

Indian Science in Indian Media



Highlights of India ScienceWire Stories

February 2018

India Science Wire - highlighting Indian science in Indian media

The coverage of science and technology particularly relating to research done in Indian research institutions, is generally very poor in Indian media. There are several reasons for this situation, one of them being the lack of credible and relevant science content. In order to bridge this gap, Vigyan Prasar launched a unique initiative - India **Science Wire (ISW)** – in January 2017.

The news service is dedicated to developments in Indian research laboratories, universities and academic institutions. Almost all news stories released by this service are based on research papers by Indian scientists published in leading Indian and foreign journals. All news stories and features are written and edited by a team of professional science journalists with decades of experience in science journalism.

News stories based on happenings in Indian research labs are released to media houses on a daily basis. These stories are also uploaded on ISW website and are simultaneously promoted through social media – Twitter and Facebook. At present, the service is available in English and Hindi.

Reach out ISW Editor with story ideas, comments and suggestions at indiasciencewire@gmail.com

ISW website: <http://vigyanprasar.gov.in/isw/isw.htm>

ISW stories released and published in February 2018

Total number of stories released: 48

S.No.	Story title	Date of release	Name of the writer
1	Scientists use silk polymer to develop artificial vertebral disc	Feb 1	Ratneshwar Thakur
2	Indian scientists develop world's thinnest material with novel technique	Feb 5	Dinesh C Sharma
3	New study could pave the way for novel contraceptive	Feb 5	Sunderarajan Padmanabhan
4	भारत में विश्व स्तरीय वैज्ञानिक संस्थान विकसित करना जरूरी	Feb 5	Navneet Kumar Gupta
5	A four-day meet on Astronomy begins at Hyderabad on 6th February	Feb 5	T.V.Venkateswaran and Sunderarajan Padmanabhan
6	India needs more astronomers, astronomy education	Feb 6	Dinesh C Sharma
7	Hyderabad – cradle of astronomy in India	Feb 6	Dinesh C Sharma
8	जलवायु परिवर्तन से रंगहीन हो रहे हैं समुद्री प्रवाल	Feb 6	Shubrata Mishra
9	Are we alone in this universe? Big data algorithms may help find answer	Feb 7	Dinesh C Sharma
10	Concern over gender gap in astronomy	Feb 7	Dinesh C Sharma
11	India gets robotic telescope to keep an eye on dynamic cosmos	Feb 8	Dinesh C Sharma
12	Inspired by a Bollywood flick and power of Facebook, Indian scientist builds army of e-astronomers	Feb 9	Dinesh C Sharma

13	Volcanic spewing in Barren Island is continuation of 2005 eruption: study	Feb 9	Dr. Aditi Jain
14	भारत में सुदूर संवेदन के जनक : पिशरोथ रामा पिशरोटी	Feb 9	Navneet Kumar Gupta
15	CV Raman Fellowships bring African and Indian researchers closer	Feb 12	Susmita Saha
16	Scientists uncover mechanism of joint cartilage formation	Feb 12	Ratneshwar Thakur
17	New initiatives to boost technology incubators	Feb 12	Sunderarajan Padmanabhan
18	Scientists identify potential early biomarker for Alzheimer's	Feb 13	Jyoti Singh
19	New technology may help scale up memory storage capacity	Feb 13	Ratneshwar Thakur
20	CCMB working to make personalised medicine a reality	Feb 15	Sunderarajan Padmanabhan
21	हिमयुग के अंतिम वर्षों में मानवीय पलायन में शामिल थीं महिलाएं	Feb 15	Umashankar Mishra
22	Fireflies emit light similar to lasers	Feb 16	Monika Kundu Srivastava
23	Augmented video games can help in stroke recovery: study	Feb 16	Dinesh C Sharma
24	लखनऊ के शहरीकरण से मृतप्राय हुई गोमती नदी	Feb 16	Shubhrata Mishra
25	Here is how nutrition may help overcome genetic risk of diabetes	Feb 20	Yogesh Sharma
26	मानसून में वन्यजीवों के लिए अधिक जानलेवा हो जाती हैं सड़कें	Feb 20	Umashankar Mishra
27	NAL working on Mark 2 version of light transport aircraft: CSIR	Feb 21	Sunderarajan Padmanabhan

28	Science films can help promote scientific temperament	Feb 21	T V Venkateswaran
29	वैज्ञानिक अनुसंधान की बुनियाद के पीछे था "नेहरू-भटनागर प्रभाव"	Feb 21	Navneet Kumar Gupta
30	Jumping genes become active in critical brain areas as we age : study	Feb 22	Vaishali Lavekar
31	Indian scientists working to unravel rare type of diarrhoea	Feb 22	Sunderarajan Padmanabhan
32	Scientists explore wild rice varieties for useful genes	Feb 23	Shikha T Malik
33	Scientists meet to understand solar cycle better	Feb 23	Sunderarajan Padmanabhan
34	Tourists can now get better insight into astronomical heritage in Jaipur	Feb 24	Sunderarajan Padmanabhan
35	Potent anti-obesity agent works in rats	Feb 24	Shikha T Malik
36	A shot in the arm for efforts to promote newer bio-fuels	Feb 26	Sunderarajan Padmanabhan
37	Genomic study may help solve 'Indian Enigma' relating to gastric bacteria	Feb 26	Dr. Aditi Jain
38	धोखा नहीं दे पाएंगे चेहरे के बनावटी हाव-भाव	Feb 26	Shubhrata Mishra
39	कार्बन फुट-प्रिंट कम करने में उपयोगी हो सकती है नई तकनीक	Feb 26	Navneet Kumar Gupta
40	Hot springs harbour microbial diversity	Feb 27	Vaishali Lavekar
41	रामन प्रभाव की याद दिलाता है राष्ट्रीय विज्ञान दिवस (फीचर)	Feb 27	Navneet Kumar Gupta
42	A page from history : How Ramanujan became a Fellow of Royal Society on this day a century ago	Feb 28	T V Venkateswaran
43	Harsh Vardhan stresses on small deeds towards clean and green environment	Feb 28	T V Venkateswaran

44	सतत विकास के लिए विज्ञान और प्रौद्योगिकी	Feb 28	Navneet Kumar Gupta
45	National awards for science communication presented	Feb 28	Jyoti Singh
46	Science is not for children alone but is a way of life	Feb 28	Sunderarajan Padmanabhan
47	विज्ञान को लोकप्रिय बनाने के लिए संचारकों को राष्ट्रीय पुरस्कार	Feb 28	Umashankar Mishra
48	हरित सामाजिक जिम्मेदारी को बढ़ावा देने में मददगार हो सकता है यह ऐप	Feb 28	Umashankar Mishra

Lab notes: Scientists use silk polymer to develop artificial vertebral disc

The artificial disc mimics the internal intricacy and mechanical properties of a human disc.



Spine model with nerves exiting between vertebra and a herniated disc (red). | [Michael Dorausch/Flickr](#)
Feb 02, 2018 · 05:30 pm

Ratneshwar Thakur

Degenerative disc disease is a major cause of low back pain affecting mobility of people. A group of Indian scientists have developed a silk-based bioartificial disc that may find use in disc replacement therapy in future.

At present, therapeutic treatment for degenerative disc disease can only provide symptomatic relief of pain without restoring the functions of discs, while disc replacement surgery is very costly. The use of a silk biopolymer to fabricate a biocompatible disc can reduce the cost of artificial discs in future, claim researchers from the department of biomaterial and tissue engineering at Indian Institute of Technology, Guwahati, who have developed the new technology.

The group has developed a fabrication procedure for a silk-based bioartificial disc adopting a “directional freezing technique”. The disc mimics internal intricacy of human disc and its mechanical properties too are similar to those of the native ones, according to research results published in international scientific journal *Proceedings of the National Academy of Sciences*.

The fabricated discs supported primary annulus fibrosus or human mesenchymal stem cell proliferation, differentiation, and matrix deposition of a sufficient amount. The annulus fibrosus is a specialised tissue having a complex, multilamellar, hierarchical structure consisting of collagen, proteoglycans and elastic fibers.

“Major challenges toward successful intervertebral disc tissue engineering remain elusive, mainly because of tremendous complexity of annulus fibrosus tissues,” said Biman B Mandal, who led the research team. “We have successfully recapitulated its internal intricacy - angle-ply construct, which is critical for the proper biomechanical functioning of the disc.”

Degenerative disc disease affects intervertebral discs, which are soft pillow-like cushions between interlocking bones that structure human spine. These discs act as shock absorbers for the spine and support weight and complex motions of the spine. With growing age, these discs change from a flexible state that allows the smooth fluid motion to a stiff and rigid state restricting movement and resulting in discomfort or pain. “Our construct mimics native structure-function attributes of the disc and provides sufficient mechanical strength to function in load-bearing activities,” explained Bibhas K Bhunia, co-author of the study.

The new disc has been tested in laboratory mice and scientists observed negligible immune response. “We believe if the silk-based biodiscs transcends clinical translation, it can be an affordable option for disc replacement therapy in future,” said Mandal.

The research team included Bibhas K Bhunia, Biman B Mandala (IIT Guwahati) and David L Kaplan (Tufts University, Medford). This work was supported by grants from the Department of Science and Technology (DST) and the Department of Biotechnology.

Outlook

Indian Scientists Develop World's Thinnest Material With Novel Technique

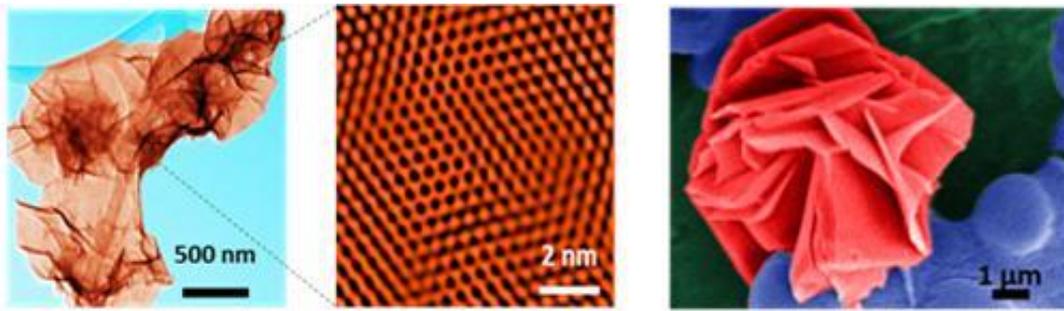
DINESH C. SHARMA



How thin can the thinnest material be? It can be as thin as 100,000 times thinner than a sheet of paper. You may not be able to imagine or see with naked eyes such a material, but this is what a group of Indian scientists have done. They have synthesized a two-dimensional material of just one-nanometer thickness using a novel method.

The nanosheets synthesized by researchers at the Indian Institute of Technology, Gandhinagar, using Magnesium diboride – a compound of boron – represent a two-dimensional material that has never existed before. Such a material can find a range of applications – from next-generation batteries to ultraviolet absorbing films.

A human hair is about 80,000 nanometer wide, while the approximate diameter of human DNA is 2.5 nanometer. 2D planar materials are just a few micron (one-millionth of a meter) long and wide, and their thickness is one nanometer. Such materials are a hot topic of research since the discovery of graphene – a single layer of carbon arranged in a honeycomb – isolated from pencil graphite. The graphene discovery had won the Nobel physics prize in 2010.



a) Nanosheets dispersed in water (appear like crumpled sheets of paper); (b) The boron atoms in these nanosheets are arranged in the form of a honeycomb; (c) Image of nanosheets recovered from water (appears like a flower) as the nanosheets tend to come together.

Scientists are racing to develop such nanomaterials as they possess unique properties. Graphene, for instance, is 200 times stronger than steel though it is just one atom thick. The quest is to synthesize newer 2D materials which are similar to graphene but made from different elements.

The nanosheets developed by researchers are made of boron atoms arranged in the shape of a honeycomb, using a simple method. “We prepared boron-rich nanosheets by an extremely simple method, which merely involves dissolving a boride compound in water and letting it recrystallize for just the right duration of time. Other methods for preparing similar nanomaterial require a deposition from the vapor phase onto a substrate, which is quite expensive and limits the applications,” explained Dr. Kabeer Jasuja of Department of Chemical Engineering, IIT Gandhinagar, while speaking to *India Science Wire*. The discovery has been announced in scientific journal *ChemPhysChem*.

The researchers have shown that a large fraction of Magnesium diboride crystals can undergo dissolution in water under ambient conditions to result in nanocrystal precursors, which recrystallize in a 2D fashion after some time. This non classical recrystallization can be used to obtain a high yield of boron-based nanostructures like nanodots, nanograins, and nanoflakes. This discovery, according to the researchers, constitutes a fundamental set of findings in the science of Magnesium diboride, a material that has been primarily known for its superconductive properties.

“The method yields an aqueous colloid of these nanosheets, which means that a drop of water from this colloid would contain thousands of ultrathin nanosheets swimming like micro-carpets,” said Jasuja. Boron has attracted nanotechnology researchers because of its rich properties – low density, high mechanical strength but lighter weight, high thermal resistance, high specific resistance at ordinary temperature, high melting point, ability to absorb neutrons, and high resistance to chemical attacks.

The ability of these boron-based nanostructures to selectively absorb UV radiation makes them promising candidates for developing transparent UV absorbing films. These functionalized magnesium boride nanostructures (containing hydrides, oxides, and hydroxide functional groups) are also promising candidates for engineering hydrogen storage materials.

“The rich chemistry of boron is expected to make these nanosheets useful for not only storing energy but also for generating energy in a green way. We are now working towards utilizing these nanosheets for developing the next generation batteries and nanocatalysts,” added Jasuja.

The research team included Harini Gunda, Saroj Kumar Das and Kabeer Jasuja from the Department of Chemical Engineering, IIT Gandhinagar. The study was funded under Fast Track Research Grant for Young Scientists of given by Science and Engineering Research Board (SERB), the INSPIRE Faculty Award Research Grant by Department of Science and Technology, and the seed funding from IIT Gandhinagar.
(India Science Wire)



New study could pave the way for contraceptive

By Sunderarajan Padmanabhan

Published on 5th, February, 2018

Hyderabad, February 5 (India Science Wire): Scientists at the Centre for DNA Fingerprinting and Diagnostics (CDFD) here have come up with a finding that could pave the way for the development of a new type of contraceptive.

The study conducted on mice has found that the presence of an enzyme called IP6K1 played an important role in the formation of sperm cells in male mouse. Formation of sperms is a multi-step process. In one of the stages, nucleus of the cell has to condense and become elongated. This process requires expression of two key sperm-specific proteins called TNP2 and PRM2. The study has found that an enzyme IP6K1 is required to ensure that these two sperm proteins get expressed properly. Researchers knocked out the gene that produces IP6K1 and found that in its absence, sperm proteins were getting synthesised prematurely and as a result, sperm failed to develop completely.

Speaking to India Science Wire, leader of the study team Dr. Rashna Bhandari noted that the finding indicated the possibility for development of a new type of contraceptive. However, in the same breath, she cautioned against expectations of an immediate product.

“We can now think of inhibiting IP6K1 to make males infertile. However, another paper from a US group has shown that an existing IP6K1 inhibitor does not cause mouse male infertility. It is probably because the inhibitor does not cross the blood-testis barrier. So, to develop a contraceptive using our new knowledge, we will first have to develop a new inhibitor of IP6K1, and then test it in mice to see if it causes male infertility.”

She also noted that there was a need to conduct more studies to understand the enzyme better. For instance, a Swedish group had, in 2007, shown that knocking out of the IP6K1 gene reduced insulin secretion from the pancreas. “It is clear that we need to be extra cautious when we deal with this gene”.

The new finding, she said, could also be looked at from the point of view of treatment for male infertility. “So far, there is no report of any infertility in human males because of lack or dysfunction of IP6K1 enzyme. But, it is conserved in men also. We can perhaps screen infertility patients to see whether there was any loss or mutation of the enzyme and whether it was causing the infertility. If that was so, then it may be possible to cure their infertility by merely adding back the enzyme to their developing sperm”.

This study was conducted by her PhD student, Aushaq Bashir Malla under her guidance. They have published the results in the Journal of Cell Science. The journal has also published an interview with Malla under its ‘‘First Person’ series which focuses highlights the work of early career researchers. “It is heartening that a reputed journal has featured Malla. He is from Kashmir and this interview should help in enthusing students from the state to go on to make a mark in global science”, Dr. Bhandari added. (India Science Wire)

(This is from a syndicated feed from India Science Wire)

DownToEarth 25 years

FORTNIGHTLY ON POLITICS OF DEVELOPMENT,
ENVIRONMENT AND HEALTH

भारत में विश्व स्तरीय वैज्ञानिक संस्थान विकसित करना जरूरी : कोविंद

Navneet Kumar Gupta @NavneetKumarGu8

Monday 05 February 2018

राष्ट्रपति रामनाथ कोविंद सोमवार को राष्ट्रपति भवन में नोबेल पुरस्कार श्रृंखला-2018 के अंतर्गत आयोजित एक कार्यक्रम में बोल रहे थे।



राष्ट्रपति ने नोबेल पुरस्कार विजेताओं से देश में शोध कार्यों को बढ़ावा देने वाले वैज्ञानिक संस्थानों के विकास के लिए भारतीय वैज्ञानिकों और नीति-निर्माताओं को परामर्श देने का आग्रह किया है

राष्ट्रपति रामनाथ कोविंद ने कहा है कि भारत में वैश्विक स्तर के संस्थान विकसित करना और वहां होने वाले शोध कार्यों को समाज से जोड़ा जाना आवश्यक है। वह सोमवार को राष्ट्रपति भवन में नोबेल पुरस्कार श्रृंखला-2018 के अंतर्गत आयोजित एक कार्यक्रम में बोल रहे थे।

चार नोबेल पुरस्कार विजेताओं, केंद्रीय विज्ञान एवं प्रौद्योगिकी मंत्री हर्षवर्धन, मानव संसाधन विकास मंत्री प्रकाश जावड़ेकर के अलावा कई जाने-माने वैज्ञानिक, शिक्षाविद् और उद्योग जगत के लोग कार्यक्रम में शामिल थे।

कार्यक्रम की शुरुआत विज्ञान एवं प्रौद्योगिकी विभाग के सचिव प्रोफेसर आशुतोष शर्मा ने स्वागत भाषण के साथ हुई। इस अवसर पर राष्ट्रपति ने नोबेल पुरस्कार विजेताओं से देश में शोध कार्यों को बढ़ावा देने वाले वैज्ञानिक संस्थानों के विकास के लिए भारतीय वैज्ञानिकों और नीति-निर्माताओं को परामर्श देने का आग्रह किया है।

नोबेल पुरस्कार श्रृंखला भारत सरकार के जैव प्रौद्योगिकी विभाग और स्वीडन स्थित नोबेल फाउंडेशन द्वारा संयुक्त रूप से की गई एक रोमांचक पहल है, जो विज्ञान के युवा छात्रों के बीच नवाचार और रचनात्मक सोच को प्रोत्साहित करने के लिए नोबेल पुरस्कार विजेताओं और प्रतिष्ठित वैज्ञानिकों को एक साथ लाने के लिए शुरू की गई मुहिम का हिस्सा है।

इस अवसर पर हर्षवर्धन ने कहा कि “हमारे वैज्ञानिक संस्थान बेहतर कार्य कर रहे हैं और यही वजह है कि आज वैज्ञानिक एवं औद्योगिक अनुसंधान परिषद (सीएसआईआर) की वैश्विक पहचान बनी है। पिछले दस सालों में विज्ञान एवं प्रौद्योगिकी के बजट में तीन गुना वृद्धि हुई है। नैनो-प्रौद्योगिकी सहित अनेक क्षेत्रों में हमारे यहां बेहतर शोध हो रहे हैं। शोध कार्य को प्रोत्साहन देने के लिए छात्रों के लिए इंस्पायर योजना चल रही है। हर साल राष्ट्रपति भवन में इनोवेशन फेस्टिवल का आयोजन किया जाता है, जो देश में शोध कार्य को प्रोत्साहित करने की दिशा में पहल है।”

मानव संसाधन विकास मंत्री प्रकाश जावड़ेकर ने इस मौके पर कहा कि “विज्ञान के द्वारा दुनिया तेजी से बदल रही है। लाखों किताबें ऐप पर आपको मिल जाएंगी और नवाचार को प्रोत्साहन दिया जा रहा है। आज देश में शोध प्रवृत्ति बढ़ रही है। बजट में भी सरकार ने एक हजार छात्रों को प्रति माह एक लाख रुपये की छात्रवृत्ति दिए की घोषणा की है।”

इस कार्यक्रम में नोबेल पुरस्कार विजेता क्रिस्टीन नुसलिन एवं सर्ज हेरोक सहित भारतीय प्रौद्योगिकी संस्थान, मुम्बई के निदेशक देवांग खखड़, बनारस हिंदू विश्वविद्यालय से समंबद्ध रमादेवी निम्ननपल्ली, टाटा मूलभूत अनुसंधान संस्थान के निदेशक संदीप त्रिवेदी, मेहता फाउंडेशन अमेरिका के राहुल मेहता और दिल्ली विश्वविद्यालय के पूर्व उपकुलपति प्रोफेसर दिनेश सिंह ने संबोधित किया।

इस अवसर पर फील्ड मेडल से सम्मानित मंजुल भार्गव ने देश में विज्ञान के स्वर्णिम अतीत एवं वर्तमान शोध कार्य के समन्वय से श्रेष्ठ शोध कार्य को आगे बढ़ाने की बात कही। वहीं, सर्ज हेरोक ने क्रांस में विश्वविद्यालयों में स्थापित शोध केंद्रों की शोध में भूमिका के बारे में बताया।

जैव प्रौद्योगिकी विभाग के पूर्व सचिव के. विजयराघवन ने इस मौके पर कहा कि भारत में विज्ञान और प्रौद्योगिकी की बात होती है, तो उसमें इसरो, नाभिकीय ऊर्जा आदि क्षेत्रों का बजट भी जोड़ दिया जाता है, जबकि आधारभूत विज्ञान के क्षेत्र में प्रदान किए जाने वाले बजट की राशि तुलनात्मक रूप से कम है।

कार्यक्रम के दूसरे सत्र को संबोधित करने वाले वक्ताओं में दो नोबल पुरस्कार विजेताओं में टॉमस लिंगाल एवं रिचर्ड आर रॉबर्ट्स शामिल हैं। इनके अलावा इस सत्र में काडिला के अध्यक्ष राजीव मोदी, एवं इंफोसिस के सह-संस्थापक के. दिनेश एवं स्टेन्फोर्ड विश्वविद्यालय के प्रोफेसर मनु प्रकाश ने चर्चा में भागीदारी की। इनके अलावा इस अवसर पर नोबल समिति के जुलिन जिरेथ ने भी अपने विचार व्यक्त किए।

(इंडिया साइंस वायर)

A four-day meet on Astronomy begins at Hyderabad on February 6

SUNDERARAJAN PADMANABHAN T.V.VENKATESWARAN



NEW DELHI, FEBRUARY 5

About 400 astronomers are gathering at Hyderabad for a stimulating four-day discussion on a range of topics in astronomy being organised by the Astronomical Society of India beginning tomorrow, Tuesday, February 6 at Osmania University in the southern metropolitan city.

Subjects ranging from mysteries of super-massive black holes lurking in the middle of our galaxy and exploration of the character of dark matter, to peculiarities of planets orbiting other stars, and gravitational waves, the latest topic in the world of astronomy, will feature at the meet to mark the 36 th annual meeting of ASI.

Addressing a press conference, Prof. Dipankar Banerjee Secretary, Astronomical Society of India, said many interesting results are expected to be presented in the next four days including results from AstoSAT, India's first space multi-wavelength telescope.

Prof Ajit K. Kembhavi, from Inter-University Centre for Astronomy and Astrophysics and also Vice President of International Astronomical Union, noted that one one of the talks would ponder over whether humans are the only living organisms who look at the starry sky in wonderment. The talk by Prof Biman Nath, scheduled for Thursday, February 8, will explain how nocturnal dung beetles apparently use not just bright objects like Moon but also spectacular distant objects like the milkyway to navigate during the night, he said.

“It is, he pointed out, “an exciting time to do astronomy and astrophysics in this country. We are part of many mega projects having multi-national involvements. The thirty meter telescope that is coming up in Hawaii, the LIGO-India project, the gravitational wave observatory that is to be set up in Maharastra, the soon to be launched Aditya L-1 mission to explore Sun, the recently inaugurated 3.6 meter ground based optical telescope in Devasthal Observatory, the Square Kilometre Array, in which India will be a key partner, will all offer exciting opportunities for Indian students to pursue research in astronomy and astrophysics. These facilities would provide world class access to telescopes and probes for doing international quality astronomy astrophysics research in India.”

Presenting a report on the 3.6 metre-sized optical telescope in Devasthal, which is run by the Aryabhata Research Institute of Observational Sciences, Prof Brijesh Kumar, said it was the largest telescope to be set up in India.

Prof. Bindu Rani, from NASA GSFC, said that some recent results on inter galactic universe would be presented during the conference.

Pointing out that deep Learning, or Machine Learning is being increasingly used in pattern and image recognition and even to beat world champions in certain games like ‘Go’, Prof Ashish Mahabal, from University of Caltech, said a workshop to train astronomy students to use machine learning techniques is being organised as part of the four day meet.

With a membership over 1,000, Astronomical Society of India is the oldest and largest association of professional astronomers in the country and was founded in Osmania University way back in 1972.. The annual meeting will see more than 100 talks by researchers detailing their discoveries and about 170 posters showcasing the work done by young students in various Indian institutions. “Indian students studying abroad have also come to attend this conference showing the importance it is gaining in years” says Prof. Dipankar Banerjee.

Using the opportunity, the Public Outreach and Education Committee of ASI is arranging for visits of astronomers from various parts of the country to go and interact with children in a number of schools and colleges in the city. Further, a panel of eminent astronomers will present information on career opportunities in Astronomy in India. They will talk about the observatories and telescopes in the country and student programs in various institutes.

Niruj Mohan Chairperson of the POEC, ASI said “an exhibition detailing basics of astronomy and Indian astronomical institutions has been prepared and they will be taken in a mobile van to various schools in Hyderabad. “We had organised a one day capacity building programme for school teachers on ‘basics of astronomy yesterday”, he added.

TECH 2

Astronomy education in India is lacking and only a handful of universities are taking the initiative, says ASI president

Dinesh C Sharma [Feb 06, 2018 23:15 PM IST](#)

New discoveries in *astronomy* in recent years have generated a lot of excitement globally, and Indian scientists have contributed to them in large measure. However, the country is lacking when it comes to promoting astronomy education at different levels and the number of professional astronomers it needs.



Just a handful of our country's 700-odd universities teach astronomy and astrophysics at postgraduate and research levels. The number of undergraduate colleges with courses in astronomy and astrophysics is minuscule and at the school level, astronomy does not figure in the curriculum. This was stated by Prof S K Pandey, President of the *Astronomical Society of India*, which is holding its 36th annual meeting at *Osmania University* here.

India needs to boost astronomy education at all levels as astronomy acts as a proxy for promoting scientific temper, besides addressing fundamental questions about human existence and our place in the universe. Its promotion could drive innovation as some of the most cutting-edge technologies find their application in astronomy, Prof Pandey said.

“The need to promote astronomy education and public outreach is even more important when there is a growing influence of astrology in the society,” Prof Pandey, who is a leading astronomer and vice chancellor of Raipur-based Pandit Ravishankar Shukla University, said while talking to India Science Wire after delivering the presidential address.

One of the objectives of the society is “striving to include astronomical courses in the school, college and university curricula.” But astronomy education has been slow to pick up despite efforts being made by organisations like the Inter-University Centre for Astronomy and Astrophysics (IUCAA). The IUCAA Node for Astronomy and Astrophysics Development (INAAD) provides technical knowledge, resource people, coordination, financial support and some basic resources.

Astronomy and astrophysics courses are taught at the postgraduate level, but they are too dense with too many topics covered. Given the way the discipline of astronomy and astrophysics have developed, Prof Pandey said there was a need emphasise on laboratory courses that focus on the analysis of data, in addition to observational exercises using telescopes. Online courses on different subjects could be developed for those interested in participating in astronomy projects. For instance, engineers trained in data analysis, instrumentation and image processing could suitably be trained for astronomy projects.

“There is going to be huge data pouring from mega-science projects in astronomy and we need an army of professional astronomers to handle it,” he added. “We need a conveyor belt of astronomers – who start with smaller projects then move on to bigger ones.”

For teaching and research at an undergraduate level, the ASI president suggested the use of small telescopes whose capacity could be enhanced significantly by using low-cost back-end instrumentation like a stellar photometer, CCD camera and stellar spectrograph. “With advanced sophistication in optics and electronics, it is possible for smaller telescopes to do what larger

telescopes could do in the past. There is no need to move smaller telescopes to museums,” Prof Pandey said.

Small telescopes could be acquired for up to Rs 15 lakh, for which funding is available from agencies like the Department of Science and Technology (DST) and the *University Grants Commission (UGC)*. “These telescopes could be useful in sustaining interest in astronomy and possibility of retaining a student in science stream”. Besides training and research, small telescopes could also be deployed for public awareness by organising events like night sky reading.

Overall, “the culture of astronomy teaching must grow in India,” the ASI chief said. The five-day annual meeting of the society is being attended by astronomers, researchers and students from all over the country. There will be over 100 scientific talks and 170 posters presented at this meeting, including details of some of the latest discoveries such as those from AstroSat. The meeting will also include discussion on future observatories and missions being planned, like Aditya L-1 and LIGO-India.

Hyderabad – cradle of astronomy in India

DINESH C SHARMA



Osmania University

HYDERABAD, FEBRUARY 6

The city of Hyderabad is famous for its historical monuments like Charminar and cuisine like biryani, but few would know that it has been the cradle of modern astronomy in India.

The city was the location of one of the earliest modern astronomical observatories established in India in early twentieth century. The city-based Osmania University was the first educational institution in the country to start teaching astronomy and astrophysics at post graduate and research levels. The first generation of Indian astronomers cut their teeth into the subject in Hyderabad, which was also the birthplace of the Astronomical Society of India (ASI) in 1972.

The Nizamiah Observatory was established in 1908 by the Nizam's government with instruments donated by one of the leading nobles, Nawab Jafar Jung who was also an amateur astronomer. The instruments included an eight-inch astrograph and 15-inch refractor. One of the landmark contributions of the observatory has been the publication of 13 volumes of the Astrographic Catalogue of the Hyderabad zones of the sky.

After the establishment of Osmania University in 1917, the observatory became a part of the university. This laid the foundation of astronomy education in India.

The formal teaching of astronomy at Osmania University began with the setting up of the Department of Astronomy in 1959, while astronomy teaching at post-graduate level was

introduced in 1960 -61. The department was recognized as the Centre of Advanced Study in Astronomy by the University Grants Commission in 1964. The department has produced more than 500 M.Sc. students and produced close to 50 doctorates. Many of them have become astronomers in India and abroad.

“I was among the first batch of post graduates in astronomy from this department, and soon after I passed out I was offered the job of a lecturer. I joined here though I had job offers from the two other two Indian observatories – Kodaikanal and Nanital – too,” recalled Sarma Modali, who later shifted to America for PhD and worked with NASA and NOAA there, while speaking to India Science Wire.

The university telescope at Rangapur has been used for the study of binary stars, black holes, neutron stars, white dwarfs, active galactic nuclei, peculiar stars, pulsating stars, galactic clusters. In addition, a 10 - feet radio telescope was installed at Japal-Rangapur Observatory in 1980 for conducting research on the sun.

The ASI, which is holding its annual meeting in Osmania University this week, has a special connection with the city. Prof Vainu Bappu, the famous astronomer from Hyderabad, was the President of the society, Prof U. R. Rao, who later became the Chairperson of ISRO, was the Vice-President, and Prof. KD Abhyankar, who was the first head of the department and director of the university observatory, was the secretary of ASI.

दैनिक जागरण

नई जानकारी

भारतीय शोधकर्ताओं के अध्ययन ने बताया- ग्लोबल वार्मिंग के असर से बच नहीं पाई प्रवाल प्रजातियां



ग्लोबल वार्मिंग से रंगहीन हो रहे कोरल रीफ

बास्को द गामा (गोवा), आइएसडब्ल्यू : बढ़ते वैश्विक तापमान के कारण समुद्री प्रवाल भित्तियां यानी कोरल रीफ पर पड़ रहे असर का मुद्दा करीब दो दशक से बना हुआ है। एक अध्ययन में भारतीय शोधकर्ताओं ने पाया है कि जलवायु परिवर्तन की मार से प्रवाल प्रजातियां भी बच नहीं पाई हैं। जलवायु परिवर्तन के कारण बदलते समुद्री तापमान की वजह से प्रवाल प्रजातियां रंगहीन हो रही हैं।

तमिलनाडु के तुतीकोरिन स्थित सुगंती देवदासन समुद्री अनुसंधान संस्थान के वैज्ञानिक महाराष्ट्र के सिंधुदुर्ग जिले में स्थित मालवन समुद्री अभयारण्य की प्रवाल प्रजातियों के रंगहीन होने की प्रक्रिया का अध्ययन करने के बाद इस नतीजे पर पहुंचे हैं। अध्ययन के दौरान समुद्र के भीतर दो से पांच मीटर की गहराई वाले क्षेत्रों में दिसंबर, 2015 से मई, 2016 के बीच दो बार सर्वेक्षण किया गया है। अभयारण्य में समुद्री प्रवाल के रंग बदलने की तीव्रता और प्रवृत्ति का आकलन भी किया गया है। दिसंबर, 2015 में इस समुद्री अभयारण्य में प्रवालों के मृत होने की दर 8.38 फीसद एवं उनमें रंग बदलने की दर 70.93 फीसद दर्ज की गई थी। सिर्फ 29.07 फीसद प्रवाल ही इस घटनाक्रम से अप्रभावित पाए गए।

अध्ययन में शामिल वरिष्ठ वैज्ञानिक डॉ. के.



दिराविवा राज ने बताया कि विरंजन यानी रंग बदलने के बाद प्रवाल रीफों के प्रति अति संवेदनशील हो जाते हैं, जिससे उनकी मृत्यु दर बढ़ सकती है। तापमान को प्रभावित करने वाले मानव जनित कारकों को नियंत्रित करने के लिए वैश्विक पहलू और नीतिगत सुधार की जरूरत है। प्रवालों के पुनर्जीवन के लिए मानव जनित खतरों को कम करना होगा।

डॉ. के. राज के अनुसार मलवान समुद्री अभयारण्य प्रवाल भित्तियों और संबंधित संसाधनों से समृद्ध है, जो इसके आसपास के क्षेत्र में रहने वाले स्थानीय मछुआरों की आजीविका का मुख्य स्रोत है। ऐसे में यहां प्रवालों को संरक्षित बनाए रखने के लिए लोगों की गतिविधियों पर ध्यान देने की सख्त जरूरत है। स्थानीय लोगों में प्रवालों के दीर्घकालिक लाभ को समझ पैदा करने के लिए उनमें जागरूकता लाना

भी बहुत महत्वपूर्ण है, क्योंकि यदि प्रवाल समाप्त हो जाएं, तो यह सुनिश्चित है कि उन पर आश्रित लोगों की आजीविका चुरी तरह प्रभावित होगी।

वैश्विक प्रवाल विरंजन की घटनाएं 1998 और 2010 के दौरान पहले भी दो बार हो चुकी हैं। 2014 से 2017 के दौरान तीसरी और सबसे लंबे समय तक चलने वाली प्रवाल विरंजन की घटना से दुनिया भर के प्रवालों पर काफी असर पड़ा था। वैज्ञानिकों के अनुसार प्रवाल विरंजन के लिए समुद्री सतह का तापमान एक प्रभावी कारक माना जाता है। तापमान में बदलाव का असर प्रवालों की संवेदनशीलता पर स्पष्ट रूप से देखा गया है। वैज्ञानिकों के अनुसार समुद्री सतह के तापमान में मात्र एक से दो डिग्री सेल्सियस वृद्धि से ही प्रवाल और शैवाल के बीच संतुलन बिगड़ जाता है और विरंजन होने लगता है। प्रवाल विरंजन से प्रवाल कमजोर हो जाते हैं तथा इसका विपरीत प्रभाव प्रवालों की भित्ति निर्माण की क्षमता पर पड़ता है। लंबे समय तक विरंजन की प्रक्रिया जारी रहने पर प्रवालों के पुनर्जीवन की संभावनाएं बहुत कम हो जाती हैं। ऐसे में इन पर अन्य गैर-सहजीवी शैवाल हावी हो सकते हैं, जिनका विपरीत प्रभाव प्रवाल भित्तियों पर आश्रित समुद्री जीवों पर भी पड़ सकता है। इस शोध का प्रकाशन जर्नल करंट साइंस में किया गया है।



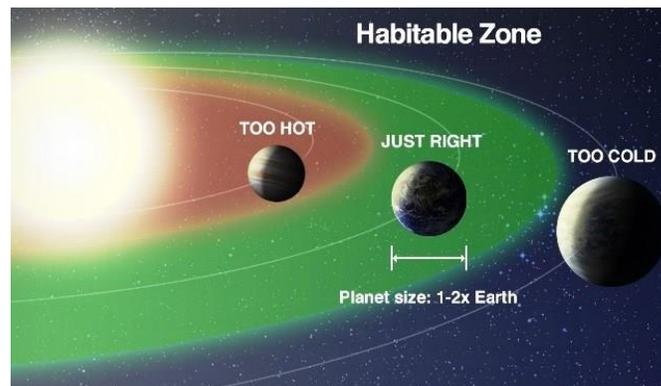
Research Stash

Are We Alone In This Universe? Big Data Algorithms May Help Find Answer

The search for life outside the earth is all set to get intensified. Indian astronomers have developed a new technique to know if any of the newly discovered exoplanets – planets outside our solar system – are potentially habitable.

Till now over 3500 exoplanets have been discovered and scientists estimate that the number could run into billions in our galaxy alone and trillions in the observable universe. The earth, according to astrophysicists, is actually an average planet and our solar system may not be unique in the sense of its ability to support life. In this scenario, efforts are on to find if there are life-harboring and Earth-like planets.

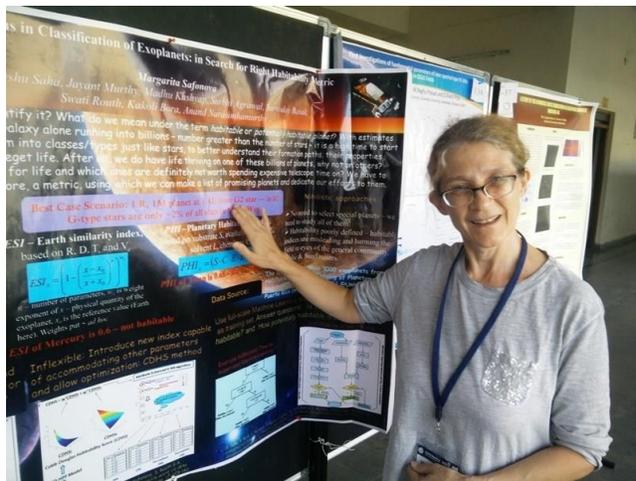
The technique developed by Indian scientists is based on the emerging understanding that habitability need not be defined solely from the perspective of the earth or the solar system we are part of. So far, the search for life has been confined to stellar habitable zones where liquid water exists on the surface, but now it has expanded to galactic and even universe habitable zones.



Artist's impression of the special zone around every star where liquid water can exist on the surface of its planet, which is called the habitable zone

Habitability depends on an understanding of physical planetary parameters like orbital properties, chemical composition, mass, radius, density, surface temperature, distance from the parent star, and temperature or mass of parent star. Applying these parameters to each of the newly discovered exoplanets one by one is going to be a time consuming and tardy task. Indian researchers have automated this process by using data analysis and machine learning techniques – an exercise which represents an emerging discipline called astroinformatics that combines astronomy and computing. The new technique was presented at the [36th session of the Astronomical Society of India \(ASI\)](#) being held at Osmania University here.

The present approach to look for life on planets outside the solar system is to search for Earth-like conditions or planets similar to the earth, what we call ‘earth similarity’ and also for the possibility of life in a form known or unknown to us, meaning ‘habitability’. For this, two indices used are Earth Similarity Index (ESI) and Planetary Habitability Index (PHI).



Margarita Safonova at ASI conference in Hyderabad.

“We have proposed a different metric – a Cobb-Douglas Habitability Score (CDHS) – which computes the habitability score by using measured and estimated planetary input parameters like radius, density, escape velocity and surface temperature of a planet. The values of the input parameters are normalized to the Earth Units. The metric, with exponents accounting for metric elasticity, has analytical properties that ensure global optima, and can be scaled up to accommodate more input parameters,” explained Margarita Safonova of Bangalore-based M P Birla Institute of Fundamental Research, and a member of the research team, while speaking to *India Science Wire*.

The Cobb-Douglas Habitability Score has actually been derived from an economic theory first proposed in the 1920s. “Using known parameters of each exoplanet, like density, radius, escape velocity and surface temperature, our sophisticated model predicts a score for each planet, by comparing it to the Earth. These scores are fed into powerful machine learning and artificial intelligence algorithms that can group these planets into various classes of habitability potential”, said Prof Jayant Murthy of Indian Institute of Astrophysics, Bangalore.

The new metric has been applied to the exoplanet Proxima b orbiting the nearest star (Proxima Centauri) to the Sun. There is an expectation that Proxima b is potentially habitable since it is located in the star's habitable zone and its mass is 1.27 the earth's mass. Though it orbits its star eight times closer than Mercury, the amount of energy it receives is 2/3rd of what the earth receives from the sun, raising the possibility that liquid water can exist on the surface.

“We computed the habitability score CDHS of Proxima b using radius, density, escape velocity and surface temperature, only surface temperature and radius, stellar flux and radius, and stellar flux and mass. According to our classification algorithm, Proxima b falls in the ‘Earth-League’”, said Safonova. Earth's habitability ‘floor function value’ is 1, and the difference between its CDHS and the earth's CDHS is within the acceptable threshold.

“Our algorithm emphatically exhibits potential habitability of Proxima b, matching with an estimate the [Planetary Habitability Laboratory](#) at the [University of Puerto Rico](#) which maintains the catalog of all exoplanets,” she added. “This indicates that the model may be extended for a quick check of the potential habitability of newly discovered exoplanets in general. We have created a web page (<https://habitabilitypes.wordpress.com/>) for this project to host all relevant data and results including datasets, figures, animation video and a graphical abstract.”

Snehanshu Saha, Kakoli Bora, S. Agrawal, Swathi Routh and Anand Narasimhamurthy are also members of the research project, which was conducted by astronomers from [Indian Institute of Astrophysics](#), [PES University](#), and [MPBIFR](#). The work funded and supported by [Vision Group on Science and Technology \(VGST\)](#), Government of Karnataka, and the [Inter-University Centre for Astronomy and Astrophysics \(IUCAA\)](#). (India Science Wire)



EASTERN MIRROR

Concern Over Gender Gap in Astronomy

By [EMN](#) / February 7, 2018 /

By **Dinesh C Sharma** | **India Science Wire**

It is a subject that is not much spoken about in scientific meetings. But breaking from the tradition of academic societies, the Astronomical Society of India (ASI) has taken a bold step by putting gender bias on its agenda.

The Working Group on Gender Equity, established by the association two years ago, presented results of its first survey on gender equity in the field of astronomy in India, at the ongoing session of ASI here.

The survey, for the first time, acknowledges the presence of gender bias in Indian research and academic institutions engaged in teaching and research of astronomy and astrophysics. This is reflected in both the small numbers of women scientists and researchers in the institutes, as well as the perceptions gathered in the survey.

The survey has revealed that 30% of both male and female student respondents believe there is gender-based discrimination in astronomy in India. Among faculty members and researchers who participated, 60 percent of male participants believed that there is gender discrimination while 80 percent of women felt there was discrimination.

At the faculty level, Indian Institute of Astrophysics and National Centre for Radio Astronomy of TIFR had between 21 to 23 percent women, while the number was larger at the student level. The Indian Institute of Science, Bangalore performed poorly with just one female faculty out of six in the astrophysics department, and just two of 18 students are women in 2017. Only 40 percent of women astronomers surveyed were aware about mechanisms like Internal Complaints Committee.

Overall, only 12 percent of faculty positions in Indian astronomical and astrophysics institutes are occupied by women, although their number is considerably higher at postdoc (30 per cent) and PhD (32 percent) levels. “This only means that we are losing trained talent,” pointed out PreetiKharb, a scientist at the National Centre for Radio Astrophysics – TIFR, and a member of the working group.

However, universities seem to be doing a job better in hiring female faculty members (up to 20 percent) compared to research institutes (10 percent).

“Gender-balance will not be achieved as long as the fraction of women in a given level of advancement is smaller than the fraction in the total pool. It is also necessary that gender-related data must be gathered, monitored, and used to identify – and address – problems,” said Kharb. In addition, she said, gender-sensitization talks and meetings should be organised to enhance awareness about the issue at all levels.

Several senior scientists, mid-career researchers and students, who spoke at the meeting, expressed concern over discrimination and offered suggestions.

“It is important that scientific and astronomy community transforms itself into a more open, inclusive, and diverse one, truly representative of our population. The WGGE set up by the ASI is crucial in this struggle to make astronomy gender equitable. This objective is to involve men, women and transgender astronomers together,” commented Niruj Mohan Ramanujam, a member of the working group.

ASI President Prof S K Pandey said “the first meeting of ASI held in Hyderabad in 1974 had just two women members, now it is almost one third of the total participants”.

Globally there is renewed interest about the presence of women in science, particularly mathematics and physics. PrajvalShastri, a member of the Global Gender Gap Project of the International Union for Science, said existing data on participation of women in mathematical and natural sciences was scattered and inconsistent over research areas. The project is aimed at generating evidence to support decision making.

(The working group members are PreetiKharb, SushanKonar, Niruj Mohan, NissimKanekar (NCRA – TIFR), PrajvalShastri (Indian Institute of Astrophysics), ResmiLekshmi (Indian Institute of Space Technology), Jasjeet Singh Bagla (IISER – Mohali) and Dibyendu Nandi (IISER – Kolkata).)

Outlook

08 FEBRUARY 2018 Last Updated at 5:03 PM NATIONAL

India Gets Robotic Telescope To Keep An Eye On Dynamic Cosmos

The fully robotic telescope costs Rs. 3.5 crore and is much smaller than the 2 meter Himalayan Chandra Telescope at Hanle.

D I N E S H C S H A R M A



DOMES OF THE NEW TELESCOPE COMING UP AT HANLE. THE HIMALAYAN CHANDRA TELESCOPE IS IN THE BACKGROUND.

Stars and galaxies in the universe may appear to be static to us as they are located millions of light years away. But the universe is actually dynamic with events occurring in timescales much shorter – years, days and even hours. India is now joining a global network to monitor the dynamic cosmos.

A new telescope is getting ready for commissioning at the Indian Astronomical Observatory at Hanle in Ladakh, as part of an international network specifically designed to watch dynamic events or transient objects in the universe. The programme is called Global Relay of Observatories Watching Transients Happen (GROWTH).

Observatories in this network are located in a way that will allow uninterrupted observation of transient events.

“A lot of interesting objects and events occur in the universe which need to be caught very young and soon after they happen, such as supernovae, gamma ray bursts, active galactic nuclei, and many more. They are called transients because electromagnetic signature radiated as a result is transient in nature. Gravitational wave events too fall in this category,” explained G C Anupama, the Indian principal investigator of the project at the Indian Institute of Astrophysics, while speaking to India Science Wire here.

The facility will also track asteroids. “Near-earth asteroids are not transients in the sense of their light emitting capability, but they do come close to the earth and that is when you need to track them. This time period is very short. In this sense, they are transient in terms of time,” said Anupama.

The new 70 cm telescope is much smaller than the 2 meter Himalayan Chandra Telescope at Hanle. “HCT is already over-booked, while the new telescope will be purely for observing transients. It is different from HCT in the sense that it will only be an imaging telescope and all spectroscopy will happen at HCT,” Anupama said.

The fully robotic telescope costing Rs. 3.5 crore has been funded by the Science and Engineering Research Board (SERB) of the Department of Science and Technology. “The telescope is equipped with a sensitive camera that can detect some of the faint transients found by our partner survey telescopes like the Zwicky Transient Facility at Palomar, California,” she added. The new facility will be commissioned this summer.

The telescope will be remotely operated from IIA’s Centre For Research and Education in Science and Technology near Bangalore. The facility houses the control room for remote operations of the HCT and is the data hub for the telescope. The new telescope will be programmed to directly communicate with various ground-based and space-based surveys that are searching for transient sources.

Transient events in the universe are caused due to several factors such as relatively benign flares on stars, accretion of matter on compact objects, stellar mergers and explosions. All this results in a flash in the sky for a period and then slowly fades away. By capturing these electromagnetic

signatures, astronomers try to gain an insight about cosmic objects as well as physical processes that govern their evolution. Finding such objects requires continuous monitoring of large areas of the sky. Telescopes deployed for ‘transient surveys’ are usually small, wide-field instruments but they can’t see very faint objects.

According to Dr. Mansi Kasliwal, who is heading GROWTH project at Caltech, the project is “primarily looking at optical transients from a host of different observatories to build a more complete picture of the physical processes of their evolution. The network has 18 observatories in the Northern Hemisphere. As the earth rotates and daylight creeps, the network switches observations to facilities westward that is still enjoying night-time.”

(India Science Wire)

the India saga

Inspired by a Bollywood Flick and Facebook, Indian Scientist Builds Army of E-Astronomers

By Dinesh C Sharma 11 Feb 2018



Hyderabad : If anybody can become a dancer as depicted in 2013 Bollywood dance drama, *Anybody Can Dance* (ABCD), directed by choreographer Remo D'Souza, why can't anybody become an astronomer and make new discoveries?

Yes, says Dr Ananda Hota, radio astronomer at the Centre for Excellence in Basic Sciences (University of Mumbai-Department of Atomic Energy) in Mumbai, and he has shown how. He is the founder of a unique citizen science project, RAD@home Astronomy Collaboratory, which trains lay citizens to analyse radio astronomy data from professional telescopes so that they can make discoveries.

Members of this project have made discoveries using data from radio telescopes in India and abroad. These discoveries have been announced at scientific meetings of astronomers and even published in peer-reviewed scientific journals.

Any undergraduate science or engineering student or lay person can join the group to get basic training which is provided over Facebook. Face-to-face training camps are also held in different cities. The group's activities go under hashtag #ABCDresearch – anybody can do research – and are widely followed. Since 2013, Hota has trained over 100 e-astronomers.

This week, members of this group presented their findings at the 36th meeting of the Astronomical Society of India in Hyderabad on “three intriguing cases of jet-galaxy interaction as laboratory for AGN (Active Galactic Nuclei) feedback in galaxy merger”. Past discoveries from this group include new Spica-like galaxies, episodic radio galaxies, relic-lobe radio galaxies, a few Z- and X-shaped radio galaxies, intriguing cases of jet-galaxy interaction, bent-lobe radio galaxies tracing cosmic accretion onto clusters through filaments.

Radio telescopes gather enormous amount of data and it could take professional astronomers decades to analyse every bit collected. At the same time, this data may contain clues to important objects and events on the cosmos. Therefore, observatories make this data available for use to anyone interested. The primary data for the citizen-science project comes from sky surveys done by the Giant Metrewave Radio Telescope (GMRT) of the Tata Institute of Fundamental Research.

“Ours is a unique, zero-infrastructure, zero-funded collaboratory of trained e-astronomers, which has made several new discoveries by analyzing GMRT data using open access tools such as NASA Skyview,” Hota explained while speaking to *India Science Wire*.

“This model possibly can convert the Big Data problem in astronomy into a prospect. Citizen science can contribute to knowledge creation in never-seen-before speed and in approach. Since it is based on internet, it can provide an equal opportunity of academic growth to people in under-developed regions where our optical and radio telescopes are located ,” he pointed out.

Unlike conventional education programmes, those who get involved with RAD@home not only learn but also directly contribute to astronomy research from initial one-week face-to-face interaction. “Citizen science can be particularly useful in discovering certain events where features are fuzzy which can be detected more efficiently by human eye than a machine. Radio interferometry images are more complicated than optical and need citizen-scientists to be trained to read them,” pointed out Hota.

The citizen scientist team which presented its findings in Hyderabad included Akanksha Manojkumar Tiwary, Megha Rajoria, Viswajith Govinda Rajan, Avinash Kumar, Sumanta Kumar Sahoo, Lavanya Nemani, Sagar Sethi, Arpita Misra, Mitali Damle, Shilpa Dubal, Karuna Gamre, Pradeepta Mohanty, Anjali Amesh, Gitika Mall, Alakananda Patra, Charitharth Vyas, Aikya Shah, Ankit Vaghasiya, Ankita Das, Ashutosh Sharma, Bhargav Reddy, Debaiudh Das, Devanshu Shrivastava, Dwiti Krushna Das, Joydeep Naskar, Kavil Mehta, Raveena Dandona, Rohith Sai Shashank, Ronaldo Laishram, Sushrut Mane, Sayali Kulkarni, Pratik Dabhade, Sravani Vaddi, Chiranjib Konar.

(India Science Wire)

दैनिक जागरण

अध्ययन

इसरो के वैज्ञानिकों का निष्कर्ष है कि 2005 के विस्फोट का ही नतीजा है 2017 में निकला लावा। नए अध्ययन से क्षेत्र की प्रकृति को समझने में मिलेगी मदद

2005 के विस्फोट से ही सुलग रहा बैरन आइलैंड

नई दिल्ली, आइएसडब्ल्यू : भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) के वैज्ञानिकों ने हाल ही में किए गए एक अध्ययन में निष्कर्ष निकाला है कि बैरन आइलैंड ज्वालामुखी से 2017 में जो लावा निकला था वह दरअसल 2005 के ज्वालामुखी विस्फोट का ही सिलसिला है। ध्यान रहे कि बैरन आइलैंड भारत और दक्षिण एशिया का एकमात्र सक्रिय ज्वालामुखी है। यह पोट ब्लेयर से 135 किलोमीटर उत्तर-पूर्व में स्थित है। इस ज्वालामुखी में पहला बड़ा विस्फोट 1787 में हुआ था। करीब 150 वर्ष तक शांत रहने के बाद यह 1991 में फिर फटा था। तब से इस ज्वालामुखी में बीच-बीच में सक्रियता दिख रही है। ताजा गतिविधि की जानकारी वैज्ञानिकों ने जनवरी 2017 में दी थी। ये वैज्ञानिक वहां ज्वालामुखी गतिविधियों का अध्ययन करने गए थे। वर्तमान अध्ययन में वैज्ञानिकों ने 2005 से 2017 तक ज्वालामुखी क्षेत्र में हुए परिवर्तनों और लावा के प्रवाह के मार्ग को समझने के लिए उपग्रह से प्राप्त आंकड़ों का प्रयोग किया। द्वीप के छोटे भू क्षेत्र और आसपास के समुद्र के कारण राडार तकनीकों से ज्वालामुखी की त्रिआयामी तस्वीर बनाना मुश्किल था। अतः वैज्ञानिकों ने ज्वालामुखी के आकार में हुए परिवर्तनों की पहचान करने के लिए विजियल, शार्ट-



वेव इंफ्रारेड और थर्मल इंफ्रारेड बैंड्स में हॉसिल की गई तस्वीरों का प्रयोग किया।

ज्वालामुखी के लावा, राख और गैसों उगलने वाले सक्रिय छिद्र के चारों तरफ बना गढ़वा ज्वालामुखी विस्फोट की निशानी है। उपग्रह की तस्वीरों से पता चलता है कि जनवरी 2017 में जो छिद्र सक्रिय थे वे उस गढ़वे में स्थित हैं, जो 2005 में हुए विस्फोट से बना है, न कि 1991 में हुए विस्फोट से। इससे इस बात की पुष्टि होती है कि हाल में देखी गई ज्वालामुखी गतिविधि 2005 में हुए विस्फोट का

ही विस्तार है। वैज्ञानिकों ने वह भी पता लगाया कि 2005 के विस्फोट ने लावा के प्रवाह के लिए तीन अलग-अलग दिशाओं में मार्ग बनाए। पहले लावा सिर्फ पश्चिम दिशा में बह रहा था। उन्होंने इस बात की भी पुष्टि कर दी कि 2005 के विस्फोट के बाद ज्वालामुखी से लावा की निकासी बढ़ गई है।

ज्वालामुखीय विस्फोटों से निकलने वाली विषाक्त गैसों, राख और लावा का वनस्पति पर दीर्घकालिक प्रभाव पड़ता है और यह जगह जानवरों के रहने के लिए उपयुक्त नहीं रहती। इन विस्फोटों से वायुमंडल में उत्सर्जित होने वाली कार्बन डाईऑक्साइड और सल्फर डाईऑक्साइड से प्रदूषण बढ़ता है। ज्वालामुखी कब फटेगा, इसका पूर्वानुमान लगाना मुश्किल है, लेकिन इन विस्फोटों को निरंतर निगरानी करने से विस्फोटों के कारणों और परिणामों के बारे में हमारी समझ बढ़ती है और हम इनसे होने नुकसान को कम करने के बेहतर उपाय खोज सकते हैं। इस अध्ययन के नतीजे ब्रिटेन ऑफ वोल्केनोलॉजी में प्रकाशित हुए हैं। रिसर्च टीम में भारतीय अंतरिक्ष अनुसंधान संगठन के नेशनल रिमोट सेंसिंग केंद्र और जियोसाइंस के वैज्ञानिक तपस आर. मार्था, प्रियम रॉय और के. विनोद कुमार शामिल थे।

स्पंदन फीचर्स

विकास की बात सबके साथ

भारत में सुदूर संवेदन के जनक : पिशरोथ रामा पिशरोटी
नवनीत कुमार गुप्ता

आज कई क्षेत्रों में सुदूर संवेदन का उपयोग किया जा रहा है। चाहे बात प्राकृतिक आपदाओं से हुए नुकसान की हो या फिर भौगोलिक नक्शों की। हर क्षेत्र में सुदूर संवेदन का दखल है। सुदूर संवेदन के उपयोग के लिए भारतीय अंतरिक्ष अनुसंधान संस्थान यानी इसरो ने कई उपग्रहों को प्रक्षेपित किया है। सुदूर संवेदन जैसे महत्वपूर्ण प्रौद्योगिकी का उपयोग हमारे देश में 1960 के दशक में आरंभ हुआ। उस समय, वर्तमान में उपस्थित उन्नत प्रौद्योगिकी नहीं थी। लेकिन फिर भी सुदूर संवेदन के महत्व से पूरे देश को एक वैज्ञानिक ने अपने प्रयोगों से अवगत कराया गया। वह वैज्ञानिक थे प्रोफेसर पिशरोथ रामा पिशरोटी।



प्रोफेसर पिशरोथ रामा पिशरोटी को भारतीय सुदूर संवेदन का जनक माना जाता है। 1960 के दशक के अंत में उन्होंने नारियल विल्ट रोग का पता लगाने के लिए अपने सुदूर संवेदन संबंधी अग्रणी प्रयोग किए जो सफल रहे। उन्होंने अपने प्रयोगों के लिए हवाई जहाज का उपयोग किया। अपने प्रयोगों के लिए उन्होंने अमेरिका द्वारा विकसित उपकरणों का उपयोग किया। इस प्रकार उन्होंने में दूरदराज क्षेत्रों में इस तकनीक की शुरुआत करने में महत्वपूर्ण भूमिका निभाई। यह समय भारतीय सुदूर संवेदन संबंधी प्रयोगों के लिए आरंभिक समय था। आज तो सुदूर संवेदन के माध्यम से फसलों की उपज और प्राकृतिक आपदाओं जैसे ओलावृष्टि एवं हिमपात से फसलों का होने वाले नुकसान का आकलन किया जाता है। अब सुदूर संवेदन क्षेत्र कृषि सहित अनेक क्षेत्रों में उपयोगी साबित हुआ है।

पिशरोटी का जन्म 10 फरवरी 1909 को केरल में कोलेंगोड़े में हुआ था। उनका शैक्षणिक जीवन उपलब्धियों से भरा रहा। उन्होंने 1954 में कैलिफोर्निया विश्वविद्यालय से पीएचडी की उपाधि प्राप्त की। उन्हें विश्व के अनेक प्रसिद्ध वैज्ञानिकों के साथ कार्य करने का अवसर मिला। भारत में उन्होंने विज्ञान के क्षेत्र में एशिया के पहले नोबल पुरस्कार विजेता प्रोफेसर सी वी रमन के साथ काम करने का भी अवसर मिला था। उन्होंने सामान्य परिसंचरण, मानसून मौसम विज्ञान और जलवायु के विभिन्न पहलुओं पर काम किया। उन्होंने मौसम विज्ञान के क्षेत्र में महत्वपूर्ण शोध कार्य किए। और राष्ट्रीय और अंतरराष्ट्रीय पत्रिकाओं में सौ से अधिक शोध पत्रों का प्रकाशन किया। उनके सबसे महत्वपूर्ण योगदान में भारतीय मानसून की समझ पर आधारित था। उन्होंने यह भी पता लगाया कि गर्मियों के दौरान

भारतीय मानसून और ठंडे के दिनों में उत्तरी गोलार्ध में ऊष्मा के संचरण का गहरा संबंध है। उन्होंने बताया था कि मानसून में अरब सागर की नमी की महत्वपूर्ण भूमिका होती है। प्रोफेसर पिशारोटी ने भारतीय वैज्ञानिक विभागों में कई महत्वपूर्ण पदों पर रहे थे। वह भारत मौसम विज्ञान विभाग और कुलाबा वेधशाला वह पुणे स्थित भारतीय उष्णकटिबंधीय मौसम विज्ञान संस्थान के संस्थापक निदेशक थे।

1967 में भारतीय उष्णकटिबंधीय मौसम विज्ञान संस्थान से सेवानिवृत्त होने के बाद उन्होंने भौतिक अनुसंधान प्रयोगशाला में वरिष्ठ प्रोफेसर के रूप में कार्य किया। वे 1972-1975 के दौरान वह भारतीय अन्तरिक्ष अनुसंधान संगठन के अंतर्गत कार्यरत अहमदाबाद स्थित सुदूर संवेदन और उपग्रह मौसम विज्ञान के निदेशक रहे। उन्होंने अनेक अंतरराष्ट्रीय संस्थाओं में भी अपना योगदान दिया। वह विश्व मौसम विज्ञान संगठन के वैज्ञानिक सलाहकार बोर्ड में भी रहे। उन्होंने वैश्विक वायुमंडलीय अनुसंधान कार्यक्रम के अध्यक्ष पद का भी दायित्व निभाया। उनके सम्मान में इसरो के अंतर्गत कार्यरत विक्रम साराभाई अंतरिक्ष केंद्र द्वारा विकसित रेडियोसोनडे को पिशारोटी रेडियोसोनडे नाम दिया गया है। जिसके द्वारा तापमान, आर्द्रता और वायुदाब को मापा जाता है। पिशारोटी रेडियोसोनडे अत्याधुनिक उपकरण है जिसका भार 125 ग्राम है और इसमें जीपीएस भी लगा है।

प्रोफेसर पिशारोटी भारतीय राष्ट्रीय विज्ञान अकादमी के रामन शताब्दी पदक (1988) और प्रोफेसर के आर आर रामनाथन मेडल (1990) के प्राप्तकर्ता थे। उन्हें 1970 में भारत सरकार द्वारा पद्मश्री प्रदान किया गया था। उन्हें 1989 में प्रतिष्ठित अंतर्राष्ट्रीय मौसम पुरस्कार भी प्रदान किया गया था। 24 सितम्बर 2002 को 93 वर्ष की आयु में उनका देहावसान हुआ। इंडियन सोसायटी ऑफ रिमोट सेंसिंग द्वारा उनके सम्मान में सुदूर संवेदन के क्षेत्र में प्रति वर्ष 'पी आर पिशारोटी सम्मान' प्रदान किया जाता है।

(इंडिया साइंस वायर)

C V Raman Fellowships bring African and Indian researchers closer

[Susmita Saha](#)

Monday 12 February 2018

Between 2010 and 2018, close to 500 African researchers availed the C V Raman International Fellowship to improve the quality of lives back home



Picture for representation only-African fellows are aiming to use their training, gained through collaborative research in Indian universities as well as science and technology institutions, in various ways. Credit: ELSA International/Flickr

At the Delhi-based Indian Agricultural Research Institute (IARI), Abdel Karim Dafalla Elfadil from Sudan is working on a new mechanical device which will help sow seeds, irrigate fields and apply fertiliser in one go, using technology developed at the institute's division of agricultural engineering.

Elfadil is working in India as a C V Raman Fellow. "Our target is to help him develop the machine before the six-month fellowship duration comes to an end. We are working very fast to reach that

goal,” said Indra Mani, head, division of agricultural engineering. The device, he says, will go a long way in improving agriculture potential of arid zones in Sudan.

The ‘aqua ferti seed drilling’ is a mechanised sowing device capable of multi-tasking. The fertiliser distributed through the drill is in aqueous form, which facilitates timely irrigation and subsequent seed germination. “Elfadil is working on the same technology but is customising the mechanism to the conditions of his country, keeping in mind soil, crop and water requirements,” said Mani.

This knowledge sharing exercise is part of the C V Raman International Fellowship programme for African researchers being implemented by the Department of Science and Technology (DST). Between 2010 and 2018, the number of African researchers who have availed the fellowship is close to 500. The number of fellows during 2017-2018 is about 100.

Recently, DST and the Federation of Indian Chambers of Commerce and Industry (FICCI) launched a coffee table book on the fellowship programme. It focuses on the successful journey of the programme so far. “The Fellowship is one of the most prestigious programmes of DST and we are proud to see the pan-India and Africa reach with our commitment to double up the number of fellowships,” said Ashutosh Sharma, Secretary, DST.

African fellows are aiming to use their training, gained through collaborative research in Indian universities as well as science and technology institutions, in various ways. They intend to publish papers in prestigious scholarly journals, engage in further research and improve the quality of lives back home.

The fellowship that offers training opportunities from four weeks to six months is gaining popularity in Africa since its launch in 2010. African scholars attribute this success to positive research environment in India. For instance, Chinwe Christy Isitua from Nigeria is working under Rakesh Bhatnagar at the School of Biotechnology, Jawaharlal Nehru University’s (JNU). Isitua had applied for the fellowship thrice and has managed to get it only on her last attempt.

Isitua, associate professor of microbiology in Nigeria’s Afe Babalola University (ABUAD), has already picked up conversational Hindi phrases such as *suprabhat*. She is upbeat about her research on the role of indigenous African spices in inhibiting proliferation of cancer cells. “I will use the knowledge acquired in India to add value to the learning of my students at ABUAD,” said Isitua.



Isitua with Dr. Rakesh Bhatnagar. Credit: India Science Wire

Indian scientists hosting African researchers agree that the three categories -Doctoral/Post Doctoral, Visiting Fellowship and Senior Fellowship - offered under the programme has strengthened research ties between Africa and India.

Gad Elsayed Mohamed Salem, a researcher at Egypt's National Organization for Drug Control and Research (NODCAR) and currently a C V Raman Fellow at Amity Institute of Microbial Biotechnology said everyone at his host institute was a collaborator. The Egyptian researcher's work in the domain of fibrinolytic enzymes is closely linked to the work of his host scientist, Rajni Singh, on microbial enzymes and microbial biotechnology.



Gad with Dr. Rajni Singh. Credit: India Science Wire

“Gad wasn’t aware of purification techniques of particular enzymes, which he learnt during his stint here. He also got to know about ways to use different microbial cultures and handle them,” said Singh.

A reason why the fellowship has created a buzz among African researchers is because their assimilation in Indian universities and research facilities is smooth. For many African scholars, a welcoming environment is a big draw. According to Salem, his fascination with Delhi stemmed from the city’s abundant greenery. “Through my interactions with Indian people I found them to be polite, cooperative and peaceful,” said Salem.

Equally positive is Mustapha Jamma of Morocco, who is availing the fellowship at Delhi Technological University under Dheeraj Joshi. Jamma has been encouraged to visit various laboratories within the campus so as to get maximum exposure through interactions with the institute’s M. Tech and PhD students. “We keep the laboratory where he is working open till 8 pm so that he gets uninterrupted research time. His accommodation facilities have been arranged within the campus at a reasonable price. Jamma is so optimistic about his Indian research eco-system that he has extended his fellowship duration by one month,” said Joshi, Professor, Electrical Engineering Department, Delhi Technological University.

(India Science Wire)

Biotech Times

Scientists Uncover Mechanism of Joint Cartilage Formation



Designed by Kipargeter / Freepik

Ratneshwar Thakur February 12, 2018

Researchers have reported the role of two novel molecules – NFIA and GATA3 – in development of joint cartilage during embryo growth

By Ratneshwar Thakur

New Delhi, February 12: Joint pain due to osteoarthritis is an emerging health problem. Researchers are engaged in developing new strategies for osteoarthritis treatment based on regenerative medicine, [tissue](#) engineering, and gene therapy. Now Indian researchers have made headway towards finding a molecule that can stop degeneration as well as promote regeneration of articular cartilage.

Researchers at the Indian Institute of Technology Kanpur have reported the role of two novel molecules – NFIA and GATA3 – in development of joint cartilage during embryo growth. They have observed in chicken and mouse studies that both these molecules prevent cartilage degeneration. In addition, GATA3 can also promote the formation of articular cartilage, which covers ends of joints. Deterioration of articular cartilage in joints causes osteoarthritis. The results of the study have been published in journal *Development*.



Pratik N. Singh

Dr. Amitabha Bandyopadhyay

“We have identified and characterized roles of two novel articular cartilage factors – NFIA that prevents degeneration of cartilage and maintains it permanently throughout life; and GATA3 that is not only necessary to prevent cartilage degeneration but also can induce articular cartilage, in collaboration with other factors,” explained Dr. Amitabha Bandyopadhyay, who led the research team.

Previous studies suggest that genes involved in tissue repair and regeneration are largely similar to the ones associated with tissue building during embryo development. In an earlier study, this group had reported a collection of genes that are turned on exclusively during embryonic articular cartilage development.

In this study, the authors also observed interesting phenomena where molecular manipulation leading to perturbation of articular cartilage also led to a defect in transient cartilage formation. Pratik Singh, co-author in this study says “this study provides novel insight into the cross-talk between articular cartilage and transient cartilage formation which is essential for successful development of limb skeleton. By studying these molecules further we hope to learn to make stable articular cartilage in vitro, currently a major challenge in the field.”

“The work provides important pieces in the puzzle of how joints are initially formed in the body,” commented Dr. Terence D. Capellini of Human Evolutionary Biology department of Harvard University, who was not connected with the study.

“We know that joint cartilage is different from other cartilage. It has a different tensile strength and unlike skeletal cartilage, it is resistant to ossification. This new work is going to be the first step in identifying how these differences are established at the molecular level,” said Dr. Raj Ladher from National Centre for Biological Sciences, Bangalore. He is not a part of this study.

“Despite the importance of joint/articular cartilage in normal physiology and disease conditions, very little is known about how it develops and is maintained permanently as cartilage throughout life. This limited understanding is perhaps why there is no effective strategy to treat osteoarthritis,” said Dr. Bandyopadhyay.

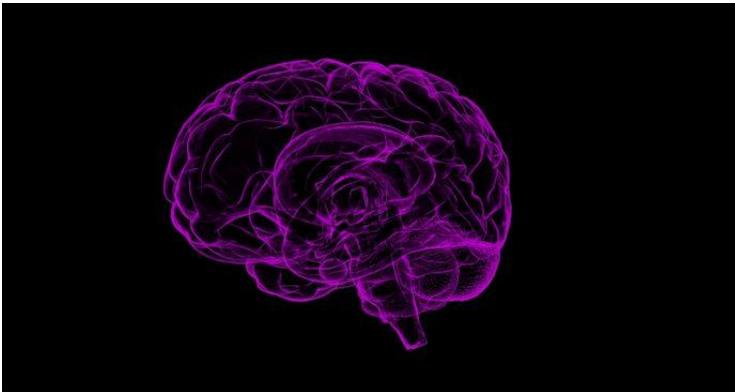
The research team included Pratik Singh, U. S. Yadav, K. Azad and Amitabha Bandyopadhyay (IIT- Kanpur) Pooja Goswami (KIIT University, Bhubaneswar), Veena Kinare (Sophia College for Women, Mumbai). The work was supported by grants from the Department of Biotechnology (DBT) and Science and Engineering Research Board (SERB) of Department Science and Technology (DST).

[\(India Science Wire\)](#)

Scientists identify potential early biomarker for Alzheimer's

In the study at IISc-Bengaluru, researchers used mice that were genetically modified to mimic Alzheimer's disease to look at proteins involved in maintaining dendritic spine shape and number

By **BioVoice News Desk** -



By Jyoti Singh

Bengaluru: In a significant advance in the understanding of Alzheimer's disease, scientists at the Indian Institute of Science (IISc), Bengaluru, have figured out the way memory deficit develops in early stages.

The researchers have found that early breaking down of a protein, fibrillar actin or F-actin, in the brain leads to disruption in communication among nerve cells and consequently memory deficits.

The protein is critical for maintaining the symmetry of mushroom-shaped projections called dendritic spines on surface of nerve cells. These spines protrude into synapses – junctions between nerve cells – and act as docking spots for other neurons to connect and transmit signals. When synapses get disrupted due to loss of, or defects in dendritic spines, flow of information between nerve cells is interrupted.

In the study, researchers used mice that were genetically modified to mimic Alzheimer's disease to look at proteins involved in maintaining dendritic spine shape and number. F-actin proteins are found within these spines along with another related protein, G-actin. It was found that in mice with Alzheimer's as young as one month old, F-actin/G-actin balance was disrupted, leading to lost spines. In contrast, formation of toxic protein clumps called amyloid plaques – an early first clinical symptom of Alzheimer's, was seen when mice were 6 to 8 months old.

Further studies revealed that F-actin loss had an effect on behavior of mice.

When researchers injected a chemical into affected mice that prevented F-actin from breaking down, they found that the mice were able to regain their normal behaviour. “When we stabilized F-actin, we were able to see the behaviour recovery,” pointed out Reddy Kommaddi, first author and DBT Ramalingaswami Fellow at the Centre for Neuroscience, IISc.

To test if similar effects were taking place in human brain, researchers looked at post-mortem brain tissue samples of patients with Alzheimer's disease, who had been studied for more than a decade before their death. The samples were obtained from collaborator David Bennett at the Rush Alzheimer's Disease Center in Chicago, USA. Just like the mice with Alzheimer's, these samples also showed a gradual breakdown of F-actin over time, as their symptoms — memory loss and accumulation of plaques — worsened.

“Because F-actin is a structural protein, it gives shape to all cells in the body, and is present everywhere. It could potentially become a biomarker,” said Vijayalakshmi Ravindranath, senior author and Professor at the Centre for Neuroscience.

The research team included Reddy Peera Kommaddi, Debajyoti Das, Smitha Karunakaran, Siddharth Nanguneri, Deepti Bapat, Ajit Ray, Eisha Shaw, David A. Bennett, Deepak Nair and Vijayalakshmi Ravindranath. The study results have been published in the Journal of Neuroscience.

(India Science Wire)

New technology may help scale up memory storage capacity

[RATNESHWAR THAKUR](#)



Researchers at Indian Institute of Technology, Hyderabad

NEW DELHI, FEBRUARY 13

Silicon-based memory devices such as hard drives and flash drives are in high demand for gadgets that require storage. Conventional semiconductor material-based memory devices have limited scale-up ability to increase their storage capacity. Hence, there is a quest in developing new memory technologies with superior characteristics. In this direction, a group of Indian researchers has developed a new type of resistive random access memory (RRAM) device that can be controlled with magnetic fields.

Researchers at Indian Institute of Technology Hyderabad have demonstrated the control of resistive switching characteristics of titanium dioxide- based resistive random access memory device with magnetic field. The team has designed a memory device which is made up of silver, titanium dioxide and fluorine doped Tin oxide (FTO).

Non-volatile memory devices such as flash memory and magnetic random access memory (MRAM) are key components in many technological devices like hard drives on a computer and memory cards in a phone. Non-volatile memory is typically used for storing information that would be retained even after power is switched off. Ideally, a good memory device should be able to operate with high speed, low power consumption and must possess high density.

Study suggests that the data transport properties (resistive switching behaviour) in currently available RRAM based device are mainly controlled by voltage. It would help if resistance switching

behaviour can be controlled with magnetic field, light and temperature. Researchers say they are exploring magnetic fields because that would give an opportunity to control transport in a remote way.

According to researchers, RRAM devices were fabricated on FTO substrate to study the resistive switching behaviour in newly designed device. To build this new device, titanium dioxide paste was used to prepare a thin film on FTO substrate which was followed by heating of film at very high temperature (400 degree C). “We used silver as top electrode for good conduction as well as its anti-oxidation property where as fluorine doped tin oxide was used as bottom electrode,” said researchers.

“As present memory technologies are approaching their scaling limits, we need intensive research to develop non-volatile memory technologies. Among various NVM technologies, resistive random access memory (RRAM) also has attracted a great deal of scientific and technological interest owing to its easy fabrication, high density, and promising performance,” said Dr S. N. Jammalamadaka, who did the study along with Dwipak Prasad Sahu.

This finding may be helpful in future RRAM-based storage devices which could be operated with magnetic fields. The study was recently published in journal Scientific Reports.

(India Science Wire)



ISSN 2348-4500

Indian Science Journal

CCMB working to make personalised medicine a reality

India Science Wire 18 Feb 2018 1:42 PM Scientists at Hyderabad-based Centre for Cellular Molecular Biology are working now to convert ordinary cells extracted from a patient's body and use them to develop a variety of organoids – multiple miniaturized and simplified versions of body organs. These can then be used to screen a variety of customized drugs.

Scientists working at CCMB Lab Hyderabad (ISW) - One size does not fit all. This applies to medicine, as much as for garments. Some medicines might work on some but not on others. The key to unravel this secret lies in the uniqueness of cells of each one of us. However, unlike garments, the consequences can be quite serious when we do not respond favorably to the drugs. Could we then have a test run of the drug on a body double and pick only the ones that work for ourselves?

Recent developments in life science research have led to a novel solution for this problem. Scientists can now convert ordinary cells extracted from a patient's body into what are called pluripotent stem cells and use these to develop a variety of organoids – multiple miniaturized and simplified versions of body organs. These can then be used to screen a variety of drugs for the ailment a person is suffering from and identify those that are best suited for him or her.

The Hyderabad-based Centre for Cellular and Molecular Biology (CCMB), a part of the Council of Scientific and Industrial Research (CSIR), is in the process of setting up a facility to take the benefit of this new technology to common people.

Noting that several other new technologies have also come up in recent years that could help make personalised medicine a reality, the Director of the institute, Dr. Rakesh K. Mishra, said steps were underway to put them too into use. For instance, it is now possible to make cells produce bioactive products like insulin and deliver them to patients who do not produce enough of them in the form of patches. "The technologies are available.

We just need to put them in place after obtaining appropriate approvals. Lots of activities are happening on this front", he said. CCMB, he said, is looking to engage with clinicians and the industry in a big way, with them participating right from the beginning stages of research. "We want them to invest and be a partner in developing technologies. This will help accelerate research in industrial context. We will also gain a lot from their expertise in marketing and production," Dr Mishra said.

In this regard, he recalled how Shanta Biotech, one of the first major biotechnology companies in India had begun its journey from CCMB. CCMB focuses both on contributing intellectually as well as in terms of developing industry ready manpower. "We interact with the industry, find out what kind of manpower they require so as to design appropriate short term courses of one, two and six month duration. In this programme, we focus on producing properly qualified technicians, technical officers and other manpower required by industries engaged in biology-related activities," he said.

The research institute has recently started a programme to expose students in medical colleges in Telangana on various aspects of medical research. The aim of the program is to foster collaborations between scientists and medical professionals in medical research.

Source: India Science Wire

दैनिक जागरण

अध्ययन

भारतीय शोधकर्ताओं द्वारा जम्मू-कश्मीर में किए गए एक नवीन अध्ययन में आया सामने, प्लाइस्टोसीन यानी हिमयुग के अंतिम दौर में लगाया पलायन का पता

हिमयुग में मानवीय पलायन में शामिल थीं महिलाएं

नई दिल्ली, आइएसडब्ल्यू : जब से जीवधारियों के जीनोम को पढ़ना और जीन्स को क्रमबद्ध करना संभव हुआ है, तब से मानव विकास क्रम के बारे में कई नई बातें सामने आ चुकी हैं। अब भारतीय शोधकर्ताओं द्वारा जम्मू-कश्मीर में किए गए एक नवीन अध्ययन में पता चला है कि प्लाइस्टोसीन यानी हिमयुग के अंतिम दौर और उसके बाद भी एक जगह से दूसरी जगह हने वाले मानवीय पलायन पूरी तरह पुरुष प्रधान नहीं थे, बल्कि इसमें महिलाएं भी शामिल थीं।

अब तक मिले तथ्यों के आधार पर माना जाता है कि मनुष्य की वर्तमान आबादी के पूर्वजों की उत्पत्ति अफ्रीका में हुई थी, जो करीब एक लाख वर्ष पूर्व पलायन करके विश्व के विभिन्न हिस्सों में फैल गए। पलायन के प्रमुख गलियारे के रूप में भारत दुनिया के उन क्षेत्रों में शामिल रहा है, जहां अफ्रीका छोड़ने के बाद मनुष्यों का बसना सबसे पहले शुरू हुआ। जम्मू-कश्मीर की भौगोलिक स्थिति अच्छी होने कारण यह राज्य इस गलियारे का प्रमुख हिस्सा रहा है। जम्मू-कश्मीर के विभिन्न जातीय समूहों के 83 असंबद्ध व्यक्तियों के डीएनए का अध्ययन करने के बाद कटरा स्थित श्री माता वैष्णो देवी विश्वविद्यालय के शोधकर्ता इस नतीजे पर पहुंचे हैं। अध्ययन में



माइटोकॉन्ड्रियल डीएनए को शामिल किया गया है क्योंकि यह डीएनए महिलाओं को ही पूर्वजों से विरासत में मिलता है। मानव विकास के इस क्रम में विभिन्न व्यक्तियों में अनुवांशिक बदलाव होते रहते हैं। इन बदलावों के अध्ययन से वैज्ञानिक उन व्यक्तियों में परस्पर संबंध और उनके वंशक्रम का पता लगाते हैं।

मातृवंश समूहों में पाई गई विविधता : इस अध्ययन से जुड़े शोधकर्ता डॉ. स्वारकर शर्मा के मुताबिक, इस अध्ययन में मातृवंश समूहों में काफी विविधता पाई गई है और 19 नए मातृ-वंश समूहों की पहचान भी की गई है। इससे स्पष्ट होता है कि माइटोकॉन्ड्रियल उत्परिवर्तनों की संख्या भारतीय आबादी में ज्ञात अनुवांशिक बदलावों तक सीमित नहीं है, कई अन्य नए बदलाव भी इसमें शामिल हैं। मातृवंश समूह में कई वंशक्रमों की मौजूदगी हजारों वर्ष पूर्व पुरुषों के साथ-साथ महिलाओं के पलायन का भी संकेत करती है।

पूर्व अध्ययनों में रही कमी

बकौल डॉ. स्वारकर, ज्यादातर पूर्व अध्ययनों में जम्मू-कश्मीर से लिए गए माइटोकॉन्ड्रियल नमूनों का अभाव रहा है, जिस कारण यह निष्कर्ष निकाला गया कि हमारे मातृवंश समूह बेहद कम हैं। इसका तात्पर्य यह है कि हमारे जो पूर्वज इस क्षेत्र में हिमयुग के बाद पहुंचे, उनमें सिर्फ पुरुषों की प्रधानता रही होगी। लेकिन इस अध्ययन से स्पष्ट हो गया है कि हजारों वर्ष पूर्व हुए पलायन में महिलाएं भी शामिल थीं।

यह निकाला निष्कर्ष

अध्ययनकर्ताओं के मुताबिक, भारत की वर्तमान जनसंख्या के स्वरूप को आकार देने में करीब 8000-10000 वर्ष पूर्व हुए पुरुषों एवं महिलाओं दोनों का पलायन प्रमुख रहा है और भारत में ही जाति व्यवस्था का एक सामाजिक ढांचे के रूप में जन्म हुआ है, न कि इसे किसी तरह के पलायन से जोड़ा जा सकता है। मनुष्यों की आनुवंशिकी में मातृवंश समूह उस वंश समूह को कहते हैं, जिसके बारे में किसी के माइटोकॉन्ड्रिया के गुण सूत्र पर स्थित डीएनए की जांच से पता चलता है।



Research Stash

Fireflies Emit Light Similar to Lasers

Fireflies are known for the light they emit during nights. A new study has analyzed the light emitted from fireflies and found a certain portion of it to be similar to laser beams.

A laser light is different from an ordinary light. It is usually single-colored and is emitted in the form of a narrow beam that can be focused to very tiny spots. This way a laser beam shines very brightly and is capable of intense heat if targeted on a small area. Laser beams can also be used to measure distances.

The study led by [Dr. Anurup Gohain Barua](#) from Department of Physics, Gauhati University, analyzed the light emitted from fireflies. It was found that though the light from fireflies usually falls between the range of 490 and 680 nanometers (between green and red), the emissions have a tendency for being within the narrow yellow sector of the spectrum. This feature is similar to the single-color property of most laser beams. Like visible lasers, the light from fireflies does not have any infrared or ultraviolet frequencies. Both lasers and fireflies emit a light that is highly directional, which means it does not diverge or spread much and goes as a narrow bright beam.

Data was collected using Michelson interferometer and Young's double-slit experiment. The results of the study have been published in journal *Current Science*.

It is known that light from fireflies is primarily used for attracting mates or prey, like a signal to communicate with other fireflies. "An efficient laser system could be constructed in the model of the firefly light-emitting system. In firefly biology, the yellow could possibly be the real-coded signal. In future, this should even be extended to other bioluminescent systems in the world," said Dr. Barua.

The research team also included Upamanyu Sharma and Angana Goswami from the Department of Physics, Gauhati University, Guwahati.

Scroll.in

Lab notes: Augmented video games can help in stroke recovery

VR-based reaching and coordination tasks that trigger movement joints as prescribed in physiotherapy guidelines.



NIHClinicalCentre

Feb 19, 2018

Dinesh C Sharma

Video games, popular among children in the 1990s, have made a comeback with the advent of virtual reality or VR, which gives users a sense of touch when augmented with add-on instruments. A group of Indian engineers and neuroscientists has put these advances to use in a field which is not entertainment – recovery of stroke patients.

Stroke is one of the leading health problems and causes of disability in India. It affects muscle weakness and movement disabilities related to the upper limb. The rehabilitation of such patients usually involves physiotherapy involving repetitive exercises, but this has to be carried out by trained physiotherapists either at home or in hospitals. Lack of trained therapists often poses a problem. The new, technology-assisted rehabilitation technique can help overcome these challenges.

The technique developed by a group of researchers at the Indian Institute of Technology, Gandhinagar, is a computer-based exercise platform augmented with a feeling of touch. It is a performance-sensitive platform that can intelligently adapt itself as per performance of patients.

The software of the platform consists of 48 templates of VR-based reaching and coordination tasks that trigger abduction and adduction movement of the shoulder joint as prescribed in

physiotherapy guidelines. These tasks in the video game have three difficulty levels to suit severity of stroke. The hardware interface consists of a haptic stylus that provides tactile feedback to users. In addition, the platform has modules for task switching and physiological data acquisition.

The video game tasks appear to be similar to what children play but they have been designed for a specific purpose for stroke patients. For instance, the car navigation task requires users to tackle dynamic obstacles like a pedestrian crossing the road as well as static obstacles like tree pots at the edge of the road. This is a coordination task, designed for abduction movement of the shoulder joint. Similarly, a reaching task where participants have to puncture balloons, avoiding dynamic and static obstacles, is supposed to spur adduction movement.



(a)



Still from VR-based video games. Image: IIT Gandhinagar

The technique has been tested in a set of six patients with chronic stroke, and has been found to be effective. The research results have been published in journal *Computer Animation and Virtual Worlds*.

“Unilateral shoulder abduction and adduction are essential for performing daily activities. In our experimental setup, while stroke patients interacted with our VR-based tasks, we recorded their physiological signals in a synchronized manner. Results indicate the potential of using this adaptive and individualised system in persons who had a stroke suffering from upper limb movement disorders,” explained Dr Uttama Lahiri of IIT Gandhinagar, who led the team.

The researchers said the system can deliver real-time feedback on one’s skill progress. The patients in the study interacted with the system for 30 minutes a day for a week. Results indicated that their performance improved in terms of better scores, reduced task completion time and reduced performance errors.

The system has been designed and tested as a technology platform. More studies will have to be conducted for it to be tested as an intervention in stroke rehabilitation. “Our study points out the novelty of the work. There are quite a few VR-based studies that have been designed for entertainment, but they are not adaptive to performance like ours that makes our system unique. Therefore, it has the potential to be deployed as a low-cost exercise platform for stroke patients in future,” said Lahiri.

“Computer game-assisted upper limb recovery seems to be a novel method for assisting recovery of brain functions after stroke. Such game-based recovery may help in precise motor unit activation which makes recovery rational and task-oriented,” commented Dr Vijaya Nath Mishra, a stroke specialist at Sir Sunderlal Hospital, Banaras Hindu University, who is not connected with the study. However, he said, cost and affordability factors would have to be addressed for the new system to become a useful intervention.

The research team included Uttama Lahiri, Ashish Dhiman, Dhaval Solanki (IIT Gandhinagar), Ashu Bhasin (All India Institute of Medical Sciences, New Delhi) and Abhijit Das (AMRI, Kolkata). The work was funded by the Department of Science and Technology under its Technology Interventions for Disabled and Elderly programme.

This article was first published by India Science Wire.

लखनऊ के शहरीकरण से मृतप्राय हुई गोमती नदी

लेखक: डॉ. शुभ्रता मिश्रा

इंडिया साइंस वायर, 16 फरवरी, 2018

वास्को-द-गामा (गोवा) : करीब दो दशक से लखनऊ के निरंतर बढ़ते शहरीकरण का असर गोमती नदी पर भी पड़ रहा है और इसका पानी अब मानवीय उपभोग लायक नहीं बचा है। गोमती नदी की जल-गुणवत्ता सूचकांक के विश्लेषण के आधार पर लखनऊ विश्वविद्यालय और बाराबंकी स्थित रामस्वरूप मेमोरियल विश्वविद्यालय के शोधकर्ताओं ने यह खुलासा किया है।

अध्ययनकर्ताओं के अनुसार गोमती नदी के पानी का औसत जल-गुणवत्ता सूचकांक 69.5 पाया गया है। लखनऊ के प्रवेशद्वार पर गोमती का जल-गुणवत्ता सूचकांक 42.9 है और वहाँ पानी की गुणवत्ता बेहतर पायी गई है। लखनऊ से होकर गुजरने के बाद शहर के अंतिम छोर पर गोमती नदी का जल-गुणवत्ता सूचकांक 101.9 पाया गया है।

सतह जल और भूजल गुणवत्ता मानकों के बीच सम्बन्ध का पता लगाने के लिये लखनऊ के आठ अलग-अलग स्थानों से गोमती नदी और उसके आस-पास के छह स्थानों से भूजल के नमूने इकट्ठे किए गए हैं। जल के पीएच मान, चालकता, नाइट्रेट, फ्लोराइड, घुलित ऑक्सीजन (डीओ), जैविक ऑक्सीजन मांग (बीओडी), फॉस्फेट और कुल कोलीफार्म बैक्टीरिया को केंद्र में रखकर नमूनों का विश्लेषण किया गया है।

जल-गुणवत्ता सूचकांक नदी के पानी की खराब गुणवत्ता का सूचक है। यह सूचकांक जल के भौतिक, रासायनिक तथा जैविक गुणधर्मों के आधार पर उसके समुचित उपयोग को दृष्टिगत रखते हुए निर्धारित किया जाता है।

अध्ययन से प्राप्त आंकड़े दर्शाते हैं कि लखनऊ में प्रवेश करते ही शहर से निकले नदी में सीधे प्रवाहित होने से गोमती का जल प्रदूषित होने लगता है। शहर के मध्य में इसका जल-गुणवत्ता सूचकांक लगभग 75.9 पाया गया है, जो बेहद खराब माना जाता है। वैज्ञानिकों का कहना है कि ऐसे जल का उपयोग पीने के लिये नहीं किया जा सकता। भूजल की गुणवत्ता के लिये भी प्रदूषण की समान प्रवृत्ति देखी गई है।

अध्ययन में पाया गया है कि शहर में प्रवेश करने से पूर्व गोमती के जल में घुलित ऑक्सीजन की मात्रा 11 मिलीग्राम प्रति लीटर थी, जो शहर से बाहर निकलते समय मात्र 1 मिलीग्राम प्रति लीटर रह गई।

गोमती के प्रवेश-स्थल पर जहाँ जल में कुल कोलीफार्म अर्थात मल-कोलीफार्म जीवाणुओं की सर्वाधिक संभावित संख्या 1700 एमपीएन प्रति 100 मिलीलीटर आंकी गई थी, वहीं गोमती के अंतिम छोर पर बढ़कर यह एक लाख तीस हजार एमपीएन प्रति 100 मिलीलीटर दर्ज की गई है। भूजल में भी नाइट्रेट की मात्रा प्रारंभिक स्थल पर 1.3 पीपीएम थी, जो

बढ़कर अंतिम स्थल पर 39.5 पीपीएम आंकी गई। वहीं, भूजल में फ्लोराइड भी 0.431 से बढ़कर 1.460 पीपीएम दर्ज किया गया।

इन आंकड़ों से स्पष्ट है कि गोमती के प्रदूषित होने से इस नदी और आस-पास के इलाकों के भूजल की गुणवत्ता भी प्रभावित हो रही है। हालाँकि, लखनऊ में पीने और अन्य घरेलू उपयोग के लिये प्रयुक्त 415 एमएलडी (मिलियन लीटर प्रति दिन) जल की आपूर्ति के लिये 245 एमएलडी जल गोमती नदी से और 170 एमएलडी जल भूजल स्रोतों से प्राप्त किया जा रहा है।

अध्ययन में शामिल वैज्ञानिक डॉ. अभिषेक सक्सेना ने इंडिया साइंस वायर को बताया कि “गोमती नदी के लखनऊ शहर में प्रवेश करने और बाहर निकलने के बीच उसके प्रवाह मार्ग पर शहरीकरण की विभिन्न प्रक्रियाओं द्वारा प्रतिकूल असर पड़ता है। एक समय था, जब गोमती भूजल से जल लेती थी। जबकि, इस समय गोमती का प्रदूषित जल रिसते हुए भूजल को रिचार्ज कर रहा है। शहर की बढ़ती आबादी द्वारा भूजल के अत्यधिक दोहन से गिरते भूजल स्तर दोबारा संतुलित करने के लिये गोमती का प्रदूषित जल वहाँ रिसकर पहुँच रहा है। यह शोचनीय स्थिति है, क्योंकि भूजल प्रकृति में निरंतर गतिशील है और यदि खराब गुणवत्ता वाले जल के रिसाव के कारण भूजल संसाधनों के प्रदूषित होने की संभावना बढ़ जाती है।”

डॉ. सक्सेना के अनुसार “नदी में सीवेज के सीधे प्रवाह को रोकने के लिये त्वरित उपाय किए जाने चाहिए। नदी के प्राकृतिक प्रवाह को भी बनाए रखना जरूरी है, क्योंकि प्रत्येक नदी की अपनी आत्म-शुद्धि प्रणाली होती है, जिसमें कृत्रिम प्रयासों की आवश्यकता नहीं पड़ती।”

अध्ययन में शामिल एक अन्य शोधकर्ता डॉ. पूजा गोयल के अनुसार “यह शोध सीधे तौर पर तेजी से बढ़ते शहरीकरण के प्रतिकूल प्रभाव को दर्शाता है। बढ़ती आबादी के साथ जल सहित विभिन्न प्राकृतिक संसाधनों की मांग में वृद्धि ने विकराल रूप ले लिया है। यदि हम संसाधनों के उपयोग के प्रति संवेदनशील नहीं होते हैं, तो निकट भविष्य में गुणवत्तापूर्ण भूजल के लिये भी गंभीर संकट का सामना करना पड़ सकता है।”

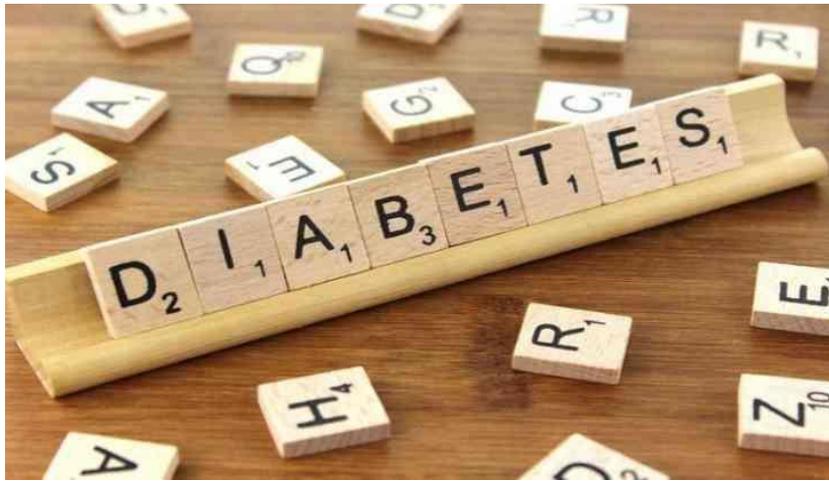
शोधकर्ताओं के अनुसार “गोमती के प्रदूषण में सबसे अधिक योगदान देने वाले क्षेत्रों की पहचान करने और इस से निपटने के लिये कारगर रणनीति बनाने में यह अध्ययन मददगार हो सकता है। गोमती के प्रदूषण के स्तर और भूजल पर इसके प्रतिकूल प्रभाव को जानने के लिये विस्तृत अध्ययन की आवश्यकता है।”

अध्ययनकर्ताओं में डॉ. अभिषेक सक्सेना और डॉ. पूजा गोयल के अलावा डॉ. ध्रुव सेन सिंह और दीप्ती वर्मा भी शामिल थे। यह शोध हाल ही में शोध पत्रिका करंट साइंस में प्रकाशित किया गया है।

catch हिंदी

Here is how nutrition may help overcome genetic risk of diabetes

INDIA SCIENCE WIRE | Updated on: 21 February 2018, 12:02 IST



(File)

For years, scientists have been engaged in finding human genes associated with lifestyle ailments like diabetes and heart disease to know if some population groups are prone to such disorders. Now Indian scientists have found that good nutrition can modify the risk of diabetes posed by presence of some faulty genes.

New research revealed that good nutrition – in the form of B12 and folic acid supplements – has a beneficial impact on genes associated with Type 2 diabetes. The study has been led by scientists at the Hyderabad-based Centre for Cellular and Molecular Biology (CCMB), a laboratory of the Council of Scientific and Industrial Research (CSIR).

Vitamins B12 and folate plays an important role in DNA methylation – a process that regulates various function of genes without altering the sequence. In DNA methylation, basically a methyl group is added to the DNA, which can change its activity.

Researchers provided Vitamin B12 and folic acid to a group of children for one year and examined the DNA methylation status by analysing their blood samples. They found that only

vitamin B12 and not folic acid influences regulation of several Type 2 Diabetes associated genes through methylation of a specific microRNA.

“This assumes significance in the light of our earlier observations that maternal homocysteine levels due to vitamin B12 deficiency are predictive of the future risk of cardio-metabolic risk in their children.

“Hence, this study provides a novel epigenetic explanation for the association between disordered one-carbon metabolism and risk of adiposity, insulin resistance and diabetes and has translational potential” Dr. Giriraj R Chandak, who led the research, said.

To understand the programming of complex diseases in detail, the group is currently working on a set of mothers who were given micronutrients, to see the effect of supplementation in their offspring. This work is being done in collaboration with Dr C S Yajnik at KEM Hospital and Research Centre (KEMHRC), Pune.

In order to understand molecular mechanism of programming in more details, similar conditions have been generated in animal models and effects are being analyzed in their cells, tissues and organs. “Finding of this study will enrich our understanding of the molecular mechanism of foetal programming, cause, and development of complex diseases. These studies will have potential public health significance and help in designing prevention policies,” Dr Chandak said.

The research team included Dr Chandak, Dilip Kumar Yadav and Smeeta Shrestha from CCMB; Hong Pan and Joanna D Holbrook from Singapore Institute for Clinical Sciences; Caroline HD Fall and Karen A Lillycrop from Southampton General Hospital, UK; Charu V Joglekar and CS Yajnik from KEM Health Research Centre, Pune. The study was funded by CSIR, Wellcome Trust and Department of Biotechnology (DBT).

जाँची परखी बातें

मानसून में वन्यजीवों के लिए अधिक जानलेवा हो जाती हैं सड़कें

By उमाशंकर मिश्र | Publish Date: Feb 22 2018 12:59PM



उमाशंकर मिश्र (इंडिया साइंस वायर) सड़कों का जाल लगातार फैल रहा है। लेकिन, उष्ण कटिबंधीय एवं संरक्षित वन्य क्षेत्रों में सड़क निर्माण का असर स्थानीय पारीस्थितक तंत्र और वन्यजीवों पर पड़ रहा है और वाहनों की चपेट में आने से वन्यजीवों की मौतों के मामले बढ़ रहे हैं। भारतीय शोधकर्ताओं के एक ताजा अध्ययन में ये तथ्य उभरकर आए हैं।

अध्ययनकर्ताओं के अनुसार सड़कों पर वन्यजीवों की सबसे अधिक मौतें मानसून के दौरान होती हैं। गर्मी के मौसम में वाहनों की चपेट में आकर जान गंवाने वाले जीवों की अपेक्षा मानसून में मरने वाले जीवों की संख्या 2.4 प्रतिशत अधिक दर्ज की गई है।

पश्चिमी घाट के वाल्परई पठार, अन्नामलाई टाइगर रिजर्व और इसके आसपास के क्षेत्रों के आश्रय-स्थलों और मौसम को केंद्र में रखकर मैसूर स्थित नेचर कंजर्वेशन फाउंडेशन के शोधकर्ताओं द्वारा यह अध्ययन किया गया है। सड़क पर वाहनों की चपेट में आने से सर्वाधिक 44 प्रतिशत उभयचर जीवों की मौत होती है और मानसून में मेंढक जैसे उभयचर जीव सड़क पर सबसे अधिक वाहनों का शिकार बनते हैं।

अध्ययन के दौरान 3-12 किलोमीटर लंबे ग्यारह सड़क-खंडों का 9-12 बार मानसून और गर्मी के मौसम में सर्वेक्षण किया गया है। घोंघे जैसे जीव (मालस्क), उभयचर जीव, रेंगने वाले जीव, पक्षी, केंचुए जैसे ऐनेलिडा समूह के खंडयुक्त कीड़े, मकड़ी एवं बिच्छू जैसे अष्टपाद कीट (ऐरेक्निडा), शतपाद कीट (सेन्टिपीडा), केकड़े, सहस्रपाद जीव (मिलपीडा) और स्तनधारी जीवों के ग्यारह वर्ग-समूहों के अलावा अज्ञात वर्ग के जीव अध्ययन में शामिल हैं। कशेरुकी और अकशेरुकी जीवों को दो विस्तृत वर्गीकरण के आधार पर अध्ययन में शामिल किया गया है।

सड़क पर मरने वालों में 14 प्रतिशत रेंगने वाले जीव पाए गए हैं, जिनमें सर्वाधिक 80 प्रतिशत से अधिक संख्या सांपों की होती है। इन जीवों में सिपाही बुलबुल, इंडियन स्किमिटर बैबलर, व्हाइट थ्रॉट किंगफिशर, गुलदुम बुलबुल समेत पक्षियों की अन्य कई प्रजातियां शामिल हैं। इसके अलावा चूहे, धारीदार गिलहरी, चमगादड़, छल्लूंदर, ब्लैक नेप्ड हेयर, बोनट मकॉक, इंडियन क्रेस्टेड पोर्क्यूपाइन, इंडियन पाम स्कीरल, ब्राउन पाम सीवेट, केंचुए, घोंघे, तितलियां और मकड़ियों समेत कीट-पतंगों की प्रजातियां भी वाहनों की चपेट में आने से मारी जाती हैं।

बदलते मौसम के अनुसार विभिन्न आवासीय क्षेत्रों में अलग-अलग जीव समूहों की सड़कों पर मरने की आवृत्ति में अंतर पाया गया है। इससे पहले अन्य अध्ययनों में भी वन्य क्षेत्रों में सड़कों को स्थानीय आवास के नुकसान, जीवों की गतिविधियों में बाधक, मिट्टी के कटाव, भूस्खलन, जल-तंत्र संबंधी बदलाव, आक्रमणकारी पौधों के प्रसार और प्रदूषण के लिए जिम्मेदार पाया गया है।

अध्ययनकर्ताओं के अनुसार “वाहनों एवं पर्यटकों की बढ़ती आवाजाही, सड़कों का चौड़ीकरण, सड़कों के किनारे स्थानीय पौधों की प्रजातियों को हटाने और दीवार खड़ी करने से वन्यजीवों की गतिविधियां प्रभावित होती हैं। ऐसे क्षेत्रों के लिए सड़कों का डिजाइन कुछ इस तरह होना चाहिए, जिससे जीवों की गतिविधियां प्रभावित न हों और उन्हें मरने से बचाया जा सके। सड़कों पर विभिन्न जीवों के मरने की आवृत्ति और मौसम एवं आवास के आधार पर इसमें पायी जाने वाली विविधता से जुड़ी जानकारियां इस दिशा में कारगर हो सकती हैं।”

यह अध्ययन शोध पत्रिका करंट साइंस में प्रकाशित किया गया है। अध्ययनकर्ताओं की टीम में पी. जगन्नाथन, दिव्या मुदप्पा, एम. आनंद कुमार और टी.आर. शंकर रमन शामिल थे।

इंडिया साइंस वायर

TECH ②

NAL is working on Mark 2 version of its light transport aircraft Saras: CSIR

Sunderarajan Padmanabhan Feb 21, 2018 20:28 PM IST

India's indigenously developed light transport aircraft Saras was successfully test flown for a second time today, less than a month after the first flight on January 24.

The flight commanded by Wing Commander U.P. Singh, Group Captain R.V. Panicker and Group Captain K.P. Bhat of Indian Air Force- Aircraft and System Testing Establishment (ASTE), took off from *Hindustan Aeronautics Limited (HAL)*'s airport at Bengaluru, according to details released by the *Council of Scientific and Industrial Research (CSIR)* here.



A total of 20 test flights are planned for the aircraft before freezing the production version. The design and development of the aircraft are being done by National Aerospace Laboratories (NAL). The production model design is expected to be ready by June-July this year.

NAL has incorporated several design modifications and improvements after the project was revived. These include the provision of a pair of 1200 shaft horsepower engines and a 104-inch diameter propeller assemblies to cater to second segment climb gradient requirements, besides improved flight control system, rudder area, main wheel and brakes.

Union Minister for Science and Technology Dr Harsh Vardhan said NAL had proposed to get Mark 2 version of the aircraft certified initially for military and subsequently for the civilian version. He said the aircraft will be 20-25% cheaper than any imported aircraft in the same category. The improved version will be a 19-seater aircraft instead of a 14-seater proposed earlier.

“The unit cost of the aircraft, with more than 70 percent indigenous content, will be around Rs. 40 crores to Rs.45 crore as against Rs.60 crore to Rs.70 crore for imported ones and has far more benefits than what the imported aircraft offer,” he said.

Hindustan Aeronautics Limited (HAL) has been identified as the production agency for the military version of Saras, while the production of civil version will be given to identified private industries. India needs 120-160 aircraft in this genre – both civil and military versions – in the next 10 years.

“Saras Mk 2 will be ideal for commuter connectivity under the *UDAAN scheme* and other applications like aerial search/survey, executive transport, disaster management and border patrol,” the minister added. The Mark 2 version has considerable drag/weight reduction with unique features like high cruise speed, lower fuel consumption, short landing and take-off distance, low cabin noise, operable from a high and hot airfield, with a pressurised cabin, operable from semi-prepared airfield and low acquisition and maintenance cost.

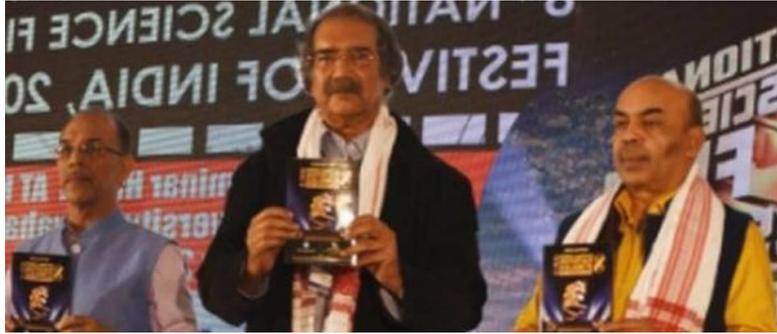
Director General of CSIR Dr Girish Saini said the cost of development and certification of Saras Mk2 will be around Rs. 600 crores with a time period of about 2 to 3 years.

“IAF is committed to test and thereafter induct the first indigenously designed and manufactured Light Transport Aircraft. IAF is fully supporting this programme and the design and configuration of the new version of Saras would be frozen soon,” said Air Vice Marshal Sandeep Singh.

India Science Wire

Science films can help promote scientific temperament

T V VENKATESWARAN



Mike Pandey (Centre) releasing the festival directory.

GUWAHATI, FEBRUARY 21

Over 200 film makers along with a large contingent of scientists, students and film critics from across the country have gathered here for eighth edition of the National Science Film Festival of India (NSFFI) which began today at the P.D Hall of Gauhati University.

Inaugurating the five-day event, noted wildlife photographer and environmentalist Mike Pandey emphasised the importance of every living organism in maintaining the ecological balance and called upon science film makers to help foster awareness towards preserving biodiversity.

“Nature is our mother and she is in danger. It is high time that we take appropriate action to save her.”

Nimish Kapoor, Director of NSFFI, said “the aim of the festival is to promote scientific temperament so that one can think and act scientifically.” In all, 232 films were entered for the festival and of them 82 have been shortlisted for screening. The festival provides a platform for professionals, non-professionals and student documentary film makers. The jury headed by three-time Green Oscar awardee Mike Pandey will select best films in various categories that would be given cash awards and citations.

A documentary showcasing the Forest-PLUS program of USAID/India in collaboration with the Ministry of Environment, Forests & Climate Change was screened as the inaugural film. Titled ‘Forest – Securing the Future’, the film documents experience of improving and managing the forested landscapes of the country, particularly to help mitigate the ill effects of climate change.

Twenty national and international organisations including UNICEF, IIT Guwahati, INDO-US Science and Technology Forum, National Council of Science Museums, CSIR-NISCAIR, British High Commission, Research Councils of UK, National Research Council - CNR Italy, Max-Planck-Gesellschaft, Germany India Office, Institute Francais (India) and Anamika Ray Memorial Trust are showing their films on science, technology, nature, health, technology, biodiversity and innovation.

Ankuran Dutta, Head, Department of Communication and Journalism, Gauhati University, said films screened during the festival would cover a wide spectrum of themes including health, water reservoir system, pollution, climate change and scientific achievements.

Vice Chancellor of Gauhati University, Mridul Hazarika, chaired the inaugural session. Manoj Kumar Patariya (Director, CSIR-NISCAIR), Sambhu Nath Singh (Director, School of New Media Studies at IGNOU) and Suresh Kumar Nath (Registrar, Gauhati University) also addressed the gathering.

The festival would also feature a number of workshops, panel discussions and film making classes. It has been organised by Vigyan Prasar under the Ministry of Science and Technology in collaboration with Gauhati University.

(India Science Wire)

शाखिसयत

वैज्ञानिक अनुसंधान की बुनियाद के पीछे था “नेहरू-भटनागर प्रभाव

By नवनीत कुमार गुप्ता | Publish Date: Feb 22 2018 1:04PM



नवनीत कुमार गुप्ता (इंडिया साइंस वायर): शांतिस्वरूप भटनागर का नाम भारत के उन अग्रणी वैज्ञानिकों में शामिल किया जाता है, जिन्होंने विज्ञान की मदद से औद्योगिक समस्याओं को हल करने में अहम भूमिका निभायी है। उन्हें देश के सबसे बड़े शोध संगठन वैज्ञानिक एवं औद्योगिक अनुसंधान परिषद (सीएसआईआर) के संस्थापक के रूप में याद किया जाता है। स्वतंत्रता के बाद तत्कालीन प्रधानमंत्री जवाहर लाल नेहरू ने देश के विकास में विज्ञान एवं प्रौद्योगिकी की भूमिका को समझते हुए शोध संस्थानों की स्थापना का दायित्व जिन व्यक्तियों को सौंपा, उनमें भटनागर प्रमुख थे।

वर्ष 1942 में सीएसआईआर की स्थापना शांतिस्वरूप भटनागर (21 फरवरी 1894 – 1 जनवरी 1955) की अध्यक्षता में की गई थी और भटनागर के नेतृत्व में ही इस संस्थान का विस्तार हुआ। स्वतंत्रता के बाद विज्ञान के जरिये देश को विकास पथ पर ले जाने की नीति को भटनागर ने सीएसआईआर के माध्यम से आगे बढ़ाया। आजादी के दो दशक में ही देश के विभिन्न हिस्सों में सीएसआईआर की कई प्रयोगशालाएं एवं अनुसंधान केंद्र कार्य करने लगे थे। तेजी से हो रहे वैज्ञानिक ढांचे के इस विस्तार के पीछे एक वजह भटनागर और नेहरू की नजदीकियों को भी माना जाता है। यही कारण था कि प्रसिद्ध भारतीय वैज्ञानिक सी.वी. रामन ने इन दोनों के वैज्ञानिक शोध के प्रति लगाव को 'नेहरू-भटनागर प्रभाव' का नाम दिया।

होमी जहांगीर भाभा और प्रशांत चंद्र महालनोबिस के साथ शांतिस्वरूप भटनागर ने देश में विज्ञान एवं प्रौद्योगिकी के आधारभूत ढांचे के विकास में महत्वपूर्ण भूमिका निभाई। उन्होंने कई युवा और होनहार वैज्ञानिकों का मार्गदर्शन किया और उन्हें प्रोत्साहित किया।

भटनागर के मार्गदर्शन में भारत में बारह राष्ट्रीय प्रयोगशालाएं स्थापित की गईं। इनमें मैसूर स्थित केन्द्रीय खाद्य प्रौद्योगिक अनुसंधान संस्थान, पुणे स्थित राष्ट्रीय रासायनिकी प्रयोगशाला, राष्ट्रीय भौतिकी प्रयोगशाला, नई दिल्ली; राष्ट्रीय मैटलर्जी प्रयोगशाला, जमशेदपुर एवं केन्द्रीय ईंधन संस्थान, धनबाद आदि शामिल हैं।

शांतिस्वरूप भटनागर का जन्म शाहपुर (अब पाकिस्तान में) में हुआ था। उनके पिता परमेश्वरी सहाय भटनागर की मृत्यु उस वक्त हो गई, जब वह केवल आठ महीने के थे। उनका बचपन अपने ननिहाल में ही बीता। उनके नाना एक इंजीनियर थे, जिनसे उन्हें विज्ञान और अभियांत्रिकी में रुचि पैदा हुई और यांत्रिक खिलौने, इलेक्ट्रानिक बैटरियां एवं तारयुक्त टेलीफोन बनाना उनके शौक बन गए।

स्नातकोत्तर डिग्री पूर्ण करने के उपरांत शोध फैलोशिप पर शांतिस्वरूप भटनागर इंग्लैंड चले गए। वहां उन्होंने यूनिवर्सिटी कॉलेज, लंदन से वर्ष 1921 में रसायनशास्त्र के प्रोफेसर फ्रेड्रिक जी. गोणान के मार्गदर्शन में विज्ञान में डॉक्टरेट की उपाधि प्राप्त की। अपने शोधकार्य में उन्होंने तेलों में उच्च-वसा अम्लों के द्विसंयोजक एवं त्रिसंयोजक लवणों की घुलनशीलता और तेलों के पृष्ठीय तनाव पर उनके प्रभाव का अध्ययन किया। भारत लौटने के बाद बनारस हिन्दू विश्वविद्यालय में शांतिस्वरूप भटनागर ने प्रोफेसर के पद पर कार्य किया। आगे चलकर उन्होंने कोलायडीय रसायन तथा चुम्बकीय रसायन के क्षेत्र में महत्वपूर्ण शोध कार्य किए।

शांतिस्वरूप भटनागर का मूल योगदान चुम्बकीय-रासायनिकी के क्षेत्र में है। उन्होंने रासायनिक क्रियाओं को अधिक जानने के लिए चुम्बकत्व को औजार के रूप में प्रयोग किया। प्रायोगिक और औद्योगिक रसायन के क्षेत्र में भी उन्होंने महत्वपूर्ण कार्य किया। सबसे पहले पहले भटनागर ने जिस औद्योगिक समस्या को सुलझाया, वह गन्ने के छिलके को मवेशियों को खिलाई जाने वाली खली में बदलने की प्रक्रिया विकसित करना थी।

इसी प्रकार उन्होंने ड्रिलिंग के दौरान तेल कंपनियों के सामने उत्पन्न होने वाली समस्या का निदान किया। ड्रिलिंग के दौरान कीचड़ जब नमक के संपर्क में आता था तो वह ठोस हो जाता था। कुछ समय बाद वह और अधिक कठोर हो जाता था, जिससे ड्रिलिंग को जारी रखने में कठिनाई होती थी। भटनागर ने इसके समाधान के लिए कोलाइडीय रसायन का उपयोग किया। उन्होंने पाया कि गोंद में कीचड़ के ठोस होने के समय उत्पन्न होने वाली श्यानता को घटाने की उल्लेखनीय क्षमता होती है। भटनागर द्वारा विकसित किए गए इस तरीके से मेसर्स स्टील ब्रदर्स इतने खुश थे कि उन्होंने उनके सामने पेट्रोलियम से संबंधित शोध कार्य के लिए डेढ़ लाख रुपये देने का प्रस्ताव रखा था। इस अनुदान से विश्वविद्यालय में भटनागर के मार्गदर्शन में पेट्रोलियम अनुसंधान विभाग स्थापित करने में मदद मिली। फिर उस विभाग में मोम-निर्गन्धीकरण, मिट्टी के तेल से उठने वाली लपटों की ऊंचाई को बढ़ाने और वनस्पति तेल एवं खनिज तेल उद्योग में अपशिष्ट उत्पादों के उपयोग से संबंधित खोजपूर्ण कार्य संपन्न हुए।

भटनागर विज्ञान संबंधी प्रयोगों के लिए नए उपकरणों के विकास को तत्पर रहते थे। उन्होंने के.एन. माथुर के साथ चुम्बकीय व्यवधान तुला नामक अभिनव उपकरण का विकास किया। यह तुला चुम्बकीय गुणों को मापने वाला एक संवेदनशील उपकरण थी, जिसे वर्ष 1931 में रॉयल सोसायटी के कार्यक्रम में भी प्रदर्शित किया गया था।

भटनागर की मृत्यु के उपरांत उनके सम्मान में सीएसआईआर की पहल पर वैज्ञानिकों हेतु भटनागर पुरस्कार की शुरुआत की गई। इस पुरस्कार का उद्देश्य विज्ञान एवं प्रौद्योगिकी के क्षेत्र में उल्लेखनीय शोध कार्य करने वाले वैज्ञानिकों को प्रोत्साहित करना है।

प्रतिभाशाली वैज्ञानिक होने के साथ शांतिस्वरूप भटनागर एक कोमल हृदय कवि भी थे। हिंदी और उर्दू के बेहतरीन जानकार भटनागर ने अपने नाटकों और कहानियों के लिए कॉलेज के समय में अनेक पुरस्कार भी जीते। शांतिस्वरूप ने बनारस हिंदू विश्वविद्यालय का कुलगीत भी लिखा था, जो हिंदी कविता का बेहतरीन उदाहरण है।

वर्ष 1941 में ब्रिटिश सरकार द्वारा भटनागर को उनके युद्ध संबंधी शोध कार्यों के लिए नाइटहुड से सम्मानित किया गया। 18 मार्च, 1943 को इन्हें फैलो ऑफ रॉयल सोसायटी भी चुना गया। 1 जनवरी, 1955 को इस प्रसिद्ध वैज्ञानिक ने दुनिया को अलविदा कह दिया।

Jumping genes become active in critical brain areas with age

Studies on jumping genes are significant as it can cause insertional mutations leading to several diseases. Till date, more than 100 disease-causing jumping gene insertions have been identified



Research team at Department of Biotechnology, IIT Roorkee.

By Vaishali Lavekar

Pune: Aging is a complex phenomenon. Scientists have been trying to figure out mechanisms underlying changes that occur in behaviour and cognition processes due to aging. Among various possibilities, the role of retrotransposons – popularly known as jumping genes – is suspected to be critical in the process of aging.

Now a group of Indian scientists have found that a jumping gene known as LINE-1 retrotransposons becomes highly active with age in different anatomical regions of the human brain like frontal cortex, hippocampus and basal ganglia. This indicates that alteration of neuronal genome occurs as age advances. The group is now engaged in finding out correlation between activation of retrotransposons in human brain and its possible effects on behaviour.

“We have demonstrated that LINE-1 jumping gene is highly active in different anatomical regions of normal human brain like frontal cortex, hippocampus and basal ganglia as compared to other non-brain tissues like kidney, heart, liver and lung,” explained Dr Prabhat Mandal from Department of Biotechnology, Indian Institute of Technology Roorkee. The experiments were conducted using post-mortem tissue obtained National Institute of Mental Health and Neurosciences, Bangalore.

Transposon is a piece of DNA sequence with an inherent ability to move from one genomic location to another. Its discovery in 1956 went against the notion of genome being static. There are two types of transposons – DNA transposon where a piece of DNA sequence moves from one place in the genome to another either by ‘cut and paste’ or ‘copy and paste’ mechanism; and RNA transposons – also called retrotransposon- which move within a genome using RNA as an intermediate.

LINE-1 or Long INterpersed Element-1 is the most abundant and active jumping gene sequence in human genome. Almost 500,000 copies of LINE-1 sequences are present in human genome with 100 to 150 copies actively jumping. An active LINE-1 encodes two proteins designated as ORF1p and ORF2p; both proteins are required for jumping LINE-1 sequences from one place of the genome to another place.

Studies on jumping genes are significant as it can cause insertional mutations leading to several diseases. Till date, more than 100 disease-causing jumping gene insertions have been identified.

“Our work reveals that the number of L1 copies are more in neurons compared to other somatic cells. This work also pointed that the copy number of L1 retrotransposon might increases with age and making neuronal genome plastic as we get older,” he added. The research results have been published in journal Mobile DNA.

The study was done by IIT Roorkee in collaboration with Jawaharlal Nehru University, New Delhi and Human Brain Tissue Repository (HBTR), Neurobiology Centre at NIMHANS. The

research team included Debpali Sur, Raj Kishor Kustwar, Savita Budania, Anita Mahadevan, Dustin C. Hancks, Vijay Yadav, S. K. Shankar and Dr Prabhat K. Mandal. The study was funded by the Department of Science and Technology (DST).

(India Science Wire)

Indian scientists working to unravel rare type of diarrhoea

[Sunderarajan Padmanabhan](#)

Thursday 22 February 2018

Scientists at the Indian Institute of Science are developing a novel transgenic mouse which will express the human GUCY2C protein, a receptor for bacterial toxins that cause the rare diarrhoea



📷 Diarrhoea is caused when toxins generated by certain strains of E. coli that colonise the gut, bind to the receptor and activate it. This results in changes in the intestinal cell, which leadsto fluid secretion and diarrhoea. Credit: Jean-Etienne Minh-Duy Poirrier/Flickr

Diarrhoea is normally caused by bacterial, viral or parasitic organisms. The disease could be prolonged or last for a few days. Provision of safe drinking water and use of improved sanitation and hand washing with soap can significantly reduce the riskof infection.

However, there is a rare form of diarrhoea, which is caused due to specific genetic mutation in patients. The symptoms of the disorder begin right from birth and continue lifelong, even in the absence of infection. The patients also suffer from several other complications, including irritable bowel syndrome, bowel obstruction and inflammatory bowel disease.

The disease was first identified in a Norwegian family ten years ago, with as many as 32 members from three branches of the family found to be affected by the disease. Studies showed that the cause was a mutation in a gene that produced a protein called GUCY2C.

GUCY2C is a receptor for bacterial toxins that cause diarrhoea, as well as peptides found in the gut. Diarrhoea is caused when toxins generated by certain strains of *E. coli* that colonise the gut, bind to the receptor and activate it. This results in changes in the intestinal cell, which lead to fluid secretion and diarrhoea. Normally, the activity of GUCY2C is kept under control, but the mutation in these patients causes hyperactivity of the receptor, resulting in continuous fluid secretion.

Studies to understand the basis of the disease and perhaps provide ways of helping

Patients have recently got a shot in the arm with the Department of Biotechnology (DBT) awarding a grant to scientists at the Indian Institute of Science, Bengaluru, led by Sandhya S Visweswariah, professor, the Department of Molecular Reproduction, Development and Genetics.

The project includes development of a novel transgenic mouse which will express the human GUCY2C protein, harboring a mutation in its gut. The mouse is being produced by a company in France and is likely to be ready for studies by July this year.

Speaking to *India Science Wire*, Visweswariah said a significant feature of the animal model will be that it will be possible to switch on and switch off the activity of the human gene. “We don’t know what will be the impact of the human gene on the animals. Therefore, we don’t want to keep it active all the time. The gene will be switched on when we want to conduct a study, by providing a specific chemical in the diet.”

“I have been working on GUCY2C for a long time. When the Norwegian clinicians found that mutations in GUCY2C had a role in the disorder, they got in touch with me and since then we have been collaborators,” she added.

The disease may be present in India, but managing this disorder is very expensive. “The disease manifests at birth, and children affected by it have to be given nutrition constantly through parenteral methods to compensate for the loss due to frequent bouts of diarrhoea. In the West, people can afford to set up necessary system within their homes,” she said.

The focus of the study, she said, was to find a drug molecule that could suppress the activity of the protein. She and her team have also been studying other transgenic mouse models where GUCY2C protein is made to be active all the time, and this mouse was developed with funding from the US-based Bill and Melinda Gates Foundation and the University of Bergen, Norway.

“Mice and humans have a major difference in that we consume a lot of fluid in our diet. Rodents such as mice consume very little water and therefore it gets largely absorbed in the body. Consequently, it is not possible for mice to demonstrate aspects of the disease identical to that seen in humans. However, we need to use the mouse as a model, and the new mouse that is on the way would hopefully be a game changer.”

Visweswariah made a presentation on her work at the recently concluded International Conference on Cell Biology 2018. It was a first of its meeting where three organisations came together: International Federation for Cell Biology, Asian Pacific Organization for Cell Biology and Indian Society of Cell Biology. The meeting also commemorated the 30th anniversary of the APOCB. It was organised by the Hyderabad based-Centre for Cellular and Molecular Biology.

(India Science Wire)

Biotech Times

Scientists Explore Wild Rice Varieties For Useful Genes



Researchers studied two uncultivated varieties of rice, *Oryza rufipogon* and *Oryza nivara* from West Bengal and Odisha that could be important source of beneficial genes for rice breeding and crop improvement

By [Shikha T Malik](#)

New Delhi, 23 February: Rice is a staple food in most of the countries in South and South East Asia with India being the second largest producer of rice after China. With increasing population and demand for food, scientists are exploring new ways to enhance the productivity of rice.

In this quest, they are using genetic tools to identify unique regions or genes in wild rice varieties that confer better survival and increased yield.

Prof. GJN Rao with his team of researchers at the Division of Crop Improvement, National Rice Research Institute at Cuttack have performed genetic analysis of wild or uncultivated rice found in Eastern India, to identify regions that give unique properties to these rice and which can be exploited to produce better varieties for enhanced productivity.

Researchers studied two uncultivated varieties of rice, *Oryza rufipogon* and *Oryza nivara* from West Bengal and Odisha that could be important source of beneficial genes for rice breeding and crop improvement. Both these varieties are close relatives of Asian cultivated rice yet with very different and unique properties. Both of these varieties have distinctive growing patterns with different climatic and geographical environments. One grows in wetlands including swamps and lakes and the other in dry areas.

Dr. Rao's team identified a total of 30 rare variants of genes in these rice varieties with majority of new variants in *O. rufipogon* as compared to *O. nivara*. In one of the varieties, they have identified regions associated with drought tolerance which could be quite beneficial in crop improvement programmes.

The morphological analysis, that is characteristics like size, shape and structure of these two varieties shows a lot of variation within and between the two populations, the researchers have reported. These regions could be associated with special features which once validated could be useful in breeding programmes, suggested Prof. Rao and his group.

“O. rufipogon and O. nivara, the closest wild relatives of rice, known to be rich reservoirs of genetic diversity, can be the source material for enhanced rice production. The study, based on the assessment of variability in the two wild forms, could clearly demarcate them into two distinct species and the information generated can be a critical component of the rice improvement programs of the future”, Dr. Rao explained.

This study has established the status of *O. nivara* as separate species based on morphological and molecular markers. “It has opened a discussion about original progenitor of cultivated rice. In earlier studies, *O. rufipogon* has been claimed as original progenitor and *O. nivara* has been claimed as ecotype or intermediate of *O. rufipogon*. *O. nivara* is mainly found in the Indian subcontinent and if in future through scientific evidences it gets established as immediate progenitor of cultivated rice this may establish that modern rice got originated from India,” pointed out Dr. Rakesh Singh, Principal Scientist (Plant Biotechnology) in the Department of Genomic Resources, National Bureau of Plant Genetic Resources, New Delhi. He is not connected with the study.

The research team included Jwala Narasimha Rao Gundimeda, Rashmita Samal, Pritesh S Roy, Auromira Sahoo, Meera Kumari Kar, Bhaskar C Patra, Bishnu C Marndi. This study has been reported in journal *Scientific Reports*.

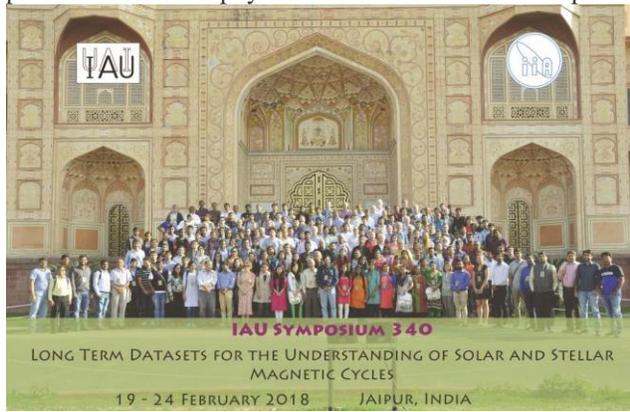
[\(India Science Wire\)](#)



Research Stash

Scientists Meet to Understand Solar Cycle Better

Influence of the Sun on the Earth is modulated by solar activity cycle. The 11-year cycle is one of the most striking phenomena in solar physics and has fascinated both specialists and laymen for centuries.



The cycle is thought to be the product of a dynamo located deep inside the Sun. Although great advances have been made in understanding the physics of the 'dynamo', the world is still far from having a consistent and generally accepted picture of it. Even more enigmatically, no two cycles are alike and there are great differences from one cycle to the next. This phenomenon remains a big challenge.

Understanding of the origin and physics of the solar cycle requires data spanning not just one cycle. Rather, many solar cycles must be observed with equal reliability.

The global effort has got a new impetus with scientists and other stakeholders from different parts of the world coming together to take stock of the current state of research and the level of datasets that are available for different aspects of the solar cycle.

The six-day symposium organized by the [International Astronomical Union \(IAU\)](#), which concluded here today, saw presentations and discussions among researchers from different fields of study.

The meeting assumes importance as it was the first such gathering that focused specifically to look at long-term data on solar cycles in their totality. Over the years there had been workshops and symposia focused on the different aspects of various datasets. But, this is the first time where an integrated approach was taken.

It is also significant as the scientific world would soon have high-quality datasets spanning about 40 years or about 4 cycle's datasets at its disposal of important aspects such as the polar field data and the synoptic magnetograms. Also, the weakest solar cycle over the past century would come to an end soon.

The co-Chair of the symposium titled [IAUS340](#), Dr. Dipankar Banerjee, noted, “during the last few years, renewed interest on the digitization of many long-term data sources and more systematic and automated methods of analysis have given us invaluable statistics about the sunspot, faculae, and prominences from the beginning of the 20th century. With the current cycle now reaching its end, how strong the next cycle will be? Can we predict the next cycle physically with the available datasets? It will be the right point in time to discuss”.

(India Science Wire)

Tourists can now get better insight into astronomical heritage in Jaipur

[SUNDERARAJAN PADMANABHAN](#)



Tourist guides participating in astronomy workshop at Jantar Mantar.

JAIPUR, FEBRUARY 24

The Jantar Mantar monument in Jaipur is a UNESCO world heritage site. It is an astronomical observatory built in early 18th century by Rajput king Sawai Jai Singh II. It houses 19 astronomical instruments made out of masonry, stone and brass.

The monument expresses architectural innovations as well as the coming together of ideas from different religious and social beliefs in 18th century India. The observatory is an example of the Ptolemaic positional astronomy shared by many civilisations. The monument is a must-visit place in the itinerary of any visitor to Jaipur.

With a view to help disseminate unique features of the monument and the science behind astronomical observations in a more effective manner, Astronomical Society of India (ASI) organised a two-day workshop on Thursday and Friday for tourist guides operating there. ASI's Public Outreach & Education Committee (ASI-POEC) conducted it in association with Dronah Foundation, a NGO working in the area of heritage conservation.

The programme included lectures on basic concepts of positional astronomy and detailed mathematics behind various astronomical instruments held at Birla Auditorium in the centre of

the city, followed by a hands-on session at the monument. The guides were encouraged to take readings from various instruments. About 50 guides participated.

It was conducted by N. Rathnashree, Director, Nehru Planetarium, Delhi, Aniket Sule of Tata Institute of Fundamental Research's Homi Bhabha Centre for Science Education, Alok Mandavgane from Aryabhat, Bhopal and Mukesh Sharma, a traditional scholar from Jaipur.

The workshop was followed by the release of a set of activity sheets designed for visitors to Jantar Mantar. The activity sheet set is designed to encourage visitors to use the instruments and record their own observations. There are separate sheets for each instrument. The visitors can send their observations to Nehru Planetarium, Delhi by email (nehruplanetarium@gmail.com).

The training session was organised as a satellite event for a global symposium held by the International Astronomical Union (IAU) here to take stock of the status of studies across the world on the difference aspects of solar cycle and the way forward.

(India Science Wire)



Research Stash

Potent Anti-Obesity Agent Works In Rats

Obesity has emerged as a public health problem, resulting in the significant burden of non-communicable diseases. A team of scientists at [Maharaja Sayajirao University \(MSU\)](#), Baroda have claimed success with a potent anti-obesity agent in studies done in laboratory animals.

The group, led by [Prof. Mange Ram Yadav](#), has designed new molecules that seem to be effective in controlling food intake in preliminary studies done in rats. The researchers screened a database of chemical compounds and identified a chemical moiety, phenothiazine, that can be modified to act as an anti-obesity agent. These compounds containing phenothiazine on Cannabinoid Receptor 1 and inhibit it.

Cannabinoid Receptor 1 (CB1R) is a class of receptors present in the brain and other tissues and organs like eyes, mouth and oral cavity, cardiovascular system, gastrointestinal tract, and immune system. These receptors are involved in various functions like regulating our appetite, pain, and emotions. A receptor is a molecule on the surface of a cell that receives chemical signals from the outside and results in initiating a response inside the cell.

“Activation of CB1R leads to increased food intake, while inhibition of this receptor decreases the feeding,” researchers explained. By exploiting this quality of CB1R, the team designed new molecules that target and inhibit this receptor and thus lead to decreased food intake. They further modified the molecule in such a way that it does not reach the brain and only acts on cells outside the central nervous system. This may help in avoiding side effects like anxiety and depression.

Preliminary studies done in rats showed a significant decrease in food intake as compared to rats in the control group. These study results have been published recently in journal *Scientific Reports*.

“This group has reported the role of phenothiazine nucleus containing compounds as peripherally acting cannabinoid 1(CB1) receptor antagonists for management of obesity. The investigations have indicated good physiochemical and pharmacokinetic properties suggesting their drug-like behavior”, noted [Dr. Gita Chawla](#), Associate Professor in Department of Pharmaceutical Chemistry, Jamia Hamdard, who was not connected with the study.

“We are currently in the process of chemical modification and optimization of molecule activity that can then be converted in the form of drug”, Prof. Yadav told *India Science Wire*. He said he has filed a patent application in India for these compounds.

The team included Mayank Kumar Sharma, JatinMachhi, Prashant Murumkar and M R Yadav.

(India Science Wire)

Biotech Times

A Shot In The Arm For Efforts To Promote Newer Bio-Fuels



A Shot In The Arm For Efforts To Promote Newer Bio-Fuels

By [Sunderarajan Padmanabhan](#)

New Delhi, Feb 26: Mission Innovation (MI) is a global initiative of 22 countries and the European Union to accelerate innovation in the area of clean energy across the world. It focuses on seven aspects of clean energy including [biofuels](#). India co-leads the programme on biofuels along with Brazil, Canada and China.

The area of bio-fuel poses several challenges as well as opportunities for governments, researchers, investors and industry. It has seen rapid strides in terms of research and development. However, there are still challenges as most exciting new bio-fuels still remain at an early-commercial stage of development.

A two- day International Conference to take stock of current knowledge, share information and best practices, and build consensus on the actions most needed to move forward began here today. Over 300 officials, technical experts, academicians, researchers and investors from 18 countries are participating in the event organized by Department of Biotechnology.

Inaugurating the conference, V.K. Saraswat, Member, NITI Aayog, emphasized the need to promote renewable and other clean energy options in the wake of growing concerns over the issue of climate change and expressed the hope that the collective wisdom of the participating countries can help foster a revolution in this regard.

Prof. Ashutosh Sharma, Secretary Department of Biotechnology and Department of Science and Technology, noted that India has already taken steps to double the level of investment on research and development in the area of clean energy as per the target set under Mission Innovation. “India is keen to realize the goals of Mission Innovation at the earliest and has been taking all necessary to make this possible”.

Dr. Renu Swarup, Senior Advisor, DBT, welcoming the gathering, said the conference aimed to provide a common platform for the various stakeholders to exchange experiences and challenges related to development and scaling of advance biofuels. Among other things, it was designed to will focus on concerns of the private sector to speed up large-scale production of biofuels.

A “New Delhi Declaration on Sustainable Bio-fuels”, prepared by Mission Innovation in consultation with member countries is scheduled to be endorsed and announced at the end of the conference.

[\(India Science Wire\)](#)



Research Stash

Genomic Study May Help Solve ‘Indian Enigma’ Relating To Gastric Bacteria

Indian researchers, working in collaboration with their Australian counterparts, have sequenced 42 strains of a disease-causing bacterium, *Helicobacter pylori*, to better understand genetic factors that play a role in disease development in Indian populations.



Dr. Mamatha Ballal and her team

Helicobacter pylori, a bacterium that stays in the human gut, causes gastritis, peptic ulcers, and gastric cancers. Although it infects half of the human population, most individuals do not show any symptoms. This bacteria, which transmits through direct contact with saliva, vomit or fecal matter of infected individual, has a high prevalence in developing countries with poor sanitation facilities.

In India, although this infection is spread in all regions, the incidence of infection resulting in gastric cancer is more in South and North-East regions than North India which is called ‘Indian Enigma’. High genetic variation in *H. pylori* strains from different regions of India is considered one of the major reason of this enigma.

Now, scientists from the [Kasturba Medical College, Manipal University](#) together with Australian scientists have sequenced 42 strains of *H. pylori* strains from south Indian population. The scientists isolated the bacterial strains from the biopsy samples of patients with various kinds of gastritis, peptic ulcers and duodenal ulcers who visited the hospital from rural regions of Karnataka and Kerala.

The isolated bacteria were grown on nutrient media and then DNA was extracted from the culture mass of bacteria and sequenced. Further, sequence analysis of similar genes from these strains was carried out to understand their relatedness. This analysis showed that South Indian population harbor *H. pylori* strain from both Asian and European origin.

“Our collection of *H. pylori* draft genomes from South India will allow the scientific community to identify whether *H. pylori* genetic factors (if present) play a role in disease development, particularly in that of duodenal ulcer disease, and to compare this role to that in closely related strains from the Northern regions of India,” explained [Dr. Mamatha Ballal](#), author this study, while speaking to *India Science Wire*.

The study compared outer membrane proteins, virulence genes harbored by strains from this particular region with strains of East Asian countries where there is a higher rate of gastric cancers. “It also explored the mechanisms responsible for drug resistance with the identification of mutations in the antimicrobial resistance encoding genes” Dr. Ballal added.

The results of this study are published in journal *American Society of Microbiology*. The research team included Vignesh Shetty and Mamatha Ballal from Kasturba Medical College, Manipal University and Binit Lamichhane, Eng-Guan Chua and Chin-Yen Tay from the Marshall Centre for Infectious Diseases Research and Training School of Biomedical Sciences, University of Western Australia.

(India Science Wire)

फर्स्टपोस्ट

चेहरे के हावभाव से पहचाने कौन सच बोल रहा है कौन झूठ

विज्ञान ने काफी ऐसे शोध किए हैं जो लोगों के चेहरे के हावभाव से सच और झूठ का अंतर बता देते हैं



किसी के चेहरे पर बनावटी हाव-भाव देखकर लोग अक्सर धोखा खा जाते हैं. अब एक ताजा अध्ययन में पता चला है कि ज्यादातर भारतीय अपनी वास्तविक प्रसन्नता को दबाते हैं और अपनी नकारात्मक भावनाओं पर पर्दा डाल देते हैं.

कलकत्ता विश्वविद्यालय के मनोवैज्ञानिकों द्वारा भारतीय लोगों के चेहरे के वास्तविक एवं बनावटी हाव-भावों की पहचान के लिए हाल में किए गए अध्ययन में ये रोचक तथ्य उभरकर आए हैं.

चेहरे की अभिव्यक्ति का विश्लेषण फेशियल एक्शन कोडिंग सिस्टम (एफएसीएस) पद्धति के आधार पर किया गया है. एफएसीएस, मनोवैज्ञानिकों पॉल ऐकमान और फ्रिज्जिन द्वारा विकसित मानव चेहरे की अभिव्यक्ति का सटीक विश्लेषण करने वाली अंतरराष्ट्रीय मान्यता प्राप्त पद्धति है.

शोध के दौरान 18- 25 वर्ष के बीच की कुल 20 स्वस्थ व सामान्य युवतियों के चेहरे के भावों का अध्ययन किया गया है. इसमें प्रसन्नता और दुख की वास्तविक और नकली अभिव्यक्तियों का आकलन चेहरे की मांसपेशियों की गति के आधार पर किया गया है.

चेहरे की वास्तविक और नकली अभिव्यक्तियों को समझने के लिए अध्ययन में शामिल प्रतिभागियों के गालों के उठाव, भौहों की भंगिमा, नथुनों के फूलने-सिकुड़ने, होंठों के खुलने-बंद होने और मुस्कुराहट के समय होंठों की खिंचाव रेखा से लेकर आंखों के हाव-भाव के संचालन का विश्लेषण किया गया है।

मनुष्य अपने भावों को वास्तविक यानी सच्ची अभिव्यक्ति एवं बनावटी या नकली अभिव्यक्ति समेत दो रूपों में व्यक्त करता है। इस शोध में मनुष्य की दोहरी भावाभिव्यक्ति की प्रवृत्ति के अंतर को समझने का प्रयास मनोवैज्ञानिक सिद्धांतों के आधार पर किया गया है।

अध्ययन के लिए खींची गई युवतियों की विभिन्न तस्वीरों और वीडियो शूट के तुलनात्मक अध्ययन से पता चला है कि वास्तविक प्रसन्नता में व्यक्ति की आंखों के नीचे हल्की-सी सिकुड़न होती है, जबकि नकली प्रसन्नता में मुस्कुराते समय आंखों के पास ऐसी कोई भी सिकुड़न दिखाई नहीं देती।

इसी तरह दुखी होने पर भौहों, होंठ के कोनों और ठोड़ी के क्षेत्रों की मांसपेशियों में बदलाव से वास्तविक उदासी का आकलन कर सकते हैं। इसके अलावा आंखों से निकले आंसू भी दुख के प्रमाण होते हैं। नकली दुख को दर्शाने में मांसपेशियों का अधिक उपयोग करना पड़ता है और गाल थोड़े उठ जाते हैं, लेकिन होंठ सख्ती से बंद हो जाते हैं।

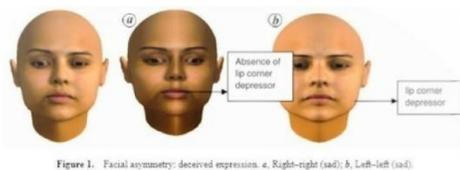


Figure 1. Facial asymmetry: deceived expression. a, Right-right (sad); b, Left-left (sad).

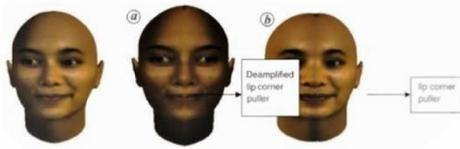


Figure 2. Facial asymmetry: deceived expression. a, Right-right (happy); b, Left-left (happy).

मनोवैज्ञानिकों ने पाया है कि झूठी भावाभिव्यक्ति के समय व्यक्ति को अपने वास्तविक भाव को दबाने के लिए चेहरे की तंत्रिकाओं पर अधिक नियंत्रण रखने की आवश्यकता होती है। इसी तरह भावों के माध्यम से धोखा देने के जानबूझ कर किए गए प्रयासों के संकेतों के दौरान प्रतिभागियों के चेहरे की पार्श्व अभिव्यक्तियों में भी स्पष्ट तुलनात्मक भाव देखे गए हैं।

प्रमुख शोधकर्ता डॉ. अनन्या मण्डल ने इंडिया साइंस वायर को बताया कि “आम लोगों के लिए किसी व्यक्ति विशेष की भावाभिव्यक्ति में सच्चाई या झूठ को समझ पाना कठिन होता है. इन दोहरी भावाभिव्यक्तियों के कारण कई बार लोग जीवन में धोखा खाते रहते हैं.”

डॉ. मण्डल के अनुसार “मनुष्य के चेहरे में हाव-भाव पैदा करने वाली मांसपेशियां अलग होती हैं, जो सिर और चेहरे की त्वचा से जुड़ी रहती हैं. ये पेशियां ही चेहरे की त्वचा के भागों को अलग-अलग दिशाओं में खींचकर भावाभिव्यक्ति में बदलाव को दर्शाती हैं. आंखों एवं मुंह के चारों ओर गोलाकार पेशियां होती हैं, जिससे आंखें और होंठ घूमते और फैलते हैं. इसी तरह दूसरी छोटी-छोटी पेशियां भौहों, ऊपरी पलकों तथा मुंह के कोणों को ऊपर व नीचे हिलाती हैं और नथुनों को फैलाती हैं. चेहरे की ये मांसपेशियां व्यक्ति की वास्तविक और नकली अभिव्यक्तियों में अंतर बताने में अहम भूमिका निभाती हैं.”

वरिष्ठ मनोवैज्ञानिक डॉ. पृथा मुखोपाध्याय के अनुसार “इस शोध से प्राप्त निष्कर्ष विभिन्न व्यवसायों, कानून प्रवर्तन, सुरक्षा एवं स्वास्थ्य देखभाल संबंधी व्यवस्थाओं में साक्षात्कार, पूछताछ और व्यापारिक लेनदेन के समय सही लोगों का चयन करने में मददगार हो सकते हैं.”

अध्ययनकर्ताओं की टीम में डॉ. अनन्या मण्डल और डॉ. पृथा मुखोपाध्याय के अलावा नवनीता बसु, समीर कुमार बंदोपाध्याय और तनिमा चटर्जी भी शामिल थे. यह अध्ययन करंट साइंस जर्नल में प्रकाशित किया गया है

(इंडिया साइंस वायर के लिए शुभ्रता मिश्रा)

Now, monitoring of air and water quality

SUNDERARAJAN PADMANABHAN, Delhi:

Four new research and development projects for real time monitoring of air and water quality were launched jointly by Department of Science and Technology (DST) and Corporate Research Council of Intel. Among the proposed projects is an air quality monitoring test bed that would be able to report and visualise scientifically validated PM 2.5 and gas measurements from 40 locations in real time. After upscaling to 60 locations, the monitoring technology

is expected to cover 500 cities and towns across India.

The project aims to collect air quality information to allow policy makers and citizens to deploy data-driven control and preventive mechanisms. The focus would be on low-cost PM2.5, ozone, nitrogen oxide and sulfur-oxide sensors. The idea is to integrate hardware, communication and software stack, from local sensing to distributed analytics. For this, Indian Institute of Technology, Kanpur, would work in collaboration with Indian Institute of Science,

Bangalore, IIT-Bombay and Duke University, Durham.

The second group would work on high resolution air quality monitoring and air pollutant data analytics. It would be led by Indian Institute of Science, Bangalore, with Central Electronics Engineering Research Institute, Pilani, and University of Southern California. The researchers would aim to develop sensors as well as new techniques of sampling and calibrations to develop air quality index. The third team would work on developing an aquatic

autonomous observatory.

The project is also led by IIT-Kanpur, but with Woods Hole Oceanographic Institution (WHOI). The team aims to design and develop low-cost, multi-parameter, water quality platforms with auto-sampling capabilities. The system would measure parameters like dissolved oxygen, conductivity, temperature, nutrients, carbon-dioxide and select heavy metals. A novel energy harvesting system integrating solar panel, piezo electric system and micro wind turbine is envisaged.

The fourth team would work

towards developing sensors for real time river water monitoring and decision making. The project is co-led by IIT-Delhi and University of California (UCR), Riverside, along with other Indian and American partners. They would develop sensors for chemical oxygen demand, microbial indicators and water flow for determining water quality.

The programme will be administered by the Indo-US Science and Technology Forum.

(Courtesy: India Science Wire)

Climate change affecting apple cultivation

DINESH C. SHARMA, Delhi

With apple production greatly affected due to changing climate in Himachal Pradesh, apple farmers are taking to cultivation of vegetables and 'low chill' fruits such as pomegranate and kiwi. Hill farmers are steadily moving towards other options, particularly in low and mid altitude (1200-1800 metres) regions of Kullu, Shimla and Mandi Districts. They are following intercropping in apple orchards with vegetable crops as well as low chill varieties at lower elevations (1000-1200 meters).

Farmers are also taking to protected cultivation of vegetables and flowers in a big way. Apple farmers in Kullu Valley are growing pomegranate, kiwi and vegetables such as tomato, peas, cauliflower, cabbage and broccoli.

Apples can be grown at altitudes 1500 to 2700 meters above mean sea level in the Himalayan Range, which provides 1000-1600 hours of chilling necessary for production of good quality apples. As the region experiences warmer winters and erratic snowfall, the apple-growing belt – known as the apple line – is shifting to higher altitudes. Warmer winters at lower elevations have resulted in shifting of apple to higher elevations. In the dry temperate regions of the state, increased temperature and early melting of snow since 1995 has shifted apple cultivation to higher reaches of Kinnaur (2200-2500 meters).

"Abnormal climatic factors during winters, flowering and fruit development stage have lowered apple productivity of the state," said Prof S.K. Bhardwaj of the Department of Environmental Science, Y S Parmar University of Horticulture and Forestry, while speaking at a media workshop on climate change in Delhi organised by the Centre for Media Studies (CMS), in partnership with the Ministry of Environment, Forests and Climate Change (MoEFCC), GIZ and the Climate Change Cell of Himachal Pradesh.

He said apple productivity in the region has dropped at the rate of 0.183 tonnes per hectare every year during the period from 2005 to 2014. The overall drop in productivity has been 9.405 tonnes per hectare in last twenty years. "The highly suitable apple production areas are now restricted only to higher hills of Shimla, Kullu, Chamba, dry temperate zones of Kinnaur and Spiti areas. The moderately suitable areas have now become marginal for apple production in the state," he points out.

Warm winters have reduced chilling hours required for apple production. Chill unit hours in Kullu Region, for instance have decreased at the rate of 6.385 chill units per year and an overall decrease of 740.8 chill units in last thirty years (1986-2015). Less number of chilling hours results in delayed foliation, reduced fruit set and increased buttoning – all of which contribute to poor fruit quality.

Another major cause of apple production taking a hit is increased incidence of hailstorms during the flowering and fruit setting stages. The hails accompanied by other variable weather factors during 1998-99 and 1999-2000 dropped yields to the minimum. The quality of the crop was affected during the stage of growth and development in 2004-2005. In April 2015, 0.67 lakh hectares crop area was affected due to hailstorms and unseasonal rains in the state. Many villages of Theog, Jubbal and Kotkhai were lashed by hailstorms, grounding the unripened apple fruits in the month of May 2017.

"There is an urgent need to focus attention on studying impacts of climate change on growth development, yield and quality of horticultural crops. The focus should also be on developing adaptation technologies and quantifying mitigation potential of horticultural crops and their dissemination among farmers," says Prof Srivastava.

Giving an overview of changing weather patterns in HP, Dr Manmohan Singh (IMD, Shimla) pointed out that monsoon season in HP is expanding but overall rainfall is on a decline. Most IMD weather stations are reporting increasing trend in temperature in HP and J&K in the past thirty years. Days of snowfall in Srinagar and Shimla are decreasing in number. ■



Photo: ISW

Apples ready to be plucked.

(Courtesy: India Science Wire)

No lessons learnt yet in quake-prone Northeast

It is often said that earthquakes don't kill people; it is the buildings that do. If building codes are not enforced in seismically active zones, even moderate intensity quakes can cause widespread damage to buildings and injure people. This is what is happening in the Northeast, a new study has pointed out, says **Dinesh C. Sharma**

Manipur was hit with an earthquake of intensity 6.7 on January 4, 2016, which caused devastation in state capital, Imphal, and adjoining areas. It provided an opportunity to scientists to understand risks posed to buildings and the state of construction practices in the region. While many buildings collapsed, it was noted that the damage caused to public building was disproportionate to the observed intensity of shaking.

Scientists from three Indian Institutes of Technology (IITs) – Kanpur, Guwahati and Patna – undertook a reconnaissance survey of earthquake-affected regions immediately after the quake, and revisited the area after three months to see the condition of the damaged structures and restoration work.

Results of the study have now been published in the journal, *Current Science*.

It was found that while several reinforced concrete (RC) buildings in Imphal suffered varying degree of damage, traditional wooden houses made using bamboo and wood, known as *shing-khim*, reported no damage. Government buildings, covered in the study, were damaged heavily because they did not conform to seismic code of practices, and there was general lack of enforcement of existing regulations and codes. In addition, factors such as inferior quality of raw materials and shoddy workmanship contributed to collapse of buildings.

“The seismic risk in the region is growing at an alarming pace with increasing inventory of vulnerable

construction,” the study has concluded. The 2016 quake, it said, “should be regarded as a preview of what is likely to happen in the event of a greater shaking expected for the region and should hasten the community to take necessary steps.”

Durgesh C. Rai, a professor of civil engineering at IIT Kanpur, who led the study, told *India Science Wire* that “despite considerable awareness in public about earthquakes and associated risks, both public and administrators, chose to ignore the threat and continued to build structures which were not earthquake-resistant.”

Due to such negligence, he said, “many publicly-funded buildings suffered severe damage under shaking intensity of VI–VII which is not only ironic but also represents



Collapse of a three-storey building in Keishampar (a). Collapse of 4-storey building in Dewlabland, Imphal (b).



Good performance shown in traditional construction—a two-storey wooden house (known as shing-khim) at Dewolabland in Imphal (left) and a single storey shing-khim at Noney Bazar near Epicentral.

the utter betrayal of the public trust.”

Buildings at the Inter State Bus Terminal (ISBT), Government Polytechnic and Central Agriculture University (CAU), all government-funded and supervised constructions, were expected to perform satisfactorily during earthquakes, but they all experienced moderate to severe damages. Large building campuses such as CAU were constructed on landfill soil and they performed extremely poorly during the earthquake shaking, the study pointed out.

The newly constructed concrete buildings of world famous Ima

Keithel or Mothers’ Market, too, suffered damage. The market earlier operated from bamboo structures which were functional but were in poor condition due to lack of maintenance. So, the government dismantled the market and built three concrete structures in 2010. All three buildings have similar elevation and plan but only one of them showed better performance during the earthquake.

“The traditional constructions using lighter timber and bamboo have performed well and no damage to such structures in Imphal was reported,” Dr Rai added. “Despite available knowledge, seismic safety remains neglected and the society

is not adequately prepared due to lack of implementation.” He said the lessons from the Manipur quake were applicable for the entire northeast region. ■

(Courtesy: India Science Wire. The research team included Durgesh C. Rai, Hemant B. Kaushik and Vaibhav Singhal.)

Ira Joshi is director-general, Doordarshan News

Press Information Bureau director-general Ira Joshi was on Nov 20 appointed as the director-general of Doordarshan News following the retirement of Veena Jain, according to the Ministry of Information and Broadcasting. Press Information Bureau DG Ghanshyam Goel has been made the new DG of Directorate of Advertising and Visual Publicity (DAVP), replacing Esther Kar, who was put on "compulsory wait", a ministry order said. Doordarshan News is currently producing news content in Hindi, English, Urdu and Sanskrit languages. ■

(Courtesy: exchange4media.com)