

EDUCATION

Ph.D in Physics - Stanford University 2019 - 2024

◇ Doctoral Thesis: *Atomic-Scale Manipulation and Modeling of 2D Quantum Systems*.
Advisors: Hari Manoharan and Trithep Devakul.

Bachelors in Physics with Mathematics Minor - UC Berkeley 2015-2019

◇ Senior Thesis: *Topological Phases and the Negative Sign Problem in Neural-Network Quantum State Simulation*. Advisor: Joel Moore.

PROFESSIONAL EXPERIENCE

Doctoral Student Researcher - Multi-scale Simulations of 2D Materials 2023-2024

Devakul Group, Stanford University

- ◇ Designed numerical and analytical models of multilayer materials to identify novel quantum phases.
- ◇ Performed parallelized simulations on computing clusters to efficiently survey material parameter space.
- ◇ Evaluated

Doctoral Student Researcher - Atomic-scale Electronic Imaging 2019-2023

Manoharan Lab, Stanford University

- ◇ Operated and maintained a custom-built scanning tunneling microscope (STM) with low-noise electronics and vibration isolation to image and manipulate surfaces of exotic materials.
- ◇ Statistically analyzed STM data and developed theories to explain experimental observations.
- ◇ Prepared quantum-mechanical simulations to motivate experimental design of atomic nanostructures.
- ◇ Maintained a facility for reliquefying gaseous helium from cryostats with recycling rates of up to 90%.
- ◇ Coordinated with synthesis and fabrication partners to prepare novel 2D material samples for STM.

Undergraduate Student Researcher - Diamond Spintronics 2017-2019

Pines Lab, UC Berkeley

- ◇ Part of a team that built a NMR system with integrated laser and RF excitation to investigate polarization transfer and spin relaxation mechanisms of defects in diamond.
- ◇ Designed algorithms to efficiently process experimental data and optimize sample growth parameters.
- ◇ Programmed control software with microsecond device synchronization to minimize signal loss.
- ◇ Engineered portable devices for NMR signal enhancement and field tested them on external devices.
- ◇ Mentored 10+ student researchers from diverse STEM backgrounds, and conducted hiring interviews.

TECHNICAL SKILLS

Experimental Methods: Laboratory electronics (lock-in amplifiers, spectrum analyzers, feedback controllers, waveform generators), cryogenics (liquid nitrogen and helium), ultra-high vacuum equipment, clean-room preparation of vacuum-safe materials, optics design, laser alignment, soldering, spot welding.

Programming Languages: Python, MATLAB, Julia, C, Labview, SQL (MySQL).

Operating Systems: Windows, Windows subsystem for Linux (MPI compatible).

Visual Design: Adobe Illustrator, AutoCAD, LaTeX, HTML, Houdini.

Other Software Skills: Density functional theory simulation of materials (VASP, pymatgen, Quantum Espresso), machine learning (Pandas for data processing, Scikit-learn and Pytorch for statistical modeling), Slurm, Git.

AWARDS

◇ **Paul Kirkpatrick Teaching Award, Winter 2023.**

Awarded to those who have demonstrated a commitment to the teaching of physics to undergraduates.

SCIENTIFIC TALKS

◇ **Macroscopic Quantum Tunneling Devices for Nanoscale Attonewton Force Sensing**
APS March Meeting 2020, Denver, CO

PUBLICATIONS

1. C. Z. Zerger *et al.* "Nanoscale Electronic Transparency of Wafer-Scale Hexagonal Boron Nitride." [Nano Lett.](#) **2022**, *22*, *11*, 4608–4615. [[arXiv:2109.01522](#)]
2. A. Ajoy, **B. Safvati**, *et al.* "Hyperpolarized Relaxometry Based Nuclear T1 Noise Spectroscopy in Diamond." [Nature Communications](#), vol. *10*, no. *1*, 2019. [[arXiv:1902.06204](#)]
3. A. Ajoy *et al.* Orientation Independent Room-temperature Optical ^{13}C Hyperpolarization in Powdered Diamond, [Science Advances](#), *4*, eaar5492, 2018. [[arXiv:1806.09812](#)]
4. A. Ajoy *et al.* "Enhanced Dynamic Nuclear Polarization via Swept Microwave Frequency Combs," [Proceedings of the National Academy of Sciences](#), 1807125115 (2018). [[arXiv:1807.07664](#)]
5. A. Ajoy, *et al.* "Wide dynamic range magnetic field cyclers: Harnessing quantum control at low and high fields," [Review of Scientific Instruments](#) *90*, 013112 (2019). [[arXiv:1808.10579](#)]
6. A. Ajoy *et al.* "Room temperature Optical Nanodiamond Hyperpolarizer: physics, design and operation," [Review of Scientific Instruments](#) *91*, 023106 (2020); [[arXiv:1811.10218](#)]