

The National Academy of Sciences, India (NASI)

5, Lajpatrai Road, Prayagraj-211002, India

Monthly Summary for the month of May 2021

1. Hon'ble Prime Minister of India announced/started the celebration of '*Azadi ka Amrut Mahotsav*'; following that, the DST, GoI sent circulars to its AIs to develop programmes for next 75 weeks to celebrate the same. NASI prepared it; and started the programme timely. Several Popular Science Articles were written by the Fellows of the Academy (as Prof. G. Padmanaban, Prof. V. P. Kamboj, Prof. Anirban Pathak and others), and dedicated to the prestigious *Amrut Mahotsav* Programme (Please see the weblink- <https://www.anandabazar.com/science/dsts-quest-quantum-cryptography-the-best-weapon-against-hackers-claims-professor-anirban-pathak-dgtlx/cid/1264311>; and the attached article).
2. As part of the 'Jagrukta Abhiyan' against COVID-19, a series of programmes are being organised by the NASI under the NASI New Initiatives (Chaired by Prof. Manju Sharma, Past President, NASI); so far 24 such webinars have been organised all across the country through the NASI-HQ and its several Chapters. In series of that a National WEBINAR on "*Second wave of CORONA Virus infection in West Bengal*" was organised by the NASI-Kolkata Chapter in association with Bishnupur High School, Nadia (now available on <https://youtu.be/uQEbiyzT99E>). INSA was also associated with the programme. **Dr. Avijit Hazra MD, Dean** of Student Affairs, Department of Pharmacology, Institute of Post Graduate Medical Education and Research, Kolkata, in his keynote address elaborated very lucidly the subject in Bengali. Various schools in and around Nadia mainly class 11-12th grade students participated.
3. The celebration programme of National Technology Day, was organised by the Mumbai Chapter of NASI on 11th May, which was attended by more than 500 participants including Fellows/Members of the NASI, University/College teachers/students, several scientists and others. A very nice and informative lecture was delivered on Optical Fibres (please see a copy of the programme), which is also on the 'youtube'.
4. On International Day of Light (16th May), the Academy noted the theme of the day-Trust Science — encourages both scientists and the public alike to sign and support a declaration affirming their trust in science and the importance of public confidence in the scientific process. Prof. Ajoy K Ghatak, President, NASI summarised a note on the importance of the day.
5. The Uttarakhan and Bhopal Chapters of the NASI celebrated the world Biodiversity Day with the involvement of more than 300 participants to convey the message of 'Saving our Biodiversity & Natural Wealth' (please see the copy of the programme).

6. An important meeting of the Inter Academy Panel for the Women in Science was organised to develop concrete programme of action, involving all three National Science Academies and other government/non-government bodies of concern.

7. Although the UP/Prayagraj is in a lockdown situation (since mid April) due to COVID-19 pandemic these days, but several meetings with other Academies, DST and Advisory Members of different programmes, were organised on web.

Several other NASI Chapters also organized online scientific activities.



The National Academy of Sciences, India (Mumbai Chapter)



Announces

National Webinar - *cum* - Panel Discussion

In celebration of



National Technology Day – 2021

In association with

Thakur College of Engineering & Technology, Mumbai

Tuesday, May 11, 2021, 3:00 pm to 5:30 pm

Program Schedule

3.00 PM	Welcome Address: Prof. B K Mishra, Principal, TCET Mumbai	
3.05 PM	Opening Remarks: Prof. Anil K Singh, Chairman, NASI Mumbai Chapter	
	Chair: Prof. J P Mittal, Former President, NASI	
3.10 PM - 4.30 PM	Lecture-1 Inaugural Talk: Prof. R K Shevgaonkar, (FIEEE, FINAE, FNASc, FIETE, FOSI) Professor Emeritus, Electrical Engineering Department, IIT Bombay, (Formerly: Director, IIT Delhi; Vice Chancellor, Savitribai Phule Pune University & Bennett University) Lecture Title: Fibre Backbone for 3-A Information Society	
	Lecture-2: Prof. R R Sedamkar, Director IQAC & Professor, Department of Computer Engineering & Head (Ph.D. Programs), Thakur College of Engineering & Technology, Mumbai Lecture Title: Leveraging Technology & Driving Change for National Development - A Need for the Society	
4.30 PM	Panel Discussion: Theme: Science, Technology and Innovation - New Imperatives & Impact on National Development <ul style="list-style-type: none">• Dr A V Sapre, Advisor, Rajiv Gandhi Science & Technology Commission, Govt. of Maharashtra, Mumbai• Prof R K Shevgaonkar, Professor Emeritus, Electrical Engineering Department, IIT Bombay• Prof B K Mishra, Principal, Thakur College of Engineering, Mumbai• Prof R R Sedamkar, Professor (Comp) & Director IQAC Moderator: Prof P A Hassan, Secretary, NASI-MC	
4.45 PM	Vote of Thanks: Prof P A Hassan Secretary, NASI-MC	

To join the program please click following Zoom link or Scan QR code:

<https://zoom.us/j/94810353621?pwd=K3JvK0JoMHZKaEVXTEFJelRrMXRhQT09>

Program will be live streamed on:

<https://www.youtube.com/c/TCETMumbaiOfficial>



All are cordially invited.

Lecture Abstract and Speaker's Profile

Lecture 1

Fibre Backbone for 3-A Information Society

Raghunath K Shevgaonkar

Professor Emeritus, Indian Institute of Technology Bombay, Powai, Mumbai – 400 076

(Email: rks@ee.iitb.ac.in)

In the middle of the last century, the optical fiber was proposed as an alternative to the cable for transmitting signals with low loss and large bandwidth. Optical fiber technology, along with the laser technology, made the optical communication most attractive for long haul communication. Further, optical fiber amplifier technology made the repeater-less transmission possible over hundreds of Kilometres. Today, optical fiber can send information at unprecedented rates across the globe within a fraction of a second making it the backbone of the trans-continental high-speed network. The new 5G wireless technology that requires multi-Gigabits per second transmission capability in access network will bring the fiber even closer to the users in the form of dense optical network. The talk provides an account of the exciting journey of optical communication that integrated the world to make it a 3A information society.

Biography

Prof. Raghunath K. Shevgaonkar has been an active researcher in the area of Electromagnetics, Optical communication, Image processing, Antennas, Microwaves, Radio astronomy etc. He has extensively published in international journals and conferences, and authored a textbook namely Electromagnetic Waves and a Monograph on Transmission lines for Electrical Engineers with McGraw Hill Education.

He has occupied many academic leadership positions like Director of IIT Delhi, Vice- Chancellor of University of Pune, Vice-Chancellor of Bennett University, and Deputy Director, Dean Resource Mobilization, Dean Student Affairs, Head Department of Electrical Engineering, Founder Head of Centre of Distance Engineering Education Program etc. at IIT Bombay.

He is a Fellow of IEEE, Indian National Academy of Engineering, National Academy of Science, India, Institution of Electronics and Telecommunication Engineers, Optical Society of India, Institution of Engineers, Maharashtra Academy of Sciences, and Member of International Astronomical Union and Astronomical Society of India.

He is a recipient of IEEE William E. Sayle Award for his Achievements in Engineering Education, IEEE Undergraduate Teaching Award for his inspirational teaching, SN Mitra Memorial Award of Indian National Academy of Engineering for his contribution to electromagnetics, antenna and radio astronomy, Ram Lal Wadhwa Award of IETE for his outstanding contribution to Optical communication, VASVIK Award in ICT, and the 'Excellence in Teaching' award of IIT Bombay. He has received the Education Leadership Award from Headlines Today, and Dewang Mehta Educational Excellence Award.

Lecture Abstract and Speaker's Profile

Lecture 2

Leveraging Technology & Driving Change for National Development – A Need for the Society

Raghavendra R Sedamkar

**Director IQAC & Professor, Department of Computer Engineering & Head (Ph.D. Programs),
Thakur College of Engineering & Technology, Mumbai
(Email: rr.sedamkar@thakureducation.org)**

This lecture will address "How India post-independence, being a developing nation has ensured technological advancements and leveraged its technology workforce in serving the global community during this humanitarian crisis arising out of the pandemic and how it has kept the world moving uninterrupted by fruitfully connecting the society mentally, socially and emotionally" I would also be emphasizing on how India has capitalized its position after opening of its economy to global markets till now and shall throw light on the Emerging Technology areas which are going to impact the world in the decades to come.

Biography

Prof. R. R. Sedamkar (Ph.D.), presently working as Director IQAC-NAAC is a Computer Engineering Graduate of 1991 batch from Karnataka. With a rich experience of Institution Building, Prof. Sedamkar joined the Thakur college of Engineering & Technology (TCET) Mumbai in the year 2011 as Professor of Computer Engineering and has also held there the position of Dean-Academic till May 2020.

In the capacity of Dean Academic, he has been instrumental in designing and developing a highly innovative "Holistic Student Development Scheme under the Graded Autonomy System". He is a strong believer of student-centric system-driven approach of providing quality engineering education, which has transformed from class education to mass education in the last few decades.

Prior to joining TCET, he has served as founder associate Dean at NMIMS University's first off-campus centre at Shirpur, where he lead a team of highly enthusiastic professionals in shaping the rural campus in a tribal belt of North Maharashtra into a world class campus offering quality education.

He also headed a collaborative program with Kingston University, London during his tenure at D.J. Sanghvi College of Engineering as Head of IT Department, and visited USA for collaborative and research activities.

He pursued his Ph.D. (Computer Engineering) in the field of 'Performance Analysis of Hyper Spectral Image Compression for Satellite Imagery Data' and is presently guiding seven Ph.D. students at TCET Research Centre of University of Mumbai.

Fixing the vaccine crunch

Besides the two vaccines in use in India, three vaccine candidates look promising

G. PADMANABAN

The unprecedented rise in COVID-19 cases has changed vaccine hesitancy to vaccine advocacy. Even as the government has allowed those aged 18 and above to get vaccinated, the availability of vaccines has become an issue. Many extraneous issues such as Centre-State relations have clouded the picture. Given the rise in cases and deaths, COVID-appropriate behaviour has to be strictly implemented from now on and vaccination has to take place on a war footing.

Production capacity

The main issue is of volume of vaccines. Bharat Biotech (BB) was making about 8-10 million doses of Covaxin a month. Serum Institute of India (SII) makes about 70 million doses of Covishield a month. We need about 1,500 million doses (two doses per person) to vaccinate the target population. India has covered about 10% of the target population. BB is expanding its capacity and hopes to reach a target of 50-60 million doses a month in four months. SII has stated that it will push production to 100 million doses a month. Sputnik may chip in with 50 million doses a month in about four months.

Besides these, three vaccine candidates look promising. The DNA vaccine (for spike protein) by Zydus Cadila, the recombinant spike protein (Biological E), and self-amplifying messenger RNA (Sa-mRNA for spike protein) by Genovax can reach field application in four months. All the three may need emergency approval from the DCGI. With the availability of five approved vaccines, with some outside help perhaps, and with an aggressive timeline, India should be able to vaccinate the target population in six months from now.

What are the riders and imponderables? Despite the unfolding tragedy, there are some major outcomes. The DNA vaccine, if successful, will be the first DNA vaccine that goes into human application for any disease. The 10,000L bioreactor for mammalian cell expansion, to be commissioned by BB, will be largest by global standards. But it is not easy to scale up the micro-carrier technology used by BB. Sa-mRNA, being developed by

Genovax, is the first of its kind (uniquely, stable between 2-8°C), even for a mRNA vaccine, already commercialised by Moderna and Pfizer (require -20 and -70°C for stability). Sa-mRNA can amplify itself and so a lower dose may be adequate. In the context of 'variants', mRNA vaccines provide the greatest flexibility to tweak and make a new vaccine in the shortest time. Interestingly, the five vaccines would represent five different platforms and eventually need not be confined to a single company for production. Several research publications have shown that vaccines produced using different platforms are all effective in preventing severity of disease and hospitalisation, although infection may still happen.

The way forward

It is possible that when 60% of the target population is reached in terms of vaccination (in addition to the infected and recovered individuals), herd immunity may kick in and cases may go down drastically. But people and the system may once again get complacent and a third wave may become a reality. We also do not know how long the antibody-mediated protection lasts. We need to look into T-Cell memory and its role in long-term protection. The issue of vaccinating children will become a priority, since, being asymptomatic, they are the largest carriers to spread the disease. This would call for independent trials based on age groups.

A few other public sector units have also been supported for capacity building and can become major vaccine manufacturing centres over time. Viral variants will evolve, especially under vaccine pressure, and pose challenges to vaccine efficacy. Constant tweaking may be needed or a new vaccine strain may be added each year. Vaccines produced using different platforms may be priced differently and it is possible that we may have a poor man's vaccine and a rich man's vaccine since the government may not subsidise the cost forever. One hopes that these efforts will also prepare India for a future pandemic.

G. Padmanaban, former Director, IISc, is Senior Science Innovation Advisor, Department of Biotechnology, Govt. of India

no mean
nom and the
tion must be
anerjee must
osition. If she
writing on the
to breach the
ext elections.

pply to Kerala
with Pinarayi
cond consecut
Stalin making
Chief Minister of
ast tenures of
Front and the
azhagam have
troversies and
dedness and

ssam vote too
P, has been ri
al and ethnic
on citizenship
es; its citizens
ag experience.
will hopefully
aws and rules
nities and the

s to the also-
hul Gandhi of
He should be
neral Douglas
is fatal to enter
will to win it."

is a soldier, farmer



ould find a
of material
ritish Council
he American
in the city,
eading places
ered largely to
olars.

Public Service
aspirants
the Anna library
me. The library
er other
o bring back
k. Better canteen
nts can be
Importantly,
ld be plans to
e stock of books
material with
other countries.
also be a
o have stalls sell
products to
ater awareness.

RAJA KUMARASAMI



Celebration of International Biodiversity Day 2021

Keynote Lecture on “International Biodiversity Day-2021”

Dr G.S.Rawat, *FNASc*, Former Director, Wildlife Institute of India (WII), Dehradun

Through Virtual Mode on

22nd May, 2021 11:25 AM -12:30 PM



22 MAY 2021
BIODIVERSITY DAY
We're part of the solution **#ForNature**