Dr. 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

EXPERIENCE

Senior Scientist @ Areté Associates *Dec 2020 - Present*

- Lead development and deployment of numerous algorithms (data cleaning, ML classifiers, and anomaly detectors) to improve a deployed network of sensors for the DOD.
- Principal investigator (PI) for a Phase-I AFRL SBIR ($150 thousand) to develop an event camera based star-tracker. An improved sensor for satellite navigation.
- PI for a Phase-I army SBIR ($260 thousand) for the development ultra-fast optical wavefront sensor to study turbulence. A four member team spanning hardware and software.
- Technical lead for a Phase-II army SBIR ($1.1 million) to develop a drone detection system based using high resolution cameras, and machine-vision/ML algorithms. A six member team.
- PI for an Army contract ($1.8 million) to develop a tracking and localization system for incoming ordinance using high speed cameras and modern algorithms. A ten member team.
- Supported early development on numerous other projects/proposals with a total acquisition value of >$6 million. Reputation as technology innovator for hard problems

Graduate Teaching Fellow @ Columbia *Dec 2015 - Dec 2020*

- Developed a new lab to teach script based python data analysis to advanced undergraduates. Involved the measurement of the CMB temperature from a roof in Manhattan.
- Founded and led (2016-2019) an ongoing biweekly graduate student seminar series to help graduate students improve presentation skills, and learn about other disciplines.

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

- Led the design and construction of a new machine to study the chemistry of cold molecules.
- Proposed a new phenomenological signature for the direct terrestrial detection of dark matter, and integrated this new technique into an ongoing dark matter hunting collaboration.
- 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 atomic 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:** Member of Integration and testing team for final spacecraft with AFRL facility prior to launch with SpaceX. Collaborated with aerospace R&D company ASTRA to demonstrate a new method to identify satellites from radar tracking data.

Outreach

- Industry mentor for the GLEE 2023 student satellite mission, a "citizen science" program to send 500 post-it note sized satellites to teams around the world (2020-2023).

Skills

- Software: MATLAB, Mathematica, Python, NumPy, SciPy, Pandas, Scikit-Learn, Keras/TF
- Finding innovative and efficient solutions to challenging problems.
- Identifying ways to apply cutting edge research to real world problems in a variety of fields.
- Leading teams with disparate skill sets towards common goals.

Awards

- 2014 CU Boulder's Fall Outstanding Graduate for Research, Graduating Summa Cum Laude
- 2016 "Audience Favorite" at the NYC's famous Abbey Pub mac and cheese competition
- 2017 NSF: IGERT Fellowship Award recipient
- 2019 Allen M Sachs Teaching Award for outstanding graduate student instruction
- 2021 & 2022 Areté New Business Capture Award