Michael J. Nickerson

resume@nickersonm.com | Boston, MA
https://www.linkedin.com/in/michael-j-nickerson/ https://github.com/nickersonm/

SUMMARY

Integrated photonics engineer specializing in architecting integrated optical phased arrays and project management. Expertise in PIC lifecycle from system and epitaxy design through component modeling, PDK development, mask layout, semiconductor fabrication, device measurement, and data analysis.

EDUCATION

UC Santa Barbara, Electrical and Computer Engineering **Sep 2018 – Oct 2023**

Ph.D., GPA 4.00 Oct 2023

M.S. Jun 2020

University of Washington, Physics **Aug 2003 - Jun 2006**

B.S., GPA 3.60 Jun 2006

RESEARCH EXPERIENCE

Director of Advanced Projects, Analog Photonics **April 2024 – Present**

- Managing and architecting multiple projects developing optical phased array LiDAR with FSOC capability.
- Designing and simulating novel photonics architectures to advance future system capabilities.
- Writing proposals for commercial customers and government funding opportunities.

Sr. Photonics Design Engineer, Analog Photonics **Nov 2023 – March 2024**

- Managed multiple projects developing optical phased array FMCW LiDAR with FSOC capability.
- Developed and wrote proposals for multiple commercial customers.

Graduate Student Researcher, UC Santa Barbara **Sep 2018 – Oct 2023**

- Managed and executed an externally sponsored program to develop an integrated optical phased array, including defining project goals and timeline, device design, simulation, layout, fabrication, and testing. Project renewed for 3 years in a row.
- Developed GaAs-based efficient broadband integrated optical phase modulators, resulting in 2 oral conference presentations at *CLEO 2022* and *APC IPR 2022*. The modulators exhibit single-sided $V_\pi \cdot L$ efficiency of 0.7 V·cm and RAM below 0.5 dB at 1030 nm, and ≥770 MHz electro-optical bandwidth.
- Developed GaAs-based integrated optical phased array with less than 10% deviation from theoretical performance, resulting in *Optics Express* paper. The 16-channel OPA achieves 0.92° beamwidth with 15.3° grating-lobe-free steering range and 12 dB sidelobe level at 1064 nm.

Assistant Technical Staff, MIT Lincoln Laboratory **May 2014 – Aug 2018**

- Extended and maintained multiple high power coherently combined pulsed fiber laser testbeds.
- Constructed automated wafer-level QCL testbench, reducing array measurement time from days to hours.

Professional Research Assistant, JILA, University of Colorado **Jun 2006 – Apr 2014**

- Developed and executed laser cavity metrology and stabilization experiments involving multi-modal extended time scale measurements under high vacuum.
- Managed the laboratory, designed and assembled optical, vacuum, and data acquisition systems.

Undergraduate Research Assistant, University of Washington **Aug 2003 – Jun 2006**

- Maintained and extended laboratory data acquisition system; manufactured analog signal conditioners.

SELECTED PUBLICATIONS

M. Nickerson, B. Song, J. Brookhyser, G. Erwin, J. Kleinert, and J. Klamkin, "Gallium arsenide optical phased array photonic integrated circuit," *Opt. Express*, vol. 31, no. 17, pp. 27106–27122, Aug. 2023. https://doi.org/10.1364/OE.492556

M. Nickerson, J. Brookhyser, G. Erwin, B. Song, J. Kleinert, and J. Klamkin, "Gallium Arsenide Optical Phased Array Beam Steering Photonic Integrated Circuit," *Optica Advanced Photonics Congress* (2023), Jul. 2023.

M. Nickerson, P. Verrinder, L. Wang, B. Song, and J. Klamkin, "Broadband Optical Phase Modulator with Low Residual Amplitude Modulation," *Optica Advanced Photonics Congress (2022), paper IW4B.4*, Jul. 24, 2022. https://doi.org/10/grtvck

M. Nickerson *et al.*, "Broadband and Low Residual Amplitude Modulation Phase Modulator Arrays for Optical Beamsteering Applications," *Conference on Lasers and Electro-Optics (2022), paper SS1D.4*, May 15, 2022. https://doi.org/10/grtvcm

P. A. Verrinder *et al.*, "Gallium Arsenide Photonic Integrated Circuit Platform for Tunable Laser Applications," *IEEE Journal of Selected Topics in Quantum Electronics*, vol. 28, no. 1, Jan 2022. https://doi.org/10/gmzfnn

C. A. Wang *et al.*, "MOVPE Growth of LWIR AlInAs/GaInAs/InP Quantum Cascade Lasers: Impact of Growth and Material Quality on Laser Performance," *IEEE Journal of Selected Topics in Quantum Electronics*, vol. 23, no. 6, pp. 1–13, Nov 2017. https://doi.org/10/gfzm6b

M. Nickerson, E. Ames, and P. L. Bender, "Recent LISA studies at the University of Colorado," *J. Phys.: Conf. Ser.*, vol. 154, p. 012027, Mar 2009. https://doi.org/10/bt7dpz

TECHNICAL TALKS

DEPS Directed Energy Science & Technology Symposium, *Colorado Springs, CO*	May 2024
Advanced Photonics Congress, Integrated Photonics Research (IPR), *Busan, South Korea*	Jul 2023
DEPS Directed Energy Science & Technology Symposium, *San Antonio, TX*	Apr 2023
Advanced Photonics Congress, Integrated Photonics Research (IPR), *remote*	Jul 2022
Conference on Lasers and Electro-Optics (CLEO), *remote*	May 2022
DEPS Directed Energy Science & Technology Symposium, *remote*	Mar 2021, Apr 2022
DEPS Directed Energy Science & Technology Symposium, *West Point, NY*	Mar 2020

AWARDS AND MEMBERSHIPS

OSA, SPIE, IEEE, and **IEEE Photonics Society** Member	**Sep 2018 – Present**
Best Student Paper Award, 2023 Advanced Photonics Conference	**July 2023**
Dr. Samuel Blankenship DEPS Graduate Scholarship	**Sep 2022**
DEPS Graduate Scholarship	**Aug 2019, Aug 2020, Aug 2021**
Photonics Society at UCSB	**Sep 2018 – Oct 2023**
Treasurer, Executive Committee	Sep 2019 – Dec 2021

PROFESSIONAL SKILLS

Management: *proficient in* project and program management, commercial and government proposal composition and writing, integrated photonics system architecting, and system tradespace analysis.

Optical: *proficient with*, integrated photonic, free space, and fiber optical devices and systems including waveguides, phase and amplitude modulators, and standard optical components.

Fabrication: *proficient in* semiconductor fabrication, fiber splicing, optical layout and alignment.

Programming and Software: *proficient with* MATLAB, Lumerical, POSIX shell, KLayout, nazca-design; *formerly proficient with* C++, PHP; *familiar with* Python, Mathematica, SQL.

Test and Analysis: *proficient in* electro-optical test and measurement system design and implementation; multi-modal automation of system operation, data collection, and analysis.