak visited Laboratory for Biomaterials Science and Development, Department of Prosthodontics, Charite Universitätsmedizin Berlin. The team had a brief discussion with Dr. Franziska Schmidt, Charite University on various advanced processing and characterization techniques of the soft tissue anchors. Mr. Peter Jaschinsk from KCS Europe GmbH also participated in the discussion and during lab visit which is equipped with various advanced characterization testing such as inflow-corrosion testing under cyclic loading facility in the control atmosphere and micro-3D CT scan; apart from the above two facilities other microstructural, mechanical testing, biocompatible and antimicrobial testing facilities for biomaterials are also housed.

On 21st November, the consortium had organised an online meeting involving all partners and discussed on the work progress made by partners during the last few months. A separate meeting was also arranged with Prof. Frank Witte to discuss on design of First-generation Soft Tissue Anchors (STAs) and materials developed at ARCI. During the discussion, minor modifications in the existing design were agreed upon to be better suitable for AM printing. Silver coating on Fe-Mn alloy sample results made by KSC was discussed, and it was advised that various coating arrangements for 3D samples be improved. The fruitful meeting and facility visit at various organisation enhanced the networking and cooperation among partners and also helped to identify future direction on printing and commercialisation of customised STAs.



Bilateral Workshops

CatCE²

Open SDI

RS-HEAT

Green H₂

Indo-German joint workshop at BITS Pilani Hyderabad Campus



The Indo-German workshop on 'Catalysis for Circular Economy towards Sustainable Energy', under the support of IGSTC Open Call Workshop, comprehensively covered a range of catalysis and energy-related topics, fostering lively discussions, networking, and potential collaborations among participants. The Workshop was scheduled during 20th - 23rd September 2023, at BITS Pilani Hyderabad Campus. The meeting revealed shared interests, innovative problem-solving approaches, and strengthened connections. The Workshop was coordinated by Prof. Sounak Roy from Department of Chemistry, Birla Institute of Technology & Science (BITS) Pilani Hyderabad Campus and Prof. Jennifer Strunk from



Technical University Munich (TUM), Germany. Attendees included early-career researchers to internationally acclaimed experts, representing diverse institutions and industries from both countries. The Workshop technically covered the fundamental and applied aspects of catalysis and reaction engineering for a wide range of applications, such as alternatives to petrochemical processes, sustainable energy production, and environmental purification.

Indo-German workshop at CEPT Ahmedabad



Centre for Environmental Planning and Technology (CEPT) University Ahmedabad had organised a two days' workshop on "Open Spatial Data Infrastructure for Sustainable Urban Development" from 3rd - 4th October 2023. The workshop focused to foster a collaborative and interdisciplinary dialogue that transcends traditional boundaries. The keynote address, by Dr P. G. Diwakar highlighted the significant role of Spatial Data and Geospatial Technology in the country, commending the efforts of Indian Space Research Organisation (ISRO). Despite of the challenges posed by a densely populated landscape, he mentioned that the crucial data derived from space, specifically through the high-resolution Indian satellites has played a significant role in planning Indian cities. Mr Falk Würriehausen, talked about 'Federal Agency for Cartography



and Geodesy Spatial Data Infrastructure in Germany: Prospects and Challenges.' Mr Würriehausen shared insights into the spatial data infrastructure in Germany, outlining both prospects and challenges. The workshop unfolded as a dynamic platform, delving into pivotal themes Open Spatial Data Infrastructure for Sustainable Urban Development, and collaborative efforts between India and Germany. To strengthen the links between industry and research, topics, and interests for mutual application for Indian and German research grants were identified.

Indo-German joint workshop at University of Agricultural Sciences, Dharwad



IGSTC supported workshop on “Heat waves: Forestry and agriculture under pressure: a remote sensing perspective” was organized during 19th - 21st October 2023 at the University of Agricultural Sciences, Dharwad. The Workshop was inaugurated by Mr R Madhan, Director, IGSTC. The event brought together experts from universities, governmental research institutions, and industries to explore the integration of remote sensing into heat wave research and mitigation strategies. Coordinated by Prof. Arjun Koppad and Dr Carsten Montzka, the workshop facilitated profound discussions, fostering



partnerships, and paving the way for joint initiatives in addressing climate threats to forestry and agriculture. With IGSTC's financial support, this collaborative endeavour marks a significant step towards leveraging remote sensing technologies for building resilience and adapting to the challenges posed by our evolving climate.

Indo-German workshop at IIT Bhilai



The IGSTC bilateral Workshop on Green Hydrogen and Allied Technologies, held at the Indian Institute of Technology (IIT) Bhilai in collaboration with Technical University Berlin, Germany, during 22nd - 24th November 2023. Domain experts, researchers, and industry leaders convened for thought-provoking discussions and collaborative initiatives focused on advancing green hydrogen and related technologies. Key achievements include the identification of joint research endeavours, facilitating technology transfer and knowledge exchange, enhancing industry partnerships, and laying out a clear roadmap for future



collaborations. This collaborative effort signifies the commitment of both India and Germany towards promoting sustainable energy solutions and fostering innovation in the green hydrogen sector. The workshop's success is a testament to the dedication of academia and industry partners in propelling advancements in green hydrogen technologies.

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Women Involvement in Science & Engineering Research (WISER)



Dr. Radha Chaube

Professor at the Department of Zoology, Banaras Hindu University (BHU) has been awarded WISER-2022 to conduct Joint collaborative research project between BHU and Ludwig- Maximilians-University, Munich (LMU) in the field of fish diseases. The goal of the research is to minimize use of antibiotics in aquaculture with use of safe and efficient autogenous vaccines to prevent and control bacterial disease in Bavarian salmonid aquaculture. During her visit, she visited Institut für Fischerei/ Bavarian State Institute for Agriculture and Institute of Fisheries in Starnberg/Bayern, the leading Institutions in the research associated with areas of fish farming, especially, carp pond farming and intensive aquaculture. Through IGSTC WISER Award, she is aiming at developing the brain transcriptome and autogenous vaccine development for Bavarian salmonid aquaculture.



Dr. Monika Gupta

Ramanujan Fellow at the Department of Chemistry, Indian Institute of Technology (IIT), Ropar, has recently received the IGSTC WISER-2023 award for her project focused on developing solid-state solar thermal fuels derived from liquid crystalline norbornadiene derivatives. In this joint project with her host Prof. Frank Wuerthner at The Julius Maximilians University of Würzburg, she is aiming to create visible-light responsive norbornadiene- based liquid crystalline systems for solar energy storage. Through IGSTC WISER support she intends to initiate the development of advanced organic materials based on functional dyes such as perylene and naphthalene bisimides, merocyanines, squaraines, chlorins and diketopyrrolopyrroles for applications in optoelectronic and photovoltaic devices as well as in photocatalytic water splitting.



Dr. Thanammal Ravichandran

Kumaraguru College of Liberal Arts and Science in Coimbatore, Tamil Nadu, received the IGSTC WISER 2022 award. Under this programme, she collaborates with Dr Mizeck Chagunda from the University of Hohenheim, Germany on the project titled "Potential of digital innovations and its institutional dimensions to enhance dairy productivity in developing countries". During her research journey she visited dairy farms in Germany acquiring insights into scientific breeding, innovative mechanization processes, digital practices for boosting dairy productivity, and effective methane emission reduction strategies which she aims to implement in India. Besides dairy farms, she explored various laboratories, familiarizing herself with diverse methodologies for monitoring methane emissions, nutrient extraction from biowaste, nutritional analysis of livestock feed, and alternative livestock feeding technologies.



Dr Meenu Saraf

Director of School of Sciences and Head of the Department of Department of Microbiology and Biotechnology, Gujarat University Ahmedabad has been awarded IGSTC WISER-2022 to carry out research through a collaborative project titled- "Nutrient Dynamics and Functional Aspects of Microbial Diversity in saline Soils" with Prof Jorg Overmann, The Leibniz Institute DSMZ - German Collection of Microorganisms and Cell Cultures GmbH, Braunschweig. Under this award, Dr Saraf intend to explore several aspects of Soil and Agriculture Microbiology with a focus on regeneration of agricultural lands using biofertilizers and biopesticides.



Industrial Fellowship

PhD Industrial Exposure Fellowship (PIEF)
Post-Doctoral Industrial Fellowship (PDIF)

Industrial Fellowship 2022 -Awardees



Dr. Sarita Devi has completed her PhD from AcSIR-Central Scientific Instruments Organization (AcSIR-CSIO), Chandigarh. She has been working on the fabrication of chemo/biosensors for hazardous explosive compounds using the luminescent nanomaterials. Dr Devi was awarded IGSTC-postdoctoral industrial fellowship (IGSTC-PDIF) in 2021. Under this Award, she worked with Dr. Rudolf J Schneider at the Department of Environmental Analysis, Federal Institute of Material Research and Testing (BAM), Berlin, Germany on the production of metal-organic framework mediated electrochemical sensor for lethal bacterial toxin with the help of microfluidic-flow cell platform. Through the IGSTC Industrial Fellowship, she aimed to develop an in-house, transparent, and lightweight microfluidic-flow cell device for easy replacement of sensing electrodes without the need for any additional instruments or tools.



Dr. Ankit Kumar Kansara completed his Ph.D. under Dr. Puyam S. Singh from AcSIR - Central Salt & Marine Chemicals Research Institute (CSMCRI), Bhavnagar. Dr. Kansara has been awarded the IGSTC- Postdoctoral Industrial Fellowship (PDIF) in the year 2022. He was hosted by Dr. Ralf Wyrwa, at Polymer and Mixed Matrix Department, Fraunhofer IKTS, Hermsdorf. Dr. Kansara worked on the development of mixed matrix membranes using metal-organic frameworks (MOFs) for the separation of xylene isomers. With the IGSTC Industrial Fellowship, he aimed at enhancement of membrane separation performance, particularly for xylene isomers separation.



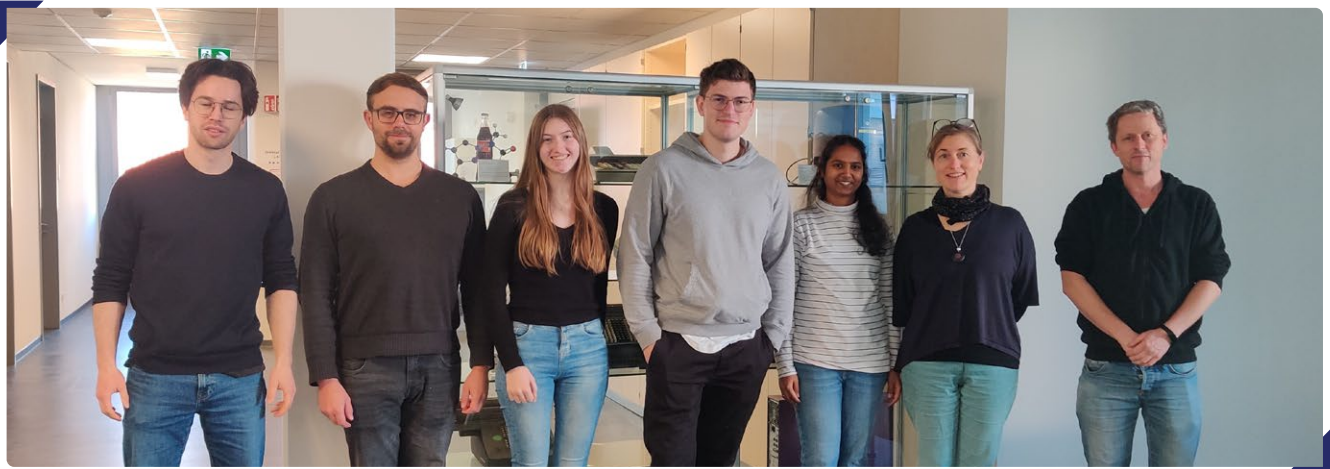
Dr. Swathi E has completed her PhD in Metallurgical and Materials Engineering from Indian Institute of Technology (IIT) Madras. She has been awarded the IGSTC-Postdoctoral Industrial Fellowship (IGSTC-PDIF) upon her work on the fabrication of transparent fiber reinforced polymer composites at the research division Polymeric Materials and Composites under Prof. Christian Dreyer at Fraunhofer-IAP. Through the IGSTC Industrial Fellowship, she aimed to develop urban biospaces using light weight polymer composites for artificially growing macroalgae and crickets to ensure food supply for the future.



Dr. Pritam Bari completed his PhD under Dr. Mohit Law and Prof. Pankaj Wahi at IIT Kanpur, India. As an IGSTC Post-Doctoral Industrial Fellow (PDIF), Dr Bari worked at the Fraunhofer - IWU, Chemnitz, Germany, under the supervision of Prof. Steffen Ihlenfeldt to integrate cutting forces and stability models for different cutting tool geometry (i.e., variable helix angles, variable pitches, serration geometries) into the digital twin of the machining process to mitigate machine tool vibrations and improve machining performance. IGSTC fellowship has facilitated him to enhance hands-on experience on advanced valuable technologies such as the digital twin, mill-turn machine, virtual sensor systems, etc at the host institute in Germany.



Dr. Anusha Epparla completed her PhD in development of laser surface hardening of bearing steels under Dr. S M Shariff, ARCI-Hyderabad and Prof. Adepu Kumar, NIT Warangal. Under the IGSTC Post Doctoral Industrial Fellowship, she worked with Dr Frank Riedel, head of the department of Thermal Joining, Fraunhofer-IWU, Chemnitz on process optimization of adaptive laser welding with experimentation and development of appropriate artificial intelligence technique with process simulation, property evaluation and analysis. IGSTC-PDIF fellowship has helped her in development of unique laser-DED process employing twin-laser processing approach employing green lasers for cladding copper on copper.



Dr. B. S. Sindu from CSIR-Structural Engineering Research Centre (CSIR-SERC), Chennai has been awarded IGSTC Post Doctoral Industrial Fellowship (PDIF). Under the award, she worked with Dr. Jan Hamaekers, Head of Virtual Materials Design Group, Fraunhofer Institute for Algorithms and Scientific Computing (SCAI), Sankt Augustin on machine learning supported approach for synthesis of novel epoxy polymers towards sustainable fiber reinforced polymers. With IGSTC PDIF fellowship, she developed advanced ML based techniques to understand the durability characteristics of the material and also to predict multiple properties of epoxy polymers simultaneously. The fellowship helped Dr. Sindu to expand her work towards 'fourth paradigm' of data-driven design of materials for sustainable development.

PhD Industrial Exposure Fellowship (PIEF) 2023 - Awardees



Nabab Khan

CSIR -
Institute of Himalayan
Bioresource Technology

Host:
LIONEX GmbH



Ajin Rajan

IIT, Madras

Host:
BASF SE



Aparna Ramachandran

CSIR -
National Chemical
Laboratory

Host:
UCB Biosciences



Nipun Sharma

IIT, Jodhpur

Host:
Fraunhofer Institute
for Reliability and
Microintegration (IZM)



Kumar Vaibhav Tejan

IIT Mandi

Host:
OLI Systems GmbH



Apurva Sharma

CSIR -
Central Scientific
Instruments Organisation

Host:
K|Lens GmbH



Paladugu Sri Harsha

Indian Institute
of Science Bangalore

Host:
Fraunhofer Institute
for Microengineering and
Microsystems IMM



Arunava Kr Kalita

IIT, Guwahati

Host:
Fraunhofer Institute
for Integrated Circuits IIS



Angel Joseph

IIT, Delhi

Host:
Fraunhofer Institute for
Interfacial Engineering and
Biotechnology IGB



Faridul Hassan

National Institute of
Technology Silchar

Host:
Fraunhofer Institute for
Solar Energy System ISE

Post-Doctoral Industrial Fellowship (PDIF) 2023 - Awardess



Dr Yamini Mittal

CSIR -
Institute of Minerals &
Materials Technology

Host:
Ingenieurgesellschaft
Janisch & Schulz mbH



Dr Jaladhi Trivedi,

CSIR -
Central Salt and Marine
Chemicals Research Institute

Host:
Fraunhofer Institute for
Ceramic Technologies and
System IKTS



Dr Ashish Sengar

IIT, Delhi

Host:
Fraunhofer Institute for
Interfacial Engineering and
Biotechnology IGB



Dr Ramarajan J

Indian Institute of
Information Technology,
Design and Manufacturing,
Kancheepuram

Host:
Fraunhofer Institute for
Wind Energy Systems IWES



**Dr Bhabagrahi
Natha Sharma**

IIT, Delhi

Host:
TESTIA GmbH



Dr Harshal Agarwal

CSIR -
Central Electrochemical
Research Institute

Host:
Fraunhofer Institute for
Chemical Technology ICT



Dr Mohammed Shariq

Vellore Institute
of Technology

Host:
Fraunhofer Institute for
Manufacturing Engineering
and Automation IPA



Dr Abhay Mishra

IIT, Bombay

Host:
QuantumDiamonds GmbH



Dr Amit Kumar Vats

National Institute of
Technology, Kurukshetra

Host:
Fraunhofer Institute for
Manufacturing Engineering
and Automation IPA



Dr Jyotsnamayee Nayak

Sardar Vallabhbhai
National Institute of
Technology, Surat

Host:
DendroPharm GmbH



Paired Early Career Fellowship in Applied Research (PECFAR)



Dr Sai Gautam Gopalakrishnan is an assistant professor at the Indian Institute of Science (IISc), Bangalore. He has been awarded Paired Early Career Fellowship in Applied Research (PECFAR) together with Dr Hans George Steinruck, University of Paderborn. During May 2023, he visited the University of Paderborn, the pairing institute to establish long-term research collaborations on electrode materials for Ca-ion intercalation which are essential components of Ca-ion batteries for energy storage and for faradaic desalination by combining multi-scale theory with advanced characterisation to understand the underlying correlation between structure and dynamics in Ca-ion intercalated electrodes.

During his visit, Sai Gautam actively participated in various events, leaving an indelible mark on the collaborative landscape. Notable visits included a seminar and networking session at



Humboldt-University of Berlin, where he delivered a talk and interacted with Prof. Phillip Adelhelm's group. His engagement extended to industry collaboration, with a visit to Schaeffler in Herzogenaurach, exploring opportunities for academic-industry partnerships. Additional academic interactions comprised seminars and networking sessions at Universität Bayreuth, Helmholtz Institute Ulm, Forschungszentrum Jülich, and Universität Münster. Such intense engagements & valuable interactions with faculty members and research groups helped him to understand the current trends electrochemical research in Germany and established strong connections for potential future collaborations.



Dr Bukke Kiran Naik from NIT Rourkela has been awarded Paired Early Career Fellowship in Applied Research (PECFAR) – 2022 together with Dr Sumit Agarwal, PTB Braunschweig. Under the PECFAR award, he aimed at the commercialization and safety standards of low-temperature thermochemical energy storage (LTES) devices, with a broader exploration of their future potential. During his visit to PTB Braunschweig, the host institute, Dr Naik conducted a thorough state-of-the-art review on LTES devices, with a special emphasis on sustainable building cooling and heating applications. Furthermore, he developed an initial framework addressing safety considerations for LTES in residential buildings, setting the stage for future advancements in this critical area.

The PECFAR networking visits enabled Dr Naik to explore cutting-edge research facilities at institutions such as the University of Kassel, DLR Institute of Engineering Thermodynamics, TEC4FUELS GmbH, and TU Berlin. These visits helped him to establish new avenues of collaboration with various German research institution in advancing sustainable energy solutions and safety standards in the field of thermochemical energy storage.



Dr Sumit Agarwal from PTB Braunschweig has been awarded the IGSTC Paired Early Career Fellowship in Applied Research (PECFAR) 2022 to conduct his research at NIT Rourkela from on Thermal Energy Storage for Building Applications.

Dr Agarwal's tenure at NIT Rourkela resulted in notable achievements, including the publication of two impactful journal articles. The first, titled "Energetic and exergetic performance analyses of mobile thermochemical energy storage system employing industrial waste heat," has been communicated to the Energy Journal. The second article, "Parametric investigation and optimization of pcm-based thermal energy storage integrated desiccant coated energy exchanger through PINNs," has been submitted to the Journal of Energy Storage. These contributions underscore the valuable insights gained during his research stay.

Beyond his research endeavours, Dr Agarwal actively engaged with the academic community at NIT Rourkela, delivering talks across various departments to raise awareness about IGSTC programs and collaborative research opportunities in Germany. These interactions not only facilitated knowledge exchange but also



opened avenues for potential future exchanges, benefiting the career development of PhD students at NIT Rourkela.

Dr Agarwal's networking activities extended beyond the host institution, encompassing visits to prominent institutions and organizations across India. A notable highlight was his representation of Germany at the G20 Research Innovation Initiative Gathering (RIIG) on Circular Bioeconomy in Dibrugarh, Assam, and Itanagar, Arunachal Pradesh. This recognition further underscores the significance of his research contributions on a global scale. Throughout his fellowship, Dr Agarwal visited esteemed institutions such as IIT Delhi, IIT Jammu, NPL India, CEPT University Ahmedabad, and the World Energy COE dba GREEN ENERGY in Bengaluru. These visits served as platforms to discuss collaborative research opportunities with Germany, fostering potential plans for future endeavours.

Paired Early Career Fellowship in Applied Research (PECFAR) 2023 - Awardees

Pair 1 | INDIA



Janani Radhakrishnan

DBT - National Institute of Animal Biotechnology (NIAB), Hyderabad

Pair 1 | GERMANY



Alexander Sieberath

University Hospital
Knappschaftskrankenhaus
Bochum

Pair 2 | INDIA



Harish Pothukuchi

IIT Jammu

Pair 2 | GERMANY



Khaled Yassin

Forschungszentrum
Juelich

Pair 3 | INDIA



Pravarthana Dhanapal

IIT Indore

Pair 3 | GERMANY



Markus Göbner

Chemnitz University
of Technology

Pair 4 | INDIA



Akshay Kumar Singh

IISc Bangalore

Pair 4 | GERMANY



Angela Wittmann

Johannes Gutenberg
University Mainz

Pair 5 | INDIA



Sarvesh Mishra

IIT Kanpur

Pair 5 | GERMANY



Roxane Lung

Karlsruhe Institute
of Technology

Pair 6 | INDIA



**Bramha Dutt
Vishwakarma**

IISc Bangalore

Pair 6 | GERMANY



Codrut-Andrei Diaconu

German Aerospace
Center (DLR), Bavaria

Pair 7 | INDIA



Navneet Kaur

Punjab Engineering
College, Chandigarh

Pair 7 | GERMANY



Hesam Amiri

RWTH Aachen University

Pair 8 | INDIA



Abhijeet Joshi

BITS Pilani,
Hyderabad campus

Pair 8 | GERMANY



Ines Klein

University Hospital
of Cologne

Pair 9 | INDIA



Rajveer Sharma

Inter University
Accelerator Centre, Delhi

Pair 9 | GERMANY



Ingrid Silva Chanca

Max Plank Institute for
Biogeochemistry, Jena

Pair 10 | INDIA



Sunil Prasad

CSIR- National
Aerospace Laboratories,
Bengaluru

Pair 10 | GERMANY



Bojan Lukic

German Aerospace
Center (DLR),
Braunschweig

Pair 11 | INDIA



Abhishek Bichhawat

IIT Gandhinagar

Pair 11 | GERMANY



Yixin Zou

Max Planck Institute
for Security and Privacy,
Bochum

Pair 12 | INDIA



Himanshu Singh

IISER Berhampur

Pair 12 | GERMANY



Benedikt Söldner

Technical University
of Dortmund

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Small Immediate Need Grants (SING)

SING - Awardees



Ms Kanchan Samadhiya from Indian Institute of Technology (IIT) Indore has been awarded the Small Immediate Need Grants (SING) to visit and work with Prof Regina Nogueira, at the Institute of Sanitary Engineering and Waste Management at Leibniz University Hannover, Germany. Ms Samadhiya aimed to investigate biohydrogen production in isolates of purple non-sulfur bacteria (PNSB) using dark fermentation under this award. During her research stay, she conducted screenings of isolated PNSB strains for their ability to produce biohydrogen through dark fermentation. Positive results were obtained with glucose supplementation and by formulating a



medium with a strong buffer strength to prevent pH decrease during fermentation. These experiments highlight the potential of PNSB for H_2 production. These initial investigations revealed the potential for bio- H_2 generation in countries like Germany, which lack year-round sunlight. The SING award facilitated Ms Kanchan to have collaboration with her host supervisor provided her with fresh perspectives on research issues and a more systematic and effective working method.



Dr. Rajesh Kumar from Indian Institute of Technology (IIT) Indore received the Small Immediate Need Grants (SING) grant to carry out his research for 12 months with host Prof Nadja Bigall at Leibniz University Hannover (LUH) in Germany. Throughout the project, Dr. Rajesh diligently adhered to the development of a prototype device at IIT Indore, utilizing nanomaterials synthesized at LUH. Dr. Rajesh, in collaboration with Prof Bigall, has successfully developed a prototype electrochromic electrode and device using novel materials synthesized in the host lab in Germany. The crossbar geometry design, featuring two transparent conducting electrodes with optimized relative compositions, shows potential for multiple colours with the application of appropriate bias. The flexibility of the materials allows

for the fabrication of flexible devices on plastic substrates. Comprehensive testing, including in-situ UV-Vis spectroscopy and Raman spectroscopic measurements, provides valuable insights into the device's colour-changing capabilities and cycle life. The collaboration yielded significant achievements, including a joint research paper publication in *Material Advances*. The fellowship accelerated the successful synergy between material synthesis and device fabrication, paving the way for advancements in electrochromic technology.

The background is a deep blue gradient. In the upper right, there is a complex network diagram with white and light blue nodes connected by thin lines, some of which are highlighted with bright white glows. To the left of this, there are faint, overlapping geometric shapes like triangles and polygons. The lower half of the image features a pattern of small, light blue dots arranged in a grid-like fashion, with some dots slightly larger or brighter than others. At the bottom, there are subtle, wavy lines that sweep across the width of the page.

IGSTC Networking



Dr P V Lalitha, Chief Scientific Officer, Indo-German Science & Technology Centre (IGSTC) delivered a talk titled "Indo-German Bilateral Cooperation: Role of IGSTC through its various programmes" at IIIT Kottayam on 11th September 2023.



A delegation from DAAD comprising of Dr Michael Harms, Deputy Secretary General, DAAD, Dr Katja Lasch, Director DAAD India and Ms Shikha Sinha visited the IGSTC Secretariat to discuss potential areas of Indo-German partnership in science and technology on 9th October 2023.



Mr R Madhan, Director, IGSTC delivered a talk at INTERGEO Expo and Conference 2023 in Berlin on various mechanisms to establish Indo-German collaborations and engage in joint scientific activities through different programs of IGSTC. H.E. Parvathaneni Harish, Ambassador of India to Germany, visited the IGSTC stall at the INTERGEO Expo and Conference 2023. The ambassador engaged in discussions to deepen areas of Indo-German scientific cooperation.



Mr R Madhan, Director, IGSTC along with Dr Manjula Mundakana, Consulate General of the Federal Republic of Germany, Chennai visited IIT Dharwad on 19th October 2023. Mr Madhan addressed the research community of IIT Dharwad on bilateral S&T opportunities at IGSTC.



Mr R Madhan, Director, IGSTC visited Coimbatore for installation of pilot scale ECOOP reactor as a part of 2+2 project ElectroH₂O and participated in the industry meet on 1st December 2023.



Visits of H.E. Philipp Ackermann, German Ambassador to India, and Mr Kaspar Meyer, German Science Counsellor along with Dr Sanjeev Varshney, Indian Co-Chair, IGSTC for a brief interaction with the IGSTC staff on 24th October 2023.



Mr Saquib Sheikh, Deputy Scientific officer, IGSTC participated in DWIH round table discussion on 10th October 2023.



Dr P V Lalitha, Chief Scientific Officer, IGSTC, participated at the IITs International Relations Conclave 2023 on 6th November 2023.



Dr P V Lalitha, Chief Scientific Officer, IGSTC, visited Dr Bhaskar Jyoti Deka's lab at IIT Roorkee on 6th November 2023.



Dr P V Lalitha, Chief Scientific Officer, and Dr Rupak Bhattacharya, Senior Scientific Officer, IGSTC visited project site of 2+2 project HERCET at IIT Madras on 3rd November 2023.



Dr P V Lalitha, Chief Scientific Officer, IGSTC delivered a talk at Gujarat University on 'Indo-German Bilateral Cooperation: Role of IGSTC through its various programmes on 5th October 2023.



Visit of IGSTC GB members to Rector, TU Dresden on 23rd November 2023.



Visit of IGSTC GB members at Factory Global Foundries, Dresden on 21st November 2023.



Visit of IGSTC GB members to Prof Micheal Gelinsky, TU Dresden on 24th November 2023.



IGSTC participated in the Global Bio India 2023 organised by BIRAC and Department of Biotechnology, Government of India from 4th to 6th December 2023. IGSTC booth attracted significant interest from various academicians, early career scientists, startups, industry, and women researchers for the Indo-German opportunities



Dr P V Lalitha visited Pune on 6th October 2023 for the inauguration of Sewage Treatment Plant made of Textile Reinforced Concrete from IGSTC 2+2 project CleanWater.



IGSTC Outreach Event



Panel Discussion at Chandigarh



Participants at IGSTC Outreach Event, Chandigarh



Discussion of potential areas of Indo-German partnership in science and technology at Nagpur

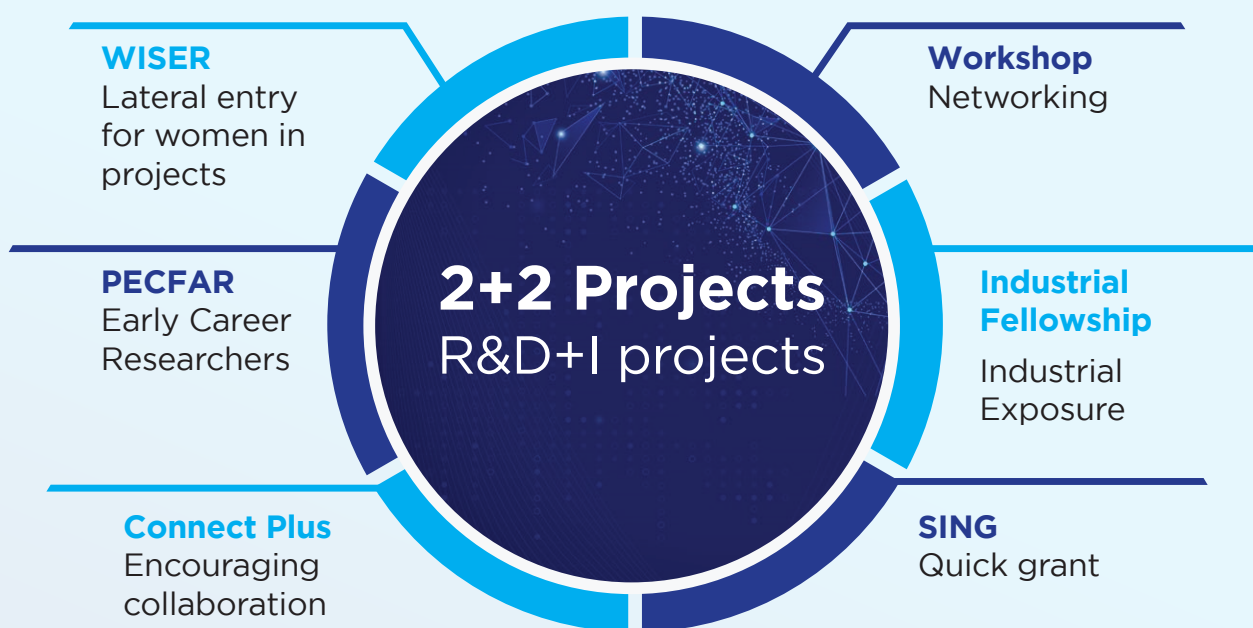


Participants at IGSTC Outreach Event, Nagpur

The Indo-German Science and Technology Centre (IGSTC) has been increasing its outreach and visibility by conducting events in various tier-2 cities of India. Recently, IGSTC organized two successful outreach events in Chandigarh and Nagpur on 16th September 2023 and 04th December 2023, respectively. The events were attended by more than 100 invitees from approximately 50 institutions, including academic and research institutions as well as industries in the vicinity of both cities. The one-day interactive events included detailed sessions on IGSTC activities, descriptive sessions for applications, presenting success stories, an address from visiting dignitaries, and

a panel discussion. The panel discussion, which featured panellists from academia, research, industry, focused on the relevance of international science and technology cooperation in today's context and connecting industry, academia, and research. It generated an excellent response from the audience and was a great experience for all involved. The events were well received and much appreciated by the participants. They were a great opportunity for the IGSTC to connect with stakeholders and highlight the centre's mission of fostering collaboration between India and Germany in the field of science and technology.

IGSTC Programmes



Indo-German Science & Technology Centre

IGSTC Secretariat – India

Indo-German Science & Technology Centre
Ground Floor, Block – II, Technology Bhavan,
New Mehrauli Road, New Delhi – 110016
Phone: +91-011-26543500

German Project Office

German Aerospace Center (DLR)
Project Management Agency
Heinrich-Konen-Str. 1, Bonn- 53227
Phone: +49-228 38211473



info.igstc@igstc.org



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