

# 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: Profs. David Catling & Victoria Meadows

**Visiting Researcher** ..... 2024  
*Massachusetts Institute of Technology (MIT)* – Advisor: Prof. Gaia Stucky de Quay

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

## SELECTED FELLOWSHIPS & AWARDS

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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**..... 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*

## INVITED PRESENTATIONS

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Astrobiology Departmental Colloquium – UW ..... 2024

Planetary Lunch Seminar – UW..... 2024

Planetary Climate and Habitability Research Group Seminar – Harvard University ..... 2024

Gaia Lab Seminar – MIT..... 2024

Discover UW – UW Foundations Board..... 2023

Virtual Planetary Laboratory Webinar – NASA/UW ..... 2023

High Performance Computing Webinar – NASA JPL..... 2022

ROCKE-3D Planetary Climate Webinar – NASA GISS..... 2022

## PEER-REVIEWED PUBLICATIONS

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**4 published/accepted (3 first or second author), 1 submitted, 2 in prep.**  
26 citations since 2021 ([Google Scholar](#))

### JOURNAL ARTICLES

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1. Adams, D., Scheucher, M., Hu, R., Ehlmann, B., **Thomas, T. B.**, Wordsworth, R., Scheller, E., Lillis, R., Smith, K., Rauer, H. & Yung, Y. *Nature Geoscience* (accepted). Crustal Hydration Primed Early Mars with Warm and Habitable Conditions.
2. **Thomas, T.B.**, & Catling, D.C. 2024, *Nature Communications*. [Three-stage Formation of Cap Carbonates after Marinoan Snowball Glaciations Consistent with Depositional Timescales and Geochemistry.](#)
3. **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.](#)
4. Hu R., & **Thomas, T.B.** 2022, *Nature Geoscience*. [A Nitrogen-Rich Atmosphere on Ancient Mars Consistent with Isotopic Evolution Models.](#)

### FORTHCOMING

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5. **Thomas, T. B.**, Meadows, V. S., Krissansen-Totton, J., Gialluca, M., Wogan, N., & Catling, D.C. *The Planetary Science Journal* (submitted). Geochemical Constraints on Water Outgassing as a Source of Secondary Atmospheres on the TRAPPIST-1 Planets.
6. **Thomas, T. B.**, Macdonald, F. A., & Catling, D.C. (in prep. for *Geology*). Carbon Cycle Explanations for the Duration of Sturtian and Marinoan Snowball Glaciations.
7. **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.

## CONFERENCE PRESENTATIONS

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

1. **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]
2. **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]
3. **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]
4. **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]
5. **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]

6. **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](#)]
7. **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](#)]
8. **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](#)]
9. **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](#)]
10. **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](#)]
11. **Thomas, T. B.**, and Hu, R., (2020) “A Nitrogen-Rich Atmosphere on Ancient Mars Indicated by Isotopic Evolution”. UCLA Undergraduate Research Week. Virtual. [[O](#)]
12. **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](#)]

## TEACHING & MENTORSHIP

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### 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

Veronica Fula – UW ..... 2024-Present  
 Jasmine Singh – Purdue University ..... 2022

## 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

Exoclimes Simulation Platform Summer School – University of Bern ..... 2019

## SERVICE

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Department Representative – UW CoEnv Student Advisory Council ..... 2024-Present

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

*Awards, computing, graduate-nominated speaker (x2), retreat, peer mentor.*

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

Classroom Mentor (20 hours, 8 students) – Coyote Central Youth Arts Organization ..... 2024

[Contributor](#) – NASA NExSS & NASA NFO LD 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