Braden Boucher

Curriculum Vitae

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EDUCATION

Bridgewater State University — Bridgewater, MA
Bachelor of Science in Photonics and Optical Engineering (ABET-accredited)
Expected Graduation: May 2026
Relevant Coursework: Advanced Optics, Semiconductor Devices, Photonic Integrated Circuit Design, Fiber Optics, Electricity and Magnetism, Laser Engineering, Digital and Electronic Devices, Differential Equations, Quantum Optics, Quantum Mechanics, Advanced Quantum Mechanics, Quantum Computing for Computer Science

EXPERIENCE

Undergraduate Researcher January 2024 – Present
Bridgewater State University

- Designed and constructed experimental setups involving electrical probes and temperature control systems.
- Performed IV, LIV, and optical spectrum characterization of DFB and Fabry-Perot laser diodes across multiple operating temperatures and bias conditions.
- Extracted and compared key device parameters including threshold current, turn-on voltage, FWHM, peak wavelength, and ideality factor.
- Produced technical reports and presented research at multiple conferences; currently completing an honors thesis.
- Supported by the Adrian Tinsley Grant and multiple semester research awards.

Research Assistant for NSF Grants January 2023 – Present
Bridgewater State University

- Assisted graduate students with lab projects involving PIC and QPIC characterization, heterodyne detection, and sustainable manufacturing.
- Developed Python scripts for data organization and analysis.
- Researched technical literature and trends relevant to ongoing lab projects.
- Supported through multiple phases of several grant-funded research efforts.

Optixlog.com September – December 2025

- Built a platform with a small team to log, track, and analyze photonic simulations.
- Developed interactive dashboards for simulation artifacts, performance metrics, and experiment tracking.
- Streamlined workflow efficiency for photonics research and simulation management.

Optics-Physics Sensor Engineering Co-Op January – June 2025
Charles Stark Draper Laboratory

- Built and optimized optical breadboard test setups involving fiber and free-space optical components.
- Characterized PIC structures including MZIs, edge couplers, and spirals; developed Python and MATLAB scripts to process data and extract device parameters.
- Communicated results to project teams to guide analysis and experimental direction.

Teaching Assistant, Physics I September – December 2024
Bridgewater State University

- Served as a teaching assistant for General Physics I using *OpenStax University Physics Volume 1*.
- Assisted students during independent and group work in class.
- Taught class sessions when needed and held office hours as necessary.

PUBLICATIONS

A Review of Solid-State LiDAR Principles and Metasurface-Based LiDAR Sensors 2025

- Second author on a published literature review covering 100+ papers on solid-state LiDAR principles, metasurface-based LiDAR sensors, and recent advances in the field.
- Contributed to technical writing, literature synthesis, and manuscript editing.

Effect of Silver Epoxy Bonding of III-V Laser Dies on Silicon for LiDAR Applications 2026

- Authored a CLEO paper on bonding micron-scale III-V laser dies to silicon using silver epoxy; accepted for presentation and publication.
- Measured optoelectronic characteristics before and after bonding, achieving wall-plug efficiencies up to 20%, infrared output above 10 mW, and a modest efficiency reduction from 14.9% to 14.2%.

PRESENTATIONS

"Effect of Silver Epoxy Bonding of III-V Laser Dies on Silicon for LiDAR Applications"
Conference on Lasers and Electro-Optics (CLEO), Charlotte, NC, May 17–21, 2026

"Temperature Dependent Optoelectronic Characterization of III-V Laser Dies on Silicon"
Harvard National Collegiate Research Conference, Cambridge, MA, January 23–25, 2026

"Effect of Silver Epoxy Bonding of III-V Laser Dies on Silicon"
University of Arizona Winter School, Tucson, AZ, January 6–9, 2026

"Lensed Fiber Coupling for Efficient Laser Diode Characterization"
Bridgewater State University Mid-Year Symposium, Bridgewater, MA, December 3–4, 2025

"Optoelectronic Characterization of III-V Laser Dies"
National Conference on Undergraduate Research, Pittsburgh, PA, April 7–9, 2025

"Optoelectronic Characterization of III-V Laser Dies"
Massachusetts Undergraduate Research Conference, Amherst, MA, April 19, 2024

TECHNICAL SKILLS

Experimental: Optoelectronic device characterization, PIC testing, fiber handling and splicing, chip/die handling, optical breadboard setup
Instrumentation: Class 3B and Class 4 lasers, optical spectrum analyzers, detectors, and related lab instrumentation
Software: Python, MATLAB, LabVIEW, ANSYS Lumerical, Luceda Photonics, Tidy3D, Swift
Lab and Safety: Cleanroom procedures, laser safety certified, technical documentation

LEADERSHIP ROLES

- Vice President, BEAM, BSU's OPTICA student chapter; current member
- Co-founder and Vice President, BSU Men's Club Volleyball Team

OTHER EXPERIENCE

- Men's Cross Country, Bridgewater State University (2022–2023); conference Rookie of the Year
- Intermediate in piano and guitar