David Brian Rogers

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RESEARCH INTERESTS

reactive transport modeling, biogeochemistry, hydrogeology, high-performance computing, data science, geostatistics

EDUCATION

Stanford University, Stanford, CA — Sep. 2020 –
Ph.D. Earth System Science
Dissertation Advisor: Kate Maher

Missouri University of Science and Technology, Rolla, MO — Aug. 2017 – Dec. 2019
B.S. Geological Engineering, *summa cum laude*

University of Pennsylvania, Philadelphia, PA — Aug. 2015 – May 2017
Environmental Science and Computer Science

TECHNICAL SKILLS

Computational Skills: R, MIN3P, MODFLOW, MT3D, HYDRUS-1D, high-performance computing, ArcGIS, ENVI, Microsoft Excel, ParaView, Java, KBase, DRAM, Surfer, RES2DINV

Field Skills: groundwater sampling, soil water sampling, water quality testing, dye trace tests, slug tests, benthic macroinvertebrate collection, greenhouse gas collection, vegetation collection, sap flow monitor installation, pollinator trap installation, near-surface geophysics (GPR, ERT, MASW)

Laboratory Skills: UV/Vis spectroscopy, flushing vials, denitrification enzyme activity assay, soil combustion analysis, sample preparation for shipment to outside laboratories

HONORS AND AWARDS

Department of Energy Computational Science Graduate Fellowship (2020)
Stanford Graduate Fellowship in Science and Engineering – Stanford University (2020)
Enhancing Diversity in Graduate Education Fellowship – Stanford University (2020)
Grant in Aid of Research – Sigma Xi Scientific Research Honor Society (2020)
Lemke Research Scholar – Association of Environmental and Engineering Geologists (2019)
Opportunities for Undergraduate Research Experience (OURE) Fellowship – Missouri S&T (2019)
Wilbert Stoecker Research Endowment – Missouri S&T (2019)
Top Undergraduate Researcher – Missouri S&T Department of Geological Engineering (2018, 2019)
Undergraduate Research Grant – Geological Society of America North-Central Section (2018)
Top Undergraduate Research Poster – Geological Society of America North-Central Section (2018)
Penn Emerging Scholars Program – University of Pennsylvania School of Engineering (2015-2016)
Integrated Studies Program – University of Pennsylvania College of Arts and Sciences (2015-2016)
Benjamin Franklin Scholar – University of Pennsylvania (2015-2017)

PROFESSIONAL AFFILIATIONS

Member – Geochemical Society
Member – American Geophysical Union
Member – Geological Society of America
Member – Association for Environmental and Engineering Geologists

RESEARCH EXPERIENCE

Lawrence Berkeley National Laboratory, Berkeley, CA May 2019 – Present
Modeling the impact of riparian hollows on riparian corridor nitrogen exports
Advisors: Dr. Michelle Newcomer, Dr. Susan Hubbard

- modeling rates of biogeochemical transformation and nutrient cycling within riparian hollows in the East River, Colorado using reactive transport model MIN3P
- imposing and evaluating climate-induced perturbations using high-performance computing to understand effect of climate change on riparian hollow hydrobiogeochemical dynamics

Missouri University of Science and Technology, Rolla, MO Jan. 2018 – Jan. 2020
Investigating sources of heavy metal contamination in the Tri-State Mining District
Advisor: Dr. Katherine Grote

- determining relative contribution of geogenic and anthropogenic sources of heavy metals
- designed and engineered baseflow monitoring wells for sample acquisition
- analyzing lead isotopic ratios, lead concentrations, and zinc concentrations using ICP-MS
- using mixing models and multivariate statistical techniques to determine contaminant sources

Argonne National Laboratory, Lemont, IL May 2018 – Aug. 2018
Quantifying denitrification rates in a multifunctional landscape
Advisors: Dr. John Quinn, Patty Campbell, Colleen Zumpf

- investigated the sustainability of implementing bioenergy practices in agricultural settings
- developed a procedure for quantifying denitrification rates and derived an analytical solution for scaling the results

Missouri University of Science and Technology, Rolla, MO Aug. 2017 – Dec. 2017
Predicting the occurrence of saline groundwater in northern and western Missouri
Advisor: Dr. Katherine Grote

- assimilated well construction and water chemistry data from numerous public and private sources
- performed multivariate statistical analysis in R and Excel to investigate spatial and temporal trends in groundwater quality

University of Pennsylvania, Philadelphia, PA Sep. 2016 – May 2017
A streamlined workflow for the analysis of biogeochemical soil data using R
Advisor: Dr. Alain Plante

- developed R scripts to merge and analyze data obtained from thermal and gas analyzers
- analyzed sets of soils, which involved sample preparation, operating specialized equipment, and processing data using specialized software and scripts

Vanderbilt University, Nashville, TN May 2016 – Aug. 2016
Statistical modeling of water consumption in entirely sustainable community in Colorado
Advisor: Dr. Hiba Baroud

- analyzed large sets of water consumption data using multivariate statistical techniques in R
- developed quantitative relationships to input into a water consumption simulation to evaluate community resilience and vulnerability to potential future extreme weather events

FIRST AUTHOR PUBLICATIONS

(1) Rogers, D.B., Newcomer, M.E., Raberg, J., Steefel, C.I., Bouskill, N.J., Nico, P.S., Fox, P.M., Conrad, M., Bill, M., Brodie, E., Falco, N., Williams, K.H., Hubbard, S.S. (under review). Modeling the impact of riparian hollows on river corridor nitrogen exports. Frontiers in Water: Water and Critical Zone.

FIRST AUTHOR PUBLICATIONS IN CONFERENCE PROCEEDINGS

(1) Rogers, D.B., Newcomer, M.E., et al. (2020). Modeling hydrological and geochemical controls on nitrogen retention in riparian hollows. Proceedings from Computational Methods in Water Resources XXIII. Stanford, CA.
(2) Rogers, D.B, Newcomer, M.E, et al. (2019). Modeling riparian hollow controls on nitrogen cycling in hydrodynamic systems. Proceedings from American Geophysical Union Fall Meeting 2019. San Francisco, CA.
(3) Rogers, D.B., Grote, K. (2019). Investigating sources of heavy metal contamination in the historic tri-state mining district. Proceedings from Association of Environmental and Engineering Geologists 62nd Annual Meeting. Asheville, NC.
(4) Rogers, D.B., Campbell, P. (2018). Quantifying rates of denitrification in a biomass production and nutrient recovery site. Proceedings from Geological Society of America 130th Annual Meeting. Indianapolis, IN.
(5) Rogers, D.B., Havens, V., Grote, K. (2018). Predicting the occurrence of groundwater salinity in northern and western Missouri. Proceedings from 52nd Annual Meeting of the GSA North-Central Section. Ames, IA.

FIRST AUTHOR PRESENTATIONS

(1) Rogers, D.B., Newcomer, M.E., et al. (2020). Modeling hydrological and geochemical controls on nitrogen retention in riparian hollows. Oral session presented at: Computational Methods in Water Resources XXIII; 2020 June 22-25; Stanford, CA.
(2) Rogers, D.B., Newcomer, M.E., et al. (2019). Modeling riparian hollow controls on nitrogen cycling in hydrodynamic systems. Poster session presented at: American Geophysical Union Fall Meeting 2019; 2019 December 9; San Francisco, CA.
(3) Rogers, D.B., Grote, K. (2019). Investigating sources of heavy metal contamination in the historic tri-state mining district. Poster session presented at: Missouri Department of Natural Resources Annual Research Colloquium; 2019 December 6; Rolla, MO.
(4) **(Invited)** Rogers, D.B., Grote, K. (2019). Investigating sources of heavy metal contamination in the historic tri-state mining district. Oral session presented at: Association of Environmental and Engineering Geologists 62nd Annual Meeting; 2019 September 17-22; Asheville, NC.
(5) Rogers, D.B., Newcomer, M.E., et al. (2019). Riparian hollow controls on biogeochemistry in hydrodynamic systems. Poster session presented at: Lawrence Berkeley National Laboratory SULI Presentation Session and Ceremony; 2019 August 7; Berkeley, CA.
(6) Rogers, D.B., Grote, K. (2019). Proposal for research on sources of heavy metal contamination in the historic tri-state mining district. Oral session presented at: Missouri University of Science and Technology 15th Annual Undergraduate Research Conference; 2019 April 16; Rolla, MO.
(7) Rogers, D.B., Campbell, P., Zumpf, C. (2019). Quantifying denitrification in a multifunctional landscape. Poster session presented at: Annual Geological Sciences and Geological and Petroleum Engineering Department Colloquium; 2019 April 6; Rolla, MO.

(8) Rogers, D.B., Campbell, P., Zumpf, C. (2018). Quantifying denitrification in a multifunctional landscape. Poster session presented at: Missouri Department of Natural Resources Annual Research Colloquium; 2018 November 30; Rolla, MO.
(9) Rogers, D.B., Campbell, P., Zumpf, C. (2018). Quantifying rates of denitrification in a biomass production and nutrient recovery site. Oral session presented at: The Geological Society of America 130th Annual Meeting; 2018 November 4-7; Indianapolis, IN.
(10) Rogers, D.B., Campbell, P., Zumpf, C. (2018). Quantifying rates of denitrification in a biomass production and nutrient recovery site. Oral session presented at: Argonne National Laboratory SULI Presentation Session and Ceremony; 2018 August 1; Lemont, IL.
(11) Rogers, D.B., Havens, V., Grote, K. (2018). Predicting the occurrence of groundwater salinity in northern and western Missouri. Poster session presented at: 52nd Annual Meeting of the GSA North-Central Section; 2018 April 16-17; Ames, IA.
(12) Rogers, D.B., Havens, V., Grote, K. (2018). Predicting the occurrence of groundwater salinity in northern and western Missouri. Poster session presented at: Annual Geological Sciences and Geological and Petroleum Engineering Department Colloquium; 2018 April 13; Rolla, MO.
(13) Rogers, D.B., Prouty F., et al. (2016). Predicting future water consumption for the sterling ranch community. Poster session presented at: VUSE Summer Research Ceremony, Nashville, TN.