

# Anshuraj Sedai

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## Education

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### Caldwell University

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

*Expected Grad.: May 2026*

## Research and Fellowship

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### Massachusetts Institute of Technology (MIT)

*Undergraduate Research Intern with Dr. Sai Ravela*

Cambridge, MA

*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<sub>2</sub>) and benchmarked against observations, substantially reducing runtime versus traditional Bayesian retrievals while maintaining high fidelity.

### NSF Cyberinfrastructure Compass Fellowship (CICF) Program

*Student Fellow*

Virtual/Remote

*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

*Undergraduate Research Assistant with Dr. Thaddeus Komacek*

College Park, MD

*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 Medicine and Biotechnology, Rutgers University

*Undergraduate Research Assistant with Dr. Vikas Nanda*

New Brunswick, NJ

*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)

*Citizen Scientist and Mentor*

Virtual/Remote

*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

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**Programming:** Proficient in Python, JavaScript, HTML, CSS. Intermediate SQL

**Technologies:** Linux (Ubuntu), Unix, LaTeX, Jupyter, Microsoft Office

**Language:** English (advanced), Nepali (native), Hindi (advanced), Spanish (basic)

## Teaching Experience

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### 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.

## Outreach and Leadership

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### 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 - Present*

- 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 3<sup>rd</sup> International Olympiad on Astronomy and Astrophysics - Junior (IOAA-jr) 2024 hosted in Nepal.
- Mentored the national delegates of Nepal for the 15<sup>th</sup>, 16<sup>th</sup>, and 17<sup>th</sup> International Olympiad on Astronomy and Astrophysics (IOAA), and 26<sup>th</sup>, 27<sup>th</sup>, and 28<sup>th</sup> International 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 and current affairs in native Nepali language.

## Presentations

<b>MIT Summer Research Program Symposium</b> <i>The Need for Speed (and Accuracy): Surrogate Models in Exoplanet Atmospheric Characterization</i> Poster presentation at MIT Summer Research Program at Massachusetts Institute of Technology.	Aug 2025
<b>245<sup>th</sup> American Astronomical Society (AAS) Meeting</b> <i>Modeling Atmospheric Conditions of M-dwarfs' Exoplanets: Insights from LHS 1140b and GJ 806b</i> <a href="#">iPoster</a> <a href="#">🔗</a> . Finalist for the Chambliss Astronomy Achievement Student Award at AAS 245, MD.	Jan 2025
<b>GRAD-MAP Summer Scholars Research Symposium</b> <i>Modeling the Atmospheric Conditions of M-dwarfs' Exoplanets: Insights from LHS 1140b and GJ 806b</i> Poster presentation at GRAD-MAP Summer Scholars REU program at University of Maryland, College Park.	Aug 2024
<b>Caldwell University Research and Creative Arts Day</b> <i>Tracing Stardust: Exploring Metal Abundance in Galaxy Evolution with Galacticus</i> Best Science (Computational) Presentation at Caldwell University.	Apr 2024
<b>Conference for Undergrad Underrepresented Minorities in Physics (CU2MiP)</b> <i>Tracing Stardust: Exploring Metal Abundance in Galaxy Evolution with Galacticus</i> Poster presentation at University of Maryland, College Park.	Apr 2024
<b>Summer Undergraduate Research Experience Symposium</b> <i>Assessing the Efficiency of AlphaFold2 in Predicting Structures of Protein Fold-Switching Pairs</i> Poster presentation at the end of the SURE program at Rutgers University, New Brunswick.	Aug 2023

## Awards and Honors

<b>Pioneer Award</b> Awarded by the Honor Society of Phi Kappa Phi as one of the 50 receipts nationwide	July 2025
<b>Outstanding Student Leader of the Year</b> Awarded by the Office of Student Engagement, Caldwell University	May 2025
<b>Finalist, Chambliss Astronomy Achievement Student Award</b> Recognized by the American Astronomical Society	Jan 2025
<b>C-Pin Award (Student of the Year)</b> Awarded by the Office of Student Engagement, Caldwell University	May 2024
<b>Honorable Mention</b> , 18 <sup>th</sup> New Jersey Undergraduate Mathematics Competition Awarded by the New Jersey Section of the Mathematical Association of America (MAA-NJ)	Apr 2023
<b>Presidential Scholar</b> Awarded by Office of Undergraduate Admissions, Caldwell University	Aug 2022
<b>Absolute Winner</b> , 8 <sup>th</sup> National Astronomy Olympiad 2021 Awarded by the Nepal Astronomical Society for ranking 1 <sup>st</sup> nationwide	Oct 2021
<b>Honorable Mention</b> , 1 <sup>st</sup> Global e-Competition on Astronomy and Astrophysics Awarded by the International Olympiad on Astronomy and Astrophysics (IOAA) Organizing Committee	Oct 2020

## Affiliation

<b>The Honor Society of Phi Kappa Phi</b> <i>Undergraduate Student Member</i>	Mar 2025 – Present
<b>American Astronomical Society</b> <i>Undergraduate Student Member</i>	Oct 2024 – Present
<b>Nepal Astronomical Society</b> <i>Undergraduate Student Member</i> <i>Junior Member</i>	Kathmandu, Nepal Aug 2022 - Present Aug 2019 - Aug 2022