

KEVIN D. WEBSTER

<https://websterkgd.com>

EDUCATION

Indiana University, Bloomington

Ph.D. *Geology*. February 2017. Advisor: Arndt Schimmelmann. Dissertation: The Sources and Sinks of Methane in Caves. Minor: *Ecology and Evolution*

M.Sc. *Geology*. May 2013. Advisor: Lisa M. Pratt. Thesis: Methane dynamics associated with a small arctic lake, southwest Greenland.

University of Colorado at Boulder

BA: *Ecology and Evolutionary Biology and Geology*. May 2010.

Honors Thesis (*Summa cum Laude*): The preservation of fossil arthropods in the Middle Miocene Barstow Formation, southern California. Advisor: Dena M. Smith

EMPLOYMENT

2020 – Current: *Faculty*, Diné College, Department of STEM

2018 – Current: *Associate Research Scientist*, Planetary Science Institute

2018 – 2019: *Senior Research Associate*, University of Arizona, Department of Soil, Water, and Environmental Science

2017: *Post-Doctoral Research Associate*, University of Arizona, Department of Ecology & Evolutionary Biology

MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS

National Speleological Society (2012 -)

Geological Society of America (2013 -)

American Geophysical Union (2014 -)

PREPRINT, IN PREP., OR SUBMITTED PUBLICATIONS

Rhodes SM, D'souza S, **Webster KD**. Attitudes among emergency department staff regarding advance care planning among patients in the ED. (In preparation).

Webster KD, Drobniak A, Mastalerz, M, Sauer PE, Schimmelmann A. Continental-scale volatile organic compound consumption in karst caves and estimates of their fluxes. (In preparation)

Webster KD, Barberán A. Methane-, hydrogen-, and carbon monoxide- oxidizing bacteria in North American dust. (In preparation)

Spitale JN, Tigges MD, Rhoden A, Hurford TA, **Webster KD**. Curtain-based maps of eruptive activity in Enceladus' south-polar terrain at fifteen Cassini epochs. (Submitted)

Meyer KM, Morris AH, **Webster KD**, Klein AM, Kroeger ME, Meredith LK, Brændholt A, Nakamura F, Venturini A, Fonseca de Souza L, Shek KL, Danielson R, van Haren J, Barbosa de Camargo B, Tsai SM, Dini-Andreote F, de Mauro JMS, Nüsslein K, Saleska SR, Rodrigues JLM, Bohannan BJM (2020). Rainforest to

- pasture conversion stimulates soil methanogenesis across the Brazilian Amazon. *bioRxiv* <https://doi.org/10.1101/2020.03.10.984807>
- Kroeger ME, Meredith LK, Meyer KM, **Webster KD**, Barbosa de Camargo P, Fonseca de Souza L, Tsai SM., van Haren J, Saleska SR, Bohannan BJM, Rodrigues JLM, Nüsslein K (2020). Rainforest to pasture conversion stimulates soil methanogenesis across the Brazilian Amazon. *bioRxiv* <https://doi.org/10.1101/2020.03.08.982587>
- Webster KD**, Schimmelmann A, Drobniak A, Mastalerz M, Rosales Lagarde L, Boston PJ, Lennon JT (2018). Diversity and function of cave methanotrophic communities. *bioRxiv* <http://dx.doi.org/10.1101/412213>

PEER-REVIEWED PUBLICATIONS

- Rodriguez JAP, Dobrea EN, Kargel J, Baker VR, Crown D, **Webster KD**, Berman D, Wilhelm MB, Buckner D (2020). Mars' oldest highlands reveal evidence of a possible muddy rain origin. *Scientific Reports*, 10, 10347. <https://doi.org/10.1038/s41598-020-64676-z>
- Carrier BL, ... **Webster KD**, ... et. al. (2020). Mars extant life: What's next? Conference report. *Astrobiology*, 20(6), 785-814. <https://doi.org/10.1089/ast.2020.2237>
- Rodriguez JAP, Leonard GJ, Domingue DL, Berman DC, Banks M, Zarroca M, Rogelio Linares R, Marchi S, Kargel JS, Baker VR, **Webster KD**, Sykes M (2020). The chaotic terrains of Mercury reveal a history of planetary volatile retention in the innermost solar system. *Scientific Reports*, 10(1), 1-14. <https://doi.org/10.1038/s41598-020-59885-5>
- Webster KD**, Drobniak A, Etiope G, Mastalerz M, Sauer PE, Schimmelmann A (2018). Subterranean karst environments as a global sink for atmospheric methane. *Earth and Planetary Science Letters*, 485, 9-18. <https://doi.org/10.1016/j.epsl.2017.12.025>
- Stelmach KB, Neveu M, Vick-Majors T, Mickol R, Chou L, **Webster KD**, Tilley M, Zacchei F, Escudero C, Flores Martinez C, Labrado A, Fernández E (2018). Secondary electrons as an energy source for life. *Astrobiology*, 18(1), 1-13. <http://doi.org/10.1089/ast.2016.1510>
- Webster KD**, Rosales Lagarde L, Sauer PE, Schimmelmann A, Lennon JT, Boston PJ (2017). Isotopic evidence for the migration of thermogenic methane into a sulfidic cave, *Cueva de Villa Luz*, Tabasco, Mexico. *Journal of Cave and Karst Studies*, 79(1), 24-34. <http://dx.doi.org/10.4311/2016ES0125>
- Lennon JT, Nguyễn-Thùy D, Phạm TM, Drobniak A, Tạ PH, Phạm NĐ, Streil T, **Webster KD**, Schimmelmann A (2017). Microbial contributions to subterranean methane sinks. *Geobiology*, 15(2), 254-258. <http://dx.doi.org/10.1111/gbi.12214>
- Webster KD**, Mirza A, Deli JM, Sauer PE, Schimmelmann A (2016). Consumption of atmospheric methane in a limestone cave in Indiana, USA. *Chemical Geology*, 443, 1-9. <http://dx.doi.org/10.1016/j.chemgeo.2016.09.020>
- Webster KD**, White JR, Pratt LM (2015). Use of open-path laser spectroscopy to evaluate atmospheric methane concentrations, Southwest Greenland. *Arctic, Antarctic, and Alpine Research* 47(4), 599-609. <http://dx.doi.org/10.1657/AAAR0014-051>

INVITED TALKS

- Cave air, isotopes, microbes, and extraterrestrials. *University of Georgia, Department of Geosciences Weekly Seminar*, 2020
- Cave air and the search for extraterrestrial life. *Diné College Seminar*, 2020
- An overview of methane in cave air. *Geological Society of America Conference*, 2019
- Caves as a global methane sink. *Empa: Emissions and Isotopes Group*, Switzerland, 2019
- Let's go to Mars: A historical overview of humanity's interest in Mars, what's happening today, and what might happen next. *Science Café*, Bloomington Indiana, 2013

PUBLISHED ABSTRACTS

- Webster KD** (2019). An overview of methane in cave air. *Geological Society of America Conference*. Invited Talk
- Webster KD**, Schimmelmann A, Drobniak A, Mastalerz, M (2019). Differential trace gas concentrations in cave air compared to the atmosphere. *Geological Society of America Conference*. Poster
- Truebe SA, **Webster KD** (2019). High-resolution measurements of cave air pCO₂ in the context of 30 years of cave air carbon dioxide data. *National Cave and Karst Management Symposium*.
- Webster KD** (2019). Developing cave air as a biosignature. *Mars Extant Life: What's Next?* Talk.
- Webster KD**, Jarnot AW, Blake DR, Drobniak A, Schimmelmann A, Mastalerz M, Barberán A (2018). Consumption of volatile organic compounds in caves. *American Geophysical Union Fall Meeting*, Poster.
- Webster KD**, Meredith LK, Piccini W, Pedrinho A, Nüsslein, K, van Haren J, Camargo PB, Mui TS, Saleska SR (2017). Recovery of methane consumption by secondary forest soils in the Amazon River Basin. *American Geophysical Union Fall Meeting*, Poster.
- Webster KD**, Schimmelmann A, Lennon JT (2016). Diversity and function of methanotrophic bacteria in caves. *American Geophysical Union Fall Meeting*, Talk.
- Schimmelmann A, Lennon JT, Nguyen-Thuy D, Hoa PT, Drobniak A, **Webster KD**, Schimmelmann M (2016). Vietnam's tropical karst is a sink for atmospheric methane greenhouse gas. *5th International Conference on Earth Science & Climate Change*.
- Webster KD**, Schimmelmann A, Sauer PE (2015). Seasonal fluctuations in the methane concentration of cave air. *Geological Society of America Annual Meeting Paper No. 15-6*. Talk.
<https://gsa.confex.com/gsa/2015AM/webprogram/Paper264539.html>
- Webster KD**, Drobniak A, Sauer PE, Mastalerz, M, Schimmelmann A (2015). Cave air as a biosignature. *2nd International Planetary Caves Conference* October 20–23, 2015. Talk. <http://www.hou.usra.edu/meetings/2ndcaves2015/>
- Webster KD**, Rosales Lagarde L, Sauer PE, Schimmelmann A, Lennon JT, Boston PJ (2014). Hydrogen and carbon stable isotopic compositions and concentrations of

- methane in cave air of Cueva de Villa Luz, Tabasco, Mexico. *American Geophysical Union Fall Meeting*, B31B-0010. Poster.
<http://abstractsearch.agu.org/meetings/2014/FM/B31B-0010.html>
- Webster KD**, Schimmelman A, Drobnik A, Mastalerz M, Etiope G, Sauer PE, Lennon JT (2013). Methane dynamics in limestone caves. *Geological Society of America Abstracts with Programs* 45(7). Talk.
- Webster KD**, White JR, Cadieux SB, Young SA, Pratt LM (2013). Methane dynamics associated with a small, arctic lake southwest Greenland: Implications for Mars. *Indiana University Crossroads*. Poster.
- White JR, **Webster KD**, Pratt LM (2013). Methane concentration gradients associated with a small thermokarst lake on the ice-free margin of western Greenland. *LPSC XLIV*, Abstract # 3105.
- Webster KD**, White JR, Young SA, Pratt LM (2012). Methane gradients associated with a small, deep lake on the ice-free margin of western Greenland. *AGU Abstracts* B31D-0446. Poster.
- Broemsen EL, **Webster KD**, Dieser M, Pratt LM, Christner BC (2012). Analysis of methanogenic and methanotrophic activity at the western margin of the Greenland Ice Sheet. *AGU Abstracts* C13B-0624.
- Webster KD**, Etiope G, Drobnik A, Schimmelman A, Pratt LM (2012). Measurement of terrestrial methane concentrations comparable to proposed methane concentrations on Mars. *IWIPM Abstract* #1009. Poster.
- Webster KD**, Rebholz JA, White JR, Douglas BJ, Pratt LM (2012). Using open-path laser measurement of atmospheric methane concentration along a major shear zone in western Greenland as an analogue for exploration on Mars. *LPSC XLIII* Abstract #1514. Poster.
- Webster KD**, Smith DM (2009). Preservation of fossil arthropods in the Middle Miocene Barstow Formation, southern California. *Geological Society of America Abstracts with Programs* 41(7), 630. Poster.
- Hollis KA, **Webster KD**, Smith DM (2008). Using taphonomic disparity to understand preservation biases in the Western Interior Seaway: An example from the Pierre Shale (Upper Cretaceous). *Geological Society of America Abstracts with Programs*.

GRANTS AWARDED

- Student Travel Grant, Indiana University Department of Geological Sciences, 2016. \$300.
- Student Travel Grant, Indiana University Department of Geological Sciences, 2015. \$300.
- Geological Society of America Student Travel Grant, Annual Meeting, 2015, \$100.
- Mars Student Travel Grant. NASA International Planetary Caves Conference, 2015, \$800.
- NASA Astrobiology Institute Santander Summer School Scholar, 2014, \$1,785
- Methane dynamics of caves, 2014. Funded by The National Speleological Society Veshlage Grant, 2014, \$1,577. PI- KD Webster

Methane cycling in caves as an analog for methane cycling on Mars. Funded by The National Speleological Society Research Grant, 2013, \$700. PI- KD Webster, CO PI- A Schimmelmann

Methane cycling in caves as an analog for methane cycling on Mars. Funded by Indiana University Department of Geological Sciences Grant in Aid, 2013. \$900. PI – KD Webster

Chevron Fellow, IU Bloomington 2011-2012, \$20,000

Preservation of fossil arthropods in the Middle Miocene Barstow Formation, southern California. Funded by Geology Mentorship Program, 2008, Undergraduate Research Opportunities Program (UROP), \$2,000. 2009 (University of Colorado).

Using Taphonomic Disparity to Understand Preservation Biases in the Western Interior Seaway: An Example from the Pierre Shale (UpperCretaceous). UROP, 2007. \$800. (University of Colorado).

TEACHING EXPERIENCE

L113: Introduction to Biology	Associate Instructor	(Fall 2016)
G104: Evolution of the Earth	Associate Instructor	(Spring 2014)
G131: Oceans & Our Global Environment	Associate Instructor	(Fall 2013)
G406: Introduction to Geochemistry	Associate Instructor	(2013)

PROFESSIONAL SERVICE

Peer Reviewer: *Science of the Total Environment*, *FEMS Microbial Ecology*, *The Journal of Cave and Karst Studies*

Primary Session Convener: Advances in origin of life research. AGU Conference, 2017

PROFESSIONAL OUTREACH (PAST THREE YEARS)

Volunteer at the Tucson Book Festival: 2017-2019.

Public Webinar: Cave Air and Life on Mars. November, 2018.

Expert Science Guest in the Sexy Beasts Podcast: Live at Science Gallery Dublin. 2018.
<https://audioboom.com/posts/6949781-sexy-beasts-live-aliens>

Public Lecture: The Chemical Composition of Cave Air and its Astrobiological Significance. Cochise Country Cavers Meeting. July, 2018

Public Lecture: The Sources and Sinks of Methane in Caves. ARA Winter Technical. January 2018

2016: Leader in departmental *First Grade Geology Day*, Proctor for *Science Olympiad*

Host of *Indiana University Origin of Life Reading Group* (2013 - 2017)

Host of *Indiana University Clean Up Wikipedia Day* (2014 - 2017)

President of *Oktoberchess* (Ind. Univ. Geol. Sci.) (Charity Chess Tournament) (2011 - 2016)

ACADEMIC HONORS

NASA Astrobiology Institute Santander Summer School Scholar 2014

Nat. Sci. Foundation Graduate Research Fellowship Honorable Mention 2013

Chevron Fellow, IU Bloomington 2011-2012

Member of ΦBK (Phi Beta Kappa)

CU Boulder Graduate with Distinction, May 2010

CU Boulder Dean's List: Spring 2010; Fall 2009; Fall 2007

OTHER

1st and 2nd Team All-Conference Water Polo Goalie, Rocky Mountain Division (2007, 2009)

Captain of *University of Colorado Men's Club Water Polo* team (2009)

REFERENCES

Dr. Arndt Schimmelmann, Senior Scientist, Earth and Atmospheric Sciences, Indiana University, aschimme@indiana.edu, 812-855-7645

Dr. Albert Barberán, Assistant Professor, Department of Environmental Science, University of Arizona, barberan@email.arizona.edu, 520-621-1646

Dr. Peter E. Sauer, Director of the Stable Isotope Research Facility, Earth and Atmospheric Sciences, Indiana University, pesauer@indiana.edu, 812-855-6591

Dr. Jay T. Lennon, Professor, Biology, Indiana University, lennonj@indiana.edu, 812-856-0962

Dr. Penelope J. Boston, Director, NASA Astrobiology Institute, NASA Ames Research Center, penelope.j.boston@nasa.gov, 650-604-0022