



NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 18-095

Dear Colleague Letter: Research on Integrated Photonics Utilizing AIM Photonics Capabilities

July 20, 2018

Dear Colleagues:

With this Dear Colleague letter (DCL), the Division of Electrical, Communications and Cyber Systems (ECCS) and the Division of Industrial Innovation and Partnerships (IIP) within the Engineering Directorate of the National Science Foundation continue to encourage innovative exploratory and translational research by academic researchers and small businesses in all aspects of integrated photonics that utilize the current silicon photonics capabilities resident in AIM Photonics.

Please see below a brief introduction of **AIM Photonics** and examples of the research project opportunities that it can enable. Then follow the step-by-step instructions in the section on **Project Preparation** for use of AIM Photonics capabilities, and at the end of this document the **Proposal Submission to NSF** procedures.

AIM PHOTONICS - The American Institute of Manufacturing of Integrated Photonics (AIM) (<http://www.aimphotonics.com>) was established in July 2015 by the U.S. government under Department of Defense (DoD) leadership as a manufacturing innovation institute to advance integrated photonics. AIM Photonics is an industry-led public-private-partnership that focuses the nation's premiere capabilities and expertise to capture and mature critical manufacturing domestic capability for integrated photonics. The Institute's goal is to emulate the dramatic successes experienced by the semiconductor industry over the past 40 years and transition key lessons, processes, and approaches to the photonic integrated circuit (PIC) industry. AIM Photonics supports providing practical access and technology on-ramps for academic communities, as well as for industry and government. AIM Photonics is creating a National PIC manufacturing infrastructure, widely accessible and inherently flexible to meet the challenges of the future marketplace with practical, innovative PIC manufacturing-oriented solutions.

Research projects utilizing the AIM Photonics fabrication process technologies via multi-

project wafer runs should have an objective to bring a specific innovation to integrated photonics circuits and components or to demonstrate a new approach that uses integrated photonics as its differentiator. Examples of such challenges may include:

- Research into new applications of PICs that have promise of breakthrough performance due to the use of an integrated photonic component;
- New devices that are realizable within AIM Photonics standardized integrated silicon photonics processes;
- PIC implementations that have innovative contributions to advancements of photonics circuits (i.e., low power, greater bandwidths and dynamic ranges, better tolerances, new topologies, etc.);
- Innovative design approaches and new models of integrated photonics devices/circuits; and
- Materials and attachment technologies for incorporating integrated photonics into novel packages.

PROJECT PREPARATION

For researchers seeking to utilize AIM Photonics capabilities, the AIM Photonics processes are available through the MOSIS Integrated Circuit Fabrication Service (<https://www.mosis.com/vendors/view/AIM>). MOSIS offers access to AIM Photonics multi project wafer (MPW) runs. AIM Photonics process development kits (PDK) are also available for download from the MOSIS site. AIM Photonics plans to offer several MPW runs per year on three different silicon photonics processes: Full (active), Passive, and Interposer. Schedules for all 3 of these MPW types are available at the AIM Photonics website (<http://www.aimphotonics.com/mpw-schedule/>), and the MOSIS website (<https://www.mosis.com/db/pubf/fsched?ORG=AIM>).

The **step-by-step instructions** located at <http://www.aimphotonics.com/nsf-dcl/> will help interested parties understand what will be needed prior to submitting an NSF proposal for an integrated silicon photonics project utilizing AIM Photonics capabilities. The steps include: (1) Process Design Kit (PDK) Access; (2) Multi-Project Wafer (MPW) Access; (3) MPW design size and cost; (4) Design Preparation; (5) Training; and (6) Design Submission for MPW Fabrication.

PROPOSAL SUBMISSION TO NSF

Academic researchers who plan on utilizing the capabilities of AIM Photonics may submit unsolicited proposals to the ECCS Electronic, Photonic, and Magnetic Devices (EPMD) core program via FastLane or Grants.gov at any time with no deadline (https://www.nsf.gov/news/news_summ.jsp?cntn_id=245720&org=ECCS). Proposals responding to a specific solicitation must follow the solicitation's specified deadline date.

Submission as CAREER proposals can be accepted by ECCS, with the solicitation deadline in July each year. All submitted proposals must adhere to NSF's Proposal and Award Policies and Procedures Guide (PAPPG) instructions at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Small businesses that plan on utilizing the capabilities of AIM Photonics to commercialize a product may submit proposals to IIP according to the latest Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) solicitation with deadlines in June and December each year. Detailed SBIR/STTR Photonics topics can be found at <https://www.nsf.gov/eng/iip/sbir/topics/SP.jsp>. Requests for **supplemental funding** to existing ECCS or Phase II IIP awards should first be discussed with the cognizant NSF program director and may be submitted at any time.

Titles of proposals submitted in response to this DCL should begin with "PIC:". Proposals should clearly define in the Project Description the AIM Photonics capabilities to be used and include in the Budget Justification the AIM processing costs to be incurred. All proposals will be subject to the NSF merit review process. If the proposal or supplement is granted, then the Principal Investigator should contact MOSIS, schedule for the next run, and proceed with AIM/MOSIS processing.

For further information, please contact the cognizant NSF Program Directors:

- Lawrence S. Goldberg (lgoldber@nsf.gov), Division of Electrical, Communications and Cyber Systems (ECCS)
- Dominique M. Dagenais (ddagenai@nsf.gov), Division of Electrical, Communications and Cyber Systems (ECCS)
- Rick C. Schwerdtfeger (rschwerd@nsf.gov), SBIR/STTR, Division of Industrial Innovation and Partnerships (IIP)

The NSF ENG Division web sites can be accessed at:

- ECCS: <https://www.nsf.gov/div/index.jsp?org=ECCS>
- IIP: <https://www.nsf.gov/div/index.jsp?org=IIP>

Sincerely,

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