e-mail: tphinkle@gmail.com
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github: github.com/tphinkle

Preston Hinkle

Education

- **University of California, Irvine** — Irvine, California
  Ph.D., Physics — *2012 – 2017 (anticipated)*
- **The Ohio State University** — Columbus, Ohio
  B.S., Physics and B.S., Astronomy — *2006-2011*

Research Description

- **Ph.D. Research** — Advisor: Prof. Siwy
  Transport properties of solid-state nanopores, electrokinetics in micro- and nanofluidic systems.
  - **Experiment**: Designed and conducted experiments to study ion and particle transport in micro- and nanoscale fluid channels.
  - **Hardware**: Responsible for design and fabrication of devices in a clean room environment.
  - **Software**: Wrote code for every stage of the research workflow, including instrumentation control and data acquisition, analysis, and visualization.
  - **Data science fellowship**: Awarded the UCI Data Science Initiative Summer Fellowship for project to write open-source software for analyzing data from experiments.
- **B.S. Research** — Advisor: Prof. Loh
  Condensed matter theory
  - Wrote Markov Chain Monte Carlo simulations in C++ and Mathematica to study cold atoms.

Programming & Data Science Skills

- Programming proficiencies
  - Python
  - C++
  - Qt framework
  - Mathematica
  - Git
  - LaTeX
  - HPC
  - Serial communication
  - NI-DAQmx

Programming Portfolio

- Data processing and analysis
  - Software pipeline for analyzing resistive pulse data from experiments written in Python and PyQt. Uses machine learning to validate detected events.
  - Python scripts for analyzing microscope images taken by a high-speed camera. Includes particle tracking, size measurement, and edge detection. Uses a combination of custom code and the OpenCV-Python image processing library.
  - Python program to automatically compile and plot experimental data, automating a previously manual process and reducing data analysis time from 1 hour to 1 minute per experiment.
  - Numerous other miscellaneous Python scripts to analyze data and produce figures for publication.
- Instrument control
  - Multithreaded C++ GUI program for remotely controlling multiple instruments needed to perform experiments on cancer cells.
  - GUI program written in C++ that remotely controls a measurement instrument for producing IV curves.

Relevant Experience

- **Data science workshops**: Instructor and teaching assistant for graduate level Python and machine learning workshops.
- **Astrophysics machine learning course**: Helped organize and lead discussions in a study group for machine learning methods in astrophysics research.
- **Programming and data science education**: Completed various workshops and online courses in data science, machine learning, and computer science.

Publications

Crystal Yang, Preston Hinkle, Justin Menestrina, Ivan V. Vlassiouk, and Zuzanna S. Siwy. Polarization of Gold in Nanopores Leads to Ion Current Rectification. *J. Phys. Chem. Lett.* **2016**, *7* (20), 4152-4158.

Yinghua Qiu, Ivan Vlassiouk, Preston Hinkle, [and 3 others.] Role of Particle Focusing in Resistive-Pulse Technique: Direction-Dependent Velocity in Micropores. *ACS Nano* **2016**, *10* (3), 3509-3517.

Yinghua Qui, Chih-Yuan Lin, Preston Hinkle, [and 7 others.] Highly Charged Particles Cause a Larger Current Blockage in Micropores Compared to Neutral Particles. *ACS Nano* **2016**, *10* (9), 8413-8422.

Yinghua Qiu, Crystal Yang, Preston Hinkle, [and 2 others.] Anomalous Mobility of Highly Charged Particles in Pores. *Anal. Chem.* **2015**, *87* (16), 8517-8523.

Yinghua Qiu, Preston Hinkle, [and 9 others.] Pores with longitudinal irregularities distinguish particles by shape. *ACS Nano* **2015**, *9*, 4390-4397.

Talks

Building a full resistive pulse sensing data analysis pipeline
UC Irvine Data Science Initiative invited talk for prospective graduate students

Detecting and isolating cancer stem cells using resistive pulse sensing
UC Irvine Data Science Initiative Summer Fellows talk

Ion and particle transport in solid-state nanopores
Advancement to Ph.D. candidacy talk

A new method for measuring nanoparticle length using the resistive pulse technique
2015 Annual Meeting of the Far West Section of the APS

Posters

Developing a resistive pulse sensing analysis pipeline for cell characterization
UCI Data Science Initiative Summer Fellows research presentation

A new procedure for measuring particle length using the resistive pulse technique with irregular single micropores
Biophysical Society 2016 Meeting

Charge induced rectification in single nanopores
Biophysical Society 2016 Meeting

Pores with longitudinal irregularities distinguish particles by shape
Biophysical Society 2015 Meeting

Estimation of mean square flux noise in SQUIDs from Monte Carlo simulations of the classical 2D XY model
American Physical Society 2014 March Meeting

Teaching

Graduate teaching assistant 2012–2014
Department of Physics and Astronomy, University of California, Irvine

Temporary lecturer 2011–2012
Department of Physics, The Ohio State University

Private tutor 2011–
Physics tutor for high school and college students.