

## EDUCATION

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### Yale University

*Astronomy PhD Student, Thesis Advisor: Prof. Daisuke Nagai*

New Haven, NJ

*Aug. 2021 – present*

### Princeton University

*B.A. in Astrophysics; Certificates in Applications of Computing and Russian Language*

Princeton, NJ

*Sep. 2017 – Jun. 2021*

## PUBLICATIONS

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**Medlock, I.**, Neufeld, C., and Nagai, D., et al., “Quantifying Feedback in CAMELS: The impact of stellar and black hole feedback on galaxy evolution”, in preparation

**Medlock, I.**, Nagai, D., Singh, P., Oppenheimer, B., Anglés-Alcázar, D., and Villaescusa-Navarro, P., “Probing the Physics of the Circum-galactic Medium using Fast Radio Bursts: Insights from CAMELS”, 2024, *ApJ*, in press (astro-ph/2403.02313)

**Medlock, I.**, and Cen, R., “Dispersion Measure Distributions of Fast Radio Bursts Due to the Intergalactic Medium”, 2021, *MNRAS*, 502(3), 3664-3669.

Oppenheimer, B., Nagai, D., Lau, E., Singh, P., Butler Contreras, A., Gluck, N., Dorigo Jones, J., **Medlock, I.**, and Villaescusa-Navarro, P., “A Multi-Wavelength, Multi-Model Exploration of How Feedback Disrupts Gaseous Atmospheres”, 2022, *Bulletin of the AAS*, 54(1).

Singh, P., Nagai, D., Oppenheimer, B., Lau, E., Gluck, N., and **Medlock, I.**, “Galactic Gaseous Halos: Mini-Clusters Disrupted by Feedback”, 2022, *Galactic Atmospheres*.

## PRESENTATIONS

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**Baryons in the Universe 2024** at Kavli IPMU, Kashiwa, Japan (Talk)

*Apr 11th, 2024*

**FRB2023** at IISER Bhopal, Indore, India (Remote Talk)

*Nov 9th, 2023*

**SACNAS National Diversity in STEM Conference** in Portland, Oregon (Poster)

*Oct 27th, 2023*

**American Physical Society April Meeting** in Minneapolis, Minnesota (Poster)

*Apr 17th, 2023*

**American Astronomical Society Winter Meeting 241** in Seattle, Washington (Poster)

*Jan 12th, 2023*

**CAMELS Workshop** at the Center for Computational Astrophysics (Talk)

*Nov 30th 2022*

**SACNAS National Diversity in STEM Conference** in San Juan, Puerto Rico (Talk)

*Oct 28th, 2022*

**Princeton Physics Junior Paper Symposium** (Remote Talk)

*Apr 19th, 2020*

## RESEARCH EXPERIENCE

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### Cold Streams: The Umbilical of High-z Galaxies

*Aug 2023 - present*

- **PhD Thesis (with Daisuke Nagai)**: Developing high-resolution zoom-in simulations to study the interaction of cold streams feeding star-forming high-z galaxies with the circumgalactic medium.

### Quantifying Feedback in the CAMELS Project

*Aug 2023 - present*

- **Co-mentoring Theory Project by Chloe Neufeld with Daisuke Nagai**: Quantifying the energetics of AGN and SNe feedback and the effect on halo properties such as the CGM gas fraction.

### Probing the Physics of the CGM using FRBs: Insights from CAMELS

*Sep 2021 - March 2024*

- **Theory Project with Daisuke Nagai**: Used CAMELS to study fast radio bursts as probes of baryons in the circumgalactic medium and the effect of feedback.

### AGN Classification with Modulos

*Aug 2022 - Sep 2023*

- **Observational Project with Meg Urry**: Used Modulos (machine learning software) along with AGNDB to develop algorithms to classify AGN.

## Electron Acceleration in Simulations of Collisionless Shocks

*Jun 2020 - May 2021*

- **Senior Thesis with Anatoly Spitkovsky:** Studied electron acceleration in simulations of collisionless shocks. Developed methods for visualizing particle reflection and acceleration using Paraview and Python. Participated in the Princeton Astrophysics Undergraduate Summer Research Program.

## Analysis of Vertical Structures of Edge-On Galaxies Using HSC-SSP

*Feb 2020 - May 2020*

- **Junior Paper with Jenny Greene:** Identified sample of edge on nearby galaxies. Using imaging techniques and model fitting, investigated the diversity of vertical structures and connection to galaxy formation and evolution.

## Dispersion Measure Distributions of Fast Radio Bursts

*Oct 2019 - Jan 2020*

- **Junior Paper with Renyue Cen:** Used simulation data to calculate the dispersion measure of FRBs, considering redshift, phases of gas, and contribution of the IGM.

## FELLOWSHIPS AND AWARDS

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### NSF ACCESS Computing Grant (Co-PI) with Daisuke Nagai (PI)

*2024*

- **Title::** Simulating Cold Gas Streams Feeding High-Redshift Galaxies
- **Allocation:** 300k Stampede3 node hours (equivalent of \$62k)

### Yale Graduate Student Assembly Conference Travel Fellowship (\$800)

*2024*

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*2023*

### APS Division of Astrophysics April Meeting Travel Grant (\$300)

*2023*

### American Astronomical Society FAMOUS Travel Grant (\$1000)

*2023*

### Dean's Emerging Scholars Research Award, Yale University (\$2000)

*2022*

### SACNAS NDiSTEM Conference Travel Fellowship (\$1000)

*2022*

## ACTIVITIES AND OUTREACH

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### SACNAS Yale Chapter

*Jan 2023 - ongoing*

- **Secretary and Treasurer:** In charge of communications, and managing funding. Assist in event planning.
- **Recruiter:** Recruiter for Yale Astro at NDiSTEM, 2022 and 2023

### Yale Cosmology Seminar

*Sep 2023 - ongoing*

- **Co-Organizer:** Invite and host weekly speakers. Facilitate seminar.

### Leitner Family Observatory and Planetarium at Yale

*Feb 2023 - ongoing*

- **Presenter:** Present to and assist in monitoring school visits to the Planetarium.
- **Leitner Planetarium Spanish Night:** Creator and organizer of Spanish Public Nights at Leitner Planetarium (including Planetarium shows and telescope viewing), targeted towards the Spanish-speaking community in New Haven.

### Science in the News

*Oct 2022 - May 2023*

- **Presenter:** Present short talks on exciting science topics at local libraries and schools.

### Yale Astronomy Siblings

*Sep 2022 - present*

- **Graduate Student Mentor:** Paired with undergraduate astronomy student as a mentor for advice including on research experiences and graduate school applications.

### Astronomy Climate and Diversity Committee

*Sep 2022 - present*

- **Member:** Working on putting together report of best practices for graduate school admissions interviews

## PROFESSIONAL SOCIETIES

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- Society for the Advancement of Chicanos/Hispanics & Native Americans in Science** *Sep 2021 - present*  
**American Astronomical Society (AAS)** *Sep 2021 - present*  
**Yale Women in Physics (WiP)** *Sep 2021 - present*  
**Princeton Undergraduate Women in Physics (PUWiP)** *Apr 2018 - May 2021*
- **Co-President (2020)**: Planned Junior Paper Symposium and spearheaded formation of mentorship program for local high schools

## TEACHING EXPERIENCE

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- Eduexplora Yale Summer Session** *July 2023*
- **Instructor**: Developing two week intro to astronomy course that will be taught to Latin American high school students, visiting Yale through the Eduexplora program.
- Teaching Fellow - ASTR 120: Galaxies and the Universe, Yale** *Jan - May 2023*  
**Teaching Fellow - ASTR 160: Frontiers and Controversies in Astrophysics, Yale** *Sep - Dec 2022*  
**Teaching Fellow - ASTR 180: Introduction to Relativity and Black Holes, Yale** *Jan - May 2022*  
**Teaching Fellow - ASTR 110: Planet and Stars, Yale** *Sep - Dec 2021*  
**Integrated Science Curriculum Tutor, Princeton** *Sep 2018 - May 2019*

## SKILLS

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**Technical**: Java, Python, Javascript, C, MATLAB, HTML, Paraview  
**Language**: Native Spanish speaker; Intermediate Russian