

# Eric Agol | Curriculum Vitae

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Professor of Astronomy, Adjunct Professor of Physics.

## Previous Employment

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- **University of Washington** **Seattle**  
*Professor* *2017 – present*  
Department of Astronomy; Adjunct in Physics.
- **University of Washington** **Seattle**  
*Associate Professor* *2009 – 2017*
- **University of Washington** **Seattle**  
*Assistant Professor* *2003 – 2009*
- **Caltech** **Pasadena**  
*Chandra Fellow* *2000 – 2003*
- **Johns Hopkins University** **Baltimore**  
*Postdoctoral Fellow* *1997 – 2000*

## Education

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### Academic Qualifications.....

- **University of California** **Santa Barbara**  
*PhD, Department of Physics, Astrophysics* *1992–1997*
- **University of California** **Berkeley**  
*BA, Physics and Mathematics* *1988–1992*

### Dissertation.....

- 'The Effects of Magnetic Fields, Absorption, and Relativity on the Polarization of Accretion Disks around Supermassive Black Holes.'  
Advisor: Omer Blaes.

## Selected Research Accomplishments:

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- Created grid of models for Quasars (Hubeny, Agol et al. 2000; Agol 1997).
- Computed optically-thin general-relativistic ray-tracing model, and proposed experiment for imaging the shadow of the Galactic Center black hole (Falcke, Melia & Agol 2000), which culminated in the Event Horizon Telescope.
- Derived fast, analytic transit model for quadratic limb-darkening (Mandel & Agol 2002) which has been used in the detection and characterization of thousands of exoplanets.
- Coined the term 'Transit-Timing Variations' (TTVs) to describe the detection and characterization of

dynamical interactions in transiting multi-planet systems (Agol et al. 2005).

- Developed algorithm for creating the first longitudinal map of an extrasolar planet (Knutson et al. 2007, *Nature*; Cowan & Agol 2008).
- Applied mapping algorithm to EPOXI data of Earth to show that future multi-band monitoring of exoplanets could be used to find oceans and continents (Cowan, Agol et al. 2009).
- Developed novel technique for detecting quasi-periodic transiting exoplanets (Carter & Agol 2013), which was then used to discover and characterize the two most closely orbiting super-Earth mass planets found to date, Kepler-36 (Carter, Agol et al. 2012, *Science*), and the first 7-planet transiting system, Kepler-90 (Lissauer et al. 2014).
- Discovered a small diameter planet in a star's 'habitable zone', Kepler-62f, which had been missed by Kepler pipeline (Borucki, Agol, et al. 2013, *Science*).
- Developed model for self-lensing binary (Agol 2002, 2003); predicted, helped to discover, and characterized the first self-lensing binary star system, KOI-3278 (Farmer & Agol 2003; Agol Kruse & Agol 2014, *Science*).
- Developed fast Gaussian Process model for analysis of time-series of stellar variability (Foreman-Mackey, Agol et al. 2017).
- Developed differentiable N-body code which was used to measure the masses and densities of the temperate, Earth-sized exoplanets for the first time in the seven-transiting planet TRAPPIST-1 system (Gillon et al. 2017, *Nature*; Grimm et al. 2018; Agol et al. 2021).

## Synergistic Activities

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- Pre-MAP: Faculty Advisor of the Pre-Major in Astronomy Program at the University of Washington ([Pre-MAP webpage](#)), a research program for undergraduates with the goal of recruiting and retaining students in STEM disciplines. One hundred+ students have participated in research through the program.
- Code development: I developed computer code for modeling planetary transits which has been made freely available, and become widely used by the astronomical community for the discovery and characterization of thousands of transiting extrasolar planets, including TRAPPIST-1.

## Awards and recognition

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- National Merit Scholar (1988).
- Elks' Club Scholar (1988).
- Regents' Scholarship, UC Berkeley (1988-92).
- Phi Beta Kappa, UC Berkeley Chapter (1992).
- Regents' Fellowship, UC Santa Barbara (1992-97).
- California Space Grant Fellowship, UC Santa Barbara (1996).
- Dissertation Fellowship, UC Santa Barbara (1997).
- Chandra Fellow, NASA (2000-2003).
- CAREER Fellowship, National Science Foundation (2007-2014).
- Distinguished Visiting Scientist, Spitzer Science Center, Caltech, Pasadena (2008).
- Miller Visiting Professor, UC Berkeley (2011).
- Lecar Prize for extrasolar planets and theoretical astrophysics (2016).
- Guggenheim Fellow (2017-2018).

## Selected grants:

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- Total of \$4M in grant funding since becoming faculty.
- CAREER: Prospecting for Planets," NSF CAREER, 2007-14
- "Long-term Dynamics of Kepler Multiple Planet Systems," NASA Origins of Solar Systems, 2013-15, PI: Matt Holman
- "Detection and masses of super-Earth transiting planets in the Kepler data," NASA Origins of Solar Systems, 2013-15

- "Masses and architectures of (potentially habitable) exoplanet systems," NSF Astronomy & Astrophysics Collaborative Grant, 2016-19, with Leslie Rogers at University of Chicago.
- "CDS&E: Development of fast, multi-dimensional Gaussian Processes for Exoplanet discovery and beyond," NSF Astronomy & Astrophysics Grant, 2019-2022.
- "Probing the compositions of multi-planet transiting systems with photodynamics," NASA Exoplanet Research Program (XRP), 2021-2024.

## University of Washington Service:

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- Ten-year review committee, department of Astronomy, Co-Chair (2021-22)
- Associate Chair, Department of Astronomy (2021-)
- Executive Committee, Department of Astronomy (2021-)
- Graduate Program Coordinator (2021-)
- Talent Committee, Department of Astronomy (2020-)
- UW Astronomy Merit Raise committee - 2019-20.
- Session Chair, UW Undergraduate Research Symposium - 2020.
- Faculty Advisor for the Pre-Major in Astronomy Program - 2005 to present
- University of Washington graduate student committee member for fifteen students to date.
- University of Washington Faculty Senate - 2019-present.
- Colloquium chair, UW Department of Astronomy - Fall 2003, Spring 2017, committee member Autumn 2019- Autumn 20.
- Astronomy graduate admissions committee (2004-2019); graduate admissions chair (2012, 2014, 2017).
- University of Washington representative to the Sloan Digital Sky Survey III Collaboration Council, 2011-2016
- UW Faculty Advisory Committee for the Louis Stokes Alliance for Minority Participation, 2011-2013
- Committee member for the Institute for Nuclear Theory Senior Fellow search (2010).
- UW Apache Point Observatory Time Allocation Committee member - 2004 to 2006
- UW Undergraduate Astronomy advisor for research - 2003-2004

## Astronomical Community Service:

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- TRAPPIST-1 Community Initiative committee
- Panel member of NASA Interdisciplinary Consortia for Astrobiology Research review (2020)
- Scientific Organizing Committee, "Exoplanets-III," Heidelberg, Germany, June 2020.
- Scientific organizing committee for conference "TRAPPIST-1: Towards the comparative study of temperate terrestrial worlds," Liège, Belgium - June 2019.
- Scientific advisor for Kavli Institute for Theoretical Astrophysics Program "Better Stars, Better Planets: Exploiting the Stellar-Exoplanetary Synergy," University of California, Santa Barbara - April-June 2019
- Referee for Nature, Science, Astrophysical Journal and Letters, Astronomical Journal, Publications of the Astronomical Society of the Pacific, Astronomy & Astrophysics, Monthly Notices of the Royal Astronomical Society, Celestial Mechanics - ongoing.
- Co-chair of the Scientific Organizing Committee for "Kepler & K2 Science Conference IV," June 2017.
- Scientific organizing committee for conference "Exoplanets I," Davos Congress Center, Switzerland, 3-8 July 2016.
- Panel member and co-author of the NASA Roadmap Task Force, "[Enduring Quests, Daring Visions: NASA Astrophysics in the Next Three Decades](#)," 2013.
- Scientific organizing committee for Aspen Center for Physics program "Exoplanets in Multi-body Systems in the Kepler Era," February 2013.
- Chair of Science Working group for the *Multi-object APO Radial Velocity Exoplanet Large-area Survey* (MARVELS), part of the Sloan Digital Sky Survey-III project, 2005-12
- Proposal Reviewer: US-Israeli Binational Committee; Hong Kong Research Foundation; NASA Explorer Program; Davidson Fellowship; NASA Postdoctoral Program applications; University of Washington Royalty Research Fund; Chilean National Science Foundation; Polish Science Foundation.

- NASA and NSF Panels: Astrophysics Theory Program; NASA Discovery Program; Hubble Space Telescope Time Allocation Committee, Cycles 11 and 12; Spitzer Space Telescope Time Allocation Committee - chair of galactic/exoplanet panel; NSF CAREER panel.
- Organized special session at 209th American Astronomical Society Meeting in Seattle, WA, January 2007: "Next Generation Radial Velocity Planet Surveys"
- Chaired session at 209th American Astronomical Society Meeting in Seattle, WA, January 2007: "Session 241: Extrasolar Planets IV"
- National Optical Astronomical Observatories Large Survey Time Allocation Committee, October 2007
- American Physical Society Minority Mentor - 2003 to 2004

## Courses Taught

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### Undergraduate Courses:

- PHYS 225 - Introduction to Modern Physics - Special Relativity and Quantum Mechanics
- ASTR 101 - Introduction to Astronomy
- ASTR 102 (5 times) - Honors Introduction to Astronomy
- ASTR 150E (1 time) - Introduction to the Solar System
- ASTR 323 (3 times) - Galaxies and Cosmology
- ASTR 400 (every quarter) - Undergraduate Research
- ASTR 419 (3 times) - Exoplanets
- ASTR 421 (1 time) - Stellar Astrophysics

### Graduate Courses:

- ASTR 507 (7 times) - Graduate Statistical Mechanics and Thermodynamics (with applications to astrophysics)
- ASTR 508 (1 time) - Graduate Hydrodynamics and Magnetohydrodynamics
- ASTR 561 (6 times) - High Energy Astrophysics
- ASTR 513 (2 times) - Graduate Cosmology
- ASTR 576 (3 times) - Colloquium
- ASTR 597/558 (5 times) - Exoplanets
- ASTR 600 (every quarter) - Graduate research
- ASTR 800 (every quarter) - Advance graduate research

## Recent Invited Talks:

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- 2021: Columbia University Department of Astronomy Colloquium (canceled last-minute in support of graduate student strike);
- 2020: Oregon State University Department of Physics Colloquium
- 2019: UC Santa Barbara Physics Colloquium; TRAPPIST-1 Conference; UNLV Astrophysics Colloquium.
- 2018: University of Arizona joint Steward/NOAO colloquium.
- 2017: Institute d'Astrophysique de Paris Colloquium; University of Grenoble seminar; University of Bern seminar; Paris Observatory, Meudon, seminar.
- 2016: Harvard CfA - Colloquium/Lecar Prize Lecture; University of Toronto - Center for Planetary Sciences' Planet Day seminar; University of Washington Astrobiology program - Colloquium; NASA Goddard Spaceflight Center - LUVOIR seminar; JPL Astronomy colloquium; UCSC Astronomy Colloquium
- 2015: UC Santa Barbara - KITP Conference "From Earths to Mini-Neptunes;" Johns Hopkins University - Colloquium; Princeton/Institute for Advanced Study - joint Astrophysics colloquium; University of Hawaii Institute for Astronomy - Colloquium
- 2014: UC Irvine - Physics colloquium; University of Washington - Astronomy colloquium; Space Telescope Science Institute - "Habitable Worlds Throughout Time and Space" conference talk; Harvard Observatory - SSP talk; Boston University - Astrophysics lunch talk.
- 2013: UCLA - colloquium; University of Washington Center for Quantitative Fisheries - seminar; Harvard - SSP seminar; University of British Columbia - "Time and Life in the Universe - A Roundtable Initiative"

conference talk at the Peter Wall Institute for Advanced Study.

- 2012: Sagan Summer Symposium - plenary talk; Vanderbilt - astronomy colloquium; Johns Hopkins - astrobiology colloquium; Ohio State University - lunch talk; UCSB - astrophysics talk; University of Washington - astronomy colloquium; Applied Physics Laboratory - colloquium; "Planets Around Stellar Remnants" - plenary talk (Arecibo Observatory, Puerto Rico).
- 2011: University of Florida - astronomy colloquium; Miller Institute - lunch talk (UC Berkeley); University of Hawaii - astronomy colloquium, astrobiology talk, geology colloquium; American Astronomical Society - plenary session talk: "Exoplanets: New Approaches to their Discovery and Characterization."
- 2008-2010: SDSS-III Collaboration meeting - plenary session talk; UCSC - astronomy colloquium; Corot First International Symposium - plenary talk; University of British Columbia - astronomy colloquium; UCLA - astronomy colloquium; JPL - astrophysics colloquium; Spitzer Science Center - colloquium; IPAC/Caltech - lunch talk.

## Selected Press:

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- Feb 2018 - [UW Press release](#) on Grimm et al. paper deriving densities of the TRAPPIST-1 system from transit-timing: Concurrent [ESO press release](#). [King-5 Interview Q13 Fox coverage](#)
- February 2017 - Transit timing analysis of the Trappist-1 system "UW astronomer Eric Agol assists in new seven-planet NASA discovery using 'distracted driving' technique" [KXLY News Radio](#); [Q13 Fox Seattle](#); [King 5 Seattle](#)
- May 2017 - Prediction of period of outermost Trappist-1 planet "Kepler telescope spies details of TRAPPIST-1 system's outermost planet"; [Sky & Telescope](#)
- April 2014 - Discovery of first self-lensing binary by graduate student Ethan Kruse: [UW Press release](#)
- March 2013 - Discovery of smallest temperate transiting planet, Kepler-62f: [UW Press release](#)
- May 2007 "First Map of an Extrasolar Planet," articles in [New Scientist](#), [Discover Magazine](#), [Discovery Channel](#), [Scientific American](#), [The Telegraph](#), [National Geographic](#), [USA Today](#), among others.

## PhD Students:

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Current:

- Tyler Gordon;
- Bethlee Lindor (NSF Graduate Fellow).
- Diana Windemuth (NASA NESSF Fellow).

Former:

- Rodrigo Luger (co-advised with Rory Barnes): postdoc at Flatiron Institute;
- Jason Steffen: professor at University of Nevada, Las Vegas;
- Nick Cowan: professor at McGill University;
- Jason Dexter: Assistant Professor at University of Colorado, Boulder (Fall 2019);
- Praveen Kundurthy (co-advised with Andrew Becker): data scientist at Blue Origin;
- Ethan Kruse: NASA postdoctoral fellow at GSFC.
- Brett Morris (Postdoctoral Fellow at Universitat Bern, Switzerland);

## Postdoctoral mentees:

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Former:

- Daniel Foreman-Mackey: Sagan Fellow, now Associate Research Scientist, CCA, Flatiron Institute.
- Sarah Ballard: Sagan Fellow, now Torres Fellow, MIT.
- Jeremiah Murphy: NSF Fellow, now professor at Florida State University.
- John Wisniewski: NSF Fellow, now professor at University of Oklahoma.
- Nick Cowan: professor at McGill University.
- Brian Lee: professor at Santa Fe College in Florida.
- Ian Dobbs-Dixon: Sagan Fellow, now professor at NYU-Abu Dhabi.