

Dr. Derek K. Gibson
Assistant Professor
Email: derek.gibson@siu.edu
Phone: 1-618-453-4422

School of Earth Systems and Sustainability
Southern Illinois University
Carbondale, Illinois 62901

Research interests and expertise

Paleoclimatology; environmental geology; geomorphology; sedimentology

Education

Ph.D., Applied Earth Sciences, September 2022

Indiana University, Indianapolis, IN, USA

Advisor: Dr. Broxton W. Bird

GPA: 3.9/4.0

Dissertation: Investigating the effects of synoptic-scale climatic processes on local-scale hydrology by combining multi-proxy analyses of lacustrine sediments and instrumental records

B.Sc., Geology, July 2016

Ball State University, Muncie, IN, USA

Advisor: Dr. Kirsten Nicholson

GPA: 3.4/4.0

Professional employment

Since 2024 Assistant Professor of Environmental Geology, Southern Illinois University, Carbondale, Illinois, USA

Fall 2023 Visiting Assistant Professor of Paleolimnology, State University of New York, Fredonia, New York, USA

2022-2024 National Science Foundation Postdoctoral Fellow, Missouri University of Science and Technology, USA and the University of Notre Dame, USA (joint appointment)

2019-2022 Graduate teaching and research assistant, Indiana University-Purdue University, Indianapolis, USA (IUPUI)

2018 Graduate research fellow, IUPUI

2016-2017 Graduate teaching assistant, IUPUI

Publications

2026

In Review: Bird, B.W., **Gibson, D.K.**, Brenton, M., St. Pierre, J. A 4400 year record of climate-flood dynamics on the Upper Missouri River from Blyburg Lake, Nebraska, USA. In Review in *The Holocene*.

In Review: **Gibson, D.K.**, Obrist-Farner, J., Berke, M.A., Williams, W. Moisture source variability in Central America over the past 1,200 years. In Review in *Nature Scientific Reports*.

2025

Obrist-Farner, J., Maurer, J., **Gibson, D.K.**, McEnaney, T., Eckert, A., Kenney, W.F., Beeson, J., Wattus, N., Stangeland, Q. and Reyes, F., 2025. Paleoseismic evidence of directivity for the 1976 Mw 7.5 Motagua earthquake, Guatemala. *Geology*, 53(11), pp.971-976.

2024

Gibson, D.K., Obrist-Farner, J., Correa-Metrio, A., Rodriguez-Abaunza, A., Castañeda-Posadas, C., 2024. Geochemical evidence of drying during the 4.2 ka event in sediment cores from the Yucatán Peninsula, Mexico. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 655, p.112527.

Bird, B.W., Steinman, B.A., Escobar, J., Correa-Metrio, A., Holper, K., **Gibson, D.K.**, Mark, S. and Fonseca, H., 2024. Synchronous tropical Andean hydroclimate variability during the last millennium. *Journal of Geophysical Research: Atmospheres*, 129(13), p.e2023JD040255.

Gibson, D.K., Bird, B.W., Finney, B.P. and Steinman, B.A., 2024. Holocene insolation and sea surface temperature influences on the polar front jet stream and precipitation in the midcontinental United States. *Quaternary Science Reviews*, 340, p.108865.

Gibson, D.K., Obrist-Farner, J., Birkett, B.A., Curtis, J.H., Berke, M.A., Douglas, P.M., Rice, P.M. and Maurer, J., 2024. The influence of tropical Atlantic sea-surface temperatures and the North Atlantic Subtropical High during the Maya Droughts. *The Holocene*, 34(2), pp.212-223.

2023

Wright, M. N., Bird, B.W., **Gibson, D.K.**, Pollard, H.J., Escobar, J., Barr, R.C. (2023). *Fluvial responses to late Holocene hydroclimate variability in the midcontinental United States*. *Quaternary Science Reviews*, 301, 107939.

Obrist-Farner, J., Eckert, A., Douglas, P., Perez, L., Correa-Metrio, A., Konecky, B., Brenner, M., Zimmerman, S., Kutterolf, S., Maurer, J., Noren, A., Myrbo, A., Harms, U., Berke, M., Lachniet, M., Steinman, B., **Gibson, D.**, and the LIBRE scientific team. (2023). *Workshop report for the Lake Izabal Basin Research Endeavor (LIBRE) continental scientific drilling project*. *Scientific Drilling*, 32.

2022

Gibson, D. K., Bird, B. W., Pollard, H. J., Nealy, C. A., Barr, R. C., Escobar, J. (2022). *Using sediment accumulation rates in floodplain paleochannel lakes to reconstruct climate-flood relationships on the lower Ohio River*. *Quaternary Science Reviews*, 298, 107852.

2019

Gibson, D. K., Bird, B.W., Wattrus, N.J., Escobar, J., Ahmed, M., Fonseca, H., Velasco, F., Polissar, P.J. (2019). *Characterizing late Quaternary lake-level variability in Lago de Tota, Colombian Andes, with CHIRP seismic stratigraphy*. *Journal of Paleolimnology*. Vol. 62, Number 4.

Funding

2025

Vice Chancellor for Research Request for funds to purchase, upgrade, or repair major research equipment and facilities; Request for sediment coring tower-winch system: Improving flood frequency investigations and increasing accessibility in the geosciences - \$16,400 USD

Vice Chancellor for Research Request for funds to purchase, upgrade, or repair major research equipment and facilities; What can't we do with lasers?!: Request for Laser-Induced Breakdown Spectroscopy (LIBS) Analyzer - \$39,700 USD

2022

National Science Foundation Postdoctoral Research Fellowship to reconstruct late Holocene hydroclimatic variability across western Central America - \$180,000 USD

2020

Sigma Xi research grant to retrieve sediment cores from floodplain lakes along the Arkansas and Missouri rivers and investigate late Holocene Midwestern U.S. hydroclimate variability - \$1,000 USD

2019

Geological Society of America research grant to retrieve sediment cores and produce paleoclimate records from floodplain lakes along the lower Ohio River, USA - \$1,500 USD

2018

IUPUI (now IUI) University Fellowship - \$40,000 USD

Teaching

2026

Southern Illinois University Carbondale – Climate Change and Human Civilizations

2025

Southern Illinois University Carbondale – Geomorphology; Quaternary Geology; Natural Hazards; Paleoclimatology

2023

Missouri University of Science & Technology, Rolla, MO, USA – Geomorphology & Terrain Analysis (Instructor of record)

State University of New York, Fredonia, NY, USA – Limnological Field and Laboratory Methods (visiting assistant professor)

2021

IUPUI, Indianapolis, IN, USA – Evolution of Earth and Life laboratory (Graduate teaching assistant)

2020

IUPUI, Indianapolis, IN, USA – Introductory Geology laboratory (Graduate teaching assistant)

2019

IUPUI, Indianapolis, IN, USA – Sedimentation and Stratigraphy recitation (Graduate teaching assistant); Introductory Geology laboratory (Graduate teaching assistant)

2017

IUPUI, Indianapolis, IN, USA – Introductory Geology laboratory (Graduate teaching assistant)

2016

IUPUI, Indianapolis, IN, USA – Environmental Geology laboratory (Graduate teaching assistant)

Ball State University, Muncie, IN, USA – Earth, Life, and Time laboratory (Undergraduate teaching assistant)

Invited talks

2025

Climate and land-use influences on flooding in the Midwestern United States. University of Illinois Urbana-Champaign departmental seminar. Champaign, IL, USA.

2024

Geochemical evidence of drying during the 4.2 ka event in sediment cores from the Yucatán Peninsula, Mexico. University of Missouri Science and Technology departmental seminar. Rolla, MO, USA.

2023

Climate change and society: Paleo-perspectives and future implications. Scripps College department seminar. Claremont, CA, USA.

2022

Floodplain lake sediments as recorders of past climate-flood relationships. University of Missouri Science and Technology departmental seminar. Rolla, MO, USA.

2021

Climate change, land-use, and Midwestern flooding: Paleo-perspectives and future implications. Ball State University departmental colloquium. Muncie, IN, USA.

Climate change, land-use, and Midwestern flooding: Paleo-perspectives and future implications. Indiana 500 Earth Sciences Club. Indianapolis, IN, USA.

2020

Characterizing late Quaternary lake-level variability in Lago de Tota, Colombian Andes, with CHIRP seismic stratigraphy. Ball State University departmental colloquium. Muncie, IN, USA.

Characterizing late Quaternary lake-level variability in Lago de Tota, Colombian Andes, with CHIRP seismic stratigraphy. Indiana 500 Earth Sciences Club. Indianapolis, IN, USA.

Meeting abstracts

2024

Gibson, D.K., Obrist-Farner, J., Correa-Metrio, A., Rodriguez-Abaunza, A. and Castañeda-Posadas, C., 2024. Geochemical evidence of drying during the 4.2 ka event in sediment cores from the Yucatán Peninsula, Mexico. American Geophysical Union Fall Meeting 2024. Washington, D.C., USA.

2023

Gibson, D. K., Obrist-Farner, J., Birkett, B.A., Curtis, J. H., Berke, M. A., Douglas, P. M. J., Rice, P. M., Maurer, J. *The influence of tropical Atlantic sea-surface temperatures and the North Atlantic Subtropical High during the Maya Droughts.* Geological Society of America Annual Meeting 2023. Pittsburg, PA, USA.

McEnaney T.N., Obrist-Farner, J., **Gibson, D.K.**, Ghosh, S., Zimmerman, S.R. *Earthquake-Induced Sedimentation Events in Lacustrine Environments Along the North American-Caribbean Plate Boundary in Guatemala.* Geological Society of America Annual Meeting 2023. Pittsburg, PA, USA.

Ghosh, S., Obrist-Farner, J., **Gibson, D.K.**, McEnaney, T.N. *A reduction of carbon storage potential in Lake Izabal, Guatemala, during the 8.2 ka marine incursion event.* Geological Society of America Annual Meeting 2023. Pittsburg, PA, USA.

2022

Gibson, D.K., Bird, B.W., Pollard, H. J., Nealy, C. A., Barr, R. C., Escobar, J. E. *Using sediment accumulation rates in floodplain paleochannel lakes to reconstruct climate-flood relationships on the lower Ohio River.* American Geophysical Union Fall Meeting 2022. Chicago, IL, USA.

Nealy, C.A., **Gibson, D.K.**, Bird, B.W. “Late Holocene Midcontinental Hydroclimate Variability from a 1,500-yr Wisconsin Lake Sediment Record.” American Geophysical Union Fall Meeting 2022. Chicago, IL, USA.

2019

Gibson, D.K., Bird, B.W., Wattrus, N.J., Escobar, J., Ahmed, M., Fonseca, H., Velasco, F., Fernandez, A., Polissar, P.J. *Characterizing late Quaternary lake-level variability in Lago de Tota, Colombian Andes, with CHIRP seismic stratigraphy*. American Geophysical Union Fall Meeting 2019. San Francisco, CA, USA.

Beard, A., Bolin, N., Bowers, C., Keith, S., Millican, A., Warsame, F., Bird, B.W., Wilson, J., **Gibson, D.K.**, Nealy, C.A., *Investigating Pre-Columbian land-use impacts on watershed-scale erosion and environmental Pb pollution at Oakville Pond, Alabama*. IUPUI Multi-disciplinary Undergraduate Research Institute Research Day, Indianapolis, IN.

Beard, A., Bolin, N., Bowers, C., Keith, S., Millican, A., Warsame, F., Bird, B.W., Wilson, J., **Gibson, D.K.**, Nealy, C.A., *Investigating flood-climate relationships along the lower Ohio river at Grassy Pond, Kentucky*. IUPUI Multi-disciplinary Undergraduate Research Institute Research Day, Indianapolis, IN.

2018

Gibson, D.K., Bird, B.W., Perello, M., Gilhooly III, W., Wilson, J., Steinman, B. *Decadally-resolved Holocene hydroclimate trends in the midwestern United States revealed through multi-proxy analyses of lacustrine sediments*. Geological Society of America Annual Meeting, Indianapolis, IN.

Pollard, H.J., Bird, B.W., **Gibson, D.K.**, *Holocene development of the Black Bottom point bar system along the southern Illinois portion of the Ohio River*. Geological Society of America Annual Meeting, Indianapolis, IN.

Atherton, C., Meyer, A., Pham, T., Sturgill, H., Turner, K., Watkins, C., Bird, B.W., Gilhooly III, W., **Gibson, D.K.**, Perello, M. *Investigating Holocene Hydroclimate Variability in the Midwestern U.S. using Lake Sediment Derived Proxies of Precipitation and Evaporation*. IUPUI Multi-disciplinary Undergraduate Research Institute Research Day, Indianapolis, IN.

2017

Gibson, D.K., Bird, B.W., Wattrus, N.J., Escobar, J., Ahmed, M., Fonseca, H., Velasco, F., Fernandez, A., Polissar, P.J. *Using seismic reflection analysis of lacustrine sediment stratigraphy from Laguna de Tota to reconstruct Late Quaternary hydroclimate in the Colombian Andes*. American Geophysical Union Fall Meeting. New Orleans, LA, USA.

2016

Gibson, D.K., Grysen, T., Nicholson, K. *Geothermal heatflow map of the South Sumatra basin*. Power Plays: Geothermal Energy in Oil and Gas Fields Conference. Southern Methodist University, Dallas, Texas, USA.

Gibson, D.K., Grysen, T., Nicholson, K. *Geothermal heatflow map of the South Sumatra basin*. Geological Society of America North-Central Section. University of Illinois, Champaign, Illinois.

Field Work

Guatemala

March 2023, Lago de Atitlán, Lago de Ayarza, Laguna Lachua, Laguna Chichoj

Mexico

May 2023, Lake Yalahau, Yucatan, Mexico

October 2022, Laguna Silvituc & Laguna Maravillas, Campeche, Mexico

United States of America

April 2025, Horseshoe Lake, southern Illinois, USA

October 2024, Cache River wetlands, southern Illinois, USA

December 2021-March 2022, Grand Kankakee Swamp, Illinois, USA

Fall 2021, Multiple floodplain lakes along the White River, Indiana, USA

Summer 2021, Multiple floodplain lakes along the Missouri River, Nebraska, USA

January 2020, Oakville Pond, Alabama, USA

October 2019, Grassy Pond, Kentucky, USA

July 2019, Goose Pond, Kentucky, USA

June 2019, Pitcher Lake, Indiana, USA

May 2018, Martin Lake, Indiana, USA

May 2018, Black Bottom floodplain, southern Illinois, USA

China

May-July 2017, Cuobu and Ruba Co lakes, interior Tibetan Plateau

Students mentored

2025

Sydney McDonald – MSc. student at Southern Illinois University

Jacob Niebrugge – Undergraduate student at Southern Illinois University

Al Pearman - Undergraduate student at Southern Illinois University

2024

Sydney McDonald – Undergraduate student at Southern Illinois University

Jacob Niebrugge – Undergraduate student at Southern Illinois University

2022

Abe Underhill – Undergraduate field and laboratory assistant

Hannah Ayer – Undergraduate field and laboratory assistant

Nicole Shields – Undergraduate student using XRF geochemistry to analyze Andean lake samples in the laboratory

2021

Jae St. Pierre – Undergraduate field and laboratory assistant

Cory Beeles – Undergraduate field and laboratory assistant

Mikayla Benton– Undergraduate laboratory assistant

2020

Abigail Mallo – Undergraduate student using XRF geochemistry to analyze Andean lake samples in the laboratory

Brent Neice – Undergraduate student using physical sedimentology to analyze Andean lake samples in the laboratory

Zachary Smith – Undergraduate student assisting with high-resolution sampling of sediment cores