

Arvind Freedman Gupta

NOIRLab Postdoctoral Fellow
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Education

Ph.D., Astronomy & Astrophysics (dual title Astrobiology), Pennsylvania State University August 2023
Thesis: *Harnessing the Potential of Radial Velocity Exoplanet Surveys* [Advisor: Jason Wright]
M.S., Astronomy & Astrophysics, Pennsylvania State University December 2020
B.Sc., Astronomy-Physics, University of Virginia May 2018

Awards & Honors

NOIRLab Prize Postdoctoral Fellowship 2023 – Present
Zaccheus Daniel Fellowship 2022
Flatiron CCA Remote Pre-Doctoral Fellowship 2021
NSF Graduate Research Fellowship Honorable Mention (×2) 2018 & 2020
Verne A. Willaman Distinguished Graduate Fellowship 2018–2019
Virginia Space Grant Scholarship 2017 – 2018
Barry M. Goldwater Scholarship Honorable Mention 2017
Phi Beta Kappa 2018
Raven Society 2017

Talks & Seminars

Contributed Talk, Know Thy Star, Know Thy Planet 2 (Pasadena, CA) Feb 2025
Following the Flows: Coordinated Observations of Supergranulation with EPRV Facilities Across the Globe
Contributed Seminar, University of Arizona, Origins Seminar series Nov 2024
Searching for Snapshots of Giant Exoplanet Migration: case studies of eccentric warm Jupiters
Invited Colloquium, New Mexico State University May 2024
Searching for Snapshots of Giant Exoplanet Migration: case studies of eccentric warm Jupiters
Dissertation Talk, AAS 243 (New Orleans, LA) Jan 2024
Harnessing the Potential of Radial Velocity Exoplanet Surveys
Contributed Talk, EPRV Research Coordination Network Survey Design Meeting Dec 2023
Using Fisher Information to Assess EPRV Survey Performance in the Presence of Correlated Noise
Invited Talk, NOIRLab Flash Talks Sep 2023
Searching for Snapshots of Giant Exoplanet Migration: case studies of eccentric warm Jupiters
Contributed Talk, Emerging Researchers in Exoplanet Science VII (New Haven, CT) Jun 2023
Status of the NEID Earth Twin Survey and Early Science Results
Contributed Talk, EPRV 5 (Santa Barbara, CA) Mar 2023
Status of the NEID Earth Twin Survey and Early Science Results
Invited Seminar, Princeton University Exoplanets Seminar Oct 2022
Harnessing the Potential of Radial Velocity Exoplanet Surveys
Invited Seminar, Caltech Oct 2022
Harnessing the Potential of Radial Velocity Exoplanet Surveys
Contributed Talk, Flatiron CCA Predoctoral Symposium Jun 2022
Fishing for Planets: Analyzing the Fisher Information Content of EPRV Exoplanet Surveys
Contributed Talk, Emerging Researchers in Exoplanet Science VI (State College, PA) Jun 2022
Fishing for Planets: Analyzing the Fisher Information Content of EPRV Exoplanet Surveys
Contributed Talk, Exoplanets IV (Las Vegas, NV) May 2022
Characterization of Single-transit TESS Warm Jupiters with NEID
Invited Seminar, Yale Stars & Exoplanets Seminar Feb 2022

Subgiant Asteroseismology with NEID and TESS

Contributed Talk, Penn State Astronomy Lunch Talks

Feb 2020

The NEID Earth Twin Survey: Target Selection and Survey Strategy

Contributed Talk, Emerging Researchers in Exoplanet Science V (Ithaca, NY)

Jun 2019

The NEID Earth Twin Survey: Target Selection and Survey Strategy

Conference Posters

☞ Towards the Habitable Worlds Observatory (Washington, DC)

Jul 2025

Extreme Precision Radial Velocity Monitoring of HWO Target Stars

☞ EPRV 6 (Porto, Portugal)

Jul 2025

A hot Jupiter progenitor on a super-eccentric retrograde orbit

☞ Cool Stars 22 (San Diego, CA)

Jun 2024

A hot Jupiter progenitor on a super-eccentric retrograde orbit

☞ Extreme Solar Systems V (Christchurch, New Zealand)

Mar 2024

A hot Jupiter progenitor on a super-eccentric retrograde orbit

☞ SPIE Astronomical Telescopes & Instrumentation (Montreal, Canada)

Jul 2022

Real-time Exposure Control and Instrument Operation with the NEID Spectrograph GUI

☞ Cool Stars 21 (Toulouse, France)

Jun 2022

Fishing for Planets: Analyzing the Fisher Information Content of EPRV Exoplanet Surveys

☞ TESS Science Conference II (virtual)

Jul 2021

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

Observing Programs

Transiting Warm Jupiter Follow-up [Total 159 hours; \$47,000 awarded through NN-Explore]

– Measuring the Spin-Orbit Misalignment of the most Eccentric Transiting Exoplanet

2024A

PI: A. F. Gupta; WIYN/NEID: 10 hours

– Cornering an Eccentric Giant

2023B

PI: A. F. Gupta; WIYN/NEID: 3 hours & PI: J. Libby-Roberts; APO-3.5 m/ARCTIC: 5 hours

– Radial Velocity Observations of Long-period TESS Exoplanet Candidates with NEID

2021A – 2023B

PI: A. F. Gupta; WIYN/NEID: 130 hours; WIYN/NESSI: 11 hours

EPRV Stellar Variability Characterization [Total 54 hours]

– Coordinated Multi-Facility Observations of Supergranulation in EPRV Time Series

2024B, 2025A

PI: A. F. Gupta; WIYN/NEID: 30.3 hours; Gemini-N/MAROON-X: 30.4 hours & PI: J. Luhn; Keck/KPF: 22.5 hours

– 2 Fingers on the Pulse: Simultaneously Resolving P-mode Oscillations with NEID and TESS

2022A

PI: J. Luhn; WIYN/NEID: 7 hours

– Simultaneous NEID and TESS Observations of p-mode Oscillations in HD 35833

2020B

PI: A. F. Gupta; WIYN/NEID: 8 hours

The NEID Earth Twin Survey [Total ~ 180 nights]

– Guaranteed Time Observations Program

2021A – 2025B

PI: S. Mahadevan, J. Wright; WIYN/NEID: 30 nights / year for 5 years, plus 2-4 institutional nights / semester

Observing Experience

NEID, WIYN-3.5 m, Kitt Peak National Observatory

November 2019 – May 2021

30 nights NEID instrument commissioning

FourStar, Baade Magellan 6.5 m, Las Campanas Observatory

2017 – 2018

7 nights

Teaching and Mentoring

Instructor of Record, Pennsylvania State University

Spring 2022

Astro 5: The Sky & Planets

Guest Lecturer, Pennsylvania State University

Fall 2019

Astro 140: Life in the Universe, Astro 401: Fundamentals of Planetary Science and Astronomy

Instructor, Upward Bound Math & Science (State College, PA)

Summer 2019 & 2020

Astronomy: The Search for Exoplanets and Life Beyond Earth

Academic Tutor, University of Virginia Department of Athletics

2016 – 2017

Calculus, Differential Equations, Introductory calculus-based Physics, Introductory Astronomy

Mentor, Carnegie Astronomy Summer Student Internship (CASSI) Program

2020 – Present

Research Advising

Evan Fitzmaurice, Graduate Student at Pennsylvania State University

2023 – Present

EPRV data analysis for the NEID Earth Twin Survey

Henry Arnpriester, Undergraduate Student at University of Arizona

2025 – Present

Information theory approaches to transiting exoplanet follow-up observations

James Ball, Undergraduate Student at Arizona State University

2024 – Present

TESS + NEID warm Jupiter characterization

Armand Zeibari, Undergraduate Student at Pennsylvania State University

2022 – 2023

Prospects for atmospheric characterization of RV exoplanets

Scientific and Professional Service

Task Group Lead, Habitable Worlds Observatory START: Target Stars & Systems

2024 – Present

Activity & Rotation, EPRV

NASA ROSES Review Panelist

2024

NOIRLab Time Allocation Committee

2024 – Present

Referee, AAS Journals

2023 – Present

Member, EPRV Research Coordination Network

2022 – Present

Science & Local Organizing Committee, Emerging Researchers in Exoplanet Science VII

Aug 2022

American Astronomical Society Congressional Visits Day

Mar 2021

Press

Discovery of TIC 241249530 b: [CNN](#), [NOIRLab](#), [Penn State](#), [Simons Foundation](#), [MIT](#), [IAC](#), [Space.com](#), [Cosmos](#), [Popular Science](#), [365 Days of Astronomy Podcast](#)

Discovery of TOI-4127 b: [Space.com](#)

Kitt Peak celebrates 60 years of telescope tourism: [Tucson.com](#)

Outreach

Kitt Peak National Observatory Tours

2024 – Present

Summit and telescope tours for members of the Tohono O'odham Nation and Pascua Yaqui Tribe

Tucson Dark Sky Advocacy

2024 – Present

Classroom presentations at local schools, analysis of sky brightness monitoring data

Organizing Committee, Penn State Astronomy Grad-Undergrad Research Mentoring Program 2021 – 2023

Co-Organizer & Host, Astronomy on Tap – State College

2019–2023

Public Science Talks & Presentations, various topics, events, locations

2019 – Present

Refereed Publications [7 First Author, 58 Total [↗](#)]

† = advised student

First Author:

1. Gupta, A. F., Fitzmaurice, E.[†], Mahadevan, S., et al., *The NEID Earth Twin Survey. III. Survey Performance After Three Years on Sky* 2025, arXiv e-prints, arXiv:2506.23704
2. Gupta, A. F., Luhn, J. K., Wright, J. T., et al., *The NEID Earth Twin Survey. I. Confirmation of a 31 Day Planet Orbiting HD 86728* 2025, *The Astronomical Journal*, 169, 1
3. Gupta, A. F., Millholland, S., Im, H., et al., *A hot Jupiter progenitor on a super-eccentric retrograde orbit*, 2024, *Nature*, 632, 50
4. 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
5. Gupta, A. F., Jackson, J. M., Hébrard, G., et al., *A High-Eccentricity Warm Jupiter Orbiting TOI-4127*, 2023, *The Astronomical Journal*, 165, 234
6. 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
7. 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

Co-author:

8. Tusay, N., Wright, J. T., Beatty, T. G., et al., *A Disintegrating Rocky World Shrouded in Dust and Gas: Mid-infrared Observations of K2-22 b Using JWST* 2025, *The Astrophysical Journal*, 987, L6
9. Hotnisky, A., Kanodia, S., Libby-Roberts, J., et al., *Searching for GEMS: Two Super-Jupiters Around M Dwarfs that May have Formed via Gravitational Instability* 2025, *The Astronomical Journal*, 170, 1
10. Giovinnazzi, M. R., Blake, C. H., Robertson, P., et al., *The NEID Earth Twin Survey. II. Dynamical Masses in Seven High-acceleration Star Systems* 2025, *The Astronomical Journal*, 170, 52
11. Fernandes, R. B., Kanodia, S., Delamer, M., et al., *Searching for GEMS: Confirmation of TOI-5573 b, a Cool, Saturn-like Planet Orbiting an M Dwarf* 2025, *The Astronomical Journal*, 170, 55
12. Veldhuis, H., Espinoza-Retamal, J. I., Stefansson, G., et al., *TOI-1259Ab: A Warm Jupiter Orbiting a K-dwarf White-Dwarf Binary is on a Well-aligned Orbit* 2025, arXiv e-prints, arXiv:2507.07737
13. Kanodia, S., Cañas, C. I., Mahadevan, S., et al., *Searching for GEMS: TOI-7149 b an Inflated Giant Planet causing a 12% Transit of a Fully Convective M-dwarf* 2025, arXiv e-prints, arXiv:2506.17861
14. Eberhardt, J., Trifonov, T., Henning, T., et al., *TOI-6695: A Pair of Near-resonant Massive Planets Observed with TESS from the WINE Survey* 2025, *The Astronomical Journal*, 169, 298
15. Luhn, J. K., Robertson, P., Halverson, S., et al., *Time-resolved p-mode oscillations for subgiant HD 142091 with NEID at WIYN* 2025, arXiv e-prints, arXiv:2506.18989
16. Larsen, A., Swaby, T. N., Kobulnicky, H. A., et al., *Searching for GEMS: Discovery and Characterization of Two Brown Dwarfs Around M Dwarfs* 2025, *The Astronomical Journal*, 169, 246
18. Reji, V., Kanodia, S., Ninan, J. P., et al., *Searching for GEMS: TOI-5688 A b, a Low-density Giant Orbiting a High-metallicity Early M-dwarf* 2025, *The Astronomical Journal*, 169, 187
19. Heidari, N., Hébrard, G., Martioli, E., et al., *Characterization of seven transiting systems, including four warm Jupiters from SOPHIE and TESS* 2025, *Astronomy and Astrophysics*, 694, A36
20. Beard, C., Robertson, P., Lubin, J., et al., *Jitter Across 15 yr: Leveraging Precise Photometry from Kepler and TESS to Extract Exoplanets from Radial Velocity Time Series* 2025, *The Astronomical Journal*, 169, 92
21. Dong, J., Chontos, A., Zhou, G., et al., *Origins of Super Jupiters: TOI-2145b has a Moderately Eccentric and Nearly*

Aligned Orbit 2025, *The Astronomical Journal*, 169, 4

22. Kanodia, S., Gupta, A. F., Cañas, C. I., et al., *Searching for GEMS: Characterizing Six Giant Planets Around Cool Dwarfs* 2024, *The Astronomical Journal*, 168, 235

23. Bernabò, L. M., Kanodia, S., Cañas, C. I., et al., *Searching for GEMS: TOI-6383Ab, a Giant Planet Transiting an M3-dwarf Star in a Binary System* 2024, *The Astronomical Journal*, 168, 273

24. Placco, V. M., Gupta, A. F., Almeida-Fernandes, F., et al., *BD+44°493: Chemo-dynamical Analysis and Constraints on Companion Planetary Masses from WIYN/NEID Spectroscopy* 2024, *The Astrophysical Journal*, 977, 12

25. Lam, C., Bedell, M., Zhao, L. L., et al., *Gaspary: Optimized Scheduling of Radial Velocity Follow-up Observations for Active Host Stars* 2024, *The Astronomical Journal*, 168, 200

26. Jones, S. E., Stefánsson, G., Masuda, K., et al., *TOI-2015 b: A Warm Neptune with Transit Timing Variations Orbiting an Active Mid-type M Dwarf* 2024, *The Astronomical Journal*, 168, 93

27. Ford, E. B., Bender, C. F., Blake, C. H., et al., *Earths within Reach: Evaluation of Strategies for Mitigating Solar Variability using 3.5 years of NEID Sun-as-a-Star Observations* 2024, *arXiv e-prints*, arXiv:2408.13318

28. 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

29. 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

30. 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

31. 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

32. 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

33. 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

34. 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

35. 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

36. 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

37. 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

38. 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

39. 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

40. 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

41. 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

42. 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

43. Frazier, R. C., Stefánsson, 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

44. 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

45. 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

46. 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

47. 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

48. 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

49. 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

50. 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

51. 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

52. Cañas, C. I., Mahadevan, S., Bender, C. F., et al., *An Eccentric Brown Dwarf Eclipsing an M dwarf* 2022, *The Astronomical Journal*, 163, 89

53. 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

54. 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

55. 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

56. 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

57. 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

58. 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

SPIE Conference Proceedings

1. 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

2. 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

Research Notes

1. Han, T., Robertson, P., Cañas, C. I., et al., *NEIDSpecMatch: Stellar Parameter Estimation with NEID Spectra Using an Empirical Library* 2025, *Research Notes of the American Astronomical Society*, 9, 63