

Arvind Freedman Gupta

NOIRLab Fellow
arvind.gupta@noirlab.edu

EDUCATION

Pennsylvania State University – <i>PhD Astronomy & Astrophysics and Astrobiology</i>	May 2023
– <i>MS Astronomy & Astrophysics</i>	Dec 2020
University of Virginia – <i>BS Astronomy-Physics with Highest Distinction</i>	May 2018

RESEARCH EXPERIENCE

Postdoctoral Research Fellow , NOIRLab	Aug 2023 - Present
Graduate Research Assistant , Pennsylvania State University <i>Dr. Jason Wright</i> PhD Thesis: <i>Harnessing the Potential of Radial Velocity Exoplanet Surveys</i>	Aug 2018 - July 2023
Pre-Doctoral Researcher , CCA, Flatiron Institute (Remote) <i>Dr. Megan Bedell</i>	Sep 2021 - Dec 2021
Undergraduate Research Assistant , University of Virginia <i>Dr. Steven Majewski & Dr. Rachael Beaton</i> Senior Thesis: <i>The Distance to the Sagittarius Dwarf Galaxy and its relation to M 54 using Infrared Photometry of RR Lyrae Variable Stars</i>	May 2015 - Jul 2018
Undergraduate Research Assistant , University of New South Wales <i>Dr. Chris Tinney</i> Honours Thesis: <i>Assessing The Cannon as a Spectral Classification Tool for the FunnelWeb Survey</i>	Jul 2017 - Nov 2017
Summer Research Assistant , Carnegie Observatories <i>Dr. Rachael Beaton</i>	Jun 2016 - Aug 2016

SELECT AWARDS & HONORS

Zaccheus Daniel Fellowship	Sep 2022
NSF Graduate Research Fellowship Honorable Mention ($\times 2$)	Apr 2018 & Mar 2020
Verne A. Willaman Distinguished Graduate Fellowship	Aug 2018 - Jul 2019
Virginia Space Grant Scholar	Jun 2017 - May 2018
Barry M. Goldwater Scholarship Honorable Mention	Mar 2017
Phi Beta Kappa	Mar 2018
Raven Society	Mar 2017

SELECT TALKS & PRESENTATIONS

1. Searching for Snapshots of Giant Exoplanet Migration: case studies of eccentric warm Jupiters	
Astronomy Department Colloquium, New Mexico State University	May 3, 2024
Cool Stars 22, San Diego, CA (<i>poster</i>)	June 2024
Extreme Solar Systems V, Christchurch, NZ (<i>poster</i>)	March 2024
NOIRLab Flash Talks	September 15, 2023

- 2. Harnessing the Potential of Radial Velocity Exoplanet Surveys**
 AAS 243
 Princeton Exoplanet Lunch Seminar
 Caltech
 January 11, 2024
 October 31, 2022
 October 27, 2022
- 3. Subgiant Asteroseismology with NEID and TESS**
 Yale University Stars & Exoplanets Seminar
 February 8, 2022
- 4. Fishing for Planets: Analyzing the Fisher Information Content of EPRV Exoplanet Surveys**
 Emerging Researchers in Exoplanet Science VII, State College, PA
 Cool Stars 21, Toulouse, France (*poster*)
 CCA Pre-Doc Symposium, New York, NY
 August 2, 2022
 July 2022
 June 24, 2022
- 5. Real-time Exposure Control and Instrument Operation with the NEID Spectrograph GUI**
 SPIE Astronomical Telescopes & Instrumentation 2022, Montreal, Canada (*poster*)
 July 2022
- 6. Characterization of Single-transit TESS Warm Jupiters with NEID**
 Exoplanets IV, Las Vegas, NV
 May 2, 2022
- 7. The NEID Earth Twin Survey: Target Selection and Survey Strategy**
 Penn State Astronomy Lunch Talk, State College, PA
 Emerging Researchers in Exoplanet Science V, Ithaca, NY
 February 4, 2020
 June 18, 2019

OBSERVING PROGRAMS

- Measuring the Spin-Orbit Misalignment of the most Eccentric Transiting Exoplanet**
 PI: Gupta (NEID: 10 hours) 2024A
- Cornering an Eccentric Giant with NEID**
 PI: Gupta (NEID: 3 hours) 2023B
- Radial Velocity Follow-up Observations of Long-period TESS Exoplanet Candidates with NEID**
 PI: Gupta (NEID: 130 hours, NESSI: 1.1 nights) 2021A, 2021B, 2022A, 2022B, 2023A, 2023B
- Simultaneous NEID and TESS Observations of p-mode Oscillations in HD 35833**
 PI: Gupta (NEID: 8 hrs) 2020B
- TESS False Positive Vetting with NESSI**
 PI: Gupta (NESSI: 3.5 nights) 2019B, 2021A, 2021B, 2022A, 2022B, 2023A
- The NEID Earth Twin Survey**
 PI: Wright (Co-I: Gupta) 2021A, 2021B, 2022A, 2022B, 2023A, 2023B
- 2 Fingers on the Pulse: Simultaneously Resolving P-mode Oscillations with NEID and TESS**
 PI: Luhn (Co-I: Gupta) 2022A
- Expanding the TESS Mission's Legacy of Long-period Planets**
 PI: Dragomir (Co-I: Gupta) TESS Cycle 4

OBSERVING EXPERIENCE

- NEID, WIYN 3.5m**, Kitt Peak National Observatory
30 nights NEID instrument commissioning November 2019 - May 2021
- FourStar, Baade Magellan 6.5m**, Las Campanas Observatory
 3 nights July 2018
 4 nights July 2017
-

TEACHING & MENTORING

Instructor , Pennsylvania State University <i>Astro 5: The Sky and Planets</i>	Spring 2022
Instructor , Upward Bound Math and Science, State College <i>Astronomy: The Search for Exoplanets and Life Beyond Earth</i>	Summer 2019 & 2020
Guest Lecturer , Pennsylvania State University <i>Astro 140: Life in the Universe, Astro 401: Fundamentals of Planetary Science and Astronomy</i>	Fall 2019
Teaching Assistant , University of Virginia <i>Astronomy 3130: Observational Astronomy</i>	Spring 2018
Academic Tutor , University of Virginia Department of Athletics <i>Calculus, Differential Equations, Introductory calculus-based Physics, Introductory Astronomy</i>	Jan 2016 - May 2017

Research Mentor , Armand Zeibari, Undergraduate, Pennsylvania State University <i>Prospects for Atmospheric Characterization of Exoplanets from Radial Velocity Surveys</i>	Fall 2022
Mentor , Carnegie Astrophysics Summer Student Internship (CASSI) Program	2020 – Present

OUTREACH & PROFESSIONAL SERVICE

Science & Local Organizing Committee, Emerging Researchers in Exoplanet Science VII	Aug 2022
Organizing Committee, Penn State Astro Grad-Undergrad Research Mentoring Program	2021–2023
Co-Organizer & Host, Astronomy on Tap – State College	2019–2023
American Astronomical Society Congressional Visits Day	2021
Webmaster, Center for Exoplanets and Habitable Worlds, Penn State	2020–2021
Speaker, Astronomy on Tap – State College	Aug 2019, Jul 2022
Speaker, Space Drafts – Tucson	Apr 2024

PUBLICATIONS (6 FIRST AUTHOR, 40 TOTAL)

1. Gupta, A. F., Millholland, S. C., Im, H., et al., *A hot Jupiter progenitor on a super-eccentric retrograde orbit*, 2024, *Nature*
 2. Gupta, A. F., & Bedell, M., *Fishing for Planets: A Comparative Analysis of EPRV Survey Performance in the Presence of Correlated Noise*, 2024, *The Astronomical Journal*, 168, 29
 3. Gupta, A. F., Jackson, J. M., Hébrard, G., et al., *A High-Eccentricity Warm Jupiter Orbiting TOI-4127*, 2023, *The Astronomical Journal*, 165, 234
 4. Gupta, A. F., Luhn, J., Wright, J. T., et al., *Detection of p-mode Oscillations in HD 35833 with NEID and TESS*, 2022, *The Astronomical Journal*, 164, 254
 5. Gupta, A. F., Bender, C. F., Ninan, J. P., et al., *Real-time exposure control and instrument operation with the NEID spectrograph GUI*, 2022, *Proceedings of the SPIE, Software and Cyberinfrastructure for Astronomy VII*, 12189, 1218925
 6. Gupta, A. F., Wright, J. T., Robertson, P., et al., *Target Prioritization and Observing Strategies for the NEID Earth Twin Survey*, 2021, *The Astronomical Journal*, 161, 130
-

7. Peluso, D. O., Dalba, P. A., Wright, D., et al., *Confirming the Warm and Dense Sub-Saturn TIC 139270665 b with the Automated Planet Finder and Unistellar Citizen Science Network*, 2024, *The Astronomical Journal*, 167, 170
8. Orell-Miquel, J., Carleo, I., Murgas, F., et al., *Revisiting the warm sub-Saturn TOI-1710b. The impact of stellar activity on the mass measurement*, 2024, *Astronomy and Astrophysics*, 684, A96
9. Jones, M. I., Reinartz, Y., Brahm, R., et al., *A long-period transiting substellar companion in the super-Jupiters to brown dwarfs mass regime and a prototypical warm-Jupiter detected by TESS*, 2024, *Astronomy and Astrophysics*, 683, A192
10. Carleo, I., Malavolta, L., Desidera, S., et al., *The GAPS programme at TNG. L. TOI-4515 b: An eccentric warm Jupiter orbiting a 1.2 Gyr-old G-star*, 2024, *Astronomy and Astrophysics*, 682, A135
11. Delamer, M., Kanodia, S., Cañas, C. I., et al., *TOI-4201: An Early M Dwarf Hosting a Massive Transiting Jupiter Stretching Theories of Core Accretion*, 2024, *The Astrophysical Journal*, 962, L22
12. Han, T., Robertson, P., Kanodia, S., et al., *TOI-5344 b: A Saturn-like Planet Orbiting a Super-solar Metallicity M0 Dwarf*, 2024, *The Astronomical Journal*, 167, 4
13. Lubin, J., Wang, X.-Y., Rice, M., et al., *TOI-1670 c, a 40 day Orbital Period Warm Jupiter in a Compact System, Is Well Aligned*, 2023, *The Astrophysical Journal*, 959, L5
14. Mann, C. R., Dalba, P. A., Lafrenière, D., et al., *Giant Outer Transiting Exoplanet Mass (GOT 'EM) Survey. III. Recovery and Confirmation of a Temperate, Mildly Eccentric, Single-transit Jupiter Orbiting TOI-2010*, 2023, *The Astronomical Journal*, 166, 239
15. Jones, S. E., Stefansson, G., Masuda, K., et al., *TOI-2015b: A Warm Neptune with Transit Timing Variations Orbiting an Active mid M Dwarf*, 2023, arXiv e-prints, arXiv:2310.11775
16. Kanodia, S., Lin, A. S. J., Lubar, E., et al., *Stable Fiber-illumination for Extremely Precise Radial Velocities with NEID*, 2023, *The Astronomical Journal*, 166, 105
17. Powers, L. C., Libby-Roberts, J., Lin, A. S. J., et al., *TOI-3785 b: A Low-density Neptune Orbiting an M2-dwarf Star*, 2023, *The Astronomical Journal*, 166, 44
18. Cañas, C. I., Kanodia, S., Libby-Roberts, J., et al., *TOI-3984 A b and TOI-5293 A b: Two Temperate Gas Giants Transiting Mid-M Dwarfs in Wide Binary Systems*, 2023, *The Astronomical Journal*, 166, 30
19. Libby-Roberts, J. E., Schutte, M., Hebb, L., et al., *An In-depth Look at TOI-3884b: A Super-Neptune Transiting an M4Dwarf with Persistent Starspot Crossings*, 2023, *The Astronomical Journal*, 165, 249
20. Lambert, M., Bender, C. F., Kanodia, S., et al., *TOI-5375 B: A Very Low Mass Star at the Hydrogen-burning Limit Orbiting an Early M-type Star*, 2023, *The Astronomical Journal*, 165, 218
21. Luhn, J. K., Ford, E. B., Guo, Z., et al., *Impact of Correlated Noise on the Mass Precision of Earth-analog Planets in Radial Velocity Surveys*, 2023, *The Astronomical Journal*, 165, 98
22. Kanodia, S., Mahadevan, S., Libby-Roberts, J., et al., *TOI-5205b: A Short-period Jovian Planet Transiting a Mid-M Dwarf*, 2023, *The Astronomical Journal*, 165, 120
23. Frazier, R. C., Stefansson, G., Mahadevan, S., et al., *NEID Reveals That the Young Warm Neptune TOI-2076 b Has a Low Oblliquity*, 2023, *The Astrophysical Journal*, 944, L41
24. Ulmer-Moll, S., Lendl, M., Gill, S., et al., *Two long-period transiting exoplanets on eccentric orbits: NGTS-20 b (TOI-5152 b) and TOI-5153 b*, 2022, *Astronomy and Astrophysics*, 666, A46
25. Kanodia, S., Libby-Roberts, J., Cañas, C. I., et al., *TOI-3757 b: A Low-density Gas Giant Orbiting a Solar-metallicity M Dwarf*, 2022, *The Astronomical Journal*, 164, 81

26. Beard, C., Robertson, P., Kanodia, S., et al., *GJ 3929: High-precision Photometric and Doppler Characterization of an Exo-Venus and Its Hot, Mini-Neptune-mass Companion*, 2022, The Astrophysical Journal, 936, 55
27. Gupta, A. F., Bender, C. F., Ninan, J. P., et al., *Real-time exposure control and instrument operation with the NEID spectrograph GUI*, 2022, Software and Cyberinfrastructure for Astronomy VII, 12189, 1218925
28. Logsdon, S. E., Wolf, M. J., Li, D., et al., *The NEID port adapter: on-sky performance*, 2022, Ground-based and Airborne Instrumentation for Astronomy IX, 12184, 121844N
29. Cañas, C. I., Kanodia, S., Bender, C. F., et al., *TOI-3714 b and TOI-3629 b: Two Gas Giants Transiting M Dwarfs Confirmed with the Habitable-zone Planet Finder and NEID*, 2022, The Astronomical Journal, 164, 50
30. Reefer, M. A., Luque, R., Gaidos, E., et al., *A Close-in Puffy Neptune with Hidden Friends: The Enigma of TOI 620*, 2022, The Astronomical Journal, 163, 269
31. Beard, C., Robertson, P., Kanodia, S., et al., *TOI-1696 and TOI-2136: Constraining the Masses of Two Mini-Neptunes with the Habitable-Zone Planet Finder*, 2022, The Astronomical Journal, 163, 286
32. Lin, A. S. J., Monson, A., Mahadevan, S., et al., *Observing the Sun as a Star: Design and Early Results from the NEID Solar Feed*, 2022, The Astronomical Journal, 163, 184
33. Guo, Z., Ford, E. B., Stello, D., et al., *Modeling Stellar Oscillations and Granulation in Radial Velocity Time Series: A Fourier-based Method*, 2022, arXiv e-prints, arXiv:2202.06094
34. Cañas, C. I., Mahadevan, S., Bender, C. F., et al., *An Eccentric Brown Dwarf Eclipsing an M dwarf*, 2022, The Astronomical Journal, 163, 89
35. Kanodia, S., Stefansson, G., Cañas, C. I., et al., *TOI-532b: The Habitable-zone Planet Finder confirms a Large Super Neptune in the Neptune Desert orbiting a metal-rich M-dwarf host*, 2021, The Astronomical Journal, 162, 135
36. Burt, J. A., Dragomir, D., Mollière, P., et al., *TOI-1231 b: A Temperate, Neptune-sized Planet Transiting the Nearby M3 Dwarf NLTT 24399*, 2021, The Astronomical Journal, 162, 87
37. Stefansson, G., Kopparapu, R., Lin, A., et al., *A Mini-Neptune and a Radius Valley Planet Orbiting the Nearby M2 Dwarf TOI-1266 in Its Venus Zone: Validation with the Habitable-zone Planet Finder*, 2020, The Astronomical Journal, 160, 259
38. Cañas, C. I., Stefansson, G., Kanodia, S., et al., *A Warm Jupiter Transiting an M Dwarf: A TESS Single-transit Event Confirmed with the Habitable-zone Planet Finder*, 2020, The Astronomical Journal, 160, 147
39. Dalba, P. A., Gupta, A. F., Rodriguez, J. E., et al., *The TESS-Keck Survey. I. A Warm Sub-Saturn-mass Planet and a Caution about Stray Light in TESS Cameras*, 2020, The Astronomical Journal, 159, 241
40. Roy, A., Halverson, S., Mahadevan, S., et al., *Solar Contamination in Extreme-precision Radial-velocity Measurements: Deleterious Effects and Prospects for Mitigation*, 2020, The Astronomical Journal, 159, 161