

Alexander Moskowitz, Ph.D.

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA August 2021
Ph.D. in Physics. Recipient of CMU presidential fellowship.

Brown University, Providence, RI May 2015
B.Sc. in Physics. Graduated Magna Cum Laude, Phi Beta Kappa, Sigma Chi
Recipient of NASA Rhode Island Space Grant Research Award and Brown Undergraduate Teaching and Research Award.

EXPERIENCE

VISIMO, Carnegie, PA 2021-present
Principal Research Scientist

- Led Data Science and Machine Learning projects, providing technical oversight, project management and personnel coordination
- PI for 2022 and 2023 NASA SBIR Phase I projects
- Created summary reports and figures; interfaced with clients and partners
- Designed and trained Computer Vision, Object Detection, Generative Adversarial Network, Stable Diffusion, and Natural Language Processing machine learning models and Monte Carlo and Nested Sampling statistical models
- Located, characterized, and processed large data sets using supercomputing resources
- Performed on-site data collection of unmanned aircraft visual and infrared data
- Developed success metrics and performed statistical analysis of machine learning model outputs
- Technical lead writer for successful SBIR/STTR proposals; developed technical approach, performed patent searches, and developed statements of work and task timelines.

Physics Department, Carnegie Mellon University, Pittsburgh, PA 2015-2021
Graduate Research Assistant

- Simulated millions of mock data points with accurate treatment of observational uncertainties
- Created methods for automatic rejection of anomalous data points
- Used Maximum Likelihood, Markov chain Monte Carlo, Neural Network, and Random Forest methods to fit models to data
- Developed novel statistical and physical models for describing the positions and velocities of extragalactic stars
- Created efficient models to fully utilize supercomputing resources
- Lead author responsible for writing text and constructing plots for peer-reviewed first-author papers
- Presented research results at academic conferences and public lectures

Carnegie Science Center, Pittsburgh, PA 2021-present
Planetarium Presenter

- Performed visitor Q&A sessions, planetarium shows, and educational demonstrations. Supervised public telescope events
- Experienced with computerized and manual telescopes, as well as planetarium software
- Presented lectures for adults and school programming

PUBLICATIONS

GAN-based Satellite Imaging: A Survey on Techniques and Applications. 2022; IEEE Access. doi: 10.1109/ACCESS.2022.3221123.

Stellar Density Profiles of Dwarf Spheroidal Galaxies. 2020; The Astrophysical Journal. Volume 892, Number 1, 27. doi.org/10.3847/1538-4357/ab7459

Proposed low-energy absolute calibration of nuclear recoils in a dual-phase noble element TPC using D-D neutron scattering kinematics. 2017; Nuclear Instruments and Methods in Physics Research Section A, Volume 851, 68-81. doi.org/10.1016/j.nima.2017.01.053

AWARDS

- George E., S 1945, and Marjorie S. Pake Presidential Fellowship in Physics (2016)
- NASA Rhode Island Space Grant (2014)
- Brown Undergraduate Teacher and Research Award (2013)

PRESENTATIONS

- The Promise and Perils of Synthetic Satellite Images.* Presented at GEOINT 2022 Symposium Lightning Talk, April 2022.
- Large-Scale Astronomical Surveys for Debris Detection.* Presented at IARPA 2022 Orbital Debris Detection & Tracking RFI Workshop, April 2022.
- Comparing Emergent Gravity to Dark Matter in Dwarf Spheroidal Galaxies.* Presented at AAS 237, Jan 11, 2021.
- Stellar Density Profiles of Dwarf Spheroidal Galaxies.* Presented at AAS 235, Jan 5, 2020.

TEACHING EXPERIENCE

Physics Department, Carnegie Mellon University

2015-2021

Teaching Assistant

- Teaching Assistant/Grader for: Introductory Astronomy, Physics for Future Presidents, Physics of Musical Sound, Science and Science Fiction, Basic Experimental Physics, Experimental Physics, Modern Physics Laboratory, and General Relativity
- Led problem sessions and office hours, developed homework assignments
- Participant in Carnegie Mellon's Future Faculty Program to acquire research-based teaching methods, 2019-2020
- Selected by physics department to train new teaching assistants, 2016-2021

OUTREACH

Carnegie Science Center, Pittsburgh, PA

2016-2021

Expert Volunteer

- Performed visitor Q&A sessions, planetarium shows, and educational demonstrations during public telescope events
- Presented lectures for adults and school programming

Steel City Improv Theater, Pittsburgh, PA

Expert Interviewee

- Interviewed as part of 24-hour fundraising drive, 2020
- Guest on "Absolute Truth," 2020

SKILLS and INTERESTS

Programming: Mathematical and data science applications of Python, Fortran, Julia, and Mathematica.

Observational: Created optical fiber maps and hand plugged optical fibers into plate masks for 6 nights of nighttime observations at the 6.5-meter Magellan/Clay telescope at Las Campanas Observatory, Chile.

Software: Experienced with Linux, Mac, and Windows operating systems

Interests: Cellist, performing with music graduate students at CMU school of music (3 years); house team member at Steel City Improv Theater (3 years); Level 2 dog handler at Animal Friends Shelter (2 years).