



NEWSLETTER

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INSPIRE

Indo-German Network for
Science, Partnership, Innovation,
Research & Excellence

(Spring Edition)

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 Research, Technology and Space (BMFTR), 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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Foreword



Mr. Wolf Muth

Country Director
KfW office New Delhi

*Advancing
Indo-German
science, technology,
and innovation
through strategic
partnerships and
collaborative
research excellence.*

The INSPIRE edition of the IGSTC Newsletter brings you the news of IGSTC achievements during the early part of 2026.

Before we move on let me briefly introduce myself. My name is Wolf Muth, Country Director of the KfW Office New Delhi, KfW Development Bank. As a new member of the Governing Board of the IGSTC I have the Honor of the First Word. I have held various specialist and management positions at KfW Group for more than 30 years. Acting on behalf of the German government, KfW Development Bank is executing the Financial Cooperation within the Indo-German Development Partnership. KfW Development Bank's current portfolio in India amounts to around EUR 8 billion, with a strong focus on Renewable Energy, Classical Urban Development, and Urban Mobility sectors, alongside selected initiatives in Natural Resources and Biodiversity.

Marking a high point in the journey of bilateral ties, H.E. Mr. Friedrich Merz, Federal Chancellor of the Federal Republic of Germany, paid an official visit to India from 12-13 January 2026 and was warmly hosted by Hon'ble Prime Minister Shri Narendra Modi. In a joint statement, the Leaders

appreciated the progress made over the years in cooperation in critical and emerging technologies, including semiconductors, critical minerals, digitalisation, telecommunications, health and the bioeconomy, between India and Germany. The flagship role of IGSTC in promoting bilateral industry-academia strategic research in areas of advanced manufacturing, medical technologies, sustainable production, bioeconomy, waste to wealth initiatives, and artificial intelligence for sustainability received a special mention, along with appreciation of its (2+2) industry-academia projects and Women Involvement in Science and Engineering Research (WISER). In this backdrop, the tenure of IGSTC was extended with a self-renewing process.

This happy news was well received during the FC and GB meetings (online) held during January 2026, where the new Director presented progress made by streamlining the various funding programs of IGSTC along with plans for the future. In February IGSTC organized convened two high-impact strategic conclaves on Mobile Health & Telemedicine and Integrated Water Resource Management (IWRM), the subtopics of 2+2

Call 2026, addressing critical pillars of a resilient, future-ready society. The mHealth & Telemedicine conclave captured the pulse of a rapidly evolving healthcare paradigm, while the Integrated Water Resource Management (IWRM) conclave shifted the spotlight to an equally urgent frontier i.e. water security and sustainability. The congregation of scientific and industrial partners along with policymakers and other stakeholders during these events brought to the fore the potential of IGSTC as a powerful nerve centre of Indo-German joint knowledge pool.

Continuing this journey, IGSTC also launched the Research and Innovation Dialogue Series in March 2026, a platform for online colloquia and discussion on topical themes. Six colloquia have been held already, on topics like Infection Biology, AI for catalysis, Sustainable Water Management and many others by leading experts are planned for the rest of the year. Other S&T engagements include Roundtable on Future of Higher Education, Research, and Tech-Transfer: Opportunities and Challenges, co-organized with Heidelberg University, delegation visit of RWTH Aachen, IGSTC booth in Transforming Healthcare

through IT in Hyderabad. In April, the engagements moved to Germany where IGSTC delegation participated in Hannover Messe and DMEA-Europe's leading event for digital health. The delegation also visited Gefertec GmbH, BASF, BAM and HZB in Berlin, to connect with potential S&T partners in Germany and learn of their interests and queries regarding research collaborations with Indian partners. The outreach activities further reaffirm IGSTC's evolving role as a dynamic interface between science, technology, innovation, and diplomacy. Whether through bilateral dialogues, international networking platforms, research colloquia, or stakeholder matchmaking initiatives, IGSTC continues to foster an enabling ecosystem that catalyses collaborative research, knowledge exchange, and long-term institutional partnerships between India and Germany.

Beyond institutional engagements and policy dialogues, this report reflects the expanding scientific depth and evolving thematic diversity of Indo-German collaborations fostered through IGSTC. The featured research stories under WISER and PECFAR demonstrate how bilateral partnerships are advancing

frontier areas ranging from quantum photonics, advanced energy storage, hydrogen technologies, smart manufacturing, and sustainable materials to AI-enabled geohazard monitoring, biomaterials, and next-generation computational sciences. These initiatives underline IGSTC's growing role not only as a facilitator of scientific exchange, but as an enabler of translational, interdisciplinary, and globally relevant innovation ecosystems.

During this period, IGSTC's flagship programmes witnessed an encouraging response from the research and innovation community, with over 50 proposals submitted under the 2+2 Call 2026, 141 paired applications received for WISER, 35 applications for PECFAR, and 77 for Industrial Fellowships. The successful applicants will further contribute to the growth of the Indo-German innovation ecosystem over the coming years.

It is my pleasure to serve on the Governing Body of this specialized yet important organization, which can be a vehicle for lasting change in strengthening S&T ties between the two countries, thereby also fostering deeper economic relations and increased investments.



EVENTS AND INITIATIVES





IGSTC launched call for 2+2, IF, PECFAR & WISER 2026

IGSTC commenced the year on a strong note with the launch of several programmes, further reinforcing its position as a key catalyst for Indo-German innovation and technology partnerships. At the forefront was the flagship initiative 2+2 Call 2026, IGSTC's bilateral funding programme that uniquely integrates academia and industry from both India and Germany under the "2+2 Mode of Partnership to jointly develop innovative, market-oriented technologies with strong commercialization potential. Centered around the theme "Economic and Sustainable Solutions," the call focuses on emerging priority areas such as Mobile Health & Telemedicine and Integrated Water Resource Management, encouraging translational research, industrial innovation, and sustainable technology development. By supporting collaborative R&D projects with significant funding support and industry participation, IGSTC continues to strengthen the innovation bridge between the two nations while accelerating technology readiness and global competitiveness.

Complementing the flagship call, IGSTC also unveiled its

prestigious fellowship and mobility programmes aimed at nurturing the next generation of scientific leaders and innovators. The Women Involvement in Science & Engineering Research (WISER) programme continues to empower young women scientists through international research exposure and advanced scientific training in Germany. The Paired Early Career Fellowship in Applied Research (PECFAR) seeks to foster long-term collaborative applied research between promising early-career researchers from both countries, while the Industrial Fellowship (IF) programme offers a unique platform for industry-oriented

learning, skill enhancement, and technology-driven engagement. Together, these initiatives reflect IGSTC's sustained commitment to fostering innovation-led partnerships, strengthening bilateral research ecosystems, and building globally connected scientific communities for future-ready solutions.



INDO-GERMAN SCIENCE & TECHNOLOGY CENTRE

A joint initiative by the Department of Science & Technology (DST), Government of India and the Federal Ministry of Research, Technology and Space (BMFT), Government of Germany to catalyse Indo-German strategic R&D partnerships.

2+2 PROJECTS CALL 2026

Thematic based bilateral R&D project of industrial relevance with at least one research/academic institution plus one industry from both India & Germany.

Thematic Area: Economic and Sustainable Solutions

Sub-Topics

- Mobile Health & Telemedicine
- Integrated Water Resource Management

Financial Support

₹ 350 Lakh
(broken institute & industry together)
€ 500000
(German institute & industry together)

Application submission opens February 2026



BILATERAL WORKSHOPS

Platform for substantive interaction between scientists/researchers from academia and industry from India & Germany to explore new avenues for Indo-German scientific collaborations.

Financial Support
₹ 25 Lakh / € 30000
Approximately

Applications Close
31st January 2026
31st July 2026



WOMEN INVOLVEMENT IN SCIENCE AND ENGINEERING RESEARCH (WISER)

WISER program is intended for women researchers in India and Germany to foster innovation in the field of STEM.

- Duration: 3 years
- In paired mode
- One month/year stay at the host country

Financial Support
₹ 39 Lakh
(Indian awardee)
€ 48000
(German awardee)

Application Submission
1st February to
31st March 2026



PAIRED EARLY CAREER FELLOWSHIP IN APPLIED RESEARCH (PECFAR)

Two-way exchange of early career researchers in pairs to explore Indo-German research landscape.

Support for research stay in India/Germany to build future partnerships.

Financial Support
€ 2300
per month/fellow
(up to 2 months)
plus travel support

Application Submission
1st February to
31st March 2026



IGSTC INDUSTRIAL FELLOWSHIPS

Exposure for PhD students/Post Doc researchers from India at a German industrial/applied research setup to promote applied research and technology development.

Financial Support
PhD Industrial Exposure Fellowship (PIEF)
€ 1500/month
(up to 6 months)
Plus travel, insurance & visa fees

Post Doctoral Industrial Fellowship (PDIF)
€ 2500/month
(up to 12 months)
Plus travel, insurance & visa fees

Application Submission
1st February to
31st March 2026

✉ info@igstc.org

✉ @INDOGSTC

IGSTCIndoGerman

company/igstc

www.igstc.org

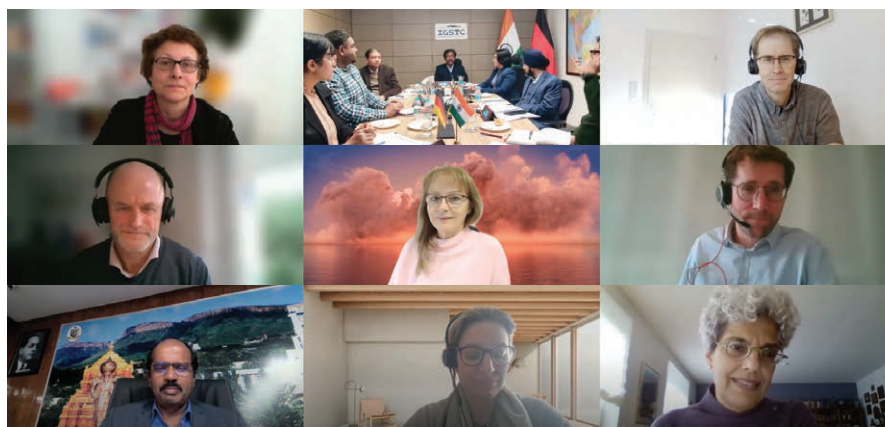
20th Governing Body Meeting

The 20th IGSTC Governing Body (GB) meeting was held virtually on 19th January 2026. The GB comprises of Dr. Praveen Kumar S (DST & Indian Co-Chair), Ms Kathrin Meyer (BMFTR & German Co-Chair), Mrs Yatinder Prasad (Addl. Secretary & Financial Advisor, DST), Dr. Tata Narasinga Rao (Adjunct Professor, IIT Hyderabad), Ms Viktoria Apitzsch (Counsellor & Head of Science & Technology, German Embassy, New Delhi), Dr. Martin Goller (Desk Officer, Division for health Research, BMFTR), Prof. K. K. Pant (Director, IIT Roorkee), Dr Michaela Wilhelm (Senior Scientist, Univ. of Bremen), Mr. Wolf Muth (Country Director, KfW Development Bank) and Mr Ankit Mehta (Co-founder & Chief Executive Officer, ideaForge). Dr Reneta Ch. Feldmann (Indian Desk Officer, BMFTR), and Dr Arindam Bhattacharyya (Scientist F, International Cooperation

Division, DST), were present as Member Secretaries. Dr Kusumita Arora (Director), Mr Hans Westphal (DLR-PT), Mr Inderjit Singh (Chief Administrative Officer), Dr Rupak Bhattacharya (Senior Scientific Officer), Ms Doerte Merk (DLR-PT), Mr Saquib Shaikh (Scientific Officer), Dr Ludwig Kammesheidt (DLR-PT), Mr Pankaj Kothari (Account Officer), Ms Alexandra Stinner (DLR-PT) and Ms Isha Goel (Deputy Scientific Officer, IGSTC)

represented IGSTC in the meeting. The GB focused holistically on IGSTC's activities, status and updates on different programmes including 2 + 2 projects, Workshops, WISER and various other networking fellowships.

IGSTC's activities, status and updates on different programmes including 2 + 2 projects, Workshops, WISER and various other networking fellowships



13th Finance Committee Meeting

The GB was preceded by the IGSTC's Finance Committee Meeting was held in January 2026 under the Chairpersonship of Ms. Yatinder Prasad, Additional Secretary & Financial Advisor, DST, and Dr. Renata Feldmann, BMFTR, to deliberate key financial matters of the Centre. The meeting was convened by Dr. Kusumita Arora, Director, IGSTC, and participated by Mr. Hans Westphal (DLR-PT), Mr. Inderjit Singh, Chief Administrative Officer, IGSTC, Ms. Alexandra Stinner, Manager Finance (DLR-PT), and Mr. Pankaj Kothari, Account Officer, IGSTC. The Committee reviewed financial

progress and reaffirmed its commitment to efficient, transparent, and financial management in support of IGSTC activities.

*Reaffirmed
commitment towards
efficient, transparent,
and accountable
financial management*





IGSTC Participated in THIT 2026

A delegation from IGSTC participated in the Transforming Healthcare with IT (THIT) Conference & Expo 2026 organised by Apollo Hospitals in Hyderabad on 30-31 January 2026. The event brought together leading experts, healthcare professionals, researchers, startups, technology providers, policymakers, and industry representatives to deliberate on emerging trends and innovations in healthcare technologies, digital health, artificial intelligence, medical devices, telemedicine, and patient-centric healthcare solutions. The conference served as an important platform for discussions on the future of healthcare delivery, technology integration, and collaborative innovation aimed at addressing evolving healthcare challenges. It also enabled interactions among

stakeholders towards advancing healthcare solutions and improving accessibility and efficiency in healthcare systems.

IGSTC set up an exhibition booth at the venue to showcase its Indo-German collaborative research and innovation programmes, particularly in the areas of healthcare technologies and translational research. The booth attracted considerable interest from researchers, clinicians, startups, innovators, and industry representatives interested in exploring opportunities for bilateral cooperation and joint technology development. During the event, the IGSTC team interacted with participants from diverse sectors and shared information on its ongoing programmes, funding mechanisms, and

partnership opportunities aimed at strengthening science, technology, and innovation collaboration between India and Germany.

IGSTC showcased Indo-German healthcare research and innovation programmes, attracting researchers, startups, and industry representatives.



IGSTC Research & Innovation Dialogue Series

IGSTC initiated the Research & Innovation Dialogue Series, a virtual platform for bringing together experts and researchers from India and Germany to deliberate on emerging scientific and innovation challenges. The series was inaugurated by Prof. Regina Nogueira from the Institute of Sanitary Engineering and Waste Management (ISAH), Leibniz University Hannover, who delivered an insightful talk on "Emerging Contaminants in Alternative Water Sources: Implications for Sustainable Water Management."

The lecture highlighted critical concerns surrounding contaminants in alternative water resources and their implications for sustainable water management practices. The session provided valuable scientific perspectives on environmental sustainability, water quality management, and emerging research approaches to address future global water challenges. The initiative highlighted the growing importance of international scientific cooperation in addressing global environmental and sustainability key challenges.

IGSTC-iPEARL Mini Series on Life Sciences

IGSTC-iPEARL Global Science Colloquium initiative, under a Letter of Intent between IGSTC and iPEARL partners, is a special year long drive to create a structured platform for regular engagement among eminent scientists, industry experts, early-career researchers, and students in the field of Life Sciences. The thematic focus spans multi-omics, parasitology, infectious diseases, vaccines, therapeutics, optobiology, biosensors, and synthetic biology, encompassing both fundamental research and translational outcomes. Across India, Germany, and beyond.

The inaugural lecture under this initiative featured Prof. Adriano Aguzzi from University of Zurich,

Research & Innovation Dialogue, sustainable water management, emerging contaminants, water quality, environmental sustainability, global water challenges, scientific cooperation.

IGSTC
INDO-GERMAN SCIENCE AND TECHNOLOGY CENTRE

RESEARCH & INNOVATION DIALOGUE SERIES

Emerging Contaminants in Alternative Water Sources:
Implications for Sustainable Water Management

VIRTUAL EVENT

DATE
30th April 2026

TIME
2:30 PM – 3:30 PM IST
11:00 AM – 12:00 PM CET

SPEAKER
Prof. Dr.-Ing. Regina Nogueira
Institute of Sanitary Engineering and Waste Management
Leibniz Universität Hannover

ABOUT THE TALK

- ALTERNATIVE WATER SOURCES
- EMERGING CONTAMINANTS
- SUSTAINABLE WATER MANAGEMENT

With increasing pressure on freshwater resources, alternative water sources are becoming essential. However, the presence of **emerging contaminants** – such as pharmaceuticals, microplastics, and industrial chemicals – poses new challenges for sustainable water management. This session will explore their sources, impacts, and innovative approaches for monitoring and mitigation.

Register Here
<https://forms.cloud.microsoft/r/yFd1n0MbBt>

Register Here
<https://forms.cloud.microsoft/r/yFd1n0MbBt>

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who discussed cutting-edge advances in prion biology, neurodegeneration, and CRISPR-based genomic tools for understanding disease mechanisms. The second session was delivered by Prof. Sarah Teichmann from University of Cambridge, who highlighted transformative developments in human genomics and systems biology, particularly the Human Cell Atlas and single-cell technologies reshaping insights into immunity and disease. The third session was delivered by Prof. Takeharu Nagai from Osaka University, Japan, who

highlighted transformative advances in automated trans-scale imaging technologies, particularly the "AMATERAS – Illuminate Everything" platform, and its potential to revolutionise infection biology and life sciences research through high-resolution, large-scale biological visualization. All the lectures emphasised translational research linking fundamental science with biomedical applications. The sessions attracted strong global participation and interactive discussions, reinforcing the colloquium's

role as a dynamic platform for knowledge exchange, scientific collaboration, and advancing innovation in infection biology and related life sciences disciplines across international research communities.

The IGSTC-iPEARL Global Science Colloquium advances global collaboration in life sciences through cutting-edge research, innovation, and translational science.

IGSTC-iPEARL Present
Global Science Colloquium

FRONTIERS IN INFECTION BIOLOGY

Inaugural Session:
The Molecular Biology of the Prion Life Cycle

20 February 2026
(2:00 pm – 3:30 pm IST)
(10:30 am – 12:00 pm CEST)
(4:30 pm – 6:00 pm CST)

Prof. Dr. med. Adriano Aguzzi
Institute for the Science of the Aging Brain
& Universität Zürich, Switzerland

Registration: Scan the QR Code

IGSTC

IGSTC-iPEARL
Global Science Colloquium

FRONTIERS IN INFECTION BIOLOGY

Exclusive Session on:
MAPPING THE HUMAN BODY, ONE CELL AT A TIME

17 March 2026
(3:00 pm – 4:30 pm IST)
(10:30 am – 12:00 pm CET)
(9:30 pm – 11:00 am GMT)

Prof. Dr. Sarah Teichmann
University of Cambridge, UK

Register here
<https://forms.cloud.microsoft/r/9qbfJFKEa>

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IGSTC-iPEARL
Global Science Colloquium

FRONTIERS IN INFECTION BIOLOGY

Exclusive Session on:
**"AMATERAS – Illuminate Everything":
AUTOMATED TRANS-SCALE SCOPE IN
LIFE SCIENCES RESEARCH**

15 April 2026
(2:00 pm – 3:30 pm IST)
(05:30 pm – 07:00 pm JST)
(10:30 am – 12:00 am CET)

Prof. Takeharu Nagai
Osaka University, Japan

Register Here
<https://forms.cloud.microsoft/r/9qbfJFKEa>

IGSTC

IGSTC celebrated International Day of Women and Girls in Science

On the occasion of the International Day of Women and Girls in Science on 11 February 2026, IGSTC reaffirmed its commitment to advancing gender inclusion and equity in STEM by celebrating the achievements of women shaping science, engineering, and innovation across India and Germany. The day highlighted the critical role of women researchers and scientists in driving breakthrough ideas and strengthening bilateral scientific collaboration. IGSTC emphasized that empowering women in science is central to building inclusive, impactful, and future-ready innovation ecosystems.

Through its dedicated WISER (Women Involvement in Science & Engineering Research) programme, IGSTC continues to enable women researchers to engage in Indo-German collaborative research, gain international exposure, and contribute to cutting-edge projects. Over the years, WISER has supported several women scientists in forging strong cross-border research partnerships. With the WISER

Call 2026 now open, IGSTC further invites women researchers to seize new opportunities for global collaboration and scientific leadership, reinforcing its vision of inclusive excellence in global research and innovation.

IGSTC emphasized that empowering women in science is central to building inclusive, impactful, and future-ready innovation ecosystems.



IGSTC
INDO-GERMAN SCIENCE AND TECHNOLOGY CENTRE

CELEBRATES 11 | FEB | 2026

INTERNATIONAL DAY

OF WOMEN
AND GIRLS —

IN SCIENCE

WITH

WISER
**WOMEN INVOLVEMENT IN
SCIENCE & ENGINEERING
RESEARCH**

Empowering women in STEM through collaborative
research and innovation in India/Germany

WISER CALL 2026 OPEN TILL 31st MARCH 2026



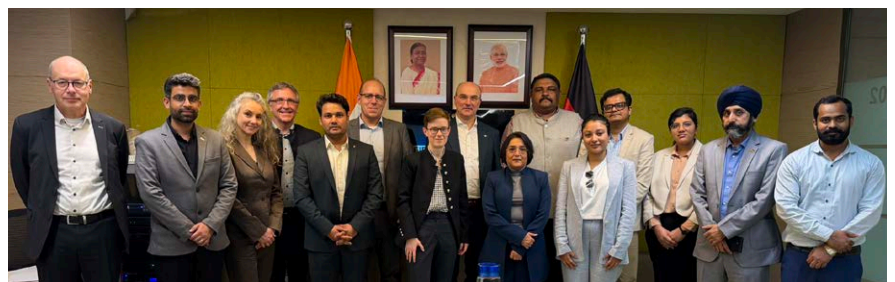
IGSTC hosted the visit of delegation from RWTH Aachen

IGSTC hosted a high-level delegation from RWTH Aachen University, reinforcing strong Indo-German innovation bridges. The delegation was led by Prof. Ulrich Rüdiger, Rector, and included Prof. Thomas Gries, Director, Centre for Sustainable Textiles, Prof. Sven Ingebrandt, Director, Institute of Materials in Electrical Engineering, Dr. Vivek Pachauri, Group Leader, Institute of Materials in Electrical Engineering, Prof. Holger Schüttrumpf, Head, Institute of Hydraulic Engineering and Water Resources Management, Dr. Antara Dasgupta, Junior Professor, Institute of Hydraulic Engineering and Water Resources Management, Mr. Himanshu Chawla, Head, RWTH Aachen University India Office, Ms. Karola Schmidt, Coordinator, Strategic India Activities, International Office, and Ms. Sara Wigger, Head of

Division, International Strategy, International Office. The visit underscored RWTH Aachen's commitment to deepening further collaboration with Indian partners in strategic areas of research and innovation. Discussions focused on strengthening bilateral research partnerships, enhancing industry linkages, and exploring new joint initiatives in sustainable engineering, advanced materials, water resources systems, and emerging technologies. Both sides highlighted the importance of translating academic excellence into impactful

solutions for societal challenges. The engagement reiterated the shared vision of IGSTC and RWTH Aachen in advancing a robust Indo-German innovation ecosystem, fostering long-term scientific cooperation, and building pathways from knowledge generation to real-world impact through sustained collaborative efforts across academia and industry.

Indo-German Science & Technology Centre hosted a delegation from RWTH Aachen University to strengthen Indo-German research and innovation collaboration.





IGSTC co-organized the dialogue on “Future of Higher Education, Research, and Tech-Transfer: Opportunities and Challenges”

IGSTC in partnership with Heidelberg University, successfully organised a high-level dialogue on “Future of Higher Education, Research, and Tech-Transfer: Opportunities and Challenges” on 8 April 2026 at Vigyan Bhavan. The event brought together eminent policymakers, academic leaders, and research and innovation stakeholders from India and Germany to deliberate on emerging opportunities and challenges in higher education, translational research, and technology transfer. The distinguished panel included Dr. Parvinder Maini, Scientific Secretary, Office of the Principal Scientific Adviser to the Government of India, Dr. Shivkumar Kalyanaraman, CEO, Anusandhan National Research Foundation (ANRF), Prof. Dr. Frauke Melchior, Rector, Heidelberg University, Germany, Dr. Simon Preker, First Secretary, German

Embassy, New Delhi, Prof. B.S. Murty, Director IIT Hyderabad, Prof. Dhananjay Singh, Secretary, Indian Council of Social Science Research (ICSSR), and Dr. Kusumita Arora, Director, IGSTC shared valuable insights on strengthening global scientific partnerships and innovation ecosystems.

The discussions underscored the growing need for stronger academia-industry collaboration, enhanced support for technology demonstration, and streamlined frameworks for funding, intellectual property, and regulatory alignment to accelerate the translation of research into societal and industrial impact. The dialogue also highlighted the evolving role of universities as integrated innovation

hubs, the increasing influence of AI in education and research, and the immense potential for expanding Indo-German talent mobility and scientific exchange. The event reaffirmed the shared commitment of India and Germany towards fostering research excellence, enabling technology transfer, and building future-ready higher education systems through sustained bilateral cooperation.

The dialogue also highlighted the evolving role of universities as integrated innovation hubs, the increasing influence of AI in education and research





IGSTC hosted the delegation from University of Heidelberg

IGSTC had the honour of hosting a distinguished delegation from Heidelberg University, led by Prof. Frauke Melchior, Rector of Heidelberg University. The delegation brought together senior academic leaders and international relations experts, including Prof. Peter Comba, Professor of Inorganic Chemistry, Heidelberg University, Dr. Suboor Bakht, Head, Heidelberg Centre South Asia, Dr. Mark Fischer, Deputy Head of International Relations, Heidelberg University and Ms. Jana Ehret, Office of the Rectorate, Heidelberg University reflecting the university's strong commitment to global academic and research engagement.

The visit provided a valuable platform for meaningful dialogue on strengthening

Indo-German cooperation in science, technology, and innovation. Discussions focused on deepening institutional partnerships, expanding academic mobility, and fostering collaborative research initiatives of mutual strategic interest. A notable highlight of the visit was the release of IGSTC's newsletter THRIVE by Prof. Melchior, marking a shared commitment

to advancing and showcasing success stories of impactful bilateral scientific collaboration.

Heidelberg University and Indo-German Science & Technology Centre advanced Indo-German partnerships in research, innovation, and academic collaboration.





IGSTC delegation participated in Hannover Messe, DMEA-Europe's leading event for digital health and RWTH Tech Impact Festival

An IGSTC delegation comprising Dr. Kusumita Arora, Director, IGSTC, and Dr. Rupak Bhattacharya, Senior Scientific Officer, IGSTC, Mr Hans Westphal, DLR-PT and Dr Doerte Merk, DLR-PT participated in Hannover Messe 2026 and DMEA-Europe's leading event for digital health 2026 in Germany to engage relevant stakeholders and explore emerging opportunities for future Indo-German collaboration in advanced technologies and innovation-led research.

At Hannover Messe 2026, the delegation engaged with industries, innovation agencies, and technology providers working in areas such as smart manufacturing, industrial AI, automation, robotics, and sustainable production systems. Particular emphasis was placed on one-to-one interactions with companies involved in AI-driven

industrial applications, aligned with IGSTC's upcoming 2+2 Call 2027. The discussions focused on strengthening bilateral translational research partnerships and promoting the upcoming IGSTC matchmaking activities in Berlin.

During DMEA 2026 in Berlin, the delegation explored recent developments in digital healthcare, including AI-enabled diagnostics, telemedicine, point-of-care devices, and interoperable healthcare systems. Interactions with healthcare technology companies, startups, and SMEs provided valuable insights into Germany's rapidly evolving digital health ecosystem and opened new avenues for future Indo-German engagements in healthcare innovation and medical technologies.

The IGSTC delegation participated in the RWTH Tech

Impact Festival, a dynamic showcase of cutting-edge science, entrepreneurship, and technological innovation. Bringing together researchers, industry leaders, start-ups, and policymakers, the event highlighted advancements in AI, biotechnology, digital industry, future mobility, raw materials, sustainable infrastructure & energy, and deep-tech innovation. The visit offered valuable insights into Germany's innovation ecosystem and fostered opportunities for impactful bilateral collaborations translating research excellence into societal solutions.

IGSTC explored partnerships in emerging technologies including AI, smart manufacturing, critical minerals and digital healthcare at Hannover Messe 2026, DMEA 2026 and RWTH Tech Impact Festival.



IGSTC participated in Indo-German Dialogue on Digital Health and Water Management for Sustainable Futures, organised by Indian Embassy, Berlin

On 21 April 2026, IGSTC participated in "Indo-German Dialogue on Digital Health and Water Management for Sustainable Futures" organised by the Embassy of India in Berlin. Conducted in a hybrid format, the event emerged as a vibrant convergence point for scientists, policymakers, industry leaders, innovators, and institutional stakeholders from India and Germany to deepen bilateral cooperation under the IGSTC 2+2 Call 2026 thematic areas i.e. "Mobile Health & Telemedicine" and "Integrated Water Resource Management (IWRM)." The programme served as a strategic platform to connect ideas, technologies, and institutions working towards resilient and sustainable futures.

The event commenced with inaugural remarks by Dr. Ramanuj Banerjee, Counsellor (S&T), Embassy of India, Berlin, followed by addresses from Mr. Abhishek Dubey, Deputy Chief of Mission, Dr. Kusumita Arora, Director, IGSTC, Ms. Kathrin Meyer from German Federal Ministry of Research, Technology and Space (BMFTR), and Dr. Praveen K. Somasundaram from Department of Science & Technology (DST), India. The speakers underscored the growing importance of Indo-German scientific cooperation in addressing healthcare accessibility, environmental sustainability, and technology-driven societal transformation.

The scientific sessions featured keynote presentations by Prof.

Axel Pries, President of the World Health Summit, and Prof. Daniel Karthe, Deputy Director, UNU Flores, who highlighted the urgent need for digitally enabled healthcare ecosystems and integrated approaches to water governance in an era shaped by climate stress, demographic shifts, and rapid urbanisation. A high-energy pitch-in session brought together experts from institutions including AIIMS New Delhi, Apollo Health Axis, Helmholtz Zentrum Dresden Rossendorf, FU Berlin, KIT, CEEW, Magdeburg-Stendal

Indo-German Science & Technology Centre organised an Indo-German dialogue on digital health and sustainable water management in Berlin.

University of Applied Sciences, and OTT HydroMet GmbH. Discussions explored AI-enabled healthcare delivery, smart diagnostics, telemedicine systems, medical data science, hydrological resilience, environmental monitoring technologies, urban water systems, and sustainable water chemistry solutions.

The programme further featured dedicated panel discussions on Indo-German cooperation in both thematic domains, generating insightful exchanges on translational research, policy frameworks, industry participation, and scalable innovation models. The event concluded with the felicitation of awardees under IGSTC's Industrial Fellowship, Paired Early Career Fellowship in Applied Research (PECFAR), and Women Involvement in Science & Engineering

Research (WISER) programmes, celebrating emerging scientific talent and reinforcing the shared Indo-German commitment towards

collaborative innovation, technological excellence, and sustainable global development.





Visit of IGSTC delegation to Gefertec GmbH, BASF, BAM and HZB

A delegation from the IGSTC undertook a series of strategic visits in Germany on 24 and 28 April 2026 to strengthen Indo-German collaboration in advanced manufacturing, materials research, energy technologies, and industrial innovation. The visit included engagements with Gefertec GmbH, BASF, BAM – Federal Institute for Materials Research and Testing, and Helmholtz-Zentrum Berlin.

At Gefertec GmbH, the German industry partner of the IGSTC-supported 2+2 Call 2020 project RAMFLICS, the delegation observed advancements in wire arc additive manufacturing (WAAM) and a newly developed non-robotic 3D deposition system based on a 5-axis goniometer with rail-mounted deposition heads. Discussions highlighted

process optimisation, deposition accuracy, and industrial scalability of large metal components, along with the growing market relevance of cost-effective additive manufacturing solutions for reducing material wastage and improving production efficiency. The interaction also provided valuable insights into the ongoing project implementation under

RAMFLICS with participation from German project partners.

At BASF's corporate office, discussions focused on advanced materials, circular

Indo-German Science & Technology Centre discussed possibilities of long term partnerships in manufacturing, materials, energy, and innovation.





economy strategies, and sustainable industrial transformation.

The discussion was graced with the in-person presence of Mr Tassilo Galitz, Industrial, Security & Digital Policy, Corporate Government Relations, BASF along with Dr Rohini Gupta, open innovation manager, BASF and Dr Stephan Schunk, Executive Expert - Vice President, hte GmbH & BASF SE virtually.

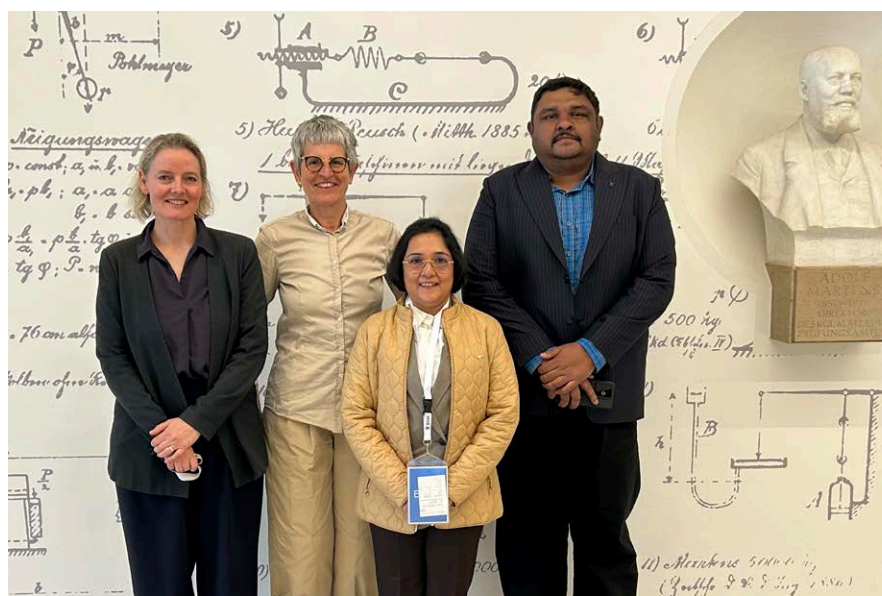
The representatives from BASF shared insights into their global innovation ecosystem, digitalisation efforts, and industry-academia collaboration models, while

identifying potential areas for Indo-German cooperation under future thematic programmes and innovation platforms. BASF also agrees to contribute to IGSTC's Research and Innovation dialogue series by identifying suitable speaker in their network.

The visit to BAM – Federal Institute for Materials Research and Testing provided exposure to Germany's national infrastructure for materials characterization, testing, safety assessment, and quality assurance. BAM was represented by Dr Britta Schumacher, referent in internationales, BAM and Dr. Claudia Eggert, Member of the Presidential Board, BAM. Discussions were held with the representatives regarding

opportunities for future cooperation in advanced materials research, and translational science. The visit also highlighted the importance of scientific infrastructure and applied research institutions in supporting industrial innovation and technological reliability. The interaction contributed towards strengthening institutional networking and exploring potential areas for future Indo-German collaboration in materials science and applied technology domains. BAM expressed their clear intention to further bolstering joint activities with IGSTC in terms of organising bilateral workshops and designing joint collaborative projects.

At Helmholtz-Zentrum Berlin, discussions was centered on



possibilities for future cooperation and joint scientific initiatives. HZB is internationally known for its research in energy materials, photovoltaics, synchrotron radiation-based research, green hydrogen and advanced characterization techniques. The visit provided exposure to Germany's high-end scientific infrastructure and interdisciplinary research ecosystem. HZB was represented by Prof. Rutger Schlattmann (Director, PVcomB), Prof. Yan Lu (Director, Battery), Dr. Tobias Sontheimer (Head of Strategy Department for Energy), Prof. Prashanth Menezes (Head of Department of Materials Chemistry for Catalysis), Dr. Ana Sofia Freire Anselmo (Director's Office, International Matters). Discussions focused on collaborative research opportunities, researcher mobility, scientific exchange programmes, and future institutional/industrial partnerships. Particular emphasis was placed on emerging technologies related to energy transition, energy storage, green hydrogen, material modelling and advanced functional materials research. The interaction also reinforced the importance of strengthening Indo-German scientific networks and



developing long-term collaborative frameworks between Indian and German research organizations.

At Helmholtz-Zentrum Berlin (HZB), the delegation engaged in detailed discussions on exploring future cooperation and potential joint scientific initiatives. HZB, internationally recognised for its cutting-edge research in energy materials, photovoltaics, synchrotron radiation-based techniques,

green hydrogen, and advanced material characterisation, showcased its strong interdisciplinary research ecosystem and world-class scientific infrastructure. The interaction brought together key representatives from HZB, including Prof. Rutger Schlattmann (Director, PVcomB), Prof. Yan Lu (Director, Battery Research), Dr. Tobias Sontheimer (Head, Strategy Department for Energy), Prof. Prashanth

Menezes (Head, Materials Chemistry for Catalysis), and Dr. Ana Sofia Freire Anselmo (Director's Office, International Matters). Their collective inputs provided a comprehensive overview of ongoing research priorities and institutional strengths.

The IGSTC delegation was also provided with a guided visit to BESSY II at HZB, one of Germany's leading third-generation soft X-ray synchrotron facilities. The visit offered an insightful overview of the sophisticated mechanisms involved in synchrotron-based X-ray generation and the functioning of advanced beamline systems. The delegation gained exposure to the application of high-brilliance synchrotron radiation in conducting ultra-sensitive and high-resolution experiments across diverse scientific domains, including catalysis research, advanced materials science, physics, structural biology, biotechnology, crystallography, and energy research. The interaction also highlighted the critical role of large-scale scientific

infrastructure in enabling frontier interdisciplinary research and innovation-driven technological development.

Deliberations centred on expanding collaborative research opportunities, enabling researcher mobility, strengthening scientific exchange programmes, and building long-term institutional and industry partnerships. Special emphasis was placed on priority areas such as

energy transition technologies, energy storage systems, green hydrogen, computational material modelling, and advanced functional materials. The engagement further underscored the importance of deepening Indo-German scientific linkages and establishing sustainable, long-term collaborative frameworks between research organisations of both countries.



FEATURE

On 23–24 February 2026, Vigyan Bhawan in New Delhi witnessed a confluence of ideas as the Indo-German Science & Technology Centre (IGSTC) convened two high-impact strategic conclaves on Mobile Health & Telemedicine and Integrated Water Resource Management (IWRM), the subtopics of 2+2 Call 2026, addressing critical pillars of a resilient, future-ready society.

The mHealth & Telemedicine conclave captured the pulse of a rapidly evolving healthcare paradigm. Anchored in the vision of blending German precision with India's vast scale and diversity, the deliberations emphasized transforming ideas into meaningful collaborations and implementable outcomes. The programme featured technical sessions focused on Wearable IoT & Medical Devices, AI/ML in Diagnostics and Healthcare. High-level



panel discussions on The AI frontier in Diagnostics and Data Security, Interoperability, and Regulatory Harmonization further enriched the discourse, highlighting future pathways for innovation-driven healthcare partnerships. Experts converged on a shared vision of "connected care," where wearable technologies, IoT-enabled devices, and AI-driven diagnostics seamlessly extend healthcare from hospitals into homes. The emphasis was given on innovation that translates into clinically validated,

interoperable, and scalable solutions. As conversations navigated regulatory harmonization and data security, a compelling narrative emerged—healthcare's future lies in decentralization, accessibility, and intelligent integration.

A day later, the Integrated Water Resource Management (IWRM) conclave shifted the spotlight to an equally urgent frontier i.e. water security and sustainability. Here, discourse evolved into a powerful call for systemic transformation.



Moving beyond fragmented management, stakeholders advocated for integrated, circular, and technology-driven approaches that treat water not merely as a resource, but as a regenerative system. Through focused sessions on Membrane Science & Sensor Technology, Resource Recovery, Wastewater Technologies, and Technologies for the "Hard-to-Abate" sectors, the conclave highlighted emerging scientific pathways capable of addressing some of the most complex environmental and industrial challenges. From AI-enabled monitoring and digital twins to resource recovery and nature-based solutions, the conclave showcased how innovation can secure water futures while aligning policy frameworks, community engagement, and industrial transformation.

Together, these conclaves reflected IGSTC's approach of bringing together diverse expertise, perspectives, and partnerships. Across themes ranging from healthcare to water sustainability, the discussions highlighted that meaningful innovation emerges through interdisciplinary collaboration and practical implementation. By strengthening Indo-German partnerships and fostering outcome-oriented dialogue, IGSTC continues to facilitate collaborative pathways towards sustainable and inclusive solutions for the future.

On 23–24 February 2026, Vigyan Bhawan hosted IGSTC's Indo-German conclaves on digital healthcare and sustainable water solutions, fostering innovation-driven collaborations for a resilient future.





WOMEN INVOLVEMENT IN SCIENCE & ENGINEERING RESEARCH (WISER)





Can light and matter interact strongly enough to create entirely new quantum states?

At the quantum scale, light can behave in unexpected ways when confined within nanostructured materials. Exploring this frontier, PD Dr. Sylke Blumstengel from the Institute of Physics, Humboldt-Universität zu Berlin, collaborated with Prof. Parinda Vasa at IIT Bombay under the IGSTC WISER programme to investigate plasmonic platforms capable of manipulating light-matter interactions at extremely small dimensions.

The project focuses on integrating atomically thin transition metal dichalcogenides (TMDCs) with engineered plasmonic silver gratings to achieve strong exciton-photon coupling. Using finite element simulations, the team optimized nanoscale grating designs to confine electromagnetic fields near the

TMDC layers, enabling enhanced optical interactions. Fabrication of the plasmonic platforms was carried out at HU Berlin using electron beam lithography, followed by transfer of large-area monolayer WS_2 and multilayer heterostructures onto the gratings.

During Dr. Blumstengel's research stay at IIT Bombay in February–March 2026, comprehensive optical characterization, including reflection, photoluminescence, and Raman spectroscopy, was performed on the fabricated structures. These experiments confirmed sharp plasmonic resonances, exciton-plasmon coupling, and strong near-field confinement effects consistent with earlier simulations and ellipsometry studies conducted in Berlin.

The collaboration has identified key fabrication challenges

associated with atomically thin materials, particularly strain and structural imperfections introduced during transfer processes. To address this, the team has initiated development of improved fabrication protocols using rigid spacer layers to reduce mechanical stress and further enhance coupling strength. In the second year of the project, the collaboration will further explore chiral plasmonic platforms and their interaction with valley-polarized excitons, opening new directions in quantum-scale photonics and nano-photonics research.

These experiments confirmed sharp plasmonic resonances, exciton-plasmon coupling, and strong near-field confinement effects consistent with earlier simulations and ellipsometry studies conducted in Berlin.



Can high-temperature thermal energy storage unlock more reliable renewable power systems?

One of the major challenges in renewable energy systems is storing large amounts of heat efficiently at high temperatures for later use. Addressing this problem, Dr. Shobhana Singh, Assistant Professor in the Department of Mechanical Engineering at IIT Jodhpur, is developing advanced thermal energy storage systems using macro-encapsulated phase change materials (PCMs) under the IGSTC WISER programme, in collaboration with Dr.-Ing. Klarissa Niedermeier at the Karlsruhe Institute of Technology (KIT), Germany.

The project explores how specially designed PCM capsules integrated into packed-bed thermal energy storage systems can improve storage density, heat transfer efficiency, and charging–discharging performance for high-temperature applications relevant to future solar thermal plants. Combining computational modelling with

experimental studies, the team has developed CFD models in COMSOL Multiphysics to simulate melting and solidification processes inside encapsulated PCM systems.

During the first project year, promising PCM–shell material combinations were identified, while simulations and experiments helped analyse transient heat transfer, thermal cycling behaviour, and temperature uniformity within the storage capsules. Research visits to KIT enabled close interaction with researchers working on advanced thermal energy systems, including the Karlsruhe Liquid Metal Laboratory (KALLA), where liquid-metal-based storage systems operating up to 450 °C are being developed.

The collaboration has already resulted in peer-reviewed publications in International Journal of Heat and Mass Transfer and Physics of Fluids

during the award period, alongside joint conference contributions on phase change materials and thermal storage technologies. Second year onwards plans are in place for joint monograph development, student exchanges, and future Indo-German collaborative proposals.

By integrating materials science, thermal engineering, and computational modelling, the ongoing WISER project is contributing toward scalable thermal energy storage solutions that could support long-duration renewable energy storage and future sustainable power systems.

The International Journal of Heat and Mass Transfer and Physics of Fluids during the award period, alongside joint conference contributions on phase change materials and thermal storage technologies.



What if transparent glass surfaces could become significantly more scratch-resistant without losing clarity?

Transparent protective coatings are everywhere! From eyewear and smartphone screens to furnace windows and precision optical systems. Yet increasing hardness and scratch resistance often comes at the cost of optical transparency. Seeking to overcome this trade-off, Dr. Sharmistha Anwar, Senior Principal Scientist at the CSIR-Institute of Minerals and Materials Technology (IMMT), Bhubaneswar, is developing a new class of transparent ceramic coatings under the IGSTC WISER programme in collaboration with Dr. Mandy Höhn at the Fraunhofer Institute for Ceramic Technologies and Systems (IKTS), Dresden, Germany.

The collaboration focuses on aluminium-germanium nitride (Al-Ge-N) thin films – nanostructured coatings designed to combine optical transparency with high

hardness and anti-scratch performance. Instead of relying on conventional transparent coatings that are prone to crack propagation, the project explores how nanoscale engineering of nitride phases can improve durability while retaining light transmission.

To build this platform, the team first optimized individual aluminium nitride (AlN) and germanium nitride (GeN) coatings using reactive magnetron sputtering. Early experiments show that GeN coatings deposited at elevated substrate temperatures achieved transparency close to 80%, while AlN coatings demonstrated improved hardness associated with changes in crystalline structure and deposition conditions.

During her research stay at Fraunhofer IKTS in May 2025,

Dr. Anwar worked with the Fraunhofer team on refining deposition parameters, identifying suitable characterization strategies, and establishing the experimental framework for ternary Al-Ge-N coatings. As the project progresses to second year, the collaboration aims to develop robust transparent coatings with potential applications in optical devices, wear-resistant surfaces, and advanced engineering systems where both durability and transparency are critical.

Transparent coatings, scratch resistance, Al-Ge-N films, nanostructured coatings, optical transparency, thin films, magnetron sputtering, wear-resistant surfaces, optical devices, ceramic coatings.



Wastewater and discarded battery use in hydrogen fuel production

What if wastewater and discarded battery materials could help generate clean hydrogen fuel more efficiently? This idea lies at the centre of the ongoing WISER-supported collaboration between Dr. Archana Singh of the CSIR-Advanced Materials and Processes Research Institute (AMPRI), Bhopal, and Dr. Anjana Devi at the Leibniz Institute of Solid State and Materials Research (IFW Dresden), Germany.

Hydrogen generation through conventional water electrolysis is energy intensive because of the slow oxygen evolution reaction. Dr. Singh's research explores an alternative approach using urea-assisted electrolysis, where urea present in wastewater can be simultaneously degraded while lowering the energy required for hydrogen production. The project focuses on designing high-performance

metal nitride electrocatalysts capable of accelerating these electrochemical reactions efficiently and sustainably.

During her first research visit to IFW Dresden in June 2025, Dr. Singh interacted with multiple research groups working on metal nitride thin films, advanced deposition methods, and in situ spectroscopy techniques. The visit enabled detailed characterization of catalyst materials and initiated further collaborative studies aimed at understanding the reaction pathways.

In the first phase of the project, nanostructured nickel-iron catalytic films were fabricated using organometallic nickelocene and ferrocene precursors. The collaboration has also introduced a

circular-materials dimension by developing nickel nitride electrocatalyst films using recycled NiMH battery waste as substrate material. These recycled-material- derived electrodes highlight opportunities for integrating clean-energy technologies with resource recovery strategies.

Clean hydrogen, urea electrolysis, metal nitride catalysts, nickel-iron films, recycled battery waste, wastewater treatment, clean energy, resource recovery.





Hybrid nanomaterials unlock more efficient solar-driven hydrogen production?

Can specially engineered materials use sunlight more efficiently to produce clean hydrogen fuel? This question drives the ongoing WISER-supported collaboration between Dr. Rik Rani Koner, Associate Professor at the Indian Institute of Technology (IIT) Mandi, and PD Dr. Majd Al-Naji at Universität Leipzig, Germany.

The project focuses on designing hybrid photocatalytic materials based on metal-organic frameworks (MOFs), semiconductor oxides, and electrospun carbon nanofibers for solar-driven hydrogen generation. One of the major limitations in photocatalytic water splitting is the rapid recombination of charge carriers, which lowers hydrogen production efficiency. To address this, the collaboration explores hierarchical composite structures capable of improving light absorption,

charge separation, and catalytic stability.

During the first phase of the project, several MOF-based composites were synthesized and evaluated for photocatalytic hydrogen evolution. While some pristine Cu- and Zn-based MOFs showed stronger oxygen evolution behaviour, the team successfully developed a NiCP-TiO₂ composite that demonstrated nearly fourfold higher hydrogen evolution activity compared to commercial TiO₂ photocatalysts. Structural and spectroscopic analyses confirmed successful formation of the hybrid composite and preservation of crystallinity within the catalytic system.

Dr. Koner's research visit to Universität Leipzig in July 2025 enabled collaborative

photocatalytic testing using specialized photochemical facilities and facilitated joint planning for mechanistic investigations and future publications. The collaboration is expected to contribute toward scalable photocatalytic materials for sustainable hydrogen production while strengthening Indo-German research partnerships in advanced energy materials.

Solar hydrogen, MOF composites, TiO₂ photocatalysts, clean energy, hybrid materials, hydrogen evolution.





PAIRED EARLY CAREER FELLOWSHIP IN APPLIED RESEARCH (PECFAR)





entist
an Geology
onomous Inst...ent of Science and Technology),
Government of...dun, Uttarakhand, India.
rcher: Paired Early Career Fellowship in Applied Research (PECFAR),
Technology Centre (IGSTC), Institute of Photogrammetry and GeoInformation
17th September, 2025



Decoding Himalayan Landslides with AI and Radar Imaging

Landslides rarely occur without warning. Before catastrophic slope collapse, mountain surfaces often undergo millimetre-scale deformation detectable only through radar satellites. During his PECFAR 2025 fellowship visit to Dr. Mahmud Haghsheenas Haghighi, Leibniz University Hannover from August to October 2025, Mr. Naveen Chandra of the Wadia Institute of Himalayan Geology investigated how artificial intelligence and Synthetic Aperture Radar (SAR) can identify these hidden precursors of instability.

His work combined Sentinel-1 and TerraSAR-X datasets with deep-learning architectures,

including attention-enhanced U-Net models, to improve landslide detection across the Himalayas and Alps. Focusing on the Hardiyarpana landslide in Uttarakhand, he applied InSAR time-series analysis to detect coherence loss and surface deformation linked to active slope movement.

The study advances AI-driven geohazard intelligence by linking rainfall, tectonics, and pre-failure deformation,

The Hardiyarpana landslide in Uttarakhand, he applied InSAR time-series analysis to detect coherence loss and surface deformation linked to active slope movement.

strengthening Indo-German collaboration in disaster forecasting and satellite-based hazard monitoring for climate-sensitive mountain regions.





Can Sodium-Ion Batteries Challenge Lithium's Dominance?

Lithium-ion batteries power modern electronics and electric vehicles, but concerns over lithium cost and supply chains are driving a global search for alternatives. Under PECFAR 2025, Dr. Premkumar Senguttuvan of JNCASR and Prof. Matteo Bianchini of the University of Bayreuth explored how sodium-ion batteries can overcome one of their biggest scientific challenges: maintaining structural stability while storing large amounts of energy.

During reciprocal visits between October 2025 and March 2026, the collaboration moved beyond routine laboratory exchange into a multi-institutional Indo-German research network spanning BayBatt, JNCASR, IISc, IIT Madras, and Helmholtz Institute Ulm. Using operando X-ray diffraction, XPS, and NMR techniques, the team tracked how sodium ions migrate through layered oxide and

NASICON cathodes during electrochemical cycling, revealing phase evolution and reaction intermediates with high temporal resolution.

The exchange also created a platform for scientific networking across institutions. Prof. Senguttuvan delivered lectures at Helmholtz Institute Ulm, while Prof. Bianchini presented seminars at IISc, JNCASR, and IIT Madras on advanced sodium-ion electrodes, solid electrolytes, and operando characterization techniques. Interactions with multiple research groups expanded discussions toward high-voltage cathodes, multi-metal NASICON systems, and solid-state battery architectures.

Beyond experimental

outcomes, the fellowship catalysed concrete plans for joint publications, structured student and postdoctoral exchange, and a proposed Indo-German International Research Training Group (IRTG) involving multiple laboratories in India and Germany focused on advanced battery materials, operando analytics, and sustainable energy-storage technologies.

Sodium-ion batteries, energy storage, NASICON cathodes, solid electrolytes, operando analytics, battery materials, sustainable technology.





Can Higher-Dimensional Mathematics Make Scientific Computing Faster?

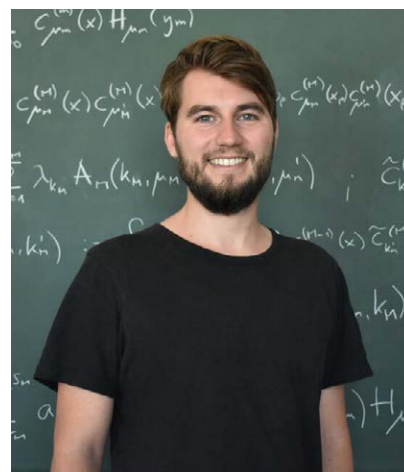
From quantum chemistry to machine learning, many modern scientific problems are governed not by simple matrices, but by tensors complex multi-dimensional mathematical objects that are notoriously difficult to compute efficiently. Under PECFAR 2025, Dr. Max Pfeffer of the University of Göttingen, in collaboration with Dr. Hariprasad Manjunath Hegde of Chanakya University explored whether circulant decomposition methods, widely used for accelerating matrix computations, can be extended to tensors for faster large-scale numerical algorithms.

During Dr. Pfeffer's visit to India from February to March 2026, the collaboration progressed from theoretical formulation to algorithm development and early application studies. The researchers investigated

how tensors can be decomposed into structured circulant components, enabling efficient computation while preserving key mathematical properties. In the process, they reassessed tensor eigenvalue problems and redirected the project toward more computationally promising applications.

The exchange also evolved into a wider scientific networking initiative across India's computational mathematics community. At IISc Bengaluru and IIT Bombay, Dr. Pfeffer delivered seminar talks and interacted with researchers including Dr Rajesh Sundaresan, Dr Parimal Parag, Dr Pratik Jawanpuria, and Prof. Narayan Rangaraj, alongside multiple student groups working in numerical mathematics, optimization, and data science.

The collaboration laid the foundation for joint research article and long-term Indo-German cooperation in tensor methods, scientific computing, and student exchange.



Quantum Chemistry, Machine Learning, Tensor Computing, Numerical Algorithms, Scientific Computing, Data Science, Indo-German Collaboration.



Floating Solar Systems for Energy Generation and Ecological Balance

As floating solar farms expand across reservoirs and irrigation networks worldwide, researchers are increasingly asking how these systems influence surrounding aquatic ecosystems and long-term photovoltaic reliability. During his PECFAR fellowship visit to India from March to April 2026, Mr. Alexander Graef of Fraunhofer ISE collaborated with Dr. Manish Kumar at Himachal Pradesh University to investigate the environmental and operational behaviour of floating photovoltaic (FPV) systems under Indian climatic conditions.

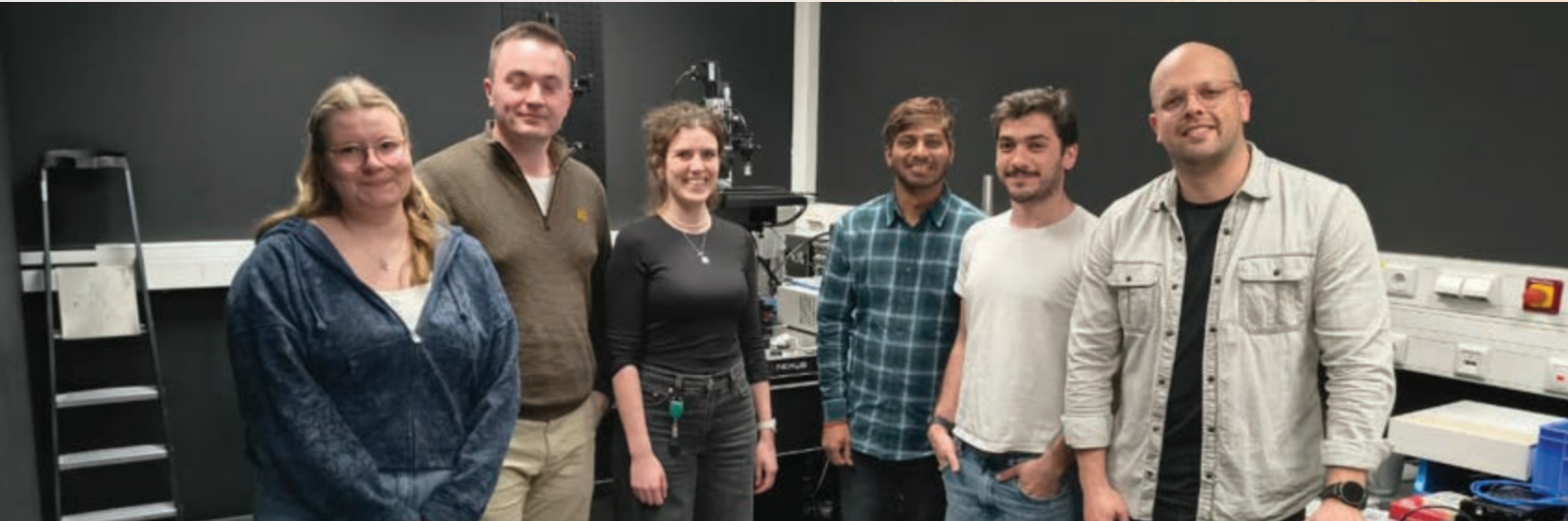
The visit combined field-based measurements, institutional networking, and technology

assessment across multiple Indian research centres. At MNIT Jaipur and IIT Roorkee, Mr. Graef delivered lectures on Fraunhofer ISE's FPV research, environmental monitoring strategies, and large-scale deployment challenges while interacting with faculty working on soiling analysis, hydrology, and renewable-energy systems. At Chandigarh's FPV water-irrigation facility operated with Quant Solar, he examined degradation behaviour, ecological interactions, and mitigation strategies in operational floating solar infrastructure.

A major outcome of the exchange was the

formalisation of long-term Indo-German collaboration through the signing ceremony of an MoU between Himachal Pradesh University and Fraunhofer ISE. The visit also catalysed new IGSTC SING and 2+2 proposal discussions, agro-photovoltaic pilot planning, and future joint work on FPV reliability, environmental monitoring, and Himalayan deployment feasibility.

Floating Photovoltaics, Environmental Monitoring, Renewable Energy, FPV Reliability, Hydrology Research, Agro-Photovoltaics, Himalayan Deployment, Indo-German Collaboration.



Light Travelling Through a Hair-Thin Fibre Transform Industrial Metrology Inspection

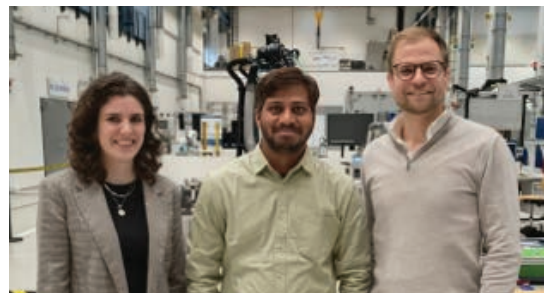
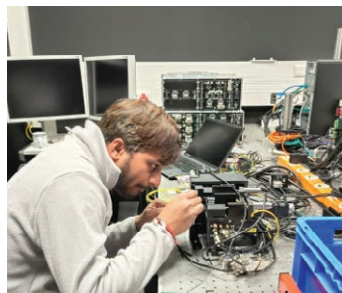
Inspecting the inner surfaces of microscopic cavities such as fuel-injector nozzles and precision boreholes remains a major challenge in advanced manufacturing. During his PECFAR 2025 fellowship at Fraunhofer Institute for Production Technology (IPT), Aachen, from February to April 2026, Dr. Karanam Manjunath of the Central Manufacturing Technology Institute (CMTI) worked on developing a fibre-optic low-coherence interferometry system capable of high-resolution cavity analysis inside extremely confined industrial geometries.

His research, in collaboration with Ms. Caroline Girmen, Group Manager, Optical Metrology and Imaging Techniques at the Fraunhofer IPT, combined optical simulations in Zemax OpticStudio with experimental

fibre-probe fabrication using single-mode and GRIN fibres to optimise beam delivery, focal spot size, and imaging resolution. The work translated theoretical beam-shaping designs into functional hardware prototypes integrated with piezomotor-driven positioning systems for nanometric inspection. Using superluminescent diode sources, the team evaluated beam quality and propagation characteristics for non-contact industrial metrology applications.

Beyond laboratory development, the visit connected Dr. Manjunath with Germany's advanced manufacturing ecosystem through interactions at RWTH Aachen and Fraunhofer ILT on robotic metrology, femtosecond laser micro-machining, MEMS fabrication, and digital manufacturing systems.

Optical metrology, cavity inspection, GRIN fibres, precision manufacturing, nanometric inspection, MEMS fabrication.





Engineering Synthetic Mucus to Trap Respiratory Viruses

Can engineered biomaterials mimic the body's first line of defence against respiratory viruses? During his PECFAR 2025 visit to India, Prof. Daniel Lauster of Freie Universität Berlin collaborated with Dr. Pradip Dey at Visva-Bharati to develop peptide-polymer hydrogels designed to capture influenza and SARS-CoV-2 particles by replicating key properties of human respiratory mucus.

The collaboration combined Dr. Dey's expertise in supramolecular polymer chemistry with Prof. Lauster's work on virus-mucus interactions and antiviral biomaterials. Together, they explored how polymer branching, charge density, and mucin-inspired peptide architectures influence viral diffusion and trapping within hydrogels. The materials are

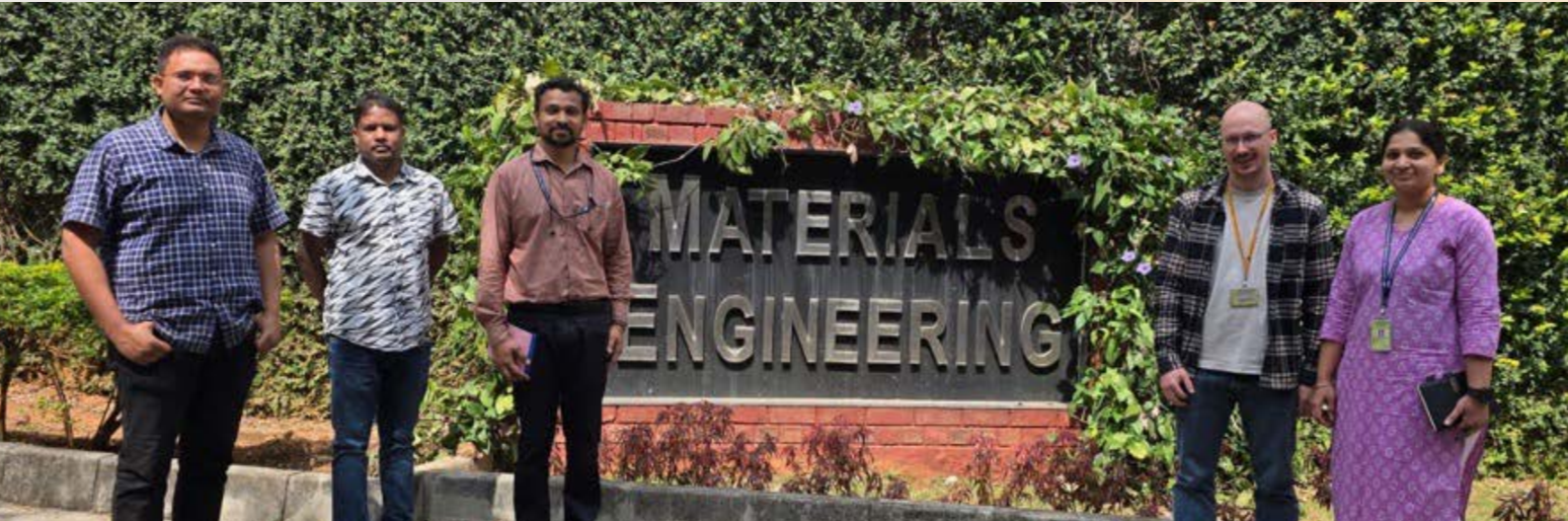
intended to function as synthetic mucus barriers capable of reducing viral mobility at biological interfaces.

Beyond laboratory discussions at Visva-Bharati, Prof. Lauster used the visit to build a broader Indo-German research network through invited talks and scientific interactions at the University of Delhi, IIT Delhi, IIT Bombay, and IIT Guwahati. Discussions with researchers including Prof. Sunil Sharma and Prof. Raju Bej focused on student exchange, collaborative grant

applications, and future interdisciplinary projects in biomaterials and antiviral therapeutics. The visit also resulted in a joint application to IGSTC for a student internship programme and opened discussions on a future Indo-German International Research Training Group (IRTG) in advanced biomaterials and biomedical interfaces.

Antiviral hydrogels, synthetic mucus, virus trapping, biomaterials, SARS-CoV-2, influenza, biomedical interfaces.





Advancing AI-Driven Monitoring for Large-Scale Metal Additive Manufacturing

Can artificial intelligence and real-time sensing improve the reliability of large-scale metal 3D printing for aerospace and defence applications? Under PECFAR 2025–26, Frederic Cousin of Fraunhofer IAPT collaborated with Dr. Anusha Epparla of Central Manufacturing Technology Institute (CMTI), Bengaluru, to develop advanced in-situ monitoring strategies for Wire Directed Energy Deposition (Wire-DED) manufacturing.

The collaboration focused on integrating thermal cameras, pyrometers, optical sensors, and AI-based data analysis tools into Wire-DED systems for real-time defect detection and process optimization. The project aimed to establish correlations between monitored process signatures, melt-pool behaviour, and the resulting microstructure and

mechanical performance of additively manufactured components.

Working closely with Dr. Anusha Epparla and her team at CMTI, Frederic Cousin helped establish comparable monitoring infrastructure in India and Germany, enabling coordinated experimental studies and future joint process-development activities. Experimental trials conducted during the fellowship generated thermal monitoring datasets that are now being correlated with metallurgical characterization results to better understand

defect formation and material properties in large-scale DED components.

The fellowship also enabled extensive scientific and industrial networking across India, including visits to IISc Bengaluru, ARCI Hyderabad, and industrial stakeholders working in additive manufacturing, aerospace, and defence technologies.

Artificial Intelligence, Metal 3D Printing, Wire-DED, Defect Detection, Process Optimization, Aerospace Collaboration.





AI-Enabled Human Gait Assessment for Movement and Rehabilitation

Human gait carries critical information about neurological health, musculoskeletal stability, and movement disorders, yet conventional gait laboratories remain expensive and clinically restrictive. Under PECFAR 2025, Dr. G. Muralimohan of VIT Chennai and Dr. Manuel Bange of the University of Augsburg carried out reciprocal research visits to develop an AI-enabled multimodal gait assessment framework integrating foot sole pressure sensing with markerless motion capture.

The collaboration combined eight-camera markerless motion capture, foot-sole pressure sensing, IMUs, ECG, and EEG systems to create a synchronized multimodal framework for gait and posture analysis. During Dr. Muralimohan's visit to Germany

from October to December 2025, the teams established standardized experimental protocols and initiated pilot recordings on German participants for multimodal gait assessment.

The reciprocal visit by Dr. Manuel Bange to VIT Chennai from January to March 2026 focused on implementing and refining the platform in India. A major technical achievement

was the development of a reliable calibration methodology for multi-camera markerless motion capture systems using open-source

Biomechanics Research, Rehabilitation Engineering, Neurological Disorder Assessment, Medical Informatics, Cross-National Dataset, Indo-German Collaboration.



tools, significantly improving 3D motion tracking accuracy and reproducibility.

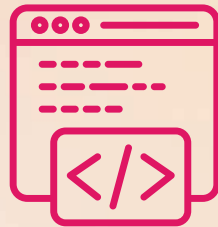
The collaboration also generated one of the project's most valuable outcomes, a cross-national multimodal dataset from Indian and German participants for future AI-driven gait and posture analytics.

Beyond laboratory research, the fellowship fostered extensive scientific networking across biomechanics, sports science, and medical informatics communities. Discussions at Johannes Gutenberg University Mainz,

the University of Augsburg, IIT Madras, and VIT's Centre for Human Movement Analytics explored future collaborations in rehabilitation engineering,

neurological disorder assessment, joint PhD supervision, and multicentric AI-assisted movement science research.





EMPOWERING RESEARCHERS: IGSTC INDUSTRIAL FELLOWSHIP PROGRAM





Microneedle-Based Electrochemical Biosensing for Transdermal Diagnostics

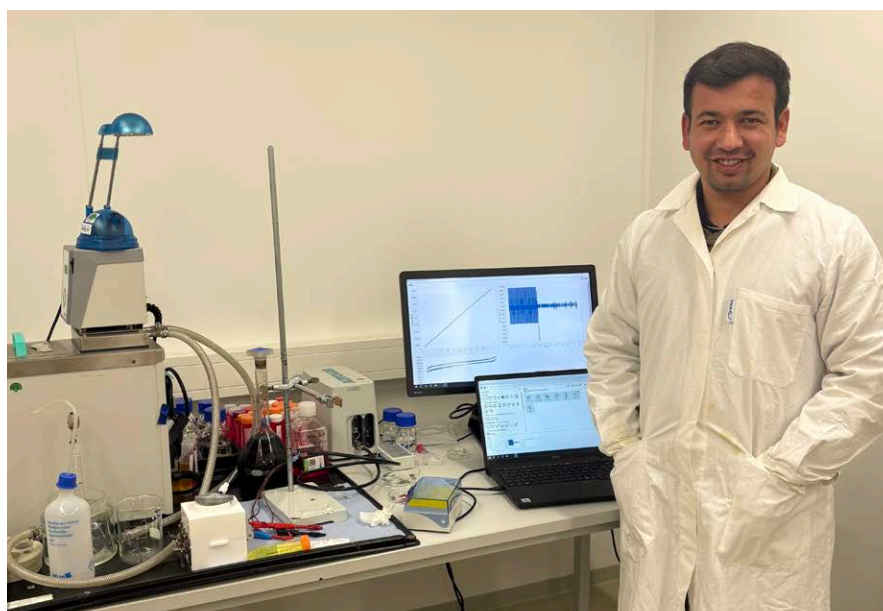
Dinesh Kumar, a Ph.D. Research Scholar at CSIR-Central Scientific Instruments Organisation (CSIR-CSIO), is currently advancing research on microneedle-based transdermal theragnostic systems under the IGSTC Industrial Fellowship programme in Germany. Hosted at Fraunhofer Institute for Ceramic Technologies and Systems (Fraunhofer-IKTS) under the supervision of Dr. Jörg Opitz, his research focuses on developing an electrochemical microneedle platform for cholesterol detection with potential applications in next-generation healthcare diagnostics.

As part of the fellowship, Mr Kumar is involved in functionalization and optimization of screen-printed electrodes for electrochemical sensing, representing a critical step toward integrating biosensing capabilities into minimally invasive microneedle

patches. The research combines advanced electrochemical techniques with practical device engineering, contributing to the development of portable and patient-friendly diagnostic technologies. Through collaborative work with international researchers and exposure to advanced instrumentation, the fellowship has strengthened both the scientific depth and translational potential of the

research, with outcomes expected to contribute toward high-impact publications and future intellectual property development.

Microneedle Diagnostics, Cholesterol Detection, Electrochemical Biosensing, Transdermal Healthcare, Portable Diagnostics, Indo-German Collaboration.





Advancing Sustainable Barrier Coatings for Circular FoodPackaging through Indo-German Industrial Research Collaboration

Ms. Manisha Madan, a Ph.D. researcher at IIT Roorkee, is carrying out advanced research on sustainable antimicrobial food packaging systems with a focus on controlled-release functional materials for improving food safety and shelf life. Her work addresses a critical challenge in modern packaging science by developing environmentally sustainable alternatives to conventional plastic-based barrier coatings used in food packaging applications. She is hosted at Siegwirk Druckfarben AG & Co. KGaA in Germany during her visit to Germany under IGSTC Industrial Fellowship for working with the Circular Economy Coatings team on next-generation biodegradable barrier coatings for paper and paperboard packaging. Ms Madan's

research focuses on developing bio-based coatings capable of providing oil, moisture, and oxygen resistance while maintaining recyclability and compliance with evolving European sustainability regulations, including European Union's Single Use Plastics Directive (SUPD) and Packaging & Packaging Waste Regulation (PPWR) frameworks.

The research holds significant industrial relevance as it contributes toward advancing circular packaging technologies and reducing dependence on synthetic polymer coatings. The fellowship has also enabled development of prototype formulations with strong commercial potential through exposure to industrial-scale coating technologies and

interdisciplinary R&D collaboration. Beyond her research work, Ms. Madan has embraced a rich cultural immersion during her stay in Germany. The IGSTC fellowship has served as a transformative bridge between academic research and industrial application. Working at Siegwirk has allowed her to collaborate with an international and multidisciplinary workforce, broadening her perspective and strengthening both her technical and interpersonal skills.

Sustainable Packaging, Antimicrobial Coatings, Biodegradable Materials, Circular Economy, Recyclable Packaging, Food Safety Innovation.

Advancing Perovskite and Tandem Solar Cell Technologies for Sustainable Energy Generation

Research in next-generation photovoltaic technologies is gaining increasing importance as the global scientific community moves toward cleaner and more sustainable energy transformation. In this direction, Ms. Nikita Rahar, a Ph.D. scholar from Institute of Nano Science and Technology has been working on advanced thin-film materials and device architectures for optoelectronic and solar energy applications. The research combines materials engineering with device physics to improve the efficiency and stability of emerging solar cell technologies.

Through the IGSTC Industrial Fellowship, Ms. Rahar carried out advanced studies at Fraunhofer Institute for Solar Energy Systems (Fraunhofer-ISE) under the guidance of Dr. Juliane Borchert. The work focused on tandem and perovskite solar cells, particularly exploring cobalt oxide-based hole transport layers integrated with fully evaporated

perovskite absorbers. Significant efforts were directed toward optimizing thin-film deposition conditions and understanding interface interactions critical for charge transport and device performance.

The exposure to advanced fabrication facilities and high-end characterization techniques provided valuable insight into modern photovoltaic research, while

also strengthening expertise in developing efficient and stable solar energy devices for future sustainable energy applications.

Next-Generation Photovoltaics, Thin-Film Materials, Tandem Solar Cells, Perovskite Solar Cells, Sustainable Energy, Device Engineering, Solar Energy Innovation, Advanced Photovoltaic Research.





Sustainable Geopolymer Concrete development through Hybrid Fibre Systems and Explainable Machine Learning

Ms. Shimol Philip, Senior Research Fellow from NIT Puducherry is currently undertaking advanced research in sustainable construction materials through the IGSTC PhD Industrial Exposure Fellowship (PIEF) at Sonocrete GmbH, Germany. Working under the mentorship of Dr. Christiane Rößler, her research is centred on the development of hybrid fibre-reinforced geopolymer concrete using industrial by-products such as ground granulated blast furnace slag (GGBS) and agricultural residues like sugarcane bagasse ash (SBA), with a strong focus on improving material performance under extreme temperature conditions.

A significant aspect of her work involves investigating the

structural and microstructural evolution of geopolymer composites after elevated-temperature exposure, with special emphasis on the role of fibre reinforcement in enhancing residual mechanical strength. Alongside experimental investigations, she is developing an explainable machine learning framework for predicting compressive strength, integrating SHAP-based interpretation and optimized algorithms such as PSO-enhanced XGBoost, thereby enabling a more reliable and data-driven approach to concrete mix design.

Ms Philip's research contributes to low-carbon and circular construction practices by valorising waste materials and reducing reliance on

conventional cementitious systems. During her fellowship, she has also actively engaged with academic and industrial research communities through technical presentations, knowledge-sharing sessions, and participation in international scientific forums, further strengthening the practical and interdisciplinary relevance of her work in sustainable infrastructure development.

Sustainable Construction, Geopolymer Concrete, Fibre Reinforcement, Circular Construction, Explainable AI, Low-Carbon Infrastructure.



Advanced Electrochemical Conditioning and Degradation Studies in PEM Water Electrolyzers for Hydrogen Production

Ms. Shubhi Tripathi is pursuing her PhD at CSIR–Central Electrochemical Research Institute (CSIR–CECRI) with her research focused in the field of green hydrogen production through advanced water electrolysis technologies. Her studies span capillary-fed, alkaline, and PEM electrolyzers, with a strong emphasis on electrochemical conditioning, degradation behaviour, and performance diagnostics under realistic operating conditions. The work is directed towards improving the stability, efficiency, and long-term durability of electrolyzers, which are critical for enabling scalable hydrogen energy systems.

Through the IGSTC Post Doctoral Industrial Fellowship (PIEF 2025), she is currently working as a visiting scientist at the Fraunhofer Institute for Chemical Technology (Fraunhofer ICT), Germany,

under the supervision of Prof. Jens Tübke. Her research at Fraunhofer ICT focuses on systematically understanding PEM water electrolyzer behaviour under different conditioning protocols, where she is evaluating constant-voltage and constant-current activation strategies, along with accelerated stress tests, to study their influence on catalyst activation, membrane hydration, and interfacial stability during both initial operation and long-term cycling. The investigation is supported by a combination of in-situ electrochemical techniques such as polarization measurements, cyclic voltammetry, and impedance spectroscopy together with ex-situ characterization to capture evolving material and performance changes. This integrated approach is helping

to map degradation pathways and understand how conditioning impacts overall system performance.

During the period of research stay in Germany, Ms Tripathi also had opportunities for cultural engagement alongside her scientific work. Visits to traditional Christmas markets provided exposure to local customs and festive traditions, offering insight into regional cultural practices. The historic city of Heidelberg was also explored, allowing for appreciation of its architectural charm and long-standing cultural heritage.

Green hydrogen, PEM electrolyzers, water electrolysis, catalyst activation, membrane stability, hydrogen energy, stress tests, electrochemical diagnostics.



Translational Research on Rapid and Accessible Tuberculosis Diagnostics

Developing rapid, innovative and reliable diagnostic technologies for infectious diseases remains a major priority in global healthcare research, particularly for countries where early disease detection is crucial for sustainable healthy livelihood. In this direction, Ms. Sonali J Jain, a PhD researcher in Biological Sciences at BITS Pilani, has been working on translational diagnostic strategies with expertise spanning clinical microbiology, antimicrobial resistance, and bacterial virulence. Her research interests are closely aligned with improving accessible diagnostic solutions for infectious diseases caused by clinically significant pathogens.

As part of the IGSTC PhD Industrial Exposure Fellowship (PIEF), she conducted research at Lionex Diagnostics and Therapeutics GmbH, where her

work focused on developing rapid tuberculosis diagnostic assays using sputum- and urine-based samples. The study explored monoclonal antibody-based detection of multiple tuberculosis biomarkers, including protein and carbohydrate antigens, with the aim of improving diagnostic sensitivity and reliability. The project involved assay optimization, validation of rapid testing formats, and exposure to industrial diagnostic development workflows under regulatory-compliant environments.

Beyond research, the fellowship provided her a rich cultural experience. Living and

working in Germany offered exposure to a highly structured research culture, strong emphasis on precision, punctuality, and teamwork, and a collaborative international work environment. Experiencing German workplace ethics, interacting with multicultural teams, and adapting to a new scientific ecosystem contributed significantly to personal and professional growth, reinforcing the value of Indo-German collaboration beyond science alone.

*Rapid Diagnostics,
Tuberculosis Detection,
Clinical Microbiology,
Antimicrobial Resistance,
Translational Healthcare,
Indo-German Collaboration.*





Developing Integrated Biosensing Systems for Food Safety

Ms. Surbhi Kumari, a PhD scholar at the Department of Biochemistry, Panjab University, is currently advancing her doctoral research through the PhD Industrial Exposure Fellowship (PIEF) in Germany. Her work primarily centers on the synthesis of electrochemically compatible nanomaterials aimed at detecting antibiotics in complex matrices, with a strong emphasis on translating laboratory innovations into practical applications.

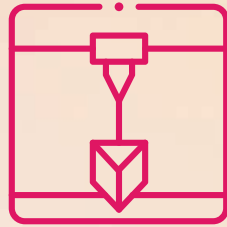
At the Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin, under the guidance of Dr. Rudolf J. Schneider, her research focuses on developing a rapid detection system for β -lactam antibiotics in milk using microfluidic flow cell technology. Her ongoing work involves experimental

optimization, device handling, and systematic data generation to enhance detection accuracy. To strengthen validation, she is integrating electrochemical sensing with ELISA techniques, ensuring reliability and reproducibility of results. This interdisciplinary approach not only enriches her doctoral thesis but also contributes to advancing food safety technologies. Her fellowship experience significantly strengthens her research capabilities while fostering international scientific collaboration and applied research expertise.

Living and working in Berlin provided her a culturally enriching experience, offering opportunities to interact with individuals from diverse nationalities and backgrounds, which contributed to the

development of a broader global perspective. The professional culture in Germany, particularly its strong emphasis on punctuality, organization, and quality-oriented work practices, positively influenced professional and research approaches. Beyond the research environment, exposure to Berlin's Christmas markets, museums, festivals, and cultural events, along with everyday life in Germany, added significant cultural depth to the experience.

Antibiotic detection, nanomaterials, microfluidic flow cells, β -lactam antibiotics, electrochemical sensing, food safety, ELISA techniques, applied research.



SMALL IMMEDIATE NEED GRANTS (SING)



Sepsis Diagnostics through Indo-German Research Collaboration

Dr. Tummala Anusha from KL University undertook a research visit to TU Bergakademie Freiberg under the IGSTC SING Programme, marking an important step in advancing Indo-German collaboration in healthcare diagnostics and biosensor technology. Hosted at the Institute of Nanoscale and Biobased Materials under the mentorship of Dr. Parvaneh Rahimi, Group Leader of Biosensors, Dr. Anusha carried out pioneering research on the development of an electrochemical biosensing platform for the simultaneous detection of sepsis biomarkers. The project addressed the urgent global need for rapid and accurate diagnosis of sepsis, a life-threatening medical condition where early detection plays a decisive role

in improving patient survival and clinical outcomes.

During her research stay, Dr. Anusha focused on developing a portable electrochemical point-of-care sensing device capable of simultaneous quantification of C-reactive protein (CRP) and procalcitonin (PCT), two critical biomarkers associated with sepsis management. Her work involved the synthesis of advanced poly pyrrole doped CoNi-MOF nanocomposites and their characterization

using sophisticated analytical techniques such as XRD, FE-SEM, XPS, and HR-TEM. She further contributed to electrode surface engineering, optimization of sensing parameters, and evaluation of sensor performance for multiplex biomarker detection.

Healthcare Diagnostics, Electrochemical Biosensors, Sepsis Detection, Point-of-Care Sensing, Healthcare Innovation, Indo-German Collaboration.



The research engagement provided her with valuable exposure to cutting-edge laboratory infrastructure, interdisciplinary scientific practices, and international research standards, while also facilitating intensive scientific interactions with researchers and faculty members at TUBAF.

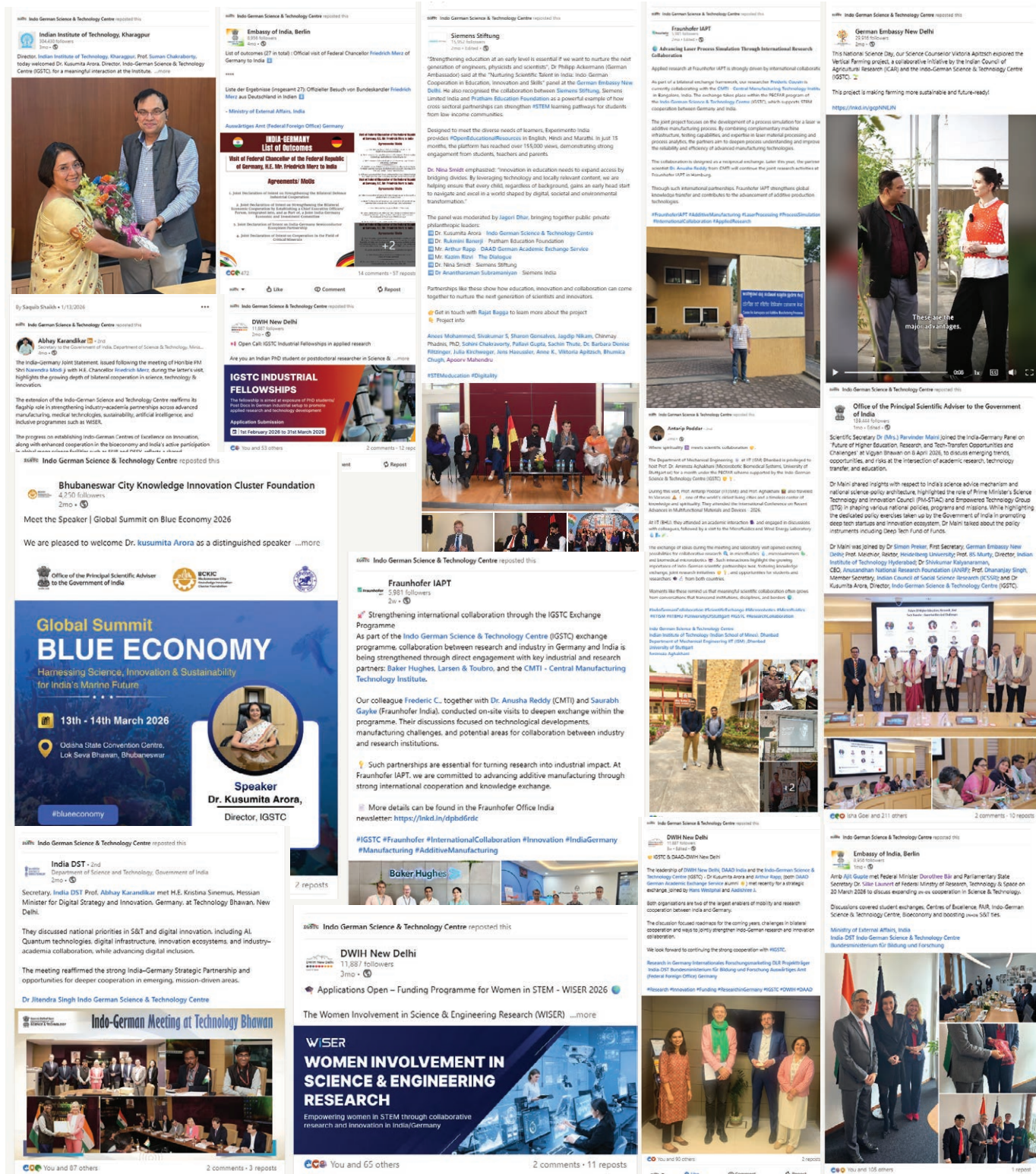
A major outcome of the visit has been the development of an Electrochemical Immunosensor for CRP Detection Using Poly Pyrrole Doped CoNi-MOF Nanocomposite for Sepsis Management, with the

corresponding research paper currently under review for publication. In addition to strengthening her technical expertise and scientific communication skills through presentations and collaborative discussions, the visit also opened avenues for future Indo-German research partnerships and knowledge exchange. The experience stood as a remarkable blend of scientific excellence, innovation, and cultural learning, reinforcing the role of international collaboration in addressing critical healthcare challenges. Dr. Anusha conveyed her gratitude to

IGSTC for empowering young researchers and enabling transformative global research exposure through various programmes.



IGSTC Unplugged: Echoes Across the Digital Sphere





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