

Andrew A. Zaffos

DATA SCIENTIST · GEOLOGIST · PALEOBIOLOGIST · DEVELOPER

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Current

Chief of Geoinformatics

ARIZONA GEOLOGICAL SURVEY

University of Arizona

2017-Present

Education

Postdoctoral Fellow

ADVISOR: SHANAN E. PETERS

Research Associate and Associate Lecturer

University of Wisconsin-Madison

2015-2017

PH.D. Geology

ADVISOR: ARNOLD I. MILLER

Thesis: Diagnosis and prediction of variations in the environmental distributions of marine fossils across time and space.

University of Cincinnati

2010-2014

M.S. Geology

ADVISOR: STEVEN M. HOLLAND

Thesis: Abundance and extinction at the Ordovician/Silurian boundary of the Cincinnati Arch, USA.

University of Georgia

2008-2010

B.A. Economics

ADVISOR: ROWAN LOCKWOOD AND KAREN M. LAYOU

College of William and Mary

2004-2008

Published Papers

- Holland, S.M. and **A. Zaffos** (2011). Niche conservatism along an onshore-offshore gradient. *Paleobiology* 37:270-286.
- Zaffos, A.** and S.M. Holland (2012). Abundance and extinction in Ordovician-Silurian brachiopods, Cincinnati Arch, Kentucky and Ohio. *Paleobiology* 38:278-291.
- Zaffos, A.** and A.I. Miller (2015). Cenozoic latitudinal response curves: Individualistic changes in the latitudinal distributions of marine bivalves and gastropods. *Paleobiology* 41:33-44.
- Brett, C.E., **Zaffos, A.**, and A.I. Miller (2016). Niche conservatism, tracking, and ecological stasis: A hierarchical perspective. Eldredge, N. and T. Pievani (Eds.), *Evolutionary Theory: A Hierarchical Perspective*, University of Chicago Press.
- Zaffos, A.**, Finnegan, S., and S.E. Peters (2017). Plate-tectonic regulation of marine animal diversity. *Proceedings of the National Academy of Sciences* 114:5653-5658.
- Peters, S.E., Ross, I., Czaplewski, J., Glassel, A., Husson, J., Syverson, V., **Zaffos, A.**, and M. Livny (2017). A new tool for deep-down data mining. *Eos* 98.
- Barnes, B.D., Sclafani, J.A., and **A. Zaffos** (2021) Dead clades walking are a pervasive macroevolutionary pattern. *Proceedings of the National Academy of Sciences* 118.

Invited Talks, Chapters, and Lectures

- Zaffos, A.** (2012). Climate Change: A paleontologist's perspective. *Illinois Wesleyan University*.
- Zaffos, A.** (2012). Mass Extinction: What you need to know so it doesn't happen to you. *Northern Kentucky University*.
- Brett, C.E., **Zaffos, A.**, Baird, G.C., and A.J. Bartholomew (2013). Fossil beds, facies gradients, and seafloor dynamics in the Middle Devonian Moscow Formation, Western New York. Deakin, A.K. and G.G. Lash (Eds.), *New York State Geological Association 85th Annual Field Trip Guidebook*, SUNY Fredonia.
- Zaffos, A.** (2014). Looking for first principles in paleobiology. *Centre College*.
- Zaffos, A.** (2015). Reconsidering the Age-Area hypothesis with R and Big Data. *Madison R Programming Group*.
- Zaffos, A.** (2016). The dynamics of geographic range size. *Madison Evolution Seminar Series*.

- **Zaffos, A.** (2017). Geobiology: The history of early life. *University of Wisconsin-Madison*.
- **Zaffos, A.** (2017). Global tectonics regulate marine biodiversity. *NOAA Science Seminar Series*.
- **Zaffos, A.** (2017). Global tectonics regulate marine biodiversity. *Arizona Geological Society*.
- **Zaffos, A.** (2017). Rethinking our expectations for global biogeographic patterns and processes. *University of Arizona*.
- **Zaffos, A.** and L. Bookman (2017). A flexible framework for data preservation and distribution. *NGGDPP Data Preservation and Rescue Workshop*.
- **Zaffos, A.** and S.E. Peters (2017). Building a comprehensive model of the upper-crust with the GeoDeepDive infrastructure and Macrostrat Database. *NSF EarthRates Workshop*.
- Bookman, L. and **A. Zaffos** (2018). An ArcMap Toolbar for generating geologic maps in NCGMP09 format. *NGGDPP Webinar*.
- **Zaffos, A.** and S.E. Peters (2018). The future of continental-scale geologic mapping. *Geologic Mapping Forum 2018*.
- Maarten, B., Fosdick, J., Gehrels, G., McKay, N., Meyers, S., Morgan, L., Renne, P., Robinson, E., Schmitz, M., Singer, B., Smith, M., Walker, D., and **A. Zaffos** (2018). GEOCHRONOLOGY Toward a 4D Digital Earth: Outcomes of the EarthRates All Hands Science Priorities Workshop. *EarthRates Working Group Report to NSF*.
- **Zaffos, A.** (2019). Ecoinformatics: Measuring biodiversity and other ecological properties. *Analytical Paleobiology Workshop*

Published Abstracts

- **Zaffos, A.**, Bonnette, M., Christie, M., Lunze, J., Pryor, A.L., and K.M. Layou (2008). Implications of beta: Diversity partitioning during Miocene-Pliocene background extinction. *Geological Society of America Abstracts with Programs* 40:60.
- Holland, S.M. and **A. Zaffos** (2009). Testing the importance of incumbency: The conservation of ecological response curves along an onshore-offshore gradient. *9th North American Paleontological Convention Abstracts, Cincinnati Museum Center Scientific Contributions* 3:145.
- **Zaffos, A.** and S.M. Holland (2010). Brachiopod abundance and extinction in the Late Ordovician and Early Silurian: Background effects during a mass extinction. *Geological Society of America Abstracts with Programs* 42:481.
- **Zaffos, A.** (2011). Latitudinal preferences in Cenozoic mollusks: A change from conservatism to dynamism with the passage of time. *Geological Society of America Abstracts with Programs* 43:541.
- **Zaffos, A.**, Brett, C.E., and A.I. Miller (2014). The persistence of ecological gradients: What do we really know? *10th North American Paleontological Convention Abstracts, The Paleontological Society Special Publication* 13:164-165.
- **Zaffos, A.**, Miller, A.I., and C.E. Brett (2014). A numerical model of gradient change and its implications for empirical data. *Geological Society of America Abstracts with Programs* 46:136.
- Peters, S., Husson, J., Czaplewski, J., and **A. Zaffos** (2015). Macrostrat: Towards a common data infrastructure to support deep time earth systems science. *Geological Society of America Abstracts with Programs* 47:70.
- **Zaffos, A.**, Peters, S.E., Husson, J., and J. Czaplewski (2015). A comparative estimate of different biodiversity curves and comments on the link between rock availability and biodiversity. *Geological Society of America Abstracts with Programs* 47:71.
- **Zaffos, A.**, Peters, S.E., and S.K. McMullen (2015). Empirical patterns of geographic range size expansion and contraction in marine invertebrates and terrestrial mammals are well predicted by a random walk. *Geological Society of America Abstracts with Programs* 48:668.
- **Zaffos, A.**, Peters, S.E., and S. Finnegan (2016). Plate-tectonic regulation of biodiversity and continental endemism. *Geological Society of America Abstracts with Programs* 48:152.
- Hartman, S. Lovelace, D.M., Linzmeier, B.J., Fitch, A., Kufner, A., **Zaffos, A.**, Matthewson, P., and W. Porter (2016) Mechanistic physiological modelling and geographic distribution of Late Triassic tetrapods. *Society of Vertebrate Paleontology Annual Meeting*.
- Ito, E.T., **Zaffos, A.**, Syverson, V.J., Ross, I.A., and S.E. Peters (2017). Identifying, cross-referencing, and extracting dark data using GeoDeepDive. *Digital Data in Biodiversity Research Conference*.
- **Zaffos, A.** and S.E. Peters (2017). Reassessing our expectations for marine latitudinal biodiversity gradients in modern and ancient systems. *Geological Society of America Abstracts with Programs* 49:6.
- Peters, S.E., Syverson, V.J., **Zaffos, A.**, Husson, J., Ross, I. and J. Czaplewski (2017). Extending the reach and resolution of the paleobiology database with computational and data infrastructures. *Geological Society of America Abstracts with Programs* 49:6.
- Linzmeier, B., Hong, S., and **Zaffos, A.** (2018). The role of morphology in the development of the geographic range sizes of ammonoids. *10th International Cephalopod Symposium*.

- **Zaffos, A.**, Quinn, D., Ross, I.A., and S.E. Peters (2020). ADEPT: An Automated Data Extraction Platform for creating new geoscientific datasets from text documents using machine-learning. *Machine Learning In Solid Earth Geoscience*.

Primary Instructor

Paleobiology 541

UNDERGRADUATE-GRADUATE COURSE

*University of Wisconsin
Spring 2016*

Physical Geology Lab 1111

UNDERGRADUATE COURSE

*University of Cincinnati
Fall 2011*

Physical Geology Lab 1003

UNDERGRADUATE COURSE

*University of Cincinnati
Fall 2010*

Teaching Assistant

Physical Geology 1250

UNDERGRADUATE COURSE

*University of Georgia
Fall 2008*

Sedimentary Geology 4500/6500

UNDERGRADUATE-GRADUATE COURSE

*University of Georgia
Spring 2009*

Data Analysis 6370

GRADUATE COURSE

*University of Georgia
Fall 2009*

Physical Geology 1102

UNDERGRADUATE COURSE

*University of Cincinnati
Spring 2011*

Environmental Geology 1106

UNDERGRADUATE COURSE

*University of Cincinnati
Spring 2012*

Astrobiology Geology 1016

UNDERGRADUATE COURSE

*University of Cincinnati
Fall 2012*

Research Support

NSF EAR 1550913

COLLABORATIVE RESEARCH: LEVERAGING DOMAIN REPOSITORIES IN FLYOVER COUNTRY, A MOBILE APP FOR GEOSCIENCE OUTREACH, DATA DISCOVERY, AND VISUALIZATION

*University of Arizona
2017-2019*

G18AP00096

PRESERVATION AND MODERNIZATION OF ARIZONA DIGITAL GEOLOGIC MAP DATA.

*University of Arizona
2018-2019*

DE-EE0008761

A HIGH-THROUGHPUT COMPUTING INFRASTRUCTURE TO GENERATE CUSTOM, OPEN COMMUNITY GEOTHERMAL DATASETS.

*University of Arizona
2019-2021*

Scholarships

- Hawthorne Rotary International (2004)
- University of Georgia Graduate Assistantship (2008)
- Geological Society of America Graduate Grant (2009)
- Paleontological Society, Cooper Grant (2009)
- University of Georgia Miriam Watts-Wheeler Memorial Grant (2009)
- University of Cincinnati Klekamp Grant (2011)
- University of Cincinnati Kenneth E. Caster Memorial Grant (2011)
- Paleontological Society of America, Gould Grant (2011)
- Geological Society of America Graduate Grant (2012)
- American Museum of Natural History: Theodore Roosevelt Grant (2012)
- University of Cincinnati Wycoff Fellowship (2013)

- University of Cincinnati Kenneth E. Caster Memorial Fellowship (2014)
- University of Cincinnati George and Frances Rawlinson Fellowship (2014)

Laboratories and Development Teams

- [University of Georgia Stratigraphy Lab](#) (2008-2010)
- [Macrostrat Development Team](#) (2015-Present)
- [GeoDeepDive Development Team](#) (2015-Present)
- [velociraptr R Package Developer](#) (2015-Present)
- [ePANDDA Working Group](#) (2016-Present)
- [Paleobiology Database Developer](#) (2016-Present)
- [Flyover Country Working Group](#) (2017-2019)

Community Participation

- Alpha Phi Omega Service Organization (2005-2008)
- Geological Society of America (2008-Present)
- Paleontological Society (2008-Present)
- Osher Lifelong Learning Center, Teaching Assistant (2010)
- American Society of Naturalists (2010-Present)
- Boy Scouts of America, Geology Merit Badge Counselor (2011-2013)
- Paleobiology Database Hackathon, University of California - Santa Cruz (2015)
- **Paleobiology** Reviewer (2015, 2017)
- **Journal of Biogeography** Reviewer (2016)
- **Nature: Scientific Reports** Reviewer (2016)
- **Geology** Reviewer (2017)
- Data Refuge Madison (2017)
- Paleontological Society: Career and Mentoring Panelist (2017)
- EarthRates Community Priorities and Planning (2017)
- **PeerJ** Reviewer (2017)
- USGS Data Management Working Group For Geological Surveys (2018)
- **Current Biology** Reviewer (2019)
- National Digital Catalog Workshop (2020)

Current Projects

- **Zaffos, A.**, Peters, S.E., and S.M. McMullen (*in preparation*). The dynamics of geographic range size over geologic timescales.
- McMullen, S.M., Peters, S.E., Weissman, G., and **A. Zaffos** (*in preparation*). Quality of the terrestrial mammalian fossil record.
- Ito, E.T., **Zaffos, A.**, and S.E. Peters (*in preparation*). The quality of the Paleobiology Database.
- **Zaffos, A.** (*in preparation*). Reassessing our expectations for modern and ancient marine latitudinal biodiversity gradients.

Field Experience

EXTANT

- 2009 **Cape Hatteras-RV**, Sampled deep-sea benthic foraminifera.
- 2010 **Oceanus-RV**, Sampled deep-sea benthic foraminifera.
- 2011 **St. Croix**, Sampled live and sub-fossil assemblages in modern sea-grass habitats.

*North Carolina
Massachusetts
U.S. Virgin Islands*

CENOZOIC

- 2008 **Coastal Plain**, Sampled benthic marine assemblages in un-lithified siliciclastic beds of Miocene-Pliocene age.

Virginia

PALEOZOIC

- 2009 **Cincinnati Arch**, Sampled benthic marine assemblages in lithified Ordovician-Silurian limestones, dolostones, and shales.
- 2012 **Northern Appalachian Basin**, Sampled benthic marine assemblages in lithified Middle Devonian limestones, sandstones, and shales.

*Ohio, Kentucky,
Indiana*

New York