



IPSR-INTERNATIONAL 2025 SPRING MEETING SCALING SEMICONDUCTOR PERFORMANCE AND REVENUE

June 5-6, 2025

MIT, Room 6-120, Cambridge, MA

The Integrated Photonic System Roadmap (IPSR-International) promotes synchronous, self-consistent solutions for the electronic-photonic manufacturing value chain. The semiconductor industry has been on a path of exponential growth for the past 40 years that has been the foundation for Economic Prosperity. However, the path of growth continually confronts boundaries of cost, materials availability and effluent in the production and operation stages. A Roadmap for solutions to these boundaries provides early warnings for coordinated research and development of solutions across the manufacturing value chain from critical materials to wafers to communications, compute, and learning systems. The urgency to align microchip system performance scaling with a commercially viable manufacturing value chain dominates business and technology decisions today.

Thursday, June 5, 2025

9am – 5pm

Semiconductor Value Chain Innovation

Keynote Session I: Manufacturing to Operations: Value Chain Optimization

Welcome

Lionel C Kimerling, MIT Microphotronics Center and Richard Gryzbowski, Ranovus

Accounting for the Energy Roadblock

Robert Kaplan, Harvard Business School

Scaling Accelerators, GPUs and Energy with Photonic Integration

TBD

Scaling the Semiconductor Innovation Infrastructure

Linda Molnar, NATCAST

Critical Materials: Criticality Causes and Strategic Solutions

Ajay Gupta, FUTUR-IC

AI Hardware Grand Challenges: Working Group Report

TBD

Keynote Session II: Electronic-Photonic Package Level Integration

Solutions for Scaling Bandwidth Density, Energy and Cost: CPO, Connectors and Interfaces

Display System Assemblies for AR/VR

Michael Klug, Google

Universal Chiplet Interconnect Express™: 8 Tbps Die-to-Die Optical Interconnect:

Milos Popovic, Ayer Labs

Fabrication and Assembly of High-Density Co-Packaged Optics

Drew Weninger¹, Samuel Serna, Luigi Ranno, Lionel Kimerling², Anuradha Agarwal, FUTUR-IC

E-P Packaging and Interconnection: IEEE-ECTC Conference Summary

Alan Evans, MIT Microphotronics Center

Luncheon Meetings

Keynote Session III: Grand Challenges for HVM

Materials, Water, Effluent and Energy

PFAS Substitution for Advanced Lithography Processes

Emily Gallager, IMEC

Copper-Based Metal-Organic Thin Films for Ultrasensitive Detection of Perfluoroalkyls in Drinking Water

Aristide Gumyusenge, FUTUR-IC

Ultratrace PFAS Detection Using Amplifying Fluorescent Polymers

Jesús Castro Esteban and Timothy Swager, FUTUR-IC

Scaling Manufacturing Tools within the Cost of Ownership Metric

TBD

Digital Twins for Innovation and Workforce Development

TBD

Session IV: Materials and Applications

Heterogeneous Materials Integration for Sensing

Si Photonic PICs for Biomedical Sensors

Diedrik Vernuelen, SiPhox

VLSI PICs for LIDAR Sensing

Michael Watts, Analog Photonics

Ge Waveguides for MIR Sensing

Goran Mashanovich, University of Southampton

Adding NIR Functionality with Low T Ge Deposition

Stephanie Marzen and Jurgen Michel, MIT Microphotonics Center

Networking Reception

Friday, June 6, 2025

8am – 3pm

IPSR-I: Foundational Solutions for High Volume Manufacturing

Workshop I: Packaging and Assembly: Polymer Technology Drivers

iNEMI-FUTUR-IC ACOP (Adhesive Characterization for Optics and Photonics) Working Group Panel

Panel Chair: Grace O'Malley, INEMI

Workshop II: Accelerating Prototype to Commercial Manufacturing

Design for Test: high throughput root cause analysis; R&D fab cycle times

Scaling MRL with AIM Photonics Design and Prototypes

Workshop Chair: David Haramé, New York Creates

- Quantum
- Sensing
- Sources

Making E-P Design More Accessible

Troy Tamas, GDS Factory

MIT Microphotonics Center Industrial Advisory Board Luncheon meeting

Workshop III: Next Generation Lasers for Communication and Beyond

Roadblocks and Solutions for 1000x Performance Scaling

Moderator: Jose Pozo, Optica

QD lasers: a step toward easier integration with PICs

Alexey Kovsh, Alfalume/Innolume

Scaling Compute Capacity with Frequency Comb Light Sources

Alex Gaeta, Columbia University

Integrated Superluminescent Diode Sources

Haider Zia, Superlight Photonics

Integrated uLEDs

Bardia Pezeshki, Avicena

Conclusion: Assessing the New Learning Curve

Lessons Learned and Next Steps

Adjourn