Peyton D. Murray

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Computing Python (proficient), C++ (intermediate), Go (intermediate), Bash (intermediate), CUDA (intermediate), Git (proficient), SQL (basic)

Skills Simulations, Data Analysis, Statistics, Data Visualization, Linux, Python Data & Visualization Ecosystem (numpy, scipy, pandas, dask, matplotlib, bokeh, pyqtgraph, ...), HPC, Distributed Computing, VTK.

Education

University of California, Davis — 2012 – 2018
- Ph. D. Physics: Dec 2018
- M. S. Physics: Dec 2013

Saint Mary's College of California, Moraga — 2007 – 2011
- B. S. Physics, *summa cum laude*

Research & Experience

Computational Physics Laboratory, Tampere University, Finland — Jan 2019 – Present
Postdoctoral Researcher
Advisor: Lasse Laurson

- Simulated nanoscale magnetic materials using a combination of open source software and in-house code (Go, CUDA, and Python).
- Leveraged GPUs deployed as part of the CSC's Taito-GPU supercluster to enable massively parallelized simulations.

Department of Physics, University of California, Davis — 2012 – 2018
Graduate Student Researcher
Advisor: Kai Liu

- Fabricated and characterized a wide variety of nanoscale magnetic materials using multiple techniques.
- Developed PyFORC, a suite of open source tools for analyzing and visualizing magnetic measurements using the First-Order Reversal-Curves (FORC) technique (Python).
- Instrument control software

Physics Division, Lawrence Berkeley National Laboratory — 2011 – 2012
Junior Specialist, ATLAS Experiment
Principal Investigator: Maurice Garcia-Sciveres

- Tested prototype next-generation hardware developed for tracking the trajectories of charged particles at the Large Hadron Collider (LHC), the largest particle physics experiment in the world.
- Developed system control GUI and backend for an integrated circuit tester (C++ and Qt; version control with SVN). These tools allowed for automated testing of hundreds of chips (entire wafers) at a time, greatly increasing throughput.
- Chips which passed tests were installed as part of the Insertable B-Layer system at the LHC in 2014, enabling continued studies of the Higgs boson.

Physics Department, Saint Mary's College of California, Moraga — 2010 – 2011
Research Assistant, ALFALFA Collaboration
Advisor: Ron Olowin

- Classified galactic and extragalactic astronomical observations as part of the Arecibo Legacy Fast-ALFA (ALFALFA) project, an international collaboration of astronomers based at the Arecibo Radio Observatory in Puerto Rico.

Teaching

Teaching Assistant — 2012 – 2016
Department of Physics, University of California, Davis

Student Tutor and Live-In Mentor 2010 − 2011

Physics Department, Saint Mary's College of California, Moraga

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 Hall effect and van der Pauw resistivity methods.

Publications

1. Murray, P. D. *et al.* Interfacial-Redox-Induced Tuning of Superconductivity in $YBa_2Cu_3O_{7-\delta}$. *In review.*
2. Murray, P. D., Zhang, J., Zhang, X. & Liu, K. Electrically Tunable Exchange Bias. *In preparation.*
3. Gilbert, D. A. *et al.* Building Bridges from FORC to Phase-Resolved Major Loops. *In preparation.*
4. Skaugen, A., Murray, P. D. & Laurson, L. Analytical computation of the demagnetizing energy of thin film domain walls. **2,** 1–11. arXiv: 1906.07475 (2019).
5. Karayev, S. *et al.* Interlayer exchange coupling in Pt/Co/Ru and Pt/Co/Ir superlattices. *Physical Review Materials* **3,** 041401. doi:10.1103/PhysRevMaterials.3.041401 (2019).
6. Quintana, A. *et al.* Voltage-Controlled ON–OFF Ferromagnetism at Room Temperature in a Single Metal Oxide Film. *ACS Nano* **12,** 10291–10300. doi:10.1021/acsnano.8b05407 (2018).
7. Gilbert, D. A. *et al.* Ionic tuning of cobaltites at the nanoscale. *Physical Review Materials* **2,** 104402. doi:10.1103/PhysRevMaterials.2.104402 (2018).
8. De Toro, J. A. *et al.* Remanence plots as a probe of spin disorder in magnetic nanoparticles. *Chemistry of Materials* **29,** 8258–8268. doi:10.1021/acs.chemmater.7b02522 (2017).
9. Sun, L. *et al.* Magnetization reversal in kagome artificial spin ice studied by first-order reversal curves. *Physical Review B* **96,** 144409. doi:10.1103/PhysRevB.96.144409 (2017).
10. Zhang, Q. *et al.* Magnetic fingerprint of interfacial coupling between CoFe and nanoscale ferroelectric domain walls. *Applied Physics Letters* **109,** 082906. doi:10.1063/1.4961545 (2016).
11. The ATLAS IBL Collaboration. Prototype ATLAS IBL modules using the FE-I4A front-end readout chip. *Journal of Instrumentation* **7,** P11010–P11010. doi:10.1088/1748-0221/7/11/P11010 (2012).