## IPSR INTERNATIONAL 2018 SPRING MEETING

**March 26th - 27th 2018**
**MIT Media Labs E14-674, Cambridge, Massachusetts**

# PHOTONIC INTEGRATION 2035

## Economics, Technology & Manufacturing

AIM Photonics Institute • The MIT Microphotonics Center • iNEMI

## MONDAY, MARCH 26th

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| 7:15a | **Registration and Light Breakfast** (Winter Garden E14-638) |
| 8:15a | **Meeting Success Factors**, Lionel Kimerling, MIT |

## SESSION I: KEYNOTE SESSION

*Market, Technology and Manufacturing Drivers: the Wall Street photonics report; Media Transport and Data Center Scaling bottlenecks; Fabless Manufacturing: outsourced vs. core competencies*
**Session Chair: Alan Evans, Corning**

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| 8:30a | **"The VICTORIES Project: PIC Technology Integration for Media Transport"**, Shu Namiki, AIST |
| 9:00a | **"Building a National Resource for PIC MPW and Small Volume Production"**, Michael Liehr, AIM Photonics Institute |
| 9:30a | **"Silicon Photonics: Belle of the Ball"**, James Kisner, LOOP Capital |
| **10:00a** | **Break** |

## SESSION II: TECHNOLOGY: P-CELLS AND FUNCTIONAL BLOCKS

*Electronic-Photonic co-design: concepts and implementation for e-ph devices, circuits and systems; architectural trends for communication, RF and sensing; hybrid III-V/Si Integration.*
**Session Chair: Tremont Miao, ADI**

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| 10:15a | **Keynote**: **"Advances in PIC with Quantum Dot Lasers for Short Reach"**, Yasuhiko Arakawa, U Tokyo |
| 10:45a | **Keynote**: **"Scaling Modulator Performance with Electronic-Photonic Synergy"**, Graham Reed, University of Southampton |
| 11:15a | **Keynote**: **"InP-Based System-On-Chip Photonic ICs"**, Gloria E. Hoefler, Infinera |
| 11:45a | **"InP- Based Mid-IR Quantum Cascade Lasers"**, Christian Pfluegl, Pendar Technologies |
| 12:05p | **Attendee Lunch** (Winter Garden E14-638)<br>**IPSR International and Microphotonics Center Board Meeting** (Silverman Skyline E14-648) |

## SESSION III: HIGH PERFORMANCE APPLICATIONS

*High End Application Drivers: Is the Data Center a sufficient driver for manufacturing ramp stability? RF, LIDAR, 3D, and Augmented Reality.*
**Session Chair: Kazumi Wada, MIT**

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| 1:35p | **"3D Sensing Technologies for Sports Innovation"**, Syoichi Masui, Fujitsu |
| 2:05p | **Keynote**: **"RF Photonic Filter with Record-Low Noise and 116 dB Dynamic Range"**, Ben Eggleton & David Marpaung, The University of Sydney |
| **2:25p** | **Break** |

## SESSION IV: IPSR INTERNATIONAL AIG BREAKOUTS

*Application Interest Groups: system requirements - technology gaps - prototype solutions*
*Initiation of new AIGs for Data Center, AnalogRF, Sensing, LIDAR/3D/AR.*
*Year 1 report from the on-Board optics AIG.*
**Session Chair: Jurgen Michel, MIT**

3:00p **Keynote**: **"System Requirements and Technology Gaps for On-Board Optical Interconnection"**, Tom Marrapode, Molex and Terry Smith, 3M

3:30p **Multi-Terabit Transceiver for Datacom**
Madeleine Glick, Columbia University
**Mid-IR Photonic Sensors**
Anu Agarwal, MIT
**CMOS-3D Integrated Imager**
Kazumi Wada, MIT
**Millimeter Wave Signal Processing**
Arthur Paolella, Harris Corporation; Sajan Saini, MIT

**5:30-8:30p** **Networking Reception** (Silverman Skyline E14-648 & Winter Garden E14-638)

## TUESDAY, MARCH 27th

**7:30a** **Registration and Light Breakfast** (Winter Garden E14-638)

8:15a **Lessons Learned**, Lionel Kimerling, MIT

## SESSION V: CHALLENGES FOR FOUNDRY MANUFACTURING

*Cost, Capex and Supply Chain: Will cost reduction schedules for fab, package, test and systems meet price expectations? Materials and Process Integration: package hermeticity; optical I/O physical density scaling; e/ph/pkg and chip/module/system design integration; Design for Yield/Test.*
**Session Chair: Farhad Vazehgoo, Massachusetts Technology Collaborative**

8:30a **"Vision for PIC Test, Assembly and Packaging Standards: The AIM TAP Facility"**, Ed White, AIM Photonics Institute

8:50a **"AIM PDK and MPW for Photonic Design"**, Peter Goetz, NRL

9:20a **"PIC Package and Test: Tools and Strategies"**, Tom Brown, University of Rochester; Robert Polster and Keren Bergman, Columbia University; Stefan Preble, Rochester Institute of Technology; James Cardenas, University of Rochester

9:50a **"Porting Wafer-Level Test Strategies from ICs to PICs"**, Frank Muscolino, Sunsil

**10:10a** **Break**

## SESSION VI: MANUFACTURING: $C_{PK}$ AND PDK

*R&D leverage: platforms, standards and tools.*
**Session Chair: Ajey Jacob, Global Foundries**

10:25a **Keynote: "Strategies for High Yield Process Capability"**, Hichem M'saad, ASM America

10:55a **Keynote: "Chip and Package Solutions for the Silicon Photonics Standard Platform"**, Greg Fish, Juniper Networks

11:25a **Keynote**: **"Monolithic IC-PIC Fabrication at the 45nm Node"**, Chen Sun, Ayar Labs

11:55a **"Silicon Photonic APD Manufacturing and Performance"**, Ching-yin Hong, SiFotonics

12:15p **Attendee Lunch** (Silverman Skyline E14-638 & Winter Garden E14-648)

## SESSION VII: IPSR INTERNATIONAL TWG BREAKOUTS

**Session Chair: Bob Pfahl,** Director, IPSR International
*Release of the 2017 IPSR International updates.*

1:15p **Keynote: "World Technology Roadmap Forum Report",** Sylwester Latkowski, Technical University, Eindhoven; Peter van Arkel, Photon Delta

1:45p **Monolithic Integration**
Ajey Jacob, Global Foundries & Lionel Kimerling, MIT
**Photonic Packaging**
Bill Bottoms, 3MTS
**Connectors and Substrates**
John MacWilliams, Chair; Tom Marrapode, Molex & Terry Smith, 3M
**Assembly**
Dick Otte, Promex Industries
**Test**
Dave Armstrong, Advantest

**3:30p Break**

## SESSION VIII: IPSR INTERNATIONAL TWG/AIG REPORT-BACK

*PIC Technology Supply Chain Alignment: needs, gaps and potential solutions.*
**Session Chair: Bill Bottoms,** 3MTS

3:45p (9 ten-minute presentations: AIG/TWG Report-Back)

5:25p **Closing Remarks**, Lionel Kimerling, MIT

**5:30p Adjourn**