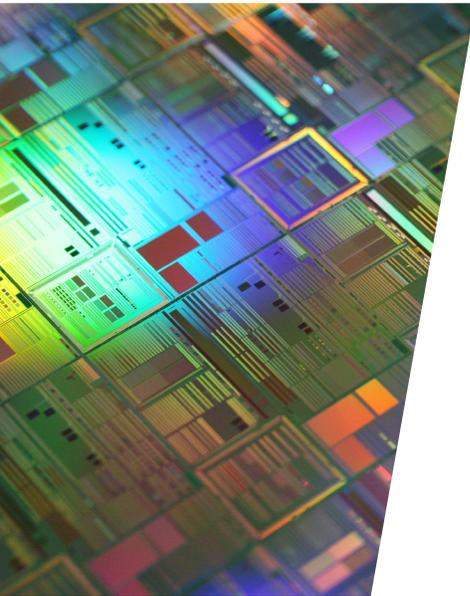


# POWERING THE 21ST CENTURY WITH INTEGRATED PHOTONICS

AIM Photonics (American Institute for Manufacturing Integrated Photonics), a Manufacturing USA® institute, establishes processes and protocols for the design, development, and manufacture of Photonic Integrated Circuit systems so manufacturers can harness a global market projected to exceed \$792 billion annually by 2022.

Manufacturing USA, a public-private partnership with 14 manufacturing institutes across the nation, connects companies, academic institutes, non-profits, and local, state, and federal entities to solve industry-relevant advanced manufacturing challenges in new technology areas with the goals of enhancing industrial competitiveness and economic growth and strengthening national security.



## Technology Focus Area

**Photonic Integrated Circuits use light for applications that traditionally use electronics.** Integrating light-based technology onto typical semiconductor chips dramatically improves performance and reliability of electronic integrated circuits while reducing weight and power consumption. Photonic sensors use light as radar—or “LIDAR”—in commercial and defense applications. In addition to tiny postage-stamp-sized LIDAR sensors that provide real-time 3D mapping for driverless cars, photonics can be used to manage database systems for cloud computing, detect sarin gases in national security environments, enhance medical imaging, and rate food safety by measuring the interactivity of chemicals. The institute is focusing on activities that target manufacturing readiness so that firms may more quickly transition to full-scale volume operation.

## Approach to Innovation and Collaboration

AIM Photonics brings together partners in industry, government, and academia to advance next generation photonic technology by accelerating access through such programs as:



**Integrated Photonics Foundry Ecosystem** reduces time to market by providing institute members with low-cost access to resources throughout the product development cycle



**TAP Facility:** the world's first 300mm open access test, assembly, and packaging facility, advances next generation PIC technology and connects with the photonics supply chain



**In-house 300 mm semiconductor fabrications** for organizations to cost-efficiently generate their own silicon photonic devices and components



**AIM Academy:** creating educational and workforce development programs in photonics fundamentals and automated design with in-person and online courses, hands-on training, and internship programs, as well as technology roadmapping for the future photonics ecosystem

## LEARN MORE



## CONNECT WITH AIM PHOTONICS

Albany and Rochester, NY

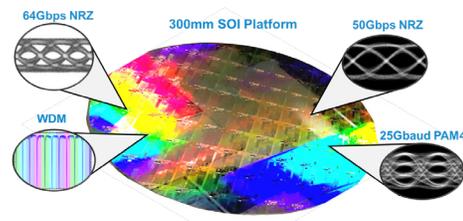
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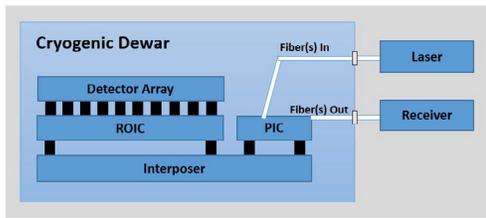
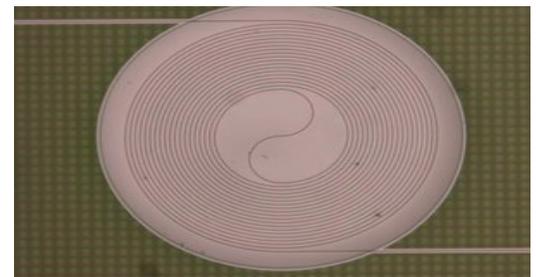
# COLLABORATIVE PROJECT EXAMPLES

“New York is quickly becoming a global leader in photonics, and by supporting this burgeoning industry, we continue to invest in the future of the Finger Lakes and move the economy and business community forward.”  
– The Honorable Andrew Cuomo, Governor of New York



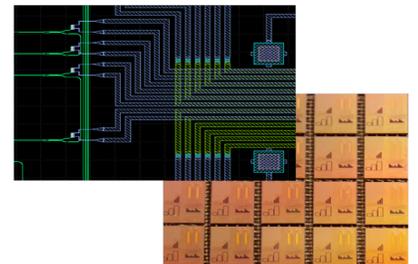
**HIGH-CAPACITY PHOTONIC INTERCONNECTED SYSTEMS:** Researching and testing replacements for costly traditional electronic switches that currently operate massive cloud-based data centers to overcome data bottlenecks and power consumption. New technology can increase data throughput at least tenfold while reducing energy consumption dramatically, so operating a data center will no longer cost more than building one.

**SARIN GAS SENSOR:** An AIM Photonics-led team is developing a process to produce detectors for chemical warfare toxins such as deadly sarin gas. The team is creating a polymer-coated waveguide that concentrates a small gas sample for detection and analysis—the technology has broad-reaching non-defense applications including medical diagnostics and point-of-care uses in medical offices.



**CRYOGENIC FOCAL PLANE ARRAYS (FPAS):** In conjunction with the U.S. Department of Defense, Sandia National Labs, University of Arizona, Raytheon and other firms, AIM Photonics is supporting the design, fabrication and testing of cryogenic PIC-based datalinks for FPA readout with the potential to strongly advance imaging capabilities for national defense. This work will address limitations of conventional electronic readouts such as heat and communications bottlenecks and identify a common datalink solution operable across multiple systems and environments.

**UNIVERSAL PIC PROCESS DESIGN KIT (PDK):** AIM Photonics' unique collaboration with design companies Synopsys' Optical Solutions Group, Cadence Design Systems, Phoenix Software—now part of Synopsys, Lumerical Inc., Mentor, Analog Photonics, MOSIS, and many other industry partners are addressing the challenges and fundamental changes needed with integrated photonic chip design. AIM Photonics has established an integrated photonic PDK, which now provides designers cost-effective and quick turn “Design to Fab” solutions utilizing AIM Photonics industry leading Foundry Partners.



“The integration of photonic integrated circuits with focal plane arrays is a critical path in developing future DoD imaging systems vital to the nation's security.”

– Dr. Frank Jaworski, Program Manager Emerging Technology, Raytheon Vision Systems