



JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH

Bi-annual Newsletter

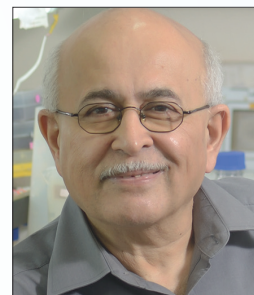
JNC News

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Message from the President

I am delighted to write this column for the 50th issue of the Newsletter. At the outset, let us congratulate Prof. C. N. R. Rao for crossing 1,00,000 citations, an unparalleled achievement. This is one of the many exciting news in the Centre in the last few months. Soon, he will be conferred with a Doctor of Science honoris causa from the University of Manchester. This is another befitting honour and we are all proud of his stupendous achievements. Other faculty also received many accolades and honours detailed inside. JNCASR itself was also a news-maker during the period. The Centre received the Clarivate Analytics India Innovation Award for the year 2018 on May 16, 2018. The award is in the Academic Institutions category, placing it among the top 12 innovators in India. In the article by Dr. Gagan Prathap in the June 10 issue of Current Science, JNCASR has been noted as being the best institute in terms of productivity or efficiency. As I write this, I received communication from UGC granting us greater autonomy in recognition of our highest NAAC grading as well as NIRF ranking. I am happy to note that the team led by Dr. Sebastian Peter advanced into the final round of the NRG COSIA Carbon XPRIZE competition. The competition provides incentives to accelerate the development of technologies that can convert carbon dioxide, a greenhouse gas, into something more valuable. Meanwhile, we have made steady progress on our patent front, outreach, and other activities. It looks like we have exciting days ahead.



With best wishes,

V. Nagaraja

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Congratulations!

According to Google Scholar, **Prof. CNR Rao** has more than 1,00,000 citations of his publications.

JNCASR as institute of special mention; NIRF Ranking 2018

JNCASR was one among the four research institutions listed under Special Mention Institutions as per the National Institutional Ranking Framework (NIRF) 2018 released by the Ministry of Human Resource Development (MHRD, GoI)





From the Editor

This newsletter aims to summarise and highlight events over the past six months that reflect the growth and progress of our Centre. As you read through this document, it will be evident that many activities of the JNCASR community have received international and national recognition. Our student strength has steadily increased as we engage in new research projects and programmes, some of them solely in-house and several involving collaborations both within and outside the country. Our scholarly pursuits have been recognised with advancing University rankings worldwide. Through various outreach activities, we continue to engage with the society at-large. While classical music concerts have been a welcome part of the cultural atmosphere of the Centre, the new Auditorium enabled the screening of the first play at JNCASR with the famed Bangalore Little Theatre bringing its production to our campus.

Sheeba Vasu, Ph.D.

Associate Professor, Neuroscience Unit
JNCASR

School of Advanced Materials (SAMat)

The school was created to provide the materials science program at JNC with more visibility and efficiency. The idea arose from the recommendation of an international review committee on the Materials Science programme at JNCASR. Faculty from Chemistry, the International Centre for Materials Science (ICMS), New Chemistry Unit (NCU), and the Theoretical Science Unit (TSU) will be part of SAMat.

MOU signed between University of Newcastle, Australia and JNC on February 13, 2018

The 5-year MOU will enhance cooperation on “Functionalized advanced nanostructures for multiple applications”. This will enable researchers to exchange visits to conduct research, write joint research proposals and supervise PhD students, and exchange information by conducting seminars and publications.

Other MOUs signed include IIT Guwahati, NIMHANS, JNC-QUT, International Nanotechnology Lab Portugal, University of Manchester, and ICAR-CPCRI.

The Chemical Heritage Exposition at JNC

Building on an idea by Prof. C. N. R. Rao, a unique exhibition will depict the history of modern chemistry (1979–2000), from Lavoisier to Sanger, using videos, portraits, posters and other exhibits, on the lines of the Science History Institute in Philadelphia. The building is planned to be completed in less than a year.

JNCASR receives the Clarivate Analytics India Innovation Award for the year 2018 on May 16, 2018

Clarivate Analytics, formerly the IP & Science division of Thomson Reuters, recognizes the most innovative companies in India according to patent-related metrics. JNCASR won the award in the Academic Institutions category, placing it among the top 12 innovators in India. This is the 2nd time JNCASR has won this award, with a previous win in 2017.



JNCASR received the Clarivate Analytics India Innovation Award for the year 2018

Research Highlights



Novel molecules that target a cell's ability to eliminate waste may help develop therapeutics for neurodegenerative diseases

Research by **Dr. Ravi Manjithaya** Faculty Fellow at JNCASR, has led to the identification of small molecules that can help the cell eliminate waste material. The accumulation of toxic proteins in cells leads to several neurodegenerative diseases such as Parkinson's, Alzheimer's, and Huntington's. These novel molecules can help develop drug candidates for combating such diseases, which have no cure today.

Dr. Manjithaya's group aims to understand the mechanisms that increase the removal of these aggregations. Starting with baker's yeast as a model system, they screened and identified

molecules that initiate the cell's clearing mechanism. Next, they tested these molecules in human neuronal cells to determine their efficiency. Finally, they tested the potential of these molecules to protect neurons in a mouse model of Parkinson's disease.

Two candidate molecules successfully degraded the toxic protein aggregates in mice. This research not only helped determine new mechanisms of how cells remove waste, but also identified small molecules that may be used as potential candidates for developing treatments for neurodegenerative diseases.

Team led by Dr. Sebastian C. Peter advanced into the final round of the NRG COSIA Carbon XPRIZE competition

The Carbon XPrize competition provides incentives to accelerate the development of technologies that can convert carbon dioxide (CO₂) into something more valuable. CO₂ is a potent greenhouse gas and its increased emissions from various sources has been a major contributor to climate change.

The BREATHE Applied Sciences Pvt Ltd team, led by **Dr. Sebastian Peter**, is developing materials and processes for the scalable and efficient conversion of waste CO₂ emitted from coal and natural gas power plants into methanol and other useful products. The team is one of ten finalists in the competition and will share a US\$5 million milestone prize.

According to Dr. Peter, catalytic conversion of CO₂ is a "two birds-one stone" approach to mitigating global warming by efficiently reducing waste CO₂ and the deficit

in energy supply by changing it into methanol, a commodity used widely in industries such as chemical and pharmaceuticals.

Novel catalysts and processing technologies developed by the team enable higher activity than commercial catalysts. Since carbon capture technology is well established, the team is focusing on developing better technologies to convert that captured CO₂. In addition, they have successfully integrated several components of the overall technology into a single unit. The team scaled up the catalyst synthesis and designed the reactor and process engineering to enhance the overall efficiency.

After completing bench- and pilot-level scaling of the technology successfully, they are now working on commercial-scale production.

Asian elephants live in groups called clans

After more than five years of observing elephants in the forests of Nagarhole and Bandipur, **Dr. T. N. C. Vidya** and team concluded that the female elephants in the Kabini population live in groups that the researchers call clans. Such a social structure is similar to what has been found before in elephant societies in Africa.

As part of The Kabini Elephant Project, a decade-long project monitoring identified elephants, and the only one in India, the team identified about 300 different female elephants and observed their social interactions. They found that female elephant societies were organised into groups or clans and may consist of several families and associated individuals. Previously it was believed that such an organisation did not exist in Asian elephant societies.

This organisation may have been masked because of the size of these clans, think the researchers, as they are much smaller than the African Samburu populations. This may be because of ecological constraints on the Kabini populations such as human intervention and less free area for the elephants to move about. Members of a clan can recognize each other by their smell, and sometimes elephants are aggressive or show dominance when they encounter an elephant that is not part of the clan. Clan members move together and if a member of the clan comes across any new information, generally the information will be passed along until the whole clan knows of it.

Understanding such organisation of the elephant society is important in managing the populations better as members of a clan must stay together. It also helps managing any health issues in the populations, as infections usually tend to spread only within clans.

The study was published in Behavioral Ecology in January 2018 and was covered by The Hindu.



Breathe team from Carbon XPrize Competition. Prof. Umesh V. Waghmare, Dr. Sebastian C. Peter & Mr. Rakshith Raghavan Belur.

Academic Activities

With 55 students joining in the August session and 5 students joining in the January session for the various degree programmes in 2017-2018, the number of students at JNCASR becomes 308. Information regarding the regular admission to the Integrated Ph.D, Ph.D, and M.S. programmes for 2018-19 was advertised in all the prominent national and regional newspapers, and announced on our website. The last date for applications was 15 April 2018.



Intellectual Property

Patents Granted

T. Govindaraju *et al.*

Self Assembly of Naphthalene Diimide Derivatives and Process Thereof,
Indian Patent No. 293450.

Jayanta Haldar *et al.*

Cationic Antibacterial Compound, Composition, Method and Articles Thereof, Korean Patent Office
No. 10-1816228.

Jayanta Haldar *et al.*

Antimicrobial Compounds, Their Synthesis and Applications Thereof,
USPTO No. 9,783,490 and Australian Patent Office
No. 2013365769.

Patents Filed

C. P. Sebastian *et al.* (International)

Shape Tailored Ordered PdCu₃ Nanoparticle Surpassing The Activity of State-of-the-art Fuel Cell Catalyst.

Palladium Based Selenides as Highly Stable and Durable Cathode Materials In Fuel Cell For Green Energy Production.

T. Govindaraju *et al.* (National Phase)

Compounds As DNA Probes, Methods And Applications Thereof.

Compounds As Stimuli-Responsive Probes, Methods And Applications Thereof.

3 provisional Indian patents filed by **C. N. R. Rao *et al.*** and **T. K. Maji, K. Kundu** and **M. Eswaramoorthy *et al.***

Outreach Activities

Under the **Program in Biology for Students** and the **Program in Chemistry for Students** organized by ETU and the CNR Hall of Science, lectures on different topics in biology and chemistry were delivered in November and December 2017. About 170 students and teachers attended these programs that covered topics such as microbiome research, understanding signals inside cells, and magnetism.

The **Chetana Winter School** was organized jointly by the CNR Rao Hall of Science, ETU, and the Department of Information Technology, Biotechnology and Science & Technology, Karnataka Govt. from December 15–22, 2017 at JNCASR. The aim of the program was to expose girls who are SSLC toppers to the latest advances in science and encourage them to pursue science as a career. The twenty-four students who participated in the workshop took home complimentary copies of 'Rasayanashastra Arivu' and 'Chemistry Today' from ETU, JNCASR, along with certificates of participation.

The **Parikrma Festival of Science**, whose theme was Air this year, was held on January 4 and 5, 2018. Over 200 students from 50 schools, 50 teachers, 30 guests and 20 volunteers participated in the event held at the CNR Rao Hall of Science, JNCASR.

The CNR Rao Hall of Science, CNR Rao Education Foundation in association with School Chandan, Laxmeshwar, Gadag jointly organized and conducted a **Science Outreach program** from February 28 to March 2, 2018. Several lectures and demonstrations were conducted and faculty from JNCASR interacted with the 150–200 students and teachers participating in the program. The **Bharat Ratna Prof. CNR Rao Science Centre** was inaugurated on March 1, 2018 at the school.



Fellowship and Extension Programmes

PROGRAMME	TOTAL APPLIED	FELLOWSHIPS OFFERED
Summer Research Fellowship (SRFP)	2220 applications	86 scholarships have been offered for the year 2018
Project-oriented Chemistry Education (POCE)	390 applications	11 students from 11 different states have been selected
Project-oriented Biology Education (POBE)	375 applications	10 students from 7 different states were selected
Visiting Scientist Programme	13 applications	9 scientists were selected

Student Buddy Programme: An outreach programme of our F&E Office that brings school children to JNC for a day-long visit

YEAR	STUDENTS PARTICIPATED
26 September, 2017	26 students from JNV Belagavi
27 October, 2017	25 students from JNV Udupi
23 November, 2017	25 students from JNV Mundugod
07 December, 2017	25 students from KV MEG, Bengaluru



Appointments and Awards



Faculty Fellow

Dr. Bivas Saha
ICMS & CPMU

Honorary Professors

Prof. Soumya Swaminathan
DG ICMR & Secretary, DHR

Prof. D. N. Rao

Indian Institute of Science

Fellowships

Prof. Hemalatha Balaram
INSA Fellowship

Prof. Maneesha Inamdar
INSA Fellowship

Prof. Chandrabhas Narayana

Fellow of the Indian Academy of Sciences

Prof. Tapas K. Maji

Fellow of the Indian Academy of Sciences

Dr. Subi J. George

DST Swarna Jayanti Fellowship in Chemical Sciences for the year 2017

Prof. Raghavendra Gadagkar

Elected Member of the American Academy of Arts and Sciences; President of "Association of Quantum Probability & Infinite Dimensional Analysis".

Awards

Prof. Tapas K. Kundu

Banga Ratna
(prestigious Civilian Award of Govt. of West Bengal), 2018.

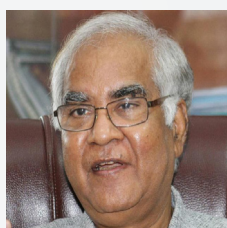
Dr. Ranjan Datta

MRSI Medal 2018

Best Maintained Garden Award

The Centre received Best Maintained Garden Award from the Mysore Horticultural Society on January 24, 2018 at Dr. Marigowda Memorial Hall, Lalbagh.

In Memorium



Sad demise of **Dr. R. Baldev Raj** on January 6, 2018 (DST nominee of our Council, Member NAAC & Honorary Professor)

Dr. Baldev Raj has made invaluable contributions as a member of the Council of Management for several years and as a member of the Technical Research Centre (TRC) at JNC. The Centre conveys its condolences to his family.



Dr. Arcot Ramachandran, an eminent Scientist, former Secretary of DST and a member of the JNCASR General Body passed away on May 17, 2018

Dr. Arcot Ramachandran was associated with the Centre since its inception and he was also a signatory to the Memorandum of Association of the JNCASR. The Centre greatly appreciates his highly valuable services over the years.

Lectures and Meetings



Special Lectures

- The Seventh Annual **Sheik Saqr Materials Lecture** was delivered by Professor Stefan Elliott, University of Cambridge on December 4, 2017.
- The **Darwin Lecture** was delivered by Professor Jerry Coyne on December 26, 2017 on Two flies on an island: Speciation in African Drosophila.
- The **Eighth Annual Chemistry Lecture** was delivered by Professor Reshef Tenne,

Weizmann Institute, Israel, on March 9, 2018 on the topic Inorganic nanotubes and fullerene-like nanoparticles at the crossroad between materials science and nanotechnology and their applications.

- Professor Utpal Banerjee, University of California, Los Angeles talked about **Metabolic control of mammalian pre-implantation development** on March 6, 2018.

Discussion Meetings

- Thermoelectric Materials for Waste Heat Harvesting Workshop, Prof. Kanishka Biswas, JNCASR, Jan. 8-10, 2018.
- International Congress of Cell Biology, Dr. Rakesh K Mishra, CCMB, Hyderabad, Jan. 27-31, 2018.
- An Interdisciplinary approach to Biological Sciences (IABS 2018), Prof. Benu Brata Das, IACS, Kolkata, Feb. 1-3, 2018.
- ICCB 2018 Satellite Meeting, Prof. Srikala Raghavan, inStem, NCBS, Bangalore, Feb. 2-3, 2018.
- 29th Annual General Meeting on Advances in Functional and Exotic Materials,

Prof. S. Arumugam, MRSI, Tiruchirappalli, Feb. 14-16, 2018.

- Conference on Physics and Chemistry of Materials, Prof. G.U. Kulkarni, CeNS, Bangalore, March 12-13, 2018.
- Annual Discussion Meeting Foundations of Biology, Prof. Amitabh Joshi, JNCASR, March-April 2018.

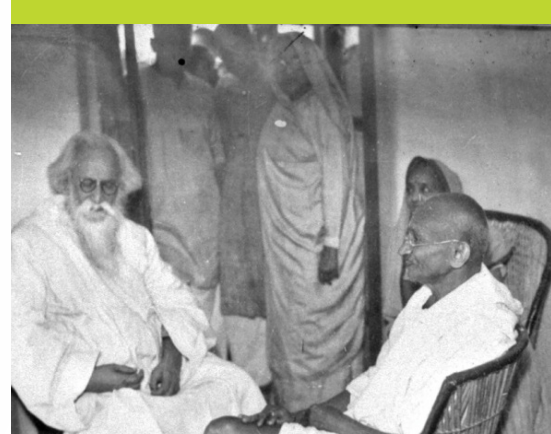
Workshops and Symposia

- I2CAM School on Clean and Renewable Energy Technologies via Chemical Route, November 27-December 2, 2017, organised by the International Institute for Complex Adaptive Matter (I2CAM), University of California, Davis and JNCASR.
- Winter School on Frontiers in Materials Science, December 4-8, 2017.
- One-day symposium on Insects in Research - InSearch 2018, January 5, 2018.
- India-UK bilateral Thermoelectric workshop: Thermoelectric Materials for Waste-Heat Harvesting workshop, January 8-10, 2018.
- Two Hindi workshops were conducted. One on December 6, 2017 by Shri Savadatti and the other on March 27, 2018 by Dr. Shankar Prasad (Retired Hindi Officer, HAL, Bangalore).



Lecture and meetings contd...

Dhwani, a student body at JNCASR, which engages in issues at the intersection of science and public policy, staged a play **"The Prophet and the Poet"** on Wednesday, 21 February 2018. The play is based on letters exchanged between Mahatma Gandhi and Rabindranath Tagore over a span of 25 years (1915-1941) and was performed by Bangalore's oldest English-language theatre company, **Bangalore Little Theatre**.



JNCASR Swacchata Pakwada (Cleanliness Fortnight)

A cleanliness fortnight was organized at JNCASR from May 1, 2018 to May 15, 2018. A meeting with the waste management companies was held and various measures were discussed to maintain a clean campus. A **'Shramadan'** was held on May 5, 2018 where students, staff, and faculty cleaned areas of the campus.

Dr. Elizabeth Daniel, Counselor, Dhanvantari, JNCASR talked about dealing with stress on April 6, 2018. **"Ph...atigue...D?"** Successfully dealing with your stress?



Upcoming Events

- > **Annual Faculty & In-house symposium** meeting will be held on November 13 and 14, 2018.
- > **Winter School on Frontiers in Materials Science** is scheduled from December 3-7, 2018.



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