Jason Wang

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Employment

2018-Present	51 Pegasi b Fellow at Caltech
2013-2018	Graduate Student Researcher at UC Berkeley
2011-2013	Research Assistant at Cornell University
2012	Software Development Engineer Intern at Microsoft

Education

2013-2018   University of California, Berkeley
Ph.D. in Astrophysics (August 2018)
- Thesis Title: *Footage of Other Worlds: Unveiling the Dynamical Architecture of Young Exoplanetary Systems* (Advisor: James Graham)

M.A. in Astrophysics (2016)

2009-2013   Cornell University
B.A. in Physics (Magna Cum Laude) and Minor in Computer Science (2013)

Research Interests

- High-contrast imaging and high-resolution spectroscopy of exoplanets
- Exoplanet characterization with long-baseline optical interferometry
- Using novel instrumentation, large datasets, and machine learning techniques to find new exoplanets
- Software development for astronomy

Awards, Honors, Distinctions

2018	Mary Elizabeth Uhl Prize, UC Berkeley Astronomy Department
2016	Chambliss Astronomy Achievement Student Award
2013	Kievel Prize, Cornell Physics Department
2013	Merrill Presidential Scholar, Cornell University
2012	Microsoft DevDiv Intern Hack-A-Thon Winner

Proposals & Grants

Keck	6.5 Nights
Subaru	2 Nights
Gemini	6 Hours
VLTI	14 Nights (Co-I; Astrometry Lead)
Hubble	9 Orbits, $106,019
JWST ERS	$17,140
Heising-Simons Foundation	$45,857
Berkeley Crowdfunding	$7,155 (for Berkeley Astronomy outreach)
XSEDE/SDSC	285,000 CPU Hours

Mentoring

2019-Present	Jea Adams (Amherst Undergraduate)
	Data reduction pipeline for JWST exoplanet direct imaging
2019-2020	Matas Kulikauskas (Pasadena City College Undergraduate)

	Web application to track the location of directly imaged planets
2018-Present	Sarah Blunt (Caltech Graduate Student)
	Development of orbitize!, an open source orbit fitting package for direct imaging datasets
2017-2019	Meiji Nguyen (UC Berkeley Undergraduate and Postbaccalaureate), co-advised with Rob De Rosa
	Improving and assessing stability of the astrometric calibration of the Gemini Planet Imager
2016-2017	Simon Ko (UC Berkeley Undergraduate)
	Software testing, continuous integration, and code coverage for pyKLIP
2016-2016	Jeffrey Vargas (UC Berkeley Undergraduate), co-advised with Rob de Rosa
	Reevaluation of the photometric calibration of the Gemini Planet Imager
2015	Joe Zalesky (UC Berkeley Undergraduate), co-advised with James Graham
	Improving computer vision algorithms in the Gemini Planet Imager Data Reduction Pipeline
2014	Maïssa Salama (UC Berkeley Undergraduate), co-advised with James Graham
	Automatic generation of observing sequences for the Gemini Planet Imager Exoplanet Survey

Teaching Experience

Fall 2016	Instructor, Astronomy Pedagogy (Ay375, UC Berkeley)
	• Syllabus: http://badgrads.berkeley.edu/doku.php?id=astro300_f16
Fall 2014	Teaching Assistant, Introduction to Astrophysics (Ay7A, UC Berkeley)
Fall 2013	Teaching Assistant, Optical Astronomy Lab (Ay120, UC Berkeley)
Fall 2012	Teaching Assistant, Operating Systems and Operating Systems Practicum (CS 4410 & CS 4411, Cornell University)

Service

Referee	A&A, AJ, Astronomy & Computing
2020	High-Resolution Infrared Spectroscopy for Exoplanet Characterization Hackathon OC
2020	ExoGRAVITY SOC
2019-2020	NOAO Galactic TAC
2019	Chinese Telescope Access Program TAC
2019	Caltech Optical Observatories TAC
2018-Present	Astro-ph Discussion Leader (Caltech)
2018-2019	AAS Chambliss Award Judge
2016-2018	Graduate Student Peer Mentoring Program (UC Berkeley)

Outreach & Volunteering

2018-Present	Developed new demos and volunteered at Caltech astronomy outreach events
2017	Created HR 8799 time-lapse that was viewed a million times online, featured on Astronomy Picture of the Day, and shown on a PBS children's TV show
2013-2018	Developed and fundraised new outreach demonstrations, helped start up Astro Night, and volunteered at various UC Berkeley astronomy outreach events
2012-2013	As treasurer of the Zambia Community Education Initiative (ZCEI), helped found, incorporate, and obtain 501(c)3 non-profit status for ZCEI
2009-2013	President (2010-2012) & treasurer (2012-2013) of the Cornell Computer Reuse Association (CCRA)
	• Organized the donation of over 1000 refurbished computers
	• Created an annual service trip to schools on Grand Bahama Island and obtained a $2500 donation to start up the program

Invited Talks

UCLA Astrophysics Lunch Talk, February, 2020.

Planetary Science Seminar, Caltech, February, 2020.

JPL Astrophysics Luncheon Seminar, Pasadena, CA, January, 2019.

ExSoCal, Pasadena, CA, September, 2018.

IPAC Seminar, Pasadena, CA, May, 2017.

Planetary Science Seminar, Caltech, May, 2017.

Center for Integrative Planetary Science Seminar, UC Berkeley, April, 2016.

Contributed Talks

In the Spirit of Bernard Lyot, Tokyo, Japan, October, 2019.

Keck Science Meeting, Los Angeles, CA, September, 2019

51 Pegasi b Science Summit, Sausalito, CA, July, 2019

Bay Area Exoplanet Meeting, Mountain View, CA, March, 2019.

American Astronomical Society 233rd Meeting, Seattle, WA, January, 2019.

Sagan Fellows Symposium, Pasadena, CA, November, 2018.

51 Pegasi b Science Summit, Sausalito, CA, August, 2018.

Exoplanets II, Cambridge, UK, July, 2018.

Combining high-resolution spectroscopy and high-contrast imaging for exoplanet characterization, Pasadena, CA, June, 2018.

NASA Goddard Extrasolar Planet Seminar, Greenbelt, MD, January, 2018.

American Astronomical Society 231st Meeting, National Harbor, MD, January, 2018.

Know Thy Star - Know Thy Planet, Pasadena, CA, October, 2017.

Bay Area Exoplanet Meeting, Mountain View, CA, September, 2017.

Bay Area Exoplanet Meeting, Stanford, CA, December, 2016.

Rock, Rubble, and Rings, Leiden, Netherlands, September, 2016.

Exoplanets I, Davos, Switzerland, July, 2016.

Nexus for Exoplanet System Science Webinar, June, 2016.

Thursday Astronomy Lunch, UC Berkeley, March, 2016.

Bay Area Exoplanet Meeting, Mountain View, CA, September, 2015.

 In the Spirit of Bernard Lyot, Montreal, QC, June, 2015.

Thursday Astronomy Lunch, UC Berkeley, February, 2015.

Astronomy Lunch, UC Berkeley, November, 2013.

Refereed Publications (* represents mentored students)

Nguyen, M.*, De Rosa, R. J., **Wang, J. J.**, et al. (2020) HD 165054: An Astrometric Calibration Field for High-Contrast Imagers in Baade's Window. AAS Journals, submitted.

Blunt, S.*, **Wang, J. J.**, Angelo, I., et al. (2019) orbitize!: A Comprehensive Orbit-fitting Software Package for the High-contrast Imaging Community, AJ, 159, 89.

De Rosa, R. J., **Nguyen, M.***, Chilcote, J., **et al.** (2019) Revised Astrometric Calibration of the Gemini Planet Imager, JATIS, in press.

GRAVITY Collaboration, Nowak, M., Lacour, S., Mollière, P., **Wang, J.**, et al. (2019), Peering into the formation history of beta Pictoris b with VLTI/GRAVITY long-baseline interferometry, A&A, 633, 110.

De Rosa, R. J., Nielsen, E. L., **Wang, J. J.,** et al. (2019) An updated visual orbit of the directly-imaged exoplanet 51 Eridani b and prospects for a dynamical mass measurement with Gaia. AJ, 159, 1.

De Rosa, R. J., Esposito, T. M., Hirsch, L. A., **et al.** (2019) The Possible Astrometric Signature of a Planetary-mass Companion to the Nearby Young Star TW Piscis Austrini (Fomalhaut B): Constraints from Astrometry, Radial Velocities, and Direct Imaging. AJ, 158, 225.

De Rosa, R. J., Nielsen, E. L., Rameau, J., **et al.** (2019) Detection of a low-mass stellar companion to the accelerating A2IV star HR 1645. AJ, 158, 226.

Madurowicz, A., Macintosh, B., Chilcote, J., **et al.** (2019) Asymmetries in adaptive optics point spread functions. JATIS, 5, 049003.

Ren, B., Choquet, É., Perrin, M. D., **et al.** (2019) An Exo–Kuiper Belt with an Extended Halo around HD 191089 in Scattered Light. ApJ, 882, 64.

Nielsen, E. L., De Rosa, R. J., Macintosh, B., **Wang, J. J.**, et al. (2019) The Gemini Planet Imager Exoplanet Survey: Giant Planet and Brown Dwarf Demographics from 10 to 100 au. AJ, 158, 13.

GRAVITY Collaboration, Lacour, S., Nowak, M., **Wang, J.**, et al. (2019) First direction of an exoplanet by optical interferometry. A&A Letters, 623, L11.

Greenbaum, A. Z., Cheetham, A., Sivaramakrishnan, A., **et al.** (2019) Performance of the Gemini Planet Imager Non-redundant Mask and Spectroscopy of Two Close-separation Binaries: HR 2690 and HD 142527. AJ, 157, 249.

Conrath, B. J., Gierasch, P. J., Herter, T., **Wang, J.** (2018) Temperature and para hydrogen gradients on Jupiter observed from the FORCAST camera on SOFIA. Icarus, 315, 1-6.

Ruffio, J.-B., Mawet, D., Czekala, I., **et al.** (2018) A Bayesian Framework for Exoplanet Direct Detection and Non-Detection. AJ, 156, 192.

Wang, J. J., Graham, J. R., Dawson, R., et al. (2018) Dynamical Constraints on the HR 8799 Planets with GPI. AJ, 156, 192.

Esposito, T. M., Duchêne, G., Kalas, P., **et al.** (2018) Direct Imaging of the HD 35841 Debris Disk: A Polarized Dust Ring from Gemini Planet Imager and an Outer Halo from HST/STIS. AJ, 156, 37.

Greenbaum, A. Z., Pueyo, L., Ruffio, J.-B., **Wang, J. J.**, et al. (2018) GPI Spectra of HR 8799 c, d, and e from 1.5 to 2.4 μm with KLIP Forward Modeling. AJ, 155, 226.

Wang, J. J., Perrin, M. D., Savransky, D., et al. (2018) Automated data processing infrastructure for the Gemini Planet Imager Exoplanet Survey. JATIS, 4, 018002.

Mékarnia, D., Chappellier, E., Guillot, T., **et al.** (2017) The δ Scuti pulsations of β Pictoris as observed by ASTEP from Antarctica. A&A, 608, L6.

Nielsen, E. L., De Rosa, R. J., Rameau, J., **Wang, J. J.**, et al. (2017) Evidence that the Directly-Imaged Planet HD 131399 Ab is a Background Star. AJ, 154, 218.

Ruffio, J.-B., Macintosh, B., **Wang, J. J.**, et al. (2017) Improving and Assessing Planet Sensitivity of the GPI Exoplanet Survey with a Forward Model Matched Filter. ApJ, 842, 14.

Rajan, A., Rameau, J., De Rosa, R. J., **et al.** (2017) Characterizing 51 Eri b from 1-5 μm: a partly-cloudy exoplanet. AJ, 154, 10.

Follette, K. B., Rameau, J., Dong, R., **et al.** (2017) Complex Spiral Structure in the HD 100546 Transitional Disk as Revealed by GPI and MagAO. AJ, 153, 264.

Rameau, J., Follette, K. B., Pueyo L., **et al.** (2017) An Optical/Near-infrared Investigation of HD 100546 b with the Gemini Planet Imager and MagAO. AJ, 153, 244.

Johnson-Groh, M., Marois, C., De Rosa, R. J., **et al.*** (2017) Integral Field Spectroscopy of the Low-mass Companion HD 984 B with the Gemini Planet Imager. AJ, 153, 190.

Chilcote, J., Pueyo, L., De Rosa, R. J., **Vargas, J.***, **et al.** (2017) 1-2.4 μm Near-IR Spectrum of the Giant Planet β Pictoris b Obtained with the Gemini Planet Imager. AJ, 153, 182.

Blunt, S., Nielsen, E. L., De Rosa, R. J., **et al.** (2017) Orbits for the Impatient: A Bayesian Rejection-sampling Method for Quickly Fitting the Orbits of Long-period Exoplanets. AJ, 153, 229.

Nielsen, E. L., De Rosa R. J., **Wang, J.**, et al. (2016) Dynamical Mass Measurement of the Young Spectroscopic Binary V343 Normae AaAb Resolved with the Gemini Planet Imager. AJ, 152, 175N.

Millar-Blanchaer, M. A., **Wang, J.**, Kalas, P., et al. (2016) Imaging an 80 AU Radius Dust Ring Around the F5V Star HD 157587. AJ, 152, 128M.

Konopacky, Q. M., Rameau J., Duchêne, G., **et al.** (2016) Discovery of a Substellar Companion to the Nearby Debris Disk Host HR 2562. ApJL, 829, 4.

Wang, J. J., Graham, J. R., Pueyo, L., et al. (2016) The Orbit and Transit Prospects for β Pictoris b constrained with One Milliarcsecond Astrometry. AJ, 152, 97W.

Esposito, T. M., Fitzgerald, M. P., Graham, J. R., **et al.** (2016) Bringing "The Moth" to Light: A Planet-Sculpting Scenario for the HD 61005 Debris Disk. AJ, 152, 85E.

Draper, Z. H., Duchêne, G., Millar-Blanchaer, M. A., **et al.** (2016) The Peculiar Debris Disk of HD 111520 as Resolved by the Gemini Planet Imager. ApJ, 826, 147D.

Rameau, J., Nielsen, E. L., De Rosa, R. J., **et al.** (2016) Constraints on the architecture of the HD 95086 planetary system with the Gemini Planet Imager. ApJL, 822, L29.

De Rosa, R. J., Rameau, J., Patience, J., **et al.** (2016) Spectroscopic characterization of HD 95086 b with the Gemini Planet Imager. ApJ, 824, 121.

Wolff, S. G., Perrin, M., Millar-Blanchaer, M. A., **et al.** (2016) The PDS 66 Circumstellar Disk as seen in Polarized Light with the Gemini Planet Imager. ApJL, 818, L15.

Poyneer, L. A., Palmer, D. W., Macintosh, B., **et al.** (2016) Performance of the Gemini Planet Imager's adaptive optics system. Applied Optics, 55, 323.

Hung, L., Duchêne, G., Arriaga, P., **et al.** (2015) First Scattered-light Image of the Debris Disk around HD 131835 with the Gemini Planet Imager. ApJL, 815, L14.

Kalas, P. G., Rajan, A., **Wang, J. J.**, et al. (2015) Direct Imaging of an Asymmetric Debris Disk in the HD 106906 Planetary System. ApJ, 814, 32.

De Rosa, R. J., Nielsen, E. L., Blunt, S. C., **et al.** (2015) Astrometric Confirmation and Preliminary Orbital Parameters of the Young Exoplanet 51 Eridani b with the Gemini Planet Imager. ApJL, 814, L3.

Wang, J. J., Graham, J. R., Pueyo, L., et al. (2015) Gemini Planet Imager Observations of the AU Microscopii Debris Disk: Asymmetries within One Arcsecond. ApJL, 811, L19.

Millar-Blanchaer, M. A., Graham, J. R., Pueyo, L., **et al.** (2015) β Pictoris' inner disk in polarized light and new orbital parameters for β Pictoris b. ApJ, 811, 18.

Macintosh, B., Graham, J. R., **et al.*** (2015) Discovery and spectroscopy of the young Jovian planet 51 Eri b with the Gemini Planet Imager. Science, 350, 64.

Perrin, M. D., Duchêne G., Millar-Blanchaer, M., **et al.** (2015) Polarimetry with the Gemini Planet Imager: Methods, Performance at First Light, and the Circumstellar Ring around HR 4796A. ApJ, 799, 182.

Herter, T. L., Vacca, W., Adams, J.D., **et al.** (2013) Data Reduction and Early Science Calibration for FORCAST, A Mid-Infrared Camera for SOFIA. PASP, 125, 1393-1404.

Software and Conference Proceedings (* represents mentored students)

Echeverri, D., Ruane, G., Jovanovic, N., et al. (2019) The vortex fiber nulling mode of the Keck Planet Imager and Characterizer (KPIC), Proc. SPIE., 11117, 0V.

Pezzato, J., Jovanovic, N., Mawet, D., **et al.** (2019) Status of the Keck Planet Imager and Characterizer phase II development, Proc. SPIE., 11117, 0U.

Jovanovic, N., Delorme, J.-R., Bond, C., **et al.** (2019) The Keck Planet Imager and Characterizer: demonstrating advanced exoplanet characterization techniques for future extremely large telescopes, Proc. SPIE, 11117, 0T.

Ruane, G., Echeverri, D., Jovanovic, N., **et al**. (2019) Vortex fiber nulling for exoplanet observations: conceptual design, theoretical performance, and initial scientific yield predictions, Proc. SPIE, 11117, 16.

Bailey, V. P., Bottom, M., Cady, E., **et al.** (2018) Lessons for WFIRST CGI from ground-based high-contrast systems. Proc. SPIE, 10698, 6P.

Macintosh, B., Chilcote, J. K., Bailey, V. P., **et al.** (2018) The Gemini planet imager: looking back over five years and forward to the future. Proc. SPIE, 10703, 0K.

Savransky, D., Shaprio, J., Bailey, V., **et al.** (2018) Mining the GPIES database. Proc. SPIE, 10703, 0H.

Wang, J. J., Perrin, M. D., Savransky, D., et al. (2017) The automated data processing infrastructure for the GPI Exoplanet Survey. Proc. SPIE, 10400, 26.

Ruffio, J.-B., Macintosh, B., **Wang, J. J.**, et al. (2017) Improving the sensitivity of the GPI Exoplanet Survey with a forward model matched filter. Proc. SPIE, 10400, 27.

Perrin, M. D., Ingraham, P., Follette, K. B., **et al.*** (2016) Gemini Planet Imager observational calibrations XI: pipeline improvements and enhanced calibrations after two years on sky. Proc. SPIE, 9908, 37.

Bailey, V. P., Poyneer, L. A., Macintosh, B. A., **et al.** (2016) Status and performance of the Gemini Planet Imager adaptive optics system. Proc. SPIE, 9909, 0V.

Millar-Blanchaer, M. A., Perrin M. D., Hung, L., **et al.** (2016) GPI observational calibrations XIV: polarimetric contrasts and new data reduction techniques. Proc. SPIE, 9908, 36.

Hung, L., Bruzzone, S., Millar-Blanchaer, M. A., **et al.** (2016) Gemini planet imager observational calibration XII: photometric calibration in the polarimetry mode. Proc. SPIE, 9908, 3A.

Wang, J. J., Ruffio, J.-B., De Rosa, R. J., et al. (2015) pyKLIP: PSF Subtraction for Exoplanets and Disks. ASCL, ascl:1506:001.

Wang, J. J., Rajan, A., Graham, J. R., et al. (2014) Gemini Planet Imager Observational Calibrations VIII: Characterization and Role of Satellite Spots. Proc. SPIE, 9147, 55.

Maire, J., Ingraham, P. J., De Rosa, R. J., **et al.** (2014) Gemini Planet Imager Observational Calibrations VI: Photometric and Spectroscopic Calibration for the Integral Field Spectrograph. Proc. SPIE, 9147.

Konopacky, Q. M., Thomas, S. J., Macintosh B. A., **et al.** (2014) Gemini Planet Imager Observational Calibrations V: Astrometry and Distortion. Proc. SPIE, 9147.

Perrin, M. D., Maire, J., Ingraham, P., **et al.** (2014) Gemini Planet Imager Observational Calibrations I: Overview of the GPI Data Reduction Pipeline. Proc. SPIE, 9147.

Macintosh, B. A., Chilcote, J. K., Dillon, D., **et al.** (2014) The Gemini Planet Imager: First Light and Commissioning. Proc. SPIE, 9148.

Adams, J. D., Herter, T. L., Gull, G. E., **et al.** (2012) The FORCAST Mid-Infrared Facility Instrument and In-Flight Performance on SOFIA. Proc. SPIE, 8446.