Anshuraj Sedai

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Education

Caldwell University *Expected Grad.: May 2026*
Bachelor of Science in Computer Science and Mathematics, *Minor in Physics*
GPA: 3.91/4.0 - *Honors Program*
Dean's List: Spring 2025, Fall 2024, Spring 2024, Fall 2023, Spring 2023, Fall 2022

Research and Fellowship

Massachusetts Institute of Technology (MIT) Cambridge, MA
Undergraduate Research Intern with Dr. Sai Ravela *Jun 2025 – Present*

- Built physics-informed neural surrogate models trained on MCMC + petitRADTRANS spectra and validated on HD 189733 b and GJ 1214 b, enabling fast, accurate emission retrievals.
- Identified key molecular features (e.g., CO, CO_2) and benchmarked against observations, substantially reducing runtime versus traditional Bayesian retrievals while maintaining high fidelity.

NSF Cyberinfrastructure Compass Fellowship (CICF) Program Virtual/Remote
Student Fellow *Jan 2025 – Jun 2025*

- Gained extensive knowledge in Python programming, software engineering, cloud computing, data workflows, machine learning, and artificial intelligence through the NSF fellowship program.
- Acquired a deep understanding of the infrastructure of NSF Major Facilities, including advanced instruments, data storage systems, repositories, and visualization environments as part of the research skills program.

Department of Astronomy, University of Maryland College Park, MD
Undergraduate Research Assistant with Dr. Thaddeus Komacek *Jun 2024 – Aug 2024*

- Investigated the atmospheric loss of M-dwarfs' exoplanets, LHS 1140b and GJ 806b using a planetary system evolution software, Virtual Planet Laboratory (VPLanet).
- Developed Python scripts to assess the water loss function and atmospheric desiccation period of LHS 1140b.
- Handled a 20-m radio telescope at Green Bank Observatory to measure and analyze data from deep-sky objects.

Undergraduate Research Assistant with Dr. Mia Bovill *Jan 2024 – May 2024*

- Assessed the abundance of metals in nearby galaxies, throughout their evolution, using Galacticus, a semi-analytic model and tested the efficiency of Galacticus with physical observations of galaxy evolution.
- Interpreted the halo dataset in the HDF5 file in Jupyter Notebook and graphed the results with Matplotlib.

Center for Advanced Biotechnology and Medicine, Rutgers University New Brunswick, NJ
Undergraduate Research Assistant with Dr. Vikas Nanda *Jun 2023 – Aug 2023*

- Examined the efficiency of AlphaFold2, a deep learning model, in predicting fold-switching protein structures by writing scripts in Python and analyzing the generated structures via TM-align and ChimeraX.
- Parsed data from .fasta files to an Excel sheet by cleaning the compiled data of protein sequences using Python.

International Astronomical Search Collaboration (IASC) Virtual/Remote
Citizen Scientist and Mentor *Nov 2019 – Jun 2023*

- Applied Astrometrica, image processing software, for the identification and tracking of near-Earth objects to detect Main Belt Asteroids by reducing and analyzing data in FITS format.
- Trained 120+ participants to use Astrometrica and analyze astronomical data from the Minor Planet Center.
- Contributed to the **discovery of four 'Provisional Level' asteroids** '2021 RE95', '2021 UR119', '2022 JQ6' and '2022 QW271'.

Skills

Programming: Proficient in Python, JavaScript, HTML, CSS. Intermediate SQL
Technical Stack: NumPy, SciPy, Matplotlib, Jupyter, LaTeX, Git, Linux (Ubuntu), Microsoft Office
Language: English (advanced), Nepali (native), Hindi (advanced), Spanish (basic)

Outreach and Leadership

Caldwell University Caldwell, NJ
Resident Assistant, **Office of Residence Life** *Aug 2024 - Present*

- Foster a safe, inclusive, and supportive living environment by enforcing university policies, mediating conflicts, and serving as a student resource and role model for 70+ residents.

Local Lead, **NASA International Space Apps Challenge at Caldwell** *Jul 2024 - Nov 2025*

- Led the inaugural NASA Space Apps Challenge at Caldwell University, a 36-hour global hackathon, which achieved the highest registrations on the East Coast and 4th highest in the U.S.
- Orchestrated all aspects of the event, including marketing, participant recruitment, coordination with global organizers, and led a dedicated team to ensure a seamless, engaging experience for all participants.

Founding President, **Caldwell Astronomy Club** *Mar 2023 - Aug 2025*

- Promoted campus community engagement in science and astronomy through strategic event planning, including a landmark solar eclipse observation with 400+ participants, regular stargazing nights, and inviting distinguished astrophysicist guest lecturers. Awarded 'Best Club' and 'Best Event' for 2 consecutive years.

Vice President, **Honors Program Student Board** *Apr 2023 – Apr 2025*

- Organized professional development workshops on securing internships and conference opportunities, mentored first-year students, and led community-building events to strengthen peer engagement.

Nepal Astronomical Society Kathmandu, Nepal
Academic Committee Member *Aug 2021 – Present*

- Served as an Academic Committee Member and contributed in drafting questions for the Observation section for the 3rd International Olympiad on Astronomy and Astrophysics - Junior (IOAA-jr) 2024 hosted in Nepal.
- Mentored the national delegates of Nepal for the 15th-17th Int'l Olympiad on Astronomy and Astrophysics (IOAA), and 26th-28th Int'l Astronomy Olympiad (IAO) on observational and positional astronomy.

Student Outreach Coordinator *Mar 2022 – Aug 2022*

- Led astronomy outreach and workshops in 15+ underprivileged communities and community schools.
- Designed a tactile workshop for visually impaired people by creating hand-made 3D celestial models.
- Co-authored a multilingual tutorial booklet on sundial, planisphere and telescope operation.

Content Writer/News Anchor *Apr 2021 – Aug 2022*

- Researched, documented, and presented 50+ episodes on astronomy-related news in Nepali language.

Presentations

247th American Astronomical Society (AAS) Meeting Jan 2026
The Need for Speed (and Accuracy): Surrogate Models in Exoplanet Atmospheric Characterization
iPoster. Abstract selected for a poster presentation at AAS 247, Phoenix, AZ.

SuperComputing25 (SC25), St. Louis, MO Nov 2025
The Need for Speed (and Accuracy): Surrogate Models in Exoplanet Atmospheric Characterization
Lightning talk at Int'l Conference for High Performance Computing, Networking, Storage, and Analysis (SC25)

MIT Summer Research Program Symposium Aug 2025
The Need for Speed (and Accuracy): Surrogate Models in Exoplanet Atmospheric Characterization
Poster presentation at MIT Summer Research Program at Massachusetts Institute of Technology.

245th American Astronomical Society (AAS) Meeting Jan 2025
Modeling Atmospheric Conditions of M-dwarfs' Exoplanets: Insights from LHS 1140b and GJ 806b
iPoster. Finalist for the Chambliss Astronomy Achievement Student Award at AAS 245, MD.

GRAD-MAP Summer Scholars Research Symposium Aug 2024
Modeling the Atmospheric Conditions of M-dwarfs' Exoplanets: Insights from LHS 1140b and GJ 806b
Poster presentation at GRAD-MAP Summer Scholars REU program at University of Maryland, College Park.

Caldwell University Research and Creative Arts Day Apr 2024
Tracing Stardust: Exploring Metal Abundance in Galaxy Evolution with Galacticus
Best Science (Computational) Presentation at Caldwell University.

Conference for Undergrad Underrepresented Minorities in Physics (CU2MiP) Apr 2024
Tracing Stardust: Exploring Metal Abundance in Galaxy Evolution with Galacticus
Poster presentation at University of Maryland, College Park.

Summer Undergraduate Research Experience Symposium Aug 2023
Assessing the Efficiency of AlphaFold2 in Predicting Structures of Protein Fold-Switching Pairs
Poster presentation at the end of the SURE program at Rutgers University, New Brunswick.

Teaching Experience

Caldwell University Caldwell, NJ
Peer Tutor for Physics, Math, and Computer Science *Feb 2023 – Present*

- Guided 100+ students through challenging physics, math, and computer science concepts in 15+ advanced courses including physics, astronomy, calculus (I - IV), database management systems, and linear algebra.

Laboratory Instructional Assistant for General Physics II *Jan 2025 – May 2025*

- Supported laboratory operations through instructional assistance, experimental preparation, student guidance, safety management, computational analysis, and grading across optics, waves, and electromagnetism.

Supplemental Instructor for Calculus I *Aug 2023 – Dec 2024*

- Developed supplemental instruction sessions on challenging concepts, reflected and revised teaching skills such as redirecting questions and fostering collaboration, 8 hr/week.

Awards and Honors

Pioneer Award July 2025
Awarded by the Honor Society of Phi Kappa Phi as one of the 50 receipts nationwide

Outstanding Student Leader of the Year May 2025
Awarded by the Office of Student Engagement, Caldwell University

Finalist, Chambliss Astronomy Achievement Student Award Jan 2025
Recognized by the American Astronomical Society at AAS 245

C-Pin Award (Student of the Year) May 2024
Awarded by the Office of Student Engagement, Caldwell University

Honorable Mention, 18th New Jersey Undergraduate Mathematics Competition Apr 2023
Awarded by the New Jersey Section of the Mathematical Association of America (MAA-NJ)

Absolute Winner, 8th National Astronomy Olympiad 2021 Oct 2021
Awarded by the Nepal Astronomical Society for ranking 1st nationwide

Honorable Mention, 1st Global e-Competition on Astronomy and Astrophysics Oct 2020
Awarded by the International Olympiad on Astronomy and Astrophysics (IOAA) Organizing Committee

Affiliation

The Honor Society of Phi Kappa Phi *Mar 2025 – Present*
Undergraduate Student Member

American Astronomical Society *Oct 2024 – Present*
Undergraduate Student Member

Nepal Astronomical Society Kathmandu, Nepal
Undergraduate Student Member *Aug 2022 - Present*
Junior Member *Aug 2019 - Aug 2022*