

## Curriculum vitae - Joshua Krissansen-Totton (he/him)

May 1<sup>st</sup>, 2026

[joshkt@uw.edu](mailto:joshkt@uw.edu)

### Employment

- **Assistant Professor** (September 2022 - Present)  
Department of Earth and Space Sciences, University of Washington, WA
- **NASA Sagan Fellow** (September 2019-August 2022)  
NASA Hubble Fellowship Program, Department of Astronomy and Astrophysics, University of California, Santa Cruz, CA. Mentor: Dr. Jonathan Fortney

### Education

- **University of Washington, Seattle, WA.** Dual-Title PhD in Earth and Space Sciences and Astrobiology, September 2013 – August 2019. Advisor: Dr. David C. Catling.
- **The University of Auckland, New Zealand.** BSc(Hons) in physics, awarded with First Class Honours, March 2012 - November 2012.
- **The University of Auckland, New Zealand.** BSc in physics and mathematics, BA in economics, March 2008 – November 2011.

### Professional offices/awards/service

- AGU Ronald Greeley Early Career Award 2025
- Co-Chair Habitable Worlds Observatory Biosignature Interpretation sub-Working Group and Living Worlds Steering Committee, 2024-2025
- NASA Decadal Astrobiology Research and Exploration Strategy – Community Webinar Panelist 2026
- James Webb Space Telescope Time Allocation Committee Panelist, Cycle 4, 2024.
- James Webb Space Telescope Time Allocation Committee Expert Reviewer, Cycle 3, 2023
- Hubble Space Telescope Time Allocation Committee External Panelist Cycle 31 and 32, 2023-2024.
- Co-lead of CHILI (Coupled atmoSPHERE Interior modeL Intercomparison), a community magma ocean model intercomparison project 2025-Present.
- NASA Hubble Fellowship Program, Panelist 2025/2026.
- Guest Editor Icarus Special Issue “Carbon in Planetary Environments: Sources and Evolution” March 2025-Present.
- Reviewer/panelist for several NASA panels, graduate fellowships, and postdoctoral fellowships including Exobiology Panelist 2025, NPP 2022 Reviewer, Habitable Worlds Panelist 2020 (+2021 Reviewer), FINESST 2020 and 2021 Reviewer.
- Reviewer for NSF Career Awards.
- External Reviewer for Einstein Foundation Berlin, 2025
- External Reviewer for Alfred P. Sloan Foundation Matter-to-Life Program
- Reviewer for Swiss National Science Foundation
- Reviewer for *Nature*, *Proceedings of the National Academy of Sciences USA*, *Geology*, *Science Advances*, *Nature Geoscience*, *Nature Communications*, *Nature Astronomy*, etc.
- External reviewer for ETH Zurich Research Grants and ETH NOMIS Fellowships 2023
- Co-presenter to internal panel review of NHFP Program: *Equity, Diversity, and Inclusion in the NASA Hubble Fellowship Program*, June 2021.
- NHFP Anti-Racism Initiative, statistics subgroup, October 2020-February 2022. Collecting and

analyzing demographics data from former and current NHFP Fellows and applicants to identify inequities or biases in application process.

- Standards of Evidence for Life Detection Community Workshop (virtual event), scientific organizing committee, July 2021.
- UCSC Planetary Science Seminar organizer, September 2019-September 2020.
- University of Washington Astrobiology Program Student Representative, 2016-2017
- Geological Society of America Annual Meeting 2017, session organizing committee: The co-evolution of life and its environment during the Precambrian
- UW Astrobiology Journal Club, founder and co-organizer 2017-2019
- Earth and Space Sciences Research Gala organizing committee, 2017

### Outreach

- The Rainier Club Seattle, science and technology committee evening lecture “What makes or breaks a habitable world? Understanding the billion-year evolution of Earth, Venus, and rocky exoplanets”, May 2025
- Guest on Science Communicator Fraser Cain’s YouTube Chanel “How Red Dwarf Stars Could Host Habitable Planets After All”, 2025
- SETI Live (virtual event) – [“Could JWST find life? Methane as a biosignature”](#) 2022
- SETI Talks (virtual event) – [“Is Oxygen Really a Biosignature?”](#), virtual discussion on oxygen biosignatures, 2021
- Don Callejon School (Santa Clara) – “Astrobiology and the search for life beyond Earth” virtual presentations to five sixth grade science classes, 2020.
- Presented talk on “Astrobiology and the search for life elsewhere” to 80 students at Rutherford College (Auckland, New Zealand), 2019.
- Presenter at Pacific Science Center, “Science and a Movie: Stargate” at Central Cinema (Seattle), 2019.
- Highlands Elementary School (Renton) – “Looking for life on other planets” presentation and activity for 90 5<sup>th</sup> Graders, 2019.
- Teen Science Café Presenter, *What can ancient rocks teach us about looking for life on other planets?* Hosted by the Pacific Science Center, 2018.
- Astronomy on Tap (Seattle) presenter. [How can billion-year-old rocks help the search for life among the stars?](#) Peddler Brewing Company, 2018.
- Presented astrobiology/astronomy talks to 90 11<sup>th</sup> Graders at Sammamish High School, 2018.
- Presented intro to astrobiology talks at Eatonville Middle School to 140 6<sup>th</sup> Graders, 2017.
- Pacific Science Center, Science Communication Fellow, 2017-2019
- Issaquah Middle School – taught introduction to astrobiology classes to around 300 7<sup>th</sup> Graders over 2 days, 2017.
- Issaquah Middle School, Meet a Scientist for Career Day, 2017
- Science Café Presenter, *The Search for Life Beyond Earth*, hosted by the Pacific Science Center, The Swiss Restaurant and Bar, Tacoma, 2016.
- Presented astrobiology and cosmology talks at Roosevelt high school, 2015
- Presented Intro to Astrobiology talks at Lister Elementary and Harbor middle school, 2014.
- Telescope operator at Stardome Observatory, Auckland, New Zealand, March 2010-2013.

### Past and Present Student Advisees

- ESS graduate student Alexandra Papesh, PhD Advisor September 2024-present.
- ESS graduate student Anna Grace Ulses, PhD Advisor October 2023-present.
- ESS graduate student Haskelle White-Gianella, PhD Advisor October 2023-present.

- ESS undergraduate student Charles Fleming, Research Mentor December 2025-Present (ESS Honors Program).
- UW undergraduate student Cameron Boyd, Research Mentor September 2025- Present.
- UW undergraduate student Maxwell Frissell, Research Mentor June 2023-September 2025 (now graduate student at Northern Arizona University).
- UCSC undergraduate Sawyer Hall, primary undergraduate research advisor, June 2021 – December 2023. Completed first-author project on simulated reflected light retrievals for terrestrial exoplanets, (Hall et al. 2023; ApJ). Now graduate student at University of Georgia.
- UCSC graduate student Maggie Thompson, mentorship on methane biosignatures project (Thompson et al. 2022; PNAS). Maggie is now a postdoctoral fellow at ETH Zurich.
- UCSC undergraduate Sydney Haith, primary undergraduate research advisor October 2021 – December 2022. Research project on oxygen false positives around F, G, K stars. Sydney was awarded a \$2000 Koret Research Scholarship to work on the oxygen project Winter quarter 2022.
- UCSC undergraduate Max Galloway, primary undergraduate research advisor, October 2019-October 2021. Resulted in multiple mentee conference presentations and two coauthored papers. Max is in graduate school in the Department of Physics at UCF.
- UW Graduate Student Nicholas Wogan, research mentor July 2018–August 2019, resulting in mentee first author publication (Wogan et al. 2020; PSJ) and ongoing collaborations.
- NAU Graduate Student Amber Vanessa Young, mentored on chemical disequilibrium code December 2019-November 2021.
- Byram Hills High School student Joseph Cipriano for Regeneron Science Talent Search, May 2019-December 2020.

#### Research Grants Awarded

Title: “Follow the Redox - Redox Perturbations, Disequilibrium Information, and Atmospheric Signs of Life”

PI: David Catling (University of Washington)

Role: Co-PI

Program: Sloan Foundation Matter-to-Life 2025-2520

Period of Performance: April 2025 – March 2030

Total budget: \$1,000,000

Title: “Determining the Habitable Worlds Observatory capabilities needed to corroborate oxygen biosignatures”

PI: Joshua Krissansen-Totton

Program: NASA Astrophysics Decadal Survey Precursor Science 80NSSC23K1471

Period of Performance: September 2023 – August 2026

Total budget: \$740,130

Title: “How to identify exoplanet surfaces using atmospheric trace species in super-Earth atmospheres”

PI: Xinting Yu (UT, San Antonio)

Role: Institutional PI

Program: NASA Habitable Worlds NNH22ZDA001N-HW

Period of Performance: September 2023 – September 2026

UW budget: \$37,591

Title: “The Virtual Planetary Laboratory Advancing the Search for Life Beyond the Solar System”

PI: Victoria Meadows (SETI Institute)  
Role: Institutional PI  
Program: NASA ICAR 80NSSC23K1398  
Period of Performance: September 2024 – September 2029  
Total budget: \$7,669,133  
UW Budget: \$1,200,000

Title: "The Thermochemistry of Ancient Lithospheres and Atmospheres (TALA) Chamber"  
PI: Haskelle White-Gianella (PhD Student Advisee)  
Role: Advising Faculty  
Program: UW Student Technology Fee 2026  
UW Budget (=Total budget): \$46,348

NASA Hubble Fellowship Program (NHFP), Sagan Fellowship, \$410,000 (September 2019-August 2022)  
NASA Earth and Space Sciences Fellowship, \$105,000 (Planetary Science), 2015-2018

#### Selected Observing Proposals

Title: "Title: MIRI Clarity: Uncovering the Mysteries of Water Worlds and Sub-Neptunes in the Mid-Infrared"  
Principal Investigator: Bjorn Benneke (UCLA)  
Program: JWST Cycle 5 GO, Exoplanet Atmospheres and Habitability  
Budget: TBC

Title: "Confirming a Tentative Terrestrial Atmosphere Detection on LHS 1478 b with JWST/MIRI"  
Principal Investigator: Prune August (DTU National Space Institute)  
Role: Institutional PI  
Program: JWST Cycle 4 GO, Exoplanet Atmospheres and Habitability  
UW Budget: \$80,999

Title: "Cliff Hangers: Testing for Atmosphere-Mantle Interactions in Radius Cliff Planets"  
Principal Investigator: Natasha Batalha (NASA Ames)  
Program: JWST Cycle 4 GO, Exoplanet Atmospheres and Habitability  
Budget: None

Title: "Bare rocks are not supposed to do that."  
Principal Investigator: Elsa Ducrot (CEA/DSM/DAPNIA/Service d'Astrophysique)  
Role: Co-I  
Program: JWST Cycle 3 GO, Exoplanets and Exoplanet Formation  
UW budget: \$167,537

Title: "Exploring the existence and diversity of volatile-rich water worlds"  
Principal Investigator: Bjorn Benneke (Universite de Montreal)  
Role: Institutional PI  
Program: JWST Cycle 2 GO, Exoplanets and Exoplanet Formation  
Amount awarded to JKT research group: \$31,161

#### Other Awards and Fellowships:

- Scialog Fellow - Signatures Life in the Universe (March 2022-2023)

- David A. Johnston Award for Research Excellence, 2018: Departmental award for research excellence, selected from 80 graduate students.
- College of the Environment Graduate Dean's Medalist, 2018: Awarded for outstanding academic achievement, leadership, and service, and selected from seven departments within the College.
- NASA Early Career Collaboration Award, \$2K, 2015
- Outstanding Astrobiology Scholar Fellowship, \$10K (UW), 2013
- Fulbright Science and Innovation Graduate Award, \$25K, 2012
- Senior Scholar Award - Bachelor of Science and Bachelor of Arts (UoA), 2012
- University of Auckland Honours Scholarship, 2012
- University of Auckland Scholarship, 2008-2010
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#### Peer-Reviewed Publications

**Summary:** 52 publications, 19 first author, \* = Mentored graduate or undergraduate student, \*\* = Primary advisor

*In preparation/under review/in revision (5 papers, 1 first author, 2 mentee first authors):*

- **Krissansen-Totton, J.**, Ulses\*\*, A.G., Frissell\*\*, Gilbert-Janizek\*, S., Young, A., Lustig-Yaeger, J., Robinson, T., Olson, S., Alei, E., Arney, G., Hagee, C., Harman, C., Hinkel, N., Lafleche, E., Latouf, N., Mandell, A., Moussa, M. M., Parenteau, N., Ranjan, S., Russell, B., Schwieterman, E. W., Sousa-Silva, C., Tokadjian, A., Wogan, N. (2026). Wavelength Requirements for Life Defection via Reflected Light Spectroscopy of Rocky Exoplanets. *In revision at Astrobiology*.
- Ih, J., Kempton, E. M. R., Diamond-Lowe, H., **Krissansen-Totton, J.**, Mansfield, M. W., Xue, Q., Wogan, N., Nixon, M. C., Hord, B. J. (2026). Do Rocky Planets around M Stars Have Atmospheres? A Statistical Approach to the Cosmic Shoreline. arXiv preprint arXiv:2508.08253.
- Benneke, B., Roy, P.-A., Coulombe, L.-P., Radica, M., Ahrer, E.-M., Piaulet, C., **Krissansen-Totton J.**, Schlichting, H. E., Hu, R., Yang, J., Christie, D., Thorngren, D., Young, E. D., Pelletier, S., Knutson, H. A., Miguel, Y., Evans-Soma, T. M., Dorn, C., Gagnebin, A., Fortney, J. J., Komacek, T., MacDonald, R., Raul, E., Cloutier, R., Acuna, L., Lafrenière, D., Cadieux, C., Doyon, R., Welbanks, L., Allart, R. (2026). JWST Reveals CH<sub>4</sub>, CO<sub>2</sub>, and H<sub>2</sub>O in a Metal-rich Miscible Atmosphere on a 2.2 R<sub>⊕</sub> Sub-Neptune. *In revision at ApJ*.
- Ulses\*\*, A. G., **Krissansen-Totton, J.**, Parenteau, M. N., Matsuo, T., Robinson, T., and Boyd\*\*, C. (2026). Exploring the Detectability of Earth's Diverse Surface Biosphere from the Archean to Modern Day. *In preparation for submission to Astrobiology*.
- Frissell\*\*, M., **Krissansen-Totton, J.**, Wogan, N., and Robinson, T. (2026). Can we Spot a Venus? Characterizing Terrestrial Exoplanet Atmospheres with Direct Imaging. *In preparation*.

*Published/in press (47 publications, 18 first author, 7 mentee first author):*

- Gilbert-Janizek\*, S., Lustig-Yaeger, J., and **Krissansen-Totton, J.** (2026). The effect of spectral resolution on biosignature detection via reflected observations of the Earth. *In press ApJ*.
- Wogan, N., Batalha, N., **Krissansen-Totton, J.**, Zahnle, K., Meadows, V., Young, A. V., Sneed, E. L., Schwieterman, E. (2026). Toward Inferring the Surface Fluxes of Biogenic Gases on Rocky Exoplanets from Telescope Spectra. *In press ApJ*.

- White-Gianella\*\*, H., **Krissansen-Totton, J.** (2026). Carbon Cycle Imbalances on Arid Terrestrial Planets with Implications for Venus. *The Planetary Sciences Journal*. 7, 79. DOI:10.3847/PSJ/ae4faa
- Ulses\*\*, A. G., **Krissansen-Totton, J.**, Robinson, T., Meadows, V., Catling, C., Fortney, J. (2025). Detecting land with reflected light spectroscopy to rule out waterworld O<sub>2</sub> biosignature false positives. *The Astrophysical Journal*, 990, 48. DOI:10.3847/1538-4357/ade69
- Lichtenberg, T., Schaefer, L., **Krissansen-Totton, J.**, Miguel, Y., Sergeev, D. E., Baumeister, P., Cmiel, J., Janssen, L. J., Nguyen, T. G., Miyazaki, Y., Nicholls, H., Papesch\*\*, A., Pelissard, H., Peng, B., Perez, J., Postolec, E., Sastre, M., Salvador, A., Spreeuw, H., Zorzi, A., Fauchez, T. J., Hamano, K., Leconte, J., Maurice, M., Noack, L., Soucasse, L. (2026). Coupled atmosphere Interior model Intercomparison (CHILI) Protocol Version 1.0: A CUISINES Intercomparison Project of Magma Ocean Models. *In press at PSJ*.
- Wogan, N., Batalha, N., Zahnle, K., **Krissansen-Totton, J.**, Catling, D. C., Wolf, E. T., Robinson, T. D., Meadows, V., Arney, G., Domagal-Goldman, S. (2025). The Open-source Photochem Code: A General Chemical and Climate Model for Interpreting (Exo)Planet Observations. *The Planetary Science Journal*, 6(11), 256. DOI:10.3847/PSJ/ae0e1c
- Coulombe, L.P., Benneke, B., **Krissansen-Totton, J.**, L'Heureux, A., Piaulet-Ghorayeb, C., Radica, M., Roy, P.A., Ahrer, E.M., Cadieux, C., Miguel, Y., Schlichting, H. E., Delgado-Mena, E., Monaghan, C., Adamski, H., Raul, E., Cloutier, R., Komacek, T. D., Taylor, J., Gapp, C., Allart, R., Bouchy, F., Canto Martins, B. L., Cook, N. C., Doyon, R., Evans-Soma, T. M., Larue, P., Mascareño, A. S., Wardenie, J. P. (2025). Possible Evidence for the Presence of Volatiles on the Warm Super-Earth TOI-270 b. *The Astronomical Journal*, 170, 4. DOI:10.3847/1538-3881/adfc6a
- Thomas\*, T., Meadows, V. S., **Krissansen-Totton, J.**, Gialluca, M., Wogan, N., Catling, D. C. (2025). Statistical Geochemical Constraints on Present-day Water Outgassing as a Source of Secondary Atmospheres on the TRAPPIST-1 Exoplanets. *The Planetary Science Journal*, 6, 126. DOI:10.3847/PSJ/add261
- Ahrer, E.-M., Radica, M., Piaulet-Ghorayeb, C., Raul, E., Wisner, L., Welbanks, L., Acuña, L., Allart, R., Coulombe, L.-P., Louca, A., MacDonald, R., Saidel, M., Evans-Soma, T.M., Benneke, B., Christie, D., Beatty, T.G., Cadieux, C., Cloutier, R., Doyon, R., Fortney, J.J., Gagnebin, A., Gapp, C., Innes, H., Knutson, H.A., Komacek, T., **Krissansen-Totton, J.**, Miguel, Y., Pierrehumbert, R., Roy, P.-A. and Schlichting, H.E. (2025). Escaping Helium and a Highly Muted Spectrum Suggest a Metal-Enriched Atmosphere on Sub-Neptune GJ3090b from JWST Transit Spectroscopy. *The Astrophysical Journal Letters*, 985(1), L10. DOI:10.3847/2041-8213/add010
- Young, A., Robinson, T., **Krissansen-Totton, J.**, Schwieterman, E.W., Arney, G., Lindberg, G.E. and Thomas, C. (2025). Modern Earth-like Chemical Disequilibrium Biosignatures are Challenging to constrain through Spectroscopic Retrievals. *The Astrophysical Journal* 986.2 (2025): 206. DOI:10.3847/1538-4357/addbd7
- Kuang, W., Kopparapu, R., **Krissansen-Totton, J.**, Mills, B. J. (2025). Strong link between Earth's

oxygen level and geomagnetic dipole revealed since the last 540 million years. *Science Advances*. DOI:10.1126/sciadv.adu8826

- Catling, C., **Krissansen-Totton, J.**, Robinson, T. (2025). Potential technosignature from anomalously low deuterium/hydrogen (D/H) in planetary water depleted by nuclear fusion technology Technosignatures. *The Astrophysical Journal*, 979, 137. DOI:10.3847/1538-4357/ad99a9
- **Krissansen-Totton, J.**, Wogan, N., Thompson, M., Fortney, J. J. (2024). The erosion of large primary atmospheres typically leaves behind substantial secondary atmospheres on temperate rocky planets. *Nature Communications* 15, 8374. DOI:10.1038/s41467-024-52642-6
- Luu, C.N., Yu, X., Glein, C.R., Innes, H., Aguichine, A., **Krissansen-Totton, J.**, Moses, J.I., Tsai, S.-M., Zhang, X., Truong, N. and Fortney, J.J. (2024). Volatile-rich Sub-Neptunes as Hydrothermal Worlds: The Case of K2-18 b. *The Astrophysical Journal Letters*, 977(2), L51. DOI:10.3847/2041-8213/ad9eb1
- Huang, Z., Yu, X., Tsai, S.-M., Moses, J.I., Ohno, K., **Krissansen-Totton, J.**, Zhang, X. and Fortney, J.J. (2024). Probing Cold-to-temperate Exoplanetary Atmospheres: The Role of Water Condensation on Surface Identification with JWST. *The Astrophysical Journal*, 975(1), 146. DOI:10.3847/1538-4357/ad76ac
- Piaulet-Ghorayeb, C., Benneke, B., Radica, M., Raul, E., Coulombe, L.-P., Ahrer, E.-M., Kubyskhina, D., Howard, W.S., **Krissansen-Totton, J.**, MacDonald, R.J., Roy, P.-A., Louca, A., Christie, D., Fournier-Tondreau, M., Allart, R., Miguel, Y., Schlichting, H.E., Welbanks, L., Cadieux, C., Dorn, C., Evans-Soma, T.M., Fortney, J.J., Pierrehumbert, R., Lafrenière, D., Acuña, L., Komacek, T., Innes, H., Beatty, T.G., Cloutier, R., Doyon, R., Gagnebin, A., Gapp, C. and Knutson, H.A. (2024). JWST/NIRISS Reveals the Water-rich “Steam World” Atmosphere of GJ 9827 d. *The Astrophysical Journal Letters*, 974(1), L10. DOI:10.3847/2041-8213/ad6f00
- de Wit, J., Doyon, R., Rackham, B.V., Lim, O., Ducrot, E., Kreidberg, L., Benneke, B., Ribas, I., Berardo, D., Niraula, P., Iyer, A., Shapiro, A., Kostogryz, N., Witzke, V., Gillon, M., Agol, E., Meadows, V., Burgasser, A.J., Owen, J.E., Fortney, J.J., Selsis, F., Bello-Arufe, A., de Beurs, Z., Bolmont, E., Cowan, N., Dong, C., Drake, J.J., Garcia, L., Greene, T., Haworth, T., Hu, R., Kane, S.R., Kervella, P., Koll, D., **Krissansen-Totton, J.**, Lagage, P.-O., Lichtenberg, T., Lustig-Yaeger, J., Lingam, M., Turbet, M., Seager, S., Barkaoui, K., Bell, T.J., Burdanov, A., Cadieux, C., Charnay, B., Cloutier, R., Cook, N.J., Correia, A.C.M., Dang, L., Daylan, T., Delrez, L., Edwards, B., Fauchez, T.J., Flagg, L., Frascchetti, F., Haqq-Misra, J., Huang, Z., Iro, N., Jayawardhana, R., Jehin, E., Jin, M., Kite, E., Kitzmann, D., Kral, Q., Lafrenière, D., Libert, A.-S., Liu, B., Mohanty, S., Morris, B.M., Murray, C.A., Piaulet, C., Pozuelos, F.J., Radica, M., Ranjan, S., Rathcke, A., Roy, P.-A., Schwieterman, E.W., Turner, J.D., Triaud, A. and Way, M.J. (2024). A roadmap for the atmospheric characterization of terrestrial exoplanets with JWST. *Nature Astronomy*, 8, 810–818. DOI:10.1038/s41550-024-02298-5
- Wogan, N., Batalha, N. E., Zahnle, K., **Krissansen-Totton, J.**, Tsai, S. M., Hu, R. (2024). JWST observations of K2-18b can be explained by a gas-rich mini-Neptune with no habitable surface. *The Astrophysical Journal Letters*, 963 (1), L7. DOI:10.3847/2041-8213/ad2616

- Young, A. V., Robinson, T., **Krissansen-Totton, J.**, Schwieterman, E.W., Wogan, N.F., Way, M.J., Sohl, L.E., Arney, G.N., Reinhard, C.T., Line, M.R., Catling, D.C. and Windsor, J.D. (2024). Inferring chemical disequilibrium biosignatures for Proterozoic Earth-like exoplanets. *Nature Astronomy*, 8, 101–110. DOI:10.1038/s41550-023-02145-z
- Hall\*, S., **Krissansen-Totton, J.**, Robinson, T., Arnaud, S., Fortney, J. (2023). Constraining Background N<sub>2</sub> Inventories on Directly Imaged Terrestrial Exoplanets to rule out O<sub>2</sub> False Positives. *The Astronomical Journal*, 166, 6. DOI:10.3847/1538-3881/ad03e9
- **Krissansen-Totton, J.** (2023). Implications of atmospheric non-detections for Trappist-1 inner planets on atmospheric retention prospects for outer planets. *The Astrophysical Journal Letters*, 951, L39. DOI:10.3847/2041-8213/acdc26
- **Krissansen-Totton, J.** and Fortney, J. J. (2022). Predictions for Observable Atmospheres of Trappist-1 Planets from a Fully Coupled Atmosphere–Interior Evolution Model. *The Astrophysical Journal* 933 115. DOI:10.3847/1538-4357/ac69cb
- Gillmann, C., Way, M. J., Avice, G., Breur, D., Golabek, G. J., Honing, D., **Krissansen-Totton, J.**, Lammer, H., O'Rourke, J.G., Persson, M., Plesa, A.-C., Salvador, A., Scherf, M. and Zolotov, M.Y. (2022). Long-Term Atmosphere Interior Evolution of Venus. *Space Science Reviews* Volume 218, 56. DOI:10.1007/s11214-022-00924-0
- Thompson\*, M., **Krissansen-Totton, J.**, M., Galloway\*, Wogan\*, N., Telus, M., Fortney, J. J. (2022). The Case and Context for Atmospheric Methane as an Exoplanet Biosignature. *Proceedings of the National Academy of Sciences USA*. DOI:10.1073/pnas.2117933119.
- **Krissansen-Totton, J.**, Thompson\*, M., Galloway\*, M., Fortney, J. J. (2022). Understanding planetary context to enable exoplanet life detection and test the Copernican principle. *Nature Astronomy*. DOI:10.1038/s41550-021-01579-7.
- **Krissansen-Totton, J.**, Fortney, J. J., Nimmo, F. (2021). Was Venus ever habitable? Constraints from a coupled interior-atmosphere-redox evolution model. *The Planetary Science Journal*. DOI:10.3847/PSJ/ac2580.
- **Krissansen-Totton, J.**, Fortney, J. J., Nimmo, F., Wogan\*, N. (2021). Oxygen false positives on habitable zone planets around sun-like stars. *AGU Advances*, 2, e2020AV000294. DOI:10.1029/2020AV000294.
- **Krissansen-Totton, J.**, Galloway\*, M., Wogan\*, N., Dhaliwal, J., Fortney, J. J. (2021). Waterworlds probably do not experience magmatic outgassing, *ApJ*, 913.2: 107. DOI:10.3847/1538-4357/abf560
- **Krissansen-Totton, J.**, Kipp, M., and D. C. Catling (2021). Inverse modeling of carbon isotope record suggests changes in organic burial could explain Great Oxidation Event. *Geobiology*. DOI:10.1111/gbi.12440.

- Kipp, M., **Krissansen-Totton, J.**, Catling D. C. (2021); High burial efficiency is required to explain mass balance in Earth's early carbon cycle. *Global Biogeochemical Cycles*. DOI:10.1029/2020GB006707.
- Wogan\*, N., **Krissansen-Totton, J.**, & Catling, D. C. (2020). Abundant atmospheric methane from volcanism on terrestrial planets is unlikely and strengthens the case for methane as a biosignature, *The Planetary Science Journal*. 1(58). DOI:10.3847/PSJ/abb99e
- Taylor, J., Parmentier, V., Irwin, P., Aigrain, S., Lee, G., **Krissansen-Totton, J.** (2020). Understanding and mitigating biases when studying inhomogeneous emission spectra with JWST. *Monthly Notices of the Royal Astronomical Society*, 493(3). DOI:10.1093/mnras/staa552
- Lehmer, O., Catling, D.C., **Krissansen-Totton, J.** (2020). Atmospheric CO<sub>2</sub> on Earth-like Exoplanets around Sun-like Stars: How Carbonate-Silicate Cycle Predictions Modify the Habitable Zone Hypothesis and Allow for its Testing. *Nature Communications*, DOI:10.1038/s41467-020-19896-2.
- **Krissansen-Totton, J.** and D. C. Catling (2020). A coupled carbon-silicon cycle model over Earth history: Reverse weathering as a possible explanation of a warm mid-Proterozoic climate. *Earth & Planetary Science Letters*, 537: DOI:10.1016/j.epsl.2020.116181.
- Kadoya, S., **J. Krissansen-Totton**, D. C. Catling (2019). Probable cold and alkaline surface environment of the Hadean earth caused by impact ejecta weathering. *Geochemistry, Geophysics, Geosystems* 21 (1), DOI:10.1029/2019GC008734
- **Krissansen-Totton, J.**, R. Garland, P. Irwin & D. C. Catling (2018). Detectability of biosignatures in anoxic atmospheres with the James Webb Space Telescope: A TRAPPIST-1e case study, *The Astronomical Journal*, 156, 3, DOI:10.3847/1538-3881/aad564.
- **Krissansen-Totton, J.**, G. Arney, D. C Catling (2018). Constraining the climate and ocean pH of the early Earth with a geological carbon cycle model, *Proceedings of the National Academy of Sciences USA*, DOI:10.1073/pnas.1721296115.
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- **Krissansen-Totton, J.**, R. Buick, D. C. Catling (2015). A statistical analysis of the carbon isotope record from the Archean to Phanerozoic and implications for the rise of oxygen, *American Journal of Science*, 315 (4), 275-316. DOI:10.2475/04.2015.01
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#### Non-refereed materials

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- Parenteau, N., Ulses\*\*, A.G., Metz, C., Kiang, N.Y., Coelho, L.F., Schwieterman, E., Grone, J., Roccetti, G., Berdyugina, S., Alei, E., Patty, L., Lafleche, E., Matsuo, T., Cardace, D., Borges, S., Mandel, A., Gordon, K., **Krissansen-Totton, J.** and Arney, G. (2026). Habitable Worlds Observatory Living Worlds Working Group: Surface Biosignatures on Potentially Habitable Exoplanets. arXiv preprint arXiv:2601.08883.
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- Meadows, V., Graham, H., Abrahamsson, V., Adam, Z., Amador-French, E., Arney, G., Barge, L., Barlow, E., Bera, A., Bose, M., Bower, D., Chan, M., Cleaves, J., Corpolongo, A., Currie, M., Domagal-Goldman, S., Dong, C., Eigenbrode, J., Enright, A., Fauchez, T.J., Fisk, M., Fricke, M., Fujii, Y., Gangidine, A., Gezer, E., Glavin, D., Grenfell, L., Harman, S., Hatzenpichler, R., Hausrath, L., Henderson, B., Stewart Johnson, S., Jones, A., Hamilton, T., Hickman-Lewis, K., Jahnke, L., Kacar, B., Kopparapu, R., Kempes, C., Kish, A., **Krissansen-Totton, J.**, Leavitt, W., Komatsu, Y., Lichtenberg, T., Lindsay, M., Maggiori, C., Des Marais, D., Mathis, C., Morono, Y., Neveu, M., Ni, G., Nixon, C., Olson, S., Parenteau, N., Perl, S., Quinn, R., Raj, C., Rodriguez, L., Rutter, L., Sandora, M., Schmidt, B., Schwieterman, E., Segura, A., Sekerci, F., Seyler, L., Smith, H., Soares, G., Som, S., Suzuki, S., Teece, B., Weber, J., Wolfe-Simon, F., Wong, M., Yano, H. and Young, L. (2022). Community report from the biosignatures standards of evidence workshop. arXiv preprint arXiv:2210.14293
- **Krissansen-Totton, J.**, Catling, D.C., Garland, R., Irwin, P. (2019) Detecting methane biosignatures on transiting exoplanets. *Appendix A.15 in the LUVUOIR Mission Concept Study Final Report.*
- **Krissansen-Totton, J.**, Arney, G.N., Catling, D.C., Felton, R., Fortney, J., Garland, R., Irwin, P., Kopparapu, R., Lehmer, O., Lustig-Yaeger, J., Meadows, V., Molaverdikhani, K., Olson, S., Schwieterman, E., Taylor, J. (2019) Atmospheric disequilibrium as an exoplanet biosignature: Opportunities for next generation telescopes. *White Paper submitted to the National Academies of Sciences Astronomy and Astrophysics 2020 Decadal Survey.*
- Berdyugina S. V., Kuhn, J.R., Langlois, M., Moretto, G., **Krissansen-Totton, J.**, Grenfell, L., Catling, D., Santl-Temkiv, T., Finster, K., Tarter, J., Shostak, S., Marchis, F., Hargitai, H., Apai, D. (2018) The Exo-Life Finder (ELF) Telescope: New Strategies for Exoplanet Direct Detection, Biosignatures and Technosignatures, SPIE, Proceedings Volume 10700. Ground-based and Airborne Telescopes VII; 107004I.

Selected Conference/Workshop Presentations:

**Bold** = invited talk; \* = Mentored graduate or undergraduate student; \*\* = Primary advisor

*Invited Scholarly Presentations:*

- Krissansen-Totton, J. (January 2026). What makes or breaks a habitable world? Understanding the divergent evolution of Earth, Venus, and rocky exoplanets. *Department of Earth Sciences, University of Oregon (invited colloquium)*
- Krissansen-Totton, J. (October 2025). The pathway to exoplanet life detection – recent findings and future prospects. *Kapteyn Astronomical Institute, University of Groningen (invited colloquium)*

- Krissansen-Totton, J. (September 2025). The role of seafloor weathering and reverse weathering in regulating Precambrian climate. *Virtual Seminars in Precambrian Geology* (**invited seminar**).
- White-Gianella\*\*, H. T. (August 2025) Was Venus Ever Habitable? Investigating the Evolution of Water and Oxygen to Assess Planetary Habitability. *NASA JPL's Science Visitor and Colloquium Program (SVCP) Planetary Science Seminar* (**invited seminar**).
- Krissansen-Totton, J. (July 2025). Design Requirements for the Habitable Worlds Observatory to Interpret Biosignature Detections as Evidence for Life. *Towards the Habitable Worlds Observatory: Visionary Science and Transformational Technology*. Washington, D.C. (plenary talk).
- Krissansen-Totton, J. (February 2025). The evolution of Venus and Venus-like exoplanets. Geology Department, Western Washington University (**invited colloquium**).
- Krissansen-Totton, J. (December 2024). The atmosphere-interior interaction of rocky exoplanets: what can we learn from JWST observations and geochemical evolution models? *AGU 2024 Union Session: Upstairs, Downstairs Revisited: Progress and Prospects in Understanding the Consequences of Internal Planet Evolution for the Habitability of Planetary Surface* (**invited talk**).
- Krissansen-Totton, J. (December 2024). The case for secondary atmospheres on temperate rocky planets around M-dwarfs. [Rocky Worlds Discussions](#) (**invited seminar**).
- Krissansen-Totton, J. (September 2024). Toward predictive models of planetary evolution to enable exoplanet life detection. *Centre for Origin and Prevalence of Life (COPL), ETH Zurich* (**invited colloquium**).
- Krissansen-Totton, J. (September 2023). Implications of atmospheric nondetections for Trappist-1 inner planets on atmospheric retention prospects for outer planets. *APEx Department, Max Planck Institute for Astronomy, Germany* (**invited virtual seminar**).
- Krissansen-Totton, J. (October 2022). Anticipating biosignature false positives in the 2020s. *Université de Montréal Astronomy Seminar* (**invited seminar**).
- Krissansen-Totton, J. (October 2022). Developing fully coupled models of terrestrial planet evolution to assess habitability and enable exoplanet life detection. *CLEVER Planets Seminar Series* (**invited seminar**).
- Krissansen-Totton, J. (September 2022). The early Earth as an analog for exoplanet biosignatures, *Prebiotic Chemistry and Early Earth Environments (PCE3) virtual seminar series* (**invited seminar**).
- Krissansen-Totton, J. (January 2022). Toward testable theories of terrestrial planet evolution to

enable exoplanet life detection. *Department of Earth, Environmental, and Planetary Sciences, Brown University (invited colloquium)*.

- Krissansen-Totton, J. (November 2021). Toward testable models of rocky planet evolution to enable exoplanet life detection. *Space Science and Astrobiology Division, NASA Ames (invited seminar)*.
- Krissansen-Totton, J. (November 2021). Toward testable theories of terrestrial planet evolution to enable exoplanet life detection. *Department of Planetary Sciences/Lunar and Planetary Laboratory, University of Arizona (invited colloquium)*.
- Krissansen-Totton, J. (November 2021). Toward testable theories of terrestrial planet evolution to enable exoplanet life detection. *UC Riverside, Department of Earth and Planetary Sciences, Hewett Club Lecture Series (invited seminar)*.
- Krissansen-Totton, J. (August 2021). Using coupled atmosphere-interior-redox models to predict terrestrial planet atmospheric evolution and anticipate oxygen false positives. *NASA Goddard Space Flight Center, Exoplanet Series (invited seminar)*.

#### *Presentations at National and International Scholarly Meetings, Symposia, and Workshops*

- Ulises\*\*, A.G., Krissansen-Totton, J., Parenteau, M., Matsuo, T., Robinson, T., Boyd\*, C. (May 2026) Exploring the Detectability of Earth's Surface Biosphere from the Archean to Present Day. *NExSS Extraterrestrial Photosynthesis Workshop (talk)*
- White-Gianella\*\*, H., Krissansen-Totton, J., Journaux, B., Weber, J. (May 2026). Crustal oxidation experiments to test the plausibility of oxygen biosignature false positives. *Astrobiology Science Conference 2026, Madison, WI (talk)*.
- Ulises\*\*, A. G., Krissansen-Totton, J., Wogan, N., Robinson, T. (May 2026). On the Plausibility and Detectability of Low Non-Condensable O<sub>2</sub> Biosignature False Positives. *Astrobiology Science Conference 2026, Madison, WI (poster)*
- Papesch\*\*, A. G., and Krissansen-Totton, J. (May 2026). Modeling Venus' atmosphere-interior evolution to assess habitability prospects for rocky planets at the inner edge of the habitable zone. *Astrobiology Science Conference 2026, Madison, WI (poster)*
- Krissansen-Totton, J. (April 2026). The role of the geologic carbon cycle in maintaining planetary habitability. *Early Earth's Atmospheres, Oceans and Planetary Habitability (EON) Workshop, University of Oslo, Norway (invited talk)*.
- Krissansen-Totton, J. (November 2025) Modeling the primary to secondary atmosphere transition and implications for the cosmic shoreline. *Atmospheric Escape and Replenishment Meeting, Baltimore, MD (virtual talk)*.

- White-Gianella\*\*, H. T. & Krissansen-Totton, J. (November 2025) Carbon Cycle Instabilities on Arid Terrestrial Planets with Implications for Venus. *VEXAG 2025 Meeting* (poster).
- White-Gianella\*\*, H. T., Krissansen-Totton, J., Journaux, B., and Weber, J (October 2025) Leveraging crustal oxidation experiments to assess the plausibility of liquid water on ancient Venus. *Organization for Venus Early-Career Networking (OVEN) Early Career Seminar*. (**invited seminar**).
- Ulises\*\*, A. G., Krissansen-Totton J., Robinson T., Meadows, V., Catling D., Fortney, J. (July 2025) Characterizing terrestrial exoplanet surfaces with reflected light spectroscopy. *Towards the Habitable Worlds Observatory: Visionary Science and Transformational Technology*. Washington, D. C. (talk)
- White-Gianella\*\*, H. T. & Krissansen-Totton, J. (July 2025) Carbon Cycle Instabilities on Arid Terrestrial Planets. *Goldschmidt Conference 2025, Prague* (**invited talk**).
- Papesch\*\*, A. G., Krissansen-Totton, J. (July 2025). Applying a fully coupled atmosphere-interior evolution model to explore habitability of ancient Venus and exo-Venus analogs. *Goldschmidt Conference 2025, Prague* (poster).
- Krissansen-Totton, J. (July 2025). Wavelength Requirements for Life Detection via Reflected Light Spectroscopy of Rocky Exoplanets, *Other Worlds Laboratory (OWL) Summer Workshop* (talk).
- Ulises\*\*, A. G., Krissansen-Totton, J., Robinson, T., Meadows, V., Catling, D., Fortney, J. (July 2025). Detecting land with HWO can rule out O<sub>2</sub> biosignature false positives. *ExoClimes VII Conference 2025* (poster).
- Ulises\*\*, A. G., Krissansen-Totton, J., Robinson, T., Meadows, V., Catling, D., Fortney, J. (June 2025). Characterizing exoplanet surfaces with reflected light spectroscopy. *Astrobiology Graduate Conference 2025* (talk).
- White-Gianella\*\*, H. T. & Krissansen-Totton, J. (December 2024) The (In)stability of the Geologic Carbon Cycle on Arid Terrestrial Planets. *American Geophysical Union (AGU) 2024 Annual Meeting* (talk).
- Ulises\*\*, A. G., Krissansen-Totton J., Robinson T., Meadows, V., Catling D., Fortney, J. (December 2024). Detecting land with HWO can rule out waterworld O<sub>2</sub> biosignature false positives. *American Geophysical Union (AGU) 2024 Annual Meeting* (talk).

- Olson, S., Krissansen-Totton, J. Ulises\*\*, A. G., Gilbert-Janizek\*, S., Frissell\*\*, M., Young, A. V. (December 2024) Design Requirements for the Habitable Worlds Observatory to Interpret Biosignature Detections as Evidence for Life. *American Geophysical Union (AGU) 2024 Annual Meeting* (talk).
- Krissansen-Totton, J. (November 2024). Climate Regulation by Seafloor Weathering on the Early Earth and Exoplanets. *UW Chemical Oceanography* (**invited seminar**).
- Krissansen-Totton, J. (September 2024). The loss of primary atmospheres does not preclude habitability: A self-consistent atmosphere-interior model of the transition from sub-Neptune to terrestrial planets. *Institute of Geochemistry and Petrology, ETH Zurich* (**invited seminar**).
- Krissansen-Totton, J. (September 2024). The evolution of Venus and Venus-like exoplanets. *Institute for Particle Physics and Astrophysics, ETH Zurich* (**invited seminar**).
- Krissansen-Totton, J. J., Wogan, N., Thompson, M., Fortney, J. (July 2024). The transition from molten sub-Neptunes to potentially habitable terrestrial planets. Other Worlds Laboratory (OWL) Summer Workshop (talk).
- Ulises\*\*, A. G., Krissansen-Totton, J., Robinson, T., Meadows, V., Catling, D., Fortney, J. (May 2024). Simulated HWO reflected light retrievals to rule out waterworld O<sub>2</sub> biosignature false positives by detecting land. *Astrobiology Science Conference 2024, Providence, RI* (poster)
- White\*\*, H. T. and Krissansen-Totton, J. (May 2024) Runaway warming on arid terrestrial planets due to carbon cycle instabilities. *Astrobiology Science Conference 2024, Providence, RI* (poster).
- Ulises\*\*, A. G., Krissansen-Totton, J., Robinson, T., Meadows, V., Catling, D., Fortney, J. (May 2024). Simulated HWO reflected light retrievals to rule out waterworld O<sub>2</sub> biosignature false positives by detecting land. *ExoPag 2024* (lightning talk)
- Krissansen-Totton, J., Wogan, N., Thompson, M., Fortney, J. (March 2024). The loss of primary atmospheres does not preclude habitability: A self-consistent model of the transition from sub-Neptune to terrestrial atmospheres. *Extreme Solar Systems V, Christchurch, New Zealand* (talk).
- Ulises\*\*, A. G., Krissansen-Totton, J., Robinson, T., Meadows, V., Catling, D., Fortney, J. (March 2024). Investigating HWO capabilities needed to rule out waterworld oxygen biosignature false positives. *Extreme Solar Systems V, Christchurch, New Zealand* (poster).
- Krissansen-Totton, J. (December 2023). How does magma ocean evolution affect the habitability of terrestrial exoplanets? AGU 2023, San Francisco, CA (**invited talk**).
- Krissansen-Totton, J. (October 2023). Geochemical evolution of terrestrial planets and biosignatures. ExoPAG 28, San Antonio, Texas (**invited talk**).
- Krissansen-Totton, J. (August 2023) Leveraging atmosphere-interior evolution models to

understand Venus and exoVenus analogs. ExoSS II Meeting. JPL, Pasadena, CA. (**invited talk**).

- Krissansen-Totton, J. (July 2023). Strongly oxidizing surface conditions that are unfavorable for prebiotic chemistry might be a frequent outcome of lifeless planetary evolution. *Goldschmidt 2023 Conference*, Lyon, France (talk).
- Krissansen-Totton, J. (May 2023). Climate Regulation by Hydrothermal Fluxes on the Early Earth and Exoplanets. *AGU Chapman Conference: Hydrothermal Circulation and Seawater Chemistry (invited talk)*.
- Krissansen-Totton, J. (May 2023). Is abundant atmospheric oxygen a common outcome of lifeless planetary evolution? *AstroBio2023: Oxygen in Planetary Biospheres*, Green Bank Observatory 2023 (talk).
- Krissansen-Totton, J. (November 2022). The Atmospheric Evolution of Venus and ExoVenus Analogs. *Exoplanets in our Backyard 2*. Albuquerque, New Mexico (talk)
- Krissansen-Totton, J. (May 2022). Predicting the observable atmospheres of Trappist-1 planets from a fully coupled atmosphere-interior evolution model. *Astrobiology Science Conference 2022, Atlanta, Georgia* (talk).
- Krissansen-Totton, J. (May 2021). Leveraging coupled atmosphere-interior-redox models to predict terrestrial planet atmospheric evolution and anticipate exoplanet biosignatures. *Caltech Planetary Science (invited seminar)*.
- Krissansen-Totton, J., Fortney, J., Nimmo, F., and Wogan, N. (April 2021). Interpreting exoplanet biosignatures with a coupled atmosphere-interior-geochemical evolution mode. *Virtual EGU General Assembly (invited talk)*
- Krissansen-Totton, J. (March 2021). Was Venus ever habitable? Constraints from a coupled interior-atmosphere-redox evolution model. *NASA GISS (invited seminar)*.
- Krissansen-Totton, J. (March 2021). Anticipating exoplanet biosignatures with coupled atmosphere-interior evolution models. *Center for Planetary Habitability, UT Austin (invited seminar)*.
- Krissansen-Totton, J. (February 2021). Identifying biosignatures depends on the whole planetary context. *Habitable Worlds, virtual conference (invited talk)*.
- Krissansen-Totton, J., Fortney, J., Nimmo, F., Wogan, N. (December 2020). Novel oxygen false positives on habitable zone planets. *AGU, San Francisco* (talk).
- Krissansen-Totton, J. (July 2020). Self-consistent models of terrestrial planet atmospheric evolution to formulate testable hypothesis for future observations. *Exoplanets III* (plenary talk).
- Krissansen-Totton, J. (May 2020). Could anti-biosignature detections constrain the prevalence of life in the universe? *What makes a Planet Uninhabitable, virtual conference, Chicago (invited*

talk).

- Krissansen-Totton, J. (February 2020). The search for life elsewhere: Leveraging Earth system science approaches to anticipate exoplanet biosignatures and habitability. *Berkeley Center for Integrative Planetary Science* (**invited seminar**).
- Krissansen-Totton, J., Kipp, M., and D. C. Catling (December 2019). Revisiting the Precambrian carbon cycle: the influence of reverse weathering and alternative interpretations of the carbon isotope record. *AGU, San Francisco* (talk).
- Krissansen-Totton, J. (November 2019). The search for life elsewhere: Leveraging Earth system science approaches to anticipate exoplanet biosignatures and habitability. *ETH Zurich, Department of Earth Sciences* (**invited seminar**).
- Krissansen-Totton, J. (November 2019). JWST will have difficulty finding life on a modern Earth analog, but could detect life on an early Earth analog. *Rocky Exoplanets in the era of James Webb, NASA Goddard Space Flight Center* (talk).
- Krissansen-Totton, J. (October 2019). New approaches to exoplanet life detection. *NASA Hubble Fellowship Program Symposium, Washington, D.C.* (talk).
- Krissansen-Totton, J. (July 2019). Disequilibrium biosignatures over Earth history and detecting life in anoxic atmospheres. *NExSci Sagan Workshop, Caltech* (**invited talk**).
- Krissansen-Totton, J. (February 2019). Disequilibrium biosignatures in exoplanet atmospheres: early Earth analogs, detectability with next generation telescopes, and implications for instrument design. *NASA Goddard Large UV, Optical, InfraRed Surveyor (LUVOIR) Telescope Seminar* (invited talk).
- Catling, D.C. and Krissansen-Totton, J. (February 2019). Finding life on exoplanets from its imprint on atmospheric composition. *University of Washington, Department of Atmospheric Sciences Seminar* (**invited talk**).
- Krissansen-Totton, J. (December 2018). Disequilibrium biosignatures in exoplanet atmospheres and their detectability with the James Webb Space Telescope. *University of California, Santa Cruz, Other Worlds Laboratory, Planetary Lunch Seminar* (**invited talk**).
- Krissansen-Totton, J. (November 2018). The search for life elsewhere: Leveraging chemical disequilibrium metrics and Earth system science to anticipate exoplanet biosignatures. *University of Chicago, Department of Geophysical Sciences Seminar* (**invited talk**).
- Krissansen-Totton, J. (August 2018). Novel approaches to exoplanet life detection: Disequilibrium biosignatures and their detectability with the James Webb Space Telescope. *International Astronomical Union 30<sup>th</sup> General Assembly*. Vienna, Austria (talk).
- Krissansen-Totton, J., S. Olson, R. Garland, P. Irwin and D. C. Catling (August 2018). Disequilibrium biosignatures on the early Earth and their detectability with the James Webb

Space. *Goldschmidt*, Boston, MA (talk).

- Krissansen-Totton, J. (July 2018). Disequilibrium biosignatures in exoplanet atmospheres and their detectability with the James Webb Space Telescope. *Exoplanets 2 Conference*, Cambridge, UK (talk).
- Krissansen-Totton, J. (April 2018). Disequilibrium biosignatures in exoplanet atmospheres and their detectability with the James Webb Space Telescope. *Space Telescope Science Institute Exoplanets, Star and Planet Formation Seminar Series (invited talk)*.
- Krissansen-Totton, J., S. Olson, R. Garland, P. Irwin and D. C. Catling (October 2017). New prospects for finding life on exoplanets: Disequilibrium biosignature metrics and their detectability with the James Webb Space Telescope. *Astrophysics Departmental Seminar, University of Exeter (invited talk)*
- Krissansen-Totton, J., G. Arney and D. C. Catling (September 2017). Robust constraints on the climate and ocean pH of the early Earth using a geological carbon cycle model. *EGU Galileo Conference*, Sao Miguel Island, Portugal (talk).
- Krissansen-Totton, J., S. Olson and D. C. Catling (April 2017). Atmospheric Disequilibrium Biosignatures on Earth through time, *Astrobiology Science Conference*, Mesa, Arizona (talk).
- Krissansen-Totton, J. and D. C. Catling (December 2016). Continental and Seafloor Weathering in the Global Carbon Cycle: Inverse Modeling and Implications for the Precambrian. *AGU*, San Francisco (talk).
- Krissansen-Totton, J. and D. C. Catling (July 2016). A model of ocean pH over Earth history. *Goldschmidt*, Yokohama, Japan (talk).
- Krissansen-Totton, J., D. Bergsman and D. C. Catling (October 2015). On detecting biospheres from thermodynamic disequilibrium in planetary atmospheres, *exoplanetary atmospheres and habitability conference*, Nice, France (talk).
- Krissansen-Totton, J. and D. C. Catling (June 2015). Do Pale Blue Dots have unique atmospheric disequilibrium and photometric color, NASA GSFC, Maryland (**invited talk**).
- Krissansen-Totton, J., D. Bergsman and D. C. Catling (April 2015). On detecting biospheres from thermodynamic disequilibrium in planetary atmospheres, *Astrobiology Science Conference*, Chicago, Illinois (talk).
- Krissansen-Totton, J. and D.C. Catling (July, 2014). The carbon isotope record and the rise of oxygen, *AbGradCon*, Troy, NY (talk).
- Krissansen-Totton, J. and D. C. Catling (June, 2014). A statistical analysis of the carbon isotope record from the Archean to Phanerozoic and implications for atmospheric oxygen, *Goldschmidt*, Sacramento, CA (poster).

- Krissansen-Totton, J. and D. C. Catling (May, 2014). What carbon isotopes can tell us about organic burial and the rise of oxygen, online seminar for *NSF Frontiers in Earth System Dynamics* research group (talk).

*For non-professional talks see Outreach section*

#### Selected Press

- Quoted in [Scientific American](#): article on the detection of an atmosphere on a lava planet
- Quoted in [The New York Times](#), [National Geographic](#), and [Nature News](#) on life detection claims on K2-18b and potential cuts to science funding.
- Work on connection between Earth's oxygenation and geomagnetic field (lead by NASA GSFC) featured in [Nature News](#).
- Our [Nature Communications](#) paper on rocky planet atmospheres generated [significant media attention](#) around the world including highlights by [popular science communicators](#).
- Featured in [story on the cosmic shoreline](#).
- Spoke to USA fact-checker about [K2-18b life claims](#).
- [NASA's James Webb Space Telescope could help solve these 5 exoplanet puzzles](#)
- TRAPPIST-1 atmospheric evolution paper highlight in [American Astronomical Society Monthly Roundup](#)
- [Knowable Magazine](#) article on exoplanet life detection.
- [Scientific American](#) comments on JWST observations of Trappist-1 planets
- Our [Science Advances](#) paper on disequilibrium biosignatures on the early Earth generated [significant media attention](#) around the world. It was featured in [Scientific American](#), [The LA Times](#), and [The Verge](#).
- Our [PNAS](#) paper on constraining the climate and ocean pH of the early Earth was featured on [Space.com](#).
- Student mentee Maggie Thompson's [PNAS paper](#) on methane biosignatures was featured by [Reuters](#) and [Vice](#).
- Our [AJ paper](#) on detecting life with the James Webb Space Telescope was featured on [BBC News](#) and [EOS](#).
- Paper on [oxygen biosignature false positives](#) was picked up by various science news organizations and [popular blogs](#) including [EOS](#) and [Astronomy.com](#).
- Interviews on JWST capabilities in [Interesting Engineering](#).
- [UW Press Release – Weathering of rocks a poor regulator of global temperatures](#)
- [BBC Sky At Night - There's something in the air](#)
- [Astrobiology Magazine – Volcanoes light up atmospheres of small exoplanets](#)
- [Space.com – Could Earth's light blue color be a signature of life?](#)

#### Teaching Experience

- ESS 102 Space and Space Travel, 5 credits, Spring 2026 (5 credits)
- ESS 311, Geomechanics, Winter 2026 (5 credits)
- ESS 490/590, Planetary Physics and Chemistry, Fall 2025 (3 credits).
- ESS 102, Space and Space Travel, Spring 2025 (5 credits)
- ESS 311, Geomechanics (co-teaching), Winter 2025 (5 credits)
- ESS 490/590, Planetary Science in the era of Exoplanets, Fall 2024 (3 credits)
- ESS 102, Space and Space Travel, Spring 2024 (5 credits).
- ESS 490/590, Planetary Physics and Chemistry, Fall 2023 (3 credits).

- ESS 102, Space and Space Travel (co-teaching), Spring 2023 (5 credits).
- ESS 490/590 Planetary Science in the era of Exoplanets, Spring 2023 (2 credits)
- ASTBIO 575 “Venus as an Astrobiology Target” astrobiology winter seminar, Winter 2023 (1 credit).
- Guest Lecturer for UCSC graduate course, ASTR 222. Lecture series on terrestrial planet atmosphere origins, evolution, and loss, Spring 2021.
- Guest Lecturer for UCSC senior undergraduate course, ASTR 118. Presented a lecture series on Planets and Life, Fall 2020.
- Teaching Assistant for UW undergraduate course, ESS 102: Space and Space Travel, 2018.
- Guest lecturer for UW senior undergraduate course, ESS 495 – NASA Space Grant Seminar, 2016.