

# Neel Nagarajan

Physics Math & Astronomy Building (PMA)  
Department of Astronomy  
The University of Texas at Austin  
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## EDUCATION

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**The University of Texas at Austin**  
B.S. in Physics and Astronomy (double major)  
**The International School of Hyderabad**  
International Baccalaureate Diploma

Austin, Texas  
May 2023  
Hyderabad, India  
May 2019

## RESEARCH INTERESTS

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- Long term evolution of planets & planetary systems, with the goal of determining planets' potential habitability over timescales of billions of years
- Observational science for detection & characterization of exoplanets, with the goal of identifying habitability and/or signs of life
- Forging interdisciplinary collaboration (e.g. bring theorists & observational astronomers together, involving geologists & astrobiologists in exoplanet research)

## AWARDS AND SCHOLARSHIPS

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- UT Co-op George H Mitchell Award Honorable Mention (\$1625)- University of Texas at Austin Co-op  
*Awarded to undergraduates for superior scholarly or creative achievement*
- Natural Sciences 21st Century Endowed Presidential Scholarship (\$2500)- College of Natural Sciences
- Karl G. Henize Endowed Scholarship (\$500)- Department of Astronomy
- Awarded \$4000) research grant by the Department of Astronomy in support of Stellar Astronomy Research over Summer 2021
- Awarded \$3500) research grant by the Department of Astronomy in support of Stellar Astronomy and Exoplanets Research over Summer 2022
- Awarded \$3600) research grant by the Department of Astronomy in support of Exoplanets research over Summer 2023
- Awarded \$10000) research grant by the Center of Planetary Systems Habitability in support of university employment doing exoplanets research from present to December 2023

## REFEREED PUBLICATIONS

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- [1] "*Chemical Compositions of Red Giant Stars in the Old Open Cluster NGC 7789*"  
**Nagarajan, N.**, Sneden, C., Afsar, M., Pilachowski, C., 2023, *AJ*, 165..245N
- [2] "*The Active Chromospheres of Lithium-rich Red Giant Stars*"  
Sneden, C., Afsar, M., Bozkurt, Z., et al. (incl. **Nagarajan, N.**), 2022, *ApJ*, 940:12 (21pp)

## RESEARCH EXPERIENCES

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- Undergraduate Research Assistant, Dept. of Astronomy, The University of Texas at Austin, May 2020- April 2023
  1. *Advisor*: Dr. Chris Sneden
  2. *Topic*: High resolution spectroscopy of red giant stars, with the goal of understanding the stellar atmospheric phenomena behind certain very unusual spectral features
  3. *Skills*: Telescope Operation (2.7m Harlan J Smith Telescope at the McDonald Observatory, spectral reductions with *IRAF*, measuring equivalent widths using *SPECTRE*, abundance computations & spectrum syntheses using *MOOG*, refereed publication writing using  $\text{\LaTeX}$
- Undergraduate Research Assistant, Dept. of Astronomy, The University of Texas at Austin, April 2022- August 2022
  1. *Advisors*: Dr. Caroline Morley and Dr. Zhoujian Zhang
  2. *Topic*: Analysis of infrared spectra of planetary systems involving short-period planets orbiting K-type stars, with the goal of searching for and identifying extended helium envelopes around the atmospheres of these planets
  3. *Skills*: spectral analysis using python, scientific communication, de-bugging code
- Undergraduate Research Assistant, Max Planck Institute of Astronomy, Heidelberg University, May 2022- November 2022
  1. *Advisor*: Evert Nasedkin
  2. *Topic*: Python coding to contribute to an upcoming high-contrast imaging algorithm called PACO ASDI, which combines angular differential imaging and spectral differential imaging
  3. *Skills*: Advanced python coding for algorithm development

- Undergraduate Research Assistant, Dept. of Astronomy, The University of Texas at Austin, April 2023- **present**
  1. *Advisor:* Dr. William Cochran
  2. *Topic:* Simulation of long term planetary interior evolution, with the goal of determining the potential habitability of planets over timescales of billions of years
  3. *Skills:* simulations of planetary physics using *VPlanet*, *Magrathea*, *MATLAB* and python, reconciling simulation results from multiple different codes
- Undergraduate Research Assistant, Dept. of Astronomy, The University of Texas at Austin, May 2023- **present**
  1. *Advisor:* Dr. Yifan Zhou
  2. *Topic:* Simulation of JWST point spread functions, with the goal of measuring JWST's theoretical capability of detecting exoplanetary rotation
  3. *Skills:* simulations of JWST data using Webbpsf, Reference Differential Imaging (RDI)

## SCIENTIFIC TALKS & POSTERS

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- GCURS Research Symposium, Rice University, Houston, TX October 2022 and October 2023
- 241st American Astronomical Society (AAS) meeting, Seattle, TX January 2023
- Astronomy Students Association general meeting, UT Austin April 2023, October 2022, & more
- Undergraduate Research Forum, UT Austin March 2022
- Bash 2023 Symposium, UT Austin October 2023

## TELESCOPE TIME

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"*Chemical Compositions of Red Giant Stars in the Old Open Cluster NGC 7789*", usage of 2.7m Harlan J. Smith Telescope at the McDonald Observatory to observe 16 red giant stars over 7 nights, PI: Dr. Chris Sneden

## ASTRONOMY OUTREACH

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- Participation in LightSound Workshop- building devices to help the vision impaired experience the upcoming solar eclipses via sound/music, June 2023
- Part time job as a planetarium tour guide for Stars & Science Austin, a mobile planetarium dome business that conducts planetarium shows for schools, libraries, etc, July 2023 - present
- Part time job as an activities specialist for the Austin Nature & Science Center, Parks & Recreation Department, will include planetarium operation, talks to a variety of audiences, etc, will begin shortly in Nov 2023

## REFERENCES

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- Dr. Christopher Sneden - Professor Emeritus, Department of Astronomy, University of Texas at Austin, [chris@astro.as.utexas.edu](mailto:chris@astro.as.utexas.edu)
- Dr. Caroline Morley - Assistant Professor, Department of Astronomy, University of Texas at Austin, [cmorley@utexas.edu](mailto:cmorley@utexas.edu)
- Dr. Zhoujian Zhang - Sagan Fellow, University of California Santa Cruz, [zhangdirac@gmail.com](mailto:zhangdirac@gmail.com)
- Evert Nasedkin - Doctoral Student, Max Planck Institute of Astronomy at Heidelberg University, [nasedkin@mpia.de](mailto:nasedkin@mpia.de)