

Celebration of BIO-SENS and Future Directions and Collaborations
Industry-Academic Biotechnology Symposium

November 18, 2026
University of New Hampshire (UNH)
Granite State Room, Memorial Union Building, Durham, NH

8:30 – 9:00 AM: Registration, Poster Setup, and Networking Breakfast

9:00 – 9:15 AM: Opening Remarks
Introduction - Jeffrey Halpern (UNH)
UNH Research and Innovation Remarks - Mark Milutinovich (UNH)

9:15 – 10:15 AM: Models and Practices for Experiential Biomanufacturing Education
Abstract: Experiential learning plays a critical role in preparing the next generation biomanufacturing workforce. This panel will explore diverse approaches to experiential education spanning K–12 engagement, hands-on learning, industry partnerships, and traditional classroom instruction. Panelists will discuss different educational models and practices that connect foundational knowledge with real-world applications, highlighting opportunities to engage learners at various stages of their educational journeys. The discussion will consider how these approaches can strengthen biomanufacturing education and prepare students for emerging workforce needs.

Moderator: Stephen Hale, Leitzel, UNH
Panelists: Carmela Amato-Wierda, UNH
Deb Audino, Great Bay Community College
Christy Johnson, Advanced Regenerative Medical Institute (ARMI)
Mike Miller, ReGen Valley Common Campus, UNH Manchester
JP Ouellette, Lonza

10:15 – 11:00 AM: Coffee Break and Poster Session A

11:00 – 12:00 PM: Bioprocess Analytical Technology: Needs and Challenges

Abstract: Advances in bioprocess analytical technology (PAT) are critical to the future of biomanufacturing, yet significant challenges remain. This panel will explore current industry needs, gaps in existing analytical technologies, and limitations in real-time process monitoring. Particular attention will be given to the challenges of developing in-line and on-line technologies capable of continuous, sensitive, and selective measurements in complex biomanufacturing environments. Panelists will also discuss the difficulties of monitoring protein function and detecting changes in protein behavior within complex media, highlighting opportunities for innovation and future technological development. We will find that interdisciplinary approaches are needed to solve these problems, including analytical chemistry, physical chemistry, biochemistry, bioengineering, signal processing, and more.

Moderator: Donna Hall, Evonik
Panelists: Marcie Black, Advanced Silicon Group
Tessa DesRochers, Advanced Regenerative Medical Institute (ARMI)
Lev Levintov, UNH
Thaddeus Webster, Lonza
Yichao Zhao, MIT

12:00 – 2:00 PM: Lunch and Afternoon Plenary and Keynote

Keynote: **An Overview of the Biotechnology Economy**
by Andrew Crawley, University of Maine

Abstract: Biotechnology has become an increasingly important part of the U.S. economy, creating opportunities for innovation, employment, and regional economic development. This presentation provides an overview of how the biotechnology economy has changed over the past five years in Maine, New Hampshire, Wyoming, Alabama. It examines trends in employment and output, highlighting similarities and differences between the four states and the nation.

The presentation also considers how the skills required by biotechnology employers have changed over this period and what these changes may mean for workforce development. Looking ahead, forecasts of employment and output will be developed for the next five years. These forecasts will be used to construct scenarios in IMPLAN to estimate the potential economic impacts of biotechnology growth. Together, this analysis provides a picture of the recent performance, workforce needs, and potential future contribution of biotechnology in EPSCoR jurisdictions.

Plenary: **From Sensing to Scaling: The Future of Biomanufacturing**
by Jon Beam

Abstract: Biomanufacturing is entering a transformative era, opening extraordinary possibilities across biopharmaceuticals, personalized cell therapies, engineered tissues, and human-relevant biological models. Advances in biosensing, AI, automation, and advanced manufacturing are creating new opportunities to make biological products more reliable, scalable, affordable, and accessible.

Looking ahead 2, 5, and 10 years, this presentation will explore the emerging technologies, opportunities, and grand challenges that will shape the next generation of biomanufacturing, including new possibilities enabled by microgravity. It will examine how collaboration among academia, industry, and government, including initiatives such as ARMI/BioFabUSA and the ReGen Valley Tech Hub, can accelerate innovation, bridge the gap between scientific discovery and commercial viability, and help bring transformative products and therapies to the people who need them.

2:00 – 3:15 PM: Protein Sensing for Biomanufacturing: Engineering Principles and Approaches

Abstract: Over the past four years, the NSF EPSCoR-funded BIO-SENS research team has taken a transdisciplinary approach to developing engineering principles for protein sensing in biomanufacturing. This panel will explore advances in sensing mechanisms, protein recognition, surface chemistry, sensor design, and transduction methods, highlighting how these disciplines converge to address complex sensing challenges. Panelists will discuss the scientific and engineering principles underlying next-generation protein sensors, their potential applications in bioprocess analytical technology, and the opportunities and challenges originating from this work.

Moderator: Brad Kinsey, UNH
Panelists: Jeffrey M. Halpern, UNH
Eva Rose M. Balog, University of New England
Caleb Hill, Idaho National Lab
Robert Pantazes, Auburn University

3:15 - 4:00 PM: Break and Poster Session B

4:00 – 5:00 PM: From Challenges to Opportunities: The Path Forward for Biomanufacturing

Abstract: What will be the research priorities of the biomanufacturing industry over the next decade? This panel will explore emerging industry needs, persistent technological barriers, and challenges that remain beyond the reach of current approaches. Panelists will discuss how these challenges may create opportunities for scientific discovery, technological innovation, and new research directions. Particular emphasis will be placed on the role of industry-academic partnerships in overcoming complex barriers, aligning research with industry needs, and shaping the next generation of biomanufacturing technologies.

Moderator: Amy Deveau, UNE
Panelists: Jason Wen, UNH
Nate Oldenhuis, UNH
Scott Wood, UNE
Kristin Di Bona, Wyonics and University of Wyoming

5:00-6:15 Concluding Remarks followed Hors d'oeuvre, poster session, and networking (Sponsored by CIBBR)

We would like to acknowledge the BIO-SENS Leadership Team:
Dr. Jeffrey Halpern (University of New Hampshire),
Dr. Eva Rose Balog (University of New England),
Dr. Kristin Di Bona (University of Wyoming)
Dr. Andrew Crawley (University of Maine),
Dr. Caleb Hill (Idaho National Laboratory),
Dr. Robert Pantazes (Auburn University),
Michelle Gregoire (University of New Hampshire)

Supported by NSF EPSCoR OIA Award #2119237