# FREDDY CABAN

freddy.caban84@gmail.com
freddy.caban@doc.nyc.gov
https://frcaban.github.io/

I have earned my master's degree in physics along with an advanced graduate certificate in data and computational science from Stony Brook University.

## EDUCATION

Master of Arts in Physics, Cum Laude
Stony Brook University, Stony Brook, NY
Graduation date: May 2024

Advanced Graduate Certificate in Data and Computational Science
Stony Brook University, Stony Brook, NY
Award date: December 2023

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        May 2018- May 2023

- 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 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 laws 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 Fabj, 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

Syeda S. Nasim, Gaia Fabj, Freddy Caban, Amy Secunda et al. Aligning retrograde nuclear cluster orbits with an active galactic nucleus accretion disc, *Monthly Notices of the Royal Astronomical Society*, Volume 522, Issue 4, July 2023, Pages 5393-5401

## 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, Data Analysis
Thesis: Migration-Coupled Disk of Gas and Stars
*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++, MATLAB, HTML, Markdown

**Software**: VS Code, Jupyter, Linux, Bash, SPSS

## 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*

- Letter of appreciation from the Warden in 2009
- Employee of the Month for July 2013

- 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 have always loved running and have been a member of the New York Road Runners training group since March of 2023 and recently completed my first marathon (the New York City marathon) in November of 2024. I enjoy weightlifting, bike riding, hiking and anything that helps me stay in shape. I love to travel and have been to Spain, Mexico, Belize as well as Canada. I also plan to visit each of the 50 states at least once with my most recent adventures in Utah and Alaska. 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*".