Rees McNally

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EDUCATION

Columbia University (2015-2020)
Doctorate: Physics
Master of Science: Physics
Master of Philosophy: Physics

University of Colorado (2010-2014)
Bachelor of Science: Applied Mathematics
Bachelor of Science: Engineering Physics
Minor: Electrical Engineering

Relevant Coursework: Algorithms for Data Science, Statistical Mechanics, Applied Probability, Linear Control Systems, Mathematical Statistics, Numerical Analysis, Biological Modeling, Nonlinear Optics, Microelectronics, Electronics Design Lab, Atomic Physics, Quantum mechanics

EXPERIENCE

Graduate Research Fellow: Columbia *Dec 2015 - Present*

- Led the design and construction of a new experiment to study the chemistry of cold molecules.
- Developed algorithms to classify and isolate distinct spectral features of nanophotonic devices.
- Managed a team of ≈ 4 undergraduate, graduate, and post-doctoral researchers.
- Obtained a $1 million grant from the W.M. Keck Foundation to fund my work.
- Published 8 peer reviewed articles on various projects over my academic career.

Independent Research: Dark Matter Data Mining *Dec 2018 - Present*

- Analyzed an existing database of geological measurements to try and detect a specific type of dark matter based on subtle correlations in a large, multidimensional data-set.
- Integrated this work into a larger dark matter hunting collaboration between four universities, which is currently applying for funding.
- Results were published, and featured by a few news sources (see my website for details)

Graduate Teaching Fellow: Columbia *Dec 2015 - Present*

- Taught numerous undergraduate recitations for physics courses from the 1000-4000 level.
- Designed a new experiment for the undergraduate physics lab to introduce students to script based data analysis in Python.
- Founded and led (2016-2019) a biweekly graduate student seminar series to help graduate students improve presentation skills. Has had 50+ seminars, with a typical attendance of 30.

Undergraduate Research Assistant: CU Boulder *Aug 2013 - Jun 2015*

- Developed a model to improve the control sequence for a prototype atomic clock, the most accurate clock in the world (at that time) using modern optimal control theory.

Physics Division Intern: Lawrence Livermore National Labs *May 2013 - Aug 2013*

- Developed algorithms to improve data reconstruction from gravity sensors using compressed sensing (essentially L1 norm optimization) techniques.

DANDE student satellite: AFRL/Colorado Space Grant *May 2011 - May 2013*

- Managed the integration and testing team before launch (on SpaceX Falcon 9 rocket)
- Collaborated with a local company ASTRA to perform data analysis post launch, until the mission terminated.

Skills

- Software: Python (seaborn, SciPy, scikit-learn), Mathematica, Labview, Solidworks
- Optical design, Laser design, and Electro-optical systems
- Prototyping for analog and digital electronics
- Ultrahigh vacuum design and manufacturing
- Cryogenic operation, and mechanical design

Awards

- CU Boulder's Fall 2014 Outstanding Graduate for Research
- Graduated Summa Cum Laude
- 2017 NSF: GRFP Fellowhip Honorable Mention
- 2017 NSF: IGERT Fellowship Award recipient
- 2019 Allen M Sachs Teaching Award for outstanding graduate student instruction