Snigdaa S. Sethuram

Snigdaa Sethuram | www.snigdaasethuram.com | snigdaa.ram@gmail.com

Education

Ph.D. Physics Georgia Institute of Technology, Atlanta, GA — Fall 2019 - Spring 2025
M.S. Physics Georgia Institute of Technology, Atlanta, GA — Fall 2019 - Summer 2020
Certificate in Data Science Rutgers University Trilogy Education, Piscataway, NJ — September 2018 - June 2019
B.S. Astrophysics Rutgers University, New Brunswick, NJ — May 2018

Research & Technology Experience

Argonne Scholar - Margaret Butler Fellow — June 2025 - Present
Argonne National Laboratory

- Developed agent models to interface with Argonne LLM models and procure data analytics of cosmological simulations in the ExaSky suite

Graduate Research Assistant — January 2020 - May 2025
Advisor: Dr. John Wise
Center for Relativistic Astrophysics, School of Physics, Georgia Institute of Technology

- Developed a machine learning model to emulate stellar feedback effects during simulation runtime, implemented in the astrophysical software Enzo
  * Received NASA FINESST (fully funded 3-yr $150k) Fellowship to investigate this work
- Simulated early galaxy and black hole spectral signatures to infer properties from James Webb observations

Pre-doctoral Fellow — August 2021 - January 2022
Advisors: Dr. Chris Hayward, Dr. Rachel Cochrane, Dr. Viviana Acquaviva
Center for Computational Astrophysics, Flatiron Institute, New York, NY

- Created a neural network to predict spectral energy distributions of galaxies in the IllustrisTNG50 simulation, a highly studied and commonly used simulation when studying galactic properties
  * Model is expandable to other simulations with similar physical prescriptions and galaxy properties
- Published code on Github for public use to be adapted to individual simulations for most accurate predictions

Undergraduate Research Assistant — August 2015 - August 2018
Advisors: Dr. Rachel Somerville and Dr. Ena Choi
Department of Physics, Rutgers University

- Analyzed spiral galaxies and created mock observations using radiative transfer code Powderday
- Studied mass-to-light ratio trends in massive galaxies to empirically constrain halo mass-stellar mass relations
  * Received High Honors on transcript for capstone thesis work

National Science Foundation (NSF) Research Experience for Undergrads — Summer 2016
Advisor: Dr. Stephen Zepf and Dr. Mark B. Peacock
Department of Physics & Astronomy, Michigan State University

- Performed photometric analysis on the Virgo Galaxy Cluster (VGC) using Source Extractor and IRAF
- Queried and cleaned data from the Hubble telescope and the Sloan Digital Sky Survey (SDSS) SQL database to compare "identical" filters of SDSS and Hubble telescopes and determine a gradient between the two telescopes

Engineering Manager — August 2015 - May 2018
Rutgers University Television Network
Piscataway, NJ

- Trained 10 engineers and 16 production members, managed 6 engineers at any one time
- Facilitated new methods to streamline communication between engineering and production teams, increasing production output by 3 broadcast-length shows per week
- Installed servers and fiber system across Rutgers campus and in-studio for higher broadcast speeds and data transfer rates between studio recording and live output
- Chief engineer for live shows produced by RUTV

Publications

Snigdaa S Sethuram, John H Wise, *CosmoConv – Stellar Feedback In-Painting With Convolutional LSTMs* (in prep)

Vincent A Horvath, **Snigdaa S Sethuram**, John H Wise, *Predicting Stellar Masses of the First Galaxies Using Graph Neural Networks*, Research Notes of the American Astronomical Society, Volume 8, April 2024

Snigdaa S Sethuram, Rachel K Cochrane, Christopher C Hayward, Viviana Acquaviva, Francisco Villaescusa-Navarro, Gergö Popping, John H Wise, *Emulating radiative transfer with artificial neural networks*, *MNRAS*, Volume 526, Issue 3, Dec 2023

Ben C Sherwin, **Snigdaa S Sethuram**, Corey Brummel-Smith, John H Wise, *Predicting the UV Escape Fraction of the First Galaxies in the Renaissance Simulations with Machine Learning*, Research Notes of the American Astronomical Society, Volume 7, Nov 2023

Corey Brummel-Smith, Danielle Skinner, **Snigdaa S Sethuram**, John H Wise, Bin Xia, Khushi Taori, *Inferred galaxy properties during Cosmic Dawn from early JWST photometry results*, *MNRAS*, Volume 525, Issue 3, Nov 2023

Desika Narayanan, Matthew J Turk, Thomas Robitaille, Ashley J Kelly, B Connor McClellan, Ray S Sharma, Prerak Garg, Matthew Abruzzo, Ena Choi, Charlie Conroy, Benjamin D Johnson, Benjamin Kimock, Qi Li, Christopher C Lovell, Sidney Lower, Georgia C Privon, Jonathan Roberts, **Snigdaa Sethuram**, Gregory F Snyder, Robert Thompson, John H Wise, *POWDERDAY: Dust Radiative Transfer for Galaxy Simulations*, The Astrophysical Journal Supplement Series, 252, 12, 2021

Honors & Awards

Argonne Margaret Butler Fellowship (2-yr independent research) 2025 - 2027
Future Investigators in NASA Earth and Space Science and Technology Fellowship ($150k) 2022 - 2025
Amelio Travel Award ($1000) Spring 2022
Pre-doctoral Fellow at the Flatiron Institute's CCA Fall 2021
High Honors in Astrophysics, Rutgers University Spring 2018
School of Arts and Sciences Honors Scholar at Rutgers University 2014 - 2018
Top Poster Presenter at APS CUWiP in Princeton January 2017

Professional Activities

Cosmology & Galaxies w/ Simulations and ML @ Flatiron Institute; *Attendee and Poster Presenter* Dec 2024
First Stars and Galaxies VII in NYC @ Flatiron Institute; *Attendee and Poster Presenter* May 2024
International HPC Summer School @ Atlanta, GA; *Student* July 2023
ENZO Days Conference @ UCSD Supercomputing Center; *Attendee* May 2023
European Astronomical Society 2022 Conference @ Valencia, Spain; *Attendee and Poster Presenter* July 2022
From Stars to Galaxies III Conference @ Gothenburg, Sweden; *Attendee and Poster Presenter* June 2022

Teaching Experience

PHYS 2212 - Intro Physics II: Electricity and Magnetism - Lab Spring 2020
PHYS 2211 - Intro Physics I: Mechanics - Recitation Fall 2019
Physics, Math, and Python Tutor with Varsity Tutors August 2018 - August 2019
Assistant Teacher at Rutgers University Science Bus August 2016 - February 2018

Outreach & Communication

GT Physics Allies for Wellness Co-Founder and Mentor Fall 2022 - Present
GT Graduate Association of Physicists Mentor Fall 2021 - Present
Astronomy on Tap Series Speaker Dec 2022, Nov 2024
National Society of Black Physicists Conference GT Liaison November 2023
Atlanta Science Festival Volunteer March 2021, 2022, 2023
Black and Minority Students in Physics at Rutgers GT Recruiter, Speaker November 2022
GT Judicial Committee Jury Member Fall 2021 - 2023
GT Graduate Student Diversity Council Member Fall 2019

Leadership and Service

Conference for Undergraduate Women in Physics Organizing Committee Co-lead Spring 2023 - Spring 2024

- Planned and executed the regional 2024 Conference for Undergraduate Women in Physics at Georgia Tech for over 200 attendees and volunteers
- Coordinated speakers, workshops, and panels while managing schedules, finances, regional team's inbox, and slack workspace for conference weekend
- Delegated tasks among the regional team while prioritizing goals and regulations laid out by the national committee

Physics Allies for Wellness (PAW) Co-Founder and Mentor Fall 2022 - Present

- Built the constitution for PAW mentors and laid the groundwork for communication infrastructure with department
- Worked with the Diversity, Equity, and Inclusion committee as well as the chair of the School of Physics to make data collection as a PAW mentor transparent and practical
- Acted as a mentor to School of Physics graduate and undergraduate students for both academic and personal issues
- Completed Safe Space, Implicit Bias, and QPR training

Graduate Association of Physicists President Summer 2021 - Spring 2022

- Facilitated the graduate mentor program, ensuring incoming first-year students were paired with a senior graduate student
- Assembled and presented talks for first-year students on picking advisors, communicating with course instructors, thinking about a path through the PhD and using school resources, and resolving interpersonal issues with their peers
- Budgeted, planned, and executed weekly social events, monthly career events, and semesterly listening sessions

Graduate Association of Physicists Vice President Summer 2020 - Spring 2021

- Innovated virtual spaces for students to gather and interact or study together due to campus being closed for the pandemic
- Contributed to action plan proposals for the DEI committee regarding fair treatment of students, reparations to minority groups, and best practices for teaching assistants and professors
- Created new social and career events for graduate students to attend virtually or in person

Mentored Students

Vincent Horvath Georgia Institute of Technology, Atlanta, GA July 2022 - April 2024
Undergraduate Research Mentor

Benjamin Sherwin Georgia Institute of Technology REU Student Summer 2023
REU Research Mentor

Samantha Hardin, Karin Roley, Rachel Nere, Sachin Venkatesh
Graduate Association of Physicists Mentor

Skills

Scripting & Data Platforms	Python, Bash, JavaScript, Fortran, SQL, CSS/HTML, Tableau, Heroku
Operating Systems	Unix/Linux, Windows Powershell
Open-Source Software Contributions	Enzo, Enzo-e, Powderday
Vocational Tech	High Performance Computing, Cluster account management, Automation pipelining, ML designing/architecting, large data storage and transfer
Collaborative Platforms	Github, HuggingFace, Slack, Discord, Microsoft Teams, Zoom
Communication and Leadership	Technical Presentations, Public Speaking, Technical/Research Papers, Committee Planning and Leading, Project Manager, Panel Moderation, Panel Participation