

# Robin B. Trayler

## Curriculum Vitae

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## Education

**2013–2018 PhD Geosciences**, Boise State University

Dissertation: *Evaluating Stable Isotope and Geochronologic Techniques for Paleoclimate Reconstruction*

Advisor: Matthew J. Kohn

**2008–2012 MS Geology**, California State University, Fresno

Thesis: *Stable Isotope Records of Inland California Megafauna*

Advisor: Robert G. Dundas

**2003–2007 BA Anthropology**, California State University, Fresno

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## Research & Teaching Positions

### Current

**7/2019–Present** *Technical Director*, Stable Isotope Ecosystem Laboratory, University of California, Merced

**7/2023 - Present** Associate Project Scientist

**7/2019 - 6/2023** Assistant Project Scientist

### Previous

**2/2021–7/2024** *Postdoctoral Scholar*, Boise State University, Idaho

- Supervisor: Mark D. Schmitz

**2/2019–1/2021** *Postdoctoral Scholar*, University of California, Merced

- Supervisor: Sora L. Kim

**1/2018–12/2018** *Stable Isotope Laboratory Manager*, Boise State University, Idaho

**2013–2018** *Teaching & Research Assistant*, Boise State University, Idaho

**2011–2013** *Assistant Archaeologist*, Table Mountain Rancheria, Friant, California

**2009–2011** *Teaching Assistant*, California State University, Fresno

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# Publications

## Upcoming

- Palefsky, G., Lertcharnrit, T, **Trayler, R. B.**, Lopes, L. E., Kim, S. L., (in revision) *Ancient Skeletons In Situ: Evaluating Bone Diagenesis at an Open-Air Archaeological Site and Community Museum in Central Thailand: The Journal of Archaeological Method and Theory*

## 2024

- **Trayler, R. B.**, Lopes, L. E., Holroyd, P. A., Kim, S. L., Southon, J. R., (2024) *Rapid, Effective Screening of Tar Seep Fossils for Radiocarbon and Stable Isotope Analysis: Quaternary Geochronology*
- Larocca Conte, G., Aleksinski, A., Liao, A., Kriwet J., Mörs, T., **Trayler, R. B.**, Ivany, L. C., Huber, M., Kim, S. L., (2024) *A proximal perspective to the Eocene Drake Passage: environmental reconstruction and habitat use based on  $\delta^{18}O$  of fossil shark teeth from Seymour Island, Antarctica: Paleoceanography and Paleoclimatology*
- **Trayler, R. B.**, Meyers, S. R., Sageman, B. B., Schmitz, M. D., (2024), *Bayesian integration of Astrochronology and Radioisotope Geochronology: Geochronology*
- Larocca Conte, G., Lopes, L., Mine, A. H., **Trayler, R. B.**, Kim, S. L., (2024) *SPORA, a new silver phosphate precipitation protocol for oxygen isotope analysis of small, organic-rich bioapatite samples: Chemical Geology*

## 2023

- Li, Y., Qin H., Jicha, B., Huyskens, M., Wall C., **Trayler R. B.**, Yin Q., Schmitz M. D., Pan, Y, Deng, C., Singer B., He, H., Zhu, R., (2023), *Revised onset age of magnetochron MOR: Chronostratigraphic and geologic implications: Geology*; 51 (6): 565–570
- Griffiths, M. L., Eagle, R. A., Kim, S. L., Becker, M. A., Maisch IV, H. M., **Trayler, R. B.**, Chan, R., McCormack, J., Ward, D. J., Tripani A. K., Shimada, K. (2023), *Thermal physiology of extinct megatooth sharks: Proceedings of the National Academy of Sciences*; v. 120 no. 27
- **Trayler, R. B.**, Valencia Landa, P., and Kim, S.L., (2023), *Evaluating the Efficacy of Collagen Isolation Using Stable Isotope Analysis and Infrared Spectroscopy: Journal of Archaeological Science* v. 151, p. 105727
- Holliday M. E., Rivera, T., Jicha, B., **Trayler, R. B.**, Biek R. F., Braunagel, M. J., Griffith, W. A., Hacker, D. B., Malone, D. H., Mayback, D. F. (2023), *Emplacement age of the Markagunt Gravity Slide in Southwestern Utah, USA, Terra Nova*, v. 35(1), p. 66-72

## 2022

- Pozo Buil, M., Ianiri, H., Carroll, S. L., **Trayler, R. B.** (2022), *ClimateWEST: A climate science activity. In S. Seagroves, A. Barnes, A. J. Metevier, J. Porter, & L. Hunter (Eds.), Leaders in effective and inclusive STEM: Twenty years of the Institute for Scientist & Engineer Educators* (pp. 291–304). UC Santa Cruz: Institute for Scientist & Engineer Educators
- Harrigan C. O., Schmitz M. D., **Trayler, R. B.**, Over, D. J., (2021), *Recalibrating the Devonian timescale: New high precision U-Pb zircon ages and a method for integrating radioisotopic ages, conodont biostratigraphy, and astrochronology for timescale modeling: Geological Society of America Bulletin*

## 2021

- Landry, Z., Kim, S., **Trayler, R.B.**, Gilbert, M., Zazula, G., Southon, J., and Fraser, D., (2021), *Dietary reconstruction and evidence of prey shifting in Pleistocene and recent gray wolves (Canis lupus) from Yukon Territory: Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 571, p. 110368
- Landing, E., Schmitz, M. D., Geyer, G., **Trayler, R. B.**, and Bowring, S. A., (2021), *Precise early Cambrian U–Pb zircon dates bracket the oldest trilobites and archaeocyaths in Moroccan West Gondwana: Geological Magazine*, p. 1-20.

## 2020

- **Trayler, R. B.**, Kohn, M. J., Bargo, M. S., Cuitiño, J. I., Kay, R. F., Strömberg, C. A., and Vizcaíno, S. F., (2020), *Patagonian Aridification at the Onset of the Mid-Miocene Climatic Optimum: Paleoceanography*

and Paleoclimatology, v. 35, no. 9, p. e2020PA003956.

- Drewicz, A. E., **Trayler, R. B.**, Hollaway, M., Harrigan, C. O., and Kohn, M. J., (2020), *The Interpretability of Stable Hydrogen Isotopes in Modern Herbivore Tooth Enamel*: Geochimica et Cosmochimica Acta, v. 270, p. 84-94.

## 2019

- **Trayler, R. B.**, Schmitz, M. D., Cuitiño, J. I., Kohn, M. J., Bargo, M. S., Kay, R. F., Strömberg, C. A. E., and Vizcaíno, S. F., (2019), *An Improved Approach To Age-Depth Modeling In Deep Time: Implications For The Santa Cruz Formation, Argentina*: Geological Society of America Bulletin.

## 2018

- Daggers, L., Plew, M. G., Edwards, A., Evans, S., and **Trayler, R. B.**, (2018), *Assessing the Early Holocene Environment of Northwestern Guyana: An Isotopic Analysis of Human and Faunal Remains*: Latin American Antiquity, p. 1-14.

## 2017

- **Trayler, R. B.**, and Kohn, M. J., (2017), *Tooth Enamel Maturation Reequilibrates Oxygen Isotope Compositions and Supports Simple Sampling Methods*: Geochimica et Cosmochimica Acta, v. 198, p. 32-47.

## 2016

- Cuitiño, J. I., Fernicola, J. C., Kohn, M. J., **Trayler, R. B.**, Naipauer, M., Bargo, M. S., Kay, R. F., and Vizcaíno, S. F., (2016), *U-Pb Geochronology of the Santa Cruz Formation (early Miocene) at the Río Bote and Río Santa Cruz (southernmost Patagonia, Argentina): Implications for the Correlation of Fossil Vertebrate Localities*: Journal of South American Earth Sciences, v. 70, p. 198-210.

## 2015

- **Trayler, R. B.**, Dundas, R. G., Fox-Dobbs, K., and Van De Water, P. K., (2015), *Inland California during the Pleistocene—Megafaunal Stable Isotope Records Reveal New Paleoecological and Paleoenvironmental Insights*: Palaeogeography, Palaeoclimatology, Palaeoecology, v. 437, p. 132-140.

## 2014

- Fox-Dobbs, K., Dundas, R. G., **Trayler, R. B.**, and Holroyd, P. A., (2014), *Paleoecological implications of new megafaunal <sup>14</sup>C ages from the McKittrick tar seeps, California*: Journal of Vertebrate Paleontology, v. 34, no. 1, p. 220-223.

## 2009

- **Trayler, R. B.**, and Dundas, R. G., (2009), *American Mastodon (Mammot americanum) in the Rancho La Brea Collection of the University of California Museum of Paleontology: Current Research in the Pleistocene*, v. 26, p. 184-186

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## Funding & Grants

- *Collaborative Research: Wolf RACE (Resource Availability and Competition in Ecosystems) - Insights from The McKittrick and Rancho La Brea Lagerstätte*
  - lead-PI, **\$683,437 total** (UC Merced - \$546,278; UC Berkeley - \$137,159)
  - Funded by NSF Sedimentary Geology and Paleobiology / Population and Community Ecology
- *¿field curious?: Sustainable Ag from Field-to-Lab*
  - Co-PI **\$30,000**
  - Funded By Henry Mayo Newhall Foundation

# Analytical & Technical Experience

## Instrumentation

ThermoFisher Delta V+ IRMS  
ThermoFisher GasBench II  
ThermoFisher TC/EA  
Costech 4010 Elemental Combustion System  
Los Gatos Research Laser Water Isotope Analyzer

## Preparation & Analysis

carbonates (C, O), phosphates (O), collagen (C, N), bioapatite carbonate and phosphate (C, O), keratins (C, N, O, H), cellulose (C, O), plants (C, N, O, H), water (H, O)

## Quality Control & Assessment

Developed robust quality control and standard operating procedures for UC Merced Stable Isotope Ecosystem Laboratory

Standard sample bracketing, stable isotope data reduction, and quality control best practices

## Computational & Software

R (programing language)

Developer:

astroBayes [github.com/robintrayler/astroBayes](https://github.com/robintrayler/astroBayes)

modifiedBchron [github.com/robintrayler/modifiedBchron](https://github.com/robintrayler/modifiedBchron)

Arduino (programing and hardware)

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## Teaching

### Boise State University

*Data Analysis and Geostatistics* (Graduate level, Teaching Assistant, Fall 2017)

*Structural Geology* (Teaching Assistant, Spring 2014)

*Geology Field Camp* (Assistant Instructor, Summer 2015, 2016, 2017)

*Sedimentology and Stratigraphy* (Teaching Assistant, Fall 2015, 2016, 2017)

*Introductory Geology* (Teaching Assistant, Spring 2018)

### California State University, Fresno

*Environmental Science* (Teaching Assistant, 2009)

*Introductory Geology* (Teaching Assistant, 2009-2011)

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## Service & Development

*Diversity & Outreach Coordinator*, Geological Society of America, Geochronology Division (2023 - 2026)

Facilitate Annual Geochronology Division Mentoring Program

Serve as Geochronology Division liaison to AGES<sup>3</sup> (Advancing Geochronology Science, Spaces, and Systems)

## Workshops, Short Courses, & Conference Sessions

*URGE* (Anti-Racism Workshop, Pod Leader) 2021, Merced, CA  
*IsoVerse* (Stable Isotope Workshop, Participant), 2020, Boulder, CO  
*ISSE Professional Development Program* (Teaching Workshop, Participant), 2019, Monterey, CA  
*IsoAstro* (Geochronology Workshop, Instructor), 2019, Rock Springs, WY  
*IsoAstro* (Geochronology Workshop, Participant), 2016, Boise, ID

## Invited Talks

*University of California, Merced* - EnviroLunch Seminar Series (October 2022)  
*George Mason University* – Virtual Geology Seminar Series (October 2020)  
*California State University, Fresno* – EES Department Seminar Series (August 2020)  
*University of Iowa* – EES Department Seminar Series (September 2019)

## Journal Referee

*Chemical Geology, Current Biology, Geochemistry, Marine Mammal Science, Palaeogeography-Palaeoclimatology- Palaeoecology, Quaternary International*

## Professional Memberships

*American Geophysical Union (AGU), Geological Society of America (GSA), Society of Vertebrate Paleontology (SVP), National Association of Geoscience Teachers (NAGT), Paleontological Society (PS)*

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## Awards, Fellowships, & Honors

Department Outstanding Teaching Assistant Award (2017, Boise State)  
GSA Graduate Research Grant (2014, Boise State)  
Department Deans Medalist Nominee (2012, CSU Fresno)  
Department Outstanding Graduate Student (2012, CSU Fresno)  
Dean's List (2006-2012, CSU Fresno)  
Faculty Sponsored Research Award (2009-2011, CSU Fresno)  
Institute of Rock Magnetism Visiting Fellow (2011, CSU Fresno)  
Provost scholarship (2008, CSU Fresno)

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## Presentations

\*invited presentations

- **Trayler, R. B.**, Schmitz, M. D., and Meyers, S. R., 2022, *Bayesian Integration of Astrochronology and Radioisotope Geochronology*, Geological Society of America Abstracts with Programs: Denver, Colorado.
- Palefsky, G., Lertcharnrit, T., **Trayler, R. B.**, & Kim, S. L. 2022, *Ancient Skeletons In Situ: Evaluating Diagenesis at a Covered Open-Air Excavation Display and Community Museum in Central Thailand*. American Journal of Biological Anthropology Vol. 177, pp. 140-141
- Holliday M. E., Rivera, T., Jicha, B., Biek R. F., Braunagel, M. J., Griffith, W. A., Hacker, D. B., Malone, D. H., Mayback, D. F., **Trayler, R. B.**, 2022, *Emplacement timing of the Markagunt Gravity Slide (Utah, USA): an example of instantaneous lithospheric change*, Goldschmidt Abstracts
- \***Trayler, R. B.**, Kohn, M. J., Schmitz M.D., Bargo, M. S., Cuitiño, J. E., Kay, R. F., Stromberg, C. A. E., and Vizcaino, S. F. 2021, *Using Geochronology and Isotope Ecology to Reconstruct Past Climates: a Case Study From the Miocene Santa Cruz Formation, Argentina* Geological Society of America Abstracts with Programs: Portland, Oregon.
- Cizina, M., Kohn, M. J., Mikesell, D., and **Trayler, R. B.**, 2019, *Optimizing Raman Analyses of Quartz and Zircon Inclusions in Garnet*, Fall Meeting, AGU: San Francisco.

- Mohr, M. T., Samuels, J. X., Famosa, N. A., **Trayler, R. B.**, Laib, A., Schmitz, M. D., and Lovelock, E. C., 2019, *Bayesian Age-Depth Modeling Improves The Chronostratigraphic Framework Of The Mid-Cenozoic John Day Formation, John Day Fossil Beds National Monument, Eastern And Central Oregon*, Geological Society of America Abstracts with Programs: Phoenix, Arizona.
- Barnes, G. L., **Trayler, R. B.**, Cramer, B. D., Calner, M., Bancroft, A. M., and Oborny, S. C., 2019, *A Bayesian Age-Depth Model for The Silurian Altajme Core, Gotland, Sweden*, Geological Society of America Abstracts with Programs: Phoenix, Arizona.
- Schmitz, M. D., **Trayler, R. B.**, Mohr, M. T., Dehler, C. M., Karlstrom, K. E., Crossey, L. J., Hagadorn, J. W., and Timmons, J. M., 2019, *Bayesian Age Modeling And Integrative Chronostratigraphy Of The Chuar And Tonto Groups Of The Grand Canyon*, Geological Society of America Abstracts with Programs: Phoenix, Arizona.
- **Trayler, R. B.**, Fraser, D. L., and Kim, S. L., 2019, *The Historic Response of Grey Wolves to Climate Change: A Case Study from Northern Alberta*: Geological Society of America Abstracts with Programs: Phoenix, Arizona.
- Crifò, C., Bargo, M.S., Cuitiño, J.I., Kay, R.F., Kohn, M.J., **Trayler, R. B.**, Vizcaíno, S.F., Zucol, A.F., Stromberg, C.A.E., 2018. *Phytolith Assemblages Record Vegetation History During the Middle Miocene Climatic Optimum in the Coastal Santa Cruz Formation, Patagonia, Argentina*. 2018 Fall Meeting, AGU.
- **Trayler, R. B.**, Schmitz, M.D., Kohn, M.J., 2018. *Using Varied Data Types to Assign Realistic Age Uncertainties to Stratigraphic Sequences and Proxy Records*. Geological Society of America Abstracts with Programs.
- **Trayler, R. B.**, 2018. *Patagonian Aridification and Ecological Shifts at the Onset of the mid-Miocene Climatic Optimum*, Journal of Vertebrate Paleontology, Program and Abstracts, 2018, Albuquerque, NM.
- **Trayler, R. B.**, Kohn, M. J., Bargo, M. S., Cuitiño, J. E., Kay, R. F., Stromberg, C. A. E., and Vizcaino, S. F., 2017, *Ecology and Climate of the Early Miocene Santa Cruz Formation, Argentina*: Geological Society of America Abstracts with Programs.
- Crifò, C., Bargo, M. S., Cuitiño, J. E., Kohn, M. J., Kay, R. F., **Trayler, R. B.**, Vizcaino, S. F., Zucol, A. F., and Stromberg, C. A. E., 2017, *Fossil phytolith assemblages from Southern Patagonia indicate changing habitats during the Middle Miocene Climatic Optimum*: Geological Society of America Abstracts with Programs.
- **Trayler, R. B.**, Schmitz, M. D., Bargo, M. S., Cuitiño, J. E., Kay, R. F., Kohn, M. J., Stromberg, C. A. E., and Vizcaino, S. F., 2017, *A New Approach for Developing Continuous Age-Depth Models from Dispersed Chronologic Data: Applications to the Miocene Santa Cruz Formation, Argentina*: Geological Society of America Abstracts with Programs.
- **Trayler, R. B.**, and Kohn, M. J., 2016, *Enamel Maturation is Independent of Appositional Geometry*: Journal of Vertebrate Paleontology, Program and Abstracts, 2016, p. 238.
- **Trayler, R. B.**, and Kohn, M. J., 2016, *Enamel Maturation Resets Appositional Isotope Compositions*: Geological Society of America Abstracts with Programs, v. 48, no. 7.
- Polon, C. K., Pluhar, C. J., Gledhill, T. A., **Trayler, R. B.**, Crowley, J. L., Ward, M. P., Schmitz, M. D., Ngo, M. M., Carlson, C. W., and Larsen, M. T., 2016, *65 km of dextral slip across Owens Valley, CA since 83 Ma: possible, but unnecessary*: Geological Society of America Abstracts with Programs, v. 48, no. 7.
- **Trayler, R. B.**, and Kohn, M. J., 2014, *Infrared Spectroscopy of Bioapatite from Taxonomically Diverse Modern Teeth—Implications for Diagenesis*: Geological Society of America Abstracts with Programs, v. 46, no. 6, p. 537.
- **Trayler, R. B.**, Dundas, R. G., Fox-Dobbs, K., and Van De Water, P. K., 2014, *Stable Isotope Records of Mammalian Megafauna from the Mid-Pleistocene Irvington Locality in California*: Geological Society of America Abstracts with Programs, v. 46, no. 6, p. 537.
- Muniz, J., Pluhar, C. J., **Trayler, R. B.**, and Bowles, J. A., 2014, *Magnetostratigraphy and Paleomagnetic Analysis of the Tulare and Turlock Lake Formations, San Joaquin Valley, California*: Geological Society of America Abstracts with Programs, v. 46, no. 6, p. 147.
- **Trayler, R. B.**, and Kohn, M. J., 2014, *Re-equilibration of Enamel Carbonate during Maturation*: Goldschmidt Abstracts, v. 77, no. 5, p. 2512.
- **Trayler, R. B.**, Dundas, R. G., Fox-Dobbs, K., and Van De Water, P. K., 2013, *Stable Isotope Ecology and Dietary Modeling of Mammalian Megafauna from The Middle Irvingtonian Fairmead Landfill Locality, Chowchilla, CA*: Geological Society of America Abstracts with Programs, Cordilleran Section, v. 45, p. 10.
- **Trayler, R. B.**, Dundas, R. G., Fox-Dobbs, K., and Van De Water, P. K., 2012, *Stable Isotope Records of Inland California Megafauna – New Insights into Pleistocene Paleoecology and Paleoenvironmental Conditions*: 2012 Fall Meeting, AGU, v. 1.
- **Trayler, R. B.**, Pluhar, C. J., and Bowles, J., 2011, *Rock Magnetic Investigation of the Turlock Lake Formation: Which Produce the Correct Magnetostratigraphy, AF or Thermal Demagnetization?*: 2011 Fall Meeting, AGU, v. 1, p. 1172.

- **Trayler, R. B.**, and Pluhar, C. J., 2010, *High Resolution Magnetostratigraphy of the Middle Pleistocene Turlock Lake Formation, California*: 2010 Fall Meeting, AGU, v. 1, p. 0764.
  - **Trayler, R. B.**, and Dundas, R. G., 2009, *Rancho La Brea Mastodons, Are They Smaller Than Mammut americanum From Elsewhere In The United States?: Geological Society of America Abstracts with Programs*, v. 41, no. 7.
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## References

Robert G. Dundas – rdundas@csufresno.edu  
Sora L. Kim – skim380@ucmerced.edu  
Matthew J. Kohn – mattkohn@boisestate.edu  
Mark D. Schmitz – markschmitz@boisestate.edu