Dr. Rees McNally

(303) 868-2920   New York, NY
reeslmcnally@gmail.com   reesmcnally.github.io

EDUCATION

Columbia University (2015-2020)   **University of Colorado (2010-2014)**
Doctorate: Physics   Bachelor of Science: Applied Mathematics
Master of Science: Physics   Bachelor of Science: Engineering Physics
Master of Philosophy: Physics   Minor: Electrical Engineering

EXPERIENCE

Staff Scientist @ Areté Associates   *Dec 2020 - Present*

- Principal Investigator for a Phase-I army SBIR grant for the development of a novel turbulence sensor based on bio-inspired event camera system. Received a business development award.

- Lead development and deployment of numerous machine learning algorithms (data cleaning, classifiers, and anomaly detectors) to improve an existing network of chem-bio sensors. Reduced false alarm rate by 50%, resulting in a projected savings above 1 million dollars annually.

- Principal investigator for a Phase-II army SBIR to develop a drone detection system based on machine vision algorithms, and a custom ultra-high definition camera system. System is self contained, with on-board GPU running machine vision and classification algorithms.

- Applied new neural-network techniques developed by Google (known as graph-neural networks) to efficiently simulate surface water waves. Model was trained on Aretés propriety wave simulation programs, which were used in the movie Titanic and Water World.

Graduate Research @ Columbia: Professor Tanya Zelevinsky   *Dec 2015 - Dec 2020*

- Led the design and construction of a new experiment to study the chemistry of cold molecules.

- Developed algorithms to automate the calibration of portable nanophotonic laser devices.

- Proposed a new phenomenological signature for the direct terrestrial detection of dark matter, mined and cleaned a terabyte scale data-set of geophysical measurements, and integrated this new technique into an ongoing dark matter hunting collaboration.

- 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.

- Published 9 peer reviewed articles on a wide variety of topics over my academic career.

Undergraduate Research   *Aug 2010 - Jun 2015*

- **Professor Jun Ye:** Developed a model to optimize the control sequence for the most accurate clock in the world using modern control theory, and digital signal analysis techniques.

- **Lawrence Livermore National Lab:** Developed algorithms for data reconstruction from sensor networks using compressed sensing techniques on Livermore's HPC cluster's.

- **AFRL/Colorado Space Grant:** Managed the integration and testing team for final spacecraft assembly at an AFRL facility prior to launch on a SpaceX Falcon 9 rocket. Collaborated with a Boulder Aerospace company ASTRA to perform data analysis post launch, demonstrating a new way to identify satellites from radar tracking data.

Skills
- Software: Python(Jupyter), NumPy, SciPy, Pandas, Scikit-Learn, TensorFlow(Keras)
- Finding innovative and efficient solutions to challenging problems.
- Extracting useful insights from complex data.
- Identifying ways to apply cutting edge research to real world problems in a variety of fields.

Awards
- 2014 CU Boulder's Fall Outstanding Graduate for Research
- 2014 Graduated Summa Cum Laude
- 2016 "Audience Favorite" at the Abbey Pub mac and cheese competition
- 2017 NSF: GRFP Fellowhip Honorable Mention
- 2017 NSF: IGERT Fellowship Award recipient
- 2019 Allen M Sachs Teaching Award for outstanding graduate student instruction