

Dr. Timothy D. Morton

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Curriculum Vitae

Education and Work Experience

2007–2013 **California Institute of Technology**, *Pasadena, CA.*

- Ph.D. in Astrophysics (Nov 2013)
 - Thesis: "Demographic Studies of Extrasolar Planets." Adviser: Prof. John Johnson
- M.S. in Astrophysics (June 2009)

2006–2007 **MATCH Charter Public High School**, *Boston, MA.*

- Assistant teacher for senior AP Calculus class
 - Helped design and plan course, wrote tests and homework assignments, tutored students, taught classes in teacher's absence.
- Tutored two freshmen one-on-one every day in math and English; successfully encouraged both students to advance a year in math.

2002–2006 **Harvard University**, *Cambridge, MA.*

- A.B. in Physics and Astronomy, *magna cum laude*
- Eliot House Navid Saheb Kasha Mathematics/Physics Prize for academic excellence.
- Leo Goldberg Undergraduate Research Prize for top Junior Thesis in Astronomy

Academic Appointments

2018–2019 **Visiting Research Scholar**, *Center for Computational Astrophysics, Flatiron Institute.*

2018–present **Assistant Professor**, *Department of Astronomy, University of Florida.*

2013–2018 **Associate Research Scholar**, *Princeton University.*

- Led independent program to characterize exoplanet demographics using the *Kepler* exoplanet survey.
- Developed open-source software packages for stellar parameter inference (**isochrones**) and transit false positive probability analysis (**vespa**).
- 2017–2018: Developer in the LSST Data Release Production software group, developing interactive visualization tools for scientific QA.

2007–2013 **Graduate Student**, *California Institute of Technology.*

- Population studies of exoplanets, transit candidate false positive analysis, stellar spectroscopy, statistical analysis techniques.
 - Adviser: Prof. John Johnson
- Searching archival survey data for optical counterparts to unidentified Fermi gamma-ray point sources.
 - Adviser: Prof. George Djorgovski

- 2004-2006 **Undergraduate Researcher**, *Harvard University*.
- Multiwavelength analysis of the supernova remnant Kes-75 using *Spitzer* and *Chandra* observations.
 - Adviser: Dr. Patrick Slane
 - Search for optical variability in low-mass AGN.
 - Advisers: Prof. Krzysztof Stanek and Jenny Greene
- Summer 2004 **Research Experience for Undergraduates**, *Ohio State University*.
- Investigating cosmological constraints on the global curvature of the Universe.
 - Adviser: Prof. Terry Walker

Grants Awarded

- 2014 **NASA Exoplanets Research Program**.
- Co-I: *The Robo-AO survey of Kepler exoplanet hosts*
 - ~\$430,000 over two years
- 2013 **NASA Kepler Participating Scientist Program**.
- PI: *Completing the Kepler Census of Earth-like Planets*
 - ~\$450,000 over three years

Teaching and Service

- 2012-present **Journal Referee**.
- Astronomy & Astrophysics (6), Astrophysical Journal (6), Monthly Notices of the Royal Astronomical Society (3)
- July 2018 **Hands-on session leader**, *Sagan Summer Workshop*, Caltech.
- Led hands-on tutorial for 120 students on the *vespa* python package for computing false positive probabilities of transiting planet candidates.
- Summers **Co-organizer**, *Princeton Undergraduate Summer Research Program (USRP)*.
- 2014-17 ○ Organized program for Princeton undergraduates doing summer research in the Princeton Astrophysics department. Evaluated applications, paired students with research mentors, planned weekly colloquium talks, and led weekly topical research seminars. Helped plan/teach introductory bootcamp (2015-17).
- June 2015 **Instructor**, *Banneker Institute*, Harvard University.
- Led week-long introductory programming mini-course for undergraduate students attending Institute, focusing on python and version control using git.
- Fall 2014 **Teaching Assistant**, *Princeton University*.
- *Planets in the Universe*, Fall 2014, Prof. G. Bakos
- 2008-2010 **Teaching Assistant**, *California Institute of Technology*.
- *The Evolving Universe*, Spring 2008, Prof. N. Scoville
 - Section Instructor.
 - *Basic Astronomy and the Galaxy*, Fall 2008, Prof. S. Phinney
 - *Interstellar Medium*, Winter 2009, Prof. W. Sargeant
 - *Introductory Electromagnetism*, Spring 2009, Prof. D. Politzer
 - Section Instructor.
 - *Statistics and Data Analysis in Astronomy*, Spring 2010, Prof. J. Johnson
 - Helped design first-time course.

- Summer 2010 **Co-instructor**, *Wilson Middle School, Pasadena, CA.*
- Prepared activities and led classes for “Forces and Rocketry” summer course.
- Summer 2007 **Instructor and Coach**, *MIT Science of Baseball Program, Cambridge, MA.*
- Designed and led classroom activities and supervised baseball activities for the first season of this program.

Mentoring/Advising

- 2011-2016 **Research students**, *Caltech and Princeton.*
- Nondh Panithanpaisal, USRP, Princeton (2016).
 - Testing the ability of the **isochrones** stellar parameter inference code to being able to distinguish physically bound and chance-aligned visual binary stars.
 - Stephen (Nic) Barton, Senior Thesis, Princeton (2015-2016); Currently Rhodes Scholar at Oxford
 - Detailed modeling of multi-transiting, multi-star *Kepler* systems.
 - Alexandra Pleus, Senior Thesis, Princeton (2014-2015); currently Ph.D. student at U. of Hawaii
 - Investigating the effect of spectral resolution in the detection of earth-like atmospheres via transit spectroscopy.
 - Jamila Pegues, Junior Paper, Princeton (2015); currently NSF Astronomy Graduate Research Fellow at Harvard
 - Investigating false positive probabilities of single-transiting planet candidates.
 - Roberta Raileanu, Junior Paper, Princeton (2015); currently Ph.D. student at NYU Courant Institute
 - Exploring machine learning techniques to identify rotation periods in *Kepler* data.
 - Maggie Thompson, USRP and Junior Paper, Princeton (2014)
 - Used public survey data to investigate stellar binarity among *Kepler* planet host stars.
 - Ganesh Ravichandran, independent HS researcher, Caltech (Summers 2012, 2013); currently an undergrad at Columbia
 - Wrote a GUI interface to identify visual companions to *Kepler* Objects of Interest
 - Developed efficient nearest-neighbor search code for a catalog of millions of stars
 - Explored the use of Voronoi density estimation in support of *Kepler* false-positive-probability code
 - Juliette Becker, Caltech SURF program (2012); currently a Ph.D. student at the University of Michigan
 - Research project: *A serendipitous RV survey of B stars.*
 - Keith Hawkins, Caltech MURF program (2011); currently UT Austin professor
 - Research project: *Towards measuring the metallicity distribution of Kepler target stars.*
 - Sandra Feng, independent undergraduate researcher, Caltech (2011)
 - Wrote automated software to calculate contrast curves from imaging data.
- 2011-2013 **Astronomy peer mentoring program**, *California Institute of Technology.*
- Mentored junior grad students: Melodie Kao, Io Kleiser.

Summer Schools and Workshops

- July 2014 **SciCoder Workshop**, *New York University, New York, NY.*

June 2010 **Penn State Astrostatistics Summer School**, Pennsylvania State University, State College, PA.

Selected Scientific Talks

- July 2018 Sagan Summer Workshop, Caltech
○ *Astronomical Observations for Transit Validation*
- March 2018 Colloquium, University of Florida
○ *A new paradigm for transiting exoplanets*
- February 2018 Colloquium, Cal State University, Northridge
○ *A new paradigm for transiting exoplanets*
- February 2016 Colloquium, McGill University
○ *A new paradigm for transiting exoplanets*
- July 2016 Sagan Summer Workshop, Caltech
○ *Vetting False Positives in Transit Photometry*
- July 2016 Colloquium, Carnegie Observatories
○ *A new paradigm for transiting exoplanets*
- March 2016 Colloquium, Perimeter Institute
○ *Exoplanet science as a case study in data-rich astrophysics*
- November 2015 Small-Scale Seminar, Harvard-Smithsonian CfA
○ *Obliquities of extrasolar systems: New insights from Kepler data*
- October 2015 Physics Department Astrophysics Seminar, University of Notre Dame
○ *Beyond Planet Occurrence Rates: Kepler and New Frontiers in Extrasolar System Demographics*
- October 2014 Astrophysics Department “Thunch” talk, Princeton University
○ *Obliquities of extrasolar systems: New insights from Kepler data*
- March 2014 Informal Seminar, Institute for Advanced Study, Princeton NJ
○ *Extracting Exoplanet Demographics from the Kepler Survey*

- Jan 2013 221st Meeting of the American Astronomical Society, Long Beach, CA
 - Dissertation talk: *Enabling the Kepler Exoplanet Census*

- Sep 2012 Keck Science Meeting, UC San Diego
 - *Enabling the Kepler Exoplanet Census*

- Sep 2011 Extreme Solar Systems II, Jackson Hole, WY
 - *False Positive Probabilities For Kepler Planetary Candidates*

- Jan 2011 Kliegel Lectures in Planetary Science, GPS department, Caltech
 - *Discerning Exoplanet Migration Mechanisms Using Spin-Orbit Measurements*

- Nov 2010 Astronomy Department Journal Club, UCLA
 - *Discerning Exoplanet Migration Mechanisms Using Spin-Orbit Measurements*

- April 2009 Palomar Science Meeting, Pasadena, CA
 - *Optical Variability-Based Identification of Blazars*

Public Lectures

- May 2015 Amateur Astronomical Association of Princeton, Princeton ,NJ
 - *The Astonishing Diversity of Planetary Systems*

- Jun 2012 Venus transit outreach event, Caltech
 - *The Search for Thin Air*

- Jul 2011 Astronomy workshop for middle and high school teachers, Rapid City, SD (by videoconference)
 - *Discovering Other Worlds: Developments in the Science of Exoplanets*

- Feb 2011 Riverside Astronomical Society, Riverside, CA
 - *Exoplanets: What do we know, and what do we hope to discover?*

- Jul 2009 "Letenka" astronomy summer camp, Fruska Gora, Serbia
 - *Extrasolar Planets*