



IGSTC

INDO-GERMAN SCIENCE AND TECHNOLOGY CENTRE

NEWSLETTER

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50 YEARS

INDO-GERMAN SCIENCE & TECHNOLOGY COOPERATION

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 programmes, 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.

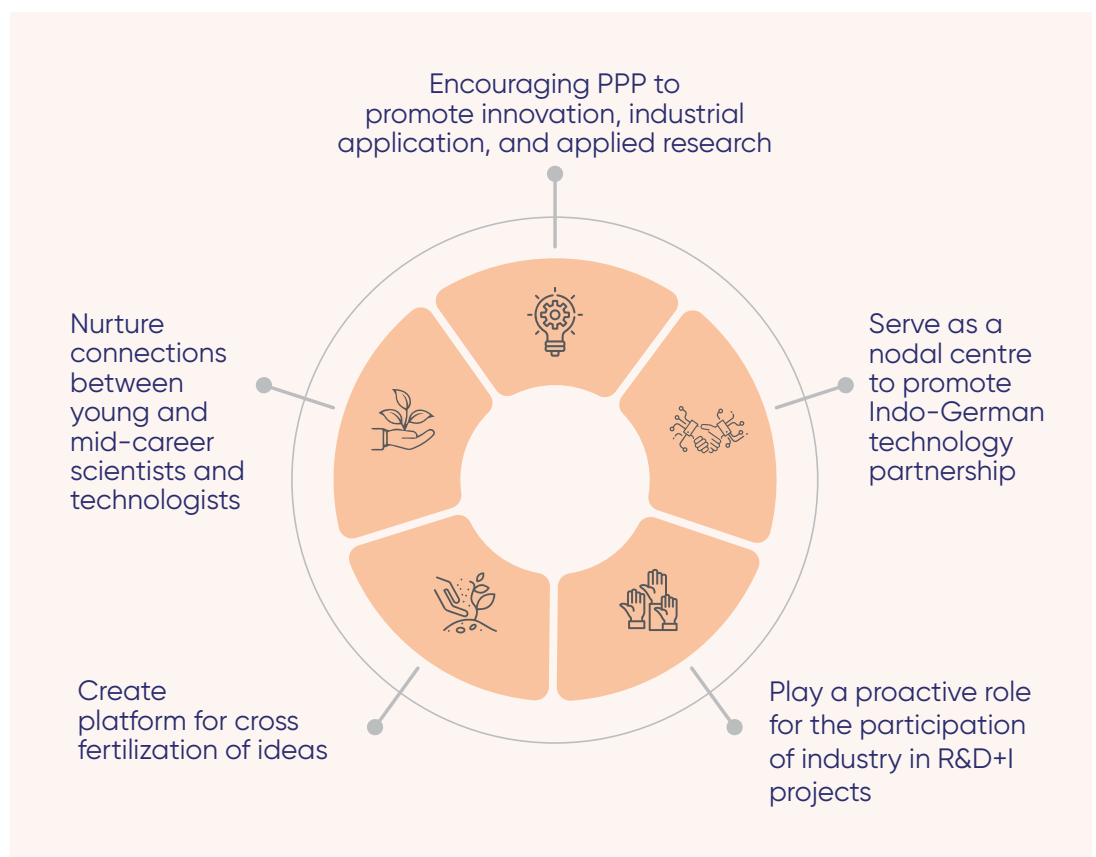


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The background features a light beige, textured surface. Overlaid on this are several large, thick, overlapping circles in various colors: black, green, orange, red, and yellow. The circles are arranged in a way that they appear to be interlocking or overlapping, creating a dynamic and colorful composition. The text is centered in the middle of the page.

**2+2
Projects**

IGSTC launched the 2+2 Call 2024 on the thematic area "AI for Sustainability" with following subtopics

- AI assisted understanding of extreme weather events
 - Climate models informing agriculture production systems and agricultural management practices
 - AI based extreme events detection and understanding
- 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)
- Infrastructure planning
 - AI across disciplines to model and plan sustainable and climate resilient cities
 - Rural/agricultural land use planning

Deadline for submitting First Stage Proposals for joint R&D&I projects of industrial relevance in 2+2 mode of partnership was 16 May 2024.

RAMFLICS

Consortium meeting and project Symposium at IIT Madras, Chennai



The symposium was inaugurated jointly by Mr R Madhan, Director, IGSTC and Prof Manu Santhanam, Dean of Industrial Consultancy and Sponsored Research, IIT Madras. All six project partners of RAMFLICS made presentations to disseminate the challenges and pathways towards

- (i) printing of 3D customisable integrated features based on computer-based models, data-driven analysis, experimentations and in-situ process monitoring, and
- (ii) evaluating structural integrity and dimensional consistency of the printed features with a focus towards EV industry, in general.

The symposium was concluded with a panel discussion, and a visit to the Joining and Additive Manufacturing Lab in IIT Madras where demonstration was made on the Wire Arc Additive Manufacturing facility created using the funding from the IGSTC.



Demands for light-weight high-performance components with reduced part counts and an ability for rapid design-to-manufacturing are ever increasing. Towards this theme, the project RAMFLICS is conceived to print structurally sound and dimensionally consistent three-dimensional features on extruded components for electric vehicles. In particular, motor casings of electric vehicles (EV) are considered as a target component. A substantive redesign of EV motor casings is undertaken to replace a number of individual parts and their assembly

by intelligent printing of customisable functional features on an extruded motor casing substrate. Wire arc additive manufacturing (WAAM) is chosen as the manufacturing route as it offers a high rate of deposition from a feedstock filler wire with a fair to superior process control.

During 9-11 January 2024, an in-person consortium meeting and a symposium were organized at Indian Institute of Technology (IIT) Madras. Technical discussions are held among the project partners for the first two days. The symposium was scheduled on the third day which involved key personnels from IGSTC, project partners and participants from various automotive OEMs, welding and additive manufacturing industries with key interest in EV sectors.



Bilateral Workshops

ESRD

Indo-German joint workshop at IIT Mandi



The Indo-German workshop titled “Engineering for Sustainable and Resilient Development” was a bilateral interdisciplinary event that brought together experts from both countries to discuss and collaborate on sustainable environment and energy solutions held on 18-20 January 2024 at IIT Mandi. The event was organized with the purpose of promoting sustainable development and addressing the challenges of climate change. The background of the workshop was about the growing concerns

towards the impacts of climate change and the need for countries to transition towards reducing energy consumption, carbon, and water footprints. Both India and Germany have shown commitments to the ambitious goals in this regard, with India aiming to achieve 40% of its installed power capacity from renewable sources by 2030, and Germany aiming to become climate neutral by 2050. The technical relevance of this workshop brings forth the facts and solutions for the broad challenges both the countries are facing in achieving aforementioned targets. By sharing the knowledge and resources, the workshop was aimed to promote sustainable development and address the challenges of climate change in a mutually beneficial way.

R-FARM

Indo-German joint workshop at University of Bonn, Germany



The Indo-German bilateral Workshop "R-FARM: Resilient Food Systems" held on 21-22 February 2024 in Bonn, Germany, coordinated by Dr Amit Kumar Srivastava, University of Bonn and Dr Adway Mitra, Indian Institute of Technology Kharagpur, addressed the urgent need for innovative agricultural practices in the face of climate change. The workshop focused on integrating Artificial Intelligence (AI), Machine Learning (ML), and remote sensing to enhance crop modelling, yield forecasting, and agricultural planning. Key outcomes included the establishment of

collaborative research initiatives between India and Germany, the development of practical tools for optimizing resource allocation and crop yield

predictions and fostering cultural exchange and networking among international researchers.



INSURE 2024

Indo-German joint workshop at IIT Gwalior



The INSURE 2024 workshop, held during 22-24 February 2024 at Gwalior, India, aimed to foster collaboration among stakeholders to develop a resilient and societally acceptable public smart city IT infrastructure. It focused on evaluating the current independent growth of various smart city infrastructures, addressing integration challenges, and exploring the potential of Information-Centric Networking (ICN) to support a multipoint distributed network. The workshop also examined how the proposed infrastructure could drive socio-economic

growth and improve quality of life, while addressing issues related to massive information processing, cyber security, and legal aspects. Through

collaborative discussions, INSURE 2024 aimed to translate innovative ideas into actionable deliverables for the advancement of smart urban infrastructures.



WTEA

Indo-German joint workshop at IISER Thiruvananthapuram



The Indo-German Workshop on Thermoelectric Devices for Emerging Applications (WTEA) was convened during 26-28 February 2024 at IISER Thiruvananthapuram. The workshop, led by Dr Vinayak B. Kamble, IISER TVM, and Dr Heiko Reith, Leibniz-Institute for Solid State and Material Research, addressed diverse topics in this thematic area. The workshop brought together material scientists, physicists, chemists, electronic engineers, modelling scientists (first principles as well as Multiphysics, finite element), researchers

from public and private industry, space and defence related organizations. Delegates delivered insightful talks on thermoelectric phenomena in engineered 2D hybrids, alongside discussions on modelling, simulation, recent material developments, and application challenges in thermoelectric devices. Through various interactive sessions,

participants engaged in fruitful exchanges of ideas, exploring potential industrial ventures, collaborative projects, research partnerships and information on industry outlook. The workshop paved a platform to catalyse future collaborations between India and Germany, promising to advance research and innovation in thermoelectric technology on a global scale.



CMChel

Indo-German joint workshop at Bombay



The bilateral workshop Carbon Management in Chemical Industry (CMChel), jointly organized by Dr Ojus Mohan, Department of Chemical Engineering, IIT Bombay and Dr Carlos Lizandara Pueyo Technology Scouting and Academic Network, BASF SE, Germany took place during 27-29 February 2024 at Mumbai, India to foster collaboration between Indian and German academia and industries, focusing on innovative strategies for carbon management within the chemical industry. Through this joint workshop, German

participant gained exposure to not only the Indian academic experts but also the dynamic Indian chemical industry, and its growing market potential in the renewable energy generation sector. Indian participants, on the other hand, benefited from the technological expertise, research advancements, and sustainability-driven practices of German academia and industry. At a glance, the

workshop has successfully offered a platform for dialogue, collaboration, and innovation, fostering the development of sustainable solutions to address the industry's carbon footprint, and empowered participants with knowledge, networking opportunities, and actionable insights to accelerate the transition towards a low-carbon and sustainable chemical industry.



FRL

Indo-German joint workshop at IIT Bombay



The Indo-German Workshop on Frontiers of Robot Learning (FRL), held during 4-6 March 2024, at Mumbai, was organized to foster collaboration between researchers from India and Germany in the field of robotics and machine learning. The workshop, coordinated by Prof Arpita Sinha from IIT Bombay and Prof Jan Peters from TU Darmstadt, highlighted recent advancements in Artificial Intelligence (AI) and their applications in robotics. The workshop served as a platform to address key challenges in robot learning, including sample

efficiency, generalization, transparency in decision-making, continuous learning, safety, human-robot interaction, sensory integration, autonomous learning, and ethical deployment. Keynote speeches by leading experts from both countries presented

cutting-edge research and the integration of robotics and machine learning. Young researchers had the opportunity to present their work and receive constructive feedback, refining their ideas with guidance from seasoned experts.



BioSusTres

Indo-German joint workshop at Uttar Banga Krishi Viswavidyalaya, Coochbehar



The BioSusTres workshop, held during 13-15 March 2024, in Coochbehar, West Bengal, India, brought together experts and stakeholders from India and Germany to explore the potential of bio-stimulants in enhancing crop sustainability and resilience in stressed environments. Coordinated by Prof Prateek Madhab Bhattacharya from Uttar Banga Krishi Viswavidyalaya and Dr Markus Weinmann from the University of Hohenheim, the workshop highlighted the urgent need to shift towards nature-based

agriculture and reduce reliance on pesticides and mineral fertilizers. Discussions covered policy challenges, historical perspectives, and technological advancements in bio-stimulant research, emphasizing the importance of collaboration, innovation, and rigorous

validation in advancing sustainable agricultural practices. The event underscored the significance of stakeholder collaboration and highlighted the role of Indian-German partnerships in driving research and development in this critical field.



FACEnergy

Indo-German joint workshop at PTB Braunschweig



The Future Energy Carriers: Advancing Bio-circular Economy for Clean Energy (FACEnergy) workshop, co-hosted by Physikalisch- Technische Bundesanstalt Braunschweig (PTB) and The Energy and Resources Institute (TERI), Delhi, took place during 19-20 March 2024, in Braunschweig, Germany. Coordinated by Prof. Dr Ravi Fernandes and Dr Sanjukta Subudhi, the event addressed the pressing need for a sustainable energy transition and the adoption of a circular economy. Bringing together 25 stakeholders from

Germany and India, the workshop facilitated knowledge exchange and collaborative problem-solving. Two sessions focussing on bio-based fuels and hydrogen/hydrogen-based fuels, providing a platform for in-depth discussions on the challenges and opportunities in these areas. Participants identified mutual interests and laid the groundwork for future collaborations, emphasizing the

development of joint pilot-scale proposals for pre-commercial demonstration (TRL 5-7), with plans to seek funding from Indo-German programs. Additionally, TERI India and PTB Braunschweig have initiated efforts to explore green technologies for the port and shipping sector, building on the workshop's momentum to advance clean energy solutions.





Industrial Fellowship

2023 - Awardees

Industrial Fellowship 2023 - Awardees



Mr Ajin Rajan

Is a PhD researcher from Indian Institute of Technology- Madras (IIT Madras), currently working on "Computational investigation of tuning the selectivity of C-O bond cleavage in biomass-derived polyols". Mr Ajin was awarded IGSTC- PhD Industrial Exposure Fellowship (IGSTC-PIEF) in 2023. Under this Award, he received the opportunity to conduct research at Badische Anilin- und Sodafabrik (BASF) SE in Ludwigshafen, Germany. His research was primarily focused on Density- functional theory (DFT) simulations to assess the energetics of the hydrodeoxygenation reaction. This method demanded extensive computational resources and time. Traditional simulation techniques in DFT, such as NEB and conformation structure search, were labour-intensive and prone to biases, besides being computationally expensive.



Ms Angel Joseph

Is a PhD researcher from Indian Institute of Technology Delhi (IIT Delhi). Her research focused on the development of sustainable photocatalysts to tackle emerging pollutants in water and wastewater. In 2023, she was awarded the IGSTC- PhD industrial exposure Fellowship (IGSTC-PIEF), facilitating her connection with Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB in Stuttgart, Germany, as her host industry. At Fraunhofer IGB, her work was focused on immobilizing nano-photocatalysts onto suitable substrates for degrading organic contaminants present in water. Under the supervision of Dr Marius Mohr and Dr Benjamin Wriedt, she has explored innovative techniques to enhance the efficiency of photocatalytic processes.



Mr Faridul Hassan

Is a PhD research scholar at the National Institute of Technology Silchar (NIT Silchar). His research primarily focuses on Renewable Energy integration and the operation of grid-connected power converters especially on developing robust grid synchronization techniques and the design and development of control strategies for Vehicle-to-Grid (V2G) and Grid-to-Vehicle (G2V) modes of operation in an industrial R & D environment. Mr Hassan was awarded IGSTC - PhD Industrial Exposure Fellowship (IGSTC-PIEF) in 2023. Through this fellowship, he worked as a visiting researcher at the Fraunhofer Institute for Solar Energy Systems ISE, Germany under the guidance of Mr Benjamin Stickan.



Mr Kumar Vaibhav Tejan

Is a PhD researcher from Indian Institute of Technology- Mandi (IIT Mandi). His research interests include the control of Permanent Magnet Synchronous Motor (PMSM) and Brushless DC Motor (BLDC) drives. Mr Tejan was awarded IGSTC- PhD Industrial Exposure Fellowship (IGSTC-PIEF) in 2023. Under this Award, he got the opportunity to conduct research at OLI System GmbH, at Stuttgart, Germany. During this tenure, he worked on the topic of "Paperless Smart Charging Solution for the Real-Estate Sector" on-site in the Stuttgart office and took over R&D activities in the field of smart charging and developed and analysed various options for incorporating the photovoltaic power into the process, i.e., to shift the charging events into times of abundant PV power and lower cost for the end users. The outcome of the work will be further tested in the prototype of OLI Move, a state-of-the-art solution designed to effectively manage and control electric vehicle (EV) charging stations, commonly referred to as wallboxes.



Mr Paladugu Sri Harsha

Is a PhD researcher from Indian Institute of Science (IISc), Bengaluru. His research interests include developing micro-sized devices for exploring disease biology. Mr. Harsha was awarded IGSTC- PhD Industrial Exposure Fellowship (IGSTC-PIEF) in 2023. Under this Award, he had the opportunity to conduct research with Fraunhofer IMM in Mainz, Germany under the guidance of Dr Michael Baßler, the head of the diagnostics group. During his fellowship, his research was aimed at reducing the cost of Organ on Chip (OoC) platforms while maintaining functionality and reliability. This involved choosing bio-compatible commercial plastics, ensuring compatibility with existing machining processes, and achieving greater control and consistency across laboratories. The collaborative efforts at Fraunhofer IMM were crucial in refining the process flow, ultimately leading to a fully operational OoC device. By the end of his fellowship, he had designed, fabricated, and validated a functional OoC, demonstrating its biocompatibility with cells and its ability to sustain cell cultures for extended periods—a significant breakthrough in the field.



Small Immediate Need Grants

(SING) - Awardees

SING - Awardees



Dr Chinmay Khare received SING award for enhancing collaboration and networking with Dr. Marina Breisch at BG University Hospital Bergmannsheil Bochum (Germany). At the department of Surgical Research, Dr. Breisch's group has expertise in conducting specialized in-vitro assays to evaluate biomaterials. Through this collaboration, the functional performance of OSSEOKRAFT™ coating is being investigated along with clarifying some key scientific questions about cell behavior



through fundamental research. Through SING project, Dr Khare visited Germany to identify and establish mutual synergies in the ecosystem. Having studied and worked in Germany for over 10 years, he is well familiar with the cultural and social aspects, which helped him to build collaborations. Going forward, his startup Wissenkraft Labs aims to continue strengthening the collaborations and building new networks with other relevant stakeholders in Germany.



Dr Shyam Kumar from National Institute of Technology Calicut (NIT Calicut) received the SING award to carry out his research with Prof. Christian Kuebel, Institute of Nanotechnology (INT), Karlsruhe Institute of technology (KIT), Karlsruhe, Germany on in-house development of cost effective micro tensile tester to be integrated to the Hitachi SU6600 SEM at the Department of Materials Science and Engineering. The SING funding resulted in development of two prototypes

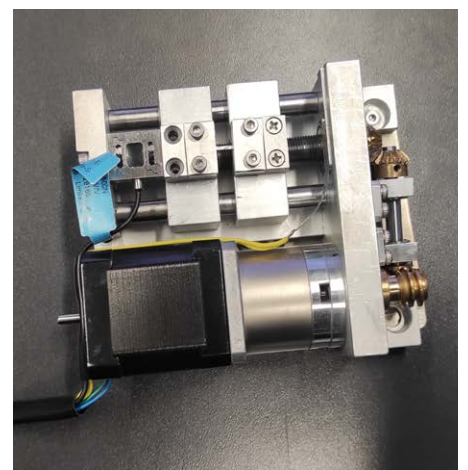
- A fully 3D printed micro tensile tester

to be used for low load application that can be integrated into SEM, optical microscope and other complementary techniques.

- A micro tensile tester with 500 N load that can be integrated into SEM, optical microscope and other complementary techniques.

The visit to KIT as a part of the award helped in testing and confirming the compatibility of the prototype to be used in SEM. The successful testing of the current prototype, initiated a new project to manufacture a micro tensile tester for testing Focused Ion Beam prepared lamellas in SEM. The visit also initiated collaborative work outside the scope of the SING proposal in developing pyrolyzed carbon for post

lithium ion batteries as well as other technological applications. The expertise of the group in characterising pyrolyzed carbon helped in detailed TEM analysis of coconut derived carbon. A joint publication is being prepared from the collaborative work. As an outcome, the team is also preparing to file a patent on the prototype.





**IGSTC
Networking
& Events**



Farewell to Mr S K Varshney, Indian Co-Chair, IGSTC on 17th January 2024



Dr Rupak Bhattacharya, Mr Saquib Shaikh, Mr Pankaj Kothari and Mr Umesh Sah visited Berlin, Germany during 29th January to 2nd February 2024 to have project site visits along with discussion with Indian Embassy Berlin



Visit of Dr Fabian and M. Benjamin from RWTH Aachen to IGSTC office on 15th February 2024.



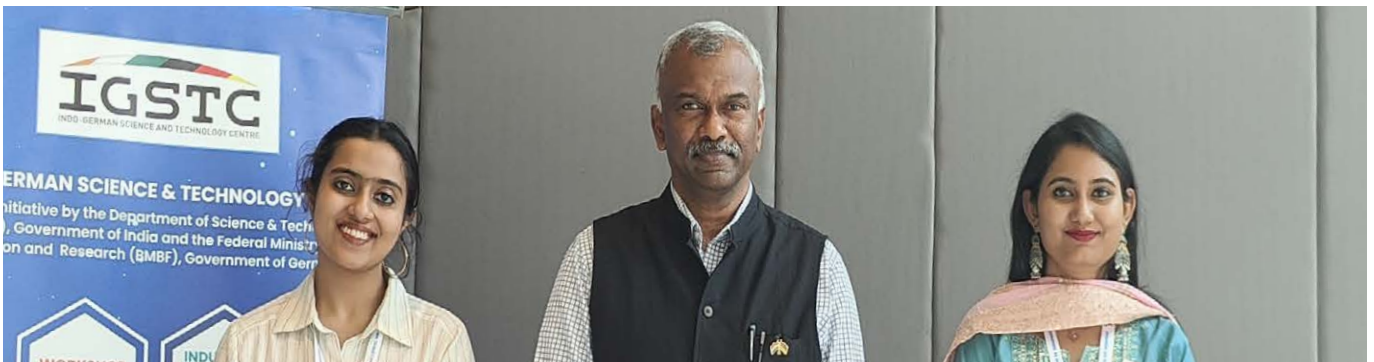
Mr R Madhan, Director, IGSTC met with the Mr Mubarak Bawa Syed, Consul General of India at Frankfurt on 12th March 2024 to discuss the Indo-German S&T bilateral cooperation. He presented a brief of various funding opportunities IGSTC provides for collaborating between India and Germany.



Mr R Madhan, Director, IGSTC met with Ms Soumya Gupta, Consul General of India, Hamburg on 18th March 2024.



Meeting of Mr R. Madhan, Director, IGSTC with Dr Birgit Barden-Läuffer, Director of International Affairs at Leibniz University Hannover on 20th March 2024.



IGSTC participated in a conference organised by DAAD India on 14th March 2024.



Mr. Madhan R, Director, IGSTC visited Bosch Global Software Technologies, Siemens Healthineers, Festo India, Mercedes-Benz India, Merck Group and Fraunhofer Office India officials to discuss on potential industry-academia collaborations through IGSTC on 10th April 2024.



A delegation from the BMW Group met with Mr R Madhan, Director, IGSTC on 18th April 2024 to explore on various opportunities for Indo-German collaboration. Ms. Nicole Kast, Mr. Philipp Janello, Mr. Abhay Dange and Mr. Satchit Gayakwad were part of BMW delegation.



**IGSTC
Outreach
Event**

IGSTC Outreach Event



Participants at IGSTC Outreach Event, Bhopal

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 Dharwad and Bhopal on 25 January 2024 and 4 April 2024, 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, and address from visiting dignitaries. 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.



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

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



info.igstc@igstc.org



[@INDOGSTC](https://twitter.com/INDOGSTC)



www.igstc.org



German Project Office

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



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