

**DAVID M. SINGER, Ph.D.**  
Associate Professor, Department of Earth Sciences  
College of Arts and Science, Kent State University

221 McGilvrey Hall, Kent, OH, 44242      e-mail: dsinger4@kent.edu    p: 330.672.3006

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**Education and Degrees**

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- 2008    **Ph.D., Geological and Environmental Sciences, Stanford University**  
Dissertation Title: “Uranium and strontium (bio)geochemistry: Limits on uranium and strontium mobility in the environment”
- 2002    **B.S., Geological Sciences, University of Michigan**  
Honors Thesis Title: “Highly oxidized rocks from the San Geronio Pass, California; Petrology and thermodynamic calculations” Magna cum laude with distinction

**Professional Experience**

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- 2019-present    **Associate Professor**, Department of Earth Sciences, Kent State University
- 2020            **Visiting Scientist**, Division of Geochemistry and Environmental Geology, Geological Survey of Israel
- 2012-2019      **Assistant Professor**, Department of Earth Sciences, Kent State University
- 2008-2012      **Post-doctoral Scholar**, Earth Sciences Division, Lawrence Berkeley National Laboratory, and the Department of Earth and Planetary Science, University of California, Berkeley
- 2005-2008      **Graduate Research Assistant**, Department of Geological and Environmental Sciences, Stanford University
- 2007            **Consultant**, Liner Yankelevitz Sunshine & Regenstreif LLP
- 2002-2005      **Graduate Teaching Assistant**, Department of Geological and Environmental Sciences, Stanford University
- 2001-2002      **Undergraduate Research Assistant**, Department of Geological Sciences, University of Michigan
- 2000 & 2002    **Undergraduate Research Assistant**, Environmental Sciences Division, Brookhaven National Laboratory

## Publications

(Citation metrics, as of May 2023: Google Scholar h-index: 16; 997 total citations)

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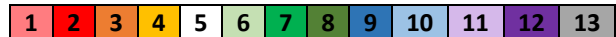
**Note:** Authorship is limited to those who have contributed substantially to the work, and who share responsibility and accountability for the results. The discipline convention is to typically list authors in order of their degree of involvement in the work, with the most active contributors listed first, and frequently (but not always) with the PI listed last. A color key is shown below each article based on CRediT (Contributor Roles Taxonomy), a high-level taxonomy that can be used to represent the 13 potential roles typically played by contributors to scientific scholarly output (Note that programming and software development are not part of these projects):



- 1 **Conceptualization** (ideas; formulation or evolution of overarching research goals and aims)
- 2 **Data curation** (management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later re-use)
- 3 **Formal analysis** (application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data)
- 4 **Funding acquisition** (acquisition of the financial support for the project leading to this publication)
- 5 **Investigation** (conducting a research and investigation process, specifically performing the experiments, or data/evidence collection)
- 6 **Methodology** (development or design of methodology; creation of models)
- 7 **Project administration** (management and coordination responsibility for the research activity planning and execution)
- 8 **Resources** (provision of study materials, reagents, materials, laboratory samples, instrumentation, computing resources, or other analysis tools)
- 9 **Supervision** (oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team)
- 10 **Validation** (verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs)
- 11 **Visualization** (preparation, creation and/or presentation of the published work, specifically visualization/data presentation)
- 12 **Writing – original draft** (preparation, creation and/or presentation of the published work, specifically writing the initial draft)
- 13 **Writing – review & editing** (preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision, including pre- or post-publication stages).

**Journal Articles** (\* = graduate student advisee co-author; \*\* = undergraduate advisee co-author; # = co-authors with equal contributions)

30. \*Smark, K.E. and **Singer, D.M. (submitted)** Appalachian Historical Coal Mine Soils Developing As A Chronosequence. *Soil Systems*.



29. \*\*Wood, D.L., \*\*Cole, K.A., Herndon, E.M. and **Singer, D.M. (2023)** Lime slurry treatment of soils developing on abandoned coal mine spoil: Linking contaminant transport from the micrometer to pedon-scale. *Appl. Geochem.* 151, 105617.  
[doi.org/10.1016/j.apgeochem.2023.105617](https://doi.org/10.1016/j.apgeochem.2023.105617) (Google Scholar cited: 1)



28. \*Chowdhury, M.A.R. and **Singer, D.M. (2022)** Trace Metal Enrichment in the Colloidal Fraction in Soils Developing on Abandoned Mine Spoils. *Minerals* 12, 1290.

[doi:10.3390/min12101290](https://doi.org/10.3390/min12101290)

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27. \*Chowdhury, M.A.R., **Singer, D.M.**, and Herndon, E. (2021) Colloidal metal transport in soils developing on historic coal mine spoil. *Applied Geochemistry*, 128: 104933.

[doi.org/10.1016/j.apgeochem.2021.104933](https://doi.org/10.1016/j.apgeochem.2021.104933) (Google Scholar cited: 5)

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26. **Singer, D.M.**, Herndon, E., \*Zemanek, L., \*\*Cole, K, Sanda, T.G., Senko, J., and Perdrial, N. (2021) Biogeochemical controls on the potential for long-term contaminant leaching from soils developing on historic coal mine spoil. *Soil Systems*. 5(1): p.3.

[doi.org/10.3390/soilsystems5010003](https://doi.org/10.3390/soilsystems5010003) (Google Scholar cited: 5)

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25. Yazbek, L.D., \*\*Cole, K.A., \*\*Shedleski, A. **Singer, D.M.**, and Herndon, E.M. (2020) Hydrogeochemical processes limiting Fe export in a headwater catchment impaired by acid mine drainage. *Environ. Sci. Technol. Water*.

[10.1021/acsestwater.0c00002](https://doi.org/10.1021/acsestwater.0c00002) (Google Scholar cited: 7)

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24. **Singer, D.M.**, Herndon, E.M., \*\*Cole, K, \*\*Koval, J., and Perdrial, N. (2020) Formation of secondary mineral coatings and the persistence of reduced metal-bearing phases in soils developing on historic coal mine spoil. *Appl. Geochem.* 121, 104711.

[10.1016/j.apgeochem.2020.104711](https://doi.org/10.1016/j.apgeochem.2020.104711) (Google Scholar cited: 12)

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23. Shaw, M., Yazbek, L.D., **Singer, D.M.**, and Herndon, E. (2020) Seasonal mixing from intermittent flow drives concentration-discharge (C-Q) behavior in a stream affected by coal mine drainage. *Hydrol. Processes*, 1-14. [10.1002/hyp.13822](https://doi.org/10.1002/hyp.13822) (Google Scholar cited: 12)

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22. **Singer, D.M.** (2020). The Effects of Natural Mineral Coatings on Metal Transport in Contaminated Aquifers. In *Encyclopedia of Water*, P. Maurice (Ed.).

[doi:10.1002/9781119300762.wsts0015](https://doi.org/10.1002/9781119300762.wsts0015).

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21. **Singer, D.M.**, Herndon, E., \*\*Cole, K., \*\*Burkey, M., \*Morisson, S., \*Cahill, M. and Bartucci, M.A. (2020) Micron-scale distribution controls metal(loid) release during simulated weathering of a Pennsylvanian coal shale. *Geochim. Cosmochim. Acta* 269, 117-135.

[doi.org/10.1016/j.gca.2019.10.034](https://doi.org/10.1016/j.gca.2019.10.034) (Google Scholar cited: 19)

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20. Herndon, E., Yarger, B., Frederick, H. and **Singer, D.M.** (2019) Iron and Manganese Biogeochemistry in Forested Coal Mine Spoil. *Soil Systems* 3, 13. (Google Scholar cited: 14)

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19. **Singer, D.M.**, Jefferson, A.J., \*Traub, E.L. and Perdrial, N. (2018) Mineralogical and geochemical variation in stream sediments impacted by acid mine drainage is related to hydro-geomorphic setting. *Elementa* 6, 16. [doi.org/10.1525/elementa.286](https://doi.org/10.1525/elementa.286) (Google Scholar cited: 11)

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18. Herndon, E.M., Havig, J.R., **Singer, D.M.**, McCormick, M.L. and Kump, L.R. (2018) Manganese and iron geochemistry in sediments underlying the redox-stratified Fayetteville Green Lake. *Geochim. Cosmochim. Acta* 231, 50-63.  
[doi.org/10.1016/j.gca.2018.04.013](https://doi.org/10.1016/j.gca.2018.04.013) (Google Scholar cited: 60)

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17. Schindler, M., **Singer, D.M.** (2017) Mineral Surface Coatings: Environmental Records at the Nanoscale. *Elements* 13, 159-164. [10.2113/gselements.13.3.159](https://doi.org/10.2113/gselements.13.3.159) (Google Scholar cited: 22)

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16. Herndon, E., \*\*AlBashaireh A., **Singer, D.M.**, Chowdhury, T.R., Gu, B., and Graham D. (2017) Influence of iron redox cycling on organo-mineral associations in Arctic tundra soil. *Geochem. Cosmochim. Acta*. 207, 210-231.  
[doi.org/10.1016/j.gca.2017.02.034](https://doi.org/10.1016/j.gca.2017.02.034) (Google Scholar cited: 89)

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15. **Singer, D.M.**, Griffith, E.M., Senko, J.M., \*\*Fitzgibbon, K., and \*Widanagamage, I.H. (2016) Celestine in a sulphidic spring barite deposit - a potential biomarker? *Chem. Geol.* 440: 15-25.  
[dx.doi.org/10.1016/j.chemgeo.2016.06.022](https://doi.org/10.1016/j.chemgeo.2016.06.022) (Google Scholar cited: 8)

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14. \*Widanagamage, I.H., Griffith, E.M., **Singer, D.M.**, Scher, H.D., Buckley, W.P., and Senko, J.M. (2015) Controls on stable Sr-isotope fractionation in continental barite. *Chem. Geol.* 411, 215-227. [dx.doi.org/10.1016/j.chemgeo.2015.07.011](https://doi.org/10.1016/j.chemgeo.2015.07.011) (Google Scholar cited: 24)

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13. \*Reilly, D., **Singer, D.M.**, Jefferson, A., and Eckstein, Y. (2015) Identification of local groundwater pollution in northeastern Pennsylvania: Marcellus flowback or not? *Environmental Earth Sciences*, 1-13. [10.1007/s12665-014-3968-0](https://doi.org/10.1007/s12665-014-3968-0) (Google Scholar cited: 14)

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12. **Singer, D.M.**, Guo, H., and Davis, J.A. (2014) U(VI) and Sr(II) batch sorption and diffusion kinetics into mesoporous silica (MCM-41). *Chem. Geol.* 390, 152-163.  
[dx.doi.org/10.1016/j.chemgeo.2014.10.027](https://doi.org/10.1016/j.chemgeo.2014.10.027) (Google Scholar cited: 29)

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11. **Singer, D.M.**, Fox, P.M., Guo, H., Marcus, M.A., and Davis, J.A. (2013) Sorption and Redox Reactions of As(III) and As(V) within Secondary Mineral Coatings on Aquifer Sediment Grains. *Environ. Sci. & Technol.* 47, 11569-11576.  
[10.1021/es402754f](https://doi.org/10.1021/es402754f) (Google Scholar cited: 21)

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10. Fox, P.M., Davis, J.A., Kukkadapu, R., **Singer, D.M.**, Bargar, J., and Williams, K.H. (2013) Abiotic U(VI) reduction by sorbed Fe(II) on natural sediments. *Geochim. Cosmochim. Acta* 117, 266-282. [dx.doi.org/10.1016/j.gca.2013.05.003](https://doi.org/10.1016/j.gca.2013.05.003) (Google Scholar cited: 54)

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9. Stoliker, D. L., Campbell, K. M., Fox, P. M., **Singer, D. M.**, Kaviani, N., Carey, M., Peck, N. E., Bargar, J. R., Kent, D. B., and Davis, J. A. (2013) Evaluating Chemical Extraction Techniques for the Determination of Uranium Oxidation State in Reduced Aquifer Sediments. *Environ. Sci. Technol.*, 47, (16), 9225-9232. [10.1021/es401450v](https://doi.org/10.1021/es401450v) (Google Scholar cited: 24)

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8. **Singer, D.M.**, Chatman, S.M., Ilton, E.S., Rosso, K.M., Banfield, J.F., and Waychunas, G.A., (2012) Identification of Simultaneous U(VI) Sorption Complexes and U(IV) Nanoprecipitates on the Magnetite (111) Surface. *Environ. Sci. Technol.* 46, 3811-3820.  
[10.1021/es203877x](https://doi.org/10.1021/es203877x) (Google Scholar cited: 75)

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7. **Singer, D.M.**, Chatman, S.M., Ilton, E.S., Rosso, K.M., Banfield, J.F., and Waychunas, G.A. (2012) U(VI) Sorption and Reduction Kinetics on the Magnetite (111) Surface. *Environ. Sci. Technol.* 46, 3821-3830. [10.1021/es203878c](https://doi.org/10.1021/es203878c) (Google Scholar cited: 95)

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6. **Singer, D.M.**, Farges, F., and Brown Jr, G.E. (2009) Biogenic nanoparticulate UO<sub>2</sub>: Synthesis, characterization, and factors affecting surface reactivity. *Geochim. Cosmochim. Acta* 73, 3593-3611. [10.1016/j.gca.2009.03.031](https://doi.org/10.1016/j.gca.2009.03.031) (Google Scholar cited: 80)

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5. **Singer, D.M.**, Maher, K., and Brown Jr, G.E. (2009) Uranyl-chlorite sorption/desorption: Evaluation of different U(VI) sequestration processes. *Geochim. Cosmochim. Acta* 73, 5989-6007. [10.1016/j.gca.2009.07.002](https://doi.org/10.1016/j.gca.2009.07.002) (Google Scholar cited: 92)

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4. **Singer, D.M.**, Zachara, J.M., and Brown Jr, G.E. (2009) Uranium speciation as a function of depth in contaminated Hanford sediments - A micro-XRF, micro-XRD, and micro- and bulk-XAFS Study. *Environ. Sci. Technol.* 43, 630-636.  
[doi:10.1021/es8021045](https://doi.org/10.1021/es8021045) (Google Scholar cited: 101)

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3. Kelsey, K.E., Stebbins, J.F., **Singer, D.M.**, Brown Jr, G.E., Mosenfelder, J.L., and Asimow, P.D. (2009) Cation field strength effects on high pressure aluminosilicate glass structure:

Multinuclear NMR and La XAFS results. *Geochim. Cosmochim. Acta* 73, 3914-3933. [10.1016/j.gca.2009.03.040](https://doi.org/10.1016/j.gca.2009.03.040) (Google Scholar cited: 91)

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2. **Singer, D.M.**, Johnson, S.B., Catalano, J.G., Farges, F., and Brown, Jr., G.E. (2008) Sequestration of Sr(II) by calcium oxalate--A batch uptake study and EXAFS analysis of model compounds and reaction products. *Geochim. Cosmochim. Acta* 72, 5055-5069. [doi.org/10.1016/j.gca.2008.07.020](https://doi.org/10.1016/j.gca.2008.07.020) (Google Scholar cited: 19)

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1. **Singer, D.M.**, Farges, F., and Brown Jr., G.E. (2007) Biogenic UO<sub>2</sub> - characterization and surface reactivity. *Am. Inst. Phys. Conf. Proc.*, 13th Int. XAFS Conf. 882, 277-279. [doi.org/10.1063/1.2644500](https://doi.org/10.1063/1.2644500) (Google Scholar cited: 12)

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## Peer Reviewed Technical Reports

1. Fuller, C.C., Johnson, K.J., Akstin, K.C., **Singer, D.M.**, Yabusaki, S.B., Fang, Y., and Fuhrmann, M. (2014) Uranium Sequestration During Biostimulated Reduction and In Response to the Return of Oxic Conditions In Shallow Aquifers, [NUREG/CR-7178](https://www.nrc.gov/docs/2014/09/NUREG-CR-7178.pdf). Office of Nuclear Regulatory Research, United States Nuclear Regulatory Commission

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## Research Funding (\$496k to date since 2012)

### Active External Awards

2020-2023	Science for Community Change
	PIs: B. Mulvey (KSU)
	<b>D.M. Singer</b>
	Funding Agency: The Martha Holden Jennings Foundation
	Amount: \$72,233
2022-2023	Oxidative exhaustion: Assessing the time frame for the cessation of acid mine drainage production within impacted watersheds
	PI: <b>D.M. Singer</b>
	Funding Agency: Ohio Water Research Center
	Amount: \$56,750

### Completed External Awards

2017-2018	Acquisition of analytical equipment for environmental mineralogy and geochemistry
	PI: <b>D.M. Singer</b>
	Co-PIs: E. Herndon, J. Williams (KSU)
	Funding Agency: National Science Foundation Earth Sciences: Instrumentation and Facilities
	Amount: \$126,459

- 2016-2018    Application of carbide lime to abandoned coal mine spoil for a novel and inexpensive treatment of acid mine drainage  
 PI:                      **D.M. Singer**  
 Funding Agency:    Ohio Coal Research Consortium  
 Amount:                \$200,485
- 2015-2016    Soil Development on Coal Mine Tailings: Impact of Trace Metal Sources and Mobility to Acid Mine Drainage  
 PI:                      **D.M. Singer**  
 Funding Agency:    Ohio Water Research Center  
 Amount:                \$40,143

#### **Pending External Awards**

- 2023-2026    Equipment: MRI: Track #3 Acquisition of a Helium-Free Ramped Pyrolysis System for Multidisciplinary Carbon and Sulfur Characterization  
 PI:                      T. Gallagher (KSU)  
 Co-PIs:                A. Tessin (KSU)  
                              **D.M. Singer (KSU)**  
                              L. Kinsman-Costello (KSU)  
 Funding Agency:    National Science Foundation  
 Amount:                \$488,588

#### **Internal Awards** *(since 2018)*

- 2021-2020    Lead (Pb) contamination in urban soils  
 PI:                      **D.M. Singer**  
 Funding Agency:    Kent State University Research Council  
 Amount:                \$3,500
- 2020            Using ball-and-stick models for mineralogy instruction  
 PI:                      **D.M. Singer**  
 Funding Agency:    Kent State University Teaching Council (Teaching Development Grant)  
 Amount:                \$1,000
- 2019-2020    Lead speciation and distribution in urban environments  
 PI:                      **D.M. Singer**  
 Funding Agency:    Kent State University Research Council  
 Amount:                \$3,500
- 2019-2020    Local Environment-based Authentic Discovery Research and Outreach on Lead (Project LEAD)  
 PIs:                     B. Mulvey (KSU)

**D.M. Singer**  
Funding Agency: Kent State University Environmental Science and Design  
Research Initiative Seed Grant Program  
Amount: \$12,000

**In-kind Funding: Synchrotron Beamtime Proposals and Awarded Time (*since 2018*)**

These competitive research awards from the Advanced Photon Source (APS) are not monetary awards, but provide in kind access to the research facilities at no charge to the user. The APS at Argonne National Laboratory has an annual operating budget of \$650 million dollars, a nominal daily operating cost of ~ \$2.6 million dollars, and supports approximately 200 projects per year. According to the 2014 APS report, the average success rate for projects submitted from 2009-2012 ranged from ~55% for General User Proposals (GUPS). A shift is 8 hours.

2020-2021 Using Se(VI)/Se(IV) and As(V)/As(III) coprecipitated in natural barite samples  
as paleoredox indicator  
co-PIs: **D.M. Singer**, L. Griffith (OSU)  
Shifts Awarded 12  
Participating students: J. Kim (OSU)

2017-2018 Application of carbide lime to abandoned coal mine spoil for a novel and  
inexpensive treatment of acid mine drainage  
PI: **D.M. Singer**  
Shifts Awarded 9  
Participating students: M. Barczok, L. Yazbek, A. Tucker

**Unfunded Proposals (*since 2018*)**

2021 Developing a framework for long-term AMD treatment: What drives remediation  
project effectiveness and how long will they be needed? (Submitted October  
2021)  
PI: **D.M. Singer**  
Funding Agency: Office of Surface Mining Remediation and Enforcement  
(US Department of Interior)  
Amount: \$197,796

2020 Downgradient spatial, temporal, and speciation changes of Pb and associated  
metals in surface soils and outdoor dust from variable sources (Submitted  
November 2020)  
PI: **D.M. Singer**  
Co-PIs: N. Teutsch (Geological Survey of Israel)  
Funding Agency: US-Israel Binational Science Foundation  
Amount: \$249,717 (\$132,099 to KSU)

From the micrometer-scale to the watershed-scale: Investigating the importance  
of colloidal transport from historic and abandoned coal mine spoil and  
implications for future reclamation (submitted May 2020)  
PI: **D.M. Singer**



Funding Agency: Office of Surface Mining Remediation and Enforcement  
(US Department of Interior)  
Amount: \$192,245

2019 The effects of volcanic ash on preservation of marine invertebrates: field, geochemical, and taphonomic approaches (submitted January, 2019)

PI: R. Feldman (KSU)

Co-PIs: C. Schweitzer

**D.M. Singer**

Funding Agency: National Science Foundation Sedimentary/Paleontology

Amount: \$202,657

2018 Soil-air transfer of lead as a function of source and climate (submitted November, 2018)

PI: **D.M. Singer**

Co-PIs: N. Teutsch (Geological Survey of Israel)

Funding Agency: US-Israel Binational Science Foundation

Amount: \$228,055 (\$119,408 to KSU)

The effects of volcanic ash on preservation of marine invertebrates: field, geochemical, and taphonomic approaches (submitted December, 2017)

PI: R. Feldman (KSU)

Co-PIs: C. Schweitzer

**D.M. Singer**

Funding Agency: National Science Foundation Sedimentary/Paleontology

Amount: \$182,000

Apatite dissolution at the nanoscale: Effects of crystal chemistry, surface altered layers, and macroscale implications (submitted January, 2018)

PI: N. Perdrial (U. Vermont)

Co-PIs: **D.M. Singer**

Funding Agency: National Science Foundation Low-Temperature  
Geochemistry Geobiology

Amount: \$120,349 to KSU

Generation and transport of colloids and associated trace metals in an acid mine drainage-impacted area (submitted May, 2018)

PI: **D.M. Singer**

Co-PIs: E. Herndon (KSU)

Funding Agency: US Geological Survey

Amount: \$464,804

### **Conference Presentations (\* = invited)**

2019 \* "From atoms to mountains: new frontiers in X-ray science", *Centennial Symposium of the Mineralogical Society of America, Washington, D.C.*

- 2018 \* “Metal transport in soils developing on abandoned coal mine waste”, *Ohio Mineland Partnership 2018 Fall Conference, New Philadelphia, OH.*
- “The relationship between hydro-geomorphic setting and geochemical gradients along flowpaths in stream sediments impacted by acid mine drainage”, *255<sup>th</sup> American Chemical Society National Meeting, New Orleans, LA.*
- 2017 \* “Metal(loid) uptake by mineral surface coatings”, *253<sup>rd</sup> American Chemical Society National Meeting in San Francisco, CA.*
- 2016 \* “The Effects of Mineralogical Transformations on the Mobility of Trace Metals in an Area Affected By Acid Mine Drainage, Huff Run, Ohio”, *251<sup>st</sup> American Chemical Society National Meeting in San Diego, CA.*
- 2015 \* “Fate and transport of trace metals and salts during shale-gas production”, *Ohio Environmental Health Association (OEHA) Annual Education Conference, Columbus, OH.*
- \* “U(VI) and Sr(II) sequestration in mesoporous materials: The importance of confined pore spaces”, *250<sup>th</sup> American Chemical Society National Meeting in Boston, MA.*
- 2013 \* “Contaminant sequestration in mesoporous materials and secondary mineral coatings: The importance of confined pore spaces. *American Chemical Society Annual Meeting, Indianapolis, IN.*
- “Geological impacts of hydraulic fracturing”, *Northern Ohio Chapter Air & Waste Management Association Spring 2013 Technical Conference on “Environmental Issues Facing Oil & Gas Well Developers”, Kent, OH.*
- 2010 \* “Identification of reduced-U nanoprecipitates on the magnetite (111) surface”, *Geological Society of America Annual Meeting, Denver, CO.*
- “Identification of U(VI) Sorption Products and Precipitates on Magnetite by GI-XAS and Microscopy”, *Goldschmidt Geochemistry Conference, Knoxville, TN.*
- 2009 “Uranyl sorption by ferrous iron-bearing minerals”, *Geological Society of America, Portland, OR.*
- 2008 “Uranyl-chlorite sorption/desorption: Evaluation of different sorption mechanisms” *Goldschmidt Geochemistry Conference, Vancouver, Canada.*
- \* “Uranium speciation as a function of depth in contaminated Hanford Sediments – A micro-XRF, micro-XAFS, and micro-XRD study”, *Advanced Photon Source Annual Cross-cut Review*

- 2007 “Using synchrotron X-ray techniques to examine uranium speciation with depth in contaminated Hanford sediments”, *Frontiers in Mineral Sciences, Cambridge, England*.
- 2006 \* “Biogenic UO<sub>2</sub> - characterization and surface reactivity”, *33rd Annual SSRL Users' Meeting, Menlo Park, CA*.
- \* “Biogenic UO<sub>2</sub> - characterization and surface reactivity”, *Annual Meeting of the Environmental Molecular Science Institute, Stanford, CA*.
- “Biogenic UO<sub>2</sub> – characterization and surface reactivity”, *Goldschmidt Geochemistry Conference, Melbourne, Australia*.

### **Invited Seminar Presentations**

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- 2022 “Legacy lead (Pb) in urban soils: An ongoing source of exposure”, *Ohio Section of the American Institute of Professional Geologists (AIPG), Canton, Ohio*.
- “The complexity, challenges, and remediation needs of environments impacted by historic coal mining”, *Characterization, Techniques, and Synchrotron Methods in Resource Extraction Conference & Technical Workshop*, hosted by The Canadian Lightsource and Natural Sciences and Engineering Research Council of Canada (NSERCC) Collaborative Research and Training Experience (CREATE) program (remote).
- 2020 “Lead (Pb) speciation and distribution in urban soils: A case study from Akron, Ohio (USA)”, *The Institute of Earth Sciences - The Hebrew University of Jerusalem* (remote)
- “Trace element speciation, distribution, and transport in anthropogenically-impacted soils”, *The Geological Survey of Israel, Jerusalem*.
- 2018 “Abandoned coal mine waste: shale weathering, acid mine drainage release, and soil development”, *Kent State University, Department of Biological Sciences*
- “Whither pyrite? From coal shale to mine spoil and soil development, and metal release along the way”, *University of Saskatchewan and The Canadian Light Source*
- 2017 “Metal transport and mineralogical transformations: From coal shale to mine spoil to soils”, *Miami University, Department of Geology and Environmental Earth Science*
- “A mineralogical-hydro-geochemical view of acid mine drainage: from the molecular- to field-scale” *The Ohio State University, School of Earth Sciences*

- 2014 “Contaminant sequestration in mesoporous materials and secondary mineral coatings: The importance of confined pore spaces”, *University of Vermont, Department of Geology*
- “Contaminant sequestration in mesoporous materials and secondary mineral coatings: The importance of confined pore spaces”, *University of Akron, Department of Geosciences*
- “Contaminant sequestration in mesoporous materials and secondary mineral coatings: The importance of confined pore spaces”, *University of Notre Dame, Department of Civil & Environmental Engineering & Earth Sciences*
- “Contaminant sequestration in mesoporous materials and secondary mineral coatings: The importance of confined pore spaces”, *The University of Texas, Arlington, Department of Earth and Environmental Sciences*
- 2013 “Contaminant sequestration in mesoporous materials and secondary mineral coatings: The importance of confined pore spaces”, *The Virginia Polytechnic Institute and State University, Department of Geosciences*
- 2006 “Biogenic nanoparticulate UO<sub>2</sub>: Synthesis, characterization, and factors affecting surface reactivity”, *Advanced Materials Research Center (CIMAV), Chihuahua, Mexico.*

**Student Advisee Conference Presentations** (*italics* denotes student co-author)

- 2023 **Nwoko, C. and Singer, D.M.** “Lead (Pb) speciation in urban soils at the house-scale” *Geological Society of America - Joint Southeastern & Northeastern Section Meeting, Reston, VA.*
- 2022 **Wood, M. and Singer, D.M.** “Lead (Pb) in urban soil” *Geological Society of America North-Central/Southeastern Joint Section Meeting, Cincinnati, OH.*
- 2021 **Chowdhury, A.R. and Singer, D.M.** “Colloidal metal transport in soils developing on historic coal mine spoils”. *American Chemical Society, National Meeting (remote).*
- Barczok, M., Smith, C., Kinsman-Costello, L., Singer, D.M., Patzner, M.S., Kappler, A., Bryce, C. and Herndon, E.M.** “Impact of increasing permafrost thaw and surface ponding on iron speciation and phosphorous bioavailability in Abisko, Sweden”. *Goldschmidt Geochemistry Conference (remote).*
- 2020 **Barczok, M., Smith, C., Kinsman-Costello, L., Singer, D.M., and Herndon, E.M.** “Phosphorous bioavailability as a function of increasing permafrost thaw and surface ponding in Abisko, Sweden”. *American Geophysical Union Conference, (remote).*

Barczok, M., Smith, C., Kinsman-Costello, L, **Singer, D.M.**, and Herndon, E.M. "Influence of Permafrost Thaw on Redox, Iron Speciation, and Bioavailable Phosphorus in a Subarctic Peatland". *Goldschmidt Geochemistry Conference, (remote)*.

2019 Chowdhury, A.R., **Singer, D.M.**, and Herndon, E.M. "Colloidal metal transport in soils developing on historic coal mine spoils". *American Geophysical Union Annual Meeting, San Francisco, CA*.

Santoro, N., and **Singer, D.M.** "Neighborhood-Level Lead Speciation and Distribution in Akron, OH.". *American Geophysical Union Annual Meeting, San Francisco, CA*.

2018 Chowdhury, A.R., **Singer, D.M.**, and Herndon, E.M. "Colloidal metal transport in soils developing on historic coal mine spoils". *American Geophysical Union Annual Meeting, Washington, D.C*.

2017 Wood, D., **Singer, D.M.**, Herndon, E., Koval, J., and Tucker, A. "Carbide Lime Treatment of Acid Mine Drainage Impacted Soils in The Huff Run Watershed of Northeast Ohio" *Geological Society of America Annual Meeting, Seattle, WA*.

Morrison, S., Herndon, E., and **Singer, D.M.** "A Micron Scale Study of the Distribution of Metal(loid)s in a Soil Formed on Coal Mine Spoil" 253<sup>rd</sup> *American Chemical Society National Meeting San Francisco, CA*.

2015 Zemanek, L., Herndon, E., and **Singer, D.M.** "A Geochemical and Mineralogical Comparison of Soil Formation on Mine Tailings and a Shale Hill and their Contribution to Stream Chemistry, Huff Run Watershed, Ohio". 250<sup>th</sup> *American Chemical Society National Meeting, Boston, MA*.

2014 Traub, E.L., Jefferson, A., and **Singer, D.M.** "The Effects of Biogeochemical Sinks on the Mobility of Trace Metals in an Area Affected By Acid Mine Drainage, Huff Run, Ohio. *Geological Society of America, Vancouver, Canada*.

Cahill, M., and **Singer, D.M.** "Speciation and Distribution of Trace Metals in Iron Sulfide-Bearing Shales". *Synchrotron Environmental Science VI, Argonne National Laboratory, Darien, Illinois*.

## TEACHING

### Courses Taught at Kent State University, Department of Earth Sciences

[Note: the links below include course syllabi, peer reviews, course evaluations, and examples of relevant teaching material for each course.]

#### Graduate level

[Graduate Student Orientation](#) (1 credit)

F2013; F2014; F2015; F2016

[Geocheminar](#) (1 credit)

F2016; F2017; F2018; F2019; F2021; F2022

#### Graduate/Advanced Undergraduate level

<a href="#">Environmental Mineralogy</a> (3 credits)	F2012; S2014; F2015; S2018; S2021; S2023
<a href="#">Environmental Geochemistry</a> (3 credits)	S2013; S2015; S2017; S2019; F2020; S2022

#### *Undergraduate Required Classes*

<a href="#">Earth Materials I</a> (4 credits)	F2016; F2017; F2018; F2019; F2020; F2021; F2022
<a href="#">Degrees and Career Pathways</a> (1 credit)	F2021

#### *Core Introductory Classes*

<a href="#">Environmental Earth Sciences</a> *(3 credits)	F2013 [ <i>Honors</i> ]; S2014; F2014; F2015; S2017; F2017 [ <i>Honors</i> ]; F2018 [ <i>Honors</i> ]; F2019 [ <i>Honors</i> ]
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\* Developed by Singer into a distance learning course in Spring 2019; first DL offering was Summer 2019.

## **MENTORING**

### **Completed Graduate Student Theses and Dissertations (10 to date)**

Raihan Chowdhury	Ph.D. Applied Geology, Kent State University, 2022 “The role of mineral surface coatings on colloids in controlling metal transport in rural and urban environments”
Max Barczok	Ph.D. Applied Geology, Kent State University, 2022 “Geochemical controls over phosphorus bioavailability as a function of redox sensitive iron oxides” (co-advised)
Kortney Cole	M.S. Geology, Kent State University, 2021 “Secondary mineral coating formation and metal sequestration in soils developing from mine spoil pre- and post-treatment with lime”
Laura Zemanek	M.S. Geology, Kent State University, 2021 “A geochemical and mineralogical comparison of soil formation on mine spoil and undisturbed shale and their contributions to pore water, Huff Run Watershed, Ohio”
Kyle Smart	M.S. Geology, Kent State University, 2021 “Exploring physical and chemical trends in a chronosequence of technosols”
Nicholas Santoro	M.S. Geology, Kent State University, 2020 “Lead (Pb) Speciation and Distribution Effects on Urban Areas”
Daniel Wood	M.S. Geology, Kent State University, 2018

“Carbide Lime Treatment of Acid Mine Drainage Impacted Soils in The Huff Run Watershed of Northeast Ohio”

Eric Traub                      M.S. Geology, Kent State University, 2016  
“The Effects of Biogeochemical Sinks on the Mobility of Contaminants in an Area Affected by Acid Mine Drainage, Huff Run, Ohio”

Inoka H. Widanagamage      Ph.D. Geology, Kent State University, 2015  
“Stable Strontium Isotope Fractionation In Biotic And Microbially Mediated Barite In Modern Continental Settings”

Darren Reilly                M.S. Geology, Kent State University, 2014  
“Identification of Local Ground Water Pollution in Northeastern Pennsylvania: Marcellus Flow-back or Not?”

### **Graduate Students In Progress**

Chukwudi Nwoko            Ph.D. Applied Geology, Kent State University, 2021 - present  
*“Assessing changes in Lead (Pb) speciation during soil weathering and aerosol formation in urban environments”*

Emily Mehta                 M.S. Geology, Kent State University, 2021 - present  
*“A Large-scale Study of the Distribution of Lead and other Trace Metal Concentrations in soils from Akron, Ohio”*

### **Graduate Committee Membership**

Kimm Jarden, M.S. Geology, Kent State University, 2015  
Mashur Zaman, Ph.D., Geology, University of Calgary, 2015  
Meaghan Shaw, M.S. Geology, Kent State University, 2018  
Lyndsey Yazbek, M.S. Geology, Kent State University, 2019  
Bryan Ice, M.S. Geology, Kent State University, 2019  
Kiersten Duroe, M.S. Geology, Kent State University, 2019  
Sydney Laubscher, M.S. Geology, Kent State University, 2019  
Ashley Haas, M.S. Geology, Kent State University, 2021  
Raissa Mendoca, Ph.D. Biology, Kent State University, 2022

### **Graduate Committee Membership In Progress**

Shagun Sharma, Ph.D. Biology, University of Akron  
Zia Ul Hassan, Ph.D. Applied Geology, Kent State University  
Alyssa Reinhardt, M.S. Geology, Kent State University  
Tatiana Fernández Pérez, Ph.D. Applied Geology, Kent State University  
Leah Stanevich, M.S. Geology, Kent State University

### **Undergraduate Student Research Projects Supervised**

Grace Michael	KSU ESI (2021-2022) “Preparation of soil and sediment samples for trace metal characterization”
Madison Wood	<p>KSU ESCI (2020-2022) Sophomore Research Experience (SRE, spring 2020); Summer Undergraduate Research Experience (SURE, 2021)  “Composition and textural analysis of Pb-bearing phases in urban soils using SEM-EDS”</p> <ul style="list-style-type: none"> <li>Awarded Ohio Space Grant Consortium Scholarship (AY-20/21 and AY-21/22)</li> </ul> <p>1<sup>st</sup> place by research category, 2022 KSU Undergraduate Research Symposium</p>
Emily Mehta	KSU ESCI (2020-2021) “Composition and particle size analyses of wetland sediments and urban soils”
Allie Shedleski	<p>KSU ESCI (2019-2020) “XRF analyses of USGS soil standards and XRD of mine waste-impacted soils”</p> <ul style="list-style-type: none"> <li>Co-author on Singer et al. (2021)</li> </ul>
Lilian Holstein	St. Vincent-St. Mary High School-KSU dual enrollment, Summer Research Experience (Summer 2019) “Soil sample preparation for X-ray fluorescence”
Nicholas Manning	<p>KSU ESCI (2018-2019) “Separation of Acid Mine Drainage Colloids by Centrifugation”</p> <ul style="list-style-type: none"> <li>KSU Summer Undergraduate Research Experience (SURE) fellow</li> </ul>
Emily Verhovitz	KSU ESCI (2017-2018) “Determining accuracy and precision of a Rigaku Miniflex X-ray diffractometer in binary and ternary phase systems”
Kortney Cole	<p>KSU ESCI (2017-2019) “Scanning electron microscope analyses of soils and rocks from an area impacted by acid mine drainage”</p> <ul style="list-style-type: none"> <li>1<sup>st</sup> place for poster presentation at 2018 KSU Undergraduate Research Symposium</li> <li>Co-author on Singer et al. (2020a,b), Yazkbek et al. (2020), and Singer et al. (2021)</li> </ul>
Michael Burkey	<p>KSU ESCI (2017-2018) “A review of iron sulfides and oxides in coal mine waste, Huff Run Watershed, Ohio”</p> <ul style="list-style-type: none"> <li>Honors Thesis</li> </ul>
Joseph Koval	KSU ESCI (2017-2018) “Synchrotron X-ray diffraction analysis and sequential extraction of metals from soils from an area impacted by acid mine drainage”



Amber Tucker	KSU ESCI (2017-2018) “Chemical analyses of soil pore water from an area impacted by acid mine drainage”
Amineh AlBashaireh	KSU ESCI, College of Wooster, Kent State University Research Experiences for Undergraduates (REU) (2015), “Geochemical Analysis of Iron and Phosphorous in Arctic Tundra Soils”, co-advised <ul style="list-style-type: none"> <li>• Co-author on Herndon et al. (2017)</li> </ul>
Jonathan Mills	KSU ESCI (2015) “Soil and water collection and analyses from an AMD-impacted watershed”
Mikala Coury	KSU ESCI (2015) “Soil and water collection and analyses from an AMD-impacted watershed”
Kaci Fitzgibbon	KSU ESCI (2014-2015) “X-ray microprobe data processing and analyses to determine Sr speciation and distribution in barite” <ul style="list-style-type: none"> <li>• Poster presented at 2015 KSU Undergraduate Research Symposium: “Determining the Sr-bearing host phase in terrestrial and synthetic barite by synchrotron x-ray microprobe analysis”</li> <li>• Co-author on Singer et al. (2016)</li> </ul>
Yuchen Shen	KSU ESCI (2014) “Soil and water collection and analyses from an AMD-impacted watershed”
Owen Jensen	KSU ESCI (2014-2015) “Sr and Ba uptake by mesoporous silica (MCM-41)”
Kristen Davis	KSU ESCI (2014-2015) “Soil collection and analyses from AMD-impacted soils and Pb-contaminated urban soils”
Sarah Morrison	KSU ESCI (2013-2015) “Soil and water collection and analyses from an AMD-impacted watershed” 2014 KSU Undergraduate Research Council Award: “Mineralogical Study of Acid Mine Drainage Sediment”

#### **Undergraduate Student Research Projects In Progress**

Rachel Izworski	KSU ESCI (2022-present) “Preparation and analysis of soil samples for Pb and other trace metal characterization”
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#### **Undergraduate Honors Thesis Committee Member**

Michael Burkey, ESCI */advisee/*  
Hannah Frederick, Biology

Jennie Brancho, Biology  
Samantha Kirgesner, Archeology  
Tyler Sanda, Geology, University of Akron  
Nora Honkomp, Biology  
Alexandra Euwema, Biology  
Justin Thompson, Environmental Studies/Political Science

## **PROFESSIONAL SERVICE**

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### **Editing and Reviewing**

- Associate Editor: *American Mineralogist* (2015-2019)
- Ad-hoc Grant Proposal Reviews: Department of Energy - Nuclear Energy (2014-2019), Sylvia Fedoruk Canadian Centre for Nuclear Innovation (2013); National Science Foundation, Low T Geochemistry/Geobiology (2017 - present); National Science Foundation, Instrumentation/Facilities (2017 - present); National Science Foundation Earth Science Proposal Review Panel for Post Doc (2021-2022); Ohio Water Resources Center (2023); Binational US-Israel Science Foundation (2023).
- Journal Peer Reviewer (2009 - present): *ACS-Earth and Space Chemistry*, *American Mineralogist*, *Applied Clay Sciences*, *Applied Geochemistry*, *Applied Radiation & Isotopes*, *Chemical Geology*, *Chemical Reviews*, *Chemosphere*, *Elementa*, *Environmental and Engineering Geoscience*, *Environmental Geochemistry and Health*, *Environmental Science - NANO*, *Environmental Science and Pollution Research*, *Environmental Science & Technology*, *Geochimica et Cosmochimica Acta*, *Journal of Hazardous Materials*, *Journal of Radioanalytical and Nuclear Chemistry*, *Minerals*, *PLOS ONE*, *Science of the Total Environment*
- Proposal Peer Review Panels: NSLS-II (2021-present); Canadian Lightsource (2012-2021).
- Committee Chair, Proposal Peer Review Committee, Canadian Lightsource (2017-2019)
- Executive Committee Member: Stanford Synchrotron Radiation Lightsource Users' Organization (2010-2012)
- Synchrotron Beamtime Proposal Reviewer (2009-present): Stanford Synchrotron Radiation Lightsource, Canadian Light Source

### **Conference Session co-convenor**

- "Chemical and Biological Processes at Mineral Surfaces: Influence on Contaminant Dynamics", 2010 Goldschmidt Conference, Knoxville, TN
- "Energy Resources: From Production to Environmental Impact", 2014 Goldschmidt Conference, Sacramento, CA
- "Environmental consequences of resource development", 2016 251<sup>st</sup> American Chemical Society National Meeting, San Diego, CA

### **Service to the Kent State University, Department of Earth Sciences**

- Graduate Coordinator (F2020-present)
- AAUP-KSU Council, unit representative (2023-present)
- Curriculum Committee (AY 14-15, 15-16, 16-17; 17-18)

- Faculty Advisory Committee (AY 14-15, 15-16, and 20-23)
- Graduate Studies Committee (AY 12-13, 13-14 and Spring 2015)
- Ad Hoc Chair Review Committee (Spring 2015 and Spring 2019)
- Undergraduate Adviser (AY 12-13)
- Colloquium Coordinator (AY 17-18)

#### **Service to the Kent State University, School of Arts & Sciences**

- College Advisory Committee (2022-present)

#### **Service to Kent State University**

- Reviewer for KSU Fellowships and Awards (2018, 2022-2023)
- Honors College Policy Council (2019-present)
- Hosted high school-KSU dual enrolment student volunteer research for KSU Summer Research Experience (2019)

#### **Outreach and Community Service**

- “Protecting ourselves and our community from overexposure to lead (Pb)”, Project Based Learning activities with Akron Public Schools (Schumacher Elementary and Buchtel High School) (Spring 2019) and Painesville City Local Schools (2020-present)
- Petrified wood and plant fossil activities for MJDS pre-K class (Fall 2019)
- “Mineral resources in everyday life” for Cub Scout Pack 3551 (Ravenna, OH) (Spring 2019)
- Judge at the Mandel Jewish Day School (MJDS, Beachwood, OH) middle school science fair (2015-present)
- Soil properties and soil coring for MJDS pre-K class (Spring 2018)
- Soil color and soil painting for MJDS Kindergarten class (Fall 2018)

#### **Awards**

- Kent State University, College of Arts and Sciences, “Distinguished Teacher Award” (2019)
- Kent State University, Department of Earth Sciences, “Glen W Frank Outstanding Teaching Award” (2018, 2019, 2020, 2021, and 2022)
- Kent State University, University Research Council - Academic Research Appointment (2016)
- Kent State University, University Teaching Council - Teaching Development Grant (2014, and 2020)
- Summer Teaching Development Grant - Kent State University (2013)
- International Association of GeoChemistry (IAGC) - Excellence in Review Award (2021)