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चिंतन

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Prof. T. G. Sitharam welcomes HE Mr. Barry O'Farrell, High Commissioner of Australia

Australian Delegation led by High Commissioner Visits IIT Guwahati- discusses multidirectional collaboration

Indian Institute of Technology Guwahati has welcomed the Australian Delegation led by His Excellency Mr. Barry O'Farrell, High Commissioner of Australia on its campus on 22nd February 2022. The four-member delegation included H. E. Mr. Barry O'Farrell, High Commissioner of Australia, Ms. Rowan Ainsworth, Australian Consulate-General, Kolkata, Mr. Paroksh Prasad, First Secretary to Australian High Commissioner, Ms. Angelina Nair, Senior Research and Visits Officer, Australian Consulate-General, Kolkata.

The delegation discussed several projects of mutual cooperation in various domains such as academics, scholarships, strategic research, trade and commerce, governance, disaster management, cultural exchange, water conservation, and clean energy.

Prof. T. G. Sitharam, Director IIT Guwahati after a customary welcome of the delegates made a presentation on the Australia India Water Centre, Global

Center for Transdisciplinary Research in Water (Tri-Water), and various initiatives which are taken under their auspices such as the development of Master of Sustainable Water Futures program, Water Matters for India - Delivering an Innovative Young Water Professional Training. He added that such collaborations are crucial for meeting sustainable development goals, and also addressing the emerging challenges due to climate change. He also highlighted the major strides taken by IITG in global rankings and stressed the importance of the Liberal arts program.

His Excellency Mr. Barry O'Farrell highlighted the importance of cooperation in multidisciplinary areas, especially through the 'MAITRI' Scholarships and Fellowships, Strategic areas collaboration, Liberal Arts, Cultural Exchange, Research Grants, Skilled Academics Cooperation, and Governance with many more possibilities with other Australian Universities.

Ms. Rowan Ainsworth during her address noted that there is an immense opportunity for collaboration in the areas of Disaster Management, Trade, and Economics, the Indian Ocean, development of the North East region. She further said, that working together on the world's most important resource, water - The Australia India Water Centre is a great example of our research collaboration.

Prof. Sukanya Sharma, Head, Department of Humanities and Social Sciences, presented the importance of the Liberal Arts Masters program being launched by IIT Guwahati and the likely possibilities of collaboration with Australian Universities.

The major projects undertaken in mutual collaboration are as follows:

Australia India Water Centre: It is Developing AIWC Graduate Certificate, Graduate Diploma, and Masters Program in sustainable water futures (largely online presently). Apart from developing the academic program, AIWC is organizing two workshops, one on Groundwater Sustainability and the other on Water Policy for the Australian Department of Agriculture, water and environment and the central Water Commission under the technical exchange program in water between Australia and India (April - May 2022). It has also received funding of \$275,000 from the Australian Water Partnership (DFAT) to run a 10 month-long course program for young water Professionals (December 2021 - November 2022).

Australia Water Partnership Project: Its 'Water Matters for India' initiative is delivering Innovative Young Water Professional Training. It has received \$275,000 DFAT funding for the first year. It is the training of 20 young water professionals younger than 35 years. There is an expectation to recognize this training towards some - Graduate Certificate, Graduate Diploma or Master.

Master of Sustainable Water Futures: It is developed with the aim of Capacity Building of water Professionals in problem-solving, situation improvement, and sustainable development. This is underpinned by a "Transdisciplinary approach" to sustainable and innovative water solutions. Administered by both West Sydney University and IIT Guwahati with teaching shared with AIWC partners. The degree certificate will include both WSU and IITG Logos It is an online program with some local face-to-face contacts.

Global Center for Transdisciplinary Research in Water (Tri-Water): It conducts collaborative and interdisciplinary research on water science, technology, and policy. To equip a new generation of water researchers with interdisciplinary perspectives on the water to contribute to the industry, academia, and society it offers academic programs with integrated and interdisciplinary approaches, involving hydrological, biophysical, chemical, economic, institutional, legal, policymaking and planning aspects, to address water challenges.

The collaborations are expected to leave a long-term positive effect on the mutual relationship of both countries by augmenting joint research, cultural exchange, and addressing the challenges together.



Australian Delegation led by High Commissioner Visits IIT Guwahati- discusses multidirectional collaboration

IIT Guwahati Researchers develop self-healable amphiphobic solid slippery coating

Indian Institute of Technology Guwahati researchers have developed a self-healable amphiphobic solid slippery coating that exhibits sliding of droplets of various liquids-including of water, polar and non-polar organic solvents, edible oil, motor, engine oil, and crude oils. It also shows self-healing of repetitive (50 times) physical damages in less than 1 min and the embedded slippery property remained intact.

The research team of IIT Guwahati which included research scholars Manideepa Dhar, Avijit Das, Dibyanjana Parbat, and led by Dr. Uttam Manna, Associate Professor, Department of Chemistry & Centre for Nanotechnology has developed a simple and scalable fabrication of a non-fluorinated, substrate-independent, and self-healable amphiphobic solid slippery

coating. This coating exhibits sliding of droplets of various liquids-including water, polar organic liquids (ethanol, 1-propanol, 1-hexanol, DMSO, DMF), and non-polar (decane, dodecane, diiodomethane) solvents, edible (vegetable oil), motor, engine (petrol, diesel, kerosene) and crude oils. This coating shows self-healing of repetitive (50 times) physical damages in less than 1 min and the embedded slippery property remains intact. Also, this surface can withstand prolonged exposures to various complex aqueous phases (pH 2, pH 12, SDS, and DTAB contaminated water, river water, seawater) and UV irradiation for 15 days. Substrate independence and scalable fabrication process are other crucial features of this current design.

This coating has been successfully developed on various substrates such as glass, aluminum foil, printed paper, plastic, etc., as well as geometrically complex objects like curved surfaces, inside of a glass bottle, etc. The simple fabrication process also allows coating on a large glass object (1325 cm²).

Bio-inspired surfaces where water / oil droplets effortlessly roll or slide off have enormous promise in developing materials related to energy, biomedical applications, etc. However, due to the delicate nature of the trapped metastable third phase (i.e., trapped air layer in textured surface) responsible for heterogeneous liquid wettability, these surfaces frequently failed to withstand abrasive conditions such as elevated temperature and pressure, alkaline and acidic environments, etc. To address this critical problem of stability, ultra-smooth and homogeneous slippery surfaces were developed following different unique approaches.

When an insect sits on the walls of nepenthes pitcher plants, it slides into a chamber filled with digestive juices. Researchers have attempted to build surfaces that are slippery to external fluids based on the slippery characteristics of the nepenthes pitcher plant. Aizenberg and her co-workers mimicked the technique of slipperiness used by the nepenthes pitcher plant and have developed an omniphobic slippery liquid-infused porous surface (SLIPS) through the strategic infusion of fluorinated liquid lubricant in an appropriately decorated porous and featured interface. This defect-free, ultra-smooth, lubricant-infused slippery surface has a much-needed self-repairing ability, allowing it to endure severe physical abrasions. However, the leaching of infused fluorinated lubricant from the surface limits the ability of the surface to be used for more extended periods and

and contaminates the beaded liquids.

To avoid this problem of infused fluorinated lubricant leaching, IIT Guwahati's team has developed this simple and scalable fabrication of a non-fluorinated, substrate-independent, and self-healable amphiphobic solid slippery coating. A hydrophilic porous polymeric coating has been strategically infused with a selected comb-like polymer to develop a crystalline network. Eventually, a self-healing and amphiphobic solid-slippery interface was obtained at the end.

The bottle that is decorated with such coating allowed traceless dispense of a viscous food item, i.e. honey with ease. Moreover, such coating protected the display of cell phones from any aqueous and oily contaminations. The prepared optically transparent solid slippery coating displayed self-cleaning ability.



IIT Guwahati Researchers with the self-healable amphiphobic solid slippery coating applied glass

IIT Guwahati launches Bachelor's programme in Energy Engineering

Indian Institute of Technology Guwahati is launching a new B.Tech. Programme in Energy Engineering. It will be offered by the School of Energy Science and Engineering, IIT Guwahati from the academic year 2022-2023.

This B. Tech. programme is aimed at training young minds to adopt a holistic approach while assessing the potential, the need, and the necessities for extending technological interventions towards sustainable energy development. The programme is also intended to bridge gaps between academia, humanities, science, engineering, economics, management, and

policymaking by incorporating Energy Management, Societal & Environmental Impact Studies, Policy Making, Economics, and other allied programmes in addition to the core engineering subjects.

Speaking about the programme, Prof. T. G. Sitharam, Director, IIT Guwahati, said, "This new B. Tech programme in Energy Engineering being offered by IIT Guwahati will be very beneficial as it will provide a fundamental understanding of renewable energy infrastructure, system development for sustainable carbon-neutral growth, energy storage, distribution and much more. There has been a substantial increase in funding from the government and private firms for renewable energy, which substantially will result in the creation of ample job opportunities in the green energy sector and companies. This programme will serve as a visible initiative aimed at meeting the demand for skilled human resources capable of implementing practical technological interventions in the areas of energy generation, storage, and distribution."

Prof. K. Mohanty, Head of the School outlined some of the new and interesting courses of the programme such as Energy Innovation & Design Thinking, Community Engagement & Entrepreneurship programme, Energy Materials & Device Fabrication Laboratory, etc. Students will have a choice to continue the Entrepreneurship programme in the last two semesters in lieu of two elective courses.

Currently, the School of Energy Science and Engineering is successfully running two academic programmes: PhD since 2005 and MS by Research since 2015, with the support of experienced faculty members from various disciplines of Science and Engineering. So far, research has been the School's primary focus, and various teams of students and faculty have successfully contributed to research areas such as energy generation via thermochemical and biochemical routes; biofuel, fuel cell, solar energy, catalyst development, solar-wind hybrid, research on Li-ion batteries, compressed air, metal hydride, nano-fluid, metamaterials, and integrated systems and innovative products.

The School has the vision to promote cutting-edge research and technology development along with translational programmes to enhance innovative solutions for economically viable, environmentally responsible, and sustainable energy needs. It is already underway to expand its existing infrastructure

to support extended activities in the areas of biomass conversion and biorefinery, energy simulation, solar device fabrication, emerging energy storage, energy transmission, distribution, and grid integration. With the introduction of this new programme, combined with the innovative, analytical, and out-of-the-box thinking abilities of the young minds, the school foresees achieving its vision collaboratively.

The first batch of 20 students will be admitted to IIT Guwahati through the JEE Advanced 2022 counseling process, and the institute looks forward to welcoming them along with all the other new batches of students to other undergraduate programme of the institute.



Signing of MoU between IIT Guwahati & Centre for Cellular and Molecular Platforms, Bangalore, for setting up of IIT Guwahati - CCAMP Bio Entrepreneurship Centre

Awards and honours



Dr. John Jose, Associate Professor, Department of Computer Science & Engineering, has been selected as Vice-Chair in IEEE Indian Council Executive Committee.

IIT Guwahati Collaborates with South Dakota Mines to Advance Multidisciplinary Research Efforts

Indian Institute of Technology Guwahati has signed a new Memorandum of Understanding (MOU) with the South Dakota Mines to advance research into two-dimensional (2D) materials, and biofilms. The collaboration enables both institutions to share resources and leverage research funding opportunities while joining multidisciplinary teams at both institutions to maximize complex problem-solving.

The research into 2D materials and biofilms has vast potential for future applications across many fields. This includes the medical field with research into new classes of anti-cancer, antibacterial, and other pharmaceuticals. This research can also help advance new types of energy production and storage; has benefits for agriculture, including better new ways to protect and nourish crops for maximum yields; and has applications in corrosion protection that will increase the longevity of structures like steel bridges, ships, and buildings. The research collaboration can also yield new startup businesses in any of these fields that add economic development opportunities tied to each university.

Professor Tapas Kumar Mandal, Department of Chemical Engineering and Centre for Nanotechnology IIT Guwahati mentioned, "IIT Guwahati has world-class state-of-the-art facilities and equipment in the Central Instrumentation Facility and the Center for Nanotechnology, available to researchers and graduate students with expert faculty oversight and training. This collaboration between IITG and Mines will benefit all of us. The multidisciplinary research can utilize various strengths and expertise to move us to the next level and to benefit society."

The agreement also creates an international pipeline of graduate students who will continue advancing science into the next generation. The MOA creates an exchange program where student researchers in each university can learn from faculty at both institutions and can access testing and research equipment at both facilities.

Associate Professor Krishna Pada Bhabak, Department of Chemistry and the Center for the Environment IIT Guwahati says, "I am part of a very young group of researchers at IITG and this MOU with Mines will definitely open new avenues of

collaboration. I am looking forward to the future of what we can accomplish together."

Venkata Gadhamshetty, an Associate Professor of Civil and Environmental Engineering at South Dakota Mines said, "This new agreement between SD Mines and IITG makes the research more accessible to a wider range of students and the outcomes available to a wider audience. I can already envision a significant number of collaboration opportunities, with all of the exciting work at IITG,"

Manoj Tripathi, Ph.D., a research fellow at the University of Sussex in the United Kingdom says, "This agreement between Mines and IITG facilitates the young researchers and the top scientists to easily collaborate and apply for grants together." While Dr. Tripathi is not a direct part of the new MOA, he gives praise to the collaborative effort. He studies surface phenomena and complex interactions that take place on surfaces at the nano and micro scales and is working alongside the research teams at both universities.

The collaboration makes both universities more competitive with major intuitions when applying for limited pools of research funding. The research collaboration tied to the new MOA is already underway at Mines and IIT Guwahati. The work is building on past research advancing the use and understanding of 2D materials.

About South Dakota Mines

Founded in 1885, South Dakota Mines is one of the USA's leading engineering, science, and technology universities. South Dakota Mines offers bachelor's, master's, and doctoral degrees and a best-in-class education at an affordable price. The university enrolls 2,418 students with an average class size of 24. The South Dakota Mines placement rate for graduates is 97 percent, with an average starting salary of more than \$66,150. For these reasons, College Factual ranks South Dakota Mines, the #1 Engineering School for Return on Investment.



IIT Guwahati and Government of Assam collaborates to augment the development of the region

Indian Institute of Technology Guwahati and officials from various departments of the Assam Government had an elaborate meeting today, to prepare the future course of action and collaborate in various fields related to the development of the region.

The government delegation comprising officials from various departments such as Mines and Minerals, Industry, Commerce, Public Enterprises, and Transport (includes inland waterways) was led by Dr. K. K. Dwivedi, IAS, Principal Secretary to the Government of Assam. The team from IIT Guwahati was led by Prof. T. G. Sitharam, Director IIT Guwahati.

The focused discussion areas were:

Opening of a Mining Department at IIT Guwahati: This initiative is expected to help to train young students and involve seasoned professionals in developing ways and means in the form of research and technical guidance to harness the abundant natural resources spread across the state of Assam and the northeast.

IIT Guwahati's involvement in organizing the international road safety conclave will be taken up immediately and efforts to enhance road safety across the region will be intensified along with the Ministry of Transport, Government of Assam.

Means and ways to advance tea technology: IIT Guwahati will give impetus to research on the use of tea compounds in various sectors such as medicine, health, and wellness sector. Efforts to highlight the importance of various types of tea and their rich ingredients will be carried out along with the state officials.

Prof. T. G. Sitharam, Director IIT Guwahati has said, "As per the request of the state government, IIT Guwahati will be very glad to contribute mainly in the areas focusing in the exploration of mines & minerals, commerce & entrepreneurship development, involvement of drones in various sectors, transport sector - Inland water transport, water buses, road safety, aspects related to skill development in multiple upcoming sectors and establishing various centres of excellence & state of the art laboratories at the institute."

Dr. K. K. Dwivedi IAS, Principal Secretary to the Government of Assam, Industries Commerce & Public Enterprises Department highlighted the importance of setting up the school of mines at IIT Guwahati and centres of excellence in areas of inland waterways, promoting Assamese traditional jewelry making, innovation in the tea sector, skill training leading to startups and adopting newer technology for enhancing road safety.

The government of Assam has sought IIT Guwahati's collaboration and support in the proposed plan to set up Assam Skill University. Under the purview of the engineering department, a research and development facility is proposed to be accommodated in multiple aspects to look after inland water transport (marine engine design, designing of vessels, and its repairing and servicing hub).



IIT Guwahati and Government of Assam collaborates to augment the development of the region



Prof. T. G. Sitharam Director IIT Guwahati chairs the meeting

Superannuation



Prof. Ravi Mokashi Puneekar
Professor
Department of Design
DoR: 31.12.2021



Prof. Debkumar Chakrabarti
Professor
Department of Design
DoR: 31.01.2022



Shri Mrinal kanti Chakraborty
Technical Officer Grade II
Department of Design
DoR: 28.02.2022



Shri Raghunath Kakati
Senior Attendant
Infrastructure, Planning & Management
DoR: 28.02.2022

New Joining



Dr. Vivek Padmanabha
Assistant Professor Gr.I
Civil Engineering
DoJ: 04.01.2022



Dr. Subrata Pramanik
Assistant Professor Gr.I
School of Health Science and Technology
DoJ: 10.01.2022



Dr. Sarvendranath Rimalapudi
Assistant Professor Gr.II
DoJ: 14.01.2022
Electronics and Electrical Engineering



Dr. Satish Kumar Panda
Assistant Professor Gr.II
Electronics and Electrical Engineering
DoJ: 17.01.2022



Dr. Tanmay Dutta
Assistant Professor Gr.II
Electronics and Electrical Engineering
DoJ: 19.01.2022



Dr. Santosh Kumar Vipparthi
Assistant Professor Gr.I
Mehta Family School of Data Science and Artificial Intelligence
DoJ: 16.02.2022



Dr. Ranjith Thangavel
Assistant Professor Gr.II
School of Energy Science and Engineering
DoJ: 18.02.2022



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