



विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY



The National Academy of Sciences, India

5, Lajpatrai Road, Prayagraj-211002, India



Summary of the Activities, held in the month of September 2023

The National Academy of Sciences, India (NASI), Prayagraj is the first Science Academy of India, established with a mandate- 'Science & Society'. Therefore, right from its inception in 1930, the Academy is striving hard to promote & popularize science & technology, all across the country (through its 22 Chapters now); its Fellows & Members organized/organizing several activities to disseminate scientific know-how and cultivate scientific temperament among the students and general mass.

1. NASI has the two tier structure, i.e. it elects Fellows/Foreign Fellows to recognize the outstanding contributions of the established scientists, on the other hand it also selects bright scientists as **Members** to enthuse the good work done by them in the realm of Science & Technology; the selected Members for the year 2023 have also been invited to attend the 93rd Annual Session of the NASI to be held in Dec. 3-5, 2023 at BARC, Mumbai (please see the list & 1st Circular attached herewith, as **Annex.1 'a' & 'b'**).
2. A two days' workshop on the '**Role of Women Scientists in S&T based Entrepreneurship Development**' was jointly organized by NASI & CSIR- IHBT on September 18 & 19, 2023 at IHBT, Palampur (H.P.). A brief report is attached herewith as **Annex. 2**.
3. As per announcement of the **Hon'ble Prime Minister of India**, September Month is celebrated as the '**Poshan Mah**'; the Academy organised several events for the students/teachers and the general mass, as well as organised debate for its staff members (please see the programme attached herewith as **Annex. 3**).
4. A Seminar on '**Artificial Intelligence**' for Everyone is being organised at Bengaluru in joint collaboration of the NASI Bengaluru & Mumbai Chapters and SIIT Alumni Centre, Bengaluru, on 30th Sept. 2023 (please see the brochure – **Annex. 4**).
5. The Academy also actively organized the meetings of **Inter Academy Panel for Women in Science**; a **SWATI Portal** (to be activated soon), has been created for easy access of information/data regarding the Women in Science, on a multidimensional web-portal.
6. The **Publications of the Academy** are also regular; and achieving the desired milestones with good impact factor.

The NASI-Secretariat is organizing/celebrating '**Hindi Pakhwara**' with several inspiring programmes/contests; and the **Cleanliness Drive** is also on. Several **Programmes for 'Science & Society'** have been conceived by the NASI-Chapters, as per mandate of the NASI; these are being discussed in the committees for necessary amendments & evaluation. Soon, the selected programmes will start from the Calendar year 2024.

The National Academy of Sciences, India

Annex. 1 a

5, Lajpatrai Road, Prayagraj

Selected candidates of NASI-Membership (Physical Sciences) -2023

Chemical Sciences

1. **Dr. H S S Ramakrishna Matte**, Central for Nano and Soft Matter Sciences, Karnataka
2. **Dr. Kaustava Bhattacharya**, BARC, Mumbai
3. **Dr. Neetu Goel**, Panjab University, Chandigarh
4. **Dr. Prabhpreet Singh**, Guru Nanak Dev University, Amritsar
5. **Dr. Rubel Chakravarty**, BARC, Mumbai
6. **Dr. Suman Singh**, CSIR-CSIO, Chnadigarh
7. **Dr. Debdas Ray**, Shiv Nadar University, Dadri, U.P.
8. **Dr. Seraj Ahmad Ansari**, BARC, Mumbai

Earth Sciences

1. **Dr. Subhash Chandra**, NGRI, Hyderabad
2. **Dr. Shailendra Rai**, University of Allahabad, Prayagraj

Engineering Sciences

1. **Dr. Sushmee Badhulika**, IIT Hyderabad
2. **Prof. Manish Kumar Goyal**, IIT Indore
3. **Dr. Anuj Dhawan**, IIT Delhi
4. **Prof. Subho Das Gupta**, IISc, Bangalore
5. **Prof. Debabrata Das**, IIIT, Bangalore
6. **Dr. Upendra Pandey**, S.N. University, Noida
7. **Dr. M.S.Santosh**, CSIR, CIMFR, Dhanbad

Mathematical Sciences

1. **Dr. Anuj Jakhar**, IIT Madras
2. **Prof. Anbhu Swaminathan**, IIT Roorkee
3. **Dr. Sushil Kumar**, Gautam Buddha University, Noida
4. **Dr. Paritosh Bhattacharya**, NIT Agartala, Tripura

Physics

1. **Dr. C.M.Chandrashekar**, Institute of Mathematical Sciences, Chennai
2. **Dr. Bhaskar Kanseri**, IIT Delhi
3. **Dr. Mohit Tyagi**, BARC, Mumbai
4. **Dr. Raavi Sai Santosh Kumar**, IIT Hyderabad
5. **Dr. Santosh Kumar Das**, IIT Goa
6. **Dr. Raman Sharma**, Himachal Pradesh University, Shimla
7. **Dr. Sayantan Choudhury**, Shree Guru Gobind Singh Tricentenary (SGT) University
8. **Dr. Pradipta Panchadhyayee**, Prabhat Kumar College, Contai

Science & Society

1. **Dr. Vishal Mishra**, IIT-BHU, Varanasi

Selected candidates of NASI-Membership (Biological Sciences) -2023

Animal Sciences

1. **Dr. Santosh Kumar Singh**, Institute of Medical Sciences, BHU, Varanasi
2. **Prof. Shweta Yadav**, Dr. Harisingh Gour Vishwavidyalya, Sagar
3. **Dr. Arti Parganiha**, Pt. Ravishankar Shukla University, Raipur
4. **Dr. Nishant Kumar**, ICAR-National Dairy Research Institute, Karnal ,Hayana
5. **Dr. Arnab Banerjee**, BITS Pilani, Goa
6. **Dr. Soumen Choudhary**, Pandit Deen Dayal Upadhyay Pashu Chikitsa Vigyan Vishwavidyalya Avam Anusandhan Sansthan, Mathura
7. **Dr. Partha Pratim Chakravorty**, Raja Narendra Lal Khan Women's College, Vidyasagar University, West Bengal

Biochemistry, Biophysics, Biotechnology

1. **Dr. Sandip Kaledhonkar**, IIT Bombay
2. **Dr. Tanveer Ali Dar**, University of Kashmir, Srinagar
3. **Dr. Ved Prakash Dwivedi**, ICGEB, New Delhi
4. **Dr. Mithu Baidya**, IIT Jammu & Kashmir
5. **Dr. Sangeeta Singh**, IITA, Prayagraj
6. **Dr. Nidhi Gour**, Indrashil University, Rajpur, Gujarat

Medical & Forensic Sciences Committee

1. **Dr. Arpita Konar**, Institute of Health Sciences, Presidency University, Kolkata
2. **Dr. Rajiv Kumar**, Institute of Medical Sciences, BHU, Varanasi
3. **Dr. Rakesh Kumar Pilonia**, PGIMER, Chandigarh
4. **Dr. Adela Ramu**, NIPER, Guwahati
5. **Dr. Utpal Nandi**, CSIR-IIIM, Jammu
6. **Dr. Vijay Jain**, ABVIMS Dr. Ram Manohar Lohia Hospital, New Delhi
7. **Dr. Kuppan Gokulakrishnan**, National Institute of Mental Health & Neuro Sciences, Bengaluru

Plant, Agriculture and Environmental Sciences

1. **Dr. Aditya Pratap**, ICAR-IIPR, Kanpur
2. **Dr. Rakesh Kumar**, IHBT, Palampur
3. **Dr. Soumitra Paul**, Dept. of Botany, University of Calcutta
4. **Dr. Sundeep Kumar**, ICAR-NIBPGR, New Delhi
5. **Dr. Koushik Chakraborty**, ICAR-National Institute of Rice Research, Cuttack
6. **Dr. Rehna Augustine**, Kerala Agriculture University, Thrissur, Kerala
7. **Dr. Vipin Kumar**, IIT Dhanbad
8. **Dr. Dibyendu Chatterjee**, ICAR-National Rice Research Institute, Cuttack
9. **Dr. Dipak Gayen**, Central University of Rajasthan, Ajmer
10. **Dr. Vinita Gowda**, IISER, Bhopal



Department of
Science &
Technology,
Government of
India



**THE NATIONAL ACADEMY OF SCIENCES, INDIA
(NASI)
&
BHABHA ATOMIC RESEARCH CENTRE
(BARC)**



NASI



BARC

REQUEST YOU

FOR ATTENDING THE

93RD ANNUAL SESSION OF NASI AND SYMPOSIUM

ON

'INDIA SECURE @75'

(An endeavour to celebrate and support Atma Nirbhar Bharat)

AT

DAE CONVENTION CENTRE, BARC, MUMBAI

3RD – 5TH DECEMBER 2023

NASI: A Brief Profile - The idea of establishing a forum for Indian scientists, which would help them on one platform to discuss and find scientific solutions to the problems of the country, was mooted by **Prof. Meghnad Saha**, a great scientist, visionary and the then Professor of Physics at the University of Allahabad. His views were published in an article titled 'A Plea for an Academy of Sciences' in December 1929 issue of the University of Allahabad magazine; in the very next year, The National Academy of Sciences, India was established as the first Science Academy of this country. Speaking in the inaugural session, Prof. Saha said:

“An Academy of Science can do a great deal by educating public opinion, undertaking particular problems, and bringing out scientific workers in various fields for discussion and cooperative research. But the main function of the Academy should be towards cultural improvement by contributions to human knowledge.”

NASI got the mandate of Science and Society by its Founder. Presently, the programmes are being steered by **Prof. Balram Bhargava** (former Secretary to the GoI; and presently at AIIMS, New Delhi), **President of the Academy**. The Past Presidents, namely **Prof M. S. Swaminathan, Prof. P. N. Tandon, Prof (Mrs.) Manju Sharma, Prof Ashok Misra, Prof Asis Datta, Prof. J. P. Mittal, Dr V. P. Kamboj, Dr. K. Kasturirangan, Prof. Akhilesh K. Tyagi, Prof. Anil Kakodkar, Prof. G. Padmanaban and Prof. Ajoy K. Ghatak** have been taking keen interest in the progress of Science and the Academy, in particular. The Academy was also nurtured especially by **Late Prof M. G. K. Menon, Prof A. K. Sharma, Prof S. K. Joshi, Prof. U. S. Srivastava and Dr V. P. Sharma** - Past Presidents, NASI (it is not possible to mention the names of all the past presidents, here).

NASI envisions the cultivation and promotion of Science & Technology in all its branches. Such as: (1) publishing two quarterly journals (Proceedings of the National Academy of Sciences, India- Section A (Physical Sciences) and Section B (Biological Sciences) and one bi-monthly journal (National Academy Science Letters); (2) holding an Annual Session in a scientific and academic institution every year; (3) organizing symposia, seminars and workshops on subjects of current national and scientific interest; (4) planning and executing science communication programmes like Science Extension Lectures, State level Science Contests (Quiz, Debate, Oration, Exhibition, Essay, etc), Talent Search, Teachers' Workshops, Summer/Winter Schools, Vocational Training Programmes, National level Scientific Creative Writing Contest, Celebration of National Technology Day, National Science Day, National Mathematics Day and World Environment Day, etc.; (5) recognizing the significant contributions of scientists at every level by honoring them with Fellowship/Membership/Awards such as Lecture Awards, NASI-Reliance Awards, NASI-SCOPUS Awards, NASI-Young Scientist Awards etc.(continued till 2022); (6) instituting prestigious Research Fellowships/Chairs/Senior-Scientist Fellowships etc. to honor distinguished scientists; (7) organizing sensitization programmes for women researchers/scientists all across the country; (8) conducting the 'Safe water' project; (9) organizing/conducting other projects and schemes, such as Nutrition Programme for eradicating malnutrition, Science Awareness Programme for adopting COVID Appropriate Behaviour, Entrepreneurship Development Programmes and a joint programmes of NASI, ICAR and ICMR; (10) establishing River Galleries; and (11) organizing Rural/Tribal Welfare Programmes.

Besides the above mentioned activities, the Academy also organizes several other activities jointly with other two National Science Academies- INSA and IASc- all through the year. Since the year 2000, the annual sessions have been held at places such as Allahabad, Pune, Shillong, Ahmedabad, Jaipur, Pondicherry, Mumbai, Mysore, Chandigarh, Kolkata, Jaipur, Trivandrum, Varanasi, Goa, Jodhpur, Bhubaneswar, Dehradun, Pune, Chitrakoot, Hyderabad and Prayagraj. These annual sessions provide a platform for the scientists across the country to interact, present their papers and exchange expertise with each other. The Academy is also maintaining a well-organized library; and it has 22 Chapters all across the country to organize scientific activities in and around their respective regions.

BARC: A Brief Profile – India is the only developing nation to have indigenously developed, demonstrated and deployed nuclear reactors for electricity generation. This was made possible through several decades of extensive scientific research and technology development primarily in BARC. In this regard, **Dr Homi Bhabha** was the architect. The country has nuclear ores from which a total of about 78,000 tonnes of uranium metal and about 518,000 tonnes of thorium metal can be extracted. If the entire uranium resources are first used in natural uranium-fueled pressurized heavy water reactors (PHWRs), it is estimated that about 420 GWe-yrs of electricity can be produced. The resulting depleted uranium and separated plutonium from these PHWRs, if used in fast breeder reactors (FBRs), could generate an additional 54,000 GWe-yrs of electricity. In these FBRs, production of uranium-233 (U233) can also be achieved by loading thorium assemblies in their blanket and low-power zones. Eventually by transitioning to generations of Th-U233 fueled breeder reactors, India should be able to produce an additional 358,000 GWe-yrs of electricity. Thus, even at an installed nuclear power capacity of 500-600 GWe, the country's nuclear resources will be able to sustain its electricity generation needs far beyond the extinction of its coal deposits.

After entering into International Civil Nuclear Cooperation agreement in 2008, India was bestowed with opportunity of setting up nuclear reactors with international cooperation. This treaty also ensured continuous supply of fuel for Indian NPPs. BARC plans to develop PWRs indigenously for accelerated capacity building. BARC has achieved forging technology for pressure vessel, reactivity drives, etc to initiate the indigenous PWR programme.

The Indian molten salt breeder reactor (MSBR) is the platform to burn thorium as part of 3rd stage of Indian nuclear power programme. The fuel in MSBR is in the form of a continuously circulating molten fluoride salt which flows through heat exchangers for ultimately transferring heat for power production to Super-critical CO₂ based Brayton cycle (SCBC) so as to have larger energy conversion ratio as compared to existing power conversion cycle. Because of the fluid fuel, online reprocessing is possible, extracting the ²³³Pa (formed in conversion chain of ²³²Th to ²³³U) and allowing it to decay to ²³³U outside the core, thus making it possible to breed even in thermal neutron spectrum. Hence MSBR can operate in self-sustaining ²³³U-Th fuel cycle. Additionally, being a thermal reactor, the ²³³U requirement is lower (as compared to fast spectrum), thus allowing higher deployment potential.

These reactors require several new technology development which are being undertaken by BARC. These include ⁷Li enrichment, salt preparation and purification, salt characterisation and chemistry, structural material development and characterisation, nuclear grade graphite development and characterisation, component development, SCBC and reprocessing for MSBR. In addition, a dedicated facility, Molten Salt Breeder Reactor Developmental Facility (MSBRDF) is being designed for full scale demonstration of all major systems for the 5 MWth MSBR. BARC has also developed Ni-Mo-Cr-Ti alloy for the vessel. R&D is being undertaken for fuel salt optimisation, characterisation, salt preparation, thermal hydraulic and corrosion studies of MSBRs.

BARC has active groups for Research and Development in Reactor Technologies, Fuel reprocessing and waste management, Isotope Applications, Radiation Technologies and their application to health, agriculture and environment, Accelerator and Laser Technology, Electronics, instrumentation and reactor control and Materials Science. Strong emphasis on basic and applied research in a number of core disciplines of Science has made synergy between basic research and technology development possible.

The NASI is grateful to **Dr. Ajit Kumar Mohanty**, Director, BARC and also to **Prof. S. M. Yusuf**, Director, Physics Group, BARC, Mumbai for extending their helping hand and inviting NASI to organize its 93rd A. Session there at Mumbai.

Symposium on 'India Secure @75' – A Prologue: For an all-round progress of a nation, we need to be able to project our national power beyond borders through our foreign policy, our cultural ambassadors, sportspersons, Indian diaspora and science academies. As India has completed 75 years of Independence, we need to look at how secure we are as a nation. Today, we are the sixth largest economy with a GDP of \$3.17 trillion in 2021 and are expected to become the 5th largest economy by the end of 2022. But when compared to the United States, with a GDP of \$23 trillion or China with around \$18 trillion economy, we can see that the country has to travel far before becoming competitive with the superpowers. It is time we start working at the challenges we face, the opportunities, the internal dynamics at play and how the world views us!! With a country as diverse as ours, we need to discuss every challenge and have a workable solution. As our ancestors have shown, out of every *Manthan* some *Amrit* always comes out. We have a proud legacy of universally accepted *sanskritized* cultural heritage, which is more than 1000 years old; and depicted systematically in many scriptures/treasure books known world-wide. The *vaidic* culture, the glorious achievements of our scientists of 17th - 19th century e.g. Aryabhata, Shushrut, Ramanujan, Meghnad Saha, P C Ray, J C Bose, S N Bose, C V Raman, and many; and the recent advancements of Indian Science, not only give us a sense of accomplishment but also inspiration to achieve more.

The victory of Bharatiya Vaccines to eradicate CORONA & Plague; the mission mode success of the missile & rocket programmes; successful launch of Chandrayaan-III, and Suryaan also just after that; the Nuclear energy emission plans and renewable energy generation, etc. are some of the great achievements and a leap forward, especially in the areas of transformational science. The Telecom, Artificial Intelligence, Information Technology, Biotechnological advancements especially its applications in the field of medicine, agriculture, food security, etc. are the recent path breaking milestones achieved by the scientific community of our motherland. Therefore, when we are celebrating 'Azadi ka Amrut Mahotsav' with the motto of becoming *Atma Nirbhar*, it is high time to assess & evaluate our caliber in terms of pursuing our goal towards becoming 'Self-Reliant' during the *Amrit Kaal* (till 2047), as prophesied by the Hon'ble Prime Minister of India.

Therefore, let us introspect to extrapolate our targeted goals & achievements in terms of a developed country by 2047. Accordingly, under the leadership of Prof. Balram Bhargava, President, NASI, and with valuable inputs from other senior fellows, as Prof. Manju Sharma, Prof. Ashok Misra, Prof. Akhilesh K. Tyagi, Prof. Anil Kakodkar, Prof. J P Mittal, Prof. Ajoy Ghatak, Prof. Jayesh R Bellare and others, a scientifically synthesized programme has been developed by Prof. S M Yusuf (Convener) to delve on several contextual issues in different fields of science & technology.

Before delving into those domains, it is good to remember that the security of a nation essentially translates into the freedom to pursue the nation's aspirations and to neutralize and ward off any obstacle in the way of achieving them. The obstacles which come in the way are referred to in security terms as threats. Two very basic needs to keep any nation secure in the modern world remain a resilient economy and energy security, both bottom line needs. And our experience show that these could be achieved only when there is a concerted/coordinated effort to harmoniously utilizing our resources; and to create an ecosystem of transformational technologies to attain the best possible results. For this, special emphasis will be given to discuss & deliberate on the issues, as -

- a) Agriculture & Food Security@75
- b) Drug-Pharmacy & Bio-applications for Security@75
- c) Forest, Climate & Environmental Security@75
- d) Energy Security@75
- e) Electronics & Cyber Security@75
- f) Space Security @75
- g) Medical & Health Security@75

THE NATIONAL ACADEMY OF SCIENCES, INDIA (NASI)

Prof. Jayesh R. Bellare

PhD, FNASc, FNAE, FEMSI, FMAS

General Secretary, NASI

Prof. Seikh Mohammad Yusuf

PhD, FNA, FNASc, FASc, FMASc

Convener, Symposium/Session

5, Lajpatrai Road,
Prayagraj – 211 002, India

16.09.2023

Dear Sir/Madam,

We are happy to inform you that the **93rd Annual Session of the National Academy of Sciences, India** and **Symposium on ‘India Secure @75’** will be held during **December 3-5, 2023** at DAE Convention Centre, Bhabha Atomic Research Centre (BARC), Mumbai.

On behalf of The National Academy of Sciences, India and the Bhabha Atomic Research Centre, Mumbai, we have great pleasure in inviting you to attend these events and participate in the deliberations.

Scientific Sessions

The Scientific Sessions will be held in two sections: **Section of Physical Sciences-** Sectional President: **Prof. Jitendra Kumar Bera, FNASc, IIT Kanpur;** and **Section of Biological Sciences-** Sectional President: **Prof. G. Taru Sharma, FNASc, NIAB, Hyderabad.**

The scientific papers are presented by selected researchers/scientists in scientific sessions, for which prior submission of the Abstract(s)/Paper(s) is necessary (for which the ‘Invitation/General Circular’ was circulated earlier; **now the date of submission has been extended till 30th Sept. 2023**). All abstracts/papers submitted for presentation through the portal (<http://www.nasi2023.in>), will be screened. Authors whose papers are accepted will be informed at the earliest. The decision of the Academy for the acceptance/rejection and also for the mode of presentation (Poster only) would be final. **The travel/ticket charges (AC-III, shortest route) will be reimbursed to the presenting authors, only.**

Symposium

A Symposium on **‘India Secure @75’** will be held during the Annual Session, as proposed by **Prof. Balram Bhargava, MBBS, MD, DM, FNASc, FACC, FAHA, FAMS, President, NASI;** and also accepted by the NASI-Council. **Presentation of papers in the Symposium would only be through invitation.** The Convener of the Symposium is **Prof. Seikh Mohammad Yusuf, PhD, FNA, FNASc, FASc, FMASc, Director, Physics Group, Bhabha Atomic Research Centre, Trombay, Mumbai - 400085,** who is being supported by a group of NASI Fellows, and other scientists at BARC.

All interested persons are invited to attend the Symposium and Scientific Sessions of Physical and Biological Sciences by registering/applying on the email (nasi.barc2023@gmail.com). **Fellows and Members of NASI are exempted from the registration fee; but they will have to register on the aforesaid mail by 31st October 2023, if they wish to attend the Session.** **Further, moderate charges are also to be given for the accommodation.**

The BARC will inform through the 2nd Circular about the accommodation charges, local transport arrangements, entry procedures, etc.

Publication of full length Papers

In case it is desired that a paper presented at the Annual Session be considered for publication in the journals of the Academy, viz. Proceedings of the National Academy of Sciences, India- Part A (Physical Sciences) or Part B (Biological Sciences)/National Academy Science Letters, it must be submitted on line as per the prescribed procedure of submission. **(For details please see the website of the Academy).** These manuscripts will undergo the usual processing and refereeing as

per rules of the Academy. Papers sent for the Session will not be automatically considered for publication in the journals of NASI.

Fellows Meeting and Annual General Body Meeting

The aforesaid meetings will also be held during the 93rd Annual Session; the notices for the same will be sent separately to the Fellows/Members.

We once again extend a very cordial invitation to you to participate in the **93rd Annual Session of the National Academy of Sciences, India** and Symposium on **'India Secure @75'** will be held during **December 3-5, 2023** at Bhabha Atomic Research Centre (BARC), Mumbai.

Yours truly

Sd/ Prof. Jayesh R Bellare
General Secretary, NASI, Prayagraj

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Website: <http://www.nasi2023.in>; www.nasi.org.in

N.B. - In the 2nd Circular the host institution (BARC) will inform in detail about the programme, stay arrangements & other logistics, by the end of October 2023.



A panoramic view of the Ganga-gallery at NASI



DAE Convention Centre at BARC, Mumbai



The National Academy of Sciences, India (NASI)

‘Role of Women Scientists in S&T based Entrepreneurship Development’

Jointly organized by NASI & CSIR- IHB T on September 18 & 19, 2023 at IHB T, Palampur (H.P.)

A Report

The National Academy of Sciences, India (NASI) organized a two-day event on ‘*Role of Women Scientists in S&T based Entrepreneurship Development*’ as part of its *Science & Society* mission on **Sep.18 & 19, 2023 at IHB T, Palampur (H.P.)** in hybrid mode.

Around 400 researchers, faculty members, scientists from IHB T, H.P.K.V. and other affiliated colleges of H.P. University (off line) including some Senior Scientists, Fellows, Members including those from H.P. region and officials of NASI participated in this event. Several lectures focusing on the subjects, related to the diverse areas of Entrepreneurship were addressed by the eminent scientists from all across the country. The event commenced with highlighting the role of *Women in Science* and importance of commemorating the ‘International Day of Women and Girls in Science’ as well as the contributions of some pioneering Women in Science viz. **Dr. Manju Sharma**, former Secretary, Department of Biotechnology, in the Indian Ministry of Science and Technology and a Padma Bhushan awardee, **Dr. N Kalaiselvi**, the currently appointed and the first women director general of CSIR, **Dr. Renu Swaroop**, former Secretary, Department of Biotechnology, **Dr. Soumya Swaminathan**, former Deputy Director General of Programmes (DDP) at the WHO. **Ms. Kiran Mazumdar Shaw**, the Executive Chairperson and founder of Biocon Limited and Biocon Biologics Limited; **Ms. Suchitra Ella**, Co-Founder and Director of Bharat Biotech International Limited and **Dr. Florida Tilton**, Head, Biozone Research Technologies Pvt. Ltd. by **Ms Abhisha Roy & Shikha Sharma**, the research scholars of CSIR-IHB T who conducted the programme.

The event commenced with the *Welcome Address* by **Dr. Sudesh K Yadav**, Director, CSIR-IHB T, Palampur. While extending a warm welcome, he apprised the audience about the research going on IHB T, the innovation based programmes, products commercialized by IHB T; and SHGs engaged for disseminating the entrepreneurial network in H.P. and other nearby regions.

Dr. Manju Sharma, Chairman, NASI New Initiatives; Former Secretary, DBT, Govt. of India; Former President, NASI gave the *Genesis of the Programme*. She discussed about various Programmes being executed under *Science & Society* mandate of NASI with special mention of *Women’s Programme* and the Mega Event organized by NASI in 2018. She stressed on the need for mentoring the young women in science at the early stage of their career and importance of S&T to enhance the socio-economic status of women, especially in rural areas.

The *Keynote Address* was delivered by **Dr. Rajendra Dobhal**, VC, SRHU, Dehradun; Former DG, UCOST, Dehradun. Speaking about the role and importance of entrepreneurship, he stressed on the guidance to be provided to the youngsters making them learn about the fundamental concepts of entrepreneurship and the related aspects such as role of marketing, pre and post marketing strategies, IP, scope and types of funding for start-ups etc. and hence, creating an eco-system for entrepreneurship, especially for the young women. Dr. Dobhal addressed a range of pertinent issues confronted by women in the fields of science and technology, highlighting the challenges and obstacles they often encounter. He also stressed on the need for establishing scientific collaborations to overcome these challenges.

Dr. Rajesh Gokhale, Secretary, DBT, Govt. of India talked about ‘Women for Wonders’. While delivering his *Inaugural Address* Dr. Gokhale outlined the current scenario of women entrepreneurship in India and mentioned about several schemes/ programmes of DBT, being executed for women entrepreneurs as well as the relevance of entrepreneurship in transforming the country. He also talked about KIRAN and WISE, the *women in science* specific programmes/ schemes of DST, Govt. of India.

Dr. Niraj Kumar, Executive Secretary, NASI proposed a *Vote of Thanks* at the end of the Inaugural Session. He expressed his gratitude to Dr. Manju Sharma for her guidance and immense contribution towards the Science and Society Programme. He sincerely thanked the Director of IHB T and Dr. R K Sharma for their efforts to host the event and all the eminent speakers/ scientists, the President of NASI, Fellows and members of NASI for their contribution. Dr. Ram Kumar Sharma, Senior Principal Scientist, CSIR-IHB T, introduced and invited the distinguished dignitaries.

The Technical Session on ‘**Agriculture & Related areas**’ was Chaired by **Prof. Pramod Tandon**, NASI Hony. Scientist; Formerly VC, NEHU & CEO, Biotech Park, Lucknow while **Dr. Sudesh K Yadav**, Director, CSIR-IHBT, Palampur was the Co-Chair. **Dr. (Mrs.) Seema Jaggi**, ADG (HRD), ICAR, KAB-II, Pusa, New Delhi highlighted on the transformation of Agriculture system in higher education. She focused on the quality assurance and Model set of agriculture system. She talked about the current scenario by portraying some statistics on agricultural universities in India and status of women in S & T which has been increased up to 46 % since 2017. She talked in detail about the ICAR admissions/ course curriculum (in UG/PG/Ph.D courses) for the extension of teaching, research and personality development, NEP-2020; and also shared some success stories of the entrepreneurs. **Prof. Akhilesh Tyagi**, Department of Plant Molecular Biology, Delhi University, South Campus; Former President, NASI talked on ‘Approaching Agriculture through Agribiotechnology’. He portrayed some statistics on Women in Science including the current scenario of their achievement of in S & T with specific mention about the role of women in agriculture, pinpointing the less number of women scientists in agriculture in higher education and academic bodies such as NAAS which comprise less than 10% women as the fellows as only ~ 12 % found in scientific fellow. He highlighted the importance of collaborative research for the benefits of the researchers and the research institutes as well as the challenges in delivering and maintaining food and nutritional security through sustainable practices and other aspects as food and nutritional security, innovations on genomics and GM crop, gene edited mustard, BT Cotton in India. **Prof. Ashwani Pareek**, Executive Director, NABI, Mohali highlighted the multi-tasking role of women in S & T and emphasized the currents need in S & T as high-throughput genotyping and phenotyping through AI based technology would be great demanding. He suggested ways to uplift the economy of the country by transferring/ applying new technologies from lab to consumer. He also mentioned about the challenges and constraints in agriculture; and talked about other related aspects such as climate change, technologies of crop modification, mutagenesis. **Dr. Vandana Jaiswal**, Scientist, CSIR-IHBT, Palampur mentioned gave glimpses on the multi -tasking role of women in S & T talked about the role of genomics for agriculture entrepreneurship. She presented her work on preservation of Himalayan bioresources and its sustainable cultivation using Marker assisted selection and application of Genome-wide association Studies (GWAS). **Ms Archana Pant**, YWS, NASI proposed a Vote of Thanks at the end of the session.

The session on ‘**Biomedical Research & Development for Entrepreneurship**’ was Chaired by **Dr. Amit Ghosh**, National Institute of Cholera and Enteric Diseases, Kolkata; Chief Editor, NASI Publication. **Prof. Manjiri Tripathi**, Department of Neurology, AIIMS, Delhi talked about the biomedical and engineering aspects of epilepsy. She highlighted the current scenario of epilepsy in the country and clinical research related to epilepsy. She suggested various measures and adoption of holistic approach to tackle the problem. She also depicted some products developed by the research group, their applications/socio-economic benefits for the society and marketing strategies/ business aspects, for reaching /connecting the potential customers effectively. Use of AI based App for the diagnosis of brain disorders. **Prof. Rohit Srivastava**, Himanshu Patel Chair Professor, Department of Biosciences and Bioengineering, IIT Bombay talked about the *Innovation Ecosystem* at IIT Bombay with special reference to a few products developed in his lab such as lipid analyser, instant lab tests kits, In-Vitro Diagnostic devices (IVDs) etc.; and the technologies commercialized and transferred from their lab to the market. He talked about the importance of collaborative socio-economic strategies beneficial for the entrepreneurship and also mentioned about the development of AI based medical devices to enhance the economics of the country with the major achievement such as development of cassava starch biofilm. He also mentioned about the other collaborations/ start-up ventures established/ co-founded by Prof. Srivastava who are working with IIT Bombay. **Prof. Sanjeev Sinha**, Department of Medicine, AIIMS, Delhi talked about the ‘Dengue Fever’ and its related aspects. Briefing on the history of the dengue infection and dengue outbreaks, he mentioned about the causes, symptoms/ clinical features observed in the patients during the three different phases of the disease; and clearly mentioned the key challenges and strategies for the protection of dengue. He also highlighted the management strategies for the prevention of dengue including anti-larval and anti-adult measures. **Dr. Santosh K Shukla**, AES, NASI proposed a Vote of Thanks to all the speakers/Chairs and Co-Chairs of this session.

At the end of the session a *General Discussion* was held among the Chairmen of the respective sessions, Chaired by **Prof. Akhilesh Tyagi** and Co-Chaired by **Dr. Ram Kumar Sharma**, Senior Principal Scientist, CSIR-IHBT, Palampur.

The second day of the event commenced with the Session on ‘**Entrepreneurship Development-Present Scenario**’ Chaired by **Prof. Ashok Misra**, NASI Distinguished Professor, IISc, Bangalore, Former President, NASI. **Prof. Rohit Srivastava**, Department of Biosciences and Bioengineering, IIT Bombay was the Co-Chair.

Dr. Purnima Sharma, Managing Director, BCIL, New Delhi talked about the *Role of Women Scientists in Biotech-based entrepreneurship*. Outlining the role/contribution of BCIL including its areas of operations, she mentioned about the efforts of BCIL in S & T based entrepreneurship, networking with stakeholders at national level. While portraying the statistics on contribution of women entrepreneurship, she talked about the gender diversity in biotech-driven innovation, various government initiatives for promoting the women scientists as entrepreneurs, funding programmes for women entrepreneurs and efforts of BIRAC towards motivating the young women for skill development as well as the challenges for women in entrepreneurship.

Prof. Subhasis Chaudhuri, Director, IIT Bombay talked about 'Role of women in S & T based entrepreneurship'. Highlighting the role of IIT Bombay in building an entrepreneurial ecosystem for its student community, he also briefed on its objective/ goal of graduating more entrepreneurs, innovators, and business leaders and executing various programmes, exclusively designed to meet the emerging needs of entrepreneurs towards promoting entrepreneurship. He portrayed the current status of entrepreneurship and mentioned about the challenges faced by the start-ups such as the gender bias, limited funding access, underrepresentation in leadership positions, time taken for translational research in S&T, mentorship etc.. He appreciated that India has seen an exponential growth in the past few years; and the women led ventures are playing a very important role in the society apart from developing the social relationships. India ranked 52 out of 57 countries in women entrepreneurship. **Prof. Veena Tandon**, NASI Hony. Scientist Platinum Jubilee Fellow; Formerly Professor, NEHU, Shillong talked about the need for science education to encourage the young girls/women. Mentioning about some women Nobel awardees in various streams of Science, viz. Physics, Physiology, Medicine, Chemistry etc. as well the Padma Awardees (till 2019), she mentioned about their scientific contributions/accomplishments in other space missions such as Mars Orbiter Mission. She portrayed some facts on India's bio-economy and highlighted the challenges/ constraints that arise during the different stages of women to pursue science as a career. Stressing the need for harnessing the full potential of women, she expressed that if we want to transform India, we need to promote more and more women entrepreneurs. Further, the gender gap needs to be closed. At the end of the session, Ms Archana Pant, YWS, NASI expressed her gratitude to all the speakers as well as the Chair and Co-Chair for sharing their expertise on the subjects of relevance.

The Session on '**Requirements of Promoting Entrepreneurship in the Country**' was Chaired by **Prof. V.P. Kamboj**, NASI Hony. Scientist, Former Director, CDRI, Lucknow & Chairman, BCIL; Former President, NASI and Co-Chaired by **Dr. Vipin Hallan**, Chief Scientist, CSIR-IHBT, Palampur. **Dr. Renu Swarup**, Former Secretary, DBT, Govt. of India described the present scenario of entrepreneurship of the country and stressed on the need for motivating the youngsters/ start-ups towards entrepreneurship and inculcating an entrepreneurial orientation amongst them. She expressed that it is the need of the hour to know how to work with the industries to identify the right talent and find the right innovation which is in demand; further, the innovation must be reached to the society. **Dr. Radha Rangarajan**, Director, CSIR-CDRI, Lucknow while presenting some facts and figures related to the current scenario, projected some of the women scientists-turned entrepreneurs; and stressed on the need for promoting more and more women entrepreneurship. She suggested a structured approach towards promoting S&T based entrepreneurship and mentioned about the CSIR technologies as well as the efforts made by the CDRI in developing/ releasing the products/ formulations to combat the disease like malaria and also reverse osteoporosis for which some clinical trials are underway. She stressed on the need for motivating the youngsters and supporting their entrepreneurial mindsets. **Dr. Pamita Bhandari**, Principal Scientist, CSIR-IHBT, Palampur mentioned about the mission and vision of the CSIR-IHBT; and presented her on-going research work on 'Bioprospection of Himalayan Plants for bioactive compounds and natural pigments as potential alternative to artificial dyes' based on phytochemical investigation of medicinal plant. She described about the plant diversity in India with special mention of the medicinal plants investigated in Himalayan region. She highlighted the importance of natural herbal product; and mentioned about the human dependence on drugs from natural resources. **Ms. Chandana Tekkate**, talked about promoting entrepreneurship and GFI involved in *Alt (alternative) Protein* project/research and training ecosystem in India. While sharing her R&D experience in stem cell biology and bioengineering for the production of alternative protein she mentioned about some of the world's most pressing problems related to climate change. She discussed about the science behind cultivated, fermentation-derived and plant-based proteins which has a lasting positive impact on human and planetary health. Dr. Santosh K Shukla, AES, NASI proposed a Vote of Thanks at the end of the session.

The **Concluding Session** was Chaired by Dr. Manju Sharma while Prof. Veena Tandon was the Co-chair. A brief summary of each session was presented by the Chairmen of the respective sessions. Dr. Manju Sharma appreciating the efforts of NASI and IHBT said that NASI is committed to spread awareness all across the country in pursuit of its mandate 'Science and Society'. The region specific problems are taken care of /focused while developing a programme for a particular region and addressed by the distinguished scientists from all across the country.

The following concluding remarks were made by the Chairperson:

- The youngsters must be motivated to take science as a career.
- More and more programme for start-ups may be organized.
- IHBT may organize some specific session(s) on *Ecology* covering all the related aspects in collaboration with NASI for disseminating the message.

At the end of the concluding session, Dr. Ram Kumar Sharma proposed a Vote of Thanks to all especially Dr. Manju Sharma, the President of NASI, Director, IHBT, all the Chairs, Co-Chairs, speakers and NASI representatives and officials for their efforts and contribution for making this event successful.

Glimpses of the event





विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY



One Day Lecture Workshop On



“Nutrition and Health: Celebrating Poshan Maah”

(September 27th, 2023)

*Organized by: The National Academy of Sciences, India, Prayagraj and
Department of Zoology, S.S. Khanna Girls' Degree College, Prayagraj
Under the aegis of Science Communication Programme, NASI and DST-CURIE Core Grant, SSKGDC*

Venue: NASI Auditorium, 5, Lajpatrai Road, Prayagraj

Programme

INAUGURAL SESSION (10.30-11.30 am)

Welcome: Dr. Niraj Kumar, Executive Secretary, NASI

Introductory Remark: Dr. Sippy Singh (Convener of Workshop), Assistant Professor, Dept. of Zoology, SSKGDC

Address by Guest of Honour: Prof. Lalima Singh, Principal & PI DST-CURIE Core Grant, SSKGDC

Address by the Chief Guest: Prof. U.C. Srivastava, National Coordinator, Science Communication Program, NASI

Felicitations of Guests: by Shri B.P. Singh (Computer Programmer), Dr. Pavitra Tandon (Assistant Executive Secretary), Ms. Archana Pant (Young Woman Scientist), NASI

Vote of Thanks: C.A. Sri. A.K. Srivastava, Accounts Officer, NASI

(Session Coordinator: Dr. Santosh Shukla, Assistant Executive Secretary, NASI)

Tea Break (11.30 am -12.00 noon)

Technical Session (12.00-2.00 pm)

Speaker I: Dr. Niraj Kumar, Bioethics Expert (GEObs), UNESCO

Speaker II: Dr. Vaibhav Kr. Gupta, Dental and Maxillofacial Expert, Prayagraj

Speaker III: Dr. Vinita Puranik, Course Coordinator, Centre of Food Technology, University of Allahabad

(Session Coordinator: Dr. Sippy Singh, Assistant Professor, Dept. of Zoology, SSKGDC)

Lunch (2:00pm)

Cordially invite you to

LET'S GET AIed

A Seminar on
Artificial Intelligence
for Everyone

Saturday, September 30, 2023

9.00 am to 5.00 pm

IIT Alumni Centre, Bengaluru
Building No. 60, Sy No. 265,
Bommasandra Village Attibele Hobli,
Anekal Taluk Bengaluru 560 099

[Location link : https://bit.ly/iitacb-maps-location](https://bit.ly/iitacb-maps-location)

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THE FOLLOWING TOPICS ARE ENVISAGED TO BE COVERED:

TRANSFORMING INDIA'S HEALTHCARE – DIGITAL TODAY & AI TOMORROW

- Mr. Girish Krishnamurthy,
Tata Medical & Diagnostics Ltd.

AI & DRONES FOR PRECISION AGRICULTURE

- Dr. Kota Harinarayan, Ex ADA

AI FOR PUBLIC GOOD

- Dr. Vivek Raghavan, Ex UID

AI IN AEROSPACE RESEARCH

- Prof. Suresh Sundaram, IISc Bangalore

AI IN MANUFACTURING

- Mr. Sivaramakrishnan Narayanan,
Bristlecone

AI IN SUPPLY CHAIN

- Sudipta Ghosh, PWC

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THE FOLLOWING TOPICS ARE ENVISAGED TO BE COVERED:

AI IN DIAGNOSTICS

- Dr. Dhanajay Dendukuri, Achira Labs

ML ADVANCES FOR NEUROIMAGING

- Dr. Neelam Sinha, IISc, Bangalore

AI IN MATERIALS DEVELOPMENT

- Prof. Abhishek Singh, IISc Bangalore

ML FOR CHALLENGING DATASETS FROM CHEMICAL SPACE

- Prof. RB Sunoj, IIT Bombay

AI IN BIOMEDICAL RESEARCH

- Prof. N R Jagannathan, Ex AIIMS

AI IN ART & HUMANITY

- Harshit Agrawal, IIT Guwahati alumnus

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