

Keira J. Brooks

She/Her/Hers

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🌐 KeiraBrooks

EDUCATION

2018 **Adaptive Optics Summer School**

Center for Adaptive Optics University of California, Santa Cruz

2014 – 2016 **MS Astronomy: Research in Astronomy - Instrumentation**

Leiden University

- Leiden Excellence Scholarship: Silver

2014 **Introduction to Astronomical Instrumentation Summer School**

Dunlap Institute for Astronomy and Astrophysics University of Toronto

2006 – 2010 **BS Astronomy, Physics**

University of Washington

- Dean's List: 11 academic quarters

2009 **Washington NASA Space Grant Consortium's Summer Undergraduate Research Program**

University of Washington

WORK EXPERIENCE

Nov. 2018 – present **Astronomical Optics Scientist I**

Space Telescope Science Institute, Baltimore, MD

- Co-chair of the INS Diversity, Culture, and Respect Working Group (DCRWG)
- Project Manager for the JWST Fine Guidance Sensor Multi-Application Guiding Interface for Commissioning (MAGIC) tool
- Integrating OPD changes over time due to variations into observatory in WebbPSF

Nov. 2017 – Nov. 2018 **Senior Research and Instrument Analyst**

Space Telescope Science Institute, Baltimore, MD

- Co-chair of the INS Diversity, Culture, and Respect Working Group (DCRWG)
- JWST Fine Guidance Sensor: Multi-Application Guiding Interface for Commissioning (MAGIC) tool development
- Coronagraphs Working Group
- Led one of the STScI studies requested by NASA's SRAB, chaired by John Mather

Feb. 2016 – Nov. 2017 **Research and Instrument Analyst II**

Space Telescope Science Institute, Baltimore, MD

- JWST Fine Guidance Sensor: Tool Development for JWST Commissioning
- Coronagraphs Working Group
- JWST Center of Curvature Testing
- Active member of the INS Diversity, Culture, and Respect Working Group (DCRWG)
- Helped lead a workshop on strategies for improving inclusion and access in the workplace at the Women in Astronomy IV Conference.

Feb. - July 2013 **Physics Tutor, Manager**

Physics from the Right Angle, Seattle, WA

- Tutored students in physics while training tutors and managing scheduling and payroll
- Managed between 10 and 15 student accounts on a daily basis

Oct. 2010 - Nov. 2012 **Education Volunteer**

United States Peace Corps, Rwanda

- Taught lower secondary (equivalent to U.S middle school) ICT to 400+ students at a public school in rural Rwanda
- Worked with local teachers to improve English language skills and teaching methodology
- Led leadership and HIV/AIDS education camps for dozens of high school-aged participants
- Trained approximately 70 incoming volunteers over the course of two years, in teaching practices and strategies for working in education in Rwanda
- Wrote a teacher's book for those teaching ICT with limited or no resources in Rwanda

RESEARCH EXPERIENCE

2017-2018

Testing Coronagraphic Solutions for LOUVIR-type Telescopes on the HiCAT Testbed

Dr. Rémi Soummer

Russell B. Makidon Lab, Space Telescope Science Institute

- Mapped actuator locations for deformable mirrors for the OPeRA and COFFEE phase retrieval algorithms
- Created and further expanding a mostly-automated testbed calibration pipeline that assesses the optimal positions for a variety of optical elements, calculates the sampling and contrast, and maps any changes to the testbed with time
- Developed analysis software

2015 **On-Sky Testing of the Polarization dOTF Wavefront Sensor Camera**

Dr. Matthew Kenworthy

Leiden University, Leiden, The Netherlands

- Designed a setup to perform in-lab and on-sky testing of polarization camera
- Reduced and analyzed data collected during observing using Python

2014 **Measuring Metallicity Gradients in Nearby, High Mass Galaxies**

Dr. Jarle Brinchmann

Leiden University, Leiden, The Netherlands

- Reduced and wavelength calibrated galaxy spectra
- Compared and analyzed trends in metallicity gradients of high mass galaxies

2013 **Simulating the Evolution of Planetary Nebulae Using Hydrodynamic Models**

Dr. Bruce Balick

University of Washington, Seattle, Washington

- Create simulations using the Adaptive Mesh Refinement code, AstroBEAR, to model bipolar planetary nebulae

2010 **Cataloging Cataclysmic Variables: SDSS VIII**

Dr. Paula Szkody

University of Washington, Seattle, Washington

- Performed spectral reductions and created a website cataloging cataclysmic variables from SDSS and their spectra

2009-2010 **Discovering Quasars Using Their Photometry**

Dr. Željko Ivezić

University of Washington, Seattle, Washington

- Developed a criterion for distinguishing quasars from other objects using only their photometry

2009 **Mapping Dust in the Milky Way**

Dr. Željko Ivezić

University of Washington, Seattle, Washington

- Combined images of dust in the milky way from SDSS-2MASS data

SKILLS

- Project Management
- Confluence, JIRA
- Python, IDL, LaTeX, GitHub/GitLab
- Software package and tool development
- Data analysis
- Lab and on-sky validation of astronomical instruments and telescopes
- Optical testbed

PRESENTATIONS AND POSTERS

- **K. J. Brooks**, M. Perrin, L. Pueyo, and K. Van Gorkom. WebbPSF Update: Providing High-Fidelity Time variable Point Spread Functions for JWST Based on Thermal Modeling. In *American Astronomical Society Meeting Abstracts #233*, volume 233 of *American Astronomical Society Meeting Abstracts*, page 245.19, January 2019
- R. Soummer, G. R. Brady, **K. J. Brooks**, T. Comeau, E. Choquet, S. Egron, R. Gontrum, J. Hagopian, I. Laginja, L. Leboulleux, M. Perrin, P. Petrone, L. Pueyo, J. Mazoyer, M. N'Diaye, A. J. E. Riggs, A. Sivaramakrishnan, K. St. Laurent, A.-M. Valenzuela, N. T. Zimmerman, R. Juanola-Parramon, N. Scott, S. Will, T. Fusco, J.-F. Sauvage, E. McChesney, S. Pourshalchi, L. Reider, A. Doran, S. Rajpurohit, M. Grenville, T. Tiberghien Alvarez, and N. Lamaison. Coronagraphy for segmented aperture space telescopes: results on the HiCAT testbed. In *American Astronomical Society Meeting Abstracts #233*, volume 233 of *American Astronomical Society Meeting Abstracts*, page 157.39, January 2019
- J. H. Girard, B. Nickson, L. Pueyo, M. Perrin, A. R. Riedel, B. York, A. Canipe, **K. J. Brooks**, B. Hilbert, D. Hines, C. Stark, and J. Stansberry. Preparing for JWST Coronagraphy, a roadmap. In *American Astronomical Society Meeting Abstracts #233*, volume 233 of *American Astronomical Society Meeting Abstracts*, page 402.01, January 2019
- C. Moriarty, **K. J. Brooks**, and R. Soummer. HiCAT Software Infrastructure: Safe hardware control with object oriented Python. In *American Astronomical Society Meeting Abstracts #231*, volume 231 of *American Astronomical Society Meeting Abstracts*, page 150.37, January 2018
- **K. J. Brooks**, G. Brady, A. Brito, T. Comeau, T. Dillon, E. Choquet, S. Egron, G. Rob, H. John, L. Leboulleux, M. Perrin, P. Petrone, L. Pueyo, J. Mazoyer, C. Moriarty, M. N'Diaye, A. J. Eldorado Riggs, R. Shiri, A. Sivaramakrishnan, K. St. Laurent, A. M. Valenzuela, N. Zimmerman, R. Soummer, and JHU Mechanical Engineering Senior Design Team. Current Status of the High Contrast Imager for Complex Aperture Telescopes (HiCAT) Testbed. In *American Astronomical Society Meeting Abstracts #231*, volume 231 of *American Astronomical Society Meeting Abstracts*, page 246.36, January 2018
- Helped lead the "Concrete Steps to Make Your Workplace More Inclusive" workshop at the Women in Astronomy IV Conference

PRESENTATIONS AND POSTERS Cont.

- **K. J. Brooks**. Russell B. Makidon Lab at Space Telescope Science Institute: Striving to Increase Diversity in Astronomical Optics. Women in Astronomy IV Conference, June 2017
- J. D. Long, M. D. Perrin, N. T. Zimmerman, and **K. J. Brooks**. WebbPSF for JWST and WFIRST. In *American Astronomical Society Meeting Abstracts*, volume 229 of *American Astronomical Society Meeting Abstracts*, page 238.13, January 2017
- **K. J. Brooks**, C. MacLeod, Z. Ivezić, S. Kozłowski, C. S. Kochanek, R. Gibson, B. Sesar, A. Becker, and W. de Vries. Twinkle, Twinkle, Little Star, or Are You a Quasar? In *American Astronomical Society Meeting Abstracts #215*, volume 42 of *Bulletin of the American Astronomical Society*, page 374, January 2010
- Presented *Discovering Quasars Using Their Photometry* research at the University of Washington 13th Annual Undergraduate Research Symposium on May 21, 2010,
- Presented *Discovering Quasars Using Their Photometry* research to the University of Washington, Board of Regents

PUBLICATIONS

1. M. D. Perrin, L. Pueyo, K. Van Gorkom, **K. J. Brooks**, A. Rajan, J. Girard, and C.-P. Lajoie. Updated optical modeling of JWST coronagraph performance contrast, stability, and strategies. In *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, volume 10698 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, page 1069809, August 2018
2. R. Soummer, G. R. Brady, **K. J. Brooks**, T. Comeau, É. Choquet, T. Dillon, S. Egron, R. Gontrum, J. Hagopian, I. Luginja, L. Leboulloux, M. D. Perrin, P. Petrone, L. Pueyo, J. Mazoyer, M. N'Diaye, A. J. E. Riggs, R. Shiri, A. Sivaramakrishnan, K. St. Laurent, A.-M. Valenzuela, and N. T. Zimmerman. High-contrast imager for complex aperture telescopes (HiCAT): 5. first results with segmented-aperture coronagraph and wavefront control. In *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, volume 10698 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, page 1069810, August 2018
3. C. Moriarty, **K. J. Brooks**, R. Soummer, M. Perrin, T. Comeau, G. Brady, R. Gontrum, and P. Petrone. High-contrast imager for complex aperture telescopes (HiCAT): 6. software control infrastructure and calibration. In *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, volume 10698 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, page 1069853, August 2018
4. G. R. Brady, C. Moriarty, P. Petrone, I. Luginja, **K. J. Brooks**, T. Comeau, L. Leboulloux, and R. Soummer. Phase-retrieval-based wavefront metrology for high contrast coronagraphy. In *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, volume 10698 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, page 1069861, July 2018
5. J. H. Girard, W. Blair, B. Brooks, **K. J. Brooks**, R. Brown, H. Bushouse, A. Canipe, C. Chen, M. Correnti, J. B. Hagan, B. Hilbert, D. Hines, J. Leisenring, J. Long, B. Nickson, M. D. Perrin, K. Pontoppidan, L. Pueyo, A. Rajan, A. Riedel, R. Soummer, J. Stansberry, C. Stark, K. Van Gorkom, and B. York. Making good use of JWST's coronagraphs: tools and strategies from a user's perspective. In *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, volume 10698 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, page 106983V, August 2018

6. B. Saif, R. Keski-Kuha, D. Chaney, P. Greenfield, K. Van Gorkom, **K. J. Brooks**, W. Hack, M. Bluth, J. Bluth, J. Sanders, K. Smith, L. Carey, S. Chaung, L. Feinberg, S. Tournois, W. S. Smith, and V. Kradinov. JWST optical telescope element center of curvature test. In *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, volume 10698 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, page 106983M, July 2018
7. J. Sanders, B. N. Saif, R. Keski-Kuha, L. Feinberg, D. M. Chaney, M. Bluth, P. E. Greenfield, K. J. Van Gorkom, **K. J. Brooks**, G. Walsh, and P. Lin. Modal Parameter Extraction from High Speed Interferometer Data. In *Society of Experimental Mechanics*, volume IMAC XXXVI, 2018 - in progress
8. B. N. Saif, D. M. Chaney, P. E. Greenfield, K. J. Van Gorkom, **K. J. Brooks**, W. Hack, M. Bluth, J. Bluth, J. Sanders, K. Z. Smith, L. B. Carey, S. M. Chaung, R. Keski-Kuha, L. Feinberg, S. C. Tournois, Smith W. S., and V. Kradinov. JWST center of curvature test method and results. volume 10401 of *Proc.SPIE*, pages 10401 – 10401 – 15, 2017
9. **K. J. Brooks**, L. Catala, M. A. Kenworthy, S. M. Crawford, and J. L. Codona. Polarization dOTF: on-sky focal plane wavefront sensing. In *Advances in Optical and Mechanical Technologies for Telescopes and Instrumentation II*, volume 9912 of *Proc.SPIE*, page 991203, July 2016
10. M. Berry, Ž. Ivezić, B. Sesar, M. Jurić, E. F. Schlafly, J. Bellovary, D. Finkbeiner, D. Vrbanec, T. C. Beers, **K. J. Brooks**, D. P. Schneider, R. R. Gibson, A. Kimball, L. Jones, P. Yoachim, S. Krughoff, A. J. Connolly, S. Loebman, N. A. Bond, D. Schlegel, J. Dalcanton, B. Yanny, S. R. Majewski, G. R. Knapp, J. E. Gunn, J. Allyn Smith, M. Fukugita, S. Kent, J. Barentine, J. Krzesinski, and D. Long. The Milky Way Tomography with Sloan Digital Sky Survey. IV. Dissecting Dust. *Astrophysical Journal*, 757:166, October 2012
11. P. Szkody, S. F. Anderson, **K. J. Brooks**, B. T. Gänsicke, M. Kronberg, T. Riecken, N. P. Ross, G. D. Schmidt, D. P. Schneider, M. A. Agüeros, A. N. Gomez-Moran, G. R. Knapp, M. R. Schreiber, and A. D. Schwope. Cataclysmic Variables from the Sloan Digital Sky Survey. VIII. The Final Year (2007-2008). *Astronomical Journal*, 142:181, December 2011
12. C. L. MacLeod, **K. J. Brooks**, Ž. Ivezić, C. S. Kochanek, R. Gibson, A. Meisner, S. Kozłowski, B. Sesar, A. C. Becker, and W. H. de Vries. Quasar Selection Based on Photometric Variability. *Astrophysical Journal*, 728:26, February 2011
13. C. L. MacLeod, Ž. Ivezić, C. S. Kochanek, S. Kozłowski, B. Kelly, E. Bullock, A. Kimball, B. Sesar, D. Westman, **K. J. Brooks**, R. Gibson, A. C. Becker, and W. H. de Vries. Modeling the Time Variability of SDSS Stripe 82 Quasars as a Damped Random Walk. *Astrophysical Journal*, 721:1014–1033, October 2010