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Trent B. Thomas

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

EDUCATION

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

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

Summary: 5 publications, 4 as first or second author. 39 citations, h-index = 3 (Google Scholar).

FORTHCOMING

1. **Thomas, T. B.,** Macdonald, F.A., & Catling, D.C. (In prep. for *Geology*). Seafloor Weathering Controls the Duration 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

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_2–N_2–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.

CONFERENCE PRESENTATIONS

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

1. **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]

2. ***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]

3. ***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]

4. **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]

5. **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]

6. ***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]

7. **Thomas, T. B.**, Hu, R., and Lo, D. Y., (2022) "Constraints on the Evolution and Ancient Composition of the Martian Atmosphere from Coupled CO2-N2-Ar Isotopic Evolution Models". 54th Division for Planetary Science Conference. London, Ontario, Canada. [O]

8. **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]

9. **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]

10. **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]

11. **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]

12. **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]

13. **Thomas, T. B.**, and Hu, R., (2020) "A Nitrogen-Rich Atmosphere on Ancient Mars Indicated by Isotopic Evolution". UCLA Undergraduate Research Week. Virtual. [O]

14. **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]

SELECTED LECTURES

PaleoLunch Seminar – UW 2025
Earth Science Department Seminar – Dartmouth College 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

David A. Johnston Award for Research Excellence – UW ESS 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
National Science Foundation Graduate Research Fellowship (NSF GRFP) 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
3 additional travel grants from NASA, AAS, & LPI

TEACHING & MENTORSHIP

CLASSES TAUGHT

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

MENTORSHIP

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

ADDITIONAL TRAINING

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
Exoclimes Simulation Platform Summer School – University of Bern 2019

SERVICE

Peer review: *Nature Communications*, *Icarus*
Early Career Committee – NASA "LIFE" Research Coordination Network 2025-Present
Expert Screener – CDRXIV, Preprints and Data for Carbon Dioxide Removal 2025-Present
Department Representative – UW CoEnv Student Advisory Council 2024-Present
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

COMMUNITY OUTREACH

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

MEDIA COVERAGE

UW News – Hannah Hickey: Explaining dramatic planetwide changes after world's last 'Snowball Earth' event 2024
NASA Astrobiology – Aaron Gronstal: The Size and Shape of Mars' Ancient Atmosphere 2023
LPI Planetary News – Isotopic Evidence that Ancient Mars' Atmosphere was More Earth-Like 2022