

## Laurel Anderson

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### EDUCATION

#### Harvard University

PhD in Physics; Advisor: Philip Kim

Cambridge, MA

May 2022 (expected)

- National Defense Science and Engineering Fellow 2015-2018
- Dissertation: "Electrical and thermoelectric transport in low-dimensional graphene-based systems"

#### University of Cambridge, Churchill College

MPhil in Physics

Cambridge, UK

October 2015

- Dissertation: "Room temperature spin-orbit torques in a ferromagnetic crystal"

#### Dartmouth College

BA in Physics, *magna cum laude*, Phi Beta Kappa

Hanover, NH

June 2014

- Honors thesis: "Experimental control of spin chain dynamics"

### RESEARCH EXPERIENCE

#### Harvard University

Graduate Researcher; Advisor: Philip Kim

Cambridge, MA

Feb. 2016 – present

Transport experiments in graphene-based systems

- Investigated quantum Hall electrical and thermoelectric transport in disordered graphene dots
- Demonstrated Coulomb drag between single metallic carbon nanotubes and monolayer graphene flakes, with increasing thermoelectric contributions at low temperature

#### University of Cambridge, Microelectronics Group

MPhil Student Researcher; Advisor: Andrew J. Ferguson

Cambridge, UK

Sept. 2014 – July 2015

Ferromagnetic resonance measurements of spin-orbit torque

- Detected spin-orbit torque in NiMnSb and confirmed the dominant Dresselhaus symmetry of the spin-orbit field by angle-dependent ferromagnetic resonance and anisotropic magnetoresistance measurements

#### Dartmouth College

Student Researcher; Advisor: Chandrasekhar Ramanathan

Hanover, NH

June 2012 – June 2014

James O. Freedman Presidential Scholar Research Assistant

June-December 2012

Nuclear magnetic resonance control of spin chain ensembles

- Investigated the transition from integrable to chaotic many-body dynamics in spin chains in fluorapatite via NMR pulse sequence modification combined with simulations

#### University of Utah

REU Student; Advisor: Jordan Gerton

Salt Lake City, UT

June – August 2013

Characterization of NV centers in nanodiamonds

- Combined confocal and atomic force microscopy for photon anti-bunching measurements on nanodiamonds to determine suitability for future experiments require single-photon emitters

## PUBLICATIONS

1. **L. E. Anderson**, A. K. Cheng, T. Taniguchi, K. Watanabe, & P. Kim, "Coulomb Drag Between a Carbon Nanotube and Graphene," *Physical Review Letters* (2021). DOI: 10.1103/PhysRevLett.127.257701. Featured as an Editor's Suggestion.
2. J. Waissman, **L. E. Anderson**, A. V. Talanov, Z. Yan, Y. J. Shin, D. H. Najafabadi, T. Taniguchi, K. Watanabe, B. Skinner, K. A. Matveev, & P. Kim, "Electronic thermal transport measurement in low-dimensional materials with graphene non-local noise thermometry," *Nature Nanotechnology* (2021). DOI: 10.1038/s41565-021-01015-x.
3. Y. Ronen, T. Werkmeister, D. Najafabadi, A. T. Pierce, **L. E. Anderson**, Y. J. Shin, S. Y. Lee, Y. H. Lee, B. Johnson, K. Watanabe, T. Taniguchi, A. Yacoby, & P. Kim, "Aharonov-Bohm effect in graphene-based Fabry-Pérot quantum Hall interferometers," *Nature Nanotechnology* (2021). DOI: 10.1038/s41565-021-00861-z.
4. M.J.H. Ku, T. X. Zhou, Q. Li, Y.J. Shin, J.K. Shi, C. Burch, **L.E. Anderson**, A. Pierce, Y. Xie, A. Hamo, U. Vool, H. Zhang, F. Casola, T. Taniguchi, K. Watanabe, P. Kim, A. Yacoby & R.L. Walsworth, "Imaging Viscous Electron Flow of the Dirac Fluid in Graphene Using a Quantum Spin Magnetometer," *Nature* (2020). DOI: 10.1038/s41586-020-2507-2
5. C. Ciccarelli, **L. Anderson**, V. Tshitoyan, A. J. Ferguson, F. Gerhard, C. Gould, L. W. Molenkamp, J. Gayles, J. Železný, L. Šmejkal, Z. Yuan, J. Sinova, F. Freimuth & T. Jungwirth, "Room temperature spin-orbit torque in NiMnSb." *Nature Physics* (2016). DOI: 10.1038/NPHYS3772

## PRESENTATIONS / POSTERS

1. **Laurel Anderson**, Austin Cheng, Takashi Taniguchi, Kenji Watanabe, and Philip Kim, "Carbon nanotube-graphene Coulomb drag in the linear and nonlinear transport regimes," APS March Meeting, March 17, 2021, virtual. (abstract: [meetings.aps.org/Meeting/MAR21/Session/M42.5](https://meetings.aps.org/Meeting/MAR21/Session/M42.5))
2. **Laurel Anderson**, Austin Cheng, Takashi Taniguchi, Kenji Watanabe, and Philip Kim, "Polarity of Coulomb drag signal in carbon nanotube-graphene heterostructures," APS March Meeting, March 7, 2019, Boston, MA. (abstract: [meetings.aps.org/Meeting/MAR19/Session/V14.2](https://meetings.aps.org/Meeting/MAR19/Session/V14.2))
3. **Laurel Anderson**, Austin Cheng, Takashi Taniguchi, Kenji Watanabe, and Philip Kim, "Towards Probing Hydrodynamics in Graphene with a Carbon Nanotube," SRITP Advanced School on Electron Hydrodynamics, January 6-10, 2019, Weizmann Institute of Science, Rehovot, Israel.
4. **Laurel Anderson**, Austin Cheng, Takashi Taniguchi, Kenji Watanabe, and Philip Kim, "Probing Graphene Hydrodynamics with a Carbon Nanotube via Coulomb Drag," APS March Meeting, March 6, 2018, Los Angeles, CA (abstract: [meetings.aps.org/Meeting/MAR18/Session/H40.8](https://meetings.aps.org/Meeting/MAR18/Session/H40.8))
5. **Laurel Anderson**, Chiara Ciccarelli, Felicitas Gerhard, Jan Zemen, Charles Gould, Laurens Molenkamp, Tomas Jungwirth, and Andrew Ferguson, "Room-temperature spin-orbit torque and AMR in NiMnSb," IOP Magnetism Conference 2015, March 20, 2015, University of Leeds.
6. **Laurel Anderson**, Chiara Ciccarelli, and Andrew Ferguson, "Room-temperature AMR and spin-orbit torque in NiMnSb," Vila Lanna spintronics meeting, January 16, 2015, Prague, Czech Republic.

7. **Laurel Anderson**, “Condensed-Matter Physics: Electrons’ Adventures in Magnet-land,” Churchill College MCR Seminar, December 3, 2014, Churchill College, University of Cambridge.
8. **Laurel Anderson**, Christopher Zeitler, and Chandrasekhar Ramanathan, “Experimental control of spin chain dynamics,” Karen E. Wetterhahn Science Symposium, May 22, 2014, Dartmouth College.
  - First Prize, Sigma Xi Christopher G. Reed Competition
9. Christopher Zeitler, **Laurel Anderson**, Lorenza Viola, and Chandrasekhar Ramanathan, “Quantum dynamics of a spin chain in the presence of engineered collective noise,” APS March Meeting, March 18-22, 2013, Baltimore, MD (abstract: [meetings.aps.org/Meeting/MAR13/Event/186662](http://meetings.aps.org/Meeting/MAR13/Event/186662)).

## TECHNICAL SKILLS

- Electronic and thermoelectric transport measurements
- 2D material heterostructure assembly
- Rayleigh scattering spectroscopy
- Carbon nanotube synthesis (CVD)
- 2D material exfoliation and characterization
- Raman spectroscopy
- Operation of various wet cryostats
- Programming in MATLAB and Mathematica
- Mesoscopic device design in AutoCAD and DesignCAD
- 6 years of nanofabrication cleanroom experience, including:
  - Electron beam lithography
  - Photolithography
  - Reactive ion etching
  - Thermal and electron beam evaporation
- Scanning electron microscopy

## TEACHING EXPERIENCE

### Harvard University

Teaching Assistant for Introduction to Solid State Physics

Fall 2019

### University of Cambridge

Demonstrator for Introductory Physics Laboratory

2014-2015

## SELECTED HONORS / AWARDS

National Defense Science and Engineering Graduate Fellowship	2015-2018
Wallace Noyes Fellowship	2017
James B. Reynolds Scholarship for Foreign Study	2014-2015
James O. Freedman Presidential Scholar	2014
Physics and Astronomy Faculty Prize in Memory of Francis W. Sears	2014
Rufus Choate Scholar	2013

## PROFESSIONAL SERVICE

Peer reviewer for <i>Nano Letters</i>	2017-present
Harvard Physics Condensed-Matter Experimental Journal Club Co-Organizer	2020-present
Conference for Undergraduate Women in Physics (CUWiP) held at Harvard, Local Organizing Committee	2016-2017

## REFERENCES

Available upon request.