

# BRETT JAMES TIPPLE

## CURRICULUM VITAE

- ADDRESS** University of California, Santa Cruz  
Mailstop: Ocean Sciences  
1156 High Street  
Santa Cruz, CA 95064  
Phone: 831-459-1350  
Email: btipple@ucsc.edu
- APPOINTMENTS** UNIVERSITY OF CALIFORNIA, SANTA CRUZ SANTA CRUZ, CA  
*Associate Project Scientist, Institute of Marine Sciences* 2017 – Present
- UNITED STATES GEOLOGICAL SURVEY SANTA CRUZ, CA  
*Affiliate Scientist, Pacific Coastal and Marine Science Center* 2017 – Present
- UNIVERSITY OF UTAH SALT LAKE CITY, UT  
*Research Assistant Professor, Department of Biology* 2010 – Present  
*Faculty Affiliate, Global Change and Sustainability Center* 2013 – Present  
*Postdoctoral Researcher, Department of Biology* 2009 – 2010
- ISOFORENSICS, INC. SALT LAKE CITY, UT  
*Senior Research Scientist* 2011 – 2016  
*Research Scientist* 2009 – 2011
- EDUCATION** YALE UNIVERSITY NEW HAVEN, CT  
*Ph.D., Geology and Geophysics, 2009*  
*Dissertation: Leaf Waxes as Environment Recorders: An Empirical Evaluation and Paleoclimate Applications.*  
Advisor: Mark Pagani
- YALE UNIVERSITY NEW HAVEN, CT  
*M. Phil., Geology and Geophysics, 2005*  
*Thesis: A Biomarker Record of the Paleogene Evolution and Expansion of C<sub>4</sub> Plants.*  
Advisor: Mark Pagani
- INDIANA UNIVERSITY BLOOMINGTON, IN  
*B.S. with Distinction, Geological Sciences, 2003*  
*Senior Thesis: Carbon Isotopic Evidence for a Methane Supported Microbial Community from a Late Archean Silty-Shale: Witwatersrand Basin.*  
Advisor: Lisa M. Pratt

## TEACHING

UNIVERSITY OF UTAH SALT LAKE CITY, UT

*Instructor*, Stable Isotope Biogeochemistry and Ecology (BIOL 7475), 2010 – 2017

*Instructor*, Isotopes in Large-Scale Environmental Research (GEO 7476), 2016

*Lecturer*, Stable Isotope Biogeochemistry and Ecology (BIOL 7475), 2015

*Instructor*, Individual Undergraduate Research (BIOL 4955), 2011, 2012

YALE UNIVERSITY NEW HAVEN, CT

*Graduate Teaching and Laboratory Assistant*, Mineralogy and Petrology, 2008

*Lecturer*, Introduction to Geochemistry, 2006

*Graduate Teaching Fellow* (Level II), Global Environmental Change, 2005

*Graduate Teaching Fellow* (Level I), Introduction to Geochemistry, 2004

INDIANA UNIVERSITY BLOOMINGTON, IN

*Student Teacher* (7<sup>th</sup> grade Earth Science), School of Education, 1998

## ADVISING

### *Postdoctoral Researchers:*

Jennifer E. Johnson, University of Arizona, 2014 – 2016

Melissa A. Berke, University of Utah, 2011 – 2013

### *Graduate Student Committees:*

Lehai Hu (M.S./Ph.D., Geology and Geophysics) University of Utah, M.S. 2015/Ph.D. expected 2019

Clement Bataille (Ph.D., Geology and Geophysics) University of Utah, 2014

Thuan Chau (P.S.M., Environmental Science) University of Utah, 2013

### *Graduate Student Research-in-Residence Advisees:*

Amanda L.D. Bender (Ph.D., Earth and Planetary Science) Washington University in St. Louis, 2016

Tiffany B. Saul (Ph.D., Anthropology) University of Tennessee, Knoxville, 2016

### *Undergraduate Thesis Mentees:*

Elizabeth Young (B.S., Biology) University of Utah, 2014

Stephannie Covarrubias (B.A. [Honors], Biology) University of Utah, 2014

Susanna Khachatryan (B.S., Biology) University of Utah, 2012

Yasmeen Hussain (B.S. [Honors], Mathematics; Biology) University of Utah, 2012

Katherine French (B.S., Chemistry) Yale University, 2009

Sara Enders (B.S., Geology and Geophysics) Yale University, 2006

Jennifer Haghpanah (B.S., Chemistry; B.A., Mathematics) Quinnipiac University, 2005

## COMMUNITY OUTREACH

*Judged* student presentations at the 10<sup>th</sup> Biennial Bay-Delta Science Conference (September, 2018).

*Presented* lecture on forensic applications of stable isotopes at the Salt Lake Valley Law Enforcement Administrators and Directors (LEADS) (March, 2018).

*Judged* for the Outstanding Student Paper Award with the Paleoceanography and Paleoclimate Focus Group at the American Geophysical Union Meeting (December, 2011-2014; 2016).

*Presented* lectures at the Salt Lake Unified Police Department's *Cold Case Summit* (June, 2014; May 2016).

*Science Fair Mentor* for New Haven Public Schools (2008) and Salt Lake City Public Schools (2012, 2013).

*Presented* petroleum geochemistry and oil spill forensics talk at a community forum following a large oil spill within Salt Lake City (2010).

*Co-authored* layman's article on stable isotopes for *Bee Culture Magazine* (2010).

*Mentor* for Armonk, NY High School Science Program (2004, 2005).

## SYNERGISTIC ACTIVITIES

*Rapporteur and Agreement Holder Representative: Implementation of Nuclear Techniques to Improve Food Traceability Systems (CRP D52037)*, Research Coordination Meeting 4, Department of Nuclear Science and Applications, Joint FAO/International Atomic Energy Agency Division of Nuclear Techniques in Food and Agriculture (November, 2015; November, 2016).

*Organized and Co-chaired: 25g. Plant Compounds and their Isotope Ratios as Ecohydrological Tracers*, Goldschmidt Conference (June, 2014).

*Organized and Co-chaired: PP12B. New Approaches to Cenozoic Terrestrial Ecosystem and Climate Reconstructions*, American Geophysical Union Fall Meeting (December, 2009).

*Peer Referee* for *Earth and Planetary Science Letters*; *Food Chemistry*; *Geochimica et Cosmochimica Acta*; *Geology*; *Geochemistry*, *Geophysics*, *Geosystems*; *Nature*; *Nature Geoscience*; *Organic Geochemistry*; *Quaternary Science Reviews*; *The Proceedings of the National Academy of Science of the United States of America*; *Plant, Cell and Environment*; *PLOS One*; *Rapid Communications in Mass Spectrometry*; *Sedimentology*.

*Proposal Reviewer* for the National Science Foundation (EAR, BIO, OCE, CAREER), Chilean Fondo Nacional de Desarrollo Científico y Tecnológico, National Institute of Justice, Sigma Xi, the Geological Society of America, and the National Geographic Society.

## PUBLICATIONS

## Peer-Reviewed Scientific Journals and Book Chapters

(#Postdoctoral Researcher author, \*Graduate Student author, §Undergraduate Student author)

33. **Tipple, B.J.**, Valenzuela, L.O., Chau, T.H., \*Hu, L., Bataille, C.P., Chesson, L.A., and Ehleringer, J.R. (*Submitted*) Strontium isotope ratios of human hair from the United States: Patterns and aberrations, *Rapid Communications in Mass Spectrometry*.
32. \*Bender, A.L.D., **Tipple, B.J.**, and Bradley, A.S. (*Submitted*) Investigating species-specific differences in hydrogen isotopic compositions of leaf wax alkanes among *Solanum* species that differ in drought tolerance, *Organic Geochemistry*.
31. Svečnjak, L., Chesson, L.A., Gallina, A., Maia, M., Martinello, M., Mutinelli, F., Necati Muz, M., Nunes, F., Özdemir, N., Saucy, F., **Tipple, B.J.**, Wallner, K., Waś, E., and Waters, T., (*Submitted*) Standard methods for *Apis mellifera* beeswax research, *Journal of Apicultural Research*.
30. \*Jameel, Y., Brewer, S., Fiorella, R.P., **Tipple, B.J.**, Terry, S., and Bowen G.J. (*Accepted, In Revision*) Isotopic reconnaissance of urban water supply system dynamics, *Hydrology and Earth System Sciences*.
29. Chesson, L.A., Barnette, J.E., Bowen, G.J., Brooks, J.R., Casale, J.F., Cerling, T.E., Cook, C.S., Douthitt, C.B., Howa, J.D., Hurley, J.M., Kreuzer, H.W., Lott, M.J., Martinelli, L.A., O'Grady, S.P., Podlesak, D.W., **Tipple, B.J.**, Valenzuela, L.O., and West, J.B. (2018) Stable isotope analysis in plant and animal ecology – with application to forensic science in the Americas, *Oecologia*, 187, 1077-1094.
28. **Tipple, B.J.** and Ehleringer, J.R., (2018) Distinctions in heterotrophic and autotrophic-based metabolism as recorded in the hydrogen and carbon isotope ratios of *normal*-alkanes, *Oecologia*, 187, 1053-1075.
27. **Tipple, B.J.**, Valenzuela, L.O., and Ehleringer, J.R. (2018) Strontium isotope ratios of human hair record intra-city variations in tap water source, *Scientific Reports*, 8, 2224, doi:10.1038/s41598-018-21359-0.
26. **Tipple, B.J.**, \*Jameel, Y., \*Chau, T.H., \*Mancuso, C.J., Bowen, G.J. Dufour, A., Chesson, L.A., and Ehleringer, J.R. (2017) Stable hydrogen and oxygen isotopes of tap water reveal structure of the San Francisco Bay Area's water systems and adjustments during a major drought, *Water Research*, 119, 212-224.
25. \*Chau, T.H., **Tipple, B.J.**, \*Hu, L., Fernandez, D., Cerling, T.E., Chesson, L.A., and Ehleringer, J.R. (2017) Reconstruction of travel history using coupled  $\delta^{18}\text{O}$  and  $^{87}\text{Sr}/^{86}\text{Sr}$  measurements of hair, *Rapid Communications in Mass Spectrometry*, 31, 1-8.
24. \*Jameel, Y., Brewer, S., Good, S.P., **Tipple, B.J.**, Ehleringer, J.R., and Bowen, G.J. (2016) Spatiotemporal variation in the tap water isotope ratios of Salt Lake City: a novel indicator of urban water system structure and dynamics, *Water Resources Research*, 52, 1-20.
23. Ehleringer, J.R., Barnette, J.E., \*Jameel, Y., **Tipple, B.J.**, and Bowen, G.J. (2016) Urban water – A new frontier in isotope hydrology, *Isotopes in Environmental and Health Studies*, 52, 4-5, 477-486.

22. Cerling, T.E., Barnette, J.E., Bowen, G.J., Chesson, L.A., Ehleringer, J.R., Remien, C.H., Shea, P.A., **Tipple, B.J.**, and West, J.B. (2016) Forensic stable isotope biogeochemistry, *Annual Reviews of Earth and Planetary Sciences*, 44, 175-206.
21. **Tipple, B.J.**, Hambach, B., Barnette, J.E., Chesson, L.A., and Ehleringer, J.R. (2016) The influences of cultivation method on inflorescence lipid distributions, concentrations, and carbon isotope ratios of *Cannabis sp.*, *Forensic Science International*, 262, 233-241.
20. <sup>#</sup>Berke, M.A., **Tipple, B.J.**, Hambach, B., and Ehleringer, J.R. (2015) Life-form specific gradients in compound specific  $\delta^2\text{H}$  of modern leaf waxes along a North American Monsoonal transect, *Oecologia*, 179, 4, 981-997.
19. Ehleringer, J.R., Chesson, L.A., Valenzuela, L.O., **Tipple, B.J.**, and Martinelli, L.A., (2015) Humans and Society – Amazing insights from stable isotope biogeochemistry, *Elements*, 11, 4, 259-264.
18. **Tipple, B.J.**, <sup>#</sup>Berke, M.A., Hambach, B., Roden, J.S., and Ehleringer, J.R. (2015) Predicting leaf wax *n*-alkane  $^2\text{H}/^1\text{H}$  ratios: controlled water source and humidity experiments with hydroponically grown trees confirm predictions of Craig-Gordon model, *Plant, Cell and Environment*, 38, 6, 1035-1047.
17. Chesson, L.A., **Tipple, B.J.**, Barnette, J.E., Cerling, T.E., and Ehleringer, J.R. (2015) The potential for application of ink stable isotope analysis in questioned document examination, *Science & Justice*, 55, 1, 27-33.
16. <sup>\*</sup>Bataille, C., Mastalerz, M. **Tipple, B.J.**, and Bowen, G.J. (2013) Influence of organic provenance and preservation on the carbon isotope variations of dispersed organics in ancient floodplain sediments, *Geochemistry, Geophysics, Geosystems*, 14, 11, 4874-4891.
15. **Tipple, B.J.**, <sup>\*</sup>Chau, T.H., Chesson, L.A., Fernandez, D., and Ehleringer, J.R. (2013) Isolation of the strontium pools and isotope ratios in modern human hair, *Analytica Chimica Acta*, 798, 1, 64-73.
14. Chesson, L.A., **Tipple, B.J.**, Erkkila, B.R., and Ehleringer, J.R. (2013) Hydrogen and oxygen stable isotope analysis of pollen collected from honey, *Grana*, 52, 4, 305-315.
13. **Tipple, B.J.** and Pagani, M. (2013) Environmental control on eastern broadleaf forest species' leaf wax distributions and D/H ratios, *Geochimica et Cosmochimica Acta*, 111, 1, 64-77.
12. Dirghangi, S.S., Pagani, M., Hren, M.T., and **Tipple, B.J.** (2013) Distribution of glycerol dialkyl glycerol tetraethers in soils from two environmental transects in the USA, *Organic Geochemistry*, 59, 1, 49-60.
11. **Tipple, B.J.**, <sup>#</sup>Berke, M.A., <sup>§</sup>Doman, C.E., <sup>§</sup>Khachatryan, S. and Ehleringer, J.R. (2013) Leaf *n*-alkane record the plant-water environment at leaf flush, *The Proceedings of the National Academy of Sciences*, 110, 7, 2659-2664.
10. Chesson, L.A., **Tipple, B.J.**, Mackey, G.N., Fernandez, D., and Ehleringer, J.R. (2012) Strontium isotope ratios of tap water from the coterminous USA, *Ecosphere*, 3, 7, Article 67.

9. **Tipple, B.J.**, Chesson, L.A., Erkkila, B., Ehleringer, J.R., and Cerling, T.E. (2012) B-HIVE: Beeswax Hydrogen Isotopes as Validation of Environment Part II. Compound-specific hydrogen isotope analysis, *Food Chemistry*, 134, 1, 494-501.
8. **Tipple, B.J.**, Pagani, M., Krishnan, S., Dirghangi, S.S., Galeotti, S., Agnini, C., Giusberti, L., and Rio, D. (2011) Coupled high-resolution marine and terrestrial records of carbon and hydrologic cycles variations during the Paleocene-Eocene Thermal Maximum (PETM), *Earth and Planetary Science Letters*, 311, 1-2, 82-92.
7. Chesson, L.A., **Tipple, B.J.**, Erkkila, B., Ehleringer, J.R., and Cerling, T. (2011) B-HIVE: Beeswax Hydrogen Isotopes as Validation of Environment Part I. Bulk honey and honeycomb stable isotope analysis, *Food Chemistry*, 125, 2, 576-581.
6. **Tipple, B.J.** and Pagani, M. (2010) A 35 Myr terrestrial higher plant *n*-alkane stable carbon and hydrogen isotope record from the Gulf of Mexico: Implications for North American C<sub>4</sub> grasslands and hydrologic cycle dynamics, *Earth and Planetary Science Letters*, 299, 1-2, 15, 250-262.
5. **Tipple, B.J.**, Meyers, S.R., and Pagani, M. (2010) The carbon isotope ratio of Cenozoic CO<sub>2</sub>: a comparative evaluation of available geochemical proxies, *Paleoceanography*, 25, PA3202, doi:10.1029/2009PA001851.
4. Edwards, E.J., Osborne, C.P., Strömberg, C.A.E., Smith, S.A., Bond, W.J., Christin, P.-A., Cousins, A.B., Duvall, M.R., Fox, D.L., Freckleton, R.P., Ghannoum, O., Hartwell, J., Huang, Y., Janis, C.M., Keeley, J.E., Kellogg, E.A., Knapp, A.K., Leakey, A.D.B., Nelson, D.M., Saarela, J.M., Sage, R.F., Sala, O.E., Salamin, N., Still, C.J., and **Tipple, B.J.** (2010) The origins of C<sub>4</sub> grasslands: Integrating evolutionary and ecosystem science, *Science*, 328, 5978, 587-591.
3. Pedentchouk, N., Sumner, W., **Tipple, B.J.**, and Pagani, M. (2008) δ<sup>13</sup>C and δD Composition of *n*-alkanes from modern angiosperms and conifers: An experimental set-up in central Washington state, USA, *Organic Geochemistry*, 39, 8, 1066-1071.
2. **Tipple, B.J.** and Pagani, M. (2007) The early origins of terrestrial C<sub>4</sub> photosynthesis, *Annual Reviews of Earth and Planetary Sciences*, 35, 435-461.
1. Pagani, M., Zachos, J., Freeman, K.H., **Tipple, B.J.**, and Bohaty, S. (2005) Marked change in atmospheric carbon dioxide concentrations during the Oligocene, *Science*, 309, 600-603.

#### Peer-Reviewed Book Chapters

7. Chesson, L.A., **Tipple, B.J.**, Youmans, L.V., O'Brian, M.A., and Harmon, M.M., (2018) Forensic identification of human skeletal remains using isotopes: A brief history of applications from archaeological dig sites to modern crime scenes, (Eds) Latham, K. Bartelink, E.J. Finnegan, M., *New Perspectives in Forensic Human Skeletal Identification*, 1<sup>st</sup> Edition, pp. 157-173. Academic Press, London, UK. ISBN: 978-0-128-05429-1.
6. Bartelink, E.J., Berg, G.E., Chesson, L.A., **Tipple, B.J.**, Beasley, M.M., Prince-Buitenhuys, J.R., MacInnes, H., MacKinnon, A.T., and Latham, K., (2018) Applications of stable isotope forensics for geolocating unidentified human remains from past conflict

- situations and large-scale humanitarian efforts, (Eds) Latham, K. Bartelink, E.J. Finnegan, M., *New Perspectives in Forensic Human Skeletal Identification*, 1<sup>st</sup> Edition, pp. 175-184. Academic Press, London, UK. ISBN: 978-0-128-05429-1.
5. Chesson, L.A., **Tipple, B.J.**, Ehleringer, J.E., Parks, T., and Bartelink, E.J. (2018) Forensic applications of isotope landscapes (“isoscapescapes”): A tool for predicting region-of-origin in forensic anthropology cases, (Eds) Boyd, D, Boyd, C., *Forensic Anthropology: Theoretical Framework and Scientific Basis*, 356 pages. John Wiley & Sons Limited, London, UK. ISBN: 978-1-119-22638-3.
  4. Chesson, L.A., **Tipple, B.J.**, Chakraborty, S., and Rogers, K. (2017) Odds and Ends, (Eds) Carter, J.F., Chesson, L.A., *Food Forensics: Stable Isotopes as a Guide to Authenticity and Origin*, 352 pages. CRC Press, Boca Raton, FL. ISBN: 978-1-498-74172-9.
  3. Chesson, L.A., Bartelink, E.J., **Tipple, B.J.**, Cerling, T.E., and Ehleringer, J.E. (2017) Forensic applications of isotope geochemistry: Linking materials to individuals, locations, and times, (Ed) Bergslien, E., *Forensics Geoscience: Advances and Applications*, American Geophysical Union Press. ISBN: 978-1-119-05390-3.2.
  2. Bartelink, E.J., Mackinnon, A.T., Prince-Buitenhuys, J.R., **Tipple, B.J.**, and Chesson, L.A. (2016) Stable isotope forensics as an investigative tool in missing person investigations, (Eds) Morewitz, S.J., Sturdy-Colls, C., *Handbook of Missing Persons*, pp. 443-462, Springer International Publishing. New York, New York. ISBN: 978-3-319-40197-3.
  1. Chesson, L.A., **Tipple, B.J.**, Howa, J.D., Bowen, G.J., Barnette, J.E., Cerling, T.E., and Ehleringer, J.R. (2014) Stable Isotopes in Forensics Applications, *Treatise on Geochemistry*, 2<sup>nd</sup> Edition, Volume 14, pp. 285-317.

#### Technical Reports

3. **Tipple, B.J.** (2016) Isotope analyses of hair as a trace evidence tool to reconstruct human movements: Establishing the effects of the “Human Ecosystem” on strontium and oxygen isotope ratios, Department of Justice, National Criminal Justice Reference Service, Document Number 250339, 92 pages.
2. Chesson, L.A., Howa, J.D. and **Tipple, B.J.** (2016) Isotope testing of heroin for provenancing, United Nations Office on Drugs and Crime, 9 pages.
1. **Tipple, B.J.** (2014) Isotope analyses of hair as a trace evidence tool to reconstruct human movements: combining strontium isotope with hydrogen/oxygen isotope data, Department of Justice, National Criminal Justice Reference Service, Document Number 248977, 51 pages.

#### Non-Peer Reviewed Contributions

4. Cook, C.S., Erkkila, B., Chakraborty, S., **Tipple, B.J.**, Cerling, T.E., and Ehleringer, J.R. (2017) Stable Isotope Biogeochemistry and Ecology: Laboratory Manual, *Amazon Independently Published*, 181 pages, ISBN-10: 1973349086/ISBN-13: 978-1973349082.
3. **Tipple, B.J.** and Ehleringer, J.R. (2016) Carbon isotopes — The chemist’s tool to trace marijuana cultivation environment, *Atlas of Science*, <http://bit.ly/2eY44xm>.

2. **Tipple, B.J.** (2013) Capturing climate variability during our ancestors' earliest days, *The Proceedings of the National Academy of Sciences*, 110, 4, 1144-1145.
1. Chesson, L.A. and **Tipple, B.J.** (2010) The isotope wobble dance: how the honey bee communicates with the chemist, *Bee Culture*, 183, 8, 30-32.

*Publications in Progress*

3. Rickaby, R.E.M., **Tipple, B.J.**, and Erez, J. (*In Preparation*) The evolution of carbon isotopic vital effects in planktonic symbiont-bearing foraminifera.
2. \*Saul, T.B., Chesson, L.A., **Tipple, B.J.**, Steadman, D.W. (*In Preparation*) An exploration of the effects of taphonomy on the isotope ratios of human hair.
1. §Covarrubias Avalos, S., Valenzuela, L.O., **Tipple, B.J.**, Chesson, L.A., and Ehleringer, J.R. (*In Preparation*) The distributions and relationships of carbon and nitrogen isotopes in human hair with socioeconomic factors in the Salt Lake Valley, Utah.

**RESEARCH GRANTS**

*Funded Proposals* (total = \$1.93 million)

US Geological Survey, FY18 Priority Ecosystems Science Mid-Year Supplemental Proposals, \$294,552 (7/1/2019-6/30/2021), PI: **B.J. Tipple**, co-PI: M.D. McCarthy, Collaborators: N.G. Prouty, "Developing a new molecular isotopic tool to examine Delta food webs."

US Geological Survey, FY18 Priority Ecosystems Science Mid-Year Supplemental Proposals, \$30,200 (7/1/2018-6/30/2019), PIs: R. Takesue and **B.J. Tipple**, "Sourcing of sediment and contaminant runoff to the northern reaches of San Francisco Bay from the Atlas and Nuns fires."

Packard Foundation: Ocean Science and Technology Grant, \$9,997 (5/15/2018-5/14/2019), PIs: **B.J. Tipple** and M.D. McCarthy, Collaborators: N.G. Prouty, A.R. Stewart. "Development of new molecular tools to understand the biogeochemistry and track change in natural and human-impacted estuaries."

UC Santa Cruz Division of Physical & Biological Sciences: Future Leaders in Coastal Science, \$21,272 (2/15/2018-2/14/2019), Student PI: N.L. Vokshoori, Faculty Advisors: **B.J. Tipple** and M.D. McCarthy, "A window into California's past coastal environments: Compound-specific amino acid isotope ratios from bivalve shells to reconstruct nearshore primary productivity."

National Institute of Justice: NIJ-2016-4305, \$270,894.26 (11/1/2016-10/31/2018), PI: L.A. Chesson, co-PI: **B.J. Tipple**. "A comprehensive test of the methods and models used to assign geographic origin to human skeletal remains with stable isotope data."

United States Fish and Wildlife Service, Wildlife without Border – African Elephant Conservation Fund: F15AS00001, \$63,523.73 (2/1/2016-1/31/2017), PI: T.E. Cerling, co-PI: **B.J. Tipple**, L.A. Chesson. "Isotopic Verification Of Region & Year (IVORY)."

National Institute of Justice: 2013-DN-BX-K009, \$367,399 (10/1/2013-3/31/2016), PI: **B.J. Tipple**. "Isotope analyses of hair as a trace evidence tool to reconstruct human



movements: Establishing the effects of the “Human Ecosystem” on strontium and oxygen isotope ratios.”

Charles Stark Draper Laboratory, University Research and Development (URAD) Program, \$109,736 (7/1/2013-6/27/2014), PI: J.R. Ehleringer, co-PI: **B.J. Tipple**, T.E. Cerling, G.J. Bowen. “Hair as a recorder of region-of-origin and travel history.”

National Institute of Justice: 2011-DN-BX-K544, \$342,000 (9/1/2011-8/31/2014), PI: **B.J. Tipple**. “Isotope analyses of hair as a trace evidence tool to reconstruct human movements: combining strontium isotope with hydrogen/oxygen isotope data.”

National Science Foundation: IOS 1052551, \$707,500 (4/15/2011-3/31/2015), PI: J.R. Ehleringer, co-PI: **B.J. Tipple**. “Hydrogen isotopes in *n*-alkanes of tree leaves and needles: experimental studies with ecophysiological, ecosystem, climate, and dust-related applications.”

Yale University: John F. Enders Fellowship and Research Grant, \$2,000 (5/1/2006-9/30/2006), “Tree leaf waxes as environment recorders: An empirical evaluation with paleoclimate applications.”

Geological Society of America: Graduate Student Research Grant, \$2,500 (5/1/2005-9/30/2005), “(U-Th)/He and fission-track detrital grain double-dating as a paleo-wildfire indicator: Implications to the PETM.”

Yale Institute of Biospheric Studies: Field Ecology Grant, \$2,000 (11/1/2004-10/31/2005), “Establishing the carbon isotope ratio of Paleogene CO<sub>2</sub> from sedimentary charcoal.”

#### **SCHOLARSHIPS, FELLOWSHIPS, AND ACADEMIC AWARDS**

Best Poster Presentation – FIRMS/Isotope Analysis, ANZFSS International Symposium on the Forensic Sciences, Auckland, New Zealand (2016)

Estwing Hammer Award, Estwing Manufacturing Corporation/Graduate School of Arts and Sciences, Yale University (2008)

John F. Enders Fellowship & Research Grant, Graduate School of Arts and Sciences, Yale University (2006)

Graduate Student Research Grant, Geological Society of America (2005)

Kenneth N. Weaver Student Travel Award, Northeastern Section of the Geological Society of America (2005)

Graduate Research Fellowship, National Science Foundation (2004-2007)

Best Undergraduate Research Project Award, Indiana University (2003)

Bill and Jan Cordua Scholarship, Department of Geological Sciences, Indiana University (2003)

William C. Menke Scholarship, Indiana University (2002)

Bill Armstrong/Little 500 Scholarship, Indiana University Student Foundation (2002)

Charles Deiss Scholarship, Department of Geological Sciences, Indiana University (2001)

Elected Phi Beta Kappa, Indiana University (2001)

## PATENTS

Ehleringer, J.R., Chesson, L.A., Dunn, R., Ehleringer, J., Shea, P.A., and **Tipple, B.J.** (2017) *U.S. Patent No. 20170299564*. Salt Lake City, UT: U.S. Patent and Trademark Office.

## PRESENTATIONS

### *Invited Lectures*

*Leaf waxes as paleoclimate proxies: The continuing evolution of stable isotope-based methods to reconstruct past terrestrial environments*, Department of Geology and Geophysics, Louisiana State University, Baton Rouge, LA (March, 2018).

*Stable isotopes of marijuana– A fingerprint of cultivation condition and origin*, Salt Lake Valley Law Enforcement Administrators and Directors (LEADS) Meeting, Salt Lake City, UT (March, 2018).

*Stable isotopes of cannabis – A powerful new analytical tool*, Cannabis Science Conference, Portland, OR (August, 2017).

*Stable hydrogen and oxygen isotopes of water: A reservoir of environmental information*, School of Natural Sciences, University of California, Merced, Merced, CA (April, 2017).

*Crawling onto the land: The evolution of stable isotope-based proxies to reconstruct past terrestrial environments*, ConocoPhillips School of Geology and Geophysics, University of Oklahoma, Norman, OK (March, 2017).

*Exploring the “human ecosystem” with isotopes of water*, Department of Earth and Planetary Sciences, Washington University in St. Louis, St. Louis, MO (December, 2016).

*A framework to develop isoscape models for product origin and tracing questions*, International Atomic Energy Agency, Research Coordination Meeting for the *Implementation of Nuclear Techniques to Improve Food Traceability Systems*, Vienna, Austria (November, 2016).

*Applications of stable isotopes in cold case investigations*, Utah Division for the International Association for Identification Spring Conference, Weber County Sheriff’s Office, Ogden, UT (May, 2016).

*Using isotope analysis to assist in cold case investigations*, Cold Case Summit, Unified Police Department of Greater Salt Lake, Salt Lake City, UT (May, 2016).

*Stable isotopes in the forensic sciences*, College of Agriculture and Natural Resources, University of Delaware, Newark, DE (March, 2016)

*Using oxygen and strontium isotopes to dissect a human ecosystem: A spatial and temporal study of water and human hair from Southern California*, American Academy of Forensic Sciences, Las Vegas, NV (February, 2016).

*Translational Geochemistry: Applying stable isotopes to societal and biogeoscience questions*, Department of Geosciences, Weber State University, Ogden, UT (February, 2016).

*A framework to interpret isotope ratios for product origin and tracing questions*, International Atomic Energy Agency, Research Coordination Meeting for the *Implementation of Nuclear Techniques to Improve Food Traceability Systems*, Kampala, Uganda (October, 2015).

*Strontium isotope ratios of hair for human provenancing*, American Chemical Society Annual Meeting, Boston, MA (August, 2015).

*Predicting the hydrogen isotope ratios of leaf waxes across landscapes*, American Geophysical Union Annual Meeting, San Francisco, CA (December, 2014).

*CSI: Crimes Solved with Isotopes*, Cold Case Summit, Unified Police Department of Greater Salt Lake, Salt Lake City, UT (June, 2014).

*Combining strontium and oxygen isotope ratios of hair for human provenancing*. American Academy of Forensic Sciences, Seattle, WA (February, 2014).

*The isotopes don't lie, but what are they telling us?* Department of Earth and Environmental Science, Temple University, Philadelphia, PA (November, 2013).

*Refining paleoenvironmental proxies from plant leaf waxes*, Department of Biology, University of Utah, Salt Lake City, UT (October, 2013).

*Isotope analysis of hair as a trace evidence tool to reconstruct human movements*. American Academy of Forensic Sciences, Atlanta, GA (February, 2012).

*A 35 Myr record of North American grasslands and hydrologic cycle dynamics*. Department of Geology, University of Cincinnati, Cincinnati, OH (November, 2011).

*Forensics applications of isoscapes*. Department of Earth, Atmospheric, and Planetary Sciences, Purdue University, West Lafayette, IN (September, 2011).

*Coupled marine and terrestrial records of carbon cycle variation during the PETM*. Department of Geological Sciences, Brown University, Providence, RI (July, 2011).

*Fingerprints of oil - how scientists can distinguish one oil from another*. Community Lecture Series – The Life of an Urban Stream, Salt Lake City, UT (August, 2010).

*Leaf wax compound specific isotope ratios: Insights from the Modern and application to Cenozoic climates and floral dynamics*. Distinguish Lecturer Series, Department of Geology and Geophysics, University of Utah, Salt Lake City, UT (February, 2010).

*Leaf waxes as environment recorders*. National Evolutionary Synthesis Center, Duke University, Durham, NC (April, 2009).

*A Neogene higher plant n-alkane carbon and hydrogen isotope record from the Gulf of Mexico*, Conoco-Philips, Houston, TX (December, 2008).

Contributed Presentations (\*Oral, #Poster)

*New molecular isotopic tools to understand the modern and past food webs of the San Francisco Bay and Delta*<sup>#</sup>, Bay/Delta Science Conference, Sacramento, CA (September, 2018).

*Combining molecular tools to track San Francisco Bay estuary biogeochemistry in relation to human development of the region*<sup>#</sup>, Organic Geochemistry – Gordon Research Conference, Holderness, NH (August, 2018).

*Tap water isotopes reveal the San Francisco Bay Area's plumbing and responses to a major drought*<sup>#</sup>, American Geophysical Union, Annual Meeting, San Francisco, CA (December, 2016).

*Strontium isotope ratios of human hair from the United States: Trends, Patterns, and Aberrations*<sup>#</sup>, ANZFSS International Symposium on the Forensic Sciences, Auckland, New Zealand (September, 2016).

*Strontium isotope ratios of hair for human provenancing*<sup>\*</sup>, American Academy of Forensic Sciences, Orlando, FL (February, 2015).

*Establishing the environmental controls and mechanisms shaping the  $^2\text{H}/^1\text{H}$  ratios of leaf wax n-alkanes*<sup>\*</sup>, Goldschmidt Conference, Sacramento, CA (June, 2014).

*Both water source and atmospheric water impact leaf wax n-alkane  $^2\text{H}/^1\text{H}$  values of hydroponically grown angiosperm trees*<sup>#</sup>, American Geophysical Union Annual Meeting, San Francisco, CA (December, 2013).

*Combining strontium and oxygen isotope ratios of hair for human provenancing*<sup>#</sup>, Geological Society of America Annual Meeting, Denver, CO (October, 2013).

*Isolation of strontium pools and isotope ratios in modern human hair*<sup>#</sup>, Forensic Isotope Ratio Mass Spectrometry (FIRMS) Meeting, Montreal, Canada (September, 2013).

*The spatial patterns of water management practices are reflected in the strontium isotope ratios of human hair*<sup>#</sup>, American Geophysical Union Annual Meeting, San Francisco, CA (December, 2012).

*Transpiration and atmospheric water impact the leaf wax n-alkane  $^2\text{H}/^1\text{H}$  values of hydroponically grown angiosperm trees*<sup>#</sup>, Organic Geochemistry – Gordon Research Conference, Holderness, NH (August, 2012).

*Leaf waxes in riparian trees: hydrogen isotopes and chain-length patterns*<sup>#</sup>, American Geophysical Union Annual Meeting, San Francisco, CA (December, 2011).

*Beeswax Hydrogen Isotopes as Validation of Environment: B-HIVE*<sup>\*</sup>, Forensic Isotope Ratio Mass Spectrometry (FIRMS) Meeting, Washington, DC (April, 2010).

*A terrestrial PETM record of variations in carbon and hydrologic cycles from Northern Italy*<sup>\*</sup>, American Geophysical Union Annual Meeting, San Francisco, CA (December, 2009).

*Beeswax normal-alkane distributions and hydrogen isotope ratios as geo-location tools*<sup>#</sup>, IsoCompound Meeting, Potsdam, Germany (May, 2009).

*Leaf waxes as a recorder of the hydrogen isotope ratios of precipitation and ground-water: Field data from the California Coastal and Sierra Nevada Ranges<sup>#</sup>*, IsoCompound Meeting, Potsdam, Germany (May, 2009).

*A 35 Myr higher plant n-alkane stable carbon and hydrogen isotope record from the Gulf of Mexico: Implications to North American C<sub>4</sub> grasslands and hydrologic cycle dynamics<sup>#</sup>*, Organic Geochemistry – Gordon Research Conference, Holderness, NH (August, 2008).

*Orographic and climatic influence on leaf wax carbon and hydrogen isotopic ratios: A field survey from Northern California<sup>#</sup>*. American Geophysical Union Annual Meeting, San Francisco, CA (December, 2008).

*(U-Th)/He and Fission-Track detrital grain double-dating as a paleo-wildfire indicator: Trials and tribulations from two Western Interior Basins and implications to the PETM<sup>\*</sup>*, Geological Society of America Annual Meeting, Denver, CO (October, 2007).

*Eliciting climatic controls on leaf wax carbon and hydrogen isotopic ratios: A field study from the eastern US<sup>\*</sup>*, American Chemical Society Annual Meeting, Boston, MA (August, 2007).

*A Neogene higher plant n-alkane carbon and hydrogen isotope record from the Gulf of Mexico<sup>#</sup>*. American Geophysical Union Annual Meeting, San Francisco, CA (December, 2006).

*A Late Miocene n-alkane  $\delta D$  and  $\delta^{13}C$  record from the Gulf of Mexico<sup>#</sup>*, Geological Society of America Annual Meeting, Philadelphia, PA (October, 2006).

*Coupled Late Miocene n-alkane  $\delta D$  and  $\delta^{13}C$  records from the Gulf of Mexico: Preliminary results<sup>#</sup>*, Organic Geochemistry – Gordon Research Conference, Holderness, NH (August, 2006).

*A biomarker record of the Paleogene evolution and expansion of C<sub>4</sub> plants<sup>\*</sup>*, Geological Society of America Annual Meeting, Salt Lake City, UT (October, 2005).

*Long-term regional contributions of Cenozoic C<sub>4</sub> plants to marine sediments<sup>\*</sup>*, Geological Society of America Annual Meeting, Denver, CO (October, 2004).

*C<sub>4</sub> plant distribution during the Cenozoic: Approach and preliminary Evidence<sup>#</sup>*, Organic Geochemistry – Gordon Research Conference, Holderness, NH (August, 2004).

*Carbon Isotopic Evidence for a Methane-Supported Microbial Community from a Late Archean Silty Shale: Witwatersrand Basin, South Africa<sup>#</sup>*, Carnegie Institute, Washington D.C. (May, 2003).

#### Abstracts

2018 **Tipple, B.J.** Prouty, N.G., Stewart, A.R., and McCarthy, M.D. *New molecular isotopic tools to understand the modern and past food webs of the San Francisco Bay and Delta*, Bay/Delta Science Conference, Sacramento, CA (September, 2018).

**Tipple, B.J.**, Prouty, N.G., and McCarthy, M.D. *Combining molecular tools to track San Francisco Bay estuary biogeochemistry in relation to human development of the region*, Organic Geochemistry – Gordon Research Conference, Holderness, NH (August, 2018).

Saul, T.B., Gordon, G.W., **Tipple, B.J.**, Chesson, L.A., Steadman, D.W., Wescott, D. *Postmortem isotope ratio fidelity of human hair throughout outdoor decomposition*, Advances in Stable Isotope Techniques and Applications (ASITA) Workshop, Washington, DC (June, 2018).

Saul, T.B., Gordon, G.W., **Tipple, B.J.**, Chesson, L.A., Steadman, D.W., Wescott, D. *Taphonomic effects on isotope ratios of human hair*, American Academy of Forensic Sciences, Seattle, WA (February, 2018).

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Bartelink, E.J., Chesson, L.A., **Tipple, B.J.**, Hall, S., and Kramer, R. *Use of stable isotopes to predict region of origin of undocumented border crossers from the US/Mexico Border*, Latin American Association of Anthropology (ALAF), São Paulo, SP, Brazil (October, 2017).

**Tipple, B.J.** and Ehleringer, J.E. *Stable isotopes of cannabis – A powerful new analytical tool*, Cannabis Science Conference, Portland, OR (August, 2017).

2016 **Tipple, B.J.**, Jameel, Y., Chau, T.H., Mancuso, C.J., Bowen, G.J. Dufour, A., Chesson, L.A., and Ehleringer, J.R. *Tap water isotopes reveal the San Francisco Bay Area's plumbing and responses to a major drought*, American Geophysical Union, Annual Meeting, San Francisco, CA (December, 2016).

Johnson, J.E. **Tipple, B.J.**, Betancourt, J.L., Ehleringer, J.E., Leavitt, S.W., and Monson, R.K., *Variation in the apparent biosynthetic fractionation of n-alkane  $\delta D$  among terrestrial plants: Patterns, mechanisms, and implications*, American Geophysical Union, Annual Meeting, San Francisco, CA (December, 2016).

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Jameel, Y, Brewer, S., Good, S.P., **Tipple, B.J.**, Ehleringer, J.R., and Bowen, G.J., *Local scale spatiotemporal variation in the tap water isotope ratios: Implications for forensic studies and geolocation*, ANZFSS International Symposium on the Forensic Sciences, Auckland, New Zealand (September, 2016).

Ehleringer, J.R., **Tipple, B.J.**, Chesson, L.A., *Stable isotopes in Environmental and Food Forensics*, International Symposium on Stable Isotopes in Marine & Environmental Sciences, Hanyang University ERICA Campus, Ansan, Korea (May, 2016).

Ehleringer, J.R., Covarrubias Avalos, S., Mancuso, C.J., **Tipple, B.J.**, Martinelli, L.A., Valenzuela, L.O., Chakraborty, S., *Diet, location, travel, and socioeconomic status: what stable isotopes reveal about you*, IsoEcol 2016, Toyko, Japan (April, 2016).

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**Tipple, B.J.**, Chau, T.H., Chesson, L.A., and Ehleringer, J.R., *Using oxygen and strontium isotopes to dissect a human ecosystem: A spatial and temporal study of water and human hair from Southern California*, American Academy of Forensic Sciences, Las Vegas, NV (February, 2016).

2015 Johnson, J.E. **Tipple, B.J.**, Betancourt, J.L., Ehleringer, J.E., Leavitt, S.W., and Monson, R.K., *Do interspecific differences in the stable hydrogen isotopic composition of n-alkanes reflect variation in plant water sources or in biosynthetic fractionation*, American Geophysical Union, Annual Meeting, San Francisco, CA (December, 2015).

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Valenzuela, L.O., Covarrubias Avalos, S., **Tipple, B.J.**, and Ehleringer, J.R., *“Somos lo que comemos”*: Isótopos estables de pelo y respiración como bio-marcadores cuantitativos de dieta y nutrición, Jornada Nacionales de Anthropologia Biologica, Corrientes, Argentina (September, 2015).

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- 2014 **Tipple, B.J.**, Berke, M.A., Hambach, B., Roden, J.S., and Ehleringer, J.R., *Predicting the hydrogen isotope ratios of leaf waxes across landscapes*, American Geophysical Union, Annual Meeting, San Francisco, CA (December, 2014).
- Mancuso, C.J., **Tipple, B.J.**, and Ehleringer, J.R., *Observation of isotope ratios ( $\delta^2H$ ,  $\delta^{18}O$ ,  $^{87}Sr/^{86}Sr$ ) of tap water in urban environments*, American Geophysical Union, Annual Meeting, San Francisco, CA (December, 2014).
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- Berke, M.A., **Tipple, B.J.**, Hambach, B., Sandquist, D., and Ehleringer, J.R., *Multidecadal isotope analysis of Encelia farinosa from Death Valley, California*, Organic Geochemistry – Gordon Research Conference, Holderness, NH (August, 2014).
- Tipple, B.J.**, Berke, M.A., Hambach, B., Roden, J.S., and Ehleringer, J.R., *Establishing the environmental controls and mechanisms shaping the  $^2H/^1H$  ratios of leaf wax n-alkanes*, Goldschmidt Conference, Sacramento, CA (June, 2014).
- Berke, M.A., **Tipple, B.J.**, Hambach, B., Sandquist, D., and Ehleringer, J.R., *Multidecadal isotope analysis of Encelia farinosa from Death Valley, California*, Goldschmidt Conference, Sacramento, CA (June, 2014).
- Tipple, B.J.**, Valenzuela, L.O., Chesson, L.A., and Ehleringer, J.R., *Combining strontium and oxygen isotope ratios of hair for human provenancing*. American Academy of Forensic Sciences, Seattle, WA (February, 2014).
- 2013 Berke, M.A., **Tipple, B.J.**, Hambach, B., and Ehleringer, J.R., *Controls on compound specific  $^2H/^1H$  of leaf waxes along a North American monsoonal transect*, American Geophysical Union, Annual Meeting, San Francisco, CA (December, 2013).
- Tipple, B.J.**, Berke, M.A., Hambach, B., Roden, J.S., and Ehleringer, J.R., *Both water source and atmospheric water impact leaf wax n-alkane  $^2H/^1H$  values of hydroponically grown angiosperm trees*, American Geophysical Union, Annual Meeting, San Francisco, CA (December, 2013).
- Tipple, B.J.**, Chesson, L.A., Valenzuela, L.O., Bowen, G.J., and Ehleringer, J.R., *Combining strontium and oxygen isotope ratios of hair for human provenancing*, Geological Society of America, Annual Meeting, Denver, CO (October, 2013).
- Bowen, G.J., Baker, M., **Tipple, B.J.**, and Ehleringer, J.R., *Stable isotope ratios document community-scale structure and connectivity in public water supply systems*, Geological Society of America, Annual Meeting, Denver, CO (October, 2013).
- Tipple, B.J.**, Chau, T.H., Chesson, L.A., Fernandez, D.P., and Ehleringer, J.E., *Isolation of strontium pools and isotope ratios in modern human hair*, Forensic Isotope Ratio Mass Spectrometry (FIRMS) Meeting, Montreal, Canada (September 2013).
- Ehleringer, J.E., Valenzuela, L.O., Chesson, L.A., **Tipple, B.J.** and Cerling, T.E., *A review of recent forensic applications of multiple stable isotopes in human hair to reconstruct travels*, Forensic Isotope Ratio Mass Spectrometry (FIRMS) Meeting, Montreal, Canada (September 2013).



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Berke, M.A., **Tipple, B.J.**, Hambach, B., and Ehleringer, J.R., *Compound specific  $^2\text{H}/^1\text{H}$  of modern leaf waxes along a North American Monsoonal transect*, International Meeting on Organic Geochemistry, Costa Adeje, Tenerife, Canary Islands (September, 2013).

**Tipple, B.J.**, Chesson, L.A., Valenzuela, L.O., and Ehleringer, J.R., *Geochemistry and the spatial patterns of water management are reflected in human hair*, Goldschmidt Conference, Florence, Italy (August, 2013).

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**Tipple, B.J.**, Berke, M.A., Hambach, B., Roden, J.S., and Ehleringer, J.R., *Transpiration and atmospheric water impact the leaf wax n-alkane  $^2\text{H}/^1\text{H}$  values of hydroponically grown angiosperm trees*, Organic Geochemistry – Gordon Research Conference, Holderness, NH (August, 2012).

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