

ERYN M CANGI

Planetary scientist

CONTACT

- ✉ eryn.cangi@colorado.edu
- ☎ 503-577-8936
- 📍 Boulder, CO
- 🏠 erynmcangi.science
- 📧 @emcangi
- 🌐 <https://www.linkedin.com/in/eryn-cangi/>
- 🆔 0000-0002-8548-4088
- 🔗 ADS: <https://tinyurl.com/EMCadspubs>

? INTERESTS

- Planetary atmospheres and climates
- Astrobiology and habitability
- Comparative planetology
- Surface-atmosphere interactions

🎓 EDUCATION

University of Colorado Boulder

Astrophysical & Planetary Sciences
2023 Ph.D.

Dissertation: The Variability of Atmospheric
D/H Fractionation on Mars
2019 M.S.

University of Oregon (UO)

2017 B.S. Physics

2010 B.S. Theatre Arts

SKILLS

Programming languages

Most used: Python, Julia

Moderate: MATLAB, IDL

Some: FORTRAN, C++

Other Software

- LaTeX, MS Office
- HTML/CSS, Perl, PHP
- Adobe Suite, Affinity Designer
- DS9, IRAF
- Linux, Windows, and Mac OSX

Languages

English



Spanish



RESEARCH EXPERIENCE

- 📅 2023 - present 📍 Laboratory for Atmospheric & Space Physics (LASP), Boulder, CO

Research scientist 1

Develop & maintain the MAVEN IUVS echelle channel pipeline. Analyze H and D Lyman α emission data to study and understand the D/H ratio and escape at Mars.

- 📅 2017 - 2023 📍 LASP, Boulder, CO

Graduate research assistant Advisor: Mike Chaffin

Developed a fully-coupled 1D photochemical model of the martian atmosphere to study how seasonal atmospheric changes affect the D/H ratio, atmospheric escape, and long-term desiccation; analyzed IUVS spectroscopic data before and after regional dust storms.

- 📅 Summer 2022 📍 NASA JPL Planetary Science Summer School

Team lead (1 of 6): Proposal manager

Co-led team of 17 grad students & postdocs to develop an Io mission. Contributed to science objectives to characterize alleged dunes, measure the nightside atmosphere.

- 📅 2016-2017 📍 UO Dept. of Physics, Eugene, OR

Undergraduate research assistant Advisor: Greg Bothun

Developed a ground-based method of detecting cirrus clouds using astronomical flux filter ratios.

- 📅 Summer 2016 📍 High Altitude Observatory, Boulder, CO

REU student researcher Advisor: Astrid Maute

Evaluated two methods of delineating the solar and lunar semidiurnal migrating tides in Earth general circulation models. (Note: REU run by LASP/NSO)

- 📅 Summer 2015 📍 Center for Interdisciplinary Exploration and Research in Astrophysics, Northwestern University, Evanston, IL

REU student researcher Advisor: Daniel Abrams

Built an N-body simulator to model formation of astrophysical systems (e.g. dust rings) by non-linear synchronization dynamics.





- 📅 2014-2015 📍 UO Dept. of Physics, Eugene, OR

Undergraduate research assistant Advisor: Ben McMorran





Performed sample measurement and interferometry experiments using a Mach-Zehnder interferometer.

PUBLICATIONS

The Vulcan Mission to Io: Lessons learned during the 2022 JPL Planetary Science Summer School

 K. G. Hanley, Q. McKown, **E. M. Cangi**, C. Sands, N. North, P. M. Miklavčič, M. Bramble, J. M. Bretzfelder, B. D. Byron, J. Caggiano, J. T. Haber, S. J. Laham, D. Morrison-Fogel, K. A. Napier, R. F. Phillips, S. Ray, M. Sandford, P. Sinha, T. Hudson, J. E. C. Sully, and L. Lowes
 2024  In prep for submission to the Planetary Science Journal 





Martian Atmospheric Deuterium and Hydrogen: A New Paradigm for Escape to Space

 J. T. Clarke, M. Mayyasi, D. Bhattacharyya, J.-Y. Chaufray, N.M. Schneider, B.M. Jakosky, R. Yelle, F. Montmessin, M. Chaffin, S. Curry, J. Deighan, S. Jain, J.-L. Bertaux, **E. Cangi**, M. Crismani, J.S. Evans, S. Gupta, F. Lefevre, G. Holsclaw, D.Y. Lo, W.E. McClintock, M.H. Stevens, A.I.F. Stewart, S. Stone, P. Mahaffy, M. Benna, and M. Elrod
 2023  Under revision at Science Advances 





Seasonal enhancement in upper atmospheric D/H at Mars driven by both thermospheric temperature and mesospheric water

 **E. M. Cangi**, M. S. Chaffin, R. V. Yelle, B. Gregory, and J. Deighan
 2023  Under revision at Geophysical Research Letters 





Venus Water Loss via HCO^+ Dissociative Recombination: Overlooked, Unmeasured, and Dominant

 M.S. Chaffin and **E.M. Cangi**, B.S. Gregory, R.V. Yelle, J. Deighan, R.D. Elliott, H. Gröller
 2023  Under revision at Nature 



MAVEN/IUVS Observations of OH Prompt Emission: Daytime Water Vapor in the Thermosphere of Mars

 M.H. Stevens., **E.M. Cangi**, J. Deighan, S.K. Jain, M.S. Chaffin, J.S. Evans, S. Gupta, J.T. Clarke, N.M. Schneider, S.M. Curry
 2023  Journal of Geophysical Research: Planets  [JGRP](#)


Polar Science Results from Mars Reconnaissance Orbiter: Multiwavelength, multiyear insights

 M. E. Landis, P.J. Acharya, N.R. Alsaeed, C. Andres, P. Becerra, W.M. Calvin, **E.M. Cangi**, S.F.A. Cartwright, M.S. Chaffin, S. Diniega, C.M. Dundas, C.J. Hansen, P.O. Hayne, K.E. Herkenhoff, D.M. Kass, A.R. Khuller, L. McKeown, P. S. Russell, I.B. Smith, S.S. Sutton, J.M. Widmer, J.L. Whitten
 2023  Icarus  [Icarus](#)





Nonthermal Hydrogen Loss at Mars: Contributions of Photochemical Mechanisms to Escape and Identification of Key Processes

 B. Gregory, M. S. Chaffin, R. D. Elliott, J. Deighan, H. Gröller, and **E. M. Cangi**
 2023  Journal of Geophysical Research: Planets  [ADS](#)





Fully coupled photochemistry of the deuterated ionosphere of Mars and its effects on escape of H and D

 **E. M. Cangi**, M. S. Chaffin, R. V. Yelle, B. Gregory, and J. Deighan
 2023  Journal of Geophysical Research: Planets  [ADS](#)

The Astrobiology Primer v3.0, Chapter 3: The Origin and Evolution of Planetary Systems

 M. J. Schaible, Z. R. Todd, **E. M. Cangi**, C. E. Harman, K. H. G. Hughson, K. Stelmach
 2023?  Astrobiology (under review) 

Enhanced water loss from the martian atmosphere during a regional-scale dust storm and implications for long-term water loss

 J. A. Holmes, S. R. Lewis, M. R. Patel, M. S. Chaffin, **E. M. Cangi**, J. Deighan, N. M. Schneider, S. Aoki, A. A. Fedorova, D. M. Kass, & A. C. Vandaele
 2021  Earth and Planetary Science Letters, Vol. 571  [ADS](#)

Higher Martian atmospheric temperatures at all altitudes increase the D/H fractionation factor and water loss

 **E. M. Cangi**, M. S. Chaffin, and J. Deighan
 2020  Journal of Geophysical Research: Planets, Vol. 125  [ADS](#)

FUNDING HISTORY

Co-Investigator

NASA SSW Understanding Venus Water Evolution via Photochemical Modeling of Nonthermal Hydrogen and Deuterium
Selected 2023 Escape to Space
PI Mike Chaffin; Co-I Kevin McGouldrick

Graduate student fellowships

NASA FINESST Seasonal variation of deuterium ions and non-thermal deuterium escape at Mars (requested 1 year only)
2022-2023

NSF GRFP Constraining the D/H ratio of Mars using MAVEN data and photochemical modeling
2019-2022

MENTORSHIP

📅 2023-present 📍 CU Boulder / LASP

Ebenezer Solomon - undergraduate - research co-advisor

Co-advising with Dave Brain. Photochemistry of early Earth.

📅 2023 📍 LASP / Legacy High School

Ryan Middleton - high school student - job shadow mentor

12 total hours of job shadow hosting/mentoring for Ryan's career-preparation course as a high school senior. Introduced to typical day-to-day activities, answered questions and provided advice on her career goals and plans.

📅 2018-2023 📍 CU Boulder / LASP

Ace Stratton - undergraduate - aerospace engineering

Informal mentorship concerning conference attendance, graduate school applications, and research.

📅 2018-2023 📍 CU Boulder Graduate School

Peer mentor

One-on-one semi-formal peer mentoring, meeting roughly once-twice a month, with other graduate students at CU Boulder.

📅 2018 - 2022 📍 CU Boulder - Astropals

Mentor

Member of grad student + post doc mentorship pods within APS department; one-on-one mentoring of junior grad students within the university.

📅 2018 - 2019 📍 CU Boulder - CU Prime

Mentor

Grad student mentor of small groups of physics undergraduates.

HONORS AND AWARDS

2022	LASP Barth Graduate Fellowship
2016 & '17	UO Physics Weiser Leadership Award
2016	UO Physics Weiser Undergraduate Research Prize
2016	AAS Chambliss Astronomy Achievement Award
2015	UO Nontraditional Student Award
2014	UO Henry V. Howe Scholarship for Natural Science Majors
2014	UO / SEIU Local 503 Jessie Bostelle Memorial Scholarship
2014	UO General Scholarship

SELECTED CONFERENCE PRESENTATIONS

- 📅 2022 **American Geophysical Union Fall Meeting** (Chicago, IL)
Poster P42F-2469: Quantifying Thermal and Non-Thermal H & D Escape at Mars Using a Fully-Coupled Ion-Neutral Photochemical Model
- 📅 2022 **Mars Atmospheric Modeling and Observations** (Paris, FR)
Talk: Fully-Coupled Photochemical Modeling of the Deuterated Ionosphere and Non-Thermal Escape of D
- 📅 2022 **Astrobiology Science Conference (AbSciCon)** (Atlanta, GA)
Talk: Multi-mode Atmospheric Escape at Mars and Venus Using a Fully Coupled Ion-Neutral Photochemical Model
- 📅 2021 **American Geophysical Union Fall Meeting** (New Orleans, LA)
Poster P35F-2184: Photochemical modeling of non-thermal processes affecting D escape on Mars
- 📅 2019 **American Geophysical Union Fall Meeting** (San Francisco, CA)
Talk P52C-04: The Mars D/H Fractionation Factor as a Function of Temperature and Water Vapor
- 📅 2019 **European Planetary Science Congress & AAS Division for Planetary Science Joint Meeting** (Geneva, SZ)
Talk 1000: Constraining the Mars D/H Fractionation Factor and Water Loss in Photochemical Modeling
- 📅 2019 **Ninth International Conference on Mars** (Pasadena, CA)
Talk 6068: The Mars D/H Fractionation Factor as a Function of Temperature and Water Vapor
- 📅 2018 **AAS Division for Planetary Sciences Fall Meeting** (Knoxville, TN)
Poster 315.09: Effect of variations in temperature and water vapor profiles in photochemical modeling of H and D escape from Mars
- 📅 2017 **American Meteorological Society Annual Meeting** (Seattle, WA)
Poster 233: Delineating the Migrating Solar and Lunar Semidiurnal Atmospheric Tides in the General Circulation Model
- 📅 2016 **American Astronomical Society Winter Meeting** (Kissimmee, FL)
Poster 141.14: Searching for Simpler Models of Astrophysical Pattern Formation (Chambliss award)

SELECTED TOPICAL COURSEWORK

- 📅 2021 Planetary Field Geology: Utah. Field lecture assignment: The Colorado River Basin
- 📅 2020 Topics in Planetary Science: Remote Sensing of Planetary Surfaces
- 📅 2019 1. Planetary Field Geology: New Mexico/Arizona. Field lecture assignment: Aeolian processes and dunes
2. Late Accretion
3. Seminar: Using Earth to Understand Planets
4. Planetary Surfaces and Interiors
- 📅 2018 1. Planetary Field Geology: Hawai'i. Field lecture assignment: cinder cone volcanism
2. Astrobiology
- 📅 2017 Planetary Atmospheres
- 📅 2016 (Undergraduate courses)
1. Scientific Programming and Data Visualization
2. Atmospheric Physics

SELECTED OUTREACH AND ACTIVITIES

📅 2017 - present 📍 CU Boulder Sommers-Bausch Observatory

Friday Night Open House Host

Host of public star parties using two 20" Modified Dall-Kirkham telescopes, Dobsonians, binoculars. Fielding questions, giving short off-the-cuff explanations, teaching constellation identification.

📅 2019 - 2022 📍 CU Boulder/LASP

Co-founder, Planetary Science Journal Club

Co-founded an all-career-level journal club focusing first on Mars, then expanding out to solid and terrestrial planetary bodies.

📅 2014-2017 📍 University of Oregon Department of Physics

Society of Physics Students: Senior advisor (2016-2017), President (2015-2016), Webmaster (2014-2015)

Revitalized local chapter of SPS: increased participation by moving elections to fall term and enabled better transition of roles between years by creating position of senior advisor.

📅 2015-2016 📍 UO Physics & River Road Elementary School

After School Program Science Mentor

Engaged students at a local Spanish immersion school after school program in science demos and activities along with other UO Physics grads and undergrads.

SERVICE

📅 2023-present 📍 Peer reviewer

Reviewer for Icarus, Journal of Geophysical Research: Planets, and the Astrophysical Journal

📅 Spring 2022 📍 CU Boulder Department of Astrophysical and Planetary Sciences

Graduate representative, astronomy instructor hiring committee

Served as one of two graduate student representatives for a successful astronomy undergraduate instructor search. Reviewed shortlist pre-interview video responses, developed site visit interview questions, interviewed candidates, and participated in full committee meetings with faculty.

📅 2019-2021 📍 CU Boulder Department of Astrophysical and Planetary Sciences

Graduate representative, Graduate Concerns and Curriculum Committee

Served on the faculty/grad student committee for departmental concerns, improvements, and policy overhauls. During my tenure, committee completed a total overhaul of the comprehensive exam procedure and refined and updated graduate coursework syllabi.