

|                   |   |
|-------------------|---|
| <b>Education</b>  | University of California, Davis (2012 - 2018) <ul style="list-style-type: none"><li>Ph. D. Physics (Dec 2018)</li><li>M. S. Physics (Dec 2013)</li></ul> St Mary's College of California (2007 - 2011) <ul style="list-style-type: none"><li>B. S. Physics, Minor: Mathematics</li></ul>  |
| <b>Computing</b>  | Python (proficient), C/C++ (intermediate), Go (intermediate), Javascript (intermediate), Rust (intermediate). Python scientific/data vis stack (contributor to <code>scipy</code> , <code>numpy</code> , <code>jupyter</code> , <code>conda</code> , ...). Dashboarding with <code>panel</code> , <code>bokeh</code> , <code>plotly</code> . Web development with FastAPI, Django/Sqlalchemy ORMs, frontend experience with JS/TS, React. Testing with <code>pytest</code> , <code>hypothesis</code> . Git for version control.   |
| <b>Skills</b>     | Agile Development, Automated Testing, Simulations, Continuous Integration, Data Analysis, Statistics, Visualization, Linux, Python Data & Visualization Ecosystem ( <code>numpy</code> , <code>scipy</code> , <code>pandas</code> , <code>jupyterlab</code> , <code>matplotlib</code> , ...) including coding at C/Python and Rust/Python interfaces; Bayesian parameter estimation, HPC ( <code>slurm</code> ), Distributed Computing, VTK.  |
| <b>Experience</b> | <div><div><b>Quansight</b> · Arcata, CA</div><div><i>Senior Software Engineer</i></div><div>May 2021 - Present</div><ul style="list-style-type: none"><li>As part of Quansight's consulting branch, delivered custom-built solutions to meet a wide range of customer needs. Much of this work consisted of open source contributions to upstream Python packages in the scientific Python ecosystem - see my <a href="#">GitHub profile</a> for examples of my work. In addition to being technical lead for numerous projects, I also acted as a personnel manager for a team of Quansight developers from around the globe.</li></ul></div> <div><div><b>Voltaiq</b> · Berkeley, CA</div><div><i>Software Engineer</i></div><div>Oct 2019 - May 2021</div><ul style="list-style-type: none"><li>Developed and deployed bespoke production-quality data analysis and visualization tools to provide quantitative insight into battery performance for some of the world's largest battery manufacturers using Django (with Django REST Framework), Plotly.js, and React.</li></ul></div> <div><div><b>Tampere University</b> · Finland</div><div><i>Postdoctoral Scholar</i></div><div>Jan 2019 - Aug 2019</div><ul style="list-style-type: none"><li>Simulated nanoscale magnetic materials on the <a href="#">CSC's</a> Taito-GPU supercluster using a combination of open source software and in-house code (Go, CUDA, and Python). Numerical calculations of domain wall motion were compared to an analytic model <a href="#">[Skaugen 2019]</a>.</li></ul></div> <div><div><b>UC Davis Department of Physics</b> · Davis, CA</div><div><i>Graduate Student Researcher</i></div><div>Aug 2012 - Dec 2018</div><ul style="list-style-type: none"><li>Developed <a href="#">PyFORC</a>, a Python-based suite of open source tools for analyzing and visualizing magnetic measurements using the First-Order Reversal-Curves (FORC) technique.</li><li>Streamlined the Liu group's material analysis pipeline by developing <a href="#">tarmac</a>, a Python library for quickly visualizing Markov-chain monte carlo (MCMC) samples. This library makes it simple to identify correlations between parameters in a statistical model and evaluate convergence during fitting.</li><li>Fabricated and characterized a wide range of nanoscale magnetic materials, including nanoparticles, thin films, single crystals, and patterned nanostructures using a variety of cutting-edge techniques. Programmed data acquisition and instrument control software for crucial laboratory equipment.</li></ul></div> <div><div><b>Lawrence Berkeley National Laboratory</b> · Berkeley, CA</div><div><i>Junior Specialist</i></div><div>May 2011 - May 2012</div><ul style="list-style-type: none"><li>Created control software (C++, with a Qt-based GUI) for automated circuit testing. Hardware tested with this system was deployed as part of the <a href="#">Insertable B-Layer system</a> at the Large Hadron Collider in 2014, enabling continued studies of the Higgs boson.</li></ul></div> <div><div><b>St. Mary's College of California</b> · Moraga, CA</div><div><i>Research Assistant</i></div><div>Sep 2010 - May 2011</div><ul style="list-style-type: none"><li>Classified astronomical data from the Arecibo Observatory as part of the <a href="#">ALFALFA Collaboration</a>.</li></ul></div> |
| <b>Teaching</b>   | <div>Teaching Assistant, <b>Physics Department, University of California, Davis</b>2012 - 2016</div> <div>Student Tutor and Live-In Mentor, <b>Dept. of Physics, St Mary's College of California</b>2010 - 2011</div>   |

## Laboratory Skills

### *Fabrication*

Sputtering, e-beam evaporation, and e-beam-/photo-lithography and lift-off.

### *Magnetic Characterization*

Vibrating sample magnetometry (VSM), magneto-optic Kerr effect (MOKE), SQUID magnetometry, and magnetoresistance.

### *Other Techniques*

X-ray diffraction (XRD), reciprocal space mapping (RSM), scanning electron microscopy (SEM), polarized neutron reflectometry (PNR), x-ray absorption spectroscopy (XAS) and magnetic circular dichroism (XMCD), and electrical techniques including Hall effect and van der Pauw resistivity methods.

## Publications

1. Murray, P. D. et al. [Electrically Enhanced Exchange Bias via Solid-State Magneto-ionics](#). ACS Applied Materials & Interfaces 13 (32), 38916-38922 (2021).
2. Burks, E. C. et al. [3D Nanomagnetism in Low Density Interconnected Nanowire Networks](#). Nano Letters 21, 716-722. issn: 1530-6984 (2021).
3. Gilbert, D. A. et al. [Reconstructing phase-resolved hysteresis loops from first-order reversal curves](#). Scientific Reports 11, 4018. issn: 2045-2322 (2021).
4. Murray, P. D. et al. [Interfacial-Redox-Induced Tuning of Superconductivity in YBa<sub>2</sub> Cu<sub>3</sub> O<sub>7-δ</sub>](#). ACS Applied Materials & Interfaces, 9b18820. issn: 1944-8244 (2020).
5. Karayev, S. et al. [Interlayer exchange coupling in Pt/Co/Ru and Pt/Co/Ir superlattices](#). Physical Review Materials 3, 041401 (2019).
6. Rippy, G. et al. [X-ray nanodiffraction studies of ionically controlled nanoscale phase separation in cobaltites](#). Physical Review Materials 3, 082001. issn: 2475-9953 (2019).
7. Skaugen, A. et al. [Analytical computation of the demagnetizing energy of thin film domain walls](#). Phys. Rev. B 100, 094440 (2019).
8. Gilbert, D. A. et al. [Ionic tuning of cobaltites at the nanoscale](#). Physical Review Materials 2, 104402 (2018).
9. Quintana, A. et al. [Voltage-Controlled ON-OFF Ferromagnetism at Room Temperature in a Single Metal Oxide Film](#). ACS Nano 12, 10291-10300 (2018).
10. De Toro, J. A. et al. [Remanence plots as a probe of spin disorder in magnetic nanoparticles](#). Chemistry of Materials 29, 8258-8268 (2017).
11. Sun, L. et al. [Magnetization reversal in kagome artificial spin ice studied by first-order reversal curves](#). Physical Review B 96, 144409 (2017).
12. Zhang, Q. et al. [Magnetic fingerprint of interfacial coupling between CoFe and nanoscale ferroelectric domain walls](#). Applied Physics Letters 109, 082906 (2016).
13. The ATLAS IBL Collaboration. [Prototype ATLAS IBL modules using the FE-I4A front-end readout chip](#). Journal of Instrumentation 7, P11010-P11010 (2012).

## Selected Conferences

- P. D. Murray. Invited colloquium: Tuning Ionic Distributions for Multifunctional Materials. Tampere University, Tampere, Finland (2019).
- P. D. Murray, D. A. Gilbert, A. J. Grutter, B. J. Kirby, D. Hernandez-Maldonado, M. Varela, Z. E. Brubaker, R. V. Chopdekar, V. Taufour, R. Zieve, J. R. Jeffries, E. Arenholz, Y. Takamura, J. Borchers, and K. Liu. Poster: Interfacial-Redox-Induced Tuning of Superconductivity in YBa<sub>2</sub> Cu<sub>3</sub> O<sub>7-δ</sub>. International Conference on Magnetism and Magnetic Materials, San Francisco, CA (2018).
- P. D. Murray, Z. Chen, D. A. Gilbert, J. Zang, T. Stücker, K. Lenz, B. B. Maranville, J. Fassbender, H. Yu, J. Borchers, and K. Liu. Poster: Topological Hall Effect in Planar Artificial Skyrmion Lattices. Conference on Magnetism and Magnetic Materials, Pittsburgh, PA (2017).
- P. D. Murray, D. A. Gilbert, A. J. Grutter, A. L. Ionin, R. V. Chopdekar, A. T. N'Diaye, B. J. Kirby, B. Maranville, Y. Takamura, E. Arenholz, K. Liu, and J. Borchers. Talk: Complete Suppression of Magnetism in Gd/(La,Sr)CoO<sub>3</sub> Films via Redox Design of Oxygen

## Awards

3rd Place Winner, 2020 John D. Hunter Excellence in Plotting Contest. [Entry \(video\)](#), [Source repository](#)