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JNC NEWS

Issue: 54

May 2020



Prof. G.U. Kulkarni, taking over as President, JNCASR from Prof. K. S. Narayan (President In-charge) on January 29, 2020 at the President's Office in JNCASR.

Message from the President

Having assumed charge as the President, it is my privilege to write this column and present to you some of the latest news and developments in the Centre.

In the past few months, the Centre has achieved success on several fronts evident from several awards and recognitions received by our students and faculty members on different platforms. Notably, in Nature Index Annual Tables 2020, the Centre ranked 4th among Indian academic institutions in the domain of life science and stands 10th in chemistry and physical sciences, respectively. Our global ranking stands at 469, 11th among Indian institutions in the tally. Prof. C. N. R. Rao and Prof. Roddam Narasimha were awarded Lifetime Achievement Awards – Prof. Rao for his exceptional contributions in the field of Solid State and Materials Chemistry and Prof. Narasimha, for his brilliant mentoring skills. Prof. Shobhana Narasimhan got elected as Honorary Member of American Academy of Arts & Science and Prof. T. Govindaraju received National Prize for Research in Chemistry of Peptides & Nucleic acids. Prof. G. U. Kulkarni received the Prof. C. N. R. Rao National Prize for Chemical Research-2020. Another noteworthy achievement was by the two students of Team ZincAir from Chemistry and Physics of Materials Unit, who won the Silver Award at the KPIT Sparkle 2020 for designing ecofriendly and efficient zinc-air batteries for electric vehicles.

Our faculty have registered excellence in science through their discoveries and inventions and fruitful collaborations, manifested in the form of numerous publications and patents. There are specific efforts in collaborating with other agencies and industries. Examples include signing of MoU with ISRO and another with a startup, Breathe Applied Sciences Pvt. Ltd. Several of our discoveries and inventions have seen higher degree of technology translation. We have also accomplished much in terms of outreach, with various notable activities to promote women in science.

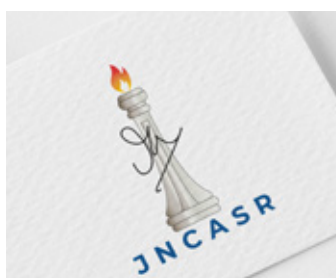
In the face of the on-going challenge posed by the COVID-19 pandemic, the health and safety of people remain our top priority. I am delighted to share with you about our significant contributions towards the global fight against the disease. Apart from active research related to the pandemic and its management, we have established a Diagnostic Training Laboratory to help build our national diagnostic capacity by training personnel in such techniques. We continue to monitor the situation on a real time basis not only for appropriate measures on campus but also to serve a heuristic predictive modeling undertaken by in-house researchers.

I would like to thank everyone at the institute for their cooperation, dedication, and support during these difficult times. We will ensure to provide all possible assistance to our members while continuing to explore innovative ways to work through this disruption.

With best wishes,
G. U. Kulkarni
President, JNCASR



Prof. CNR Rao was the highly cited researcher in 2019 in Web of Science



Leading News

The Centre has set up a short-term Residential Training Course on Laboratory Diagnosis of COVID-19 to provide training in molecular biology techniques and BSL-2 workflow. The course will impart the skills needed to perform clinical diagnostic assays and thereby help in increasing the workforce needed for COVID-19 testing across the country. This initiative is being guided by Dr. Ranga Udaykumar, Dr. GR Ramesh, and Dr. Kushagra Bansal.

The Parliamentary Standing Committee visited JNCASR on December 29, 2019 under the Chairmanship of Dr. Jairam Ramesh, Hon'ble Member of Parliament, Rajya Sabha, along with a delegation of parliamentarians.



Members of Parliamentary Standing Committee during the meeting with Deans and Faculty on December 29, 2019 at Nevil Mott Hall, ICMS.

Prof. Roddam Narasimha was presented the Award for Lifetime Achievement in mentoring 2019 Nature Publishers.

Prof. CNR Rao was awarded the TV9 Lifetime Achievement Award for his scientific work in the field of solid-state and materials chemistry.

The 11th Bengaluru India Nano conference and exhibition, which took place on March 02-03, 2020, was organized by the DST, Govt. of Karnataka, and JNCASR, in association with other Govt Institutions and corporate companies. JNCASR showcased research work related to eco-friendly batteries, nanotechnology tools developed for agriculture, and novel approaches to tackle microbial infections.

Prof. T Govindaraju (Associate Professor, New Chemistry Unit, JNCASR) and Prof. S G Srivatsan (Associate Professor, Dept. of Chemistry, IISER Pune), were selected for the National Prize for Research on Chemistry of Peptides and Nucleic Acids (donated by CNR Rao Education Foundation) in recognition of their significant contributions to the field.

Visiting Scientists & Students

Visiting Scientists

1. Prof. Jaywant H Arakeri, Indian Institute of Science (IISc), Bengaluru
2. Dr. Ashoka S, Dayananda Sagar University, Bangalore
3. Prof. Garry Brown, University of Princeton, USA

Visiting Students

1. Mr. Jonas Kolsh, Johannes Gutenberg University Mainz, Germany
2. Ms. Tusekile Alfredy Said, Water Infrastructure and Sustainable Energy Futures (WISE), Tanzania
3. Mr. Toyin Aina, University of Science and Technology (AUST), Nigeria
4. Mr. Waidi Yusuf Olatunji, University of Science and Technology (AUST), Nigeria
5. Mr. Ayuk Corlbert Ayuk, University of Science and Technology (AUST), Nigeria
6. Ms. Joan Jeptum Kiptarus, Moi University, Kenya

ACADEMIC ACTIVITIES

Mid-Year Admissions in January 2020

In response to our advertisement for Research Programmes [Ph.D/M.S (Engg.)/M.S (Res)], 275 applications were received by the deadline of 27th Oct, 2019. From the interviews conducted on 11-12 Dec, 2019, 5 candidates were selected and they joined the Centre in January 2020, taking the total strength of students on roll at the Centre to 317.

Admissions during August session 2020: In response to our advertisement regarding admissions, 2261 applications were received for research programmes, 800 for Int. PhD Programme, and 150 for Masters in Chemistry Programme. Due to the COVID-19-related lockdown, the deadlines for these applications were extended to April 24, 2020. Currently, the applications are being scrutinized and shortlisted for interviews. Due to constraints imposed by the lockdown, written tests for Int-PhD and Masters in Chemistry Programmes have been called off. Other measures of evaluation and online interviews are being planned for student selections to various programmes at JNCASR.

Lectures and Events

Discussion meetings

1. Workshop for College Chemistry Students and Teachers, organized by Dr. Joshy Joseph, NIIST, Trivandrum, during Oct 31–Nov 02, 2019.
2. SAMAT Annual Retreat, organized by Prof. Chandrabhas Narayana, JNCASR, during Nov 18–20, 2019.
3. 16th Asian Congress of Fluid Mechanics, organized by Prof. K.R. Sreenivas, JNCASR, during Dec. 13–17, 2019.
4. International Conference on ISEB 2: Indo-Swiss Meeting on Evolutionary Biology, organized by Prof. Amitabh Joshi, JNCASR, during Dec. 12–14, 2019.
5. Bangalore Science Habba (BaSH), organized by Prof. Rajesh Gopakumar, ICTS, Bangalore, in January 2020.
6. MLK@80 Symposium, organized by Profs. S Balasubramanian and UV Waghmare, JNCASR, during Feb. 18–20, 2020.
7. International Conference on Perspectives on Vibrational Spectroscopy 2020 organized by Profs. C Narayana, UV Waghmare, and A Sundaresan, JNCASR, during Feb. 24–29, 2020.
8. InSearch 2020, an event showcasing exciting research in science for school/college students and teachers, was organised by Dr Sheeba Vasu on January 17, 2020 at the AMRL Conference Hall, JNCASR



Inaugural Session of ICOPVS 2020: (left to right) Prof. Wolfgang Keifer from University of Würzburg, the honorary chair; Prof. Hemalatha Balaram, President In-charge at JNCASR; VK Rastogi, from Indian Spectroscopy Society and Prof. V S Jayakumar from Mar Baselios Institute of Technology.



Talks and Poster session at InSearch 2020

Annual Faculty Meeting and In-house Symposium

The Annual Faculty Meeting and In-house Symposium were held during November 13–14, 2019. Several eminent scientists from the Centre, InStem, and TIFR delivered talks on their latest research. The two-day programme spanning across 9 sessions, included faculty and student talks, poster teasers, and poster presentations. On the second day of the event, degree certificates were distributed by Prof. KS Narayan, President In-charge, JNCASR to the students who graduated this year.

As part of this event, a theatrical performance (drama) was presented on November 13, 2019 at the New Auditorium, JNCASR, Jakkur Campus. The play, based on the life of Mahatma Gandhi, “Bharat Bhagya Vidhata” and was performed by members of Shrimad Rajchandra Mission, Dharampur .

Technical Research Centre (TRC)

The DST-supported TRC at JNCASR has recently undertaken a project that aims towards better healthcare and clinical diagnosis via large-scale identification of disease-causing markers and a project to develop materials for water purification, storage, and harvesting. In view of the current COVID-19 crisis, TRC has invited proposals in the relevant area that will have an impact on society worldwide. It is currently looking into one such proposal, submitted by a JNCASR faculty, that aims to develop a method to screen for small molecules as potential therapeutic agents against SARS-CoV-2.

In accordance with its aim to develop and provide a state-of-the-art instrumentation facility for the research community of JNCASR and other academic and industrial users, TRC has recently procured the RC2 Spectroscopic Ellipsometer, which is considered to be the near-universal solution for its diverse applications in spectroscopic ellipsometry and Mueller matrix ellipsometry. As a part of TRC promotional activities and to acquaint users with the working of the instrument, a short course on “Spectroscopic Ellipsometry” was organized in association with J.A. Woollam Co., Inc., USA at JNCASR. The participants included external academic and industrial users apart from the JNCASR community.

Under its translational activities, TRC was instrumental in concluding a data licence and data generation agreement with an industrial collaborator for the development of a method for cardiovascular disease prognosis and diagnosis based on computer imaging-assisted tools and prediction of Fractional Flow Reserve using fluid dynamics. With TRC support, JNCASR entered into a collaborative research agreement with Bangalore International Airport Limited for the study of convection with phase change and radiation to understand micro-physics of fog and clouds, which has many implications, especially for the airline industry.



Spectroscopic Ellipsometry workshop organized by TRC in collaboration with J.A. Woollam Co., Inc., USA, on 4–5th November 2019

Awards and Achievements

Faculty Achievements

Prof. CNR Rao

- Named the Highly Cited Researcher of 2019 by Web of Science
- Received TV9 Lifetime Achievement Award

Prof. Roddam Narasimha

- Received a Lifetime Achievement award in the 2019 Nature Award for Mentoring in Science

Prof. Shobhana Narasimhan

- Elected as an International Honorary Member to the American Academy of Arts and Sciences

Prof. A Sundaresan

- Elected as a Fellow of Indian Academy of Sciences, Bengaluru

Prof. Kanishka Biswas

- Received Swarna Jayanti Fellowship from Department of Science and Technology, Government of India
- Selected as member of Editorial Advisory Boards of two prestigious international journals: *Journal of Materials Chemistry A (Royal Society of Chemistry)* and *Journal of Solid State Chemistry (Elsevier)*

Prof. Ravi Manjithaya

- Joint recipient of the CDRI Awards 2020 for Excellence in Drug Research in Life Sciences category

Dr. Kushagra Bansal

- Received Wellcome Trust/Department of Biotechnology - India Alliance Intermediate Fellowship under biomedical research category

Prof. Chandrabhas Narayana

- invited as member of the Editorial Advisory Board of *Journal of Applied Physics*

Student Achievements

Mr. Tarandeep Singh and Mr. Brijesh (Ph.D. students, CPMU and TSU, respectively)

- They represented Team ZincAir Battery who won the Silver Award of INR 2.5 lakhs at KPIT Sparkle, an innovation platform that supports aspiring entrepreneurs and helps them to transform their innovative ideas into viable products. The two students, under the mentorship of Prof. Tapas Kumar Maji, designed efficient, safe, light-weight, and eco-friendly rechargeable zinc-air batteries for electric vehicles.

Mr. Angshuman Das and Mr. Soumen Pradhan

- Ph.D. students under Dr. Subi J George and Dr. Sarit Agasti, respectively, received the prestigious CSIR-Shyama Prasad Mukherjee Fellowship

Mr. Hansraj Gautam (EIBU)

- PhD student under Prof. TNC Vidya received the best poster award for his poster entitled "Causes and outcomes of agonistic between-clan encounters in female Asian elephants" at the national conference 'ISEB1: Celebrating Ecology and Evolution in India', Oct 24–25, 2019 at Bengaluru

Ms. Medha Rao (EIBU)

- PhD student under Prof. Amitabh Joshi received the best poster award for her poster entitled "Effect of larval and adult crowding on the fecundity of *Drosophila melanogaster*" at the international conference 'ISEB2: Indo-Swiss Meeting on Evolutionary Biology', Dec 12–14, 2019 at Bengaluru

Ms. Ruchika Kumari (MBGU)

- Ph.D. student under Prof. Ravi Manjithaya received the best poster award at the XIth International Conference on Biology of Yeasts and Filamentous Fungi (ICBYFF-2019) held at the University of Hyderabad

Dr. Sreedevi Padmanabhan (MBGU)

- Post-Doc working with Prof. Ravi Manjithaya received the best poster award at the International Conference on Autophagy and Lysosomes (ICAL2020) held at the Indian Institute of Science, Bangalore

Mr. Chitrang Dani (Ph.D. Student, NSU)

- Won 3rd prize in the Ph.D. category at the DST-AWSAR (Augmenting Writing Skills for Articulating Research) awards for his story entitled "Out of the Lab: a clock conversation". Mr. Dani works with Prof. Sheeba Vasu.

Ms. Mahima Makkar (Ph.D. student, NCU)

- Won Best Popular Science Story prize at the DST-AWSAR awards for her story entitled "Nature's play in dual doping of quantum dots". Ms. Makkar works with Prof. Ranjani Viswanatha.

Dr. Lakshmi P Datta (Post-doc, NCU)

- Received ACS Chemical Biology-Best Poster Award at the 26th CRSI-National Symposium held during February 07-09, 2020 at VIT University, Vellore. Dr. Datta works with Prof. T. Govindaraju.

Dr. Mouli Konar (Post-doc, NCU)

- Received Best Oral Presentation Award, sponsored by American Chemical Society (ACS) - Journal of Proteome Research, at the student Indian Peptide Symposium (sIPS 2020) held during February 20-21, 2020 at Madurai Kamaraj University, Madurai. Dr. Konar works with Prof. T. Govindaraju.

Ms. Sushmita Chandra and Mr. Paribesh Achyarya (NCU)

- Ph.D. students under Prof. Kanishka Biswas received Best Poster Awards in International Conference on Nano Science and Technology (ICONSAT), 2020 in Kolkata for their respective posters on 'Thermoelectrics' and 'Perovskite Halide'.

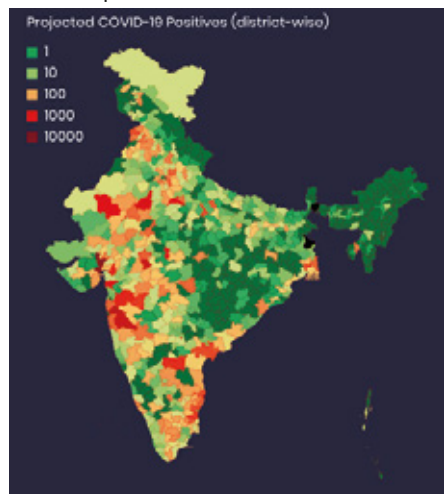


(L to R) - Mr. Brijesh, Dr. Unnat Pandit, Program Director, Atal Innovation Mission, NITI Ayog and Mr. Tarandeep Singh receiving the award at KPIT Sparkle held at the Pimpri Chinchwad College of Engineering (PCCOE), Pune on March 01, 2020

Research Highlights

Staying ahead of SARS-CoV-2

Prof. Santosh Ansumali and his team (EMU, JNCASR), along with researchers from IISc (Bengaluru) and IITB (Mumbai), and with the help of AFMS and the PSA to Gol, developed a mathematical model that can predict the evolution of the COVID-19 situation for few



A 1-week ahead projection of the number of positive cases in different districts shown on the website on 10th May, 2019

weeks, along with the medical needs that will arise as a consequence. Notably, the model is adaptive, correcting for errors between prediction and reality as more data come in, making it robust. Therefore, although the projections are only indicative, it can enable decision-makers to make informed choices that will greatly contribute to controlling the

situation. These predictions can be seen at the website <https://covid19medinventory.in>

Source: Vigyan Samachar, Department of Science and Technology <https://dst.gov.in/predictive-model-jncasr-can-help-prepare-medical-needs-covid-19>

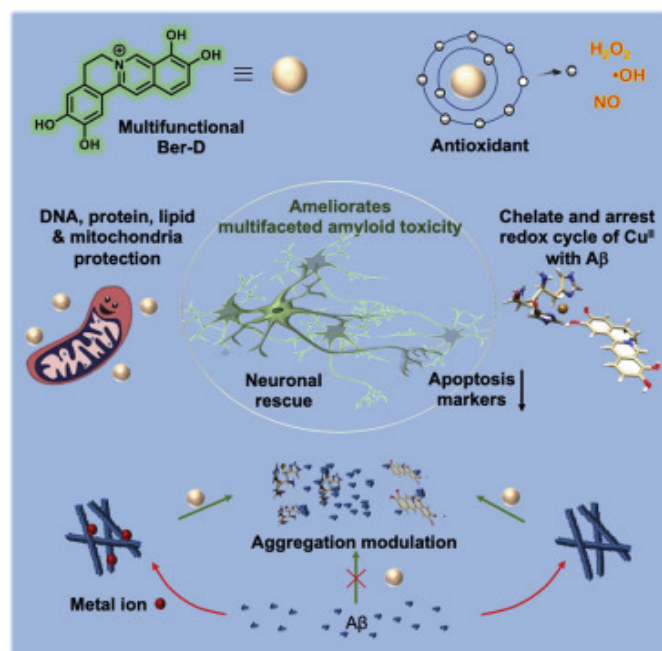
Containing the spread of microbial pathogens

Prof. Jayanta Haldar and his research group (NCU, JNCASR) developed an antimicrobial coating that kills influenza virus as well as resistant pathogenic bacteria (e.g. methicillin-resistant *Staphylococcus aureus*) and fungi (e.g. fluconazole-resistant *C. albicans*). Although the test against SARS-CoV-2 is pending, the 100% killing effect observed on influenza virus gives hope that it would be effective against SARS-CoV-2 as well. If proved to be effective, it can be used to coat different PPEs, thereby becoming extremely beneficial to healthcare professionals fighting COVID-19.

The team also developed another novel molecule by chemically linking an amino acid (glycine) to a polymer; this molecule was found to possess high antibacterial activity against multidrug-resistant *Acinetobacter baumannii*, while showing no toxicity to human cells.

Tweaking natural products to fight Alzheimer's disease (AD)

Berberine, a natural plant product found in India and China, is used in traditional medicines and other applications. However, it is poorly soluble and toxic to cells. Prof. T. Govindaraju and his team



The beneficial effects of the modified berberine molecule against AD toxicity

(NCU) modified berberine to Ber-D, which is soluble and exhibit antioxidant properties. This newly developed molecule was found to be an effective inhibitor of the multifaceted toxicity observed in AD. It not only prevents oxidative and biomolecular damage but also inhibits toxic A β fibrillar aggregation and protects from mitochondria dysfunction, which are the major causes of neuronal death during AD. This commendable work was published in *iScience* (DOI: 10.1016/j.isci.2020.101005).

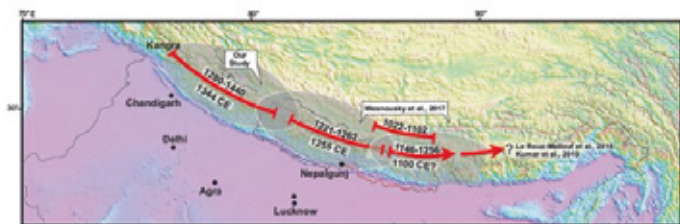
Novel insights into pathogenic fungi

Recently, Prof. Kaustuv Sanyal (MBGU) and his research group identified a variant histone H3 protein that is exclusively present in the CTG-clade, which comprises multiple opportunistic pathogenic fungi, including *Candida albicans*. This variant was found to act as a negative regulator of biofilm development in *C. albicans*, suggesting that chromatin changes may be involved in the transition of the fungus from a commensal to a pathogen. This work was published in *PLoS Biology* (doi:10.1371/journal.pbio.3000422).

The team also recently showed that the *centromere protein A* was notably absent in the Mucoromycotina subphylum of fungi. *Mucor circinelloides*, a member of this subphylum, causes the infectious disease mucormycosis, associated with high mortality owing to its poorly understood pathogenesis and lifecycle and lack of effective drugs. Prof. Sanyal and his team investigated the dynamics of its kinetochore complex during nuclear division and unveiled unique centromere characteristics. These insights are expected to open avenues for the development of species-specific anti-fungal drugs. This work was published in *Current Biology* (doi:10.1016/j.cub.2019.09.024).

Interpreting earthquakes

Identifying the causative parameters of earthquakes and predicting when they are likely to happen next is very difficult. Dr. C P Rajendran and his team (GDU) have been studying the central Himalayas and showed that the frontal thrust in this region has remained seismically quiet since the medieval pulse of great



earthquakes. Their study revealed that the long-elapsd time of 600-700 years imply an enormous stacking up of strain in the region, further suggesting that an earthquake is imminent in the populous Himalayan foothills anytime in future. Their study series was published in the *Geological Journal*, *Tectonophysics*, *Journal Asian Earth Science*, and *Earth Science Reviews*.

<https://twitter.com/IndiaDST/status/1227815114033643520>

Intellectual Property

Patent Applications Filed

Seven Indian Provisional Patent Applications filed for the inventions developed by:

- Prof. K.S. Narayan et al (Patent Appl. No. 201941051888, filed on 13/12/2019).
- Prof. T.K. Maji et al. (Patent Appl. No. 202041001843, filed on 15/01/2020).
- Prof. T. Govindaraju et al. (Patent Appl. No. 202041009838, filed on 06/03/2020; Patent Appl. No. 202041009844, filed on 06/03/2020; Patent Appl. No. 202041009845, filed on 06/03/2020; Patent Appl. No. 202041015174, filed on 06/04/2020).
- Prof. J. Haldar et al. (Patent Appl. No. 202041014961, filed on 03/04/2020).

Three International Patent Applications Filed under PCT:

- 'Catalyst, Its Process of Preparation, And Applications Towards Carbon Dioxide To Chemicals', developed by Prof S.C. Peter et al (No. PCT/IN2019/050873 filed on 29/11/2019).
- 'Recombinant Vector Comprising HIV-LTR Promoter, and Associated High Throughput Screening Method', developed by Prof. R. Udaykumar (No. PCT/IN2020/050148 filed on 14/02/2020).
- 'Small-Molecular Adjuvants And Implementations Thereof', Prof. J. Haldar et al (No. PCT/IN2020/050358 filed on 15/04/2020).

One National Phase Patent Application filed under PCT:

- 'Method For Modulating Autophagy And Applications Thereof' developed by Prof. R. Manjithaya et al. (Australian Divisional Patent Appl. No. 2019275604, filed on 4/12/2019).

Outreach Activities

Education Technology Unit

WORKSHOPS FOR COLLEGE STUDENTS: Multiple workshops were conducted using college chemistry experiment kits. The following colleges from Bengaluru participated: Sheshadripuram PU College, Yelahanka (5th Nov, 2019), MES Kishora Kendra PU College, Mallechwaram (19th Nov, 2019), and MES Vidya Sagara, MPL Sastry PU College, Rajajinagar (29th Nov, 2019). From each college, 24 students and 2 teachers participated.

Efficient thermionic energy conversion

Thermionic energy conversion, a process by which heat is transformed into usable electricity, has wide applications. Although ZrN/ScN (metal/semiconductor) multilayer structure is a promising material for this process, a high concentration of n-type carriers in the structure reduces its applicability. Recently, Dr. Bivas Saha and his team (ICMS, CPMU) successfully managed to reduce the n-type carrier concentration in ScN by Mg hole doping. The thermally stable ZrN/carrier-compensated Sc_{0.99}Mg_{0.01}N multilayer thus developed is expected to enable efficient thermionic transport devices with improved properties. This work was published in *Journal of Materials Science* (doi:10.1007/s10853-019-04127-x).

Patents Granted

Indian Patent Office issued

- Patent (No. 323000) for 'Wing And Propeller System, Method of Optimizing Wing And Propeller/Rotor System And Method of Reducing Induced Drag,' developed by Prof. R. Narasimha et al.
- Patent (No. 326517) for 'A Process for Bromination of Arylene Dianhydrides and a Method of Synthesis of Diimides Thereof' developed by Prof. T. Govindaraju et al.
- Patent (No. 328346) for 'Chitin Derivatives, Method for Production and Uses Thereof' developed by Prof. J. Haldar et al.
- Patent (No. 329957) for 'An Organic Solar Cell and Methods Thereof' developed by Prof. K.S. Narayan et al.
- Patent (No. 331127) for 'Cd-based-Chalcogenide/CDs Core-Shell Nanomaterial, Defective/Defect-Free Core Nanocrystal, Methods and Applications Thereof' developed by Prof. R. Viswanatha et al.

US Patent Office Issued

- Patent (No. 10,626,279) for 'Composition, Substrates and Methods Thereof' developed by Prof. G.U. Kulkarni et al.

European Patent Office Issued

- Patent (No. 2276691) for 'A Template Free Metal, Polymer Free Metal Nanosponge and a Process Thereof' developed by Prof. M. Eswaramoorthy et al.

SCIENCE OUTREACH PROGRAMME: Jawahar Navodaya Vidyalaya, Yelahanka, and School Chandan, Laxmeshwar participated in the programme conducted on 18th December 2019. A special lecture was delivered by Prof. SM Shivaprasad (JNCASR) and a science quiz was conducted by Dr. BR Guruprasad (ISRO). The attendees also visited the 'Chemistry of Materials Exposition' and the 'Prof. C.N.R. Rao Archives' at the C.N.R. Rao Hall of Science at JNCASR.

WORKSHOP AT SCHOOL CHANDAN, LAXMESHWAR: A three-day workshop was conducted at the school from 7–9th Jan, 2020, wherein Prof. CNR Rao and Dr. AS Kiran Kumar (ISRO) inaugurated the Science Park and Science outreach programme and addressed the students. The programme was followed by interactive session with Prof. CNR Rao, Dr. Indumati Rao, and Dr. AS Kirankumar. In addition, lectures and experiments with physics and chemistry models were presented by faculties from JNCASR and CeNS Bengaluru. This programme was supported by the C.N.R. Rao Education Foundation. Over 700 students, 25 teachers, guests, and volunteers participated in the event.

Another workshop of two days was also conducted at the school from 1–2nd Feb, 2020. In this event, a lecture on ‘how to prepare for exams’ was delivered on the first day and ‘a teacher training programme’ was conducted on the second day. Approximately 250 students and 12 teachers participated.

PARIKRMA FESTIVAL OF SCIENCE: The festival was conducted on 21–22nd Jan, 2020 and the theme this year was ‘Marine Life’. The event was inaugurated by Pradip Dutta (Corp Vice President), Prof. P. Balaram (IISc), and Prof. Shrikant Shastri (JNCASR). Over 200 students, 50 teachers, 10 guests, and 15 volunteers participated in the event held at the C.N.R. Rao Hall of Science. They also visited the ‘Chemistry of Materials Exposition’ and the ‘Prof. C.N.R. Rao Archives’ at the C.N.R. Rao Hall of Science.

CHEMICAL HERITAGE EXPOSITION: The exposition was inaugurated on 20th Feb, 2020 by students. Approximately 120 students and 6 teachers participated from Jawahar Navodaya Vidyalaya (Doddaballapur), School Chandan (Laxmeshwar), Parikrma Humanity Foundation, and Sagar Science Forum (Shimoga). Prof. CNR Rao, foreign delegates, and JNCASR faculty & staff participated in this event. The inaugural dedication was read by Dr. Indumati Rao.



Ms. Divya Bhutani, Ph.D. student, CPMU inaugurating the Exposition Building, with Bharat Ratna Prof. CNR Rao on the right



Bharat Ratna Prof. CNR Rao explaining about the eminent scientists to the visitors after the inauguration of the Exposition.

OVERVIEW OF THE EVENTS CONDUCTED BY THE EDUCATION TECHNOLOGY UNIT:

Number of programmes conducted	: 8
Number of students participated	: 1542
Number of teachers participated	: 119

■ Fellowships and Extension Programmes

SUMMER RESEARCH FELLOWSHIP PROGRAMME (SRFP) - 2020:

In response to our advertisement, the Centre received 3315 applications for SRFP-2020. Of these, 140 candidates were selected and offer letters were sent. However, owing to the ongoing pandemic, SRFP-2020 has been suspended.

PROJECT ORIENTED CHEMISTRY EDUCATION (POCE) - 2020:

Based on our advertisement in newspapers, our web site, and direct invitation to ~200 select colleges, we received 344 applications for POCE-2020. However, owing to the ongoing pandemic, POCE has been suspended. Ten students of POCE-2019 batch completed the programme successfully and have been sent renewal offers for second year programme. Nine students of POCE-2018 batch have completed the programme successfully and have been sent renewal offers for third year programme. Prof. SN Bhat has been relieved of his duties as the POCE coordinator, and Dr. Promod Gowda has assumed charge as the new coordinator.

PROJECT ORIENTED BIOLOGY EDUCATION (POBE) - 2020:

Based on our advertisement in newspapers, our web site, and direct invitation to ~200 select colleges, we received 318 applications for POBE-2020. However, owing to the ongoing pandemic, POBE has been suspended. Ten students of POBE-2019 batch completed the programme successfully and have been sent renewal offers for second year programme. Nine students of POBE-2018 batch have completed the programme successfully and have been sent renewal offers for third year programme. Prof. Ravi Manjithaya is the POBE coordinator.

VISITING FELLOWSHIP PROGRAMME (VFP) 2019–20:

The Centre received 23 applications for VFP, of which 17 faculty/scientists from research institutions across the country were selected to undertake the programme starting from September 2019 up to October 2020 for a period ranging from 2–3 months. So far, 3 faculty members have reported and completed the first spell of the programme.

INSTITUTIONAL VISITS DURING 2019–20: With a view to popularise science and encourage motivated students to pursue science education/research, the centre encourages visits of students and teachers from colleges/universities/schools to the centre. During the period 2019–20, 776 students and teachers from 16 different schools/colleges have visited the Centre.

Mid-Level Scientist/technocrats from DRDO/ISRO/NAL/ICMR/DAE/ICAR/CSIR/TSIR and universities, who are a part of the DST sponsor a training programme conducted by NIAS, visited JNCASR and appreciated the ongoing research work.

STUDENT BUDDY PROGRAMME 2019–20: A total of 86 students and 7 teachers visited JNCASR under the student buddy programme during 2019–20. Overall the event received a positive feedback and several students expressed the desire to participate in such programmes in future.

INTERNATIONAL WOMEN'S DAY (IWD) 2020: The centre organized many events to commemorate International Women's Day 2020; these are listed below.

1. Mini Marathon: A run was organized on 8th March, 2020 from I-House at JNCASR to the nearby Rachenahalli lake's inner boundary, covering a distance of ~5 km. Approximately 150 people, comprising students, faculty, and staff, enthusiastically participated in the run, which was flagged off by Prof. Ranjani Vishwanath, organizer of IWD, and Prof. Umesh V Waghmare, Dean, Academic Affairs, at 6 am.



2. Panel Discussion: A panel discussion on "Challenges of Upcoming Women in Science, Technology, Engineering, and Mathematics (STEM)" by eminent scientists was held on 9th March, 2020 and was moderated by Prof. Ranjani Viswanath. A survey was also conducted among women students, post docs, and R&D assistants to identify the challenges faced by them and discuss possible solutions. The summary of the survey was presented to the audience and panel members. The panel members expressed their expert views on various important issues hindering women's progress in STEM.

3. Lecture on "Challenges in health and career management in women": A lecture was delivered for the benefit of women at JNCASR in particular and JNCASR community in general by Dr. Prathiba Nadig, M.D., Head of Pharmacology, Vydehi Institute of Medical sciences and Research Centre, Bangalore on 9th March,

2020. The lecture was attended by ~75 members and well received.

NATIONAL SCIENCE DAY 2020: The National Science Day was celebrated this year with the theme "Women in Science" and comprised a range of events, including talks, panel discussion, and an 'open day', where all laboratories showcased their research along with posters and exhibits. Approximately 250 undergraduates and Master's students from various colleges across Bangalore and nearby areas visited our campus. Prof. Shobana Narasimhan delivered a talk on "Women who changed Science", giving a historical perspective on notable women scientists and discussing inherent biases in perception of women as leaders in the scientific arena. Ms. Svathi Bhogle's talk on her own journey as a scientist, technologist, and social entrepreneur illuminated the potential roles that women scientists must fill to counter the many challenges that we will face in future. Dr. Indumati Rao's talk emphasized the importance of imparting science education to the remotest parts of our country and highlighted the contribution of many non-scientist women to the flourishing of science over the centuries.



A panel discussion involving the above speakers and two other faculty members of JNCASR (Prof. Hemalatha Balam, Dean, Academics and Prof. Rajendran, Geodynamics Unit) enabled discussions

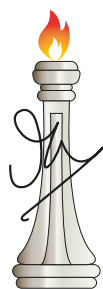


PhD student of the Centre describing her research to visitors as part of Open Day

between panellists and the audience on various aspects, including questions on what factors promote the entry and success of women in scientific institutions, the need for change in societal perceptions on the abilities of women scientists, and potential changes that can be made in policy to overcome current obstacles uniquely faced by women.

Student volunteers at JNCASR described their own research projects as well as several other physical, chemical and biological phenomena through posters, models, live exhibits, games, and quizzes.

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J N C A S R

Editor
Dr. Sheeba Vasu
Editorial Assistance
Nabonita Guha and Library Staff
Content Writer and Copy Editor
Dr. Neena Ratnakaran

Jakkur, Bengaluru - 560 064, Karnataka, India
Phone: 91-80-22082750; Fax: 91-80-22082766; E-mail: admin@jncasr.ac.in