Benjamin Schreyer

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About

I am a senior year dual degree physics and computer science student at University of Maryland. Computation and modeling focused computer science path. Interested in physics, current work in experimental adaptive optics, Fourier optics, and combinatorics.

Work Experience

- (Fall 2022-Spring 2023) Teaching assistant, wave physics course. Grading, and working with students in discussion.
- (2021-2022) Tutor with university physics society
- (2021) Montgomery College, paid learning assistant for a class on proofs and discrete math.
- (2018-2022) Private tutor, most recently in university intro. physics.
- (2023-2025) MITRE/Naval Research Lab collaboration intern
- (Fall 2024-Current) NIST Gaithersburg guest researcher

Research

- (Fall 2022) Color mapping python library project for optics research under Luke A. Johnson. Plotting complex amplitude of axial Schrödinger equation solutions along optical cable. Implemented a python module for simple drop in end user experience.
- (2023-Current) MITRE/Naval Research Lab automation of data collection for optical systems utilizing deformable mirrors under Dmitri Kaganovich. Automated optical system employed in research to collect massive data (deformable mirror, wavefront sensing, CCDs). Wrote simulation and analysis programs to accompany experimental system and data collection, and linear models for system control and generation of spatially correlated phase ensembles. Poster here.
- (Fall 2024-Current) NIST Gaithersburg optimization of torsion balance flexure for experiments on gravitational entanglement.

Publications

- *Realization of phase perturbations by deformable mirror towards testing statistical nonlinear optics* Proceedings Volume 12939, High-Power Laser Ablation VIII; 129390V (2024) https://doi.org/10.1117/12.3012409
  B. Schreyer, D. Younis, D. Kaganovich, L. A. Johnson, B. Hafizi, T. M. Antonsen Jr. (Feb 2024)

○ Manuscript and poster presentation on my work generating rapid, uniformly correlated phase screens in experiment.

Publications under review, misc.

- *Rigged Horse Numbers and their Modular Periodicity,* arxiv:2409.03799, B. Schreyer (Aug. 2024)
    - ○ Exhibition of new counting method, extending multiplication principle of combinatorics to operator multiplication for a specific problem in graph theory.
- *Shift Invariant Methods for Discrete Oscillators* B. Schreyer (Aug. 2024), here

Presentations

- Weekly lecture: Intro Computational Fourier Optics (Ongoing, Fall semester 2024)
- Undergraduate Colloquium *Shift Symmetry in Physics and Combinatorics* (October 2024)
- Presented my work in *Progress Report on Statistical Nonlinear Optics Projects* at a Naval Research plasma physics meeting (October 2023)
- University of Maryland Physics Undergraduate Colloquium *Perturbing Laser Initial Conditions with Deformable Mirror* (March 2024)
- University of Maryland Undergraduate Conference CU2MIP presentation of poster *Realization of phase perturbations by deformable mirror towards testing statistical nonlinear optics* (April 2024)

Education

Dual degree seeking undergraduate student in physics and computer science at the University of Maryland. Additionally I am pursuing a minor in German language
One year at Montgomery College, courses in STEM.
University of Maryland total: GPA 3.6
Physics Courses: GPA 3.7

Selected awards

- SPIE Optics and Photonics Scholarship, potential contributions in optics spie.org (2024)
- Maryland Space Grant Scholarship, adaptive optics and partial coherence (2023, 2024)
- University of Maryland Bardasis Fellowship, on communication and DEI in physics (2022-2024)
- Computer Science Departmental Scholarship (2022-2023)

Personal Projects

- ESP32 LED audio visualizer grid, parallelized microphone readout/processing and display control on embedded C platform to control LED spectrogram, LAN web server control interface
- C++, OpenGL rendering engine and parallelized simulation of sphere collisions using spatial hashing

Languages: German (Minor degree in German underway), French (weaker)