What's inside?

Bi Annual Newsletter | JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH

JNC NEWS

Issue: 58
May 2022

Message from the President

2022 had a good start despite the continuing COVID-19 pandemic. Vibrant academic and research activities continued in full swing, and recently, it was a proud moment for the Centre to note that Prof. Ajay K. Sood, Honorary Professor at JNCASR, was appointed the Principal Scientific Adviser (PSA) to the Government of India. Furthermore, Prof. Umesh V. Waghmare has been elected as President of the Indian Academy of Sciences, Bengaluru. Seven of our scientists appeared in "75 Under 50: Scientists Shaping Today's India", a book released by Hon'ble Union Minister Dr. Jitendra Singh while honouring the achievements of 75 influential Indian scientists. Congratulations to Prof. Ranjani Viswanatha for featuring in "She Is: 75 Women in STEAM", a compilation released by the PSA Office, that showcases successful Indian women as role models for our youth. Also, best wishes to Prof. Ravi Manjithaya for receiving the Sir C. V. Raman Young Scientist State Award. Several other faculty members have also received notable accolades and awards during this period.

The Centre signed two agreements for the transfer of technologies derived from its research initiatives, one pertaining to a potential drug candidate for dementia and the other, towards a cost-effective oxygen concentrator (OxyJani), whose intellectual property rights have been transferred to our faculty start-up, Rugn Abhilekha.

Significant scientific contributions have been made through some seminal works published in renowned journals. For instance, promising therapeutics were developed to treat the autism spectrum disorder and an efficient platform was designed to detect pathogens, including SARS-CoV-2. Another study provided mechanistic insights into glass transition, and thereby contributed to an understanding of both condensed matter physics and some biological processes! Our scientists also developed a non-toxic photocatalyst that can efficiently capture CO_2 and convert it into methane.

On the academic front, 6 new students joined through mid-year admissions. We awarded 57 degrees (Ph.D., Int. Ph.D., and M.S.) between September 2021 and January 2022. Several outreach activities were conducted during this period. Our fellowship programmes have commenced, giving selected students an option to attend either offline or online. The Student Buddy Programme will commence soon. Under GRIP (Graduate Research Internship Program), 4 students have completed their project work.

We have had a few new additions to our campus which further strengthens our scientific infrastructure. These include the recently inaugurated Mazumdar-Shaw Laboratory for Frontier Biology by Dr. Kiran Mazumdar-Shaw, Founder and Chairperson of Biocon; and unveiling of the foundation stone of the proposed School of Advanced Materials building by Dr. S. Chandrasekhar, Secretary, Department of Science and Technology, Government of India.

On a sad note, we lost our dear colleague Prof. R. Kumar, Honorary Professor at the Centre, on 7th February 2022. On behalf of everyone, I express our heartfelt condolences to the family.

The recent heavy rains, which inundated our Centre, caused great damage. Various steps were initiated on a war footing to mitigate the flood's impact. Our thanks to the Hon'ble Chief Minister of Karnataka and other senior State officials for extending their cooperation and support in mitigating these issues.

Despite all odds, it is heartening to note that the JNCASR community continues to put forth its best at various levels and I wish we will continue to maintain the same tempo in our activities in future as well!

Warm regards,
G. U. Kulkarni
President, JNCASR

Leading News

"75 Under 50: Scientists Shaping Today's India"

Seven of our scientists featured in "75 Under 50: Scientists Shaping Today's India", a coffee table book released by the Union Minister Dr. Jitendra Singh and published by the Department of Science and Technology (DST), India.

Right image: Top row (left to right) Dr. Sheeba Vasu and Dr. T. N. C. Vidya; Middle row (left to right) Dr. Kanishka Biswas, Dr. Sebastian C. Peter, and Prof. Rajesh Ganapathy; Bottom row (left to right) Prof. Tapas K. Maji and Prof. Subi J. George

Delhi Pharma Company Obtained Rights to the Drug Against Alzheimer's Developed at JNCASR

JNCASR recently transferred its IP rights on TGR63, a molecule developed by Dr. T. Govindraju and his team with the potential to effectively treat or prevent Alzheimer's disease, to the Delhi-based pharma company, Hamsa Biopharma. Through its parent firm in the US, IGC Pharma, the company will conduct primate studies and then Phase-I trials involving humans.

News reported by:

- *The Times of India,* 12th May 2022 *(https://rb.gy/agh8sr)*

JNCASR Transferred Intellectual Property Rights of OxyJani to its Own Start-Up

JNCASR has transferred the intellectual property rights of OxyJani to the start-up Rugn Abhilekha, the fifth start-up to be incubated by JNCASR. OxyJani is a robust, mobile group oxygen concentrator that uses sodium zeolites instead of conventional lithium zeolites, thereby avoiding the generation of toxic solid waste. Moreover, the sodium zeolites can be manufactured in India, promoting the 'Make in India' initiative.

News reported by:

- *The Times of India,* 13th May 2022 *(https://rb.gy/dtrlno)*

New Appointments, Promotions, and Additional Responsibilities

Visiting Scientists:

- Dr. Khurshed A. Shah, *Sr. Assistant Professor, University of Kashmir*
- Dr. Mukundan Thelakkat, *University of Bayreuth, Germany*
- Dr. Prashanth S. Adarakatti, *Assistant Professor, SVM Arts, Science and Commerce College, Ilkal, Bagalkot*
- Dr. Priya Brietener, *Faculty, Fatima College of Health Science, UA*

Visiting Students:

- Ms. Nabila Tabassum, *Bengaluru*
- Ms. Snigdha Sarthak, *Janki Devi Memorial College (DU), New Delhi*

Promotions:

- Prof. Jayanta Haldar, *NCU, as Professor*
- Prof. Rajesh Ganapathy, *ICMS, as Professor*
- Prof. Santosh Ansumali, *EMU, as Professor*
- Dr. Sarit S. Agasti, *CPMU and NCU, as Associate Professor*

Re-joining:

- Dr. Princy J. Pereira, *Academic Coordinator re-joined the Centre on 7th October 2021*

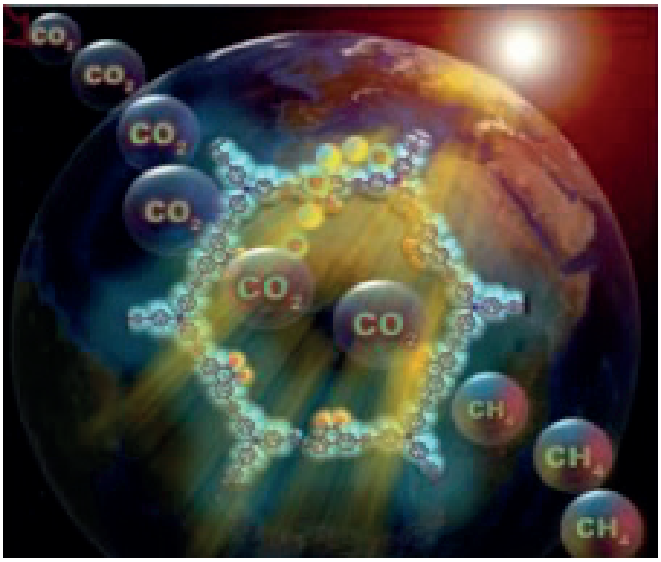
Additional Responsibilities:

- Prof. M. Eswaramoorthy, *Dean, Academic Affairs*
- Prof. N. S. Vidhyadhiraja, *Nodal Officer, Azadi Ka Amrit Mahotsav*
- Prof. Umesh V. Waghmare, *Dean, Faculty Affairs*
- Mrs. Nabonita Guha, *Project Coordinator, Gender Advancement for Transforming Institutions (GATI)*

Research Highlights

New Non-Toxic Organic Photocatalyst Efficiently Captures CO_2 and Converts it into Methane

Prof. Tapas K. Maji and his team designed a cost-effective metal-free catalyst to convert CO_2 to the value-added product methane by absorption of visible light. The heterogenous catalyst is prepared from donor (tris-4-ethynylphenylamine)–acceptor (phenanthaquinone) assembly via C–C coupling. This work has been published in the *Journal of the American Chemical Society* (10.1021/jacs.1c07916).



Schematic showing CO_2 capture and visible light-driven conversion of CO_2 to solar fuel CH_4 using a metal-free redox-active conjugated microporous polymer (Image credit: Prof. Tapas Kumar Maji, JNCASR)

Prof. Tapas. K. Maji *Dr. Soumitra Barman* *Dr. Ashish Singh* *Faruk Ahamed Rahimi*

News reported by:

- *Ministry of Science and Technology,* 27th October 2021 *(https://bit.ly/3rbVrXy)*
- *Department of Science and Technology (https://bit.ly/3CYnZ9g)*
- *India Times,* 27th October 2021 *(https://bit.ly/3d5Tjsp)*

A Step Toward Finding a Cure for Autism Spectrum Disorder

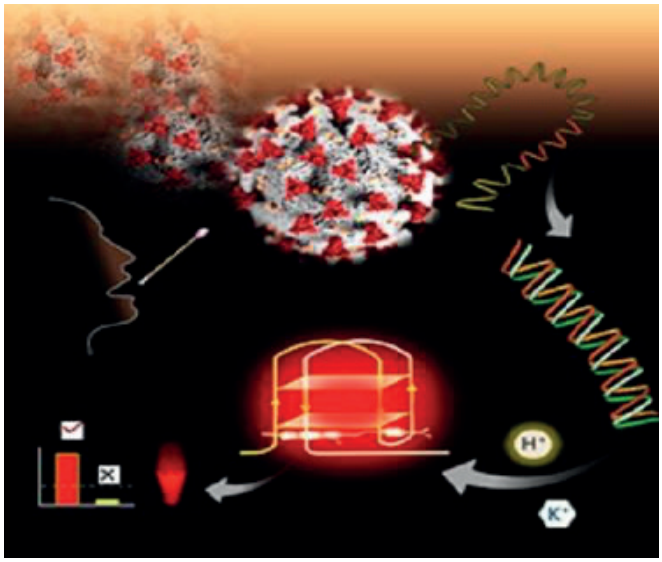
Dr. James Clement's lab and collaborators developed a compound called "6BIO" that showed potential to treat autism spectrum disorder/intellectual disability in the *Syngap1*$^{+/-}$ pre-clinical mouse model. 6BIO can potentially restore neuronal function not only when administered during development (up to 6 years) but also after mid-childhood (7–11 years). These findings have been published in *Experimental Brain Research* (10.1007/s00221-021-06254-x).

News reported by:

- *Department of Science Technology (https://bit.ly/3xoWODq)*
- *Siasat Daily,* 17th November 2021 *(https://bit.ly/3r9dmy2)*
- *Vigyan Prasar,* 17th November 2021 *(https://bit.ly/3r8nY07)*
- *The Times of India,* 18th November 2021 *(https://bit.ly/3FMHcfZ)*

Reliable Detection of SARS-CoV-2 by Fluorescence Readout

A new platform for efficient fluorometric detection of pathogens such as viruses, including SARS-CoV-2, HIV, and Zika, and bacteria, was developed by Prof. T. Govindaraju and his team. This noncanonical nucleic acid-based G-quadruplex (GQ) topology targeted reliable conformational polymorphism (GQ-RCP) platform can be integrated into field-deployable isothermal amplification assays. This work was published in *ACS Sensors* (10.1021/acssensors.1c02113).



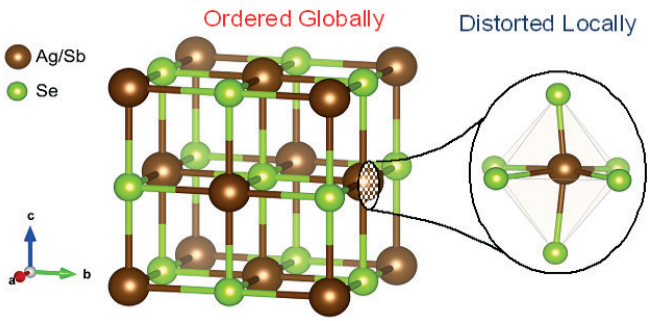
A summary of the study. Image credits: Aishwarya Ramakrishnan and Prof. Sheeba Vasu, JNCASR

News reported by:

- *Ministry of Science and Technology (https://bit.ly/3GVAhBj)*
- *Times of India,* 8th February 2022 *(https://bit.ly/3rQOVp1)*
- *Pune Mirror,* 10th February 2022 *(https://bit.ly/3sNxTHG)*
- *Deccan Herald,* 15th February 2022 *(https://bit.ly/3GVCahn)*

Origin of Ultralow Thermal Conductivity in Silver Antimony Compound

Silver antimony selenide ($AgSbSe_2$), although crystalline in nature, exhibits thermal conductivity like amorphous materials. While investigating this anomaly, Prof. Kanishka Biswas and his student Dr. Moinak Dutta observed that $AgSbSe_2$ actually shows distortion in the local scale, with the cation Sb off-centred from its ideal position. This break in symmetry locally results in ultra-low thermal conductivity. This discovery was published in *Angewandte Chemie* (10.1002/anie.202200071).



Globally ordered crystalline $AgSbSe_2$ contains locally distorted Sb/Ag, which results in glass-like thermal conductivity.

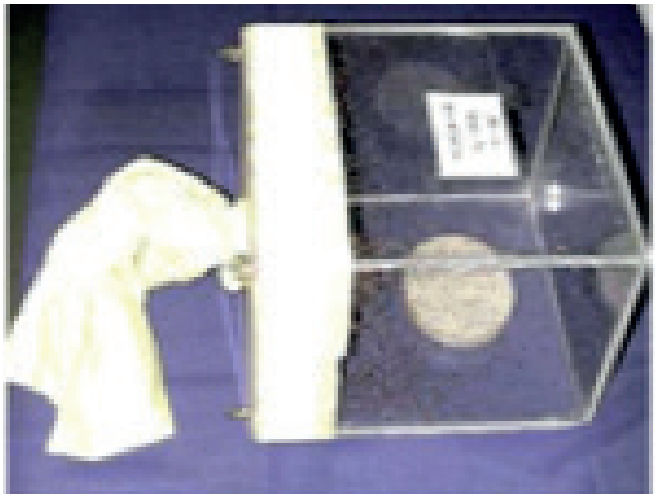
News reported by:

- *Ministry of Science and Technology (https://bit.ly/3pYtBge)*
- *News18.com,* 8th March 2022 *(https://bit.ly/3hZpETX)*

Understanding the Basis of Sexual Conflict via Experimental Evolution

Prof. Amitabh Joshi's laboratory showed that reduced sexual selection in *Drosophila melanogaster* populations can arise due

to direct selection acting on mating-related behaviours and mate choices, and as a by-product of the evolution of a life history involving rapid development to adulthood and relatively early reproduction. The study, published in *Behavioural Ecology and Sociobiology* (10.1007/s00265-022-03158-w), illustrates the power of experimental evolution in addressing fundamental evolution-related questions.



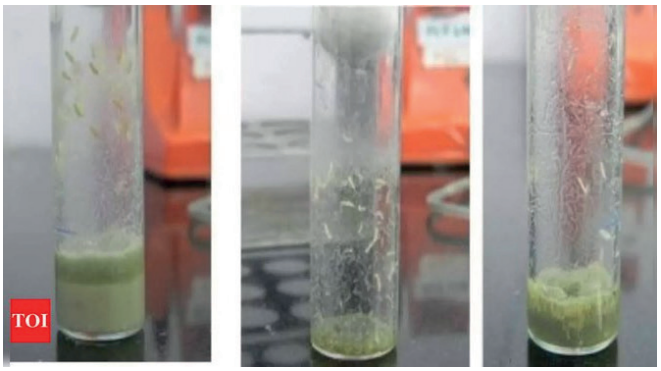
The fruitfly populations in the study are housed as adults in Plexiglass cages. Image credit: Prof. Amitabh Joshi and Avani Mittal, JNCASR

News reported by:

- *Ministry of Science and Technology (https://rb.gy/fh0tpi)*
- *The Times of India,* 26th April 2022 *(https://rb.gy/2fgqn0)*

Understanding Adaptive Evolutionary Trajectories Using Fruit Flies Subjected to Larval Crowding

Prof. Amitabh Joshi and his team found that insect populations that experience chronic larval crowding evolve to give rise to larger and faster-hatching eggs, which may be important for the competitive ability of a larva. This study, published in *Journal of Genetics* (10.1007/s12041-021-01355-6), provides a strong basis for understanding the subtle changes in adaptive evolutionary trajectories even under fairly similar selection regimes.

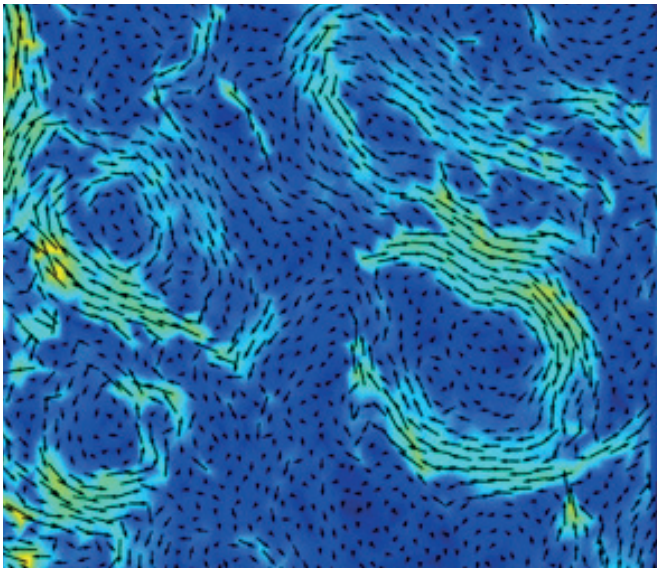


Different combinations of egg number & food amount used in study populations. Image credit: S. Venkitachalam, S. Das, A. Deep, and Prof. Amitabh Joshi, JNCASR

News reported by:

- *The Times of India,* 29th April 2022 *(https://rb.gy/uvi1wv)*
- *Ministry of Science and Technology (https://rb.gy/v8meri)*

Mechanism that Helps Active Systems Escape Transformation to Glass can Aid Study of Cancerous Metastasis



Velocity maps showing large scale swirling motion (cyan colour regions streaks)
Image credits: Pragya Arora, Ajay Kumar Sood , and Prof. Rajesh Ganapathy, JNCASR

Prof. Rajesh Ganapathy and his student from JNCASR, and Prof. Ajay. K. Sood from IISc, found that patterns can form in the presence of active elongated particles, helping the particles to keep moving and preventing the system from turning glassy. The study findings also have implications for understanding fundamental biological processes including cancerous metastasis. This research has been published in *Physical Review Letters* (10.1103/PhysRevLett.128.178002).

News reported by:

- *Department of Science and Technology,* 28th April 2022 *(https://rb.gy/95gmuu)*
- *The Indian Express,* 24th May 2022 *(https://rb.gy/duemrt)*

Academic Activities

Our intake into various academic programmes during mid-year (January) and regular (August) sessions have been robust. Degree certificates for the years 2020 and 2021 have now been updated and published in the National Academic Depository (NAD) portal.

In addition, data for the survey year 2020 is now uploaded on the All India Survey of Higher Education (AISHE) portal, and data on National Institutional Ranking Framework (NIRF) ranking for the survey period 2020–21 has been placed on the NIRF portal as well as JNCASR's website.

Mid-year admissions (January semester–2022)

Online applications received
8th–22nd November 2021

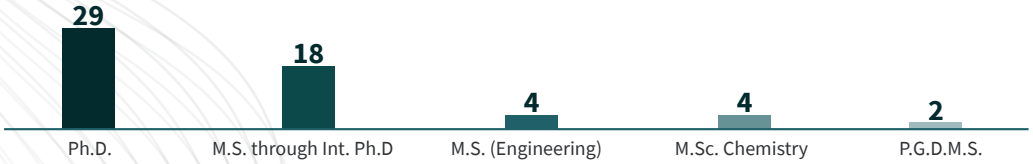
330 Total applications → **106** Shortlisted candidates

Online interviews conducted
11th–22nd December 2021

11 Admissions offered → **6** New joiners

33% Women

Degrees awarded (Since last CoM meeting on 21st September 2021)



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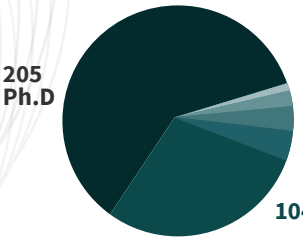
Summary of on-roll students (as on April 2022)



1 M.S. Ph.D
2 P.G.D.M.S.
10 M.Sc. Chemistry
14 M.S. (Engineering)
104 Int. Ph.D

336

Courses in hybrid mode in January–April term

32

Owing to COVID-19 pandemic, all Ph.D./Int. Ph.D./M.S. (Engineering) students who completed their stipulated term have been given extension of six months to complete course requirements

Awards and Achievements

By Faculty Members

Awards and Accolades

Prof. G. U. Kulkarni

- Karnataka Rajyotsava Award 2021 in the field of S&T on 1st November 2021 at Ravindra Kalakshetra, Bengaluru

Dr. Kanishka Biswas

- Merck Young Scientist Award (Chemical Science) 2021
- Silver Medal from Society for Materials Chemistry (SMC), DAE
- Featured in "75 Under-50 Scientists Shaping Today's India", 2022, by the Department of Science and Technology

In the image: Prof. G. U. Kulkarni receiving the Kannada Rajyotsava Award 2021 from Basavaraj Bommai, Chief Minister of Karnataka with other dignitaries at Ravindra Kalakshetra

Prof. Rajesh Ganapathy
- Featured in "75 Under-50 Scientists Shaping Today's India", 2022, by the Department of Science and Technology

Dr. Ranjani Viswanatha
- Featured in the book "She Is: 75 Women in STEAM", a book released by The Office of the Principal Scientific Advisor to the Government of India and UK in India on the occasion of India's 75th Anniversary of Independence

Prof. Ravi Manjithaya
- Sir C. V. Raman Young Scientist State Award in the field of Life Sciences for 2019 instituted by Government of Karnataka.

Dr. Sarit Agasti
- Merck Young Scientist Award 2021 (Biological Sciences)

Dr. Sebastian C. Peter
- National Award for Technology Start-Ups from the Technology Development Board, DST, for developing a pilot plant to convert CO_2 to methanol through the start-up he founded, M/s Breathe Applied Sciences Pvt. Ltd.
- Breathe Applied Sciences Pvt. Ltd. won ENRich21 on the theme "Preparing for the Low Carbon World", awarded by KPMG India.
- Featured in "75 Under-50 Scientists Shaping Today's India", 2022, by the Department of Science and Technology

Dr. Sheeba Vasu
- Featured in "75 Under-50 Scientists Shaping Today's India", 2022, by the Department of Science and Technology

Prof. Subi J. George
- Featured in "75 Under-50 Scientists Shaping Today's India", 2022, by the Department of Science and Technology

Prof. T. Govindaraju
- SASTRA CNR Rao award for the year 2022 for excellence in chemistry and materials science

Dr. T. N. C. Vidya
- Featured in "75 Under-50 Scientists Shaping Today's India", 2022, by the Department of Science and Technology

Prof. Tapas Kumar Maji
- Featured in "75 Under-50 Scientists Shaping Today's India", 2022, by the Department of Science and Technology

Memberships

Dr. Kanishka Biswas
- Editorial Board Member of *Journal of Physics D*, IOP (2022 onwards)
- Editorial Advisory Board Member of *Inorganic Chemistry*, ACS
- Editorial Advisory Board Member of *Journal of Materiomics*, Elsevier

Prof. Kaustuv Sanyal
- Member of the Editorial Board of the journal *Microbiology Spectrum*

Prof. Kavita Jain
- Appointed as Associate Editor of the journal *Evolution*

Prof. K. S. Narayan
- Chair of Working Group16–Physics and Industry, IUPAP

Prof. Maneesha Inamdar
- Member of Board of Reviewing Editors of the journal *eLife*
- Member of the International Society for Stem Cell Research (ISSCR) Task Force to develop standards for stem cell research
- Member of the ISSCR Working Group on Undifferentiated Stem Cells and Pluripotency
- President-elect of Indian Society of Developmental Biologists

Dr. Ranjani Viswanatha
- Editorial Advisory Member of *NanoFutures*

Prof. Shobhana Narasimhan
- Editorial Advisory Board Member of *Applied Physics Reviews*

Dr. T. N. C. Vidya
- Elected to a second term as Executive Council member of the Indian Society of Evolutionary Biologists, June 2021
- Member (through invitation) of the IUCN SSC (World Conservation Union's Species Survival Commission) Asian Elephant Specialist Group, for the quadrennium 2021–2025

Prof. Umesh V. Waghmare
- Distinguished Adjunct Professorship of Chemistry in the College of S&T, Temple University
- Elected as President of the Indian Academy of Sciences, Bengaluru

Fellowships

Prof. C. N. R. Rao
- Honorary Fellowship of the Karnataka Association for the Advanced of Science (KAAS) on 24th March 2022

Prof. Jayant Haldar
- Fellow of Royal Society of Chemistry London (FRSC)

Dr. Kanishka Biswas
- Fellow of Indian Academy of Science (FASc)

Prof. Tapas K. Kundu
- Fellow of the National Academy of Medical Sciences

Student Achievements

Mr. Aritra Naha (Ph.D. student, New Chemistry Unit (NCU); supervisor: Prof. Subi J. George)
- Awarded Prof. C. N. R. Rao Medal for the best Ph.D. thesis of the year 2021 in the Physical Sciences category

Mr. Abhilash Lakshman (Ph.D. student, Neuroscience Unit; supervisor: Prof. Sheeba Vasu)
- Awarded Prof. C. N. R. Rao Medal for the best Ph.D. thesis of the year 2021 in the Biological Sciences category

Ms. Akanksha Bohra (M.S. (Engineering) student, Engineering and Mechanics Unit; supervisor: Prof. Santosh Ansumali with Dr. Diwakar S. Venkatesan as in-charge)
- Awarded Prof. Roddam Narasimha and Family Award for the best M.S. (Engineering) thesis in Engineering Mechanics 2021

Ms. Aditi Saraswat (Int. Ph.D. student, NCU; supervisor: Prof. C. N. R. Rao)
- Awarded Smt. and Sri Bapu Narayanaswamy Prize 2021 for the best M.S. thesis in Chemical and Materials Sciences

Ms. Ivy Maria (Int. Ph.D. student, NCU)
- Awarded BapuMatru Prasad Scholarship 2021 for the Int. Ph.D. Chemical Sciences 1st year student with highest CGPA in course work

Mr. Anustup Mukherjee (M.Sc. Chemistry student, NCU)
- Awarded Dr. Indumati Rao Prize 2021 for the student with highest CGPA in the course work

Research and Development

Reorganization of National Advisory Committee (NAC)

NAC at JNCASR has been reorganized with the induction of two expert members: (a) Prof. Indranil Manna, Birla Institute of Technology (BITS), Ranchi and (b) Prof. Ashok Ganguli, Indian Institute of Technology (IIT), Delhi.

Technical Research Centre (TRC):

DST has in-principle approved ₹25 crore funding at the rate of ₹5 crore (recurring, ₹4 crore and non-recurring, ₹1 crore) each year over a period of five years for TRC Phase-2 (2022–2027). Through Phase-2, JNCASR will support translational research activities at the Centre to build upon IP through activities such as maintenance of incubation space, maintenance of research facilities for translational research, and providing legal help for commercialisation of inventions.

Agreements Signed

Since November 2021, MoUs were signed with Tata Steel Ltd., Mumbai, Cookson India Pvt. Ltd., Ambattur, Chennai, M/s. Sankhyasutra Labs Ltd. (SSL), Bangalore, and Hamsa Biopharma India Pvt. Ltd., Delhi. Non-disclosure agreements were also made with Simode Solutions Pvt. Ltd., Bangalore, and Trilok Corporation Pvt. Ltd.

Intellectual Property

Patents Granted

India

- Patent (No. 377411) for '*A Process for Synthesis of Graphene*' developed by Prof. Giridhar Udapi Rao Kulkarni *et al.*
- Patent (No. 386930) for '*Compounds as DNA Probes, Methods and Applications Thereof*' developed by Prof. Govindaraju Thimmaiah *et al.*
- Patent (No. 380514) for '*Shape Tailored Ordered $PdCu_3$ Nanoparticle Surpassing the Activity of State-of-the-art Fuel Cell Catalyst*' developed by Prof. Sebastian Chirambatte Peter *et al.*
- Patent (No. 390688) for '*A Tellurium-Free n-Type Material, and Implementations Thereof*' developed by Prof. Kanishka Biswas *et al.*
- Patent (No. 393130) for '*Process for Purification of Hydrocarbons*' developed by Prof. Tapas Kumar Maji *et al.*

African Regional Intellectual Property Organization (ARIPO)

- Patent (No. AP 5953) for '*Compounds as DNA Probes, Methods and Applications Thereof*' developed by Prof. Govindaraju Thimmaiah *et al.*
- Patent (No. AP 5749) for '*A Compound and Pharmaceutical Composition Thereof*' developed by Prof. Govindaraju Thimmaiah *et al.*

Patent Applications Filed

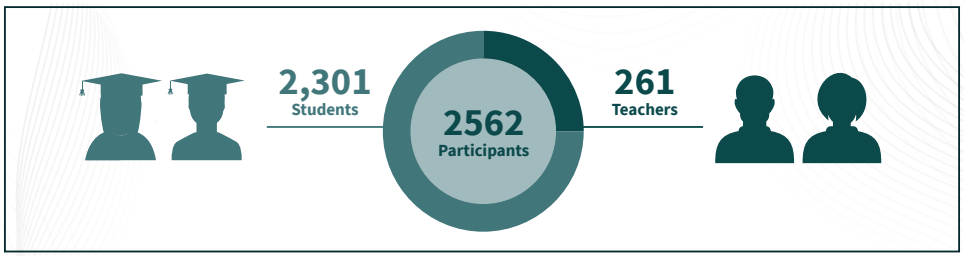
India, Provisional

- Prof. Govindaraju Thimmaiah *et al.* (Patent Appl. No. 202141055905, filed on 2nd December 2021)
- Prof. Sebastian Chirambatte Peter *et al.* (Patent Appl. No. 202241001975, filed on 13th January 2022)
- Prof. Sebastian Chirambatte Peter *et al.* (Patent Appl. No. 202241007999, filed on 15th February 2022)
- Prof. Govindaraju Thimmaiah *et al.* (Patent Appl. No. 202241011941, filed on 4th March 2022)
- Prof. Eswaramoorthy Muthusamy *et al.* (Patent Appl. No. 202241015608, filed on 21st March 2022)
- Prof. Bivas Saha *et al.* (Patent Appl. No. 202241018024, filed on 28th March 2022)

National Phase

- '*Small-Molecular Adjuvants and Implementations Thereof*' developed by Prof. Jayanta Haldar *et al.* (**US** Patent Appl. No. 17/594,408, filed on 14th October 2021)
- '*Small-Molecular Adjuvants and Implementations Thereof*' developed by Prof. Jayanta Haldar *et al.* (**European** Patent Appl. No. 20790881.5, filed on 15th November 2021)
- '*A p-Type Material, and Implementations Thereof*' developed by Prof. Kanishka Biswas *et al.* (**US** Patent Appl. No. 17/626,953, filed on 13th January 2022)

Outreach Activities and Education Technology Unit (ETU)



Programmes organised and conducted by the ETU and C. N. R. Rao Hall of Science were as follows:

10th December 2021: As part of an online Science Outreach Program, a talk titled, "Einstein and the Photoelectric Effect" was delivered by Prof. S. M. Shivaprasad, JNCASR, and Director, KHEA Dharwad. Physics experimental demonstrations were carried out by Prof. N. S. Vidhyadhiraja, JNCASR, followed by a Q&A session. About 685 students and 37 teachers participated from JNV Bengaluru Rural and Urban, Andaman–Nicobar, Udupi, Vijayapura, Dharwad, Laxmeshwar, and 8 colleges across Bengaluru.

18th December 2021: As a part of outreach activities, a special lecture, "Nanoscience and Technology" was delivered by Mr. Vinayak Pattar, ETU, JNCASR, for 1st Year BE physics and chemistry students of EastWest College, Yelahanka, Bengaluru, followed by a Q&A session. About 120 students and 3 teachers benefitted from this event.

28th January 2022: An online Interactive Lecture Program in Biology was organised wherein the lecture "Life Under A Microscope" was delivered by Prof. Deepak K. Saini, MRDG, IISc, Bengaluru, followed by a Q&A session. Around 411 students and 43 teachers from JNV Urban and Rural, Bengaluru; VVS PU college; Vidyavardhaka PU college; Parikrama Learning centres; and Government PU college, Jakkur, Bengaluru, participated in the program.

4th February 2022: An online Interactive Lecture Program in Biology was organised wherein Prof. Ravi Muddashetty, Centre for Brain Research, IISc, Bengaluru, delivered a lecture on "Stem Cells", followed by a Q&A session. Around 490 students and 71 teachers from JNV Urban and Rural, Vijaya Composite PU College, VVS PU College, Carmel PU College Bengaluru, and a few JNV's and other schools from Andhra Pradesh, Telangana, Uttarakhand, and Uttar Pradesh participated in the program.

18th February 2022: Learning Science Through Experiments was organised wherein a physics experiment demonstration was carried out by Mr. Vinayak Pattar, JNCASR, followed by a Q&A session. Around 90 students and 5 teachers participated from BEL School, Bengaluru.

28th February 2022: For National Science Day, an event was organised with the theme "Integrated Approach in Science and Technology for a Sustainable Future". The event was inaugurated by Prof. G. U. Kulkarni, President, JNCASR and a short keynote address was delivered by Bharat Ratna Prof. C. N. R. Rao, Founder President, JNCASR. The occasion was also graced by the presence of Dr. (Mrs.) Indumati Rao, and Mr. Sanjay Rao. Prof. N. S. Vidhyadhiraja compared the program, and Mr. Vinayak Pattar gave a vote of thanks. The second part of the National Science Day, celebrated on the lines of an open day, saw the enthusiastic participation of students and researchers of JNCASR and about 270 students and 30 lecturers from various schools and colleges in and around Bangalore. The day-long program included lab visits, experimental demonstrations, poster/video presentations, and visits to the Chemical Heritage Exposition, galleries, and archives.

25th–28th April 2022: Science Outreach Programs were organised and conducted at Lohaghat and Gangolihaat, Uttarakhand. These programmes were sponsored by the C. N. R. Rao Education Foundation and organised and conducted by the Geodynamics Unit, and Education Technology Unit, of JNCASR and the Himalayan Gram Vikas Samiti, Gangolihaat. The people involved in this program from JNCASR were Prof. Umesh Waghmare, Prof. N. S. Vidhyadhiraja, Prof. Ravi Manjithaya, Prof. Sheeba Vasu, Dr. Jaishri Sanwal Bhatt, Dr. Pratap Vishnoi, Mr. A. N. Jayachandra, and Mr. Vinayak Pattar. About 235 students and 72 teachers participated from more than 20 schools/colleges in and around Lohaghat and Gangolihaat, Uttrakhand.

Science Outreach Programs (SOP) organised and conducted at Lohaghat and Gangolihaat, Uttarakhand. Image credit: JNCASR team

Fellowships and Extension (F&E) Programmes

Re-opening of Fellowship Programmes

Owing to the relaxation of Covid norms in 2021, all suspended F&E programmes have been revived. Candidates selected for SRFP in 2020, POCE/POBE students selected for 2018 and 2019, and Visiting Faculty Fellows selected for 2019 have been permitted to attend the programme either in offline mode (on-campus) or online mode in consultation with the concerned guides. Of the 140 SRFP students, 15 and 2 joined the programme "online" and offline, respectively. Of 19 POBE students, 5 joined the programme offline, while 9 out 19 POCE students joined the programme offline. Of 14 Visiting Fellows, 2 joined the programme offline (on-campus) and 3 had completed it in 2019/2020.

The Student Buddy Programme and Institution Visits Programme would be activated in due course depending upon the situation.

The Graduate Research Internship Programme (GRIP) was launched w.e.f. 1st September 2021. Under GRIP, 4 students have completed while 13 students are currently carrying out their project work.

DBT–India Science and Research Fellowship–INSA Scheme

Under the DBT-ISRA-INSA Scheme, Mr. Bhoj Raj Poudel, Lecturer, Tribhuvan University, Nepal carried out research project work under the guidance of Prof. Kanishka Biswas, NCU for three months from 1st December 2021 to 28th February 2022.

SERB-VAJRA Faculty Scheme

Under the SERB-VAJRA Faculty Scheme, Prof. Mukundan Thelakkat, University of Bayreuth, Germany, joined as Adjunct Faculty at CPMU to work in collaboration with Prof. G. U. Kulkarni, on the research work titled: "Towards affordable semi-transparent solar cells based on solution-processed semiconductors and hybrid TCEs".

Lectures, Conferences, and Other Events

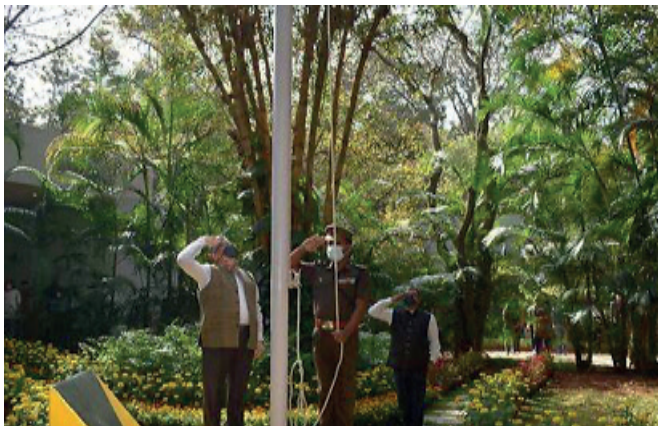
Endowment Lecture:

- **The A. V. Rama Rao Foundation Lecture in Chemistry 2022** was organized on 27th April 2022. The speaker of this lecture was Prof. A. K. Tyagi, Associate Director, Chemistry Group Sr. Professor, Homi Bhabha National Institute BARC, Mumbai, and the title of talk was "Transforming Research into Technologies: Self-reliance in Nuclear Sector". In addition, the prize lecture, titled "Nanozymes for Biomedical Applications", was delivered by Prof. G. Mugesh from the Department of Inorganic and Physical Chemistry IISc, Bengaluru.

Celebrations and inaugurations:

- Vigilance Awareness Week was observed from 26th October 2021 to 1st November 2021.
- The Constitution day was celebrated on 26th November 2021 wherein members of the Centre joined in through online portals for reading of the Preamble of the Constitution along with the Hon'ble President of India.

- The virtual Inauguration ceremony (via WebEx and YouTube) and first workshop on Gender Sensitization under Gender Advancement for Transforming Institutions (GATI) was held on 13th January 2022 at JNCASR. The event speakers were Dr. Pratibha Jolly, Principal Investigator, GATI Pilot Framework Development Project and Consultant NAAC, New Delhi, and Prof. Rohini Godbole, Honorary Professor, Centre for High Energy Physics, IISc, Bangalore.



- During the Republic Day celebration on 26th January 2022, the National Flag was hoisted by Prof. G. U. Kulkarni, President, JNCASR, in the presence of faculty members, students and employees of the Centre. A speech was delivered by Mr. M. R. Chandrashekhar, Coordinator (Security, Legal and Campus Management), followed by a cultural programme organised by the students of JNCASR Cultural Group.

- The New Estate Office was inaugurated on 3rd February 2022 by Prof. G. U. Kulkarni, President, JNCASR.

- The Health Centre Annex Block at JNCASR was inaugurated on 9th February 2022 by Prof. G. U. Kulkarni, President, JNCASR.

- As part of the Azadi Ka Amrit Mahotsav, JNCASR celebrated National Science Day on 28th February 2022, beginning with an address by Bharat Ratna Prof. C. N. R. Rao. The programme included visits to research laboratories, archives, and chemical heritage exposition, live experimental demonstrations, and on-the-spot quiz competitions.

- On 4th March 2022, Dr. S. Chandrasekhar, F. N. A., Secretary, Department of Science and Technology, Government of India unveiled the Foundation Stone of the proposed School of Advanced Materials building at the Jakkur campus. The ceremony was conducted in the presence of Bharat Ratna Prof. C. N. R. Rao, F.R.S., Prof. G. U. Kulkarni, F. N. A., President, JNCASR, Directors of Raman Research Institute, Centre for Nano and Soft Matter Sciences, and Indian Institute of Astrophysics, Deans, Chairs of the Units, Faculty Members, and Officers of the Centre. Mr. Joydeep Deb, Administrative Officer, JNCASR, proposed the vote of thanks.

- As part of the International Womens' Day Celebrations, the GATI Team at JNCASR organized a symposium and panel discussion titled "Calcium channels, Complex fluids and Quantum dots" on 7th March 2022 at the AMRL Conference Hall, JNCASR. The Speakers for the event were Prof. Ranjini Bandyopadhyay, RRI, Bengaluru and Dr. Ranjani Viswanatha, International Centre for Materials Science, JNCASR.

- The Day Care Facility (DCF) at the Centre has been augmented with the construction of an additional room, which was inaugurated by Prof. G. U. Kulkarni, President, JNCASR on 10th March 2022 in the presence of the DCF Staff and Committee Members.

- The gold medal bestowed on Bharat Ratna Prof. C. N. R. Rao F.R.S., as part of Eni International Award for Research in Energy Frontiers by the President of Italian Republic was handed over to Prof. Rao on 23rd March 2022 by Shri Basavaraj Bommai, Hon'ble Chief Minister of Karnataka in the presence of Dr. C. N. Ashwath Narayan, Hon'ble Minister of Information Technology-Biotechnology, Higher Education, Science and Technology of Karnataka.

- International yoga day celebrated on 27th April 2022, with enthusiastic participation of employees, students, and researchers. Yoga Guru Sri Prasanna gave an inspiring lecture on mental health and time management, while his students provided a demo of asanas. Another lecture, titled "Aging with wellness", by Sri. Prasanna V. Raju, was organized on 6th May 2022.

- Dr. Kiran Mazumdar-Shaw, founder and chairperson of Biocon, inaugurated the Mazumdar-Shaw Laboratory for Frontier Biology on 5th May 2022, in the presence of Bharat Ratna Prof. C. N. R. Rao.

- On 11th November 2021, Prof G. U. Kulkarni felicitated Dr. Sharada, Medical Officer, Amruthahalli Government Medical Centre, and staff for their selfless service in conducting COVID-19 tests and vaccination drive camps at JNCASR.

- The signing and exchange of IP transfer agreements in respect of technologies generated from the research at JNCASR was organised on 10th May 2022, in presence of Mr. Kris Gopalakrishnan, Executive Director of Axilor Ventures Private Ltd., and Co-Founder of Infosys, as the Chief Guest.

International Winter School and Theoretical Sciences Unit's Silver Jubilee Colloquium (TSU@25)

- As part of TSU@25, a talk titled "Non-equilibrium thermodynamics of classical integrable models in their thermodynamic limit" was given by Prof. Leticia Cugliandolo, Sorbonne University, Paris, on 29th November 2021.

- International Winter School on 'Frontiers in Materials Science' was held as a hybrid event from 6th–10th December 2021. The conveners were Prof. M. Eswaramoorthy and Prof. Umesh V. Waghmare.

- As part of TSU@25, a talk titled "Puzzles and surprises in aggregation-fragmentation kinetics" was given by Professor Nikolay Brilliantov, Skoltech, Moscow, and Department of Math, University of Leicester, on 24th January 2022.

Lectures, seminars, and colloquia:

- The Annual Faculty Meeting and In-house Symposium (IHS 2021) was held in a hybrid mode during 17th–18th November 2021. Poster sessions were hosted during the afternoons and the Annual Faculty Meeting took place on forenoon of 17th November, followed by IHS. The speakers were Prof. T. N. C. Vidya, Prof. Diwakar Venktesan, Prof. Swapan Pati, Prof. N. S. Vidhyadhiraja, Prof. Subir K. Das, Prof. Eswaramoorthy M., Prof. Anuranjan Anand, and Prof. Kavita Jain from JNCASR; Prof. Shubha Tole from TIFR, Mumbai; and Prof. Goutam Sheet from IISER Mohali. A total of 31 scientific talks were given by faculty members and students of the Centre. The event was streamed live on YouTube along with participation via Microsoft Teams.

- Degree certificates to the graduating students were also awarded on 17th November 2021 by Prof. G. U. Kulkarni, President, JNCASR.

- National Prize Lectures in Chemistry of Peptides and Nucleic Acids was conducted on 26th November 2021. Prof. S. G. Srivatsan, IISER, Pune, and Prof. T. Govindaraju, JNCASR, delivered the lectures and the event was sponsored by the C.N. R. Rao Education Foundation.

- The second C. N. R. Rao Annual Materials Lecture was given by Prof. Chennupati Jagadish from the Australian National University, Canberra, Australia, on 26th November 2021.

- The 11th Sheikh Saqr Materials Lecture was given by Prof. Judith MacManus-Driscoll, University of Cambridge, UK, on 7th December 2021.

In addition to the above events, 18 other events were organized including seminars, lectures, webinars, workshops, and meetings

Upcoming Event

- International Winter School 2022 is scheduled from 5th to 9th December 2022.

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JNCASR

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