

Arvind Freedman Gupta

NOIRLab Fellow
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EDUCATION

Pennsylvania State University – *PhD Astronomy & Astrophysics and Astrobiology* May 2023
– *MS Astronomy & Astrophysics* Dec 2020

University of Virginia – *BS Astronomy-Physics with Highest Distinction* May 2018

RESEARCH EXPERIENCE

Postdoctoral Research Fellow, NOIRLab Aug 2023 - Present

Graduate Research Assistant, Pennsylvania State University Aug 2018 - July 2023
Dr. Jason Wright
PhD Thesis: *Harnessing the Potential of Radial Velocity Exoplanet Surveys*

Pre-Doctoral Researcher, CCA, Flatiron Institute (Remote) Sep 2021 - Dec 2021
Dr. Megan Bedell

Undergraduate Research Assistant, University of Virginia May 2015 - Jul 2018
Dr. Steven Majewski & Dr. Rachael Beaton
Senior Thesis: *The Distance to the Sagittarius Dwarf Galaxy and its relation to M 54 using Infrared Photometry of RR Lyrae Variable Stars*

Undergraduate Research Assistant, University of New South Wales Jul 2017 - Nov 2017
Dr. Chris Tinney
Honours Thesis: *Assessing The Cannon as a Spectral Classification Tool for the FunnelWeb Survey*

Summer Research Assistant, Carnegie Observatories Jun 2016 - Aug 2016
Dr. Rachael Beaton

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**
NOIRLab Flash Talks September 15, 2023

2. **Harnessing the Potential of Radial Velocity Exoplanet Surveys**
AAS 243 January 11, 2024
Princeton Exoplanet Lunch Seminar October 31, 2022
Caltech 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

August 2, 2022

Cool Stars 21, Toulouse, France (*poster*)

July 2022

CCA Pre-Doc Symposium, New York, NY

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. Optimizing Radial Velocity Follow-up Strategies for Single-Transit Exoplanet Candidates

TESS Science Conference II (*virtual; poster*)

July 2021

Emerging Researchers in Exoplanet Science VI (*virtual*)

May 24, 2021

8. The NEID Earth Twin Survey: Target Selection and Survey Strategy

Penn State Astronomy Lunch Talk, State College, PA

February 4, 2020

Emerging Researchers in Exoplanet Science V, Ithaca, NY

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

November 2019 - May 2021

30 nights NEID instrument commissioning

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 <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, 2021, 2022

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
Presenter, Astronomy on Tap State College	Aug 2019, Jul 2022

PUBLICATIONS (*5 FIRST AUTHOR, 37 TOTAL*)

- Gupta, A. F., & Bedell, M., *Fishing for Planets: A Comparative Analysis of EPRV Survey Performance in the Presence of Correlated Noise*, arXiv e-prints, 2023, [arXiv:2303.14571](https://arxiv.org/abs/2303.14571)
 - Gupta, A. F., Jackson, J. M., Hébrard, G., et al., *A High-Eccentricity Warm Jupiter Orbiting TOI-4127*, 2023, *The Astronomical Journal*, 165, 234
 - 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
 - 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
 - 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
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- 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

7. 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
8. Orell-Miquel, J., Carleo, I., Murgas, F., et al., *Revisiting the warm sub-Saturn TOI-1710b*, 2024, arXiv e-prints, arXiv:2401.13574
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, arXiv e-prints, arXiv:2401.09657
10. 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
11. 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
12. 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
13. 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
14. 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
15. 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
16. 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
17. 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
18. 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
19. 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
20. 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
21. Frazier, R. C., Stefansson, G., Mahadevan, S., et al., *NEID Reveals That the Young Warm Neptune TOI-2076 b Has a Low Obliquity*, 2023, *The Astrophysical Journal*, 944, L41
22. 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
23. 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
24. 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
25. 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

26. 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
27. 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
28. 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
29. 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
30. Cañas, C. I., Mahadevan, S., Bender, C. F., et al., *An Eccentric Brown Dwarf Eclipsing an M dwarf*, 2022, *The Astronomical Journal*, 163, 89
31. 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
32. 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
33. 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
34. 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
35. 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
36. 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
37. 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