Joseph D. Long

Education

in progress **Ph.D. in Astronomy & Astrophysics**, *University of Arizona*, Tucson, Arizona.
Beginning Fall 2017.

2014 **Bachelor of Arts in Physics**, *Pomona College*, Claremont, California.
Astrophysics track.
Senior thesis: "Seeing Clearly with KAPAO: Measuring Performance with Data Analysis Tools for Adaptive Optics" advised by Dr. Philip I. Choi.

Employment

2015–2017 **Research & Instrument Analyst II**, *Space Telescope Science Institute*, Baltimore, Maryland.

2014–2015 **Research & Instrument Analyst I**, *Space Telescope Science Institute*, Baltimore, Maryland.
Worked with members of the STScI Telescopes Group on optical simulation software for the upcoming James Webb Space Telescope (JWST) and Wide Field Infrared Survey Telescope (WFIRST), JWST commissioning target selection, and other projects.

Summer 2013 **hackNY Fellow**, *Datadog Inc. and hackNY.org*, New York, New York.
Selected as a fellow by hackNY, a non-profit organization to promote software entrepreneurship. Developed Python and JavaScript software at Datadog Inc. to visualize huge quantities of time-series data quickly.

Research

ongoing **Deblending objects in seeing-limited LSST images**, *Supervisor: Dr. Harry Ferguson*.
Identified objects in both the CANDELS survey fields and simulated observations derived from ILLUSTRIS that would be blended in ground-based observations. From these, created synthetic LSST images to serve as a training and evaluation set for deblending algorithms that attempt to assign flux to components in blended images.

2013–2014 **KAPAO natural guide star adaptive optics instrument**, *Supervisor: Dr. Philip I. Choi*.
Developed tools for instrument telemetry analysis and took data on a first-light observing run. Analyzed instrument telemetry to characterize atmospheric conditions and the performance of the instrument.

2012–present **Identifying close binary central stars of PN with Kepler**, *Supervisor: Dr. George Jacoby*.
Identified candidate unresolved binary central stars of planetary nebulae using periodogram analysis of Kepler light curves. When Kepler was revived as K2, additional light curves for PN in K2 mission fields were obtained and corrections for pointing drift systematics were applied.

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Awards and Recognition

2017 **STScI Team Achivement Award**, *JWST Coronagraph Visibility Tool Team*. Joseph Long, Chris Stark, Bill Blair, Kyle Van Gorkom

2014 **Frank Parkhurst Brackett, Jr. & Davida Wark Brackett Prize in Astronomy**.

2014 **Pomona College Scholar**.

2014 **Pomona College Senior Service Award**.

Publications and presentations

Refereed publications

O. De Marco, **J. Long**, G. H. Jacoby, T. Hillwig, M. Kronberger, S. B. Howell, N. Reindl, and S. Margheim. Identifying close binary central stars of PN with Kepler. *MNRAS*, 448:3587–3602, April 2015.

Publications

M. D. Perrin, D. S. Acton, C.-P. Lajoie, J. S. Knight, M. D. Lallo, M. Allen, W. Baggett, E. Barker, T. Comeau, E. Coppock, B. H. Dean, G. Hartig, W. L. Hayden, M. Jordan, A. Jurling, T. Kulp, **J. Long**, M. W. McElwain, L. Meza, E. P. Nelan, R. Soummer, J. Stansberry, C. Stark, R. Telfer, A. L. Welsh, T. P. Zielinski, and N. T. Zimmerman. Preparing for JWST wavefront sensing and control operations. In *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, volume 9904 of *Proc. SPIE*, page 99040F, July 2016.

S. A. Severson, P. I. Choi, K. E. Badham, D. Bolger, D. S. Contreras, B. N. Gilbreth, C. Guerrero, E. Littleton, **J. Long**, L. P. McGonigle, W. A. Morrison, F. Ortega, A. R. Rudy, J. R. Wong, E. Spjut, C. Baranec, and R. Riddle. KAPAO first light: the design, construction and operation of a low-cost natural guide star adaptive optics system. In *Adaptive Optics Systems IV*, volume 9148 of *Proc. SPIE*, page 914839, July 2014.

Presentations

G. H. Jacoby, **J. Long**, M. Kronberger, O. De Marco, and T. C. Hillwig. Identifying Close Binary Central Stars of PN From the Kepler K2 Mission. In *American Astronomical Society Meeting Abstracts*, volume 227 of *American Astronomical Society Meeting Abstracts*, page 238.01, January 2016.

J. D. Long, M. D. Perrin, and R. P. Van Der Marel. Simulating PSFs for WFIRST and JWST with WebbPSF. In *American Astronomical Society Meeting Abstracts*, volume 227 of *American Astronomical Society Meeting Abstracts*, page 113.01, January 2016.

J. Long, P. I. Choi, S. A. Severson, E. Littleton, K. Badham, D. Bolger, C. Guerrero, F. Ortega, J. Wong, C. Baranec, and R. L. Riddle. Performance Characterization of KAPAO, a Low-Cost Natural Guide Star Adaptive Optics Instrument. In *American Astronomical Society Meeting Abstracts #223*, volume 223 of *American Astronomical Society Meeting Abstracts*, page 148.09, January 2014.

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J. Long, G. Jacoby, O. De Marco, T. C. Hillwig, M. Kronberger, and S. B. Howell. The Binary Fraction of Planetary Nebula Central Stars in the Kepler Field. In *American Astronomical Society Meeting Abstracts #221*, volume 221 of *American Astronomical Society Meeting Abstracts*, page 249.07, January 2013.

Open-source code

M. Perrin, **J. Long**, E. Douglas, A. Sivaramakrishnan, and C. Slocum. POPPY: Physical Optics Propagation in PYthon. Astrophysics Source Code Library, February 2016.

M. D. Perrin, **J. Long**, A. Sivaramakrishnan, C.-P. Lajoie, E. Elliot, L. Pueyo, and L. Albert. WebbPSF: James Webb Space Telescope PSF Simulation Tool. Astrophysics Source Code Library, April 2015.

Training and Mentoring

Instruments Division Training Team, *Space Telescope Science Institute*.
Substantially expanded training in Python scripting and software version control. Brought existing training materials for new hires up to date and organized them in a central repository. Arranged training programs for cohorts of incoming analysts and support scientists.

Teaching Assistant: Observational Astrophysics, *Dr. Philip Choi*.
Assisted with computer lab exercises, including helping students with data reduction, scripting, and use of the UNIX command line interface.

Teaching Assistant: Electronics, *Dr. Dwight Whitaker*.
Supervised hands-on learning activities with analog and digital circuits. Helped students troubleshoot laboratory equipment and understand circuit behavior.

Professional memberships

American Astronomical Society, *Junior Member*.

Sigma Xi Scientific Honor Society, *Associate Member*.

Outreach and Press

"Baltimore Popscope looks to unite city through public astronomy", *Baltimore Sun*, `http://www.baltimoresun.com/bs-hs-popscope-20160202-story.html`.

"Astronomy for All", *Maryland Morning on WYPR FM*, `http://wypr.org/post/astronomy-all`.

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