Alex Stephen Polanski

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Research Positions

Percival Lowell Postdoctoral Fellow — Lowell Observatory
2024–Current

Graduate Research Assistant — University of Kansas
Advisor: Ian Crossfield — 2019–2024

Visiting Research Fellow — Caltech-IPAC
Advisor: Aurora Kesseli — 2022–2023

Undergraduate Researcher — UC Santa Barbara
Advisor: Philip Lubin — 2018–2019

Education

University of Kansas — Lawrence, KS
Ph.D. in Physics, Advisor: Ian Crossfield — 2019–2024
Dissertation: *Exoplanets at High Resolution: Planetary Mass Measurements and the Characterization of their Host-Stars with Optical Spectra*, defended with honors.

University of California, Santa Barbara — Santa Barbara, CA
B.S. in Physics with a Minor in Astronomy & Planetary Science — 2017–2019

El Camino Community College — Gardena, CA
A.S. in Physical Sciences — 2014–2017

Mentorship

- Heidi Chavez — 2024–Present
  University of Kansas undergraduate. Adapted and contributed to an open-source package for the reduction of Keck/NIRC2 adaptive optics data.
- Yanzhe Zhang — 2021–2022
  University of Kansas undergraduate. Assisted with transit and radial velocity analysis of the hot-Jupiter TOI-1107 b culminating in a poster and their co-authorship on a published work. Now a graduate student at UMass Amherst.

Leadership, Outreach, & Service

- Founding Organizer, KU Astro Nights — 2021–2024
  Kick-started and continue to organize monthly telescope viewings that are open to the public and routinely gather nearly 60 attendees.

- Founder & President, Graduate Student Organization 2021–2022
  Co-founder of the KU Physics & Astronomy Graduate Organization and current president.
- Chair, Physics and Astronomy Locally Organized Assembly Committee 2022
  Coordinated a graduate student-led conference to showcase research by students from the University of Kansas Physics Department.
- Graduate Rep, Physics and Astronomy DEI Comittee Committee 2020–2022
  One of two Graduate representatives sitting on the Department's Diversity, Equity, and Inclusion committee.
- Science Technology Engineering and Math (STEM) Ambassador 2016–2017
  Conducted outreach to local public schools to encourage younger students to pursue science and engineering majors.

Research Talks (Invited*)

- **Caltech-IPAC Seminar*** *(Pasadena, Ca)* June 2025
  An Aligned Sub-Neptune Revealed with MAROON-X
- **Sienna College Astronomy Colloquium*** *(Virtual)* March 2025
  To be (Aligned) or not to be (Aligned)
- Flagstaff Astronomy Symposium *(Flagstaff, AZ)* Sept. 2024
  Rossiter-McLaughlin Measurement of a Temperate Sub-Neptune
- TESS Science Conference *(Boston, MA)* July 2024
  Unveiling Exoplanet Architectures with the TESS-Keck Survey
- ExoPAG 29 *(New Orleans, LA)* Jan. 2024
  Unveiling Exoplanet Architectures with the TESS-Keck Survey
- **Penn State Exoplanet Lecture*** *(State College, PA)* Nov. 2023
  A Tale of Two Surveys: Leveraging Keck/HIRES for a Holistic View of Exoplanetary Systems
- **Princeton Astronomy Seminar*** *(Princeton, NJ)* Nov. 2023
  A Tale of Two Surveys: Leveraging Keck/HIRES for a Holistic View of Exoplanetary Systems
- MARAC 2023 *(Atchison, KS)* Nov. 2023
  TESS-Keck Survey: Mass Catalog and Data Release
- Keck Science Meeting 2023 *(Berkeley, CA)* Sept. 2023
  TESS-Keck Survey: Mass Catalog and Data Release
- **UC Berkeley Exoplanet Symposium*** *(Berkeley, CA)* July 2023
  TESS-Keck Survey: Mass Catalog and Data Release
- **JPL Exoplanet Lecture*** *(Pasadena, CA)* June 2023
  TESS-Keck Survey: Mass Catalog and Data Release
- **UC Irvine Astrophysics Seminar*** *(UC Irvine, CA)* May 2023
  A Tale of Two Surveys: Leveraging Keck/HIRES for a Holistic View of Exoplanetary Systems
- **UC Riverside Astrobiology Colloquium*** *(UC Riverside, CA)* May 2023
  A Tale of Two Surveys: Leveraging Keck/HIRES for a Holistic View of Exoplanetary Systems

- 241st Meeting of the American Astronomical Society *(Seattle, WA)* Jan. 2023
  Keck Abundance Project: Chemical Assay of 15 Elements in Exoplanet Host Stars
- MARAC 2022 *(U. Arkansas, AR)* Oct. 2022
  Keck Abundance Project: Precise Host-Star Abundances for the JWST Era
- **UH Astrophysics Seminar*** *(Institute for Astronomy, HI)* Sept. 2022
  Keck Abundance Project: Precise Host-Star Abundances for the JWST Era
- Physics and Astronomy Locally Organized Assembly *(Lawrence, KS)* Feb. 2021
  Precise Exoplanet Host Star Abundances for the JWST Era
- University of Kansas Astronomy Graduate Colloquium *(Lawrence, KS)* Oct. 2020
  Getting Acquainted with the Exoplanet Wolf 503b
- University of Kansas Graduate Research Seminar *(Lawrence, KS)* Oct. 2019
  Analysis of Transiting Exoplanets

Public Talks

- Astronomy Associates of Lawrence *(Virtual)* Dec. 2024
  The KU Astronomical Plate Archive
- Astronomy on Tap Flagstaff *(Snowbowl, AZ)* Oct. 2024
  Fantastic Worlds and How to Find Them
- Astronomy Associates of Lawrence *(Baker University, KS)* Dec. 2023
  Some like it Hot: Exploring the Hottest Known Exoplanets
- Octagon Barn Star Party *(Sienna College, NY)* Nov. 2023
  Exoplanets Fast and Slow
- Astronomy Associates of Lawrence *(Baker University, KS)* Feb. 2022
  Understanding Exoplanets Through the Stars they Orbit
- KU Astro Nights *(Lawrence, KS)* Feb. 2022
  The Pleiades: Cultural Icon of the Winter Sky

Conference Posters

- Two HoRSEs *(Berlin, Germany)* July 2024
  Atmospheres at High Resolution with the Keck Planet Finder
- Extreme Precision Radial Velocity 5 *(Santa Barbara, CA)* April 2023
  TESS-Keck Survey: Mass Catalog and Data Release
- Keck Science Meeting 2021 *(UC San Diego)* Oct. 2021
  Keck Abundance Project: Precise Host-Star Abundances for the JWST Era
- 236th Meeting of the American Astronomical Society *(Virtual)* June 2020
  Wolf 503b: Super-Earth or Sub-Neptune?

Teaching

- **Instructor** Lawrence High School — Fall 2022 –Spring 2023
  Designed and taught an astronomy course for Lawrence High School: a minority-serving school.
- **Teaching Assistant** University of Kansas — Spring 2020 –Fall 2020
  Astronomy 196 - Introductory Astronomy Lab
- **Head Teaching Assistant** University of Kansas — Fall 2019 –Spring 2020
  Physics 114 - Introductory Physics Lab
- **Teaching Assistant** El Camino Community College — Fall 2015 –Spring 2017
  Astronomy 12 - Observational Astronomy

Awards and Grants

- U.S. Contributions to Ariel (NASA) **($326,000)** — 2025
- Percival Lowell Postdoctoral Fellow **($20,000/yr, Discretionary)** — 2024
- IPAC Visiting Graduate Fellow — 2023
- Barbara J. Anthony-Twarog Outreach Award, University of Kansas — 2022
- Research Honors Award, UC Santa Barbara — 2018
- Undergraduate Research and Creative Activities Grant, UC Santa Barbara — 2018
- Letters and Science Dean's Honor List, UC Santa Barbara — 2018
- Excellence in Astronomy Award, El Camino College — 2016
- International Physics Competition Silver Medal — 2016
- NExScI Travel Grant **($1,000)** — 2024
- Keck PI data Award **($18,650)** — 2025
- Keck PI data Award **($16,500)** — 2023
- Keck PI data Award **($17,700)** — 2023
- Keck PI data Award **($16,950)** — 2022

Accepted Observing Proposals (PI)

- **LDT/EXPRES 2025A:** *5 Nights* - Spin-Orbit Measurements of 3 Hot-Jupiters in Binary Systems
- **LDT/EXPRES 2024B:** *1.0 Night* - Spin-Orbit Measurement of a Sub-Neptune in a Bright Multi-planet System
- **LDT/EXPRES 2024B, 2025A:** *1.5 Nights* - Planet Formation on a Shoestring: Precise Mass Measurement of a Sub-Neptune in a Compact Binary System
- **LDT/EXPRES 2024B, 2025A:** *9 Nights* - The Jovian Architectures Survey (JAS): An EXPRES Route to Understanding ExoSolar Systems
- **Keck/NIRC2 2025A:** *1.5 Nights* - AO Follow-up and Validation of ARIEL Targets

- **Keck/NIRC2 2024B:** *1 Night* - AO Follow-up and Validation of ARIEL Targets
- **Keck/NIRC2 2023B:** *2 Nights* - AO Follow-up of TESS objects of interest
- **Keck/NIRC2 2023A:** *2 Nights* - AO Follow-up of TESS objects of interest
- **Keck/NIRC2 2022B:** *2 Nights* - AO Follow-up of TESS objects of interest

Observing Experience

- **Keck I (10m):** HIRES - W.M. Keck Observatory, Hawai'i. 47 nights.
- **Keck I (10m):** KPF - W.M. Keck Observatory, Hawai'i. 4 nights.
- **Keck II (10m):** NIRC2 - W.M. Keck Observatory, Hawai'i. 12 nights.
- **Palomar (200in):** PARVI - Palomar Observatory, CA. 1 night.
- **Palomar (200in):** PHARO - Palomar Observatory, CA. 3 nights.
- **Lowell Discovery Telescope (4.3m):** EXPRES - Lowell Observatory, AZ. >20 nights.
- **IRTF (3.2m):** iSHELL - NASA Infrared Telescope Facility, Hawai'i. 1 night.
- **Las Cumbres Observatory:** 0.4 Meter Telescope

First Author Publications (66 Citations)

[1] **Alex S. Polanski**, I. J. M. Crossfield, et al., "An Aligned Sub-Neptune Revealed with MAROON-X and a Tendency Towards Alignment for Small Planets", *in press* (2025).

[2] **Alex S. Polanski**, I. J. M. Crossfield, et al., "Keck Abundance Project: Stellar Abundances for 5,000 Planet-Search Stars", *in preparation* (2025).

[3] **Alex S. Polanski** et al., "The TESS-Keck Survey. XX. 15 New TESS Planets and a Uniform RV Analysis of All Survey Targets", **272**, 32, 32 (2024).

[4] **Alex S. Polanski**, I. J. M. Crossfield, A. W. Howard, H. Isaacson, and M. Rice, "Chemical Abundances for 25 JWST Exoplanet Host Stars with KeckSpec", Research Notes of the American Astronomical Society **6**, 155, 155 (2022).

[5] **Alex S. Polanski**, I. J. M. Crossfield, et al., "Wolf 503 b: Characterization of a Sub-Neptune Orbiting a Metal-poor K Dwarf", **162**, 238, 238 (2021).

Contributing Author Publications (26 papers - 150 citations)

[1] C. L. Brinkman, **Alex S. Polanski**, et al., "Revisiting the Relationship Between Rocky Exoplanet and Stellar Compositions", *in preparation* (2024).

[2] J. M. Akana Murphy et al., "The TESS-Keck Survey. XVI. Mass Measurements for 12 Planets in Eight Systems", **166**, 153, 153 (2023).

[3] J. M. Almenara et al., "TOI-4860 b, a short-period giant planet transiting an M3.5 dwarf", arXiv e-prints, arXiv:2308.01454, arXiv:2308.01454 (2023).

[4] C. L. Brinkman et al., "TOI-561 b: A Low-density Ultra-short-period "Rocky" Planet around a Metal-poor Star", **165**, 88, 88 (2023).

[5]F. Dai et al., "A Mini-Neptune Orbiting the Metal-poor K Dwarf BD+29 2654", **166**, 49, 49 (2023).

[6]F. Dai et al., "TOI-1136 is a Young, Coplanar, Aligned Planetary System in a Pristine Resonant Chain", **165**, 33, 33 (2023).

[7]M. El Mufti et al., "TOI 560: Two Transiting Planets Orbiting a K Dwarf Validated with iSHELL, PFS, and HIRES RVs", **165**, 10, 10 (2023).

[8]N. Hejazi et al., "Elemental Abundances of the Super-Neptune WASP-107b's Host Star Using High-resolution, Near-infrared Spectroscopy", **949**, 79, 79 (2023).

[9]M. Hon et al., "A close-in giant planet escapes engulfment by its star", **618**, 917–920 (2023).

[10]B. J. Hord et al., "Identification of the Top TESS Objects of Interest for Atmospheric Characterization of Transiting Exoplanets with JWST", arXiv e-prints, arXiv:2308.09617, arXiv:2308.09617 (2023).

[11]A. Householder et al., "Investigating the Atmospheric Mass Loss of the Kepler-105 Planets Straddling the Radius Gap", arXiv e-prints, arXiv:2309.11494, arXiv:2309.11494 (2023).

[12]E. Knudstrup et al., "Radial velocity confirmation of a hot super-Neptune discovered by TESS with a warm Saturn-mass companion", **519**, 5637–5655 (2023).

[13]M. G. MacDougall et al., "The TESS-Keck Survey. XV. Precise Properties of 108 TESS Planets and Their Host Stars", **166**, 33, 33 (2023).

[14]J. Van Zandt et al., "TESS-Keck Survey. XIV. Two Giant Exoplanets from the Distant Giants Survey", **165**, 60, 60 (2023).

[15]J. M. Almenara et al., "GJ 3090 b: one of the most favourable mini-Neptune for atmospheric characterisation", **665**, A91, A91 (2022).

[16]J. Brande et al., "A Mirage or an Oasis? Water Vapor in the Atmosphere of the Warm Neptune TOI-674 b", **164**, 197, 197 (2022).

[17]A. Chontos et al., "The TESS-Keck Survey: Science Goals and Target Selection", **163**, 297, 297 (2022).

[18]I. J. M. Crossfield et al., "GJ 1252b: A Hot Terrestrial Super-Earth with No Atmosphere", **937**, L17, L17 (2022).

[19]P. A. Dalba et al., "The TESS-Keck Survey. VIII. Confirmation of a Transiting Giant Planet on an Eccentric 261 Day Orbit with the Automated Planet Finder Telescope", **163**, 61, 61 (2022).

[20]S. Giacalone et al., "Validation of 13 Hot and Potentially Terrestrial TESS Planets", **163**, 99, 99 (2022).

[21]S. K. Grunblatt et al., "TESS Giants Transiting Giants. II. The Hottest Jupiters Orbiting Evolved Stars", **163**, 120, 120 (2022).

[22]J. Lubin et al., "TESS-Keck Survey. IX. Masses of Three Sub-Neptunes Orbiting HD 191939 and the Discovery of a Warm Jovian plus a Distant Substellar Companion", **163**, 101, 101 (2022).

[23]M. G. MacDougall et al., "The TESS-Keck Survey. XIII. An Eccentric Hot Neptune with a Similar-mass Outer Companion around TOI-1272", **164**, 97, 97 (2022).

[24]E. V. Turtelboom et al., "The TESS-Keck Survey. XI. Mass Measurements for Four Transiting Sub-Neptunes Orbiting K Dwarf TOI-1246", **163**, 293, 293 (2022).

[25]M. El Mufti et al., "TOI 560 : Two Transiting Planets Orbiting a K Dwarf Validated with iSHELL, PFS and HIRES RVs", arXiv e-prints, arXiv:2112.13448, arXiv:2112.13448 (2021).

[26]M. G. MacDougall et al., "The TESS-Keck Survey. VI. Two Eccentric Sub-Neptunes Orbiting HIP-97166", **162**, 265, 265 (2021).

Workshops and Summer Schools

- Sagan Exoplanet Summer Workshop *(Pasadena, CA)* July 2023
- Sagan Exoplanet Summer Workshop *(Virtual)* July 2022
- Sagan Exoplanet Summer Workshop *(Virtual)* July 2020
- JWST Master Class for Proposal Writing *(Lawrence, KS)* March 2020
- Dunlap School for Astronomical Instrumentation *(Toronto, Ontario)* July 2019
- NASA Community College Aerospace Scholars Program *(Pasadena, CA)* April 2016

Professional Programs & Societies

- NASA ExoExplorer 2024
- AAS Member 2020 – Current
- Sigma Pi Sigma 2020 – Current
- APS Bridge Program 2019 – 2022