

Ian Hunt-Isaak

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Education

Harvard University SEAS: PhD. Candidate in Applied Physics

Oberlin College: B.A. with High Honors, May 2017

Major: Physics, *Minor:* Mathematics

Cold Spring Habor Labs Yeast Genetics and Genomics Course - Summer 2019

Publications

- H. Pinkard et al. "Pycro-Manager: open-source software for customized and reproducible microscope control" *Nature Methods* 18, 226 (2021)
- Y. Ijiri, K. L. Krycka, I. Hunt-Isaak, et al. "Correlated spin canting in ordered core-shell $\text{Fe}_3\text{O}_4/\text{Mn}_x\text{Fe}_{3-x}\text{O}_4$ nanoparticle assemblies." *Phys. Rev. B* 99, (2019).
- Oberdick, S. D. et al. "Spin canting across core/shell $\text{Fe}_3\text{O}_4/\text{Mn}_x\text{Fe}_{3-x}\text{O}_4$ nanoparticles." *Scientific Reports* 8, 3425 (2018).

Research Experience

Harvard University - Hekstra lab

August 2017 - Present

Graduate Student

This is an interdisciplinary lab focused on understanding the dynamics of biological systems and how information flows in biology. Members come from Molecular and Cellular Biology, Chemistry, and Applied Physics.

- Developing a method for the measurement of nanosecond electric field pulses inside a protein crystal
- Built and maintained electronics control boxes for the structural biology experiments performed by my fellow lab members
- Developing Raman Spectroscopy as a probe of cell state to investigate the stress responses of Bacteria and Yeast

Oberlin College - Ijiri Lab

Jan. 2015 - May 2017

Researcher

- Investigated the magnetic structure of Manganese Ferrite Nanoparticles with the cutting edge technique of Polarization Analyzed Small Angle Neutron Scattering
- Extended the NIST SANS macros enabling faster data analysis
- Wrote Scripts to increase speed of analysis
- Developed python analysis scripts for systematic fitting of hundreds of data files
 - github.com/ianhi/OC_SANS_MACROS
- Completed an Honors thesis
 - Unusual Magnetic Spin Arrangements in Manganese Ferrite Nanoparticle Assemblies
 - oberlin.edu/arts-and-sciences/departments/physics-and-astronomy/honors

National Institute of Standards and Technology

Summer 2016

Summer Undergraduate Research Fellow

- Designed and developed a simulator of X-Ray and Neutron scattering from simulations of proteins using periodic boundary conditions
- Reduced computation time of scattering calculation and analysis algorithm on multi-million atom systems 5-6x using NumPy and C++

- Improved the SASSIE and SASMOL projects code developed and utilized by research for analysis and modeling of biological macromolecules

Rutgers University - Relativistic Heavy Ion Group Summer 2015

REU Student

- Studied the Quark Gluon Plasma through Monte Carlo Simulation
- Improved a framework to run Monte Carlo Simulations - github.com/ianhi/GeneratorInterface
- Investigated the 3/2 Jet Ratio in Lead Ion Collisions with C++ using the ROOT framework

Posters and Presentations

APS Division of Nuclear Physics Oct. 2015

Monte Carlo Investigations of Quark Gluon Plasma

- Presented research from Summer 2015 as a poster

Celebration of Undergraduate Research Oberlin College Sept. 2015

Monte Carlo Investigations of Quark Gluon Plasma

Presented as a poster and 15 minute talk

Graduate Coursework

Statistical Mechanics - Physics Fall 2017

Computational Physics - Applied Computation Fall 2017

Stochastic Processes and Disordered Systems - Applied Math Spring 2018

Inverse Problems In Science and Engineering - Applied Math Spring 2018

Advanced Machine Learning - Computer Science Fall 2018

Advanced Quantum Mechanics - Physics Fall 2018

Evolutionary Dynamics - Math Spring 2019

Work and Teaching Experience

Teaching Fellow Applied Math 50, Harvard University Spring 2019

- Helped develop a significant portion of the homeworks and in class labs
- I hold section and office hours weekly to convey ideas in programming and applied math

ExCo Instructor 3D Printing & Design Fall 2015[6,7] Spring 2016/2017

At Oberlin the ExCo program is a student-run, for-credit Experimental College with courses taught by students or community members.

- Developed a Course centered on 3D printing technologies
- Themes included building, using and maintaining 3D printers as well as basic electrical engineering

Science Outreach Oberlin Boys and Girls Club Sept. 2014 - May 2015

- Co-Founded Science program for Boys and Girls Club
- Developed and ran interactive science demos for 3rd-5th grade students

Tutoring Oberlin College Fall 2014-Spring 2017

- Personal Tutor for High School IB math student
- Tutored Oberlin College Students in
 - Introductory Calculus
 - Multivariate Calculus
 - Introductory Economics
 - Modern Physics
 - Drop In Calculus

Counselor Riverbend Environment Education Center Summer 2014

- Led groups of children in a team with a co-counselor
- Designed and implemented lesson plans

Fellowships and Awards

- Member Sigma Xi

Distinctions - College

- Member Sigma Xi
- Member Phi Beta Kappa
- One of four Oberlin nominees for Goldwater Scholarship in 2016
- John F. Oberlin Scholarship recipient

Leadership Activities

Treasurer and Director OC3D Oberlin College 3D Printing Sept. 2015- May 2017

- Manage Club Accounts
- Increase Club Membership
- Organize Club Projects
- Involved in developing the OC3D space since Jan. 2014

Online Presence

- Stackoverflow: stackoverflow.com/users/835607/ianhi
- Github: github.com/ianhi