JOSEPH M. AKANA MURPHY

Updated November 30, 2021 ◇ Pronouns: He/him/his
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SCIENTIFIC INTERESTS

Exoplanet characterization and formation, applications of statistical modeling and machine learning

EDUCATION

University of California, Santa Cruz
Ph.D. in Astronomy and Astrophysics — 2019 - Expected 2024
Advisor: Professor Natalie Batalha

Stanford University
Master of Science in Applied and Engineering Physics — 2018 - 2019
Bachelor of Science in Physics — 2014 - 2018
Minor in Mathematics
Advisors: Professor Bruce Macintosh, Dr. Ian Czekala
Thesis: *Inferring the Veiling Spectrum of the Pre-Main Sequence Star LkCa 15 with Gaussian Processes*

SCIENTIFIC RESEARCH

Prioritizing TESS Targets for Atmospheric Characterization — 2019 - present
A prioritization scheme to systematically search for the TESS targets that are best-suited for atmospheric follow-up with *JWST*.

The TESS-Keck Survey — 2019 - present
Observing and analysis support for the TESS-Keck Survey, a multi-institution collaboration with the goal of measuring the orbits and masses of 100 TESS planets with Keck-HIRES.

Unveiling the Spectra of Young Stars with Gaussian Processes — 2017 - 2019
Using Gaussian processes to model time-series spectroscopic observations of a young star, LkCa 15, we disentangle the stellar atmosphere from the spectrum of accretion, revealing time-variable, line-specific emission related to the infalling material.

HONORS AND AWARDS

National Science Foundation Graduate Research Fellowship — 2019 - present
LSST Corporation Data Science Fellowship — 2019 - present
Regents' Fellowship, University of California, Santa Cruz — Fall 2019, Winter 2020
Conference Travel Grant, Stanford University — 2017
Thomas J. Watson Memorial Scholarship, IBM — 2014 - 2018

PROFESSIONAL EXPERIENCE

Graduate Student
Department of Astronomy and Astrophysics, University of California, Santa Cruz — 2019 - present

Research Assistant
Kavli Institute for Particle Astrophysics and Cosmology, Stanford University — 2017 - 2019

Research and Development Intern
Pathfinder Systems, Inc., Denver, CO — Summer 2016

PUBLICATIONS (Link to NASA ADS search results)

First and second author publications

3. **Murphy, J. M. A.** *et al.* "Another super-dense sub-Neptune in K2-182 b and refined mass measurements for K2-199 b and c." Accepted for publication in *The Astronomical Journal*, September 2021.

2. Chontos, A., **Murphy, J. M. A.** *et al.* "The TESS-Keck Survey: Science Goals and Target Selection." In revision, July 2021.

1. Scarsdale, N., **Murphy, J. M. A.** *et al.* "TESS-Keck Survey V. Twin sub-Neptunes Transiting the Nearby G Star HD 63935." Accepted for publication in *The Astronomical Journal*, July 2021.

Many-author publications

13. Barragán, O. *et al.* **including Murphy, J. M. A.** "The young HD 73583 (TOI-560) planetary system: Two 10-$M_\oplus$ mini-Neptunes transiting a young, bright, and active K dwarf." Submitted to the *Monthly Notices of the Royal Astronomical Society*, October 2021.

12. Dalba, P. A. *et al.* **including Murphy, J. M. A.** "The TESS-Keck Survey. VIII. Confirmation of a Transiting Giant Planet on an Eccentric 261-day Orbit with the Automated Planet Finder Telescope." Submitted to AAS Journals, September 2021.

11. MacDougall, M. *et al.* **including Murphy, J. M. A.** "The TESS-Keck Survey. VI. Two Eccentric sub-Neptunes Orbiting HIP-97166." Accepted for publication in *The Astronomical Journal*, September 2021.

10. Heidari, N. *et al.* **including Murphy, J. M. A.** "HD207897 b: A dense sub-Neptune transiting a nearby and bright K-type star." Accepted for publication in *Astronomy & Astrophysics*, September 2021.

9. Winters, J. *et al.* **including Murphy, J. M. A.** "A Second Planet Transiting LTT 1445A and a Determination of the Masses of Both Worlds." Submitted to *The Astronomical Journal*, August 2021.

8. Lubin, J. *et al.* **including Murphy, J. M. A.** "TESS-Keck Survey IX: Masses of Three Sub-Neptunes Orbiting HD 191939 and the Discovery of a Warm Jovian Plus a Distant Sub-Stellar Companion." Accepted for publication in *The Astronomical Journal*, August 2021.

7. Dai, F. *et al.* **including Murphy, J. M. A.** "TKS X: Confirmation of TOI-1444b and a Comparative Analysis of the Ultra-short-period Planets with Hot Neptunes." *The Astronomical Journal*, 162, 62, 2021.

6. Rubenzahl, R. *et al.* **including Murphy, J. M. A.** "The TESS-Keck Survey IV: A Retrograde, Polar Orbit for the Ultra-Low-Density, Hot Super-Neptune WASP-107b." *The Astronomical Journal*, 161, 119, 2021.

5. Weiss, L. *et al.* **including Murphy, J. M. A.** "The TESS-Keck Survey II: An Ultra-Short Period Rocky Planet and its Siblings Transiting the Galactic Thick-Disk Star TOI-561." *The Astronomical Journal*, 161, 56, 2021.

4. Kosiarek, M. *et al.* **including Murphy, J. M. A.** "Physical Parameters of the Multiplanet Systems HD 106315 and GJ 9827." *The Astronomical Journal*, 161, 47, 2021.

3. Dai, F. *et al.*, **including Murphy, J. M. A.** "The TESS-Keck Survey. III. A Stellar Obliquity Measurement of TOI-1726 c." *The Astronomical Journal*, 160, 193, 2020.

2. Cloutier, R. *et al.* **including Murphy, J. M. A.** "TOI-1235 b: A Keystone Super-Earth for Testing Radius Valley Emergence Models around Early M Dwarfs." *The Astronomical Journal*, 160, 22, 2020.

1. Dalba, P. A. *et al.* **including Murphy, J. M. A.** "The TESS-Keck Survey. I. A Warm Sub-Saturn-mass Planet and a Caution about Stray Light in TESS Cameras." *The Astronomical Journal*, 159, 241, 2020.

OBSERVING EXPERIENCE

10-meter Keck I telescope (HIRES) - 50 nights — January 2020 - present

SUCCESSFUL TELESCOPE PROPOSALS

Co-Investigator

2. STIS/*HST*, PI: Loyd, R. O. P., "Leveraging High Radial Velocities to Get to the Core of Planetary Lyman-alpha Transits." 12 orbits, Cycle 29.

1. MAROON-X/Gemini North, PI: Crossfield, I., "Mass and Spin-Orbit Alignment of a Temperate Neptune." 14.7 hours, 2021B.

ADVISING AND TEACHING EXPERIENCE

Students advised

Ms. Sarah Lange, UCSC undergraduate — October 2021 - present
The masses of attractive atmospheric targets from the TESS-Keck Survey.

Ms. Bronwen Hardee, UCSC undergraduate — June 2020 - January 2021
Constructing a high-fidelity exoplanet mass and radius catalog.

Volunteer Instructor

Introduction to Astronomy Research — Summer 2020, 2021
GitHub repositories: 2020, 2021

Teaching Assistant

Astronomy 119: *Introduction to Scientific Computing*, UCSC — Spring 2020
Physics 43: *Electricity and Magnetism*, Stanford University — Spring 2019
Physics 41: *Mechanics*, Stanford University — Winter 2019
Physics 41A: *Mechanics*, Stanford University — Winter 2018

Course Instructor

Physics 91SI: *Practical Computing for Scientists*, Stanford University — Spring 2017

SCIENTIFIC PRESENTATIONS

Contributed Talks

4. *The TESS-Keck Survey: Building a Statistical Sample of Sub-Neptunes Primed for Atmospheric Characterization*, TESS Science Conference II, 2021 August 3.

3. *Sub-Neptune Diversity in the Exoplanet Mass-Radius Diagram: The masses of three* K2 *sub-Neptunes and preliminary analysis of atmospheric targets from the TESS-Keck Survey*, UCSC FLASH Seminar, 2021 May 21.

2. *The TESS-Keck Survey: Building a Statistical Sample of Sub-Neptunes Primed for Atmospheric Characterization*, TESS Science Team Meeting #25, 2021 March 25.

1. *The TESS-Keck Survey: Building a Statistical Sample of Sub-Neptunes Primed for Atmospheric Characterization*, Bay Area Exoplanet Meeting #36, 2021 March 5.

Posters

2. *Inferring the spectrum of accretion onto LkCa 15 with Gaussian Processes*, AAS Meeting 233, poster 360.19, 2019.

1. *Disentangling spectra of young stars*, AAS Meeting 231, poster 339.08, 2018.

OUTREACH

Invited Public Talks

2. *Exoplanets: Detecting and Characterizing Worlds Beyond the Solar System*, Morristown High School (NJ) STEM Academy Meeting, 2021 April 7.

1. *Piecing Together the Universe with Generative Models*, Astronomy on Tap - Santa Cruz, 2020 March 5.