

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

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### Employment

- **Assistant Professor** (September 2022 - Present)  
Department of Earth and Space Sciences, University of Washington, WA
- **NHFP Sagan Fellow** (September 2019-August 2022)  
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

- 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-Chair Habitable Worlds Observatory Biosignature Interpretation sub-Working Group, 2024-present
- Reviewer/panelist for several NASA panels, graduate fellowships, and postdoctoral fellowships.
- Reviewer for *Nature*, *Proceedings of the National Academy of Sciences USA*, *Geology*, *Science Advances*, *Nature Geoscience*, *Nature Communications*, *AGU Advances*, *JGR Planets*, *Space Science Reviews*, *American Journal of Science*, *Astrobiology*, *Precambrian Research*, *The Astrophysical Journal*, *Monthly Notices of the Royal Astronomical Society*, *The Astronomical Journal*, *AGU Books*, *Planetary Science Journal*, *G<sup>3</sup>*, *Geochimica et Cosmochimica Acta*, *Frontiers in Earth Science*, *ACS Earth and Space Chemistry* (8 papers reviewed in the last 12 months).
- External reviewer for ETH Zurich Research Grants and ETH NOMIS Fellowships
- 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

## Peer-Reviewed Publications

**Summary:** 36 publications, 18 first author, 2255 citations (Google Scholar). \* = Mentored graduate or undergraduate student.

### Published/in press:

- Catling, C., **Krissansen-Totton, J.**, Robinson, T. (2024). Potential technosignature from anomalously low deuterium/hydrogen (D/H) in planetary water depleted by nuclear fusion technology Technosignatures. *In press*.
- **Krissansen-Totton, J.**, Wogan, N., Thompson, M., et al. (2024). The erosion of large primary atmospheres typically leaves behind substantial secondary atmospheres on temperate rocky planets. *Nature Communications* 15, 8374 (2024). <https://doi.org/10.1038/s41467-024-52642-6>
- Luu, C. N., Yu, X., Glein, C. R., Innes, H., Aguichine, A., **Krissansen-Totton, J.**, ... & Fortney, J. J. (2024). Volatile-rich Sub-Neptunes as Hydrothermal Worlds: The Case of K2-18 b. *The Astrophysical Journal Letters*, 977(2), L51.
- Huang, Z., Yu, X., Tsai, S. M., Moses, J. I., Ohno, K., **Krissansen-Totton, J.**, ... & 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.
- Piaulet-Ghorayeb, C., Benneke, B., Radica, M., Raul, E., Coulombe, L. P., Ahrer, E. M., et al. including **Krissansen-Totton, J.**, (2024). JWST/NIRISS Reveals the Water-rich “Steam World” Atmosphere of GJ 9827 d. *The Astrophysical Journal Letters*, 974(1), L10.
- de Wit, J., Doyon, R., Rackham, B. V., Lim, O., Ducrot, E., Kreidberg, L., ... **Krissansen-Totton** et al. (2024). A roadmap to the efficient and robust characterization of temperate terrestrial planet atmospheres with JWST. *In press at Nature Astronomy*.
- 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.
- Young, A. V., Robinson, T., **Krissansen-Totton, J.** et al. (2024). Inferring chemical disequilibrium biosignatures for Proterozoic Earth-like exoplanets. *Nature Astronomy*, 8, 101–110.
- 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 Astrophysical Journal*, 166, 254
- **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., Avicé, G., Breur, D., Golabek, G. J., Honing, D., **Krissansen-Totton, J.** et al. (2022). Long-Term Atmosphere Interior Evolution of Venus. *Space Science Reviews* Volume 218, 56.
- 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.
- Sholes, S., **J. Krissansen-Totton**, D. C. Catling (2018). A Maximum Subsurface Biomass on Mars from Untapped Free Energy: Carbon Monoxide as an Anti-biosignature, *Astrobiology*, DOI: 10.1089/ast.2018.1835.
- **Krissansen-Totton, J.**, S. Olson, D. C. Catling (2018). Disequilibrium biosignatures over Earth history and implications for detecting exoplanet life, *Science Advances*, 4, eaao5747. DOI:10.1126/sciadv.aao5747.
- Catling, D. C., **J. Krissansen-Totton**, N. Y. Kiang, D. Crisp, T. D. Robinson, S. DasSarma, A. Rushby, A. Del Genio, W. Bains, S. Domagal-Goldman (2018). Exoplanet biosignatures: A framework for their assessment, *Astrobiology*, 18, 709-738, 2018. DOI:10.1089/ast.2017.1737
- **Krissansen-Totton, J.** and D. C. Catling (2017). Constraining climate sensitivity and continental versus seafloor weathering using an inverse geological carbon cycle model, *Nature Communications*, DOI:10.1038/NCOMMS15423.
- **Krissansen-Totton, J.** and D. C. Catling (2017), The Search for another Earth and life elsewhere. In *What is Life? On Earth and Beyond* (Ed. A. Losch), Cambridge Univ. Press. [E-print available here](#).
- **Krissansen-Totton, J.**, E. W. Schwieterman, B. Charnay, G. Arney, T. D. Robinson, V. Meadows, D. C. Catling (2016). Is the Pale Blue Dot unique? Optimized photometric bands for identifying Earth-like exoplanets. *The Astrophysical Journal* 817 (1), 31.
- **Krissansen-Totton, J.**, D. Bergsman, D. C. Catling (2016), On detecting biospheres from chemical thermodynamic disequilibrium in planetary atmospheres, *Astrobiology*, 16, 39-67.
- **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.
- Misra, A., **J. Krissansen-Totton**, M. C. Koehler, S. Sholes (2015). Transient sulfate aerosols as a

signature of exoplanet volcanism, *Astrobiology*, 15(6), 462-477.

- **Krissansen-Totton, J.**, and R. Davies (2013). Investigation of cosmic ray–cloud connections using MISR, *Geophys. Res. Lett.*, 40, 5240–5245.

#### Non-refereed materials

- Meadows, V., et al., including **Krissansen-Totton** (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 LUVVOIR 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.

#### Outreach

- 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 astrobology 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.

#### Research Grants Awarded\*

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

PI: Joshua Krissansen-Totton

Program: NASA Astrophysics Decadal Survey Precursor Science

Period of Performance: September 2023 – August 2026

Total requested budget: \$749,900

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

PI: Xinting Yu (UT, San Antonio)

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 (University of Washington)

Program: NASA ICAR

Period of Performance: September 2024 – September 2029

Total requested budget: \$7,669,133

NASA Sagan Fellowship, \$410K (September 2019-August 2022)

NASA Earth and Space Sciences Fellowship, \$105K (Planetary Science), 2015-2018

#### Selected Observing Proposals\*

Title: “Exploring the existence and diversity of volatile-rich water worlds”

Principal Investigator: Bjorn Benneke (Universite de Montreal)

Program: JWST Cycle 2 GO, Exoplanets and Exoplanet Formation

UW Budget: \$31,161

Title: “Bare rocks are not supposed to do that.”

Principal Investigator: Elsa Ducrot (CEA/DSM/DAPNIA/Service d'Astrophysique)

Program: JWST Cycle 3 GO, Exoplanets and Exoplanet Formation

UW Budget: \$167,537

#### Other Awards and Fellowships:

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

#### Conference/Workshop Presentations:

- 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)*.
- Olson, S., Krissansen-Totton, J. Ulses, 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. *AGU 2024* (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. (November 2024). Climate Regulation by Seafloor Weathering on the Early Earth and Exoplanets. *UW Chemical Oceanography* (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 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).
- 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).
- 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. (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. (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* (upcoming **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. (October 2022). Anticipating biosignatures 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. (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. (January 2022). Toward testable theories of terrestrial planet evolution to enable exoplanet life detection. *Department of Earth, Environmental, and Planetary Sciences, Brown University* (**invited seminar**).
- 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)*.
- 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).

#### Selected Press

- Our [Nature Communications](#) paper on rocky planet atmospheres generated [significant media attention](#) around the world including highlights by [popular science communicators](#).
- Spoke to USA fact-checker about K2-18b life claims:

<https://www.usatoday.com/story/news/factcheck/2024/10/30/methane-co2-on-k2-18b-dont-mean-life-fact-check/75906279007/>

- [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?](#)