

Rahul I. Patel - Postdoctoral Scholar

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CURRENT RESEARCH

- Development of interface for planet yield estimator with Wide-Field Infrared Survey Telescope (WFIRST) coronagraph.
- Post-processing development and analysis of WFIRST-IFS coronagraphic lab test data.
- High-contrast imaging of nearby, young, exoplanetary and debris disk systems.
- Detection and characterization of debris disk systems with Wide-Field Infrared Survey Explorer.
- Characterize debris disk systems using spectral energy distribution analysis.

RESEARCH EXPERIENCE

1. Postdoctoral Work
 - Large scale data analysis to identify debris disk host stars using Wide-Field Survey Explorer.
 - High-contrast imaging with multiple adaptive optics and coronagraphic systems.
 - Post-processing of coronagraphic data to remove speckles.
 - Development of astronomical tools in python.
2. Graduate Work
 - Large scale data analysis to identify debris disk host stars using Wide-Field Survey Explorer.
 - Planet yield modeling for high-contrast direct imaging surveys.
 - High-contrast imaging with multiple adaptive optics and coronagraphic systems.
3. Undergraduate/REU Work
 - Studying sub-atomic particles via lattice simulations of quark-gluon interactions.
 - Dust tracking analysis in Tokamak at Princeton Plasma Physics Laboratory.
 - Study of MnAs and MnO lattice structure from neutron scattering experiments at Oak Ridge National Lab.

EDUCATION

Sept. 2015
Ph.D., Physics (Concentration in Astronomy) Stony Brook University /Stony Brook, NY
May 2013
M.A., Physics Stony Brook University /Stony Brook, NY
May 2009
B.S., Physics (Minor in Math and Astronomy, Magna Cum Laude) Florida International University (FIU)

PRESS RELEASES

51 Eri b and Debris Disk Discovery

- [Western Ontario University Press Release \(http://bit.ly/1NtugKG\)](http://bit.ly/1NtugKG).
- [Stony Brook University Press Release \(http://bit.ly/1Yka0kk\)](http://bit.ly/1Yka0kk).
- [Washington Post Press Release \(http://bit.ly/1Yka0kk\)](http://bit.ly/1Yka0kk).
- [CBC News \(http://bit.ly/1gESuqA\)](http://bit.ly/1gESuqA).

REFEREED PUBLICATIONS

“The Faintest WISE Debris Disks: Enhanced Methods for Detection and Verification.”, by **Rahul Patel**, Stanimir Metchev, Aren Heinze, Joe Trollo, 2017. *AJ*, 153, 54.

“The Orbit and Transit Prospects for β Pictoris b Constrained with One Milliarcsecond Astrometry” by J. Wang, J. Graham, L. Pueyo, P. Kalas, M. Millar-Blanchaer, J.-B. Ruffio, R. De Rosa, S. Mark Ammons, P. Arriaga, V. Bailey, T. Barman, J. Bulger, A. Burrows, A. Cardwell, C. Chen, J. Chilcote, T. Cotten, M. Fitzgerald, K. Follette, R. Doyon, G. Duchene, A. Greenbaum, P. Hibon, L.W. Hung, P. Ingraham, Q. Konopacky, J. Larkin, B. Macintosh, J. Maire, F. Marchis, M. Marley, C. Marois, S. Metchev, E. Nielsen, R. Oppenheimer, D. Palmer, **R. Patel**, J. Patience, M. Perrin, L. Poyneer, A. Rajan, J. Rameau, F. Rantakyro, D. Savransky, A. Sivaramakrishnan, I. Song, R. Soummer, S. Thomas, G. Vasisht, D. Vega, J. K. Wallace, K. Ward-Duong, S. Wiktorowicz, and S. Wolff, *AJ*, 152, 97.

[“Astrometric Confirmation and Preliminary Orbital Parameters of the Young Exoplanet 51 Eridani b with the Gemini Planet Imager”](#), by Robert J. De Rosa, Eric L. Nielsen, Sarah C. Blunt, James R. Graham, Quinn M. Konopacky, Christian Marois, Laurent Pueyo, Julien Rameau, Dominic M. Ryan, Jason J. Wang, Vanessa Bailey, Ashley Chontos, Daniel C. Fabrycky, Katherine B. Follette, Bruce Macintosh, Franck Marchis, S. Mark Ammons, Pauline Arriaga, Jeffrey K. Chilcote, Tara H. Cotten, René Doyon, Gaspard Duchêne, Thomas M. Esposito, Michael P. Fitzgerald, Benjamin Gerard, Stephen J. Goodsell, Alexandra Z. Greenbaum, Pascale Hibon, Patrick Ingraham, Mara Johnson-Groh, Paul G. Kalas, David Lafrenière, Jerome Maire, Stanimir Metchev, Maxwell A. Millar-Blanchaer, Katie M. Morzinski, Rebecca Oppenheimer, **Rahul I. Patel**, Jennifer L. Patience, Marshall D. Perrin, Abhijith Rajan, Fredrik T. Rantakyö, Jean-Baptiste Ruffio, Adam C. Schneider, Anand Sivaramakrishnan, Inseok Song, Debby Tran, Gautam Vasisht, Kimberly Ward-Duong, and Schuyler G. Wolff. 2015. *ApJ*, 814, L3.

[“Discovery and spectroscopy of the young jovian planet 51 Eri b with the Gemini Planet Imager”](#), by B. Macintosh, J. R. Graham, T. Barman, R. J. De Rosa, Q. Konopacky, M. S. Marley, C. Marois, E. L. Nielsen, L. Pueyo, A. Rajan, J. Rameau, D. Saumon, J. J. Wang, J. Patience, M. Ammons, P. Arriaga, E. Artigau, S. Beckwith, J. Brewster, S. Bruzzone, J. Bulger, B. Burningham, A. S. Burrows, C. Chen, E. Chiang, J. K. Chilcote, R. I. Dawson, R. Dong, R. Doyon, Z. H. Draper, G. Duchêne, T. M. Esposito, D. Fabrycky, M. P. Fitzgerald, K. B. Follette, J. J. Fortney, B. Gerard, S. Goodsell, A. Z. Greenbaum, P. Hibon, S. Hinkley, T. H. Cotten, L.-W. Hung, P. Ingraham, M. Johnson-Groh, P. Kalas, D. Lafreniere, J. E. Larkin, J. Lee, M. Line, D. Long, J. Maire, F. Marchis, B. C. Matthews, C. E. Max, S. Metchev, M. A. Millar-Blanchaer, T. Mittal, C. V. Morley, K. M. Morzinski, R. Murray-Clay, R. Oppenheimer, D. W. Palmer, **R. Patel**, M. D. Perrin, L. A. Poyneer, R. R. Rafikov, F. T. Rantakyö, E. L. Rice, P. Rojo, A. R. Rudy, J.-B. Ruffio, M. T. Ruiz, N. Sadakuni, L. Saddlemyer, M. Salama, D. Savransky, A. C. Schneider, A. Sivaramakrishnan, I. Song, R. Soummer, S. Thomas, G. Vasisht, J. K. Wallace, K. Ward-Duong, S. J. Wiktorowicz, S. G. Wolff, B. Zuckerman. 2015, *Science*, 350, 64-67.

[“A Sensitive Identification of Warm Debris Disks in the Solar Neighborhood Through Precise Calibration of Saturated WISE Photometry”](#), by **Patel, R.**, Metchev, S., & Heinze, A. 2014. *ApJS*, 212, 10.

[“3-D reconstruction of pre-characterized lithium and tungsten dust particle trajectories in NSTX”](#), by J. Nicols, AL Roquemore, W. Davis, DK Mansfield, CH Skinner, E. Feibush, W. Boeglin, **R. Patel**, D. Abolafia, K. Hartzfeld, R. Maqueda. 2011, *Journal of Nuclear Materials*, 415, S1098-S1101.

[“Advances in fast 2D camera data handling and analysis on NSTX”](#), by W.M. Davis, **R.I. Patel**, W.U. Boeglin, A.L. Roquemore, R.J. Maqueda, S.J. Zweben. 2010. *Fusion Engineering and Design*, 85, 325-327.

[“The Vector Meson Mass in the Large N Limit of QCD”](#), A. Hietanen, R. Narayanan, **R. Patel**, C. Prays. 2009. *Physics Letters B*, 674, 80-82.

OTHER

[“Constraints on the Position of Supernova 2016adj in NGC 5128 from Keck-II NIRC2 Adaptive Optics Observations”](#), by Patrick L. Kelly, David R. Ciardi, Charles A. Beichman, Alexei V. Filippenko, Ori D. Fox, **Rahul I. Patel**, Evan Sinukoff. 2016. *ATel* 8720.

INVITED TALKS

My Love Hate Relationship with Astrophysics & Why I Don't Regret it. Seminar, Florida International University, Apr. 2016
New Exozodi and Asteroid Belt Analogs using WISE. Seminar, DTM, Carnegie Institute of Science, Nov. 14th, 2014.
New Exozodi and Asteroid Belt Analogs using WISE. Seminar, American Museum of Natural History, Oct 21st, 2014.

CONFERENCE PROCEEDINGS

Patel, R., Metchev, S., Heinze, A., Trollo, J., [“Sensitive Identification of Nearby Debris Disks via Precise Calibration of WISE Data.”](#), 2015, *Proceedings of the International Astronomical Union*, S314, 199-200

Patel, R., Metchev, S., Heinze, A., [“A sensitive identification of warm debris disks in the solar neighborhood through precise calibration of saturated wise photometry.”](#), 2014, at *30 Years of β Pic and Debris Disks*, Paris, France.

Patel, R., Metchev, S., [“Finding Asteroid Belt Analogues with WISE”](#), 2013, *Proceedings of the International Astronomical Union*, S299, 352-353

Wahl, M., Metchev, S., **Patel, R.**, Serabyn, E., et al., [“Debris Disk Science with the Palomar ExAO System: First Results”](#), 2013, *Proceedings of the International Astronomical Union*, S299, 72-73

CONFERENCES
AND
SEMINARS

Talk at 223 *American Astronomical Society*. **Patel, R.**, Metchev, S., Heinze, A., "[Finding the Faintest Exozodi and Asteroid Belt Analogs in WISE](#)", 2014.

Talk to Physics and Astronomy Graduate Students at Stony Brook University for Grad Seminar Series on "Studying Debris Disks Around Other Stars to Understand Our Own", Fall 2013.

Poster at Astronomical Society of New York, "A Study of Planetary System Architecture through WISE's Eye", Apr. 2012.

Poster at 218 *American Astronomical Society*, "Modeling the Detectability of Exoplanets for Palomar Extreme AO Palm-3000 System", May 2011.

Talk and Poster at Florida International University for McNair Fellowship Research Program on "[Dust Trajectories in NSTX](#)", Oct. 2009.

Talk at Florida International University's Honors College Student Research & Artistic Initiatives program on "Calculation of Mass of ρ Meson", Apr. 2008.

RESEARCH & OBSERVING EXPERIENCE

Telescope Time
Awarded:

1/2 Night: 10-m Keck NIRC2-NGS + Vortex at L band
2015B and 2016A; (PI: C. Beichman)

2 Nights: 8-m Subaru Mid-IR COMICS Instrument
Programs: 2014A-0407 and 2013B-0410; (PI: Rahul Patel)

8 Nights: 3.8-m AAT Optical Echelle Spectroscopy with UCLES
Programs: 2014B-0206, 2014A-0394, 2013B-0393, 2013A-0170, 2012B-0541; (PI: Rahul Patel)

4 Nights: 4-m Mayall Optical Echelle Spectroscopy
Programs: 2014B-0206, 2013A-0170, 2012B-0541; (PI: Rahul Patel)

>8 Nights: 5-m Hale Near-IR Adaptive Optics Imaging with ExAO and PHARO
Programs: 2011A-2013; (PI: Stanimir Metchev)

Other Facilities:

National Labs: Princeton Plasma Physics Lab Tokamak, High-Flux Isotope Reactor – Oak Ridge National Lab

TEACHING
EXPERIENCE

2014-2015
Guest Lecturer Stony Brook University
Prepared and presented special topic lectures in astronomical research to undergraduate students.
Aug. 2009–Apr. 2010

Teaching Assistant Stony Brook University
Teaching assistant for pre-med undergraduate physics lab.
Aug. 2007 – Apr. 2009

Teaching Assistant FIU
Teaching assistant for introductory physics lab.
June 5 – 15th 2006

Teaching Assistant Upward Bound Program / FIU
Teaching introductory physics to middle and high school students.

ACADEMIC
SERVICE

Sept. 2013 – Sept. 2015
Quality of Life Committee Stony Brook University
Serving on committee to organize and enhance the quality of life for the physics and astronomy dept. at SBU.

Spring 2011
Local Palomar TAC Stony Brook University
Served on local TAC to allocate observing time for Stony Brook's share of Palomar observing.
2009-2010

Friday Afternoon Seminar Coordinator Stony Brook University
Co-organized Friday afternoon graduate seminar to expose graduate students of ongoing department research.

OUTREACH

Dec. 2, 2016
Reel Science Caltech

Outreach for elementary and middle school kids on the future of Exoplanet discovery.

Oct. 22, 2016

Volunteer at Astronomy Week in Pasadena

Caltech

Engage public with astronomy demonstrations.

July 2016, Oct. 2016, Nov. 2016, Jan. 2017

Astronomy on Tap

Caltech

Outreach talk at local bar on Juno mission and M.C. at separate event.

Apr. 2016

A Ticket to Explore JPL

JPL/NASA

Engage public with astronomy demonstrations.

Fall 2014

Adopt-A-Physicist Program

JPL/NASA

Online program answering questions from middle/high school students about astrophysics.

May 14, 2014

Science Unplugged

Miller Place High School

Outreach lecture on debris disks and exoplanetary science to high school students hosted via Alan Alda's Program for Science Communication.

Feb. 7, 2014

Astronomy Public Talk

Stony Brook University

Astronomy open night talk on "Looking For Solar System 2.0 By Studying Extra Solar Debris Disks."

2012-2014

Science Fair Judge at LISEF

Woodbury, NY

Volunteered to judge science projects from high school students at the pre-Intel Long Island Science Engineering Fair.

PROFESSIONAL SOCIETIES

- American Astronomical Society (2010–Present)
- GPIES: Gemini Planet Imager Exoplanet Survey Collaboration (2014 – Present)

HONORS & AWARDS

- Peter B. Kahn Travel Prize, 2013
- Phi Beta Kappa, 2009
- Southern Cross Astronomical Society Scholarship, 2008
- Harriet Robinson Scholarship, 2008
- McNair Post Baccalaureate Fellow, (2008–present)
- Florida Bright Futures Scholarship, (2004–2009)
- Florida International University Honors College, (2006–2009)
- Florida International University Deans' List, (2004–2009)

TECHNICAL

Datasets

Wide-Field Infrared Survey Explorer, Two-Micron All-Sky Survey,

Programming

Python, Git, Linux, minimal IDL

REFERENCES

Dr. Charles Beichman
Executive Director of NExSCI at Caltech
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