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Bi Annual
Newsletter

JAWAHARLAL NEHRU CENTRE FOR
ADVANCED SCIENTIFIC RESEARCH

JNC NEWS

Issue: 55

November 2020



Message from the President

Despite the ongoing pandemic, it is exciting to note that we have continued to sustain momentum on the research and academic fronts over the past months. Prof. Subi J. George (Chemical sciences) and Prof. Rajesh Ganapathy (Physical sciences) were awarded the Shanti Swarup Bhatnagar Prize for the year 2020. Prof. Santosh Ansumali received Cray's Dr. A.P.J Abdul Kalam HPC Award 2020. I also congratulate those who have received fellowships and have been elected as fellows of national and international science academies. We have signed an MoU with the startup Breathe Applied Sciences Pvt. Ltd., for transfer and development of indigenous technology based on lab-scale research on reducing CO₂ to methanol and other useful chemicals and fuels. I would also like to add that we have continued our efforts in conducting science outreach programmes through the virtual mode.

Our campus was recently made ready for the re-entry of students and other members post the lockdown and I would like to assure that we are strictly implementing protocols and guidelines for the safety of everyone at the Centre.

Appreciating the needs of the nation, JNCASR established a state-of-the-art diagnostic training facility to train personnel in molecular diagnostics for COVID-19. Given the scale of tests required for COVID-19, it is important to become self-reliant with the critical diagnostic test kit components. VNIR Biotechnologies Private Limited, a spin-off by JNCASR, launched indigenous fluorescence probes and PCR mix for RT-PCR-based COVID-19 detection assays. We have also collaborated with IISc on the 'Covid-19 Indian National Supermodel' for prediction and monitoring infection patterns across the nation to aid in disease management.

It fills me with great sadness to say that we lost two eminent members of our community, recently-Prof. Shri Krishna Joshi during May and Prof. K.S. Valdiya in September. On behalf of the Centre, I express our heartfelt condolences to the families and pray for the departed souls.

2020 has been a rather difficult year for many of us. However, as we reflect on our accomplishments, I hope you will be inspired, as I am, by the potential of continued impact of our work globally. With this untiring spirit, I am confident, we will continue to thrive in the coming years.

With best wishes,

G. U. Kulkarni
President, JNCASR

Leading News

JNCASR signs an MoU with Breathe Applied Sciences Pvt. Ltd.

An agreement was signed between JNCASR and Breathe Applied Sciences Pvt. Ltd., a start-up company incubated at JNCASR for transfer of technology based on lab-scale research on reducing CO₂ to methanol and other useful chemicals and fuels. The laboratory research was carried out by Prof. Sebastian C. Peter and his group from the New Chemistry Unit at JNCASR. The startup company was generously funded by the DST Nano Mission Project, with a focus on scaling up the technology to the pilot level and then commercialization.



In the photograph: (left to right) The signing of Memorandum of Understanding between JNCASR and Breathe Applied Sciences Pvt. Ltd. on June 06, 2020 – Prof. Umesh V. Waghmare, Professor, JNCASR, Prof. Sebastian C. Peter, Associate Professor, JNCASR - Founder Directors, Breathe Applied Sciences Pvt. Ltd. with Bharat Ratna Prof. C.N.R. Rao (centre) Linus Pauling Research Professor, JNCASR; Mr. Joydeep Deb, Administrative Officer, JNCASR; Prof. Chandrabhas Narayana, Dean, Research and Development, JNCASR and Prof. G.U. Kulkarni, President, JNCASR.

The MOU will help in the smooth translation of the research from the laboratory scale to pilot scale economically and in the development of an indigenous technology in line with government policy. The outcome is expected to solve the problems associated with renewable energy and environmental pollution.

- Department of Science and Technology, Govt. of India, June 09, 2020. <https://bit.ly/37vCyoR>.
- Press Information Bureau, June 09, 2020. <https://bit.ly/37y4ZIT>.
- The Times of India, June 10, 2020. <https://bit.ly/3mc7Jti>.
- Economics Times, Jun 10, 2020. <https://bit.ly/3mhJXMK>.
- Vigyan Prasar, June 15, 2020. <https://bit.ly/3jjuae9>.

COVID Diagnostic Training Centre at JNCASR kicks off crash course in molecular diagnosis of infectious diseases focusing on COVID 19

JNCASR has established a state-of-the-art COVID Diagnostic Training Centre at its Jakkur campus to help build capacity for COVID 19 testing, which continues to be a nationwide challenge, as there is a lack of skilled personnel for real-time PCR-based clinical diagnostics in India. Appreciating the importance of this, JNCASR has embarked upon a campaign to train personnel in real-time PCR for COVID-19 diagnostic testing. The primary objective of the programme is to train multiple batches of trainees, 6-10 trainees per batch, in real-time PCR. The first batch has undergone training from June 16 to 22, 2020, at the COVID Training Facility, JNCASR. 3 batches have completed training so far.

- Department of Science and Technology, Govt. of India, June 24, 2020. <https://bit.ly/2TkZRJu>.
- Press Information Bureau, June 24, 2020. <https://bit.ly/3mdatqm>.
- The Times of India, June 24, 2020. <https://bit.ly/35oT9bb>.

JNCASR spinoff launches molecular probes for use in COVID-19 test kits

VNIR Biotechnologies Private Ltd., a spin-off by JNCASR, launched indigenous

fluorescent molecular probes and polymerase chain reaction (PCR) mix as part of COVID-19 test kits for carrying out reverse transcription-PCR (RT-PCR)-based detection assays. The company is incubated at Bangalore Bio-innovation Centre of the Government of Karnataka.

Prof. T. Govindaraju and Dr. Meher Prakash, co-founders of VNIR, developed the fluorescence probes and PCR mix for the RT-PCR COVID-19 test kits. A typical, PCR-based test kit has three critical components (oligos, enzymes, molecular probes), of which the molecular probes used in COVID 19 tests have to be imported. Thus, with this new launch, the test kits will not have to rely on import of the molecular probes. Furthermore, apart from the immediate application for COVID-19 testing, these molecular probes will be useful for research as well as other molecular diagnostic assays.

- Press Information Bureau, July 12, 2020. <https://bit.ly/31C5qYD>.
- BioVoice, July 13, 2020. <https://bit.ly/31zGoJw>.
- Deccan Herald, July 12, 2020. <https://bit.ly/2FYv07C>.
- Mint, July 12, 2020. <https://bit.ly/2Tjs5o6>.

Leading the Indian delegation at the virtual 2nd Meeting of BRICS Working Group on Photonics

Prof. Ranjani Viswanatha, Associate Professor, JNCASR led the BRICS Working Group on Photonics during its 2nd Meeting organised as a virtual event by Russia on October 13, 2020.

- Department of Science and Technology, Govt. of India, October 14, 2020. <https://bit.ly/3meYUil>.

Memorandum of Understanding

Since from June to October 2020, MoUs were signed with Department of Biotechnology and for an Indo-Swiss Project. Agreements were also signed with Breathe Applied Sciences Pvt Ltd,

United Way, Bengaluru, GE India Industrial Private Ltd, University of Strasbourg and Tata Steel Ltd, Jamshedpur during this period.

ACADEMIC ACTIVITIES



Sixty students were admitted during the August 2020 Session under various academic programmes. Of these, 31 and 16 were admitted to the Ph.D. programme and Integrated Ph.D. programmes, respectively. Of the 16, 5 were admitted in Biological Sciences, 4 in Materials Science, and 7 in Chemical Sciences. Six students enrolled for the M.S.(Engg.) programme, five for M.Sc. Chemistry and two for the Post-graduate Diploma in Materials Science.

Degrees awarded in 2020:

Twenty-one Ph.D. degrees were awarded in the academic year. In addition, 13 Ph.D. (through Integrated (Int.) Ph.D.), 1 Ph.D. (through M.S.-Ph.D.), and 6 M.S. (Engg.) degrees were also awarded. In M.S. (through Int. Ph.D.), 3 received degrees in Materials Science, 7 in Biological Sciences, 2 in Chemical Science, while 5 received M.Sc. Chemistry degrees. In total, 58 degrees were awarded.

Summary of on-roll students:

Currently, 209 students are enrolled in Ph.D. programmes, 102 in Integrated Ph.D. programmes, 15 in M.S.(Engg.) programme, 1 in M.S-Ph.D., 9 in M.Sc. Chemistry, and 5 in PGDMS. The total number of students on-roll is 341.

Virtual Events

The following virtual events were conducted in 2020:

- A webinar on *Earthquake and Challenges: balancing between nature and technology*, was given by Dr. C.P. Rajendran, Senior Associate, Geodynamics Unit, JNCASR and organised by the Indian Academy of Sciences, Bengaluru on June 17, 2020.
- A webinar on *Controlling heat flow by manipulating phonons and their interactions: a bottom-up approach*, by Dr. Navaneetha Krishnan Ravichandran, Department of Mechanical Engineering, IISc, Bengaluru, was organised by Chemistry and Physics of Materials Unit, JNCASR on June 26, 2020.
- The 2nd Meeting of *BRICS WG on photonics* was organised by Russia on October 13, 2020 as a virtual event. The Indian delegation at this meeting was led by Prof. Ranjani Viswanatha, New Chemistry Unit, JNCASR.

Technical Research Centre (TRC)

Considering the ongoing global pandemic caused by SARS-CoV-2, TRC is exploring technological interventions that have translational potential for management of the situation. Accordingly, TRC is supporting an R&D project for “Developing a high throughput assay to target the evolutionarily conserved proteases of Coronaviruses”, undertaken by Prof. Udaykumar Ranga and his team at the Molecular Biology and Genetics Unit. Further, Prof. Jayanta Haldar and his team at the New Chemistry Unit have developed covalently immobilized antimicrobial coating that exhibit microbicidal effects against bacteria, fungi, and viruses. The developed compounds

can be used to coat different surfaces such as polypropylene, textiles, and polyurethane. TRC is currently in discussions with industrialists to deploy products, based on the said technology, in the marketplace.

TRC continues to build a translational ecosystem in JNCASR by leveraging support systems available with industry, academia, and government. During May-October 2020, this has been further reflected in industrial consulting assignments through which JNCASR scientists offer scientific solutions to the business problem.

Awards and Achievements

Faculty Achievements

Prof. Subi J. George (under chemical sciences category) and **Prof. Rajesh Ganapathy** (under physical sciences category) received CSIR Shanti Swarup Bhatnagar Prize for the year 2020.

Prof. Anuranjan Anand and **Prof. Kaustuv Sanyal** received DST/SERB J.C. Bose Fellowship, 2020.

Prof. Umesh V. Waghmare was elected Fellow of Indian National Academy of Engineering.

Prof. Shobhana Narasimhan received the Anna Boyksen Fellowship of the Technical University of Munich, Germany.

Prof. Amitabh Joshi received Silver Jubilee Professorship, donated by C.N.R. Rao Education Foundation.

Prof. A. Sundaresan received the C.N.R. Rao National Prize in Chemical Sciences from the Chemical Research Society of India. He has been selected to receive the Prof. C.N.R. Rao Oration Award Lecture 2020.

Prof. Chandrabhas Narayana received the Platinum Jubilee Lecture Award of Indian Science Congress 2020.

Prof. Maneesha S. Inamdar was elected as:

- Member, Gene Therapy Advisory and Evaluation Committee, Indian Council for Medical Research.
- Member, Education, Engagement and Empowerment (3E) working group to the WHO Expert Advisory Committee to develop global standards for governance and oversight of human genome editing.
- Member of the Statement Working Group on Regenerative Medicine of the Inter Academy Partnership; she was nominated to this group by INSA.
- Nominee of Secretary, DST for the National Apex Committee on Stem Cell Research and Therapy.

Prof. Kanishka Biswas invited to become Fellow of Royal Society of Chemistry (FRSC) in 'Leaders in the field' category for his outstanding contribution in solid state chemistry, thermoelectrics and 2D materials.

Prof. T.N.C. Vidya joined as a member of the Editorial Board of the journal 'Frontiers in Conservation Science'.

Prof. Santosh Ansumali was awarded the Cray's Dr. A.P.J Abdul Kalam HPC Award 2020 by Hewlett Packard Enterprise under High Performance Computing category Researcher/R&D in HPC applications in India.

Prof. T. Govindaraju was selected for the National Prize for Research on Chemistry of Peptides and Nucleic Acids, donated by C.N.R. Rao Education Foundation.

Prof. Sebastian C. Peter won the CRSI Bronze Medal from the Chemical Research Society of India.

Prof. Jayanta Haldar was awarded Indo-US Virtual Networks for Covid-19 by IUSSTF for his project proposal titled "Development of Antiviral Coatings to Prevent the Transmission of SARS-CoV-2 Viruses".

Dr. Kanishka Biswas was elected as an Editorial Advisory Board Member, iScience, Cell Press.

Dr. Sarit S. Agasti was selected as a Young Associate of the Indian Academy of Sciences, Bengaluru for the year 2020.

Dr. Bivas Saha was selected as a Young Associate of the Indian Academy of Sciences 2020. He also received the Young Scientist Research Award from the Board of Research in Nuclear Sciences (BRNS) of DAE, India.

Prof. Subi J. George joins as an associate editor in the editorial board of the journal 'Chemical Science', from the Royal Society of Chemistry (RSC).

Student Achievement

Mr. Pradeep K.R. (Ph.D. student, New Chemistry Unit, JNCASR; research supervisor: Prof. Ranjani Viswanath) received the prestigious SRISTI GYTI (Gandhian Young Technological Innovation) Award 2020.

Research Highlights

Energy-efficient and economical system for security applications

Prof. G.U. Kulkarni and his research team at JNCASR fabricated a gold-silicon interface that shows high sensitivity towards light, allowing it to detect weak scattered light as an indication of intrusions or unwanted activity. Furthermore, the wafer-scale photodetector is economical, energy-efficient, and shows a rapid response, making it suitable for security applications. Moreover, it could also have use as a prototype imaging system and lux and power meter.

- Department of Science and Technology, Govt. of India, May 06, 2020. <https://bit.ly/3nZmH7P>.



In the prototype, inside the model house, a fabricated detector was mounted beside a high-value commercial detector for comparison and connected to the same external circuit to trigger warning lights (blue lights in the image) and security buzzer. The door is opened to allow only weak scattered light as a sign of unwanted activity. With such low level of lighting, not detectable by the human eye, the fabricated detector was activated, turning on the buzzer and the lights.

Injectable hydrogel for sustained insulin delivery in diabetic patients

Prof. T. Govindaraju and his research team at JNCASR developed a silk fibroin (SF) formulation using biocompatible additives and prepared an injectable SF hydrogel (iSFH) that, once injected under the skin, can slowly release insulin making delivery in diabetic patients.

- AIR Vijayawada, May 16, 2020. <https://bit.ly/3dCDMj7>.
- Prasar Bharati News Service, May 16, 2020. <https://bit.ly/2Hflati>.
- Ehealth.eletsonline.com, May 14, 2020. <https://bit.ly/2FHdgsn>.

Leading India's Covid prediction model

The department of science and technology (DST) has started 'Covid-19 Indian National Supermodel' for prediction and monitoring of infection patterns. The project will aid decisions on health and mitigation measures. Two top institutes in Bengaluru — the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) and Indian Institute of Science (IISc) — will play a crucial role in the programme. "It will aggregate successful evidence-based mathematical and statistical forecasting models and include the best predictive analytics for robust forecasting of infectious disease spread," the department said.

- The Times of India, May 31, 2020. <https://bit.ly/34blMcA>.

JNCASR scientists develop a device for long-term monitoring of cells & tissues and study drug delivery effects, tissue repair and regeneration

The need for monitoring of growth patterns of cells over long hours on desired substrates and the functionality of an explant-tissue in a non-vivo environment at a laboratory set-up triggered the research team led by Prof. K.S. Narayan from JNCASR came up with a suitable device.

The team implemented a 3D-Fluidic device (3D-FD), which has an auto bubble guidance geometry which allows controlled medium exchange to maintain the metabolites without a trace of fluid leakage and bubble formation. The auto bubble guidance geometry (Helical pathway) and controlled delivery of the medium make it efficient as a drug screening platform and unique in the current scenario of Neuro-Technology. It has been published in the journal *Biofabrication* 12:045019 (2020) doi: 10.1088/1758-5090/aba500, and a patent for the device has also been applied recently.

- Department of Science and Technology, Govt. of India, July 20, 2020. <https://bit.ly/21JUvFP>.
- APAC Digital News Network, July 21, 2020. <https://bit.ly/3jd7dt2>.

Elephants pick right or left side trunk preference at early age: #researchers

The trunk is to an elephant what hands are to humans. Prof. T.N.C. Vidya and her research team studying elephant behaviour in Karnataka have come up with an interesting observation — elephant calves pick up their right or left-sided preference for trunk usage so early in life that this trait could be innate in them. This is analogous to humans showing distinct dextral or sinistral behaviour soon after birth. The team observed 30 "unique" calves from 11 distinct clans in Kabini Project in Nagarhole and the Bandipur National Park in a span of two years. The study was published in the *Int. J. Dev. Biol.* 64: 367 - 382 (2020) doi: 10.1387/ijdb.190274tv.



- Tweeted by Dr. Harsh Vardhan, Hon'ble Union Minister for Health & Family Welfare, Science & Tech, Earth Sciences, Govt of India on July 24, 2020.
- Research Matters, July 20, 2020. <https://bit.ly/3dIMw7d>.
- The Week, July 21, 2020. <https://bit.ly/31nBoaX> (Retweeted by @DSTIndia).
- Deccan Herald, July 23, 2020. <https://bit.ly/31mtheH>.
- The Hindu, July 25, 2020. <https://bit.ly/31ldpJk>.

Scientists show how glass crystallises in real-time

In a new study, scientists from the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru, and the Indian Institute of Science (IISc), Bengaluru, have devised a unique way to observe the process of devitrification under a microscope, in real-time. Funded by the Department of Science and Technology (DST), Government of India, their study was published in the journal *Nat. Phys.* (2020) doi: 10.1038/s41567-020-1016-4. The study is the first-ever attempt at developing a molecular understanding of devitrification.

- *Research Matters*, September 07, 2020. <https://bit.ly/3kbXDbt>.
- *Deccan Herald*, September 08, 2020. <https://bit.ly/348QNh2>.
- *All India Radio News Services Division*, September 08, 2020. <https://bit.ly/2TkCLD7>.

Scientists of JNCASR of DST develop a new low cost method of upscaling most conductive material 'graphene' while preserving its single layered properties

A new low-cost method of upscaling production of graphene while preserving its single layered properties, developed by Prof. G.U. Kulkarni (Professor, JNCASR) and his research group, may reduce the cost of producing this thinnest, strongest and most conductive material in the world. Through their recent research work, the researchers have upscaled graphene production while retaining its thin layered properties. This was made possible by a simple, affordable method wherein naphthalene coated nickel foil was heated for a few minutes in an ordinary vacuum by joule heating and was cooled to get twisted layers of graphene. The study was published in *J. Phys. Chem. Lett.* 11(8):2797–2803 (2020) doi: 10.1021/acs.jpcclett.0c00582

- *Press Information Bureau (PIB)*, September 25, 2020. <https://bit.ly/2HlwZOD>.
- *DD News*, September 14, 2020. <https://bit.ly/2TcXlJ9>.
- *The Graphene Council*, September 17, 2020. <https://bit.ly/37xq6VH>.
- *Tweet by Department of Science and Technology, Govt. of India*, <https://bit.ly/3jITP62>.
- *EET India*, September 28, 2020. <https://bit.ly/35yErP5>.

New catalytic properties in gold discovered

Prof. G.U. Kulkarni (Professor, JNCASR) and other researchers from JNCASR, SINP, Kolkata and DESY, Germany introduced new catalytic properties in gold by altering most stable face-centered cubic (fcc) lattice, converting it into a new avatar that can trigger gold-based catalysis for industry.

- *Department of Science and Technology, Govt. of India*, September 18, 2020. <https://dst.gov.in/striking-gold-efficient-catalysts-industry>.

JNCASR evolutionary biology research one among 65 breakthroughs

The research work on 'the evolution of population stability as a by-product of life-history evolution' by the research team led by Prof. Amitabh Joshi of Evolutionary and Integrative Biology Unit, JNCASR has been featured as one of the 65 breakthroughs in evolutionary ecology (from Darwin, 1859 onwards) in the recently published book: *Conceptual Breakthroughs in Evolutionary Ecology*, authored by Laurence Mueller <https://bit.ly/2TegR4g>.

It is the only research work from a non-western country to be included in the 65 major breakthroughs selected in this book.

The study was published in the *Proc. R. Soc. Lond. B.* 270: S84–S86 (2003) doi: 10.1098/rsbl.2003.0020.

- *Tweet from JNCASR*, September 21, 2020. <https://bit.ly/2IS3ZyT>.
- *Tweet from Department of Science and Technology, Govt. of India*, September 24, 2020. <https://bit.ly/34eMroG>.
- *Press Information Bureau (PIB)*, September 24, 2020. <https://t.co/5qUsy4XN4G?amp=1>.
- *Outlook*, September 23, 2020. <https://bit.ly/2Hk3xJd>.
- *IndiaEducationDiary.in*, September 23, 2020. <https://bit.ly/2HigAul>.

A unique way devised to observe the process of devitrification under a microscope, in real-time

In a new study, Prof. Rajesh Ganapathy (Assoc. Professor, JNCASR) and researchers from the Indian Institute of Science (IISc), Bengaluru, have devised a unique way to observe the process of devitrification under a microscope, in real-time. Funded by the Department of Science and Technology (DST), Government of India, their study was published in the journal *Nat. Phys.* (2020). doi: 10.1038/s41567-020-1016-4.

It is impossible to watch the dynamics of this transformation at a molecular level as the constituent particles are very small. Hence, the physicists carefully chose to work with a glass made of polymer particles suspended in water.

- *Research Matters*, September 07, 2020. <https://bit.ly/3dNcpmh>.
- *Deccan Herald*, September 08, 2020. <https://bit.ly/2HTI2v>.
- *All India Radio News Services Division*, September 08, 2020. <https://bit.ly/3kkdGDR>.
- *The Week*, September 08, 2020. <https://bit.ly/3kihblL>.
- *Press Information Bureau*, October 17, 2020. <https://bit.ly/37s2Log>.

Liquids behave differently on curved surfaces than flat ones

Prof. Rajesh Ganapathy and his team of physicists from JNCASR and Indian Institute of Science (IISc), Bengaluru demonstrated novel experiments in the laboratory to study the behaviour of liquids and glasses on spherical surfaces. The study was published in the journal *Nat Commun* 11:4967 (2020). doi: 10.1038/s41467-020-18760-7.

- *Research Matters*, October 2, 2020 <http://bit.ly/34bKfNq>.

Intellectual Property

Patent Applications Filed

Two Indian Provisional Patent Applications were filed for the inventions developed by:

- Prof. Sridhar Rajaram *et al.* (Patent Appl. No. 202041023006, filed on 01/06/2020)
- Prof. Govindaraju Thimmaiah *et al.* (Patent Appl. No. 202041031875, filed on 24/07/2020)

One International Patent Application was filed under PCT:

- 'A Lead-Free p-Type Material, and Implementations Thereof' developed by Prof. Kanishka Biswas *et al.* (No. PCT/IN2020/050595, filed on 08/07/2020)

Five National Phase Patent Applications were filed under PCT:

- For the invention 'Enhancing Photocatalytic Water Splitting Efficiency of Weyl Semimetals By A Magnetic Field' developed by Prof. Chintamani Nagesa Ramachandra Rao *et al.*
- Japanese Patent Appl. No. 2020-543328, filed on 13/08/2020
- US Patent Appl. No. 16/969,841, filed on 13/08/2020
- European Patent Appl. No. 19706243.3, filed on 26/08/2020
- Chinese Patent Appl. No. 201980016975.4, filed on 03/09/2020
- Korean Patent Appl. No. 10-2020-7026259, filed on 11/09/2020

Patents Granted

The Indian Patent Office issued the following:

- Patent (No. 341132) for 'A Method for Inspecting the Quality of Solar Cells and Configuration Thereof' developed by Prof. Giridhar Udapi Rao Kulkarni *et al.*
- Patent (No. 345577) for 'Conjugated Microporous Polymer' developed by Prof. Tapas Kumar Maji *et al.*

The US Patent Office issued the following:

- Patent (No. 10,626,148) for 'Glycopeptides Conjugates and Uses Thereof' developed by Prof. Jayanta Haldar *et al.*
- Patent (No. 10,745,393) for 'Small Molecular Probes, Processes and Use Thereof' developed by Prof. Govindaraju Thimmaiah *et al.*

The Brazilian Patent Office issued the following:

- Patent (No. PI 1016070-1) for 'Optimal Wing Planforms for Reducing the Induced or Total Drag of the Wing of an Aircraft Driven by Wing-Mounted Tractor Propellers/Rotors' developed by Prof. Roddam Narasimha *et al.*

The European Patent Office issued the following:

- Patent (No. 2934563) for 'Antimicrobial Compounds, Their Synthesis and Applications Thereof' developed by Prof. Jayanta Haldar *et al.*

Outreach Activities

Education Technology Unit

Programmes organized and conducted by the Education Technology Unit (ETU) and C.N.R. Rao Hall of Science were as follows:

- On August 28 2020, an online interactive programme in Chemistry (via Google meet and YouTube live) was organised wherein lectures were delivered by Prof. T. Govindaraju and Prof. Sridhar Rajaram followed by a Q&A session. Around 370 students and 30 teachers participated in the programme.
- On September 15, 2020, an online interactive programme in Physics (via Google meet and YouTube live) was organised for science students and teachers of Classes X, XI, and XII. A lecture titled 'Alice in Nanoland' was delivered by Prof. S.M. Shivaprasad (KHEA/JNCASR), followed by a Q&A session. Around 650 students and 98 teachers participated in the programme.

- On September 25, 2020, an online interactive programme in Physics (via Google meet and YouTube live) was organized for science students and teachers of Classes X, XI, and XII. A lecture titled 'The Mysterious Quantum World' was given by Prof. N.S. Vidhyadhiraja (JNCASR), followed by a Q&A session. Around 320 students and 26 teachers participated in the program.

Number of events organized: 03

Number of students participated: ~ 1340

Number of teachers participated: ~ 154

Obituary



Prof. S.K. Joshi, Former Council Member of JNCASR and an Eminent Scientist, passed away on May 15, 2020. Prof. Joshi was a Council Member from 1994 to 2017. Over the years, with his vast knowledge and experiences in various fields, Prof. Joshi made invaluable contributions towards the academic growth of the Centre. The members of the Centre convey their heartfelt condolences to the family and pray for the departed soul.

The JNCASR community is deeply saddened by the demise of **Prof. K.S. Valdiya** (Honorary Professor and Chair, Geodynamics Unit, JNCASR) on September 30, 2020. Prof. Valdiya will be fondly remembered for his valuable contributions towards taking JNCASR's science outreach programmes to the remote corners of the country in the Himalayan region. His studies on Himalayan geology published in the form of books, journal articles and popular science articles will remain a valuable source of reference for geologists for years to come. He joined the Centre in the year 1994.



■ Fellowships & Extension Programmes

All Fellowships and Extension (F&E) programmes were under suspension due to the pandemic. Digitization of applications for the F&E programmes have been initiated, and starting of a new graduate research internship programme is under process.

■ Campus lockdown measures and re-entry

Guidelines for return of students and R&D personnel post lockdown, setting up of Medical screening booth, Dining hall modification, physical distancing guidelines, sanitization of spaces & consignments, thermal screening & face recognition etc., were

designed and communicated to all members of the community. In addition, various committees were set up at the Centre to implement and oversee these measures.

■ Past Event

On the occasion of Vigilance Awareness Week 2020, an Online Integrity Pledge was organized on October 27, 2020 at JNCASR. The Pledge was administered by Prof. K.R. Sreenivas, Vigilance Officer, JNCASR. The programme was attended by the faculty members, staff and students.



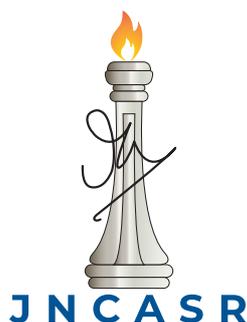
■ Upcoming Event

Annual Faculty Meeting and In-house Symposium

The Annual Faculty Meeting and In-House Symposium (IHS-2020) will be held during November 26-27, 2020. Unlike previous years, this 2020 event will be in hybrid-mode comprising online- and offline- talks, posters, and additional associated activities. Online poster sessions will be hosted during the afternoons for 3 days -

November 23 to 25, 2020. Annual Faculty Meeting will take place forenoon on the November 26, followed by the IHS for about a day and a half. IHS will include talks by JNCASR faculty members, students and short poster presentations by poster prize awardees.

www.jncasr.ac.in



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