

# Trent B. Thomas

NSF Fellow, Ph.D. Candidate at the University of Washington

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*Curriculum Vitae*

## EDUCATION

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**Ph.D. in Earth and Space Sciences, Astrobiology** ..... 2020-Present  
University of Washington, Seattle (UW) – *Dual-title Ph.D. & Data Science Certificate*

**B.S. in Astrophysics** ..... 2016-2020  
University of California, Los Angeles (UCLA) – *Phi Beta Kappa*

## PROFESSIONAL EXPERIENCE

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**National Science Foundation Graduate Research Fellow** ..... 2020-Present  
University of Washington, Seattle – *Advisors: David Catling, Victoria Meadows*

**Visiting Researcher** ..... 2024  
Massachusetts Institute of Technology (MIT) – *Advisors: Gaia Stucky de Quay, Hamish Mitchell*

**Research Intern** ..... 2018-2023  
NASA Jet Propulsion Laboratory (JPL) – *Advisor: Renyu Hu*

## PEER-REVIEWED PUBLICATIONS

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**Summary:** 5 publications, 4 as first or second author. 43 citations, h-index = 4 ([Google Scholar](#)).

### FORTHCOMING

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1. **Thomas, T. B.**, Macdonald, F.A., & Catling, D.C. (Submitted to *Geology*). Seafloor Weathering Explains the Disparate Durations of Snowball Glaciations.
2. **Thomas, T. B.**, Stucky de Quay, G., & Mitchell, W.H. (In prep.). Automatic Image Segmentation of Alluvial Fans and Deltas on Mars with Deep Learning.

### PUBLISHED

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3. **Thomas, T. B.**, Meadows, V.S., Krissansen-Totton, J., Gialluca, M., Wogan, N., & Catling, D.C., 2025, *The Planetary Science Journal*. [Statistical Geochemical Constraints on Present-Day Water Outgassing as a Source of Secondary Atmospheres on the TRAPPIST-1 Exoplanets.](#)
4. Adams, D., Scheucher, M., Hu, R., Ehlmann, B., **Thomas, T. B.**, Wordsworth, R., Scheller, E., Lillis, R., Smith, K., Rauer, H. & Yung, Y., 2025, *Nature Geoscience*. [Episodic Warm Climates on Mars Primed by Crustal Hydration.](#)
5. **Thomas, T.B.**, & Catling, D.C., 2024, *Nature Communications*. [Three-stage Formation of Cap Carbonates after Marinoan Snowball Glaciation Consistent with Depositional Timescales and Geochemistry.](#)

6. **Thomas, T. B.**, Hu, R., & Lo, D.Y., 2023, *The Planetary Science Journal*. [Constraints on the Size and Composition of the Ancient Martian Atmosphere from Coupled CO<sub>2</sub>-N<sub>2</sub>-Ar Isotopic Evolution Models.](#)
7. Hu R., & **Thomas, T.B.**, 2022, *Nature Geoscience*. [A Nitrogen-Rich Atmosphere on Ancient Mars Consistent with Isotopic Evolution Models.](#)

## SELECTED LECTURES

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Department Seminar – University of Southampton, National Oceanography Center .....	2025
PaleoLunch Seminar – UW .....	2025
Department Seminar – Dartmouth College, Earth Sciences .....	2025
Astrobiology Department Seminar – UW .....	2024
Planetary Lunch Seminar – UW.....	2024
Planetary Climate and Habitability Research Group Meeting – Harvard University.....	2024
Gaia Lab Meeting – MIT .....	2024
Virtual Planetary Laboratory Seminar – NASA/UW .....	2023
High Performance Computing Seminar – NASA JPL.....	2022
ROCKE-3D Planetary Climate Group Meeting – NASA GISS .....	2022
Mars Atmosphere Group Meeting – Caltech .....	2020

## SELECTED FELLOWSHIPS & AWARDS

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<b>David A. Johnston Award for Research Excellence – UW ESS</b> .....	2025
Best Paleoclimate and Sedimentology Talk – UW ESS Research Gala .....	2025
Finalist, Student Poster Competition – Astrobiology Science Conference .....	2024
Winglee Endowed Graduate Support Fund and Space Physics Fellowship – UW ESS.....	2023
Best Astrobiology Talk – UW ESS Research Gala .....	2023
<b>National Science Foundation Graduate Research Fellowship (NSF GRFP)</b> .....	2020
Dean’s Prize for Excellence in Undergraduate Research – UCLA .....	2020
Early Career Collaboration Award – NASA Astrobiology.....	2019
Rudnick-Abelmann Scholarship – UCLA Physics & Astronomy .....	2019
<i>3 additional travel grants from NASA, AAS, &amp; LPI</i>	

## TEACHING & MENTORSHIP

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### CLASSES TAUGHT

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Introduction to Geology and Societal Impacts (TA) – UW ESS .....	Fall 2024
Generative Design: Creating Art with Code (PI) – Coyote Central .....	Summer 2024
<i>I created and instructed a 20-hour course for K-12 students with no prior coding experience. See their final projects <a href="#">here</a>.</i>	
Earth’s Origin and Transformation over 4.6 Billion Years (PI/TA) – UW ESS .....	Winter 2023
<i>I developed ten 80-minute lectures, syllabus, and course material. I guest lectured “The history of life on Earth” and performed TA duties.</i>	

## MENTORSHIP

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Undergraduates: Veronica Fula (UW), Jasmine Singh (Purdue)

## ADDITIONAL TRAINING

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Mars Analog Workshop – UW Astrobiology .....	2023
Sagan Summer Workshop – NASA Exoplanet Science Institute .....	2023
Origin of Life Workshop – UW Astrobiology.....	2022
Storytelling Fellows Podcasting Workshop – UW Libraries .....	2022
Planetary Exploration Mission Design Workshop – UW Astrobiology .....	2022
VPLANET Developers Workshop – Virtual Planetary Laboratory .....	2021
ROCKE-3D GCM Tutorial – NASA GISS .....	2021
Quantitative Habitability Workshop – NASA NExSS .....	2020
Exoclimates Simulation Platform Summer School – University of Bern .....	2019

## SERVICE

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**Peer review:** *Nature Communications, Icarus*

Early Career Committee – [NASA LIFE Research Coordination Network](#) ..... 2025-Present

*Responsibilities include organizing the virtual seminar series, workshops, and conference events.*

Expert Screener – [CDRXIV](#), Preprints and Data for Carbon Dioxide Removal..... 2025-Present

Department Representative – UW CoEnv Student Advisory Council ..... 2024-2025 |

Committee Member – UW ESS ..... 2020-Present |

*Awards, computing, graduate-nominated speaker (x2), retreat, peer mentor, planetary science faculty hiring.*

Primary Convener & Session Chair – Astrobiology Science Conference, Providence, RI ..... 2024 |

*Session title: “Global Environmental Changes and Increased Biological Complexity in the Neoproterozoic and Paleozoic”.*

## PUBLIC ENGAGEMENT

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### COMMUNITY OUTREACH

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Guest Speaker – <a href="#">Everett Rock and Gem Club</a> .....	2025
Science Guest – Bandit Theater, <a href="#">Mad Science Improv</a> .....	2025
Classroom Mentor (20 hours, 8 students) – Coyote Central Youth Arts Organization .....	2024
<a href="#">Contributor</a> – NASA NExSS & NASA NFOLD Science Communication.....	2022 – 2023
Speaker ( <a href="#">Mars: Why the Hype?</a> ) – Astronomy on Tap, Seattle .....	2022
Volunteer Teacher (8 hours, 120 students) – Nelson Middle School, Seattle .....	2022
Page Creator ( <a href="#">Prebiotic atmosphere</a> ) – Wikipedia .....	2022
Invited Speaker – Delran School System Family STEM Night .....	2022
Social Media Manager – UW Astrobiology.....	2021-2022
Creator & Moderator – <a href="#">UW Astrobiology Public Science Panel Series</a> .....	2021
Volunteer Guide – UCLA Planetarium.....	2019-2020
Volunteer Scientist – UCLA Exploring Your Universe.....	2019

## MEDIA COVERAGE

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UW News – Hannah Hickey: <a href="#">Explaining dramatic planetwide changes after world’s last ‘Snowball Earth’ event</a> .....	2024
NASA Astrobiology – Aaron Gronstal: <a href="#">The Size and Shape of Mars’ Ancient Atmosphere</a> .....	2023
LPI Planetary News – <a href="#">Isotopic Evidence that Ancient Mars’ Atmosphere was More Earth-Like</a> .....	2022

## CONFERENCE PRESENTATIONS

[O] = oral, [P] = poster, \* = presentation award

1. **Thomas, T.B.**, Macdonald, F.A., and Catling, D.C. (2025) “Seafloor weathering controls the duration of Neoproterozoic Snowball Earth glaciations”. Life and Planet Conference. London, England. [P]
2. **Thomas, T.B.**, Macdonald, F.A., and Catling, D.C. (2025) “Long duration of the ~56 Myr Sturtian Snowball Earth event suggests missing link in the geologic carbon cycle”. European Geoscience Union General Assembly. Vienna, Austria. [O]
3. **\*Thomas, T. B.**, (2025) “Fundamental aspects of Snowball Earth revealed by a global carbon cycle model”. UW Earth and Space Science Research Gala. Seattle, Washington. [O]
4. **\*Thomas, T. B.**, and Catling, D. C., (2024) “A New Model for the Formation of Cap Carbonates after Neoproterozoic Glaciations”. Astrobiology Science Conference. Providence, Rhode Island. [P]
5. **Thomas, T. B.**, et al., (2024) “Constraints on water outgassing rates on the TRAPPIST-1 planets from interior modeling”. Extreme Solar Systems V. Christchurch, New Zealand. [P]
6. **Thomas, T. B.**, and Catling, D. C., (2023) “Untangling Planetary Processes in the Neoproterozoic with Cap Carbonates and a Geologic Carbon Cycle Model”. Goldschmidt Conference. Lyon, France. [O]
7. **\*Thomas, T. B.**, (2023) “The 4 Billion Year History of Mars’s Atmospheric Evolution Revealed by Isotopic Evolution Models”. UW Earth and Space Science Research Gala. Seattle, Washington. [O]
8. **Thomas, T. B.**, Hu, R., and Lo, D. Y., (2022) “Constraints on the Evolution and Ancient Composition of the Martian Atmosphere from Coupled CO<sub>2</sub>-N<sub>2</sub>-Ar Isotopic Evolution Models”. 54th Division for Planetary Science Conference. London, Ontario, Canada. [O]
9. **Thomas, T. B.**, and Catling, D. C., (2022) “A Self-Consistent Model for Generating Marinoan Cap Carbonates and Constraining Neoproterozoic Climate”. Astrobiology Science Conference. Atlanta, Georgia. [O]
10. **Thomas, T. B.**, (2022) “A Self-Consistent Model for Generating Marinoan Cap Carbonates and Constraining Neoproterozoic Climate”. UW Earth and Space Science Research Gala. Seattle, Washington. [O]
11. **Thomas, T. B.**, Hu, R., and Lo, D. Y., (2022) “Joint Models for the Evolutionary History of Carbon, Nitrogen, and Argon in the Martian Atmosphere”. 53rd Lunar and Planetary and Science Conference. The Woodlands, Texas. [O]
12. **Thomas, T. B.**, and Hu, R., (2020) “A Nitrogen-Rich Atmosphere on Ancient Mars Indicated by Isotopic Evolution”. American Geophysical Union Fall Meeting. Virtual. [O]
13. **Thomas, T. B.**, and Hu, R., (2020) “A Nitrogen-Rich Atmosphere on Ancient Mars Indicated by Isotopic Evolution”. 52nd Division for Planetary Science Conference. Virtual. [O]

14. **Thomas, T. B.**, and Hu, R., (2020) “A Nitrogen-Rich Atmosphere on Ancient Mars Indicated by Isotopic Evolution”. UCLA Undergraduate Research Week. Virtual. [O]
15. **Thomas, T. B.**, and Hu, R., (2019) “Evolutionary History of the Isotopic Composition of Nitrogen in the Martian Atmosphere”. 9th International Conference on Mars. Pasadena, California. [P]