Rahul I. Patel - Postdoctoral Scholar

Address: IPAC/Caltech; 700 S. Wilson Ave., Pasadena, CA, 91125. Phone: 305.772.2012
Email: rpatel@ipac.caltech.edu Web: https://astropatel.github.io

Current Research

- High-contrast imaging of nearby, young, exoplanetary systems.
- Detection and characterization of debris disk systems.
- Development of tools for coronographic surveys with Wide-Field Infrared Survey Telescope (WFIRST)

Education

Sept. 2015
Ph.D. – Physics (Concentration in Astronomy) Stony Brook University /Stony Brook, NY
Adviser: Dr. Stanimir Metchev
Committee Members: Dr. Tom Weinacht, Dr. Michael Zingale , Dr. Rebecca Oppenheimer
Characterization and evolution of circumstellar debris disks around nearby stars.

May 2013
M.A.– Physics Stony Brook University /Stony Brook, NY

Spring 2009
B.S. – Physics, 2009 (Minor in Math and Astronomy, Magna Cum Laude) Florida International University (FIU)

- **Adviser**: Rajamani Narayanan. *Study of QCD and Calculating the ρ Mass in 4D and Large N.*
- **Adviser**: Werner Boeglin. *Dust Particle Tracking in Princeton Plasma Physics Lab.*
- **Adviser**: Jaime Fernandez-Baca: ORNL. *Study of MnAs and MnO Structure From Neutron Scattering Data.*

Press Releases

51 Eri b and Debris Disk Discovery

- Western Ontario University Press Release (http://bit.ly/1NtugKG).
- Stony Brook University Press Release (http://bit.ly/1Yka0kk).
- Washington Post Press Release (http://bit.ly/1Yka0kk).
- CBC News (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. Rantakyrö, 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,20, 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. Rantakyrö, 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 Mansfied, CH Skiner, 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 – Current
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
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 ID

References

Dr. Charles Beichman
Executive Director of NExSCI at Caltech
Caltech
+1–626–395–1996
chas@ipac.caltech.edu

Dr. Rebecca Oppenheimer
Curator and Professor
Department of Astrophysics
American Museum of Natural History
+1 – 212 – 313 – 7921
roppenheimer@amnh.org

Dr. Stanimir Metchev
Associate Professor and Canada Research Chair
Department of Physics and Astronomy
The University of Western Ontario
+1 – 519 – 661 – 2111, 88438
smetchev@uwo.ca

Dr. Rafael Millan-Gabet
NASA Exoplanet Science Institute
Caltech/IPAC

r.millan.gabet@gmail.com

Dr. Bruce Macintosh
Professor of Physics
Department of Physics
Stanford University
+1 – 650 – 725 – 4116
bmacintosh@stanford.edu