

# 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

## Publications

- 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**  
Graduate Student

August 2017 - Present

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**  
Researcher

Jan. 2015 - May 2017

- 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](https://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](https://oberlin.edu/arts-and-sciences/departments/physics-and-astronomy/honors)

**National Institute of Standards and Technology**  
Summer Undergraduate Research Fellow

Summer 2016

- 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**  
REU Student

Summer 2015

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

<b>Posters and Presentations</b>	<b>APS Division of Nuclear Physics</b> Monte Carlo Investigations of Quark Gluon Plasma	Oct. 2015
	<ul style="list-style-type: none"> <li>• Presented research from Summer 2015 as a poster</li> </ul>	
	<b>Celebration of Undergraduate Research Oberlin College</b> Monte Carlo Investigations of Quark Gluon Plasma Presented as a poster and 15 minute talk	Sept. 2015
<b>Graduate Coursework</b>	<b>Statistical Mechanics</b> - Physics	Fall 2017
	<b>Computational Physics</b> - Applied Computation	Fall 2017
	<b>Stochastic Processes and Disordered Systems</b> - Applied Math	Spring 2018
	<b>Inverse Problems In Science and Engineering</b> - Applied Math	Spring 2018
	<b>Advanced Machine Learning</b> - Computer Science	Fall 2018
	<b>Advanced Quantum Mechanics</b> - Physics	Fall 2018
	<b>Evolutionary Dynamics</b> - Math	Spring 2019
<b>Work and Teaching Experience</b>	<b>Teaching Fellow</b> Applied Math 50, Harvard University	Spring 2019
	<ul style="list-style-type: none"> <li>• Helped develop a significant portion of the homeworks and in class labs</li> <li>• I hold section and office hours weekly to convey ideas in programming and applied math</li> </ul>	
	<b>ExCo Instructor</b> 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.	
	<ul style="list-style-type: none"> <li>• Developed a Course centered on 3D printing technologies</li> <li>• Themes included building, using and maintaining 3D printers as well as basic electrical engineering</li> </ul>	
	<b>Science Outreach</b> Oberlin Boys and Girls Club	Sept. 2014 - May 2015
	<ul style="list-style-type: none"> <li>• Co-Founded Science program for Boys and Girls Club</li> <li>• Developed and ran interactive science demos for 3rd-5th grade students</li> </ul>	
	<b>Tutoring</b> Oberlin College	Fall 2014-Spring 2017
	<ul style="list-style-type: none"> <li>• Personal Tutor for High School IB math student</li> <li>• Tutored Oberlin College Students in <ul style="list-style-type: none"> <li>– Introductory Calculus</li> <li>– Multivariate Calculus</li> <li>– Introductory Economics</li> <li>– Modern Physics</li> <li>– Drop In Calculus</li> </ul> </li> </ul>	
	<b>Counselor</b> Riverbend Environment Education Center	Summer 2014
	<ul style="list-style-type: none"> <li>• Led groups of children in a team with a co-counselor</li> <li>• Designed and implemented lesson plans</li> </ul>	

**Distinctions**

- 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](https://stackoverflow.com/users/835607/ianhi)
- Github: [github.com/ianhi](https://github.com/ianhi)