

# Benjamin Nussbaum

[benjaminussbaum.xyz](mailto:benjamin@benjaminussbaum.xyz)

[benjamin@benjaminussbaum.xyz](mailto:benjamin@benjaminussbaum.xyz)

(802) 373-8662

## Education

**Ph.D. in Physics**      *University of Illinois at Urbana-Champaign*      Urbana-Champaign, IL  
*Advisor: Prof. Paul Kwiat*      2021–2026 (Expected)

**Bachelor of Science in Optics**      *University of Rochester*      Rochester, NY  
*Bachelor of Arts in Physics & Astronomy; Minor in Mathematics*      2017–2021

GPA: 3.9/4.0—Dean's List, all eligible semesters

## Awards and Recognitions:

- ★ *Sommargren Prize*
- ★ *2021 NSF GRFP Honorable Mention*
- ★ *2020 SPIE Optics and Photonics Education Scholarship*
- ★ *Dean's Citation for Broadening Participation in Research*
- ★ *Xerox Award for Innovation and Technology*

**Highlighted Courses:** Fourier Optics (Graduate Level) · Advanced Lens Design (Graduate Level)  
Quantum/Nano Optics Lab. (Graduate Level) · Modern Statistics & Large Data Sets (Graduate Level)

## Research Experience

**Research Intern**      *Quantum Information Science Group, Oak Ridge National Lab*      \*Oak Ridge, TN  
*Advisor: Dr. Joseph Lukens*      \*Remote position due to the Coronavirus pandemic      Summer 2020

- Analyze and understand an optical fiber-based quantum frequency processing system
- Design a component level model for quantum frequency processing on an integrated photonic chip

**Research Assistant**      *The Institute of Optics, University of Rochester*      Rochester, NY  
*Advisor: Prof. Nick Vamivakas*      Summer 2019–Spring 2020

- Design and build custom optical system, align the system and laser
- Apply Fourier analysis in MATLAB on image data to demonstrate control of spatial coherence
- **Paper published in *OSA Continuum*:**  
S. A. Wadood et al. "A Fourier processor for partially coherent fields". In: *OSA Continuum* 3.10 (Oct. 2020), p. 2843. DOI: [10.1364/osac.395511](https://doi.org/10.1364/osac.395511). URL: <https://doi.org/10.1364/osac.395511>

## Leadership

**President**      *University of Rochester*      Rochester, NY  
*Optical Society (OSA) Student Chapter*      Fall 2019–Present

- Engage students in professional development workshops, outreach opportunities, and social events
- Manage club, lead meetings, interface with advisors, provide vision: more cross-year interaction

**President**      *University of Rochester*      Rochester, NY  
*Undergraduate Philosophy Council*      Fall 2020–Present

- Engage students in casual yet thoughtful discussions of various philosophical topics
- Manage club, facilitate meeting discussions, interface with advisors
- Topics include: epistemology, metaphysics, theory of consciousness, AI, medical ethics, and more

## Teaching

**Teaching Assistant**      *The Institute of Optics, University of Rochester*      Rochester, NY  
*Interference and Diffraction, Prof. Nick Vamivakas*      *Spring 2021*

- Lead a weekly recitation section to give students another perspective of course material.
- Hold office hours and answer questions about course material and homework by email.
- Coordinate assignment grading with Prof. Vamivakas and other TAs

**Teaching Assistant**      *The Institute of Optics, University of Rochester*      Rochester, NY  
*Geometrical Optics, Prof. Julie Bentley*      *Fall 2020*

- Hold two office hours per week to answer student questions about course material
- Coordinate assignment grading with Prof. Bentley and other TAs

**Lab Teaching Assistant**      *The Institute of Optics, University of Rochester*      Rochester, NY  
*Geometrical Optics, Physical Optics; Profs. Berger, Brown, Carney, Eastman, & Zavislan*      *2019–2020*

- Facilitate teaching lab experiments for students, grade and answer questions about labs and reports
- Lead small groups during pre-lab sessions for students to explore lab equipment

**The “ $\LaTeX$ Expert”**      *OSA and SPS Student Chapters, University of Rochester*      Rochester, NY  
*Offer experienced guidance and solutions to  $\LaTeX$  formatting questions.*      *Spring 2020*

- Next-level lab reports
- Elegant equations
- Forget finicky figure placement
- Streamlined citations
- Professional presentations and posters
- Righteous résumé templates

**Teaching Assistant**      *The Institute of Optics, University of Rochester*      Rochester, NY  
*Optical System Layout/Analysis*      *Spring 2020*

- Review and answer questions about assignments, making use of Zemax optical design software
- Coordinate course organization and direction with professor

**Workshop Leader**      *The Institute of Optics, University of Rochester*      Rochester, NY  
*Geometrical Optics, Prof. Julie Bentley*      *Fall 2019*

- Lead weekly workshops of a small group of students
- Facilitate work on solving problems extending important class topics and ideas

**Photon Camp Counselor**      *The Institute of Optics, University of Rochester*      Rochester, NY  
*Photon Camp*      *Summer 2019*

- Guide high school students through various labs/experiments and teach them about optics
- Advise a team of four in the completion of a capstone project and poster presentation

## Campus Activities

**Professional Development Committee**      *University of Rochester*      Rochester, NY  
*Society of Physics Students*      *2018–Present*

- Coordinate with committee of 5-10 students to plan and run professional development events:
- Research panels, technology workshops, REU/summer program info sessions, Ask Seniors Anything

**Undergraduate Philosophy Council**      *University of Rochester*      Rochester, NY  
*Casual philosophical discussion group*      *2017–Present*

- Participate in weekly meetings of 3-7 students to casually discuss topics of philosophical merit:
- Theory of Consciousness, Determinism, Existentialism, Automation, Genetic Engineering...