

National Science Day 2024 Celebration

Indian Science News Association observed National Science Day 2024 on the 29th February, 2024 at 4.30 p.m. in the N.R. Sen Auditorium, University of Calcutta, Rashbehari Shiksha Prangan, Rajabazar Science College. The theme for the Science Day 2024 was 'Indigenous Technologies for Vikshit Bharat'. Dr. Indranil Sanyal, former Director, National Council of Science Museums (HQ) was the Guest of Honour. The programme was presided over by Prof. (Mrs.) Julie Banerji, a Vice-President of ISNA and former Khoira Professor and Head of the Department of Chemistry, University of Calcutta.

The programme started with the Welcome Address by Professor Manas Chakrabarty, Honorary Secretary, ISNA. Professor Chakrabarty briefly stated about the glorious past, the motto and the current activities of ISNA. In mid-1935, ISNA was established by erudite educationists and science lovers like Acharya Prafulla Chandra Ray (its founder President), Shri Shyama Prasad Mookerjee, Sir U.N. Brahmachari and Shri S.C. Law (the three Vice-Presidents), Dr. Meghnad Saha and Professor Bidhu Bhusan Ray (the two Secretaries) and Shri Nikhil Ranjan Sen (the Treasurer). He mentioned about the publication of *Science and Culture*, a bi-monthly magazine of ISNA since June, 1935 uninterrupted till date and about the 12-week-long 'Training Course on Science Communication and Media Practice' since the mid-1980s. The dream of the founders of ISNA to publish a journal for school students and a vernacular journal was partially fulfilled by publishing two *e*-journals - *Scientifica Communica* in English and *Bigyan Kahon* in Bengali. Prof. Chakrabarty further informed the audience that Prime Minister Narendra Modi announced (Dec. 11, 2023) about 'Vikshit Bharat @ 2047, Voice of Youth' through video conference, and that the theme 'Indigenous Technologies for Vikshit Bharat' for the NSD 2024 was announced by the Union Minister Shri Jitendra Singh on the 6th February, 2024. The four pillars of

Vikshit Bharat, he told, are the youth, the poor, the women and the farmers. The vision of Vikshit Bharat is the development in these four areas by 2047, the hundredth year of India's independence. Three technologies were transferred to 12 industries. These are: AI-based Thermal Camera, CNOS Camera and Fleet Management System.

The Vol. 3, Issue 1 of *Bigyan Kahon* and Vol. 90, Issue 1-2, 2024 of *Science and Culture* were formally released by the two respective Editors, viz. Shri Prasanta K Bose, the Chairman of the Training Programme, and Professor Sudhendu Mandal. Shri Bose stated about the genesis of the two *e*-journals and invited members of the audience to submit articles for these *e*-journals that are gaining increasing popularity. Professor Mandal informed the audience about the content of the particular issue of *Science and Culture*.

Dr. Indranil Sanyal, the Chief Guest, started his speech by referring to the outstanding discovery by Prof. C.V. Raman. He described that period as the golden age of Indian science. He mentioned about the initiation of colonial science at The Asiatic Society and the contributions of the Botanical Survey of India, the Geological Survey of India, the Calcutta Medical College, etc. in the development of Indian science. He told that the establishment of the Indian Association for the Cultivation of Science and Science College were two landmark stepping stones in this direction. Individual contributions by



L to R: Prof. Manas Chakrabarty, Prof. Sudhendu Mandal, Dr. Indranil Sanyal, Dr. Rupali Gangopadhyay, Prof. Julie Banerji and Prof. Prabir Kumar Saha



L to R: Dr. Arnab Kumar Banerjee, Prof. Manas Chakrabarty, Prof. Sudhendu Mandal (5th from L), Shri Prasanta K Bose (8th from L), Prof. Prabir Kumar Saha (extreme R) and Award-winning students of 'Poster Competition' held at Vijaygarh Jyotish Ray College.

stalwarts like Raja Rajendralal Mitra, Prof. Jagadish Chandra Bose, Prof. Prasanta Chandra Mahalanabis and Sir Asutosh Mookerjee catalysed Indian science. He talked about Nehru's vision to develop India on scientific basis and the contributions of scientists like Dr. Homi Jehangir Bhabha and others to fulfil this vision. He stated that the making of the new nation is dependent on the western scientific research and technology, but at present the Indian Government is promoting indigenous technologies. He mentioned that India has a rich heritage of great scientific and technological knowledge, especially in Mathematics, Surgery, Astronomy and Architecture. He cited examples in support and concluded his lecture with the hope of a bright future for India.

The next speaker was Prof. Julie Banerji who elaborated on the contribution of Raman Effect and the importance of observation of the National Science Day. She stated that the day is celebrated across India through lectures, radio and TV programmes, science movies, quiz competitions, making of models in various schools, colleges, technical and scientific institutions in India. She particularly mentioned about the Science Day themes from 2018 to 2023 and put special emphasis on the theme of 2024. She concluded her talk by highlighting the scientific achievements of India, viz. more than 90,000 patents filed in 2023, S&T ecosystem, Artificial Intelligence, Astronomy, Semiconductor, Biotechnology, Chandrayan 3, vaccine development, INS-Vikrant, DRDO, Bharat Biotech Covaxin and quantum technology.

The next speaker was Dr. Rupali Gangopadhyay, Associate Professor, Department of Chemistry, Sister Nivedita University. In her speech, she explained the importance of the National Science Day and its various

themes. She told about the benefit of indigenous technology and the use of indigenous knowledge to improve upon the lives of humankind. In her view, the extraction of scientific knowledge from ancient days and making creative use of it are very much important for today's India. She cited examples of traditional things like dhecki, pillow made of mustard seed, natural dye, primitive irrigational methods, various ingredients of fishing, organic farming, etc., all of which are still relevant in modern India.

The next event was the Prize distribution of 'National Level Inter-College and University Poster Competition' on 'Indigenous Technology for Vikshit Bharat', held at Vijaygarh Jyotish Ray College. Dr. Arnab Kumar Banerjee and Dr. Shilajit Barua of Vijaygarh Jyotish Ray College along with the dignitaries on the dais distributed the Prizes.

Ms. Manavi Jaiswal and Ms. Megha Chowdhury from the JIS University grabbed the 1st Prize. The title of their poster was 'Bioplastics - Panacea in the Era of Microplastics'. Shri Rudra Sankar Karmakar from Vijaygarh Jyotish Ray College got the 2nd Prize for his poster titled 'Innovative Approaches to Arsenic Removal: Harnessing Biochar and Microbial Insights'. The 3rd Prize went to Sk. Hazikul Alam and Shri Debjit Goswami of Mankar College for their poster 'Third Eye for Blind Person'. 'Special Appreciation Award' went to Ms. Deblina Jana from Scottish Church College for her poster 'Vascular-specific Expression of GUS and GFP Reporter Genes in Transgenic Potato Plants', Ms. Rajyashree Basu and Ms. Diya Ghosh from Lady Brabourne College for their poster 'India's Newest Breakthroughs in Science and Technology: Health, Environment and Agriculture', Ms. Kankana Mondal, Dum Dum Motijheel College and Ms. Pramita Biswas from Barasat Government College for their poster 'Climate Change' and Ms. Sourima Pal from Techno International, New Town for her poster 'Building a resilient Bharat with Technology made in India!'.

At the end of the programme, the Vote of Thanks was given by Prof. Prabir Kumar Saha, the Honorary Treasurer of ISNA. □

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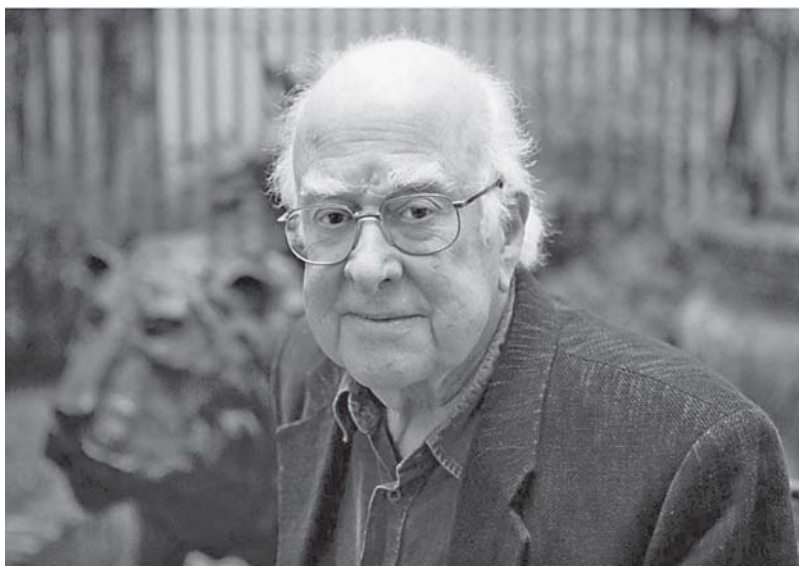
In Memoriam: Peter Higgs and the Higgs Boson God Particle

Peter Higgs, joint winner along with François Englert of the Nobel Prize in Physics 2013, died on April 8, 2024 at the age of 94 in Edinburgh, UK.

“The Nobel Prize in Physics 2013 was awarded jointly to François Englert and Peter W. Higgs “for the theoretical discovery of a mechanism that contributes to our understanding of the origin of mass of subatomic particles, and which recently was confirmed through the discovery of the predicted fundamental particle, by the ATLAS and CMS experiments at CERN’s Large Hadron Collider.”

Peter Higgs (May 29, 1929 to April 8, 2024) : Peter Higgs, a physicist born in Newcastle Upon Tyne, died at the age of 94. Six decades ago he had predicted the existence of a fundamental particle, the presence of which was crucial for the validity of the ‘Standard Model’ that unifies two basic forces of Nature: weak and electromagnetic. It took the world nearly five more decades before that elusive particle was detected at the large hadron collider (LHC) in the European Council for Nuclear Research (CERN), Geneva — much to the relief of the high energy community.

The particle that was discovered in Geneva is called the Higgs boson. Why is it a boson? The latter name was christened by Paul Dirac, in deference to Satyendra Nath Bose, who along with Albert Einstein, had come up with a new kind of counting called the Bose-Einstein statistics. The latter suggest that there exists a set of elementary particles, an unbounded number of which can be accommodated in a given quantum state. Additionally,



bosons are entities that are endowed with an intrinsic spin which is an integral multiple of the Planck constant. It must however be pointed out that Bose’s focus was on the light quantum or photon that has a spin of unity (multiplied by the Planck constant), as his attempt was to give a mathematical foundation to the Planck radiation formula. On the other hand, the Higgs boson has a spin zero, distinct from that of the photon, yet it falls under the general classification scheme of bosons.

By a queer twist of events exacerbated by ‘social media’ — much to the chagrin of religious fundamentalists, the Higgs boson had acquired the popular name of the ‘God particle’. The root-cause for that name is attributed to the Nobel laureate experimental physicist Leon Lederman who, out of frustration for not being able to detect it, had dubbed it as ‘that goddamn particle’! By all accounts, Higgs did not appreciate the nomenclature, just as he did not want it to be named after himself.

Why is the Higgs boson so significant for the acquisition of mass by the particles of the universe? Because, at a basic level, the interactions of ‘fields’ are symmetrical and consequently, the corresponding excitations have zero mass, called the Goldstone modes. A simple illustration is that of a marble at the bottom of a wine bottle. Although there is a hump at the middle which the marble has to overcome in order to cross-over from one position across another, it can however find it facile to move around the bottom of the bottle without any change in energy. Now, energy in Einstein’s relativity corresponds to mass — hence the Goldstone modes or zero-energy excitations, carry no mass. But, if the symmetry is broken, i.e., the bottom of the bottle is warped, zero-energy exchanges give way to finite energy changes and hence generation of mass. That is why the Higgs mechanism is so critical for the so-called ‘mass-renormalization’.

One year after the Higgs boson was discovered in CERN, Peter Higgs was awarded the Nobel prize in physics, along with Francois Englert, in 2013. □

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***Particulars of the Journal Science and Culture as per
Form IV of the Registration of Newspapers (Central) Rules, 1956***

Place of Publication: Kolkata, ***Periodicity of Publication:*** Bi-monthly, ***Printer's and Publisher's Name, Nationality, Address :*** Professor Sudhendu Mandal, Indian, Indian Science News Association, 92, Acharya Prafulla Chandra Road, Kolkata 700009. Shri Naba Kumar Dutta, M/s. Sailee Press Pvt. Ltd., 4A, Manicktola Main Road, Kolkata-700054.

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Names and Address of individuals who own the newspapers and partners or shareholders holding more than one per cent of the capital: Indian Science News Association, Kolkata. I, Professor Sudhendu Mandal hereby declare that the particulars given above are true to the best of my knowledge and belief.

28.03.2024

***Sd/- Sudhendu Mandal
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(On behalf of the Indian Science News Association)