

ARPITA ROY

Dept. of Astronomy & Astrophysics • The Pennsylvania State University • University Park, PA 16802



EDUCATION

- The Pennsylvania State University, University Park, PA
- PhD, Astronomy & Astrophysics (expected) 2017
 - MSc, Astronomy & Astrophysics (GPA 4.0) 2013
- Franklin & Marshall College (F&M), Lancaster, PA 2009
- BA, Magna Cum Laude
 - Astrophysics (honors) + English (Creative Writing)
- St. Catherine's College, Oxford University, Oxford, UK 2008
- Study Abroad, First Class Distinction in Literature



EXPERIENCE

- GRADUATE RESEARCH ASSISTANT [Dr. Suvrath Mahdevan] 2011-Present
Dept. of Astronomy & Astrophysics, Penn State University
- Improving techniques for radial velocity detection of exoplanets using high-precision spectroscopy
 - Instrumentation (hardware + software) for HPF, NEID, PARAS
 - Probing stellar activity using metrics of the cross-correlation function
 - Direct detection of reflected light from exoplanets using stabilized fiber-fed spectrographs
 - Combining spectroscopic and astrometric data for companion detection in anticipation of GAIA
 - A solution to the lunar farside highlands problem [Dr. Jason Wright & Dr. Steinn Sigurdsson]
- POST-BACCALAUREATE RESEARCHER [Dr. Suvrath Mahdevan] 2009-2010
Center for Exoplanets & Habitable Worlds, Penn State University
- End-to-end pipeline development for the PARAS spectrograph, commissioning and early science
- RESEARCH EXPERIENCE FOR UNDERGRADUATES (REU) 2008
Center for Astrophysics, Harvard University
- Probing high mass star formation using masers in Orion Source I [Dr. Liz Humphreys]
- UNDERGRADUATE RESEARCH SCHOLAR 2007-2009
Dept. of Physics & Astronomy, Franklin & Marshall College
- Thesis: Detection of gravitational waves using pulsar timing [Dr. Andrea Lommen]
 - Quantification of the Bull's Eye effect in large scale structure maps of the universe [Dr. Elizabeth Praton]



GRANTS & AWARDS

- Lab Bench to Commercialization Grant (Co-PI) Penn State 2016
- Zaccheus Daniel Fellowship Penn State 2011, 2014, 2016
- Lewis and Clark Field Scholar in Astrobiology NASA & APS 2015
- Downsbrough Graduate Fellowship Penn State 2015
- Center for Exoplanets & Habitable Worlds Small Grant Penn State 2015
- Stephen B. Brumbach Graduate Fellowship in Astrophysics Penn State 2013
- SDSS Astronomer Travel Assistance Award SDSS 2013
- Sigma Xi Grants-in-Aid of Research Sigma Xi 2013
- Michael J. Mumma Senior Prize in Physics & Astronomy F&M 2009
- Joseph R. Holzinger Senior Astronomy Award F&M 2009
- John Kershner Physics Scholar F&M 2008, 2009
- Phi Beta Kappa National Honor Society F&M 2009
- William Uhler Hensel Senior Prize F&M 2009
- William Uhler Hensel Junior Prize F&M 2008
- Lucille and William Hackman Research Scholarship F&M 2007, 2008
- Sigma Pi Sigma National Honor Society F&M 2007

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INSTRUMENTATION

- Experience with high precision astronomical spectrograph and sub-system design [Habitable Zone Planet Finder (HPF), NEID]
- Fiber feed design and fabrication for stabilized delivery [HPF, NEID]
- Development of reduction and scientific analysis pipelines for exoplanet detection [PARAS, HPF, NEID, Hobby Eberly Telescope HRS, SDSS-III APOGEE]
- Commissioning and first light activities [PARAS, HPF Pathfinder]
- Observing on varied aperture telescopes [Hobby Eberly Telescope 10m, Mt. Abu Observatory 1.2m, CfA 16" Refractor, Lowell Observatory 0.9m, Meade 8" LX200]
- Software: IDL, C++, Zemax (ray tracing), Solidworks (CAD; Certified Solidworks Professional)



TEACHING

Astro 011	Instructor, Introductory Astronomy Lab	2011-2012
Astro 140	Teaching Assistant & Guest Lecturer, Life in the Universe	2012
Astro 130	Teaching Assistant, Black Holes in the Universe	2011
SEECoS	Instructor, Summer program for first-generation high school students	2010
Writing Center	Tutor, academic writing across the curriculum	2006-2007
AST 121,122	Undergraduate Teaching Assistant, Introductory Astronomy	2006-2009
PHY 100-200	Undergraduate Tutor for 100 and 200 level physics classes	2008-2009



OUTREACH & ACADEMIC SERVICE

Penn State AstroFest (four-day event with ~2,000 visitors)	2010-2016
Emerging Researchers in Exoplanet Science Symposium, Organizing Committee	2015
Penn State Graduate Research Exhibition	2014
USA Science & Engineering Festival (350,000 visitors), Washington, DC	2012-2014
Penn State Workshops in Astronomy for Educators	2014



PATENTS

- "Optical Scramblers" 2016
Inventors: Suvrath Mahadevan, Arpita Roy, Samuel Halverson
U.S. Patent Application 62/204,206, filed August 2015. *Patent Pending.*
- "A Robust Microscope for External Cell Phone Attachment" 2016
Inventors: Arpita Roy, Suvrath Mahadevan, Samuel Halverson
Invention Disclosure Filed, Ongoing development under Penn State Lab Bench To Commercialization Grant



SELECT MEDIA COVERAGE

- Discovery Channel's "How the Universe Works" – The Secret History of the Moon [Season 4, E6]
- Discover Magazine's Top 100 Stories of 2014 [Jan 2015]
 - #59 Beneath the Moon's Two Faces
 - #100 Meet the Exoplanet Class of 2014
- New York Times "The Moon Comes Around Again" [Sept 2014]
- National Geographic "One of the Most Earthlike Planets Ever Found May Not Exist" [July 2014]
- New York Times "Earthlike Planets May Be Merely An Illusion" [July 2014]
- NASA Astrobiology Magazine "Early Moon Baked in Earthshine" [June 2014]
- Scientific American "2-Face Moon Tells How It Got That Way" [June 2014]
- Discovery News "The Mystery of the Moon is Finally Solved" [June 2014]
- NBC News "Scientists Explain Why Moon's Far Side Looks So Craggy" [June 2014]



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PUBLICATIONS

FIRST AND SECOND AUTHOR

1. *Precision velocimetry planet hunting with PARAS: Current performance and lessons to inform future extreme precision radial velocity instruments*
Roy, A., Chakraborty, A., Mahadevan, S., et al. 2016, Vol. 9908, SPIE, 6
2. *'Modal Noise' in Single-Mode Fibers: A Cautionary Note for High Precision Radial Velocity Instruments*
Halverson, S., **Roy, A.**, Mahadevan, S., & Schwab, C. 2015, ApJL, 814, L22
3. *An Efficient, Compact, and Versatile Fiber Double Scrambler for High Precision Radial Velocity Instruments*
Halverson, S. & Roy, A.*, Mahadevan, S., Ramsey, L., Levi, E., Schwab, C. et al. 2015, ApJ, 806, 61
4. *Stellar Activity Mimics a Habitable-Zone Planet Around Kapteyn's Star*
Robertson, P., **Roy, A.**, & Mahadevan, S., 2015, ApJL, 805, L22
5. *Earthshine on a Young Moon: Explaining the Lunar Farside Highlands*
Roy, A., Wright, J.T., & Sigurðsson, S. 2014, ApJ, 788, L42
6. *Scrambling and modal noise mitigation in the Habitable Zone Planet Finder fiber feed*
Roy, A., Halverson, S., Mahadevan, S., & Ramsey, L. W. 2014, Vol. 9147, SPIE, 6
7. *MARVELS-1: A Face-on Double-lined Binary Star Masquerading as a Resonant Planetary System and Consideration of Rare False Positives in Radial Velocity Planet Searches*
Wright, J. T., **Roy, A.**, Mahadevan, S., et al. 2013, ApJ, 770, 11

ALL COAUTHOR

8. *Proxima Centauri as a Benchmark for Stellar Activity Indicators in the Near Infrared*
Robertson, P., Bender, C., Mahadevan, S., **Roy, A.** & Ramsey, L. 2016, ApJ (Accepted)
9. *A Versatile Technique To Enable Sub-milli-kelvin Instrument Stability For Precise Radial Velocity Measurements: Tests With The Habitable Zone Planet Finder*
Stefansson, G. et al. 2016, ApJ (Accepted)
10. *Evidence for Reflected Light from the Most Eccentric Exoplanet Known*
Kane, S.R., Wittenmeyer, R.A., Hinkel, N.R., **Roy, A.**, Mahadevan, S., et al. 2016, ApJ, 821, 65
11. *Detection of a Very Low Mass Star in an Eclipsing Binary System*
Chaturvedi, P., Chakraborty, A., Anandaramo, B.G., **Roy, A.**, and Mahadevan, S. 2016, MNRAS, 463, 554
12. *Design of NEID, an extreme precision Doppler spectrograph for WIYN*
Schwab, C., Rakich, A., Gong, Q., Mahadevan, S., Halverson, S., **Roy, A.** et al. 2016, Vol. 9908, SPIE, 6
13. *A comprehensive radial velocity error budget for next generation Doppler spectrometers*
Halverson, S., Terrien, R., Mahadevan, S., **Roy, A.** et al. 2016, Vol. 9908, SPIE, 6
14. *The instrument control software package for the Habitable-Zone Planet Finder spectrometer*
Bender, C. et al. 2016, Vol. 9913, SPIE, 11

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PUBLICATIONS

ALL COAUTHOR (CONTINUED)

15. *Ultra-stable temperature and pressure control for the Habitable-zone Planet Finder spectrograph*
Stefansson, G.K. et al. 2016, Vol. 9908, SPIE, 6
16. *The APOGEE Spectroscopic Survey of Kepler Planet Hosts: Feasibility, Efficiency, and First Results*
Fleming, S. W., Mahadevan, S., Deshpande, R., Bender, C., Terrien, R., Marchwinski, R. C., Wang, J.,
Roy, A., et al. 2015, AJ, 149, 143
17. *Stellar activity masquerading as planets in the habitable zone of the M dwarf Gliese 581*
Robertson, P., Mahadevan, S., Endl, M., & **Roy, A.** 2014, Science, 345, 440
18. *The PRL Stabilized High-Resolution Fiber-fed Spectrograph: Instrument Description & RV Results*
Chakraborty, A., Mahadevan, S., **Roy, A.**, et al. 2014, PASP, 126, 133
19. *Determination of mass and orbital parameters of a low-mass star HD 213597B*
Chaturvedi, P., Deshpande, R., Dixit, V., **Roy, A.**, et al. 2014, MNRAS, 442, 3737
20. *The habitable-zone planet finder calibration system*
Halverson, S., Mahadevan, S., Ramsey, L., Terrien, R., **Roy, A.**, et al. 2014, Vol. 9147, SPIE, 7
21. *The Habitable-zone Planet Finder: A status update on the development of a stabilized fiber-fed near-infrared spectrograph for the for the Hobby-Eberly telescope*
Mahadevan, S., Ramsey, L. W., Terrien, R., Halverson, S., **Roy, A.**, et al. 2014, Vol. 9147, SPIE, 1
22. *Environmental control system for Habitable-zone Planet Finder*
Hearty, F., Levi, E., Nelson, M., Mahadevan, S., Burton, A., Ramsey, L., Bender, C., Terrien, R.,
Halverson, S., Robertson, P., **Roy, A.** et al. 2014, Vol. 9147, SPIE, 52
23. *The Tenth Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the SDSS-III Apache Point Observatory Galactic Evolution Experiment*
Ahn, C. P. et al. 2014, ApJS, 211, 17
24. *A Cautionary Tale: MARVELS Brown Dwarf Candidate Reveals Itself to be a Very Long Period, Highly Eccentric Spectroscopic Stellar Binary*
Mack, III, C. E. et al. 2013, AJ, 145, 139
25. *The SDSS-HET Survey of Kepler Eclipsing Binaries: Spectroscopic Dynamical Masses of the Kepler-16 Circumbinary Planet Hosts*
Bender, C. F., Mahadevan, S., Deshpande, R., Wright, J. T., **Roy, A.**, et al. 2012, ApJ, 751, L31
26. *First light results from PARAS: the PRL Echelle Spectrograph*
Chakraborty, A., Mahadevan, S., **Roy, A.**, et al. 2010, Vol. 7735, SPIE
27. *The habitable zone planet finder: a proposed high-resolution NIR spectrograph for the Hobby Eberly Telescope to discover low-mass exoplanets around M dwarfs*
Mahadevan, S., Ramsey, L., Wright, J., Endl, M., Redman, S., Bender, C., **Roy, A.**, et al. 2010, Vol. 7735, SPIE
28. *The Pathfinder testbed: exploring techniques for achieving precision radial velocities in the NIR*
Ramsey, L. W., Mahadevan, S., Redman, S., Bender, C., **Roy, A.**, et al. 2010, Vol. 7735, SPIE

