LOGAN BISHOP-VAN HORN

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EDUCATION

Stanford University
PhD Physics, June 2024. M.S. Physics, Jan. 2019. Advisor: Kathryn A. Moler
Dissertation: Local magnetic response and vortex dynamics in thin film superconductors

Clark University
B.A. Physics & Mathematics, *summa cum laude*, highest honors in Physics, December 2016

RESEARCH EXPERIENCE

Technical Staff August 2024 – present
MIT Lincoln Laboratory, Group 89 *Lexington, MA*

- ⋄ Technical Staff scientist working on superconducting qubits. Logan.Bishop-VanHorn@ll.mit.edu

Graduate Student Sept. 2017 – Jan. 2019, Jan. 2021 – June 2024
Stanford University Department of Physics, Advisor: Kathryn A. Moler *Stanford, CA*

- ⋄ Developed open-source software for simulating the magnetic response of 2D superconducting devices with arbitrary geometry using both London-Maxwell and time-dependent Ginzburg-Landau (TDGL) techniques.
- ⋄ Applied these numerical tools to interpret measurements of vortex dynamics induced by scanning superconducting quantum interference device (SQUID) susceptometry.
- ⋄ Constructed two new scanning SQUID microscope systems in cryogen-free fridges, together spanning sample temperatures from 20 mK to over 100 K.
- ⋄ Studied phase coherence in superconductor-semiconductor hybrid Josephson junction arrays at mK temperatures.

Research Associate Jan. 2019 – Jan. 2021
Quantum Circuits, Inc., Supervisors: Rob Schoelkopf & Harvey Moseley *New Haven, CT*

- ⋄ Characterized, modeled, and optimized superconducting devices for quantum information processing using qubits encoded in high-Q microwave cavities.
- ⋄ Developed software for quantum control, automated calibration, and quantum device simulation.

Cornell Center for Materials Research REU Summer 2016
Cornell University Department of Physics, Advisor: Dan Ralph *Ithaca, NY*

- ⋄ Developed new tools in Python for performing and analyzing GPU-accelerated micromagnetic simulations of spin transfer torque-driven ferromagnetic resonance (ST-FMR) in spintronics devices.

Undergraduate Researcher June 2014 – Dec. 2016
Clark University Department of Physics, Advisor: Charles C. Agosta *Worcester, MA*

- ⋄ Performed rf penetration depth measurements of quasi-2D organic superconductors in pulsed and DC magnetic fields using a tunnel diode oscillator (TDO).

TECHNICAL SKILLS

Scientific computing	Python, Git/GitHub, QuTiP, MATLAB, LaTeX, Bash, Slurm, JAX, CuPy, HFSS, Sonnet
Low temperature & quantum physics	Superconducting circuits (SQUIDs, qubits, cavities, etc.), cryogenic scanning probe microscopy, two-dimensional materials and devices, instrument control & automation, cryogen-free dilution fridges

PUBLICATIONS

8. Mark E. Barber, Yifan Li, Jared Gibson, Jiachen Yu, Zhanzhi Jiang, Yuwen Hu, Zhurun Ji, Nabhanila Nandi, Jesse C. Hoke, **Logan Bishop-Van Horn**, Gilbert R. Arias, Dale J. Van Harlingen, Kathryn A. Moler, Zhi-Xun Shen, Angela Kou, and Benjamin E. Feldman, *Characterization of Two Fast-Turnaround Dry Dilution Refrigerators for Scanning Probe Microscopy.* Journal of Low Temperature Physics **215** (2024).

7. **Logan Bishop-Van Horn**,* Eli Mueller,* and Kathryn A. Moler, *Vortex dynamics induced by scanning SQUID susceptometry.* Physical Review B **107**, 224509 (2023). *Equal contribution

6. **Logan Bishop-Van Horn**, *pyTDGL: Time-dependent Ginzburg-Landau in Python.* Computer Physics Communications **291**, 108799 (2023).

5. **Logan Bishop-Van Horn**,* Irene P. Zhang,* Emily N. Waite, Ian Mondragon-Shem, Scott Jensen, Junseok Oh, Tom Lippman, Malcolm Durkin, Taylor L. Hughes, Nadya Mason, Kathryn A. Moler, and Ilya Sochnikov, *Local imaging of diamagnetism in proximity coupled niobium nano-island arrays on gold thin films.* Physical Review B **106** 054521 (2022) (*Editors' Suggestion*). *Equal contribution

4. **Logan Bishop-Van Horn** and Kathryn A. Moler, *SuperScreen: An open-source package for simulating the magnetic response of two-dimensional superconducting devices.* Computer Physics Communications **280**, 108464 (2022).

3. Irene P. Zhang, Johanna C. Palmstrom, Hilary Noad, **Logan Bishop-Van Horn**, Yusuke Iguchi, Zheng Cui, John R. Kirtley, Ian R. Fisher, and Kathryn A. Moler, *Imaging anisotropic vortex dynamics in FeSe.* Physical Review B **100**, 024514 (2019).

2. **Logan Bishop-Van Horn**, Zheng Cui, John R. Kirtley, and Kathryn A. Moler, *Cryogen-free variable temperature scanning SQUID microscope.* Review of Scientific Instruments **90**, 063705 (2019).

1. Charles C. Agosta, **Logan Bishop-Van Horn**, & Max Newman *The Signature of Inhomogeneous Superconductivity.* Journal of Low Temperature Physics **185** (2016).

OPEN SOURCE PROJECTS

`pyTDGL`	2D time-dependent Ginzburg-Landau in Python
`SuperScreen`	A package for modeling the linear magnetic response of 2D superconducting devices
`SeQuencing`	Simulate and benchmark realistic quantum control sequences in `QuTiP`

TEACHING & MENTORSHIP

Teaching Assistant, Physics 21/22, Mechanics, Fluids, and Heat Sept. 2022 – Dec. 2022
Stanford University Department of Physics *Stanford, CA*

Teaching Assistant, Physics 67, Introduction to Laboratory Physics April 2022 – June 2022
Stanford University Department of Physics *Stanford, CA*

CAMPARE Graduate Student Mentor June 2018 – August 2018
Stanford University Department of Physics *Stanford, CA*

Teaching Assistant, Physics 43, Electricity and Magnetism April 2018 – June 2018
Stanford University Department of Physics *Stanford, CA*