

## 2019 AIM Photonics Call for Proposals

### AIM Photonics Academy:

AIM Photonics Academy provides the unified knowledge, technology, and workforce interface for AIM Photonics. The AIM Photonics Academy customer base includes the membership of all Tiers of AIM Photonics Institute and companies and employees in the electronics and photonics industries and application spaces where integrated photonics technology plays a critical role. The Academy projects must exhibit Customer Focus, Best Practice Execution and Compelling Content. The Education Mission is to be the industry source for technology dissemination and skill certification. The Workforce Development Mission is to provide a capable workforce and productive career paths at all levels of the integrated photonics manufacturing supply chain. The Technology Roadmap Mission is to enable cost reduction and manufacturing scale-up by identifying markets, timelines, technology roadblocks and potential solutions for Manufacturing Supply Chain alignment.

Proposed projects should be affiliated with one of the four AIM Academy Functional Directorates: Education, Workforce Development, Roadmap, and Labs for Education and Application Prototypes (LEAPs). The Commonwealth of MA has thus far invested in LEAPs at MIT (in packaging) and at Worcester Polytechnic Institute/Quinsigamond Community College (with a focus on medical sensors).

### AIM Photonics Academy Portfolio Priorities

- Education: Develop Standard Design/Package/Test Training Tools: i) Summer and winter workshops in Test, Assembly and Packaging (TAP); ii) Application Specific Photonic Integrated Circuit (AS-PIC) modules; iii) Community college teaching modules, video lessons, testing toolkit, lab lessons for LEAPs (Labs for Education and Application Prototypes) at MIT and WPI/QCC; iv) Virtual lab: interactive simulations for PIC design, fabrication, packaging, testing; v) interposer and electronic-photonics integration (PhD/MSc) teaching package/edX course; vi) modules in design for manufacturing and PIC applications, and vii) professional online edX course sequence to prepare users to submit to AIM MPW runs.
- Workforce Development: i) Industry-wide, Integrated Photonics Internship Program; ii) pervasive SME engagement in the Integrated Photonics industry supply chain; iii) regional business/academic/government coordination for job creation; and iv) Workforce Skills and Education Needs Assessment.
- Roadmap: International Integrated Photonics System Industry-Based Roadmap: i) Document and implement a technical planning process to develop additional Application Interest Group (AIG) projects addressing strategic gaps that AIM members see as critical; ii) Launch AIGs to execute these critical projects; iii) revise the content and structure of the Roadmap as changing needs are identified, at AIM Photonics and in the great integrated photonics community.
- LEAPs: LEAP activities in i) education; ii) professional certification; iii) SME prototype tool deployment; and iv) AIM MPW and TAP engagement through creation of a design services center, v) design LEAP project partnerships among industry, academia and government.

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These priorities are more fully described as follows:

**Education** AIM Photonics Academy Education prepares students, technicians, engineers, and researchers to build productive careers in the emerging Integrated Photonics Industry, by creating and disseminating education modules (teaching packages for instructors, self-paced online learning), online edX courses and online interactive simulations (Unity gaming software platform), comprised of state-of-the-art content and pedagogical best practices. White Paper should include: Topic of Module, edX Course or Interactive Simulation (see Portfolio Priorities below); Level of Difficulty (novice, intermediate or advanced) and Pre-Requisite Knowledge (e.g., basic knowledge of photonics, advanced physics, etc.); Target Audience (e.g., individuals working in a particular industry, graduate students in a specific field); Student Learning Outcomes (at the end of the course/module, students will be able to do or know ...); Content Description (A paragraph describing topics covered); Examples of Teaching Methods (active learning lectures, demonstrations, simulations, experiments, design-build projects). AIM Photonics Academy will consider proposals related to interactive design for manufacturing content, and electronic-photonics test and photonics packaging.

**Workforce Development** AIM Photonics Academy Workforce Development provides a capable workforce and productive career paths at all levels of the integrated photonics manufacturing supply chain. Practice opportunities in industry and academia for engagement and credentialing are priorities. Proposals that involve local communities and SMEs in Integrated Photonics industrial development are of particular interest to partnerships at the State level. AIM Industry Members should propose projects related to SME engagement in the industry supply chain.

**Technology Roadmap** The AIM Technology Roadmap enables cost reduction and manufacturing scale-up by identifying markets, timelines, technology roadblocks and potential solutions for Big M Manufacturing supply chain alignment. As a gateway for AIM Member recruiting, projects that i) determine market and system requirements or ii) establish limited term (e.g., 18 months) industry-led consortia to develop prototypes with near term manufacturing targets. Projects that use AIM Photonics' MPW platform at SUNY Poly (for Si photonics) are encouraged.

**AIM Design Center** The AIM Design Center provides the gateway for MPW submissions on SUNY Poly 300mm Si photonics fabrication flow/line. AIM Photonics Academy will host a portal at the Design Center for education, training and collaborative Roadmap projects. The Design Center offers a special opportunity for industrial engagement in building a community of integrated photonics designers and in tapping into AIM creativity with Design Challenges. The Si photonics MPW Design Reticle is a 50mm<sup>2</sup> area that will be partitioned for education and training projects. Industrial partners are encouraged to sponsor Design Reticles for i) education/training to develop the AIM design cohort and ii) functionality focused Design Challenges. The rules of engagement will be determined during the post white paper proposal development period. These projects will align with growing engagement in the SUNY Poly 300mm Si photonics fabrication flow/line with NSF, with AIM's TAP (Test, Assembly and Packaging facility) and with other partner organizations. A significant interest is anticipated for these projects, so please submit at the White Paper stage to secure participation.

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**AIM Labs for Education and Application Prototypes (LEAPs)** AIM Photonics will host several practice facilities for engagement of students and companies in integrated photonics manufacturing technology. The missions of these facilities range from MS-level project-based teaching of processing and prototyping at the AIM-MIT LEAP to industry engagement in manufacturing equipment qualification and employee certification at the AIM Photonics SUNY-Poly foundry and at joint AIM-Manufacturing Extension Partnership (MEP) design, test, and prototyping facilities. Proposal topics are expected to include: i) equipment donations, ii) joint tool development to meet manufacturing requirements, iii) technician certification for specific skill sets, and iv) development of the employee/student cohort and associated challenge projects in integrated photonics manufacturing.

**Proposal Submission** for AIM Photonics Academy is a two-stage process:

- **Letter of Intent with White Paper:** triggers support of AIM Photonics Academy staff – before end of day, May 15, 2018
  - one page text, budget estimate, and CVs of key personnel
  - please email submissions to Julie Diop at [jdiop@mit.edu](mailto:jdiop@mit.edu).
- **Full Proposal** submission: June 15, 2018

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### AIM Photonics Academy Advisory Council Scoring Criteria

#### Scoring Criteria Guide

1. **Significance:** The proposal matches tactical goals and missions of AIM Photonics and AIM Photonics Academy (Education, Workforce Development and Roadmap) to define contribution and its significance.

AIM Mission: Seek to advance integrated photonic circuit manufacturing technology development while simultaneously providing access to state-of-the-art fabrication, packaging, and testing capabilities for small-to-medium enterprises, academia and the government; create an adaptive integrated photonic circuit workforce capable of meeting industry needs and thus further increasing domestic competitiveness; and meet participating commercial, defense and civilian agency needs in this burgeoning technology area.

AIM Photonics Academy Mission: Provide the unified knowledge, technology, and workforce interface for AIM Photonics

2. **Relevancy:** The proposed project is responsive to the priorities of the AIM members. The proposal content should address the portfolio priorities and critical needs of Workforce Development, Education or Technology Roadmap.

AIM Member priorities: i) Education Modules and Online Courses; ii) Labs for Education and Application Prototypes; iii) Design Center; iv) Workforce Needs Assessment studies; vi) Workforce Internship, Apprenticeship and/or professional skills; v) Roadmap manufacturing supply chain and joint projects which align MCEs/KTMAs with technology and market vectors

3. **Impact:** the proposed project should address development of innovative methodologies and practices for advanced integrated photonics manufacturing. The proposal also needs to clearly define outcomes and to specify how to make an impact on AIM community, which may include specific engagement with solution in respective stratified ecosystem segment.

4. **Implementation:** the proposed project should include required competency and infrastructure for efficient execution. The deliverable milestones/checkpoints are clearly defined and realistic. The budget is appropriate to proposed activity, team personnel, resources, and deliverables.

Timeframe: Project can be done in the time allotted, such as one year or more

Target audience: Project is aligned with at least one of our target audiences: community college, undergrad, grad, industry, gr. 7-12

5. **Sustainability:** The proposed project includes a stable and sustainable model to support and contribute to AIM sustainability. This means the project charts a path both for financial sustainability and long-term value to AIM. Project deliverables are open access to AIM partners and the integrated photonics community.

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Scores in each category are used to facilitate discussion and prioritization of proposal impact, including delivery and technical strengths and weaknesses, and suitability of goals and the project team.