

# Bo Xu

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## PROFESSIONAL SUMMARY

Photonics and optical engineering professional with 7+ years of experience in designing, fabricating, and characterizing photonic devices and optical systems. Expertise in nanofabrication, optical testing, data analysis, and translating research prototypes into robust engineering solutions. Ready to pivot my photonics background into any role that demands high-level technical problem-solving. As a U.S. Permanent Resident, I'm fully authorized for immediate project start and long-term engagement.

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## TECHNICAL SKILLS

### Photonics & Optics:

Photonic integrated circuits, waveguides, nonlinear optics, plasmonics, UV/NIR/MIR optical systems, spectroscopy, fiber laser systems, signal modulation, optical alignment

### Test & Characterization:

Optical spectroscopy (FTIR, Raman, UV-Vis), SEM, AFM, ellipsometry, signal analysis

### Nanofabrication & Cleanroom:

E-beam/photo-lithography, ICP-RIE, CVD, PVD, thin-film deposition, mask design, polymer

### Simulation & Software:

Python, COMSOL Multiphysics, Ansys Lumerical, MATLAB, Klayout, Zemax, LabVIEW

### Engineering Tools:

SolidWorks, AutoCAD, experimental automation, data processing pipelines

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## PROFESSIONAL EXPERIENCE

### Independent Engineering Consultant

Self-Employed | Lafayette, CO | Sep 2024 – Present

- Architected end-to-end Python workflows for DAQ systems to synchronize multi-modal signals, automating the capture and processing of multi-GB experimental datasets.
- Proactively expanded technical stack into integrated laser and edge coupler design, mastering high-fidelity modeling and layout constraints.
- Provided freelance engineering and design services while maintaining a strong research footprint through ongoing collaborative projects.

### Research Engineer — Nanophotonics & Integrated Optics

University of Colorado Boulder | Boulder, CO | Sep 2019 – May 2024

- Advanced PIC Fabrication: Designed and fabricated hybrid-material (chalcogenide, silicon, sapphire) photonic integrated circuits (PICs) at Sandia National Labs and COSINC, achieving record high-Q microresonators for NIR/MIR applications.

- Nanofabrication Lead: Innovated novel sulfide chalcogenide glass etching and deposition processes, utilizing EBL and ICP-RIE to maximize device yield and reliability.
- Hybrid Biosensing: Engineered optical force sensors by integrating upconverting nanoparticles with plasmonic nanodisks to detect nanoscale mechanical changes.
- Flexible Nanophotonics: Developed a scalable manufacturing process for polymer-hybrid nanostructures. Engineered a custom optomechanical testing rig to validate performance.
- Multiphysics Modeling: Executed complex simulations in COMSOL, Lumerical (FDTD/MODE), and Zemax for experimental hardware development.
- Precision Characterization: Conducted deep-dive device analysis using SEM, AFM, FTIR, and Raman spectroscopy to correlate structural morphology with optical performance.
- Instrumentation & Infrastructure: Managed and upgraded thin-film deposition systems; designed custom vacuum and mechanical components using SolidWorks and AutoCAD.
- Mission-Critical Reporting: Collaborated across multidisciplinary teams to deliver technical milestones for high-stakes, federally funded (NSF/ONR/AFOSR) research projects.

### Teaching Assistant — Physics Laboratory

University of Colorado Boulder | Boulder, CO | Aug 2018 – May 2020

- Led undergraduate physics laboratory sessions and provided real-time technical guidance on experimental setups and data analysis.

### Research Assistant — Quantum Optics

Nanjing University | Nanjing, China | Jan 2017 – May 2018

- Developed rare-earth-doped crystal-based quantum memory systems for time-bin encoded photons on Nd:YVO<sub>4</sub> platform.
- Built and automated optical quantum experiments using SPDC sources, single-photon detectors, cryogenic systems, and fiber-optic components.
- Implemented LabVIEW-based automation for experimental control and data acquisition.

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## EDUCATION

**Ph.D. in Physics (AMO)** — University of Colorado Boulder, 2024

**B.S. in Physics** — Nanjing University, 2018

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## SELECTED PUBLICATIONS

[\*Ultra-high-Q chalcogenide micro-racetrack resonators,\*](#)

*Applied Physics Letters (accepted), 2026*

[\*Dispersion Engineered High-quality Ge–Sb–S Reflowed Wedge Resonator,\*](#)

*Journal of Lightwave Technology, 2025*

[\*Optical Force Sensor Based on Plasmon Modulated Upconversion Luminescence,\*](#)

*Advanced Optical Materials, 2024*

[\*Fabrication and characterization of high quality GeSbSe reflowed and etched ring resonators,\*](#)

*Optics Express, 2022*

[\*Selective excitation of plasmon resonances with single V-point cylindrical vector beams,\*](#)

*Optics Express, 2021*