Introduction

Welcome to the March 2014 edition of the Education, Research and Innovation News from India. In this issue we present news on India’s forthcoming satellite launch, the award of Germany’s highest civilian award to a distinguished India scientist and news from the education, health, and environment fields. If there are other topics you would like to see included, please do let us know.

Happy reading!

Contents

Education ............................................................................................................................................. 2
Universities Grants Commission seeks proposals for BVoc course ............................................. 2
University of Chicago opens India Centre ....................................................................................... 2
Indian private sector companies to help establish specialized technology schools ..................... 2
Foreign students can take CMAT for admission to Indian management schools ....................... 2

Health .................................................................................................................................................. 4
Plasma cell survival intermediary identified .................................................................................... 4
Genetically engineered helicase ......................................................................................................... 4
Sensor for detecting volatile gases ................................................................................................... 5

Environment ....................................................................................................................................... 6
Water for Life’ UN-Water Best Practices Award 2014 awarded to an Indian program ............... 6
Desert dust aerosol affects Indian monsoon ...................................................................................... 6
Design, development and validation of smart sensor drifting node with INSAT telemetry for oceanographic applications ................................................................. 7
Can El Niño induce stratosphere–troposphere exchange of ozone? ............................................ 7

Materials ........................................................................................................................................... 9
Nanocomposite films as food wrappers ............................................................................................ 9

Space .................................................................................................................................................. 11
ISRO set to launch second navigation satellite .............................................................................. 11
Geomagnetic storms shape airglow ................................................................................................. 11
Computer model to hunt down amino acid in space ....................................................................... 12

Miscellaneous ..................................................................................................................................... 13
India bets on DNA-based healthcare ............................................................................................... 13
Indian TB scientist gets Germany’s highest civilian award ........................................................... 14

Forthcoming events in India ............................................................................................................. 15
Education

Universities Grants Commission seeks proposals for BVoc course

After completing Standard XII, students in India will soon have the option of higher studies that go beyond the conventional arts, commerce and science courses. The University Grants Commission (UGC) has set the ball rolling for the introduction of a three-year bachelor of vocation (BVoc) degree course at recognized colleges and universities across the country. This course seeks to provide skill and specialization in different vocations. It will have a multiple-exit provision - a diploma at the end of the first year and an advanced diploma after two years.

10 vocational sectors have been identified for these courses: automobiles, entertainment, information technology, telecommunication, marketing, agriculture, construction, applied arts, tourism and printing and publishing.


University of Chicago opens India Centre

The University of Chicago opened its Delhi centre recently to boost research and training collaborations with India in diverse disciplines. The centre, the third outside the US, after Beijing and Paris, has been built with an initial investment of $3.45 million.

The centre will promote scholarship and teaching under three broad umbrellas: business, economics, law and policy; science, energy, medicine and public health; and culture, society, religion and the arts. It will represent all parts of the university, including professional divisions. The centre will not, however, grant degrees.

Source: Livemint. For full text please visit http://www.livemint.com/Politics/zmPERQaU61PWDNdxqs0H3J/University-of-Chicago-opens-India-Centre.html

Indian private sector companies to help establish specialized technology schools

Leading corporate houses are partnering with the government to establish a chain of specialized technology schools. The human resource development (HRD) ministry, with the help from state governments, has roped in more than two dozen companies to set up 20 Indian Institutes of Information Technology (IIIIs). So far 25 companies have committed to open IIIIs in a PPP (private-public partnership) mode.

Indian industry has complained for long about the lack of industry-academia collaborations and lack of job-ready human resources. Industries will be allowed to set up their own chairs in these institutions and partner to provide customized courses based on their requirements. They will be part of the governing boards as well.

Each of the IIIIs under this scheme will entail an initial investment of INR128 crore (CHF 18.6M approx.). Half of the investment will be made by the Union government, while 35% will come from the state governments and the remaining 15% from the industry partners.

Source: Livemint. For full text please visit http://www.livemint.com/Politics/vGG7ZrUo2q6WzUQllz1GI/TCS-Coal-India-to-help-establish-specialized-technology-sch.html
Foreign students can take CMAT for admission to Indian management schools
The All India Council for Technical Education, the regulatory body for technical education in India, has announced that it will open up the Common Management Admission Test (CMAT) to foreign students for admission to management schools, and make answer sheets public to boost transparency. The AICTE conducts the CMAT twice a year and students can use their scores in the test for applying to B-Schools. The next entrance examination will be in September this year. India offers more than 400,000 seats in B-schools every year.

Source: Livemint. For full text please visit http://www.livemint.com/Politics/Rj6wiyLrhccNzXav3lCIDO/Foreign-students-can-take-CMAT-answersheets-to-be-made-p.html
Health

Plasma cell survival intermediary identified
Researchers have identified inducible nitric oxide synthase (iNOS) as a key intermediate that supports the survival of plasma cells, the workhorses of immunological protection in mammals. They have also shown that iNOS deficiency results in a shorter lifespan for plasma cells.

Biologists from National Institute of Immunology, New Delhi further reported that iNOS deficiency did not have any effect on the activation and terminal differentiation of B cells.

While a number of extrinsic factors have known to promote the survival of plasma cells, the signaling intermediates involved had not been studied properly till now.

The researchers showed in vitro that plasma cells which were deficient in iNOS died more. The protection mediated by iNOS involved activation of protein kinase G and modulation of endoplasmic reticulum stress components, they report. Activation of caspases was also diminished.

"We found that iNOS was required for PCs to respond to some prosurvival mediators associated with bone marrow stromal cells and that at least one mediator, interleukin 6, fed directly into this pathway by inducing iNOS," the researchers report.

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http://www.nature.com/nindia/2014/140312/full/nindia.2014.33.html


To access the article please visit http://www.nature.com/ni/journal/v15/n3/full/ni.2806.html

Genetically engineered helicase
Scientists have genetically engineered a synthetic helicase — an enzyme that can unpack genetic material such as DNA and RNA — from the malarial parasite Plasmodium falciparum. The study will advance our knowledge of the unwinding mechanism of helicases.

Helicases unwind duplex nucleic acids by utilizing the energy of nucleoside triphosphate hydrolysis. Scientists at the International Centre for Genetic Engineering and Biotechnology (ICGEB) in New Delhi had earlier reported that helicases could serve as potential novel drug targets for the control of malaria. The researchers reported the characterization of parasite-specific UvrD helicase from P. falciparum. They showed that the N-terminal and C-terminal fragments of PfUvrD contain characteristic ATPase and DNA helicase activities.

Now, the team has reported the generation and characterization of a genetically engineered version of PfUvrD and its derivatives. The miniaturized version synthetic UvrD (sUD) helicase of ~45 kDa containing all the conserved motifs was constructed through genetic engineering. The miniature version of the naturally occurring enzyme retains all characteristic enzymatic activities.

"This synthetic enzyme and one of its smallest derivatives sUDN1N2 of ~22 kDa exhibit the ATPase and ATP-dependent 3’ to 5’ DNA unwinding activities. The mutants of sUD and sUDN1N2 were produced by substituting two amino acids in the conserved helicase motifs”, says lead researcher Renu Tuteja.

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http://www.nature.com/nindia/2014/140331/full/nindia.2014.42.html

To access the article please visit http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0090951

Sensor for detecting volatile gases
Researchers have developed a sensor that can detect trace amounts of volatile organic gases. This sensor will be very useful for monitoring the levels of such gases in indoor environments.

Certain solids or liquids emit volatile organic compounds as vapours. Such compounds are emitted by a wide array of products, including paints, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment (such as copiers and printers) and photographic solutions. Studies have shown that such compounds remain at elevated concentrations long after their use, and can give rise to adverse health effects, such as irritation of the eyes, nose and throat, headaches, loss of coordination, nausea, and damage to the livers, kidneys and the central nervous system.

The researchers developed a simple and effective sensor for monitoring such organic compounds. It contains a sophisticated ion mobility spectrometer with an ultraviolet photoionization source to measure the levels of volatile organic gases.

The researchers tested the efficacy of the sensor in detecting trace concentrations of acetone, hexane and acetone–hexane mixtures. They found that the sensor could measure acetone and hexane levels down to hundreds of parts per billion. Their experiments clearly demonstrated that the sensor could selectively monitor the levels of a specific gas in a mixture of gases.

Reproduced from Nature India http://www.nature.com/nindia/2014/140322/full/nindia.2014.37.html

Environment

Water for Life’ UN-Water Best Practices Award 2014 awarded to an Indian program

The 2014 Water for Life UN-Water Best Practice Award in the category for ‘best water management practices’ has been awarded to the IWMI-Tata Water Policy Program (ITP). The award went to a project focusing on policy research in co-management of energy and groundwater in India.

The ITP was initiated in 2001 as a co-equal partnership between the International Water Management Institute (IWMI), Colombo, and Sir Ratan Tata Trust (SRTT), Mumbai. Its mandate is to undertake policy research in the domain of water-environment-agriculture-livelihoods. Besides several other relevant research themes, one of the cornerstones of ITP’s research has been on the Energy-Irrigation Nexus. ITP was not only the first to highlight the criticality of this nexus but has been at the forefront of developing ideas for co-management of energy and groundwater, both key facets of agricultural livelihoods in India.

Participatory Groundwater Management group in the in Andhra Pradesh Community Based Tank Management Project, India, which focuses on stakeholder participation and involving farmers in water management was ranked 2nd in this category.

In the category for best participatory, communication, awareness-raising and education practices ‘Pan in the Van’ WASH, project of the Society for Energy, Environment and Development, India was ranked 3rd. This is an onsite capacity building and awareness generation project, using camps which provided opportunities for about 12,000 women and girls to actively learn and participate in the improvement of the sanitary status of their community, as well as capacitate 100 workers, 700 school teachers and 40,000 school children.

The purpose of the ‘Water for Life’ UN-Water Best Practices Award is to promote efforts to fulfil international commitments made on water and water-related issues by 2015 through recognition of outstanding best practices that can ensure the long-term sustainable management of water resources and contribute to the achievement of internationally agreed goals and targets contained in the Millennium Development Goals (MDGs), Agenda 21 and the Johannesburg Plan of Implementation.

For more information: http://www.un.org/waterforlifedecade/index.shtml

For more information on the finalists please visit

For more about the IWMI-TATA Water Policy Research Program please visit
http://www.iwmi.cgiar.org/iwmi-tata-water-policy-research-program/

For more about the Andhra Pradesh Community Based Tank Management Project, please visit
http://www.apmitanks.in/index.htm

For more about the Society for Energy, environment and Development please visit
http://www.seedngo.com/index.php

For an interview with Mr Tushaar Shah, leader of ITP and a Senior Fellow at IWMI please visit
http://www.nature.com/nindia/2014/140327/full/nindia.2014.44.html

Desert dust aerosol affects Indian monsoon

Desert dust aerosol over the Arabian Sea, West Asia and the Arabian Peninsula has a major role to play in how intense the Indian monsoon would be, according to new research.
The scientists used satellite data and models to conclude that dust and precipitation over these regions varied in concert over timescales of about a week. Analysing global climate model simulations, they show that by heating the atmosphere, dust aerosols induce large-scale convergence over North Africa and the Arabian Peninsula, increasing the flow of moisture over India within a week.

According to these simulations, dust-induced heating of the atmosphere over North Africa and West Asia rapidly modulates monsoon rainfall over central India. According to the study, increased warming from high dust concentrations leads to a reduction in surface pressure and strengthening of the pressure gradient over the Arabian Sea. This leads to increased monsoon winds, moisture convergence and precipitation over the Indian region.

Earlier studies assessing the effect of aerosols on monsoon rainfall have focused on the local impact of aerosols on precipitation on monthly to seasonal timescales. The Indian summer monsoon is influenced by numerous factors, including aerosol-induced changes to clouds, surface and atmospheric heating, and atmospheric circulation.

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http://www.nature.com/nindia/2014/140326/full/nindia.2014.41.html

http://www.nature.com/ngeo/journal/v7/n4/full/ngeo2107.html

Design, development and validation of smart sensor drifting node with INSAT telemetry for oceanographic applications

Abstract: Drifter buoys are globally deployed to measure surface meteorological and oceanographic variables. A Lagrangian drifting buoy (Pradyu II) to measure sea-surface temperature and current has been developed at the National Institute of Ocean Technology, Chennai. The drifter buoy with geostationary satellite communication (INSAT-3C) to have near real-time data at every hour is a unique attempt in the history of drifting buoy nodes. This article describes Pradyu II drifting buoy node, design of low-power embedded system, communication network and field test results from an experiment conducted in the Bay of Bengal during March–April 2013. The results from Pradyu II are compared with commercially available drifting buoy (Marlin-Yug), moored data buoy (BD11) and remotely sensed data.


For full text please visit http://www.currentscience.ac.in/Volumes/106/06/0831.pdf

Can El Niño induce stratosphere–troposphere exchange of ozone?

The possibility of stratosphere–troposphere exchange (STE) of ozone induced by El Niño has been studied over the Indian region for two events spanning the periods April 1997–May 1998 and August 2006–February 2007 using in situ and satellite-based measurements. The response of STE to El Niño was observed to be opposite in the tropics and extra tropics. In the tropics, lifting of polluted, ozone-rich surface air led to reduced lower tropospheric and enhanced upper tropospheric and lower stratospheric ozone during the El Niño period, indicating transport from the troposphere into the stratosphere. Conversely, in the extra tropics, sinking motion from the stratosphere into the troposphere resulted in higher upper tropospheric ozone concentration during the El Niño period. An increase in the middle and lower tropospheric ozone during the La Niña period immediately following the El Niño period suggests that the response of STE to El Niño did not manifest concurrently with the period of El Niño, but lagged by several months. El Niño southern oscillation (ENSO)-induced changes in total ozone are more prominent in the extra tropics of the northeast, compared to
northwest India. However, as vertical ozone profiles are available for only two El Niño events, and the ozone variability between El Niño and La Niña events are relatively small, more detailed studies are needed to understand the dynamic influence of ENSO in producing ozone variability in India.


For full text please visit [http://www.currentscience.ac.in/Volumes/106/06/0860.pdf](http://www.currentscience.ac.in/Volumes/106/06/0860.pdf)
Materials

Nanocomposite films as food wrappers
Researchers from India have synthesized a nanocomposite film that potentially can be used for wrapping food. They made this nanocomposite film from a cellulose-derived polymer, bacterial cellulose nanocrystals and silver nanoparticles.

Previous studies have shown that the cellulose-derived polymer absorbs water, making it unsuitable for protecting food from moisture. In addition, other studies have found that some chemicals in food-packaging materials seep into food.

To develop moisture-resistant films with good mechanical properties, the researchers synthesized the nanocomposite by mixing bacterial cellulose nanocrystals and silver nanoparticles with hydroxylpropyl methyl cellulose, a cellulose-derived polymer. They then produced films of this nanocomposite and probed the mechanical properties of the films.

The researchers observed aggregations of bacterial cellulose nanocrystals; these aggregations formed percolated networks throughout the nanocomposite. This structure enhanced the mechanical properties of the nanocomposite films, including their load-bearing capacity. The silver nanoparticles interacted with the hydroxyl groups of the cellulose-derived polymer, improving the tensile strength and elongation properties of the films. The silver nanoparticles also enhanced the ductility of the films.

Both the bacterial cellulose nanocrystals and the silver nanoparticles reduced the moisture intake of the films through blocking interactions between water molecules and the water-loving polymer.

"These films, which contain two nanomaterials, will be very useful for developing ecofriendly food-packaging materials including potential biomedical applications," says Johnsy George, a co-author of the study.

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http://www.nature.com/nindia/2014/140312/full/nindia.2014.32.html?WT.ec_id=NINDIA-20140312


Nanowires for optoelectronic devices
Researchers have fabricated ultrathin indium-oxide–tin nanowires on substrates such as silicon, glass, stainless steel and copper foil. The nanowires are transparent at visible and near-infrared wavelengths, making them potentially useful for developing various optoelectronic devices.

Studies have shown that cracks readily form in thin-film electrodes on bending, degrading the performance of electronic devices. However, reports demonstrate that networks of nanowires or nanotubes offer superior mechanical properties to thin-film electrodes, and thus have the potential to enhance the performance of electronic devices.

To exploit this superiority of nanowires over thin films, the researchers grew nanowires from an alloy of tin and indium oxide on substrates at low substrates temperatures in the range 150–450 °C without using any catalysts or additional oxygen. They then explored the transmission properties of the nanowires at visible and near-infrared wavelengths. The optical and electrical properties of nanowire films grown on glass substrates were investigated.
At visible and near-infrared wavelengths, the nanowire films showed less reflection than a bare glass substrate. This low reflection may be attributed to light trapping in the nanowires. All the nanowire films exhibited good antireflection properties.

The indium oxide and tin alloy acted as a self-catalyst for nanowire growth. The nanowires had a uniform morphology over the whole substrate, and the films were highly transparent. This large-area growth is expected to find use in industrial applications. "These nanowire films will be useful for fabricating light-emitting diodes, dye-sensitized solar cells and flat-panel displays," says R. Rakesh Kumar, a co-author of the study.

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http://www.nature.com/nindia/2014/140321/full/nindia.2014.38.html

Space

**ISRO set to launch second navigation satellite**
The Indian Space Research Organisation is set to launch its second navigation satellites which would help put in place the Indian Regional Navigational Satellite System (IRNSS) on 4 April.

The satellite, weighing 1,432 kg, carries two types of payloads: navigation payload and ranging payload. The navigation payload of IRNSS-1A will transmit navigation service signals to the users. This payload will be operating in L5 band (1176.45 MHz) and S band (2492.028 MHz). A highly accurate Rubidium atomic clock is part of the navigation payload of the satellite. The ranging payload of IRNSS-1A consists of a C-band transponder which facilitates accurate determination of the range of the satellite. IRNSS-1A also carries Corner Cube Retro Reflectors for laser ranging. The satellite has a mission life of 10 years from the date of launch.

ISRO needs to launch at least four of the seven satellites to start the operations of the IRNSS. IRNSS 1A, the first satellite was launched in July 2013 and it is presently in orbit.

Being developed by India, IRNSS is designed to provide accurate position information service to users in the country as well as the region extending up to 1,500 km from its boundary, which is its primary service area.

IRNSS’ applications include terrestrial and marine navigation, disaster management, vehicle tracking and fleet management.

IRNSS is similar to US’ Global Positioning System, Russia’s Glonass and Europe’s Galileo. China and Japan too have similar systems named Beidou and Japanese Quasi Zenith Satellite System, respectively, Isro officials said.


*For more on the IRNSS please visit* [http://www.isro.org/satellites/irnss.aspx](http://www.isro.org/satellites/irnss.aspx)

**Geomagnetic storms shape airglow**
Researchers have gained insights into how geomagnetic storms affect airglow — emission resulting from interactions between solar radiation and molecules in the Earth's magnetosphere.

A geomagnetic storm is a temporary disturbance of the Earth's magnetosphere caused by a shock wave in the solar wind interacting with the Earth's magnetic field. An increase in the solar wind pressure affects the Earth's magnetic field by transferring greater energy and electric current into the magnetosphere. Such a change in the energy and electric current shapes airglow, which can be classified as dayglow and nightglow. Dayglow is the brightest of the two and, as its name suggests, occurs in daylight. Nightglow, on the other hand, is the emission of light resulting from the recombination of molecules that had been split during the day by solar radiation.

To gain a better understanding of the associations between geomagnetic storms, dayglow and nightglow, the researchers developed two neutral atmospheric models (which they called the MSISE-90 and NRLMSISE-00 models) for monitoring emission rates at a low-latitude station (Tirunelveli in Tamil Nadu).
The results they obtained indicate that the emission rate for the MSISE-90 model varies more than for the NRLMSISE-00 model. In the case of the MSISE-90 model, the maximum depletion in the emission rates of dayglow was found to be about 30% at 96 km during the main phase of the one of the geomagnetic storms investigated.

The density of oxygen molecules dropped by about 22% at 96 km during the main phase of the same geomagnetic storm. The NRLMSISE-00 model did not cause any appreciable change in the number density of oxygen atoms during either of the two events. The present study also showed that geomagnetic storms do not affect the altitude of the peak emission rate.

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http://www.nature.com/nindia/2014/140318/full/nindia.2014.34.html


**Computer model to hunt down amino acid in space**

Researchers have used computer-based models to identify the chemical processes that produce amino acid serine in the interstellar medium — the space between stars, which contains gas and dust clouds. This takes researchers a step closer to understanding how prebiotic molecules such as amino acids form in the interstellar medium.

Observational data suggest that the interstellar medium is rich in methanol, water, carbon dioxide and even amino acids like glycine. These molecules are thought to hitch a ride on meteorites, which, when they collide with planets like Earth, set off reactions that pave the way for the development of rudimentary life forms. It is difficult to simulate the formation and reactions of amino acids and their precursors in the interstellar medium, as such reactions happen at extremely low densities and temperatures.

To gain insights into such amino-acid-forming reactions in space, the researchers performed computer-based quantum-mechanical calculations, which indicate how serine forms in the interstellar medium at extremely low temperatures.

The researchers found that serine forms in five steps involving both radical–radical and radical–neutral reactions. The first step starts with hydrocarbon radicals and carbon monoxide. The second step results in the formation of the dehydrogenated form of acetic acid. In the third step, the product of the second step reacts with amino and methylene groups, and finally it reacts with the hydroxyl group to form serine.

The researchers say that these results demonstrate an immediate prospect of obtaining the many transitions necessary for a definitive detection of interstellar serine.

*Reproduced from Nature India*
http://www.nature.com/nindia/2014/140312/full/nindia.2014.31.html?WT.ec_id=NINDIA-20140312


*For full text please visit http://www.aanda.org/articles/aa/abs/2014/03/aa18470-11/aa18470-11.html*
India bets on DNA-based healthcare

Genomics-based medicine will receive top priority in India in the coming years, according to a new policy announced by the government Department of Biotechnology (DBT). Announcing this, the DBT has said that by 2025 it envisions converting 50% of existing hospitals in the country into "hospitals for prediction and prevention of diseases using genomic tools" for more effective treatments with less side effects. Concurrently, it plans one dedicated centre in each city for genetic testing services at affordable prices.

DBT's draft policy "Vision 2025" says "it is imperative" to advance the field of genomics in the country also from drug discovery perspective. The new policy talks about prioritising diseases of national concern — cervical, oral, lung and breast cancers — "where genomics could play a spearheading role in devising appropriate intervention and treatment."

In order to achieve this goal, the DBT plans to take genomics from research laboratories to clinics by increasing the use of genomic information in disease prognosis, diagnosis, prediction and making appropriate choice of drug on the basis of patients' genotypes.

The new policy calls for provision of more widespread genetic testing services for diseases with chromosomal aberrations or disorders.

To deal with such diseases that may be influenced by environmental factors, "we need to move away from single genes to genomic pathways," the DBT document says. Another approach for better understanding of genetic disorders includes small molecule screening and synthetic biology. "Genomic information could be used to design and test synthetic peptides and RNA blockers for vaccination and treatment," says the policy statement.

The policy also calls for "a sincere effort" in the direction of genetic epidemiological studies. This is to be ensured by to electronically maintain records of relevant genomic information of patients. "Collection of epidemiological data would be followed-up longitudinally by deep phenotyping and correlating with cellular, molecular and cytogenetic data for in depth breadth and coverage of analysis."

According to DBT, implementing "Vision 2025" would require a workforce well-trained in genomics research. It plans to train clinicians and health-care professionals in clinical genetics in collaboration with the Medical Council of India. Setting up of clinical bioinformatics units in strategic locations across the country and creating genomics awareness in general public and healthcare providers are other proposals under the new policy.

Reproduced from Nature India
http://www.nature.com/nindia/2014/140327/full/nindia.2014.43.html

To access the text of the National Biotechnology Development Strategy please visit http://dbtindia.nic.in/docs/NBDS_2014.pdf

Indian TB scientist gets Germany's highest civilian award

Eminent Indian biologist Seyed Ehtesham Hasnain, a professor in the Department of Biological Sciences at Indian Institute of Technology, Delhi has been awarded Germany's highest civilian award, the Order of Merit. Hasnain, known for his work on tuberculosis, was bestowed with the Order of Merit of the Federal Republic of Germany by German ambassador to India Michael Steiner at an informal ceremony in New Delhi. Hasnain has been awarded for his "outstanding achievements in the relationship between the two
countries”. Hasnain has been the Director of the Centre for DNA Fingerprinting and Diagnostics and Vice-Chancellor of the University of Hyderabad.

Source: nature India. For full text please visit http://www.nature.com/nindia/2014/140312/full/nindia.2014.30.html?WT.ec_id=NINDIA-20140312
Forthcoming events in India

Recent Advances in Modeling Rare Events: Methods and Applications (RARE14)
Kumarakom, 29 May 29- 1 June 2014
http://www.iitk.ac.in/chm/rare

International conference on embedded Systems ICES 2014
Coimbatore, 3-5 July 2014
http://amrita.edu/ices14/index.html

International Conference on Electron Microscopy and XXXV Annual Meeting of the Electron Microscope Society of India
New Delhi, 9-11 July 2014
http://www.emsi2014.in/index.html

22nd Cochrane Colloquium: ‘Evidence-Informed Public Health: Opportunities and Challenges
Hyderabad, 21-26 September 2014
http://colloquium.cochrane.org/

International Conference on Polymeric Biomaterials, Bioengineering and Biodiagnostics ‘Biomaterials-2014’
New Delhi, October 27-30, 2014
http://www.biomaterials2014.org/

International conference on Technical textiles and Nonwovens
New Delhi, 6-8 Nov 2014
http://www.textileconferenceiitd.com/2014/

5th International Conference on Stem Cells and Cancer (ICSCC-2014): Proliferation, Differentiation and Apoptosis
New Delhi, 8-10 November 2014
http://www.icscc.in/

6th Asian Thermal Spray Conference (ATSC – 2014)
Hyderabad, 24-26 November 2014
http://atsc2014.in/

Recent Advances in Operator Theory and Operator Algebras
Bangalore, 9 -19 December 2014

5th International Fluid Mechanics and Fluid Power (FMFP) Conference
Kanpur, 12-14 December 2014
http://www.iitk.ac.in/fmfp14/index.html

EMBO Conference: Upstream and downstream of Hox genes
Hyderabad, 14–17 December 2014

30th International PLEA Conference: SUSTAINABLE HABITAT FOR DEVELOPING SOCIETIES Choosing the way forward
Ahmedabad, 16-18 December 2014
http://www.plea2014.in/
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