Sujay Nair

Personal Website, Google Scholar, snair303@gatech.edu, US Citizen

EDUCATION

Georgia Institute of Technology, Atlanta, GA 2022-2026
Double Major: B.S. in Computer Science; B.S. in Mathematics; (Cum. GPA 3.85/4.0)
Honors: Deans Scholarship for College of Sciences, Faculty Honors

EXPERIENCE

Undergraduate Research Assistant Fall 2023-Present
MIT Climate & Sustainability Consortium, Cambridge, MA
Advisors: Dr. Evan Coleman, Prof. Sherrie Wang, Prof. Elsa Olivetti
Training neural networks to infill mineral presence and infer geological properties of soil; applications in carbon capture and mineral discovery. Publications at ICLR Climate Workshop 2024, AAAI 2026, Nature (planned).

Machine Learning Intern Summer 2023
Fifth Set Analytics, San Francisco, CA
Trained neural networks for automated foul calling/refereeing for basketball building on pre-trained pose estimation models (MMPOSE, MMDetection).

Undergraduate Research Assistant Spring 2023
Georgia Tech Robot Learning and Reasoning Lab, Atlanta, GA
Advisor: Prof. Danfei Xu
Developed methods for human hand-tracking for Franka robot arm using RealSense D435 camera and pre-trained hand pose estimation models.

Research Intern
NASA Jet Propulsion Lab (JPL), Pasadena, CA Summer/Fall 2021
Advisor: Dr. Kyle Pearson
Trained convolutional neural networks to detect 5000+ Extrasolar Planet transits and recurrent neural networks to predict 4 planetary parameters (RP/RS, A/RS, Period, Mid-transit Time), poster at American Astronomical Society.

Student Researcher 2019-2022
NASA Exoplanet Watch
Advisors: Dr. Rob Zellem, Dr. Kalee Tock
Updated exoplanet transit properties using light curve data, numerous publications/posters at astronomy conferences.

HIGHLIGHTED RESEARCH

Sujay Nair, Evan Coleman, Sherrie Wang. Earth2EMIT: Spatiotemporal autoencoders for orbital-proximal fusion. *Nature (Planned).*
Building all-in-one soil property prediction pipeline using NASA EMIT hyperspectral satellite data fused with geospatial data, atmospheric data, and high-quality field measurements from YardStick PBC. We use a physics-guided autoencoder that learns spectral-spatial embeddings to reconstruct the soil spectra and predict soil properties.

Sujay Nair, Evan Coleman, Elsa Olivetti, Sherrie Wang. Masked Mineral Modeling: Continent-scale mineral prospecting via geospatial infilling.
Trained a U-net ResNet to infill the presence of masked minerals based on surrounding mineral resources, geophysical data (fault lines, elevation, rockype, etc), and agronomic

data (RaCA). Model outperformed ViT and Kriging with test dice coefficient of 0.31. *Association for the Advancement of Artificial Intelligence (AAAI) 2026.* Paper

Evan Coleman, **Sujay Nair**, Xinyi Zeng, Elsa Olivetti. Structured spectral reconstruction for scalable soil organic carbon inference. *International Conference on Learning Representations (ICLR) Tackling Climate Change with Machine Learning Workshop 2024.* Paper
Used USDA RaCA data to reconstruct SOC spectra alongside SOC regression to improve model generalization out of distribution. Also used a physics-based reconstruction pipeline to provide an interpretable spectral signature of SOC and avoid generalization failures through fine-tuning.

Sujay Nair, Caroline Scolari, Jay Kelath, Aishwarya Rammohan, Richard Ozer, Gloria Ng, Wesley Chang, Pat Boyce. Citizen Scientist Transit and Comparison Star Analysis of HATS-4 b with the East Bay Astronomical Society. *American Astronomical Society (AAS) 237.* Paper
Mentored 6 citizen scientists from the East Bay Astronomical Society to use the EXOplanet Transit Interpretation Code and study transit timing inaccuracies of exoplanet HATS-4 b.

HONORS & AWARDS

Deans Scholarship for College of Science, Georgia Tech 2022-2026
Deans List, Georgia Tech 2022-Present
Faculty Honors, Georgia Tech 2022,2023,2025
Betty Neall Youth Award of Merit, East Bay Astronomical Society 2021
1st Place, Washington State Science and Engineering Fair 2021
Wolfram Research Award, Washington State Science/Engineering Fair 2021
NASA Earth Sciences Award, Washington State Science/Engineering Fair 2021
Select Interview for the Research Notes of the American Astronomical Society, American Astronomical Society 2020
President's Award for Educational Excellence 2019

TECHNICAL SKILLS

Programming - Python (PyTorch, Numpy), R, Java, C, C++, x86/LC3 Assembly
Technologies - AWS, GCP, GitHub, JavaFX
Concepts - Machine Learning, Computer Systems, Object Oriented Programming, Data Structures and Algorithms, Astrophysics/Cosmology, Geophysics

PUBLICATIONS & PREPRINTS

[13] **Sujay Nair**, Evan Coleman, Sherrie Wang. Earth2EMIT: Spatiotemporal autoencoders for orbital-proximal fusion. *Nature (Planned).*

[12] **Sujay Nair**, Evan Coleman, Elsa Olivetti, Sherrie Wang. Masked Mineral Modeling: Continent-scale mineral prospecting via geospatial infilling. *Association for the Advancement of Artificial Intelligence (AAAI) 2026.* Paper

[11] Evan Coleman, **Sujay Nair**, Xinyi Zeng, Elsa Olivetti. Structured spectral reconstruction for scalable soil organic carbon inference. *International Conference on Learning Representations (ICLR) Tackling Climate Change with Machine Learning Workshop 2024.* Paper

[10] **Sujay Nair**, Kyle Pearson. Using Deep Learning with Phase Folded Light Curves to Detect Exoplanets. *American Astronomical Society (AAS) 237.* Abstract

[9] **Sujay Nair**, Caroline Scolari, Jay Kelath, Aishwarya Rammohan, Richard Ozer,

Gloria Ng, Wesley Chang, Pat Boyce. Citizen Scientist Transit and Comparison Star Analysis of HATS-4 b with the East Bay Astronomical Society. *American Astronomical Society (AAS) 237*. Paper

[8] **Sujay Nair**. Transit Analysis of TOI 1780.01. *ExoDem 2020 Caltech*. Poster

[7] **Sujay Nair**. Mid-transit and Reference Star Analysis of HAT-P-37 b and Kepler-45 b. *Exoplanet3 Heidelberg*

[6] **Sujay Nair**, Jonathan Varghese. Transit Analysis of Exoplanets TrES-5b and WASP-43b. *Research Notes of the American Astronomical Society (RNAAS), 236th American Astronomical Society (AAS), Oral Session - Extrasolar Planets III: Transits and Populations*. Paper

[5] **Sujay Nair**, Krithi Koodli, Elliott Chalcraft, Kalee Tock. Analysis of Candidate Exoplanet TOI717.01 and Confirmed HAT-P-3b. *SAS*. Paper

[4] **Sujay Nair**, Jonathan Varghese, Kalee Tock, Robert Zellem. Analysis of HAT-P-23b, Qatar-1b, WASP-2b, and WASP-33b with an Optimized EXOplanet Transit Interpretation Code. *Published and Presented: Society for Astronomical Sciences (SAS)* Paper

[3] Ryan Caputo, ..., **Sujay Nair**, ... Investigation of 14 Wide Common Proper Motion Doubles. *Published: Journal of Double Star Observations (JDSO)*. Paper

[2] Robert Zellem, ..., **Sujay Nair**, ... Utilizing Small Telescopes by Citizen Scientists for Transiting Exoplanet Follow-Up. *Published: Publications of the Astronomical Society of the Pacific (PASP)*. Paper

[1] Quinn Perian, **Sujay Nair**, Kalee Tock. Freshening Exoplanet Transit Midpoints. *235th Meeting of the American Astronomical Society (AAS), 2020 CubeSat Workshop*. Poster