

FREDDY CABAN

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<https://frcaban.github.io/>

I'm a second-year master's student at Stony Brook University interested in gravitational waves and active galactic nuclei (AGN). I have recently grown an interest in dark matter and dark energy and plan to make that my research thesis.

EDUCATION

Master of arts in Physics, and Advanced Graduate Certificate in Data and Computational Science, current GPA 3.86

Stony Brook University, Stony Brook, NY

Anticipated Graduation date May 2024

Bachelor of Science in Physics with Departmental Honors

Queens College CUNY, Flushing, NY

Graduation Date: June 2021

Associate of Science in Mathematics with Honors

Borough of Manhattan Community College, NY, NY

Graduation Date: December 2018

RESEARCH EXPERIENCE

American Museum of Natural History, New York, New York

2018-

- Analyzed the interaction between stars and stellar mass black holes with the gas disk of active galactic nuclei (AGN)
- Used Python and MATLAB for programming and calculations
- Used GeoGebra to drag figures in 3D space for visualization
- Derived equations for the the arc length distance traveled by an orbiter through the gas disk as well as loss of energy due to gas drag and the time for stellar object capture
- Applied the concepts of classical mechanics such as Kepler's law's of motion, the law of universal gravitation, drag force, work and conservation of energy laws to help formulate a capture time function

PUBLICATIONS

Journal Publications

Gaia Faj, Syeda S. Nasim, Freddy Caban, et al, Aligning nuclear cluster orbits with an active galactic nucleus accretion disc, *Monthly Notices of the Royal Astronomical Society*, Volume 499, Issue 2, December 2020, Pages 2608–2616

PRESENTATIONS AND MEETINGS

Presented:

“The Importance of Grind Time in AGN Accretion Disks”
New York University Astrofest poster presentation, 2018

“Gravitational Wave Sources in Active Galactic Nuclei (AGN)”
New York University Astrofest poster presentation, 2019

Meeting:

Several meetings regarding the future of the Arecibo Observatory in Puerto Rico in 2020 prior to its collapse

COURSEWORK

Stony Brook University (Graduate)

Physics: Stars, Dark Universe, Computational Astrophysics, The Interstellar Medium
Computing: Data and Computational Science, Scientific Programming in C++, Python and Application of Python Programming to Probability and Statistics in Advanced Computer Science
Other: Communicating Science

Queens College (Undergraduate)

Physics: Classical Mechanics, Quantum Mechanics, Thermodynamics and Statistical Mechanics, Optics, Solid State Physics, Method of Mathematical Physics I & II, Modern Physics, Classical and Modern Physics Laboratory, Electricity and Magnetism I & II
Mathematics: Partial Differential Equations

Borough of Manhattan Community College (Undergraduate)

Physics: University Physics I & II
Mathematics: Calculus I, II & III, Statistics, Linear Algebra, Differential Equations and Advanced Calculus

COMPUTING SKILLS

Programming:

Python: NumPy, SciPy, matplotlib, pandas, AstroPy, TensorFlow, Keras

Other languages: LaTeX, C++, C, MATLAB, HTML, Markdown

Software: VS Code, Jupyter, Linux, Bash

WORK EXPERIENCE

Correction Officer, New York City Department of Correction, East Elmhurst, N.Y.

June 2006 - Present

- Supervised the inmate population in order to ensure their safety and security which included congregate activities such as visits, recreation and program services
- Observed inmate behavior and made recommendations concerning medical and/or mental health referrals
- Completed forms and provided written reports regarding various incidents not limited to inmate fights and contraband discoveries
- Worked in all administrative areas where I used Microsoft Word and Excel to put together charts and spreadsheets in order to analyze data trends

Recognition

- Received a letter of appreciation from the Warden in 2009
- Employee of the Month for July 2013
- Received a letter of appreciation from the Warden in 2014

Special Training

- Crisis intervention management training (CIT) which included recognizing various psychological disorders such as bi-polar disorder, schizophrenia and mania in order to help deescalate high tension situations
- Interpersonal communication skills (IPC)
- First Aid, cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED)

OTHER

Interests/Hobbies: I enjoy running in different parks, working out, and bike riding. I love to travel and have been to Madrid and Barcelona as well as several parts of Mexico and Belize and I've been to Montreal Canada. I hope to experience the history and culture of many other parts of the world. I enjoy reading books on the mysteries of the universe such as Stephen Hawking's "*A Brief History of Time*" and Brian Greene's "*Until the End of Time: Mind, Matter, and Our Search for Meaning in an Evolving Universe*".