PETER SMITH – CURRICULUM VITAE

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Education

2026 (expected) Ph.D., Astrophysics; Arizona State University
2020 B.S., Astronomy, Physics; University of Texas at Austin

Publications

1. *A Combined Ground-based and JWST Atmospheric Retrieval Analysis: Both IGRINS and NIRSpec Agree that the Atmosphere of WASP-77A b Is Metal-poor*, Astronomical Journal, 2024
2. *The Roasting Marshmallows Program with IGRINS on Gemini South. II. WASP-121 b has super-stellar C/O and refractory-to-volatile ratios*, Astronomical Journal, 2024

Research Experience

2020-present Advisor: Prof. Michael Line

High- and low-resolution spectroscopy of transiting exoplanets, including atmospheric modeling and retrieval, planning observations, and handling of spectroscopic data products

Advisor: Prof. Molly Simon

Astronomy education; developing and testing a curricular model for college non-majors incorporating citizen science and best practices of culturally responsive education

2019-2020 Advisor: Prof. Caroline Morley

Atmospheric modeling of rocky exoplanets and simulating observations with the *James Webb Space Telescope*

Interests

Exoplanet atmospheres, Bayesian statistics, high resolution spectroscopy, radiative transfer, astronomy education, high performance computing, atmospheric modeling

Teaching and Mentoring Experience

2025 Jackson Headon, Kiera Charley, Roman Goralski, Devon Strader; Guest Lecturer SES 598 *An Overview of Planetary Atmospheres*

2024 Jackson Headon, Kiera Charley, Joshua Gonzalez, Roman Goralski (undergraduates); Sundial Early Start; Guest Lecturer AST 598 *Exoplanets*; Guest Lecturer SES 598 *An Introduction to Astro-Statistics*; Guest Lecturer SES 126

	Exploration of the Universe
2023	Colin Boecker-Grieme, Kimberly Merriam (undergraduates, Sundial); Sundial Early Start
2022	Megan Miller (undergraduate, Sundial); Sundial Early Start
2021	Gabriela Roig (undergraduate, Sundial); Sundial Early Start
2020	Astronomy Students Association Python Workshop

Accepted Observational Programs as PI

Magellan Special Call; Magellan; MIKE – 1 night
GN-2025B-FT-203; Gemini North, IGRINS-2 – 8 hr
GN-2025A-Q-209; Gemini North, IGRINS-2 – 20.5 hr
GS-2024B-FT-103; Gemini South, GHOST – 8 hr
GS-2023B-Q-110; Gemini South, IGRINS – 8 hr
GS-2024A-FT-101; Gemini South, IGRINS – 4 hr
GS-2021A-Q-113; Gemini South, IGRINS – 16 hr
GS-2022A-FT-106; Gemini South, IGRINS – 5 hr

Observing Experience

MIKE, Magellan, 1 night (remote)
IGRINS, Harlan J Smith Telescope, 4 nights
PISCES, Multiple Mirror Telescope, 3 nights
iSHELL, IRTF, 1 night (remote)
PMA 16 inch at University of Texas, 10+ nights

Awards, Grants, and Scholarships

2025	NASA ExoPAG Exoplanet Explorer; ASU Graduate College Completion Fellowship ($26,600); 2SLGBTQIA+ Leadership Graduate Award ($350)
2024	College of Liberal Arts and Sciences Student Leader
2022	NASA FINESST ($150,000); ASU Graduate Excellence Award ($100)
2020	Special Departmental Honors; University Honors
2019	John W. Cox Endowment for the Advanced Studies in Astronomy

Leadership, Service, and Outreach

2024-2025	Reviewer for The Astronomical Journal
	Reviewer for Astronomy and Astrophysics
	Vice president, SESE Graduate Council
	Coordinator, SESE Queer and Trans Coffee Hour
2023-2024	Graduate advocate, SESE Graduate Council
	Coordinator, SESE Queer and Trans Coffee Hour

	Panelist, Phoenix Fan Fusion
2021-2025	Astronomy Journal Club Co-chair
	Stars and Exoplanets Research Group Outreach Coordinator
	ASU Open Door (tabling)
	Earth and Space Exploration Day (tabling)
	Judge, Arizona Science & Engineering Fair
2019-2020	Founding member; Physics, Math, and Astronomy Board for Student Advocacy
	Member, Sigma Pi Sigma Physics Honor Society
2018-2020	Co-president, secretary; Astronomy Students Association

Press

NSF NOIRLab Stories Blog, *IGRINS on Gemini South Detects Surprising Signatures in Dynamic Atmosphere of Exoplanet WASP-121b*

Contributed and Invited Presentations

2025	American Astronomical Society Winter Meeting: *The Roasting Marshmallows Program with IGRINS on Gemini South II: WASP-121 b has Super-stellar C/O and Refractory-to-volatile ratios*
2024	Two HoRSEs: *Stronger Together: Enhancing Atmospheric Inference capabilities by combining ground-based and JWST spectra*
	ASU Astronomy Club: *Alien Worlds: Then and Now*
2023	GMT Annual Community Meeting: *Stronger Together: Enhancing Atmospheric Inference capabilities by combining ground-based and JWST spectra*
	ELT Science in Light of JWST: *Stronger Together: Enhancing Atmospheric Inference capabilities by combining ground-based and JWST spectra*
	American Astronomical Society Winter Meeting, *S'More Roasting Marshmallows: The Atmosphere of WASP-121 b is ^{13}CO-enriched*
2022	Exoplanets IV, *A Combined High- and Low- Resolution Retrieval of a Hot Jupiter using IGIRNS/Gemini South and WFC3/HS*
	Other Worlds Laboratory, *The Need for Fast, 3D Models at High Spectral Resolution*
	Leibnitz Institute for Astrophysics Thinkshop: High resolution spectroscopy of

exoplanet atmospheres and biosignatures, *A Combined High- and Low-Resolution Retrieval of a Hot Jupiter using IGRINS/Gemini South and WFC3/HST*

Oxford SPIMAX Astronomy Seminar, *A Whole New World: Opportunities and Challenges for the Next Era of Exoplanet Science*

2021 American Astronomical Society Winter Meeting, *A Combined High- and Low-Resolution Retrieval of a Hot Jupiter using IGRINS/Gemini South and WFC3/HST* (Cancelled due to COVID-19)

AAS, *A new model for culturally responsive citizen science-based curriculum* (Cancelled due to COVID-19)

CHAMPS Exoplanet Early Career Seminar, *A Combined High- and Low-Resolution Retrieval of a Hot Jupiter using IGRINS/Gemini South and WFC3/HST*

2021 Emerging Researchers in Exoplanet Science Symposium, *Detection of a Carbon Isotope in a Hot Jupiter Using High Resolution Cross Correlation Spectroscopy*

Sundial No Jargon Conference, *Understanding the Atmospheres of Alien Worlds*

Space Telescope Science Institute Spring Symposium, *High Resolution Cross Correlation Spectroscopy Observations of a Hot Jupiter with IGRINS on Gemini South*

American Astronomical Society Winter Meeting, *Predictions for Secondary Eclipse Observations of* TESS *Discoveries with* JWST

American Astronomical Society Winter Meeting, *High Resolution Cross Correlation Spectroscopy Observations of a Hot Jupiter with IGRINS on Gemini South*

2020 University of Texas Astronomy Department Undergraduate Research Seminar, *Predictions for Secondary Eclipse Observations of* TESS *Discoveries with* JWST

2019 Astronomy Students Association Undergraduate Research Month, *Detecting and Characterizing Exoplanets*

Co-authored Publications

The Roasting Marshmallows Program with IGRINS on Gemini South III: Seeing deeper into the metal depleted atmosphere of a gas-giant on the cusp of the hot to ultra-hot Jupiter transition; Panwar et al. 2025. MNRAS

An Early Look at the Performance of IGRINS-2 at Gemini-North with Application to the ultrahot Jupiter, WASP-33 b; Choi et al. 2025. AJ

Time-resolved absorption of six chemical species with MAROON-X points to a strong drag in the ultra-hot Jupiter TOI-1518 b; Simonnin et al. 2025. A&A

Peering into the Black Box: Forward Modeling of the Uncertainty Budget of High-resolution Spectroscopy of Exoplanet Atmospheres; Savel et al. 2025. AJ

A Measurement of the Water Abundance in the Atmosphere of the Hot Jupiter WASP-43b with High-resolution Cross-correlation Spectroscopy; Bartelt et al. 2025. AJ

CRIRES+ and ESPRESSO Reveal an Atmosphere Enriched in Volatiles Relative to Refractories on the Ultrahot Jupiter WASP-121b; Pelletier et al. 2025. AJ

IGRINS Observations of WASP-127 b: H2O, CO, and Super-solar Atmospheric Metallicity in the Inflated Sub-Saturn; Kanumalla et al. 2024. AJ

High-resolution Dayside Spectroscopy of WASP-189 b: Detection of Iron during the GHOST/Gemini South System Verification Run; Diebert et al. 2024. AJ

Phase-resolving the Absorption Signatures of Water and Carbon Monoxide in the Atmosphere of the Ultra-hot Jupiter WASP-121b with GEMINI-S/IGRINS; Wardenier et al. 2024. PASP

The Metallicity and Carbon-to-oxygen Ratio of the Ultrahot Jupiter WASP-76b from Gemini-S/IGRINS; Weiner Mansfield et al. 2024. AJ

Enhancing Exoplanet Ephemerides by Leveraging Professional and Citizen Science Data: A Test Case with WASP-77 A b; Noguer et al. 2024. PASP

Confirmation of Subsolar Metallicity for WASP-77Ab from JWST Thermal Emission Spectroscopy; August et al. 2023. ApJL

The Roasting Marshmallows Program with IGRINS on Gemini South I: Composition and Climate of the Ultrahot Jupiter WASP-18 b; Brogi et al. 2023. AJ

Confirmation of Water Absorption in the Thermal Emission Spectrum of the Hot Jupiter WASP-77Ab with HST/WFC3; Weiner Mansfield et al. 2022. AJ

A solar C/O and sub-solar metallicity in a hot Jupiter atmosphere; Line et al. 2021. Nature