Dr. Derek K. Gibson
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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

Funding

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

Publications

2024

Accepted **- Gibson, D. K.,** Obrist-Farner, J., Correa-Metrio, A. *Geochemical evidence of drying during the 4.2 ka event in sediment cores from the Yucatán Peninsula, Mexico.* (Accepted in: Palaeogeography, Palaeoclimatology, Palaeoecology).

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.

Teaching

Fall 2023 State University of New York, Fredonia, NY, USA – Limnological Field and Laboratory Methods (visiting assistant professor)

2023 Missouri University of Science & Technology, Rolla, MO, USA – Geomorphology & Terrain Analysis (Instructor of record)

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

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

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. 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. 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. 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., Gilhooley 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

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

2023

Trenton McEnaney – Graduate student at the Missouri University of Science & using sediment cores to reconstruct paleo-seismicity in Guatemala
Suvrajit Ghosh – Graduate student at the Missouri University of Science & Technology using sediment cores to conduct paleolimnological investigations in Guatemalan lakes

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

2019
Ashlynn Beard – Undergraduate field and laboratory assistant
Aidan Millican – Undergraduate field and laboratory assistant
Nathan Bolin – Undergraduate student**;** assisted with sediment core processing and physical sedimentology on samples from Midwestern oxbow lakes
Caroline Bowers – Undergraduate student**;** assisted with sediment core processing and physical sedimentology on samples from Midwestern oxbow lakes
Shauna Keith – Undergraduate student**;** assisted with sediment core processing and physical sedimentology on samples from Midwestern oxbow lakes
Fadumo Warsame – Undergraduate student**;** assisted with sediment core processing and physical sedimentology on samples from Midwestern oxbow lakes

2018
Cameron Nealy – Undergraduate student**;** assisted in the field collection of monthly water samples and hydrolab data from a northern Indiana kettle lake and performed XRF geochemical analyses on sediments from Midwestern oxbow lakes. Cameron later earned a Master's degree in Geology from IUPUI.
Alek Baker – Undergraduate student**;** performed grain size analysis on sediment cores collected from Midwestern oxbow lakes
Sarah Merrow – Undergraduate student**;** assisted in the field collection of monthly water samples and hydrolab data from Martin Lake, IN
Cassandra Sluis – Undergraduate student; assisted in the field collection of monthly water samples and hydrolab data from Martin Lake, IN
Thi Pham – Undergraduate student; assisted in the field collection of monthly water samples and hydrolab data from Martin Lake, IN
Carissa Atherton – Undergraduate student; assisted in the initial processing and description of sediment cores from Martin Lake, IN
Alyssa Meyer – Undergraduate student; assisted in the initial processing and description of sediment cores from Martin Lake, IN
Heather Sturgill – Undergraduate student; performed core imaging and magnetic susceptibility on sediment cores from Martin Lake, IN
Kyle Turner – Undergraduate student; performed core imaging and magnetic susceptibility on sediment cores from Martin Lake, IN
Connor Watkins – Undergraduate student; assisted in the collection of surface cores and grab samples from Eagle Creek, Indianapolis, IN