



# IGSTC THE RESEARCH NETWORK FACILITATOR

IGSTC's one of the missions is to establish knowledge pools to address global challenges. Food Security, climate change, disease eradication, sustainable energy are some of the most plaguing global challenges the world needs to solve urgently. Science & Technology plays a central role in developing innovative solutions for solving these challenges. Government Policy interventions and support to scientific community accelerates the pace of innovation. IGSTC acts as an interface between academia, industry & Government to support bilateral collaborative network of scientific community to solve the global challenges.

The Flagship programme of IGSTC "2+2 projects" has advanced the mission to establish knowledge pools. 2+2 projects programme has so far networked more than 250 leading scientists, researchers, engineers, technologists from India & Germany. Knowledge pools created within the projects has taken roles to lead on to solve global challenges. One of the networks comprising of ICRISAT, Hyderabad; BenchBio, Gujarat; Goethe University, Frankfurt; & GenXpro, Frankfurt may contribute in tackling the problem of Food Security. Together collaborating with other peers, Consortium was the first in the world to completely genome sequence 40 different varieties of Chickpea which has resulted in increase of the yield of the crops. Network of IIT Bombay; Thermax; Fraunhofer ISE & Schott Solar has developed new solar panels using Compact Linear Fresnel Reflector (CLFR) to increase the efficiency of existing thermal power plants by integrating both. This may address the ever-increasing energy demand of country like India and and may contribute in curbing the carbon footprint of fossil fuel based technologies. Consortium led by University of Hyderabad; RWTH Aachen; IFB Helmholtz-Zentrums Geesthach & Excorlab had developed lab scale nanoparticles for chronic renal failure related disease waiting to be taken up to the next stage. These are some of the knowledge pools created with the support of IGSTC to carry out pathbreaking research for addressing global challenges.

IGSTC will further strengthen & establish knowledge pools between India & Germany to solve the most pressing challenges through the existing programmes and proposed new strategic initiatives to be launched in future.

# inside

**02** IGSTC-The Research Network Facilitator

03 2+2 Projects

**Indian Ambassador's** Visit to BAM

07 Deputy Chief of Mission, German Embassy in India Visits IGSTC

**08** Open Call for Workshops

09 Meetings

DST-MPG Fellows

# 2+2 PROJECTS

## **Fec-online project meeting**

### **Project Title**

Online-indication of pathogen-like pollution in water by fecal pigment analysis (Fec-Online)

The 2nd network meeting of the 2+2 project "Onlineindication of pathogen-like pollution in water by fecal pigment analysis (Fec-Online)" was organized at the DVGW Technologiezentrum Wasser from 28th August to 1st September 2017 with participants from industry and academia both from India and Germany. The project aims to use the fluorescence of fecal pigments as indicators for fecal contamination of water.

All the four partners took part in the project meeting. Each partner presented the progress and current status within their work packages. Current state of the art of the laboratory method for determining the fluorescence of fecal pigments were the highlight of

### **PROJECT CONSORTIUM:**

### **Indian Partners**

IIT Madras, Chennai Spectro Analytical Labs New Delhi

### **German Partners**

DVGW Technologiezentrum Wasser, Karlsruhe bbe Moldaenke, Schwentinental

the TZW team. The IIT Madras briefed on the results on important factors that influence fluorescence. A first portable prototype of an onsite measuring device was highlighted in the bbe Moldaenke's presentation. Spectro presented the results and analysis of the LC-MS method, which serves as a reference procedure for the detection of fecal pigments.



Subsequently, there were discussions on various aspects of the topic. This included the further development of the laboratory method for the detection of the fluorescence of fecal pigments, the performance of a monitoring for the occurrence of fecal pigments as well as fecal bacteria (E. Coli) in the environment, the improvement of the detection of fecal pigments by means of LC-MS as well as necessary modifications and extensions for the prototype of the bbe Moldaenke.

The first tests with the prototype of bbe Moldaenke were carried out in the laboratory of the TZW. Finally, the consortium planned and defined further tasks for all of the partners for the next six months.

## METNETWORK- Workshop on Solar Photovoltaics: Materials, Mechanisms and Methods

**Project Title** 

Nanostructured hybrid transparent network electrodes for large area visibly transparent solar cells (METNETWORK)

### **PROJECT CONSORTIUM:**

### **Indian Partners**

Centre for Nano and Soft Matter Sciences (CeNS), Bangalore Tata Steel, Jamshedpur

#### **German Partners**

University of Bayreuth, Bayreuth Papierfabrik Louisenthal, Gmund am Tegernsee



As part of the networking activity of 2+2 Project "Nanostructured hybrid transparent network electrodes for large area visibly transparent solar cells (METNETWORK)", one day workshop on "Solar Photovoltaics: Materials, Mechanisms and Methods" was organized at Centre for Nano and Soft Matter Sciences (CeNS), Bangalore on the 25th September 2017. The main objectives of the project are 1) to examine the feasibility of printing methods; 2) to develop large area TCE metal network; 3) to synthesize the metal network TCE on flexible substrates such as PET or PEN or paper; 4) to test the feasibility of alternative metalation method based on solution processing techniques and/or incorporating graphene and 5) to integrate these TCEs in largearea solar cells suitable for window applications.

As part of this ongoing effort, researchers from India and German partners were invited. The workshop was to bring out the capabilities of Solar Photovoltaics and its applications. The scientific areas covered under the workshop were organic, perovskite and silicon solar cells, touching aspects of materials and methods used. Specifically, the presentations and the following discussions were focused on possible collaborative activities between German and Indian Institutions.

The opening session of workshop started with a welcome note by Prof. G. U. Kulkarni. Director, IGSTC gave a brief presentation on 'IGSTC-Nodal Centre for bilateral collaboration' which described the objective and various funding opportunities provided by the IGSTC.

Prof. D. D. Sarma, IISc delivered the opening lecture on 'Organic-Inorganic Hybrid and All-Inorganic Ferroelectric Perovskite Materials for Photovoltaic Applications: The Role of the Polar Field'. The lecture explained how investigations of physical properties with a host of techniques that are sensitive to the polar nature of the given material conclusively establish the absence of any significant polar field in MAPbX3.

The second session featured talks by Prof. Mukundan Thelakkat of Univ. Bayreuth, Prof. K.S. Narayan of JNCASR, Dr. Shaibal K Sarkar of IIT Bombay and Dr. Hirendra N. Ghosh of INST Mohali. The talks focused on fundamental quantum dot solar cell based on lead sulfide and cesium lead halide perovskite and electrophilic fluorination of A-Fe2O3 nanostructures for application in photoelectrochemical cells.

The fourth session of the workshop programme included the talks by Prof. Suresh Chand of NPL Delhi, Dr. Shyam K. Choudhary of TSL, Dr. Chetan R. Singh of Univ. Bayreuth and Prof. G. U. Kulkarni of CeNS. The talks gave a detailed description of recent innovations in polymer solar cells and the role of colloidal plasmonic nanostructures in organic solar cells which described the benefits and drawbacks of different plasmonic structures. Further, the

Workshop on "Solar Photovoltaics: Materials, Mechanisms and Methods"

#### 25 September 2017 Monday

TATA STEEL

aspects of energy, perovskite solar cells, hybrid lead halide perovskites and quantum dot solar cell. The presentations explained the activities of basic research in the field of organic photovoltaics and perovskite solar cells with emphasis on the control on material synthesis and structure-morphology-charge transport correlation. The session also covered the fabrication of solar cell devices using alloy, d o p e d, & d o p e d a II o y Q D s & semiconductor-metal hetero-structure materials and monitoring of photo-conversion efficiency.

The third session featured talks by Dr. Christoph Hunger of Papierfabrik Louisenthal GmbH, Germany, Dr. Ramakrishna Matte & Dr. Pralay K. Santra from CeNS and Dr. Ritu Gupta of IIT Jodhpur. The talks covered the areas of flexible metal network electrode on large scale via roll-toroll printing, organic photovoltaics, colloidal session briefed about highly conformal Ni micromesh as front electrode for Si solar cell, describing an innovative solution based crackle templating method developed in the CeNS laboratory for conformal metal wire network patterning over large textured surfaces. The session also featured a talk on graphene-metal mesh hybrid transparent electrode which discussed about growth of graphene like transparent film on quartz substrate using solid natural carbon precursor, which provides freedom of direct growth of film on transparent substrates.

 $(\Box)$ 

Louisenthal

UNIVERSITAT BAYREUTH

The concluding remarks were given by Prof. G.U. Kulkarni and Prof. Mukundan Thelakkat, with both of them reviewing the workshop as a success and fruitful one in terms of science and networking.

# **INDIAN AMBASSADOR'S VISIT TO BAM**

Ms Mukta Dutta Tomar, who was appointed as Ambassador of India to the Federal Republic of Germany in April, paid her first visit to Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin on 15th September 2017 together with Mr R Madhan, the Science Counsellor. The ambassador was particularly interested in BAM's joint projects funded by IGSTC.



Prof. Ulrich Panne, President BAM, welcomed the Ambassador and gave her an overview of BAM's activities and its cooperation with Indian partners. Then Dr. Claudia Eggert from the Presidential Staff Office/Research Management and Dr. Werner Daum, head of the Non-Destructive Testing Department, lead the guests for a tour to the BAM laboratories. During the tour Dr. Herbert Wiggenhauser, head of the Non-Destructive Damage Assessment and Environmental Measurement Methods Division presented current developments in his field. The highlight of the visit was an entry in BAM's Golden Book.



Ambassador was impressed and appreciated the effort on the progress made between BAM and the Indian partners on the IGSTC funded projects. Ambassador also appreciated the efforts of IGSTC to successfully identify such projects and the concept of involving industry.

### German-Indian cooperation at BAM

### AMPLAST (01.07.2014-31.12.2017)

The AMPLAST project partnered by IIT Madras & Dhvani Solutions Pvt Ltd, Chennai (Indian side) and BAM, Berlin & InfraTec GmbH (German side) aims to develop a laser-induced, thermographic test method for detecting cracks on surfaces under extremely hot environmental conditions such as in steel production.

### NDT DATA FUSION (30.03.2012 – 31.08.2016)

The NDT DATA FUSION project partnered by CSIR-SERC & Lucid Software, Chennai (Indian side) & BAM, Berlin & Specht, Kalleja + Partner GmbH (German Side), an automated scanner system is being developed which can collect multivariable data on the state of in situ concrete.

### IDC-WATER (to start in early 2018)

IDC-WATER project partnered by IISc, Bangalore & Bigtec Labs (Indian side) and BAM, Berlin & sifin diagnostics GmbH (German side) aims to develop integrated diagnostics of contaminants in water supply and management system as a part of smart cities.

Photo Credits: BAM, Berlin

# DEPUTY CHIEF OF MISSION, GERMAN EMBASSY IN INDIA VISITS IGSTC

Dr Jasper Wieck, the Deputy Chief of Mission of the German Embassy New Delhi along with Mr Stephan Lanzinger, Science Counsellor visited IGSTC Secretariat in Gurgaon on 14th September 2017. Dr Wieck had a tour of IGSTC office and met with the staff of IGSTC. Director, IGSTC briefed the activities, future orientation and the importance of IGSTC in the S & T collaboration between India & Germany. Dr Wieck was highly impressed with IGSTC's work and role in bringing both the countries together for the advancement of collaborative research and development in relevant areas of science and technology. He reinforced IGSTC to pursue new programmes to further strengthen the collaboration in S & T landscape between India and Germany for the benefit of society.





## INDO-GERMAN BILATERAL WORKSHOPS IGSTC OPEN CALL

Indo-German Science & Technology Centre invites proposals for organising Indo-German workshops on areas of mutual interest with an aim towards creating platforms for substantive interactions between scientists / researchers from academia and industry. The workshops have to take place in India or in Germany and to be designed around a specific research topic out of thematic areas relavant to both DST and BMBF (preferably those under thematic areas of past and upcoming 2+2 Calls as mentioned at www.igstc.org) with a potential for generating follow up activities including joint projects. Training workshops do not fall under the scope of this call.

## Who can Apply?

Persons holding regular positions in public or private non-profit research organisations, institutions of higher education and universities are eligible to submit applications.

## **Type and Extent of Support**

- Event costs for typically not more than 25-30 participants (organisational and logistics expenses, catering, printing and publicity, miscellaneous expenses).
- International and domestic airfare for participants including transfer to the airport / venue and return. Only those participants with an active role (oral presentation) will be funded.
- Accommodation (expenses for accommodation in a standard hotel / guest house on actual costs for normally not more than four days).
- One official dinner.

# CONDITIONS

- It is expected that the organisers also contribute to the event. In kind contributions – e.g. venue, personnel – are creditable.
- Event should be held at the organiser's premises and this cost is not covered.
- IGSTC will not pay any daily allowance nor cover any personnel costs.
- IGSTC will not give any travel support to researchers who are not based in India or Germany.
- Participation of industry is expected.

- A detailed draft program including a list of the expected participants has to be submitted along with a brief background document illustrating the importance of the workshop.
- Involvement of young scientists is highly recommended. Travel support will be provided to scientists who are pursuing at least their Ph.D., but access to the workshop for younger scientists working in the locality of the venue should be possible.
- It is expected that the workshop participants belong to various institutions.
- The utilisation of IGSTC format is mandatory for the application.

# MEETINGS

## **Due-Diligence Meeting**

Joint Scientific Committee recommended six projects for funding against Call 2016 for 2+2 projects in the overall thematic area of Smart Cities.

Funding of the selected consortiums follows national funding rules of India and Germany. The German partners undergo a similar evaluation process performed by the DLR project management agency. The Due-Diligence Committee consisting of Scientific Committee members Prof N K Bansal, CEPT University Ahmedabad (Ex Prof IIT Delhi) and Prof P P Mujumdar, IISc Bangalore met in Gurgaon on 3rd August 2017 as part of the due diligence process and to finalise the exact financial requirements of the 2+2 projects against IGSTC Call 2016 for the Indian partners of the consortium.



All the six projects were presented by the Indian PIs (combined by both institutional and industrial partners) in front of the Committee and discussed the proposals vs funding requirements in detail for finalizing the financial requirements. Finally the evaluation was made based on scientific work-packages, expected deliverables and experimental sample sizes and the Committee recommended the financial plans for the proposals.

## **Project Visits in Germany**

Director, IGSTC visited two already completed projects to discuss with the PIs the status of the consortium after the project ended and to gather their feedback. IGSTC is interested to identify mechanisms to contribute to sustainable interaction between project partners.

### NPORE (30.03.2012 – 30.09.2016)

He visited the project site of "Development, characterisation and validation of nanoparticles for the adsorption of uremic toxins in renal failure patients (NPORE)" at Helmholtz Zentrum Geesthacht (Center for Biomaterial Development), Berlin on 21st August, 2017. The project is partnered by University of Hyderabad (Indian side) and Charité (Coordinator); EXcorLab GmbH and Helmholtz Centre Geesthacht (German side). The goal of the NPORE project was the development and modification, characterization and validation of absorbing material to remove the uremic toxins (UTs) from serum of renal failure patients.

### NDT-DATA FUSION (30.03.2012 – 31.08.2016)

"Visualization of automated multi-sensor NDT assessment of concrete structures (NDT-DATAFUSION)" is partnered by CSIR-SERC & Lucid Software, Chennai (Indian side) & BAM, Berlin & Specht, Kalleja + Partner GmbH (German Side). Director visited the facilities at BAM, Berlin on 22nd August, 2017 and had detailed discussion with the team on the progress of the project and IGSTC funding model. He was impressed with the outcome of the deliverables achieved by the project.

### **Industrial Visits**

### BASF

Director made a visit to the BASF facilities on 24th August, 2017 at Ludwigshafen which is the largest integrated chemical complex in the world. There were discussions with several Lab heads mainly focusing on creating meaningful and successful collaborations between academia and industry, including IGSTC Fellowships

### Airbus Safran Launchers GmbH / Ariane Group

Following an invitation of Dr. Oudea Coumar Director along with Dr Goller, Head, German Project Office, visited the AIRBUS SAFRAN LAUNCHERS facilities at Bremen on 13th July, 2017. After an introduction to the manifold activities of the company, Director presented the importance of growing research partnership of Industrial relevance between India & Germany through IGSTC. Discussions also focused on joint research programmes with Industry and possible collaborations between IGSTC and Airbus Safran Launchers in future, especially in the areas of production technologies and material sciences.

### **Extramural Visits**

### **Alexander von Humboldt Foundation**

Director met with Dr. Katja Hartmann, Head, Berlin Office, Alexander von Humboldt Foundation on 5th July, 2017 in Berlin. Discussions focused on the role to be played by IGSTC in contributing to the Indo-German Frontiers of Engineering Symposia (INDOGFOE) as an Extramural Programme.

### Helmholtz Association of German Research Centres

Director met with Mrs. Ute Gerlach and Dr. Ludwig Stroink on 4th July, 2017 in Berlin. Discussions focused on the role of IGSTC to foster a closer cooperation between Helmholtz Association and DST. During a meeting of Minister Vardhan with Prof. Wiestler (President of the Helmholtz Society) both agreed to identify areas of mutual interest to initiate new cooperations between Indian and Helmholtz scientists. The work at DESY is an excellent example for the successful bilateral cooperation.

# **DST-MPG FELLOWS**



### **Dr S P Nehra**

Assistant Professor Centre of Excellence for Energy & Environmental Studies Deenbandhu Chhotu Ram University of Science & Technology, Murthal Sonepat, Haryana

Dr S P Nehra, Deenbandhu Chhotu Ram University of Science & Technology, Sonepat was awarded Max Planck India Mobility grant in and transition metals doped semiconducting photocatalysts and to study their atomic motion and charge transfer properties for hydrogen



May 2014 to undertake research "**Preparation** and characterization of semiconductor photocatalysts for surface reaction dynamics study and their applications" at Max Planck Institute for Structure and Dynamics of Matter, Hamburg, Germany. This was his 3<sup>rd</sup> visit for the same. This collaboration focuses on the photocatalytic processes involved in water splitting and hydrogen production, arguably one of the most important processes in our quest for sustainable renewable energy sources. The project aims to synthesize, characterize the pure energy applications. Research work entitled "Nanocasted Synthesis of Ag/WO3 Nanocomposite with Enhanced Sensing and Photocatalysis Applications" is published in the International journal Energy and Environment Focus published by American Scientific Publishers. Visitor and host group leader have discussed lab research work in detail. Extensive analysis and discussion was carried out for the project. Detailed discussions on the data developed and on further experiments etc were carried out during this visit.

### Indo-German Science & Technology Centre

### **IGSTC Secretariat**

Plot No. 102, Institutional Area Sector - 44, Gurgaon - 122003, India Tel: +91-1244929400

### **German Project Office**

German Aerospace Center (DLR-PT) Heinrich-Konen-Str. 1, 53227 Bonn, Germany Tel: +49-22838211407

E-mail: info.igstc@igstc.org