

# Matthew Dietrich<sup>1</sup>

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**Senior Research Data Analyst, *The Polis Center at IUPUI* : IU Luddy School of Informatics, Computing, & Engineering**

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## Education

### **PHD | AUGUST 2017–JUNE 2021 | VANDERBILT UNIVERSITY**

- Earth and Environmental Science: Focus – Environmental Geochemistry
- “[Trace element cycling in Bangladesh shrimp aquaculture systems: Implications for food and water security](#)” [GPA: 3.86/4.00]
- Advisor: Dr. John C. Ayers

### **M.A. | AUGUST 2015–DECEMBER 2016 | MIAMI UNIVERSITY**

- Geology
- “Urban pollution investigations in Gary, Indiana and Middletown, Ohio” [GPA: 3.93/4.00]
- Advisor: Dr. Mark P.S. Krekeler

### **B.A. | AUGUST 2012–MAY 2016 | MIAMI UNIVERSITY**

- Majors: Environmental Earth Science, Sustainability; University Honors [GPA: 3.93/4.00]

## Experience

- Senior Research Data Analyst | The Polis Center, IUPUI | Sept. 2022–Present
- National Science Foundation Postdoctoral Fellow | IUPUI | Aug. 2021–Sept. 2022
- Teaching Assistant – Dynamic Earth | Vanderbilt University | Fall 2019/2020
- Teaching Assistant – Sedimentology | Vanderbilt University | Spring 2018/2019
- Student Orientation Undergraduate Leader | Miami University | Summer 2015
- Research Assistant | Miami University | Summer 2014
- Transforming Nature Fellowship Program | Miami University | Summer 2014

## Skills & Abilities

- Programming Languages:
  - R (Advanced), Octave (Basic).
- Software & Tools:
  - LaTeX, Datawrapper, Stata, WordPress, ArcGIS Pro, ArcGIS Online, Flourish, QGIS, Excel, The Geochemist’s Workbench, PHREEQC, PDXL, Match!.
- Statistics Experience:
  - Multiple regression techniques (linear and logistic, stepwise model selection), k-means clustering, PCA, MDS, Monte Carlo simulation.
- Laboratory Equipment Experience:
  - Malvern particle size analyzers, Rigaku Powder XRD, high temperature muffle programmable furnaces (LOI), soil extract experiments and filtrations, portable XRF, SEM, LiBO2 fusion for ICP-MS analysis.
- International fieldwork experience:

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<sup>1</sup> Completed 4/13/2023

- Helped plan and organize sediment/water sampling and field measurement campaigns in rural southwestern agricultural areas of Bangladesh.
- Course-based research project on water quality and land use in Costa Rica.
- Domestic (U.S.) fieldwork experience:
  - Urban sediment sampling campaigns in cities of Gary, IN, Indianapolis, IN, and Middletown, OH.

## LEADERSHIP

- **Temporary management of community analyst team at the Polis Center, IUPUI** (Jan. 2023-Present)
  - Stepped in to help with leadership role managing projects for a team of community analysts at the Polis Center in interim phase between program manager hires
  - Serving as search committee chair for new program manager
- **Head of Dr. Filippelli Lab, IUPUI** (Jan. 2022-July 2022)
  - Acting head of Dr. Gabriel Filippelli's lab at IUPUI while he is away on sabbatical in Australia
  - Managing/mentoring undergraduate and graduate students in the lab
  - Helped run the summer research project of 5 undergraduate students
- **Program/Event Coordinator:** Vanderbilt Earth and Environmental Sciences Graduate Student Association (Aug. 2020-June 2021).
- **Treasurer:** Vanderbilt American Academy of Environmental Engineers and Scientists (Aug. 2019-June 2021).
- **Graduate Mentor:** Vanderbilt Undergraduate Research Journal (Spring 2021).
- **President:** Vanderbilt Earth and Environmental Sciences Graduate Student Association (Aug. 2019-Aug. 2020).
- **Treasurer:** Vanderbilt Earth and Environmental Sciences Graduate Student Association (Aug. 2018-Aug. 2019).
- **Head of Fundraising:** Miami University Swoop's Stoop Charity Group, a student-athlete charity group working with patients at Cincinnati Children's Hospital (May 2015-May 2017) -- ultimately helped lead to a \$20,000 donation, helping purchase an MRI machine cover.
- **NCAA Division 1 Student-Athlete** (Miami University): Aug. 2012- Dec. 2016 (15-20 hrs/wk).
- **Student Employee Service Leadership Award**, Miami University (2016).
- **Senior Service Leadership Award**, Miami University (2016).

## Service and Teaching

- **Session Co-Chair:** 2022 GSA Joint North-Central & Southeastern Section Meeting (April 2022)
- **Peer Reviewer (n = 13):** (1) American Journal of Public Health, (1) One Health, (1) Biological Trace Element Research, (1) Ecotoxicology and Environmental Safety; (1) Journal of Geochemical Exploration (JGE); (1) Frontiers in Sustainable Cities; (1) Environmental Advances; (4) Science of the Total Environment; (1) Environmental Research; (1) Journal of Water Resource and Protection (JWARP).
- **Summer research mentor:** Aided with a six-week summer research experience for high school students (REHSS) program between Vanderbilt University and Metropolitan Nashville Public Schools (Summer 2019).
- **NCAA division 1 volunteer track and field coach** (Miami University): Jan. 2017- May 2017 (15-20 hrs/wk).
- **Guest lecturer (n = 6):**
  - Vanderbilt University – Low Resource Bioengineering course, Dr. Patricia Russ

- IUPUI – “Medical Geology,” Dr. Gregory Druschel; “Urban Water and Food Systems,” Dr. Gabriel Filippelli; “Global Cycles,” Dr. Bill Gilhooly (2 times); “Forensic Geology,” Dr. Anna Jessee
- **Guest career presenter (n = 1):** Vanderbilt University – “Earth System Dynamics” course, Dr. Daniel Morgan/Moyosore Ajayi.
- **Guest presenter (n = 2):** IUPUI – “Reporting Skills in Geoscience” course, Jennifer Nelson; IU – “OT Practice: Older Adults” course, Julie Bednarski
- **Instructor of record:** IUPUI Spring 2022 sprint course (1 credit hour), “Forensic Geology”
  - Designed and taught entire 5-week course.

## Publications

1. **Matthew Dietrich**, Cynthia F. Isley, Scott Wilson. (in prep-90% complete). Legacy Contaminants. *Treatise on Geochemistry 3rd Edition*.
2. Zhen Wang, Shifeng Dai, Debabrata Das, Ellen Cowan, **Matthew Dietrich**, William Schlesinger, Mingxuan Zhou, Keith Seramur, Qingru Wu, Avner Vengosh. (in prep-99% complete). Isotopic Signatures and Fluxes of Lead (Pb) from Coal Fly Ash Disposal in China, India, and the United States. *Environmental Science & Technology*.
3. **Matthew Dietrich**, Gabriel M. Filippelli. (2023). Positive outcomes from U.S. lead regulations, continued challenges, and lessons learned for regulating emerging contaminants. *Environmental Science and Pollution Research*. <https://doi.org/10.1007/s11356-023-26319-4>
4. **Matthew Dietrich**, Leah R. Wood, John T. Shukle, Angela Herrmann, Gabriel M. Filippelli. (2023). Contributory science reveals insights into metal pollution trends across different households and environmental media. *Environmental Research Letters*, **18**, 034013.
5. **Matthew Dietrich**, Cynthia F. Isley, Jane A. Entwistle, Diana Meza-Figueroa, Liqin Wu, Chenyin Dong, Peggy Gunkel-Grillon, Khadija Jabeen, Lindsay Bramwell, John T. Shukle, Leah R. Wood, Ravi Naidu, Kara Fry, Mark P. Taylor, Gabriel M. Filippelli. (2023). Predictive modeling of indoor dust lead concentrations: Sources, risks, and benefits of intervention. *Environmental Pollution*, 121039, <https://doi.org/10.1016/j.envpol.2023.121039>
6. **Matthew Dietrich**, Shelby Rader, Gabriel Filippelli. (2022). Using community science for detailed pollution research: a case-study approach in Indianapolis, IN, USA. *Environmental Science and Pollution Research*, 1-9. <https://doi.org/10.1007/s11356-022-22561-4>
7. Deniz Yeter, Deena Woodall, **Matthew Dietrich**, Barbara Polivka. (2022). Rural and Urban Ecologies of Early Childhood Toxic Lead Exposure--the State of Kansas, 2005 to 2012: Early Childhood Lead Burdens in Kansas. *Kansas Journal of Medicine*. 15(2), 285-292. <https://doi.org/10.17161/kjm.vol15.17960>
8. **Matthew Dietrich**, John Ayers. (2022). Element transport and partitioning along tidal channels in Southwest Bangladesh. *Estuaries and Coasts*. <https://doi.org/10.1007/s12237-022-01082-w>
9. **Matthew Dietrich**, Michael O'Shea, Reto Gieré, Mark P.S. Krekeler. (2022). Road sediment, an underutilized material in environmental science research: A review of perspectives on United States studies with international context. *Journal of Hazardous Materials*, 432, 128604.
10. **Matthew Dietrich**, John Shukle, Mark P.S. Krekeler, Leah Wood, Gabriel Filippelli. (2022). Using Community Science to Better Understand Lead Exposure Risks. *GeoHealth*. 6, e2021GH000525.
11. **Matthew Dietrich**, Mark P.S. Krekeler, Masoom Kousehlar, Elisabeth Widom. (2021). Quantification of Pb pollution sources in complex urban environments through a multi-source isotope mixing model based on Pb isotopes in lichens and road sediment. *Environmental Pollution*, 288, 117815.

12. **Matthew Dietrich**, John Ayers. (2021). Influences on tidal channel and aquaculture shrimp pond water chemical composition in Southwest Bangladesh. *Geochemical Transactions*, 22(1), 1-22.
13. **Matthew Dietrich**, John Ayers. (2021). Geochemical partitioning and possible heavy metal (loid) bioaccumulation within aquaculture shrimp ponds. *Science of the Total Environment*, 788, 147777.
14. **Matthew Dietrich**, Mark P.S. Krekeler. (2021). Caution in using two end-member Pb isotope pollution source apportionment models. *Environment International*, 150, 106421.
15. John Ayers, Brooke Patton, **Matthew Dietrich**. (2020). Preliminary evidence of transport-limited chemical weathering and element immobility in the tidal delta plain of the Ganges in Bangladesh. *Geochemistry, Geophysics, Geosystems*, 21, e2020GC009029.
16. **Matthew Dietrich**. (2020). Using historical atmospheric pollution data to prioritize environmental sampling in urban areas. *City and Environment Interactions*, 6, 100042.
17. **Matthew Dietrich**, Kelsea B. Best, Jessica L. Raff, Elli R. Ronay. (2020). A first-order geochemical budget for suspended sediment discharge to the Bay of Bengal from the Ganges-Brahmaputra river system. *Science of the Total Environment*, 726, 138667.
18. John C. Ayers, Steven Goodbred Jr., **Matthew Dietrich**. "Arsenic Contamination in South and Southeast Asia." In *Oxford Bibliographies in Environmental Science*. Ed. Ellen Wohl. New York: Oxford University Press.
19. **Matthew Dietrich**, Amy Wolfe, Michelle Burke, & Mark P.S. Krekeler. (2019). The first pollution investigation of road sediment in Gary, Indiana: Anthropogenic metals and possible health implications for a socioeconomically disadvantaged area. *Environment International*, 128, 175-192.
20. **Matthew Dietrich**. (2018). In response to, " Systematic review and health risk assessment of arsenic and lead in the fished shrimps from the Persian Gulf," by Fakhri et al. *Food and Chemical Toxicology*, 121, 715.
21. **Matthew Dietrich**, Justin Huling, & Mark P.S. Krekeler. (2018). Metal pollution investigation of Goldman Park, Middletown Ohio: Evidence for steel and coal pollution in a high child use setting. *Science of the Total Environment*, 618, 1350-1362.

## Public, Non-Peer Reviewed Articles

1. **Matthew Dietrich**. (Feb. 2023). 2022 Midterm Election Voter Turnout in Marion County. SAVI. <https://www.savi.org/2023/02/14/2022-midterm-election-voter-turnout-in-marion-county/>
2. **Matthew Dietrich**, Matt Nowlin. (Dec. 2022). Limitations and opportunities with public transit for an aging population in Central Indiana. *State of Aging in Central Indiana*. <https://centralindiana.stateofaging.org/2022/12/08/limitations-and-opportunities-with-public-transit-for-an-aging-population-in-central-indiana/>

## Selected Conference Presentations

### *Geological Society of America Regional and National Conferences*

- **\*Matthew Dietrich**, John T. Shukle, Mark P.S. Krekeler, Leah R. Wood, Cynthia Isley, Kara Fry, Mark P. Taylor, Gabriel M. Filippelli. Predictive Modeling Using Community Science: Insights into Household Lead. Joint 56th Annual North-Central/71st Annual Southeastern Section Meeting – 2022. doi: 10.1130/abs/2022NC-374412 \*Oral Presenter
- Leah R. Wood, **Matthew Dietrich**, John T. Shukle, Angela Herrmann, and Gabriel M. Filippelli. Lessons Learned from Community Science in Lead Pollution and Lead Poisoning Prevention. Joint 56th Annual North-Central/ 71st Annual Southeastern Section Meeting – 2022. doi: 10.1130/abs/2022NC-375789

- Mark P.S. Krekeler, **Matthew Dietrich**, Michael J. O'Shea, Reto Giere. A Review of United States Road Sediment Studies with a Focus on Metal Pollution: Insights and Opportunities. Joint 56th Annual North-Central/ 71st Annual Southeastern Section Meeting – 2022. doi: 10.1130/abs/2022NC-374667
- \***Matthew Dietrich**, Gabriel Filippelli, Mark Krekeler, Masoom Kousehlar, Elisabeth Widom. Using Metal Isotopes and Statistics to Unravel Urban Metal Pollution Cycling. GSA Connects 2021, 10/21, DOI: 10.1130/abs/2021AM-365947 \*Oral Presenter
- \***Matthew Dietrich**, John Ayers. (**Invited**) Element transport and partitioning along tidal channels in Southwest Bangladesh. GSA Connects 2020 Online, 10/20, DOI:10.1130/abs/2020AM-352040 \*Oral Presenter
- Angela Arrington, Brittany Cymes, **Matthew Dietrich**, Mark P.S. Krekeler, Daniel M. Sturmer: Transmission Electron Microscopy Investigation of Particulate Matter in Street Sediment of Gary, Indiana: Cause for Environmental Health Concerns. GSA National Conference 2019, Phoenix, Arizona; 09/2019, DOI:10.1130/abs/2019AM-338342
- \***Matthew Dietrich**, Brooke Patton, John C. Ayers: Trace element geochemical cycling in shrimp ponds in Southwest Bangladesh: Insight into mobility and potential uptake by shrimp. GSA National Conference 2018, Indianapolis, Indiana; 11/2018, DOI:10.1130/abs/2018AM-321323 \*Presenting Author
- Mark P. S. Krekeler, **Matthew Dietrich**, Sunitha Vangala, Jennifer Tully, Erin LeGalley, Erin P. Argyilan, Michelle Burke, Amy Wolfe: Environmental Properties and Impacts of Nanoparticles in Urban Landscapes of the Midwest: Microscopy Studies of Street Sediment Demonstrate Cause for Concern. GSA National Conference 2017, Seattle, Washington; 10/2017, DOI:10.1130/abs/2017AM-301626
- V. Sunitha, **Matthew Dietrich**, Michelle Burke, Amy Wolfe, Erin P. Argyilan, Mark P.S. Krekeler: A Preliminary Field Emission Scanning Electron Microscopy (FESEM) and Transmission Electron Microscopy (TEM) Foray into Street Sediments of Gary, Indiana: Major Environmental Health Concerns are Evident. Joint 52nd Northeastern Annual Section / 51st North-Central Annual Section Meeting - 2017, Pittsburgh, Pennsylvania; 03/2017, DOI:10.1130/abs/2017NE-290614
- \***Matthew Dietrich**, Amy Wolfe, Michelle Burke, Sunitha Vangala, Erin P. Argyilan, Erin LeGalley, Mark P.S. Krekeler: A Preliminary Urban Geochemical Exploration of Street Sediments of Gary, Indiana Indicates Major Concerns are Warranted. Joint 52nd Northeastern Annual Section / 51st North-Central Annual Section Meeting - 2017, Pittsburgh, Pennsylvania; 03/2017, DOI:10.1130/abs/2017NE-290645 \*Oral Presenter
- Justin Huling, **Matthew Dietrich**, Taylor Osborne, David Beka Binyam, Kaitlyn McIntosh, Mark P.S. Krekeler: Grain Characteristics Reveal Nature of Pollutants in Goldman park, Middletown, Ohio: Probable Connections to an Adjacent Steel Facility. 50th Annual GSA North-Central Section Meeting - 2016, Champaign, Illinois; 04/2016, DOI:10.1130/abs/2016NC-275291
- \***Matthew Dietrich**, Taylor Osborne, Justin Huling, Kaitlyn McIntosh, Rachel Edwards, Joshua Combs, David Beka Binyam, Mark P.S. Krekeler: Urban Pollution Investigations of Goldman Park, Middletown Ohio: Bulk Chemistry Reveals Unexpected Heterogeneity in Metal Pollution. 50th Annual GSA North-Central Section Meeting - 2016, Champaign, Illinois; 04/2016, DOI:10.1130/abs/2016NC- 275025 \*Changed to first author after abstract submission (also presenting author)

#### *American Geophysical Union Fall Meeting Presentations/Posters*

- **Matthew Dietrich**, Ryan Mathur, Shelby T. Rader, Zhen Wang, Katalin Szlavecz, Mark P.S. Krekeler, Gabriel M. Filippelli. Using stable metal isotopes and other techniques to understand cycling of urban pollutants. AGU Fall Meeting, 2022, Chicago, Illinois; 12/2022



- **\*Matthew Dietrich**, John Ayers. Possible Factors Affecting Trace Element Concentrations in Southwest Bangladesh Surface Waters: The Role of Seasonality, Evaporation, and Irrigation Source. AGU Fall Meeting 2019, San Francisco, California; 12/2019 \*Oral Presenter

#### ***8th International Conference on Water and Flood Management (ICWFM 2021)***

- **\*Matthew Dietrich**, John Ayers. Estuarine trace metal(loid) cycling and possible environmental health risks. ICWFM 2021, virtual. 03/2021. \*Oral Presenter
- John Ayers, Brooke Patton, **Matthew Dietrich**. Rice paddy soil water salinization, acidification, and arsenic concentration. ICWFM 2021, virtual. 03/2021.

### **Grants/Funding**

- National Science Foundation, Collaborative Research: EAR-Climate: Potential effects of climate change and sea-level rise on metal mobilization, with a community science approach. (under revision, plan to resubmit) **(Co-PI). \$408,721 share w/ \$874,119 total**
- IUPUI Multidisciplinary Undergraduate Research Institute (MURI) [summer grant 2022]: What's the dirt on poisonous lead in soil, worms and birds? Mapping and communicating environmental lead risks **(Co-Mentor). \$3,000 + supports 5 students @\$11/hr.**
- National Science Foundation, *EAR-PF: Environmental source apportionment and soil-household dust relationships of urban metal pollutants across different regions and seasons (PI). \$174,000*
- Vanderbilt University Graduate Student Travel Grant to present research at American Geophysical Union conference, San Francisco, 2019. **\$500**
- Vanderbilt University Jewell-Wilson Research Fund support to attend American Geophysical Union conference, New Orleans, 2017. **\$200**
- University of Pennsylvania, Benjamin Franklin Fellowship Award, 2017 – Respectfully Declined. **\$82,500**
- Miami University, Radabaugh Geology Scholarship, 2016, **\$2000**
- Miami University Transforming Nature Fellowship Award to support communicating science to the general public through artistic representation, 2014. **\$1,200**

### **Academic Awards/Recognition**

- ***Johns Hopkins University (JHU) Blaustein Postdoctoral Fellowship Award Finalist (2021)***
  - Guest research talk to JHU Earth and Planetary Sciences Department following NSF postdoctoral fellowship award acceptance and withdrawal from the Blaustein fellowship award competition. (3/19/21): “From shrimp to house dust, why should we care about trace elements in the environment?”
- ***Florida International University 2021-2022 CASE Distinguished Postdoctoral Scholar Award Recipient – Respectfully Declined***

### **Invited Talks/Author Contributions**

- Invited Author
  - 3rd edition of the *Treatise on Geochemistry*: Section 5, Sustaining Society—Legacy Contaminants
- Indiana University–Purdue University Indianapolis Department of Forensic & Investigative Sciences (3/3/22)
- Miami University Department of Geology and Environmental Earth Science Seminar Series (2/7/22)
- Indiana University–Purdue University Indianapolis Department of Earth Sciences Seminar Series (10/25/21)

## **Professional Memberships**

- Geological Society of America (GSA)
- American Geophysical Union (AGU)