

# Naomi Gluck

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## EDUCATION

### Yale University | Physics PhD Program - 2nd Year

Advisor: Dr. Daisuke Nagai

Aug. 2021 – Present

New Haven, CT

### Stony Brook University

Bachelor of Science in Physics

Bachelor of Science in Astronomy and Planetary Sciences

Minor in Music

Aug. 2017 – May 2021

Stony Brook, NY

Stony Brook, NY

Stony Brook, NY

## PUBLICATIONS

### Galactic Atmospheres

April 2022

- Oppenheimer, B. D., Nagai, D., Lau, E., Singh, P., Contreras, A. B., Gluck, N., ... Villaescusa-Navarro, F. (2022). *A Multi-Wavelength, Multi-Model Exploration of How Feedback Disrupts Gaseous Atmospheres*.

### Royal Astronomical Society Main Journal

April 2020

- Gofman, R., A., Gluck, N., & Soker, N. 2020, MNRAS 494, 5230: *Enhanced mass-loss rate evolution of stars with mass greater than  $18 M_{\odot}$ , and missing optically-observed type II supernovae*

## RESEARCH EXPERIENCE

### Graduate Research

Yale University, Dr. Daisuke Nagai

September 2021 – Present

New Haven, CT

- Using AI accelerated simulation techniques to analyze the evolution and tracking of dark matter halos and subhalos surrounding galaxies and other substructure.
- Working with the CAMELS (Cosmology and Astrophysics with Machine Learning Simulations) dataset, detailing the correlation between dark matter, stellar, and gas densities.
- Projects in collaboration with faculty and researchers from CalTech, University of Texas-Austin, and Argonne National Lab High Energy Physics.

### Argonne National Lab | Graduate Researcher

UChicago Argonne, Dr. Andrew Hearin

May 2022 – August 2022

Lemont, IL

- Worked remotely in the Argonne National Lab High Energy Physics department as a graduate researcher, focusing on the Halo-Galaxy connection using forward modeling techniques.
- Focused on implementing new physical components into SatGen (galaxy evolution and tracking model), specifically implementing a differentiable modeling pipeline for the orbital evolutionary history of subhalos and satellite galaxies.
- Created a diffstats pipeline to determine peri-centric distance and time of a simulated NFW subhalo, based on varying initial orbital conditions.

### Undergraduate Research | Physics Thesis

Stony Brook University, Dr. Alan Calder

September 2019 – August 2021

Stony Brook, NY

- Studied Uncertainty Quantification for  $1 M_{\odot}$  following the MESA open source code to determine the validity and bounds of two different wind parameters.
- Analysed simulation results to extract data to quantify and visually assess the effects of uncertainty in the winds.
- Learned and applied Parallel Computing techniques by performing suites of MESA simulations on our campus cluster SeaWulf.
- Worked on this project as a paid researcher during Summer 2020.

### Undergraduate Research | Astronomy Thesis

Stony Brook University - Dr. Fredrick Walter

September 2020 – December 2020

Stony Brook, NY

- Data analysis of Nova V1047 using archival spectroscopic data from Stony Brook/SMARTS to perform a spectral time analysis on two different events.
- Used Python for data analysis, along with spectral catalogues for result confirmation.

### Undergraduate Research

Technion Institute of Technology, Dr. Noam Soker

July. 2019 – April 2020

Haifa, Israel

- Research conducted at the Technion Institute of Technology in Israel.
- Used MESA (Modules for Experiments in Stellar Astrophysics) open source code to simulate the evolution of several different progenitor stars with variations on wind and mass loss parameters, and Matlab for data analysis and calculations.

## Observational Astronomy

September 2020 – December 2020

*Stony Brook University - Dr. Fredrick Walter*

*Stony Brook, NY*

- Observations of the cataclysmic variable star, SS Cygni, using Stony Brook's 14" telescope and CCD camera.
- Used computer programs CCDSoft and SkyChart to position the telescope throughout observational period.
- Analyzed FITS image files through Python, presented on a poster for final project presentations.

## PRESENTATIONS

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### GAINS Conference

April 2022

*Yale University*

*New Haven, CT*

- Presentation on how to succeed while pursuing a STEM degree as women and minorities, using my Trial and Error website as inspiration.
- Answered questions in a panel format on graduate student lifestyle, work-life balance, my journey through undergrad, advice for certain scenarios, etc.

### IACS Seminar

April 2021

*Stony Brook University - Dr. Douglas Swesty*

*Stony Brook, NY*

- Seminar on the propagation of uncertainty through computer simulations.
- Discussed Uncertainty Quantification Research results and explained how models of uncertainty propagation are used in the open source code, MESA.

### SBYIR: Young Investigators Review

November 2020

*Stony Brook University*

*Stony Brook, NY*

- Live presentation via Zoom on research conducted at Stony Brook, specifically the current results of the Uncertainty Quantification (UQ) Study.

### URECA: Undergraduate Research Symposium

May 2020

*Stony Brook University*

*Stony Brook, NY*

- Poster and live presentation via Zoom on research conducted at the Technion Institute in Israel.

## TEACHING AND BROADER IMPACTS

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### Teaching Fellow

September 2021 - Present

*Yale University*

*New Haven, CT*

- Undergraduate Courses: PHYS 200 (Fundamentals of Physics – Fall 2021), PHYS 120 (Quantum Physics and Beyond – Spring 2022), PHYS/ASTR 343 (Gravity, Astrophysics, and Cosmology – Fall 2022)

### Trial and Error | [Link](#)

July 2021 - Present

*Yale University*

*New Haven, CT*

- Website built to help physics students through their undergraduate journey and advice for applying to graduate programs.
- Based on personal experience with both the undergraduate and graduate application process, along with research experiences and recommendations.
- Offering advice on completing the physics program, or any program in general, alongside dealing with ADHD.

### Seawolves for Israel | President

August 2018 – May 2021

*Stony Brook University*

*Stony Brook, NY*

- Organize and lead weekly general and executive body meetings to educate others about Israel's history, culture, and international relations. This includes working together with other student-led groups on campus, like the Jewish Student Association, College Republicans, The Environmental Club, Hillel, and the Iranian Jewish Club to broaden interactions between students.
- Previously served on the Executive Board as Secretary (2018), and Vice President (2019).
- Launched and taught a Hebrew 101 class over zoom. Created teaching materials, supplementary materials and assignments, taught vocabulary, conversational Hebrew, and reading comprehension (July - August 2020).

### Tutoring

August 2016 – Present

*Self-Employed*

*Oyster Bay, NY*

- Tutoring students (in-person and online) in Physics, Math, Biology, Chemistry, and Earth Science.

## PROJECTS

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### Computing for Scientific Research | Final Project

Spring 2022

*Yale University, Dr. David Moore*

*New Haven, CT*

- Project focused on the JAX-implemented optimization of a toy model representation of mass loss experienced by dark matter subhalos surrounding galaxies.
- Learned how to train a function such that it improves results given a best value for a set of target parameters, such that the now optimized function can be used in forward modeling techniques as the basis for modeling with AI.

### Senior Tutorial in Advanced Topics

Spring 2021

*Stony Brook University, Dr. Michael Zingale*

*Stony Brook, NY*

- Tutorial on graduate-level computational astrophysics, to understand the design of numerical algorithms, limitations of numerical methods, and applications to astrophysics.

## RELEVANT COURSEWORK

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### Graduate

2021 – Present

*Yale University*

*New Haven, CT*

- Graduate Classical Mechanics, Graduate Quantum Mechanics I, Math Methods
- Statistical Mechanics, Graduate Quantum Mechanics II, Computing for Scientific Research

### Undergraduate

2019 – 2021

*Stony Brook University*

*Stony Brook, NY*

- Galaxies, General Relativity, Electromagnetic Theory II, Stars and Radiation, Special Topics: Exoplanets, Cosmology

## TECHNICAL SKILLS

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**Computational Science:** Techniques of parallel computing including parallelization by both threads (OpenMP) and message passing (MPI), job submission with Slurm, and software management with Modules.

**Languages:** Python/Jupyter, C/C++, LaTeX, Matlab, Fortran, Mathematica

**Libraries:** NumPy, Matplotlib, pandas, rebound, Astropy, Scipy, Statistics

**Software Skills:** MESA, DS9, CCDSoft, SkyChart, Microsoft Office, Pages, Numbers, Keynote, Procreate, Photoshop, Pixelmator, iMovie, LTSpice, Sibelius

**Operating Systems:** Linux, MacOS, Windows

## WORK EXPERIENCE

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### Boost Tutors and Mentors

September 2021 – Present

*Online Tutoring, Jesse Leibman*

*New Haven, CT*

- Tutoring students online in any math or science course.
- Helping students to build confidence in their own abilities, and introducing better study methods for improving their course grades.

### Business Partnership

May 2020 – Present

*Online Startup*

*Oyster Bay, NY*

- Established online custom graphics art company.
- Use Procreate on iPad to design all custom artwork for merchandise including face masks, pillows, and blankets, specifically partnering with Stony Brook University Hillel, SUNY Geneseo Hillel, and Ohio State Hillel.

### StandWithUs Emerson Fellowship

August 2019 – May 2020

*Stony Brook University*

*Stony Brook, NY*

- Partnered with other clubs and organizations at SUNY Stony Brook to create 12 Israel-related events that impacted approximately 150 students.
- Participated in the StandWithUs conference in January 2020 in Los Angeles, to enhance critical thinking, networking, and public speaking skills.

## LEADERSHIP ROLES AND ACTIVITIES

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### **Stony Brook Hillel Board of Directors**

August 2020 – May 2021

*Stony Brook University*

*Stony Brook, NY*

- Discuss the changes necessary to adapt Hillel events, including holiday services, to the limitations of an online-only platform.
- Representative of the student-body to clarify to board members what will work more effectively to capture a student's interest.

### **Society of Physics Students | General Member**

August 2017 – May 2021

*Stony Brook University*

*Stony Brook, NY*

### **University Orchestra | Principle Oboe**

August 2017 – May 2021

*Stony Brook University*

*Stony Brook, NY*

## FOR MORE INFORMATION

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**LinkedIn:** <http://linkedin.com/in/naomigluck>

**Trial and Error:** <https://naglucxxx.wixsite.com/trialanderror>

**Humans of Hillel:** <https://tinyurl.com/y3b53rf8>