

**Contact Information**      Assistant Professor of Environmental Science      [alawman@coloradocollege.edu](mailto:alawman@coloradocollege.edu)  
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Colorado College      [www.alawman.info](http://www.alawman.info)  
Colorado Springs, CO

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**Education**      Ph.D., Geological Sciences      2020  
*The University of Texas at Austin*

Sc.B., Geology-Chemistry with Honors      2015  
*Brown University*

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**Research Interests**      Tropical climate variability, abrupt climate change, paleoclimate, climate proxies, climate modeling, coral reef ecosystem vulnerability

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**Fellowships & Awards**      Co-PI, NSF Major Research Instrumentation Program (MRI) Proposal  
*(submitted October 2023, under review)*

National Science Foundation Graduate Research Fellowship      2015-2020

NSF Expert Witness Training Academy Fellow      2019

Jackson School of Geosciences Graduate Fellowship      2015-2016

Early-Career Graduate Best Poster Award, Jackson School of Geosciences Student Research Symposium      2016

Department of Earth, Environmental and Planetary Sciences Senior Award, Brown University      2015

Undergraduate Teaching & Research Award, Brown University      2012-2013

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**Employment**

Assistant Professor of Environmental Science      July 2023-Present  
Colorado College, Environmental Studies Program

Postdoctoral Associate      Jan. 2022-June 2023

1. Cooperative Institute for Research in Environmental Sciences (CIRES), CU Boulder

2. NOAA National Centers for Environmental Information (NCEI)

Postdoctoral Research Associate, Rice University      Sept. 2020-Dec. 2021  
Department of Earth, Environmental and Planetary Sciences

Teaching Assistant, UT Austin      2019-2020

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**Peer-Reviewed**      (PDF copies available upon request)

## Publications

### *Under review*

DiNezio, P., Shanahan, T., Sun, T., Sun, C., Wu., X., **Lawman, A.**, Lea, D., Kageyama, M., Merkel, U., Prange, M., Otto-Bliesner, B., Zhang, X. The tropical response to ocean circulation collapse, manuscript under review.

### *Published*

6. **Lawman, A.**, Partin, J., Di Nezio, P., Dee, S., Thirumalai, K., Quinn, T. (2022), Unraveling forced responses of extreme El Niño variability over the Holocene, *Science Advances*. DOI: 10.1126/sciadv.abm4313.

5. **Lawman, A.**, Dee, S., DeLong, K., Correa, A. (2022), Rates of Future Climate Change in the Gulf of Mexico and the Caribbean Sea: Implications for Coral Reef Ecosystems, *JGR: Biogeosciences*. DOI: [10.1029/2022JG006999](https://doi.org/10.1029/2022JG006999).

4. **Lawman, A.**, Partin, J., Dee, S., Casadio, C., Di Nezio, P., Quinn, T. (2020), Developing a coral proxy system model to compare coral and climate model estimates of changes in paleo-ENSO variability, *Paleoceanography and Paleoclimatology*. DOI: 10.1029/2019PA003836.

3. **Lawman, A.**, Quinn, T., Partin, J., Thirumalai, K., Taylor, F., Wu, C.-C., Yu, T.-L., Gorman, M. and Shen, C.-C. (2020), A century of reduced ENSO variability during the Medieval Climate Anomaly. *Paleoceanography and Paleoclimatology*. DOI:[10.1029/2019PA003742](https://doi.org/10.1029/2019PA003742).

2. Klara, K., Hou, N., **Lawman, A.**, Wu, L., Morrill, D., Tente, A., Wang, L.-Q. Developing and implementing a simple, affordable hydrogen fuel cell laboratory in introductory chemistry, *Journal of Chemical Education*. DOI: [10.1021/ed4007875](https://doi.org/10.1021/ed4007875).

1. Klara, K., Hou, N., **Lawman, A.**, Wang, L.-Q. (2013) Developing and implementing a collaborative teaching innovation in introductory chemistry from the perspective of an undergraduate student, *Journal of Chemical Education*. DOI: [10.1021/ed300525g](https://doi.org/10.1021/ed300525g).

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## Research Highlights

6. Coral geochemical records: An overview of their use as climate proxies and of available databases (2023). Invited expert contribution for the *NCAR Climate Data Guide*, <https://climatedataguide.ucar.edu/climate-data/coral-geochemical-records-overview-their-use-climate-proxies-and-available-databases>

5. Unchecked Ocean Warming Threatens Many Gulf and Caribbean Corals

(2022), Research Spotlight, *EOS Science News by AGU*,  
<https://eos.org/research-spotlights/unchecked-ocean-warming-threatens-many-gulf-and-caribbean-corals>

4. Climate risks for Gulf of Mexico coral reefs spelled out in study (2022),  
National Science Foundation Research News,  
<https://beta.nsf.gov/news/climate-risks-gulf-mexico-coral-reefs-spelled-out>

3. Ancient El Niños Reveal Limits to Future Climate Projections (2022),  
UT News, <https://news.utexas.edu/2022/03/15/ancient-el-ninos-reveals-limits-to-future-climate-projections/>

2. Corals Make Reliable Recorders of El Niño Fluctuations (2020),  
Research Spotlight, *EOS Science News by AGU*, <https://eos.org/research-spotlights/corals-make-reliable-recorders-of-el-nino-fluctuations>

1. Archives of the El Niño-Southern Oscillation: A coral point of view  
(2021), *Past Global Changes Magazine*, vol. 29(1), p.48-49. DOI:  
<https://doi.org/10.22498/pages.29.1.48>.

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## Teaching & Mentoring

### Teaching Experience:

**Assistant Professor: Colorado College** July 2023-Present  
Courses: Introduction to Global Climate Change, Atmospheric Dynamics

**Guest Lecturer: Rice University** 2020-2021

1. *Climate of the Common Era (graduate-level class)*
2. *Inhabiting Planet Earth (undergraduate)*
3. *Discoveries in Earth, Environmental & Planetary Sciences (undergraduate)*
4. *Science of Climate Change (undergraduate)*

Teaching Assistant: *Introduction to Geology* (UT Austin) 2019-2020

### Students Mentored:

Lily Johnston, Undergraduate, Colorado College	2023-Present
Jay Mrazek, NOAA Hollings Scholar Summer Internship	2023-Present
Anastasia Werner, Undergraduate, CU Boulder	2023
Robert Domeyko, Graduate Student, UT Austin	2018-present
Desirae Thorne, Undergraduate, Wellesley, Summer Internship	2020
Jacob Okun, Graduate Student, Univ. of Michigan	2020-2021
Joseph Arias, Undergraduate, UT Austin	2018-2020
Brooke Kopecky, Undergraduate, UT Austin	2016-2019
Anthony Krupa, Undergraduate, UT Austin	2016-2018
Michael Lis, Undergraduate, UT Austin	2016-2017

## Presentations

† - Presenting Author

\* Student presentation

19. **A.E. Lawman**<sup>†</sup>, C. Morrill, B. Otto-Bliesner, E. Brady. *Bayesian Detection Methods Identify Abrupt Climate Changes in Transient Holocene Climate Simulations*, Abstract PP43D-1694 presented at the 2-23 American Geophysical Union Fall Meeting, December 2023.

18. J. Mrazek\*, A.E. Lawman, C. Morrill. *Holocene Climate Transitions in Speleothem Records: Bayesian Approaches to Event Detection and Age Uncertainty Quantification*, Abstract PP43D-1693 presented at the American Geophysical Union Fall Meeting, December 2023.

17. R. Domeyko\*, Y. Okumura, J. Partin, K. Thirumalai, **A.E. Lawman**, F. Taylor, H.M. Hu, C.C. Shen. *Assessing Changes in the El Niño-Southern Oscillation Over the Last 21,000 Years Using Coral Geochemical Records and the Community Earth System Model Version 1.2*. Abstract PP41A-06 presented at the American Geophysical Union Fall Meeting, December 2023.

16. C. Morrill, E. Gille, C. Payne, A. Werner, J. Mrazek, **A.E. Lawman**. *Progress Towards Interoperable Chronological Data at the World Data Service for Paleoclimatology and Scientific Applications*. Abstract PP13D-1251 presented at the American Geophysical Union Fall Meeting, December 2023.

15. **A.E. Lawman**<sup>†</sup>, C. Morrill, B. Otto-Bliesner, E. Brady, R. Tomas. *Using Bayesian Methods to Detect Abrupt Transitions in Transient Holocene Climate Model Simulations*, Presented at the 2022 American Geophysical Union Fall Meeting, December 2022 (poster).

14. **A.E. Lawman**<sup>†</sup>, J.W. Partin, P. DiNezio, S.G. Dee, K. Thirumalai, T.M. Quinn. *Unraveling forced responses of extreme El Niño variability over the Holocene*, Presented at the 2022 Past Global Changes (PAGES) Open Science Meeting, May 2022 (talk).

13. **A.E. Lawman**<sup>†</sup>, S.G. Dee, K. DeLong, A. Correa. *Forecasting the Leading Drivers of Gulf of Mexico & Caribbean Sea Coral Reef Ecosystem Vulnerability in a Warmer World*, Abstract B15J-1552 presented at the 2021 American Geophysical Fall Meeting, December 2021 (poster).

12. **A.E. Lawman**<sup>†</sup>, J.W. Partin, P. DiNezio, S.G. Dee, K. Thirumalai, T.M. Quinn. *Reconciling Simulated and Coral-inferred Changes in El Niño-*

*Southern Oscillation Variability during the Holocene*, Abstract OS021-02 presented at the 2020 American Geophysical Fall Meeting, December 2020 (talk).

11. P. Di Nezio, M. Puy, J.W. Partin, K. Thirumalai, C. Karamperidou, **A.E. Lawman**, Y. Okumura, *How past changes in El Niño could inform its future*, Abstract PP53A-01 presented at the 2019 American Geophysical Fall Meeting; San Francisco, CA, December 2019 (talk).

10. **A.E. Lawman**<sup>†</sup>, J.W. Partin, S.G. Dee, C.A. Casadio, P. Di Nezio, T.M. Quinn. *Developing a coral proxy system model to compare coral and climate model estimates of changes in paleo-ENSO*, presented at the Past Global Changes (PAGES) Data Assimilation and Proxy System Modeling Workshop; The University of Maryland, College Park, MD, May 2019 (Invited Talk).

9. **A.E. Lawman**<sup>†</sup>, J.W. Partin, P. Di Nezio, S. Dee, T.M. Quinn, C. Casadio, K. Thirumalai, M. Puy, F.W. Taylor, C. Karamperidou, M. Inoue, X. Kong, H. Cheng, R.L. Edwards, C.-C. Wu, C.-Y. Huang, C.-C. Shen, *Using Data and Models to Quantify Uncertainties in Coral Reconstructions: Implications for Paleo-ENSO Variability*, Abstract GC42D-08 presented at the 2018 American Geophysical Union Fall Meeting; Washington D.C., December 2018 (Talk).

8. **A.E. Lawman**<sup>†</sup>, T. Quinn, J. Partin, P. Di Nezio, K. Thirumalai, F. Taylor, C.-C. Wu, C.-C. Shen, & the paleo-ENSO working group. *Reconstructing paleo-ENSO variability using geochemical proxies from corals*, presented at the UT Austin Institute for Geophysics seminar series; Austin, TX, November 2018 (Talk). *Link to recording:* <https://streaming.beg.utexas.edu/Geology/Play/1f0f12d0fafd4ca1beaf4a75c294919d1d>

7. K.J. Gomez, T. Sun, **A.E. Lawman**, P. Di Nezio, T. Shanahan, N. Piatrunia, C. Sun, X. Wu. *Tropical Hydroclimate Change during Heinrich Stadial 1: An Integrative Proxy-model Synthesis*, presented at the 2018 Goldschmidt Conference; Boston, MA, August 2018 (Poster).

6. **A.E. Lawman**<sup>†</sup>, T.M. Quinn, J.W. Partin, F.W. Taylor, K. Thirumalai, C.-C. Wu, and C.-C. Shen, *Reconstructing Tropical Southwest Pacific Climate Variability and Mean State Changes at Vanuatu during the Medieval Climate Anomaly using Geochemical Proxies from Corals*, Abstract PP42A-08 presented at the 2017 American Geophysical Union Fall Meeting; New Orleans, Louisiana, December 2017 (Talk).  
*Link to AGU On-Demand:*

<https://www.youtube.com/watch?v=1-nhgXxzut4&feature=youtu.be&t=5532>

5. T. Sun, **A.E. Lawman**<sup>†</sup>, T. Shanahan, P. Di Nezio, K. Gomez, N. Piatrunia, C. Sun, X. Wu, M. Kageyama, U. Merkel, B. Otto-Bleisner, A. Abe-Ouchi, G. Lohman, J. Singarayer, X. Zhang, *Tropical Hydroclimate Change during Heinrich Stadial 1: An Integrative Proxy-Model Synthesis*, Abstract PP33A-1318 presented at the 2017 American Geophysical Union Fall Meeting; New Orleans, Louisiana, December 2017 (Poster).

4. **A.E. Lawman**<sup>†</sup>, T. Quinn, J. Partin, K. Thirumalai, F. Taylor, C.-C. Wu, C.-C. Shen, *ENSO variability from corals over the last millennia*, presented at the Community Earth System Model Paleoclimate Working Group Meeting; Austin, TX, February 2018 (Invited Talk).  
<http://www.cesm.ucar.edu/events/wg-meetings/2018/presentations/paleowg/lawman.pdf>

3. **A.E. Lawman**<sup>†</sup>, T.M. Quinn, J.W. Partin, F.W. Taylor, K. Thirumalai, C.-C. Wu, and C.-C. Shen, *A Coral-based Reconstruction of Interannual Climate Variability at Vanuatu during the Medieval Climate Anomaly (950-1250 CE)*, Presented at the 2017 Graduate Climate Conference; Woods Hole, Massachusetts, November 2017 (Talk).

2. **A.E. Lawman**<sup>†</sup>, T.M. Quinn, J.W. Partin, F.W. Taylor, K. Thirumalai, C.-C. Wu, and C.-C. Shen, *A Coral-based Reconstruction of Interannual Climate Variability at Vanuatu during the Medieval Climate Anomaly (950-1250 CE)*, presented at the 2017 Jackson School of Geosciences Research Symposium; Austin, Texas, February 2017 (Poster).

1. **A.E. Lawman**<sup>†</sup>, T.M. Quinn, J.W. Partin, F.W. Taylor, K. Thirumalai, C.-C. Wu, and C.-C. Shen, *A Coral-based Reconstruction of Interannual Climate Variability at Vanuatu during the Medieval Climate Anomaly (950-1250 CE)*, Abstract PP52A-07 presented at the 2016 American Geophysical Union Fall Meeting; San Francisco, California, December 2016 (Talk).

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**Workshops  
& Career  
Development**

**CESM Tutorial** July 2023  
Tutorial focused on simulating the climate system and running the Community Earth System Model (CESM). Laboratory sessions provide instruction on how to run CESM, modify components, and analyze the output using NCAR supercomputing resources (Boulder, CO).

**The ICTP 3rd Summer School on Theory, Mechanisms and Hierarchical Modeling of Climate Dynamics: Tropical Oceans, ENSO and their teleconnections** July 2022  
Summer school located at The Abdus Salam International Center for Theoretical Physics (ICTP), Trieste, Italy (July 18-29, 2022).

**Effectively Communicating Science Workshop – Expert Witness Training Academy** Aug. 2019

Workshop located at the Mitchell Hamline School of Law (St. Paul, MN), funded by the NSF Paleoclimate Program (July 30-Aug. 2, 2019).

**Data Assimilation and Proxy System Modeling (DAPS)** May 2019  
Past Global Changes (PAGES) sponsored workshop at the University of Maryland. Workshop focused on recent advancements and the outstanding questions/challenges in data assimilation and proxy system modeling.

**The Urbino Summer School in Paleoclimatology** July 2017  
The University of Urbino: Past Global Change and Modeling Techniques  
Course focused on the analysis of the long-term carbon cycling and its implications in the understanding of present and future climates.

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**Laboratory Experience** **Analytical Laboratory for Paleoclimate Studies** 2015-2020  
Jackson School of Geosciences, University of Texas at Austin  
**Instrumentation**  
Stable Isotope Ratio Mass Spectrometry: Thermo Scientific MAT 253 and Delta V Plus; Kiel IV Carbonate Device  
Trace Metal Geochemistry: Perkin-Elmer Optima 8300 ICP-OES  
Coral & stalagmite sampling

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**Field Experience** **UT Austin Marine Geology & Geophysics Field Course** May 2017  
High-resolution air gun and streamer seismic reflection, CHIRP seismic reflection, multibeam bathymetry, sidescan sonar, and sediment coring

**Gulf of Mexico Research Cruise** Nov. 2015  
USGS Paleoclimate Proxy Calibration Project sediment trap deployment and CTD cast

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**Outreach & Service** Mentor for the PROGRESS Program 2023-Present  
*PROmoting Geoscience, Research, Education, and SuccESS (PROGRESS) Program dedicated to recruiting and mentoring STEM undergraduates who identify as women and are interested in the Earth and Environmental Sciences*

Research mentor - NOAA Hollings Scholar Program 2023

Guest speaker for Science Fridays, PS #205 Bensonhurst, NY. 2022  
*Spoke to two 5<sup>th</sup> grade classes about tropical climate and corals*

Reviewer: *Nature, Science Advances, Geophysical Research Letters, Paleoceanography and Paleoclimatology, Earth System Science Data, Geochemistry, Geophysics, Geosystems, NSF P2C2 proposals*

Volunteer judge for the Outstanding Student Presentation Awards (OSPA) at the American Geophysical Union Fall Meetings 2020-Present

Convener/Session Chair: Advancing Paleoclimatology by Combining Models and Data (AGU 2020), Tropical Paleoclimate Across Time: Insights from Proxy Data and Climate Models (AGU 2021), Advances in Understanding the Causes, Mechanisms, and Impacts of Quaternary Abrupt Climate Change (AGU 2023), Climate of the Common Era (AGU 2023)

Geoscience Empowerment Network, UT Austin 2018-2020  
*A graduate student/faculty group designed to promote gender diversity in the geosciences*

K-12 STEM outreach, Ford Elementary School, Georgetown, TX 2019  
*Prepared & led weather- and climate-related activities for elementary school students*

GeoFORCE graduate student mentor, UT Austin 2015-2020  
*A mentoring program to help undergraduate students from rural/underrepresented regions of Texas transition and adjust to college*

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**Professional  
Affiliations**

American Geophysical Union  
PAGES – Past Global Changes

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