

# Arvind Freedman Gupta

NOIRLab Fellow  
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## EDUCATION

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

## RESEARCH EXPERIENCE

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<b>Postdoctoral Research Fellow</b> , NOIRLab	Aug 2023 - Present
<b>Graduate Research Assistant</b> , Pennsylvania State University <i>Dr. Jason Wright</i> PhD Thesis: <i>Harnessing the Potential of Radial Velocity Exoplanet Surveys</i>	Aug 2018 - July 2023
<b>Pre-Doctoral Researcher</b> , CCA, Flatiron Institute (Remote) <i>Dr. Megan Bedell</i>	Sep 2021 - Dec 2021
<b>Undergraduate Research Assistant</b> , University of Virginia <i>Dr. Steven Majewski &amp; 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
<b>Undergraduate Research Assistant</b> , 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
<b>Summer Research Assistant</b> , Carnegie Observatories <i>Dr. Rachael Beaton</i>	Jun 2016 - Aug 2016

## SELECT AWARDS & HONORS

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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

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1. <b>Searching for Snapshots of Giant Exoplanet Migration: case studies of eccentric warm Jupiters</b> NOIRLab Flash Talks	September 15, 2023
2. <b>Harnessing the Potential of Radial Velocity Exoplanet Surveys</b> 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

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

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#### 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

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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

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

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<b>Research Mentor</b> , Armand Zeibari, Undergraduate, Pennsylvania State University <i>Prospects for Atmospheric Characterization of Exoplanets from Radial Velocity Surveys</i>	Fall 2022
<b>Mentor</b> , Carnegie Astrophysics Summer Student Internship (CASSI) Program	2020, 2021, 2022

## OUTREACH & PROFESSIONAL SERVICE

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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*)

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1. 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)
  2. Gupta, A. F., Jackson, J. M., Hébrard, G., et al., *A High-Eccentricity Warm Jupiter Orbiting TOI-4127*, 2023, *The Astronomical Journal*, 165, 234
  3. 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
  4. 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
  5. 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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6. 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

7. 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
8. 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
9. 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
10. Orell-Miquel, J., Carleo, I., Murgas, F., et al., *Revisiting the warm sub-Saturn TOI-1710b*, 2024, *arXiv e-prints*, arXiv:2401.13574
11. 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
12. 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
13. 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
14. 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
15. 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
16. 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
17. 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
18. 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
19. 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
20. 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
21. 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
22. 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
23. 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
24. 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
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. 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
27. 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
28. 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
29. 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
30. 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
31. Cañas, C. I., Mahadevan, S., Bender, C. F., et al., *An Eccentric Brown Dwarf Eclipsing an M dwarf*, 2022, The Astronomical Journal, 163, 89
32. 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
33. 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
34. 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
35. 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
36. 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
37. 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
38. 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