Isabel Fernandez

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EDUCATION

American University, Washington, DC May 2020
College of Arts and Science (CAS) Physics and Applied Mathematics Major
Senior Capstone: Discovering Hidden Symmetries of Atoms in a Ring Trap with Prof. Nathan Harshman
Honors: GPA: 3.7/4.0, Deans List: Fall 2017, Spring 2018, Spring 2019, Fall 2019, Spring 2020

AWARDS

- *Jacob Kastner Memorial Scholarship*: American University Department of Physics 2017, 2018, 2019, and 2020
- *Textbook Award:* American University Department of Mathematics and Statistics 2017 and 2019

EXPERIENCE

Research Trainee, **National Institute of Mental Health**, Adviser: Peter Bandettini June 2020-Present

- Furthered research on a project to monitor vigilance during resting state fMRI scans through eye tracking data and monitoring Cerebrospinal fluid flow
- Designed Jupyter Notebooks for fMRI data analysis using machine learning packages such as scikit learn
- Evaluated and explored fMRI data through python packages such as hvplot, numpy, panda, and matplotlib
- Responsible for recruiting and scheduling subjects for fMRI scanning
- Operated MRI scanners to obtain fMRI data

Research Assistant, **University of Chicago REU**, Adviser: David Awschalom June-August 2019

- Collaborated with a team of 20 other researchers in David Awshalom's group to investigate q-bits used in quantum information processing
- Conducted research on optimizing spin readout of Nitrogen Vacancy (NV) centers using an infrared laser to ontically pump the singlet singlet transition in the NV energy level structure
- Worked with three other graduate students to set up a confocal microscope using both free and fiber optics
- Designed an RF logic tree for readout of the NV fluorescence signal
- Presented a ten-minute talk of my work at the end of the summer REU symposia
- Wrote a ten-page final research paper on my findings

Research Assistant, **University of Rochester REU**, Adviser: Nicholas Bigelow May-August 2018

- Worked on a team of 6 other researchers in Nicholas Bigelow's Cooling and Trapping Group to create and observe Bose-Einstein Condensates
- Continued work on a project to create Laguerre Gaussian beams using forked diffraction gratings
- Improved the Python code that created forked diffraction gratings based on Laguerre polynomials
- Managed equipment such as a Digital Micromirror Device which displayed the forked diffraction grating using a Keynote Photonics Software
- Aligned optical setup with a 780 nm wavelength diode laser to create optimal Laguerre Gaussian beams
- Presented a 10-minute talk of my work at the end of the summer REU symposium

Tutor, **American University,** 4400 Massachusetts Ave. NW, Washington, DC 20016 September 2019-May 2020

- Tutored one to five students at a time in in physics and mathematics courses
- Assisted with homework problems and test prep
- Coordinated with fellow tutors to plan effective ways to deliver information and assist students

PRESENTATIONS

- **American University Physics Capstone**, *Symmetries of Atoms in a Ring Trap*, December 2019
- **University of Chicago Physics REU 2019**, *Optimizing Contrast in Spin Detection of NV- Centers*, August 2019
- **University of Rochester Physics REU 2019**, *Creating Laguerre-Gaussian Beams Using a Forked Diffraction Grating on a Digital Micromirror Device*, August 2018

SKILLS

- *Computer*: Microsoft Word, Excel, and PowerPoint, Google Drive,
- *Programing*: Python, Mathematica, Arduino, R, Keynote Photonics, Jupyter Notebook, Bash, Shell, Git/GitHub

CAMPUS AND COMMUNITY SERVICE

Company Member, **American University Dance Company**, American University January 2018-April 2019

- Attended all company classes and rehearsals for five hours a week
- Collaborated as an ensemble with other dance members
- Provided critiques to dancers as well as receive feedback of my own performances
- Performed in final show