William S. Parker

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EDUCATION

University of Oregon, Eugene, OR — Fall 2024
Doctor of Philosophy, Physics
PhD Advisor: Benjamin J. McMorran
GPA: 3.880

Chapman University, Orange, California — Spring 2018
Bachelor of Science, Physics — Bachelor of Science, Mathematics — Minor, General Music
GPA: 3.729 (*Magna Cum Laude)*

EXPERTISE

Experimental expertise: (S)TEM, Lorentz TEM, dual-beam SEM/FIB, ultra-high vacuum systems
Quantitative skills: numerical simulation, Fourier optics, electron optics, 2D signal/image analysis
Computational skills: Python, LaTeX, high-performance computing, SSH, *nix command line, JS/HTML/CSS, 3D graphics (Blender), OpenCV, FIJI

Scientific package & web development with Git version control:

- `ltempy` – tools for the analysis, simulation, and presentation of LTEM data
- `ovf2io` – I/O package for the OOMMF Vector Field format
- `frctl` | `(GitHub)` – an interactive fractal explorer built in Svelte

RELEVANT RESEARCH EXPERIENCE

PhD Candidate, University of Oregon, Eugene, OR — Mar. 2020 – Dec. 2024
Determined and modeled the 3D structure of hybrid skyrmions in magnetic multilayer thin films.

- Experimentally determined the 3D structure of hybrid magnetic skyrmions by combining complementary electron microscopy techniques to isolate surface and bulk behavior.
- Conceived of and formalized a novel 3D topological object, the half-integer hopfion, to link the exceptional stability of hybrid skyrmions to their underlying topology.
- Derived quantitative measurables from the half-integer hopfion formalism to validate experimental results against theoretical predictions.
- Designed and performed micromagnetic simulations to bridge experiment and theory.
- Developed novel holographic magnetic imaging techniques at the National Center for Electron Microscopy with the potential for atomic-resolution, depth-resolved magnetic microscopy.
- Presented work to the scientific community by giving talks at numerous international microscopy and magnetics conferences.
- Wrote and published first-author works in Physical Review B and Microscopy & Microanalysis.

Graduate Research Assistant, University of Oregon, Eugene, OR — June 2018 – Mar. 2020
Investigated practical considerations of an orbital angular momentum sorter in a commercial TEM.

- Modeled electrostatic electron-optical elements with finite element methods and Fourier optics.
- Fabricated informed prototypes using atom probe tomography sample preparation techniques in a dual-beam FIB/SEM system.
- Presented feasibility considerations to a wide audience at the international Microscopy and Microanalysis conference, earning the MSA Student Scholar award.

Undergraduate Researcher, Chapman University, Orange, CA — Spring 2017 – Spring 2018
Created vortex optical states for Raman spectroscopy applications using a digital micromirror device.

- Wrote custom software to generate custom optical modes with binary diffractive holograms.
- Designed and built a Mach-Zehnder interferometer to characterize the generated optical states.

A complete list of publications, conference talks, honors, awards, teaching experience, and outreach efforts can be found in my CV at wsparker.com.