

Dr. Tripti Bhattacharya

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Education

2010-2016 PhD Geography, University of California, Berkeley SPECIALIZATION: Paleoclimatology and Paleoecology
2006-2010 BSc Environmental Science, Georgetown University, SUMMA CUM LAUDE

Appointments

2018-present	ASSISTANT PROFESSOR	Syracuse University
2016-2018	POSTDOCTORAL RESEARCH ASSOCIATE	University of Arizona

Research and Teaching Interests

PI Bhattacharya focuses on understanding the sensitivity of regional rainfall and climate to global climate change. She uses a variety of methods, ranging from geochemical and biological proxies to climate models. Her work focuses on a paleoclimatic perspective, whereby past instances of climate change can be used as ‘natural experiments’ to understand the response of the atmosphere-ocean system to external forcing. Her laboratory is focused on stable isotopes in organic molecules and the quantification of lipid biomarkers, as well as a computational cluster that enables the analysis of climate model output.

PI Bhattacharya is also passionate about teaching and mentoring in the climate science community. She has taught EAR 111: Climate Change Past and Present and EAR 415/615: Climate Dynamics, and received the Meredith Teaching Award. She has served on National Science Foundation grant review panels and National Academies of Science, Engineering and Math panel on the future paleoclimate science. She is a founding board member of paleoCAMP, a training course in climate science. The latter is supported by the Heising-Simons Foundation.

Submitted, In Review, or in Revision Publications (* indicates student author)

5. **Bhattacharya, T.**, Ibarra, D.E, Feng, R., Burls, N.J. submitted. Geochemical Approaches to Reconstructing Earth's Hydroclimates. Treatise in Geochemistry, 3rd Edition, Elsevier.
4. Blumm, A., Tierney, J.E., **Bhattacharya, T.**, Zhu, J. submitted. Intensification of the westerlies over southern South America during the Last Glacial Maximum. *Paleoceanography and Paleoclimatology*.
3. Gagnon, C., Butler, K., Gaviria, E., Terrazas, A., Gao, A., **Bhattacharya, T.**, Boutt D., Munk, L., Ibarra, D. in revision. Paleoclimate controls on lithium enrichment in Great Basin Pliocene-Pleistocene lacustrine clays. *GSA Bulletin*
2. Johnson, KR, Griffiths, ML, **Bhattacharya, T.**, Borsato, A, Frisia, S, Henderson GM, Legrande A, Lewis, M, Mason, A, Saniya, S, Tierney, J, Wang, JK, Yang, H. in revision. Orbital and millennial variability of Southeast Asian hydroclimate over the past 38,000 years. *Nature Geoscience*.
1. Wright, K, Johnson, KR, Serrato Marks, G, McGee, D, **Bhattacharya, T.**, Goldsmith, G, Tabor, CR, Lacaille-Muzquiz, J-L, Lum, G, Beramendi-Orosco, L. in revision. Thermodynamics control precipitation in NE Mexico on orbital to millennial timescale. *Nature Communications*.

Peer-Reviewed Publications (* indicates student author)

28. Knapp, S., Burls, N.J., Dee, S.G., Feng, R., Feakins, S.J., **Bhattacharya, T.** 2022. A Pliocene Precipitation Isotope Proxy-Model Comparison Assessing the Hydrological Fingerprints of Sea Surface Temperature Gradients. *Paleoceanography and Paleoclimatology* 37(12) : e2021PA004401
27. **Bhattacharya, T.**, Feng, R., Tierney, J.E., *Rubbelke, C., Knapp, S., Burls, N.J., Fu, M. 2022. Expansion and Intensification of North American Monsoon during the Pliocene. *AGU Advances* 3(6). doi: 10.1029/2022AV000757
26. **Bhattacharya, T.**, 2022. An energetic perspective on the Holocene North American Monsoon. *Geophysical Research Letters* 49 (19). *Invited Commentary*. doi: 10.1029/2022GL100782
25. Peuple, M., **Bhattacharya, T.**, Lowenstein, T., McGee, D., Olson, K., Stroup, J., Tierney, J.E., Feakins S.J. 2022. Biomarker and pollen evidence for late Pleistocene pluvials in the Mojave Desert. *Paleoceanography and Paleoclimatology* 37 (10), e2022PA004471
24. **Bhattacharya, T.**, Krause, S., Penny, D., Wahl, D. 2022. Progress Report: Drought and Water Management in Ancient Maya Society. *Progress in Physical Geography*. doi:10.1177/03091333221129784

23. Tierney, J.E., Torfstein, A., **Bhattacharya, T.**, Goldstein, S. 2022. Late Quaternary hydroclimate of the Levant: the leaf wax record from the Dead Sea. *Quaternary Science Reviews* 289 (107613).
22. *Brennan, P., **Bhattacharya, T.**, Feng, R., Tierney, J.E., *Jorgensen, E.M. 2022. Patterns and Mechanisms of Northeast Pacific Temperature Response to Pliocene Boundary Conditions. *Paleoceanography and Paleoclimatology* 37(7): e2021PA004370.
21. Wright, K, Johnson, KR, **Bhattacharya, T.**, Serrato Marks, G., McGee, D., Ellsbury, D., Peings, Y., Lacaille-Muzquiz, J., Lum, G., Beramendi-Orosco, L., Magnusdottir, G. 2022. Precipitation in northeast Mexico primarily controlled by the relative warming of Atlantic SSTs. *Geophysical Research Letters* 49(11) e2022GL098186.
20. Kumar, D.M., Tierney, J.E., **Bhattacharya, T.**, Zhu, J., and Murray, J. 2022. Glacial Warming in the Eastern Pacific Warm Pool. *Geophysical Research Letters* 49(10): e2022GL098830
19. Feng, R., **Bhattacharya, T.**, Otto-Bleisner, B., Brady, E., Haywood, A., Tindall, J., Hunter, S., Abe-Ouchi, A., Chan, C., Contoux, C., Guo, C. Li, X., Lohmann, G., Stepanek, C., Tan, N., Zhang, Q., Zhang, Z. 2022. Past terrestrial hydroclimate driven by Earth system feedbacks. *Nature Communications* 13(1), doi: 10.1038/s41467-022-28814-7
18. Inglis, G.N., **Bhattacharya, T.**, Hemingway, J.D., Tierney, J.E., Feakins, S. 2022. Novel molecular approaches for reconstructing terrestrial environmental change. *Annual Reviews of Earth and Planetary Sciences* 50 doi: 10.1146/annurev-earth-032320-095943
17. Kumar, Dervla M., Tierney, J.E., **Bhattacharya, T.**, Jiang, Z., McCarty, L, Murray, J. 2021. Climatic drivers of deglacial SST variability in the eastern Pacific. *Paleoceanography and Paleoclimatology* 36 (10) doi: 10.1029/2021PA004264
16. Peuple, M., Tierney, J.E. McGee, D., Lowenstein, T.K., **Bhattacharya, T.**, Feakins, S.J. 2021. Identifying plant wax inputs in lake sediments using machine learning. *Organic Geochemistry* 156, doi: 10.1016/j.orggeochem.2021.104222
15. Tierney, J.E., Poulsen, C.J., Montañez I.P., **Bhattacharya, T.**, Feng, R., Ford, H.L., Honisch, B., Inglis, G.N., Petersen, S.V., Sagoo, N., Tabor, C.R., Thirumalai, K., Zhu, J., Burls, N.J., Godd eris, Y., Foster, G.L., Huber, B.T., Ivany, L.C., Turner, S.K., Lunt, D.J., McElwain, J.C., Mills, B.J.W., Otto-Bliesner, B.L., Ridgwell, A., Zhang, Y. 2020.

Past climates inform our future. *Science* 370 (6517). doi: 10.1126/science.aay3701

14. *Judd, E, **Bhattacharya, T.**, Ivany, L.C. 2020. A dynamical framework for interpreting ancient sea surface temperatures. *Geophysical Research Letters* 47, e2020GL089044. doi: 10.1029/2020GL089044
13. **Bhattacharya, T.**, Coats, S. 2020. Atlantic-Pacific gradients drive Last Millennium hydroclimate variability in Mesoamerica. *Geophysical Research Letters* 47, e2020GL088061. doi: 10.1029/2020GL088061
12. Anderson, L., Wahl, D., **Bhattacharya, T.** 2020. Understanding Rates of Change: A case study using fossil pollen records from California to assess the potential for and challenges to a regional data synthesis. *Quaternary International*. doi: 10.1016/j.quaint.2020.04.044
11. Tierney, J.E., Haywood, A.M. Feng, R. **Bhattacharya, T.**, Otto-Bleisner, B. 2019. Pliocene warmth consistent with greenhouse gas forcing. *Geophysical Research Letters*. doi: 10.1029/2019GL083802
10. DiNezio, P., Tierney, J.E. Otto-Bleisner, B.L., Timmerman, A., **Bhattacharya, T.**, Rosenbloom, N., Brady, E. 2018. Glacial changes in warm pool climate amplified by Indian Ocean. *Science Advances* 4:12
9. **Bhattacharya, T.**, Tierney, J.E., Addison, J.A., Murray, J.W. 2018. Ice sheet modulation of deglacial North American Monsoon intensification. *Nature Geoscience*. doi: 10.1038/s41561-018-0220-7 *chosen for a News and Views feature*
8. **Bhattacharya, T.**, Chiang, J.C.H., Cheng, W. 2017. Ocean-atmosphere dynamics linked to 800-1050 CE dry interval in Mesoamerica. *Quaternary Science Reviews*. doi: 10.1016/j.quascirev.2017.06.005
7. **Bhattacharya, T.**, Tierney, J.E., DiNezio, P. 2017. Glacial reduction of the North American Monsoon via surface cooling and atmospheric ventilation. *Geophysical Research Letters* doi: 10.1002/2017GL073632 *chosen as Journal Editor's Highlight*
6. **Bhattacharya, T.**, Byrne, R. 2016. Late Holocene anthropogenic and climatic influences on fire and regional vegetation in Mexico's Cuenca Oriental. *Global and Planetary Change* 138: 56 – 69.

5. **Bhattacharya, T.**, Byrne, R., Boehnel, H., Wogau, K., Kienel, U., Ingram, B.L. Zimmerman, S. 2015. Cultural implications of late Holocene climate change in the Cuenca Oriental, Mexico. *Proceedings of the National Academy of Sciences* 112(6): 1693-1698.
4. Chiang, J.C.H., Fung, I.Y., Wu, C.-H., Cai, Y., Edman, J.E., Liu, Y., Day, J.E., **Bhattacharya, T.**, Mondal, Y., Labrousse, C.A. 2015. Role of seasonal transitions and westerly jets in East Asian paleoclimate. *Quaternary Science Reviews* 108: 111-129.
3. **Bhattacharya, T.**, Chiang, J.C.H. 2014. Spatial variability and mechanisms underlying El Nino-induced drought in Mexico. *Climate Dynamics* doi: 10.1007/s00382-014-2106-8
2. **Bhattacharya, T.**, Beach T., Wahl, D. 2011. An analysis of modern pollen rain from the Maya Lowlands of northern Belize. *Review of Paleobotany and Palynology* 164: 109-120.
1. Beach, T., Luzzadder-Beach, S., Dunning, N., Jones, J., Lohse, J., Guderjan, T., Bozarth, S., Millspaugh, S., **Bhattacharya, T.** 2009. A review of human and natural changes in Maya Lowlands wetlands over the Holocene. *Quaternary Science Reviews* 28:1710 – 1724

Research Funding

<i>Summary</i>	<i>Total funding awarded as PI: \$1,699,477, total funding awarded as co-PI and PI \$2,037,955</i>
pending	“Collaborative Research: Novel Constraints on Holocene North Pacific Marine Heat Waves from Sub-Annual Proxies” PI: Tripti Bhattacharya (Syracuse University), co-PI: Kaustubh Thirumalai (University of Arizona) \$523,686 U.S. National Science Foundation
pending	“Collaborative Research: Calibration of a global climate model and its future projection using reconstructions of the meridional gradient in temperature and isotope during the past warm climates” PI: Ran Feng (University of Connecticut), co-PI: Tripti Bhattacharya (Syracuse University), Jiang Zhu (NCAR) \$484,272 U.S. National Science Foundation
2023-2028	“CAREER: Biomarker Perspectives on the Response of Western North American Rainfall to Climate Change” PI: Tripti Bhattacharya (Syracuse University). \$793,000 U.S. National Science Foundation
2021-2024	“Collaborative Research: Sensitivity of Walker Circulation To CO ₂ forcing during the late Pliocene as an analogue for future Climate Change” PI: Ran Feng (University of Connecticut) co-PIs: Tripti Bhattacharya (Syracuse University). U.S. National Science Foundation

Paleo Perspectives on Climate Change Program (NSF P2C2). \$200,942

- 2021-2025 “PaleoCAMP (Paleoclimate training in Climate Archives, Models, and Proxies): A multi-disciplinary summer school for graduate students in paleoclimatology” PI: Jessica Tierney (University of Arizona). Co-PI: Tripti Bhattacharya (Syracuse); Dan Ibarra (Brown University); Kevin Anchukaitis (University of Arizona). Heising Simons Foundation. \$16,083 (total grant \$1,000,000)
- 2020-2023 “MRI: Acquisition of a gas-chromatograph isotope-ratio mass spectrometer for compound-specific isotope analysis” PI: Tripti Bhattacharya, co-PI: Chris Junium (Syracuse University). U.S. National Science Foundation Major Research Instrumentation.\$302,110
- 2019-2022 “Collaborative Research: A paleoclimatic perspective on Southwest US precipitation responses to elevated greenhouse gases” PI: Tripti Bhattacharya, co-PIs: Jessica E Tierney (University of Arizona), Ran Feng (University of Connecticut). U.S. National Science Foundation Paleo Perspectives on Climate Change Program (NSF P2C2).\$322,395
- 2019-2021 “Spatiotemporal Dynamics of long-term drought in Mesoamerica” PI: Tripti Bhattacharya CUSE Grant Program. \$30,000
- 2019-2022 “Acquisition of a Multi-Sensor Core Logger for Syracuse University ” PI: Melissa Chipman. co-PIs: Chris Scholz, Zunli Lu, Chris Junium, Tripti Bhattacharya. U.S. National Science Foundation Instrumentation and Facilities.\$403,425
- 2013-2015 “Reconstructing the Paleoenvironmental History of Mexico’s Cuenca Oriental” NSF Doctoral Dissertation Improvement Grant No. BCS-13333370, \$15,811

Honors & Awards

- 2022 Invited presenter, American Geophysical Union Annual Meeting, December 2022
- 2021 Meredith Award for Excellence in Teaching, Spring 2021
- 2020 Invited presenter (in two sessions), American Geophysical Union Annual Meeting, December 2020
- 2019 Invited presenter, American Geophysical Union Annual Meeting, December 2019
- 2014 Denise Gaudreau Award for Excellence in Quaternary Studies, American Quaternary Association
- 2012-2015 NSF Graduate Research Fellowship Grant No. DGE 1106400
- 2010-2012

University of California Berkeley Fellowship for Doctoral Study

Teaching

Spring Semester	Climate Dynamics (15-25 students, covers a mathematical introduction to atmosphere and ocean circulation)
Fall Semester	Climate Change (120 student course, covering basics of earth system science and the science of past and future climate change)
	Sustainability Capstone Seminar (25 student course, providing interdisciplinary perspective on earth system science and sustainability for senior undergraduates)

Student Advising and Committees

2021-	Tyler Logie, PhD Candidate (Earth and Environmental Science), Secondary Advisor
2020-	Claire Rubbelke, PhD Candidate (Earth and Environmental Science), Primary Advisor
2019-	Peter Brennan, PhD Candidate (Earth and Environmental Science), Primary Advisor
2021-	Daniel Philippi, PhD Candidate (Earth and Environmental Science), Committee Member
2019-	Laura Streib, PhD Candidate (Earth and Environmental Science), Committee Member
2019-	Briana Edgerton, PhD Candidate (Earth and Environmental Science), Committee Member
2019-	Ellen Jorgensen, Undergraduate Student, Research Mentor
2019-2022	Ruliang He, PhD Student (Earth and Environmental Science), Committee Member
2019-2020	Jessie McCraw, MS Student (Earth and Environmental Science), Committee Member
2018-2022	Nick Zaremba, PhD Student (Earth and Environmental Science), Committee Member
2018-2020	Emily Judd, Ph.D. Student (Earth and Environmental Science), Committee Member
2018-2020	Micah Wiesner, MS Student (Earth and Environmental Science), Committee Member

Recent Talks and Presentations (* indicates invited, ^x indicates student presenter)

2022

***Bhattacharya, T.** 2022. Molecular perspectives on Pliocene southwestern hydroclimate. Meeting of American Geophysical Union, Chicago, Dec. 2022.

***Bhattacharya, T.** 2022. Lessons from the Pliocene for understanding hydroclimate in a warmer world. University of Southern California, November 2022.

***Bhattacharya, T.** 2022. Isotopic constraints on Pliocene Subtropical Hydroclimate, Cornell University, September 2022.

***Bhattacharya, T.** 2022. Novel perspectives on subtropical hydroclimate from organic biomarkers and models, Stanford University, Palo Alto, CA, May 2022.

***Bhattacharya, T.** 2022. From past to future: leveraging paleoclimate data to understand future aridity in Central America, UNC Greensboro, Greensboro, NC, March 2022.

***Bhattacharya, T.** 2022. Molecular perspectives on southwest North American hydroclimate, London Paleoclimate Network Seminar Series, January 2022.

2021 ***Bhattacharya, T.** 2021. Molecular perspectives on Pliocene Hydroclimate, Departmental Colloquium, Yale University, New Haven, CT, November 2021.

***Bhattacharya, T.** 2021. Proxy and model perspectives on Pliocene western US hydroclimate, PAOC Colloquium, MIT, Cambridge, MA, October 2021.

***Bhattacharya, T.** 2021. Perspectives on subtropical Pliocene Hydroclimate from proxies and models, Changelings Meeting, Comer Foundation, October 2021.

***Bhattacharya, T.** 2021. Glacial Changes in the North American Monsoon, Iowa State University, April 2021.

***Bhattacharya, T.** 2021. Paleoclimate perspectives on drought in Central America, University of Buffalo, March 2021.

2020 ***Bhattacharya, T.** 2020. Perspectives on Atlantic-Pacific gradients from paleoclimatic proxies. Meeting of American Geophysical Union (virtual), Dec. 2020.

***Bhattacharya, T.** , Feng, R. 2020. Pliocene subtropical hydroclimate linked to monsoon dynamics. Meeting of American Geophysical Union (virtual), Dec. 2020.

***Bhattacharya, T.** 2020. Paleoclimate perspectives on long-term drought in Central America. University of California Irvine (virtual), October 19th 2020.

***Bhattacharya, T.** 2020. Atlantic-Pacific gradients modulate past and future hydroclimate variability in Mesoamerica. SUNY Albany Department of Atmospheric Sciences (virtual), October 19th 2020.

***Bhattacharya, T.** 2020. The future of the North American Monsoon: lessons from Quaternary Paleoclimates. Meeting of American Quaternary Association (virtual), June 15-19, 2020.

Public Outreach and Service

- 2023-present Associate Editor, Geophysical Research Letters
- 2021-present Founding Board Member, PaleoCAMP (Heising Simons Foundation)
- 2021 Organizing Committee Member, National Academy of Sciences, Identifying New Community-Driven Science Themes for NSF's Support of Paleo Perspectives on Climate Change (P2C2): A Workshop (July 2021). Final report link: <https://www.nap.edu/read/26377/chapter/1>
- 2020 Panelist for Paleoperspectives on Climate Change (P2C2) program at National Science Foundation, January 2020
- 2020-present Committee member, Syracuse University Earth and Environmental Science JEDI Committee (Justice, Equity, Diversity, and Inclusion)

Lab Facilities

- 2018-present - Director of Paleoclimate Dynamics laboratory at Syracuse University, which consists of two spaces (400 sq ft and 500 sq. ft), and contains a suite of instrumentation for the analysis of organic biomarkers. These include an accelerated solvent extractor (ASE 350, Dionex), Labconco freeze-drier, several evaporators, two 6-ft fume hoods, and Thermo Trace 1310 gas chromatograph with flame ionization detector (GC-FID). Our isotope facilities contain a gas chromatograph -isotope ratio mass spectrometer (GC-IRMS) capable of compound specific measurements of hydrogen and carbon at precisions of 2 permil and 0.2 permil respectively (Thermo Trace 1310 GC coupled to a Delta V plus isotope ratio mass spectrometer.)