



BIOTECHNOLOGY COOPERATION FOR THE U.S.-INDIA INITIATIVE ON CRITICAL AND EMERGING TECHNOLOGY (iCET) WORKSHOP SERIES

VIRTUAL WORKSHOP 2

**Critical and Emerging Biotechnologies:
Scientific Landscape in India and the United States**

August 30, 2024

10:00 am –12:30 pm EST

7:30 – 10:00 pm IST

The U.S. National Academies of Sciences, Engineering, and Medicine (NASEM), together with the Indian National Science Academy (INSA), will convene experts from both countries for two virtual workshops and one in-person workshop.

Workshop Goals and Objectives

The primary goal of this workshop series is to identify short-, medium-, and long-term opportunities for U.S.- India biotechnology cooperation consistent with the initiative on Critical and Emerging Technology (iCET) and beyond.

To accomplish this goal, workshop participants will discuss areas particularly well suited for bilateral biotechnology cooperation. For example, genomics, synthetic biology, biomanufacturing, protection of critical biotechnology data and information, knowledge exchange on relevant safety and security practices, toward developing efficient, effective, and harmonized regulatory approaches across a diversity of relevant sectors will be among the areas considered for enhanced cooperation.

Following these discussions, a peer-reviewed workshop proceedings will be published and available online free of charge.

FRIDAY, AUGUST 30, 2024

10:00 am EST Welcome and Opening Remarks **7:30 pm IST**

Dr. Rita Guenther
Senior Program Officer (Project Lead)
U.S. National Academies of Sciences, Engineering, and Medicine

Dr. Narinder Mehra
Vice President for International Affairs
Indian National Science Academy

10:05 am EST Introduction and Workshop Objectives **7:35 pm IST**

Dr. Michele Garfinkel (Workshop Series Planning Committee Co-Chair)
Independent Researcher

Dr. Pawan Dhar (Workshop Series Planning Committee Co-Chair)
CVJ Centre for Synthetic Biology & Biomanufacturing
Co-Founder and Director
East West Protection, LLC

10:15 am EST The Biotechnology Landscape: Maximizing Potential for **7:35 pm IST U.S. – India Cooperation**

Session Goals

- Outline biotechnology framework:
 - *Read: multi-omics*
 - *Write: biomolecule synthesis*
 - *Construct: modules, networks, and cells (including synthetic biology)*
 - *Manufacture: cell factory (biomanufacturing)*
- Understand the biotechnology landscape in India and the United States.
- Identify initial U.S. and Indian priority areas for bilateral biotechnology cooperation.
- Articulate initial practical and implementable suggestions for how to strengthen bilateral biotechnology cooperation.

Discussion Questions

1. Across the read, write, construct, manufacture biotechnology framework, which areas are most promising for cooperation?
2. Which practical steps can be undertaken to realize the potential of productive cooperation (e.g., standardization, etc.)?
3. Which areas of biotechnology cooperation are most elusive and how might these challenges be overcome?

Read, Write, Construct, Manufacture: Framing Remarks

Dr. Pawan Dhar (Co-Chair)
Executive Director
CVJ Centre for Synthetic Biology & Biomanufacturing

The Biotechnology Landscape in India

Dr. LS Shashidhara
Director
National Centre for Biological Sciences

The Biotechnology Landscape in the United States

Dr. Nathan Hillson
Computational Senior Staff Scientist
Lawrence Berkeley National Laboratory

10:45 am EST
8:25 pm IST

Safe and Secure Biotechnology Cooperation: Exchanging Knowledge and Lessons Learned

Session Goals

- Outline areas for potential biosecurity and biosafety cooperation consistent with the expansion of biotechnology.
- Given that extensive risk assessments of critical and emerging technologies have already been conducted via detailed assessments, identify areas for relevant knowledge exchange.
- Articulate initial practical and implementable suggestions for continually balancing biotechnology benefits with possible risks.

Discussion Questions

1. How might the expansion of biotechnologies affect societies and what issues need to be considered to ensure the safety and security of populations and environment?
2. How can knowledge be exchanged on risk assessments, biosafety, and biosecurity related to biotechnologies?
3. How can the United States and India advance biotechnology with biosafety and biosecurity principles incorporated from the earliest phases?

Building on Experience, Continuing Biosafety and Biosecurity in Context: Framing Remarks

Dr. Michele Garfinkel, (Co-Chair)
Independent Researcher

Responsible Research and Innovation: Enhancing Understanding through Cooperation

Dr. Dhiraj Kumar
Group Leader
Cellular Immunology
International Centre for Genetic Engineering and Biotechnology
New Delhi, India

Dr. Andrew Hebbeler (Confirmed)
Director of Biosecurity
Coalition for Epidemic Preparedness Innovations

11:25 am EST
8:55 pm IST
11:35 EST
9:05 IST

Discussion

Initial Reflections on Priorities for Biotechnology Cooperation

Session Goals

- Synthesize understanding of current biotechnologies in India and the United States and identify promising areas for U.S.-India biotechnology cooperation.
- Identify initial areas ripe for enhanced U.S.-India biotechnology cooperation, including exchange of biosafety and biosecurity lessons learned.
- Identify possible challenges for U.S.-India biotechnology cooperation and potential means of addressing them

Discussion Questions

1. Which areas for U.S.-India biotechnology cooperation emerge as most promising in the short, medium, and long term?
2. What are the most clearly identified possible challenges for U.S.-India biotechnology cooperation and how might they be most helpfully be addressed (e.g., regulatory/policy issues)? By whom?
3. How might this discussion most effectively be continued during the in-person workshop?

Enhancing Success by Identifying and Overcoming Challenges to Biotechnology Cooperation: Framing Remark

Dr. Kavitha Iyer Rodrigues
CEO
Zumotor Biologics

Maximizing Critical and Emerging Biotechnology Cooperation

Dr. James Diggans (Workshop Series Planning Committee Member)
Distinguished Scientist, Bioinformatics and Biosecurity
Twist Bioscience

11:55 am EST
9:25 pm IST
12:10 pm EST
9:40 pm IST

Discussion

Thematic Takeaways and Future Directions

Dr. Michele Garfinkel (Workshop Series Planning Committee Co-Chair)
Independent Researcher

Dr. Pawan Dhar (Workshop Series Planning Committee Co-Chair)
CVJ Centre for Synthetic Biology & Biomanufacturing
Co-Founder and Director
East West Protection, LLC

12:25 pm EST
9:40 pm IST

Concluding Remarks and Next Steps

Dr. Rita Guenther
Senior Program Officer (Project Lead)
U.S. National Academies of Sciences, Engineering, and Medicine

Dr. Narinder Mehra
Vice President for International Affairs
Indian National Science Academy

12:30 pm EST
10:00 pm IST

Adjourn