

Wendao Xu

PhD Candidate

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University of Rochester

Professional Summary

Experienced PhD candidate in Optics with 6+ years of research experience in fiber-based and integrated photonic technologies. Specialized in designing and implementing high-performance photonic waveguides for advanced microwave photonic systems, with potential applications in telecommunications and signal processing solutions.

Technical Expertise

- **Research & Development:** Brillouin Scattering, Multimode Waveguides, Microwave Photonic Filters
- **Design & Simulation Tools:** COMSOL, MATLAB, RSoft, Zemax, CodeV, Autodesk Fusion 360
- **Programming Languages:** Python, MATLAB, LabVIEW, C#
- **Experimental Skills:** Heterodyne Detection, Multi-mode Coupling, Electrical Feedback, Data Acquisition

Research Contributions

Graduate Researcher, University of Rochester | 2017 – 2019

- Developed LabVIEW code to automate capturing wavelength-dependent responses of photonic devices.
- Simulated and measured Brillouin responses in specialty optical fibers including hollow-core fibers.

Graduate Researcher, University of Rochester | 2019 – Present

- Constructed a complex high signal-to-noise Brillouin measurement setup for multi-mode photonic waveguides, incorporating tunable lasers, EO modulators, optical filters, mode couplers, photodetectors and RF instruments.
- Designed, characterized, and analyzed novel Brillouin interactions with up to **> 100x** narrower linewidth and **record-breaking** coupling efficiency in fiber tapers, specialty fibers, and silicon nitride nanophotonic devices.
- Collaborated with researchers worldwide to optimize photonic device design and fabrication.
- Proposed, validated, and refined novel Brillouin theories to model photon and phonon evolution in photonic waveguides with geometric inhomogeneity.
- Designed and implemented multi-stage, continuously tunable, reconfigurable, wideband microwave photonic bandpass filters with **> 10x** improved bandwidth over traditional designs.
- Modeled and validated microwave performances of the microwave photonic filters, guiding future system designs.

Research Impact

- First author of 5+ peer-reviewed publications, including articles in *Optica* and *APL Photonics* (accepted), and conference proceedings, with additional co-author contributions in collaborative research.
- Key Publication: *Strong Optomechanical Interactions with Long-lived Fundamental Acoustic Waves*, Optica 2023
 - demonstrating the first Brillouin interaction combining high coupling efficiency with narrow linewidth.
- Full publication list available on Google Scholar.

Education

PhD in Optics, University of Rochester, USA | 2019 – Expected mid-2025

Master's in Electrical and Computer Engineering, University of Rochester, USA | 2017 – 2019

Bachelor of Engineering, Huazhong University of Science and Technology, China | 2013 – 2017