

Varun G. Paul, PhD

Assistant Professor

Department of Geosciences
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PROFESSIONAL PREPARATION

Missouri University of Science & Technology	PhD	Geological Science	2014
Missouri University of Science & Technology	MS	Applied & Environmental Biology	2009
St. Peter's Engineering College (Anna University)	B. Tech	Industrial Biotechnology	2007

PROFESSIONAL EXPERIENCE

Department of Geosciences, Mississippi State University (MSU)

Aug 2016-present

Assistant Professor

Teaching (graduate* and undergraduate level):

- Water Resources (GG 3613)
- Introduction to Environmental Geology (GG3133)
- Water Biogeochemistry (GG8633*)
- Physical Hydrogeology (GG 4613/6613*)
- Chemical Hydrogeology (GG 4623/6623*)
- Engineering Geology (GG 4153/6153*)

Research:

- Nutrient and metal monitoring, and risk assessment in water and sediments
- Surface water and groundwater interaction in watersheds
- Microbial mat characterization using metagenomics and isotopic profiling
- Surface and subsurface biogeochemical analogues for astrobiological applications
- Soil carbon and soil health under changing climate

Service:

- Member of Materials Working Group and Energy Working Group at MSU
- Department of Geology, MSU: Seminar, Museum, and Diversity & Inclusion committee
- Advisor, Association of Environmental and Engineering Geologists (AEG) student chapter; Secretary, Lower Mississippi Valley (LMV) AEG section

Department of Geological Sciences, Missouri S&T

Jan 2016-Jul 2016

Assistant Adjunct Professor

Teaching (undergraduate level): Introduction to Geochemistry (Geol 3410)

Research: Biogeochemical Investigation of Microbialites in a hypersaline lake in The Bahamas

Service: Leading high school students to field trips as part of 'Jackling Intro to Engineering' program

Engineering Consulting Services, Ltd., Virginia

Sept 2014-Dec 2015

Field Inspector

Technical monitoring of environmental practices, inspection of building materials and soil used in foundations and construction, overseeing contractor and field staff and reporting

Department of Geology, Department of Biology, Missouri S&T

Jan 2008- Dec 2013

Graduate Research and Teaching Assistant

Research assistant for M.S. thesis and Ph.D. dissertation projects

- a) PhD Dissertation: Carbonate bio-mineralization- Implications for subsurface CO₂ sequestration
- b) MS Thesis: Halo-alkaliphilic microbial fuel cells along with wastewater treatment
- c) Field-trip associated investigations involving sample collection from hypersaline lakes, analysis and interpretation of data obtained from *in-situ* and laboratory measurements.
- d) Reporting to program sponsors, laboratory management, proposal writing and journal publication
- e) Mentoring undergraduate students and assisting faculty and graduate students in research projects and field trips

Teaching assistant

- a) Mineralogy laboratory- Training students to identify and distinguish various minerals by using specific properties. Grading exams and setting-up laboratory assignments
- b) Geochemistry field trips-Training students in the handling and working of portable geochemical equipment, and surface and subsurface *in-situ* water quality analysis and interpretation
- c) Microbiology laboratory-Lecturing and providing hands-on training to students about various general and advanced techniques in the field of microbiology.

Space Life Science Lab, Kennedy Space Center, FL

Jun 2010-Aug 2010

Intern, NASA Planetary Biology Internship

Investigated the effects of rising CO₂ on modern marine stromatolites. The project involved exposing stromatolites collected from Highborne Cays (The Bahamas) to varying levels of CO₂ and conducting a metatranscriptomics and microbial community analysis of the microbialites

Central Institute of Brackish water Aquaculture (CIBA), Chennai, India

Jan 2007-Apr 2007

Undergraduate Intern

Studied effects of ammonia on shrimp cultivation and explored ways to treat or remove excess ammonia. Project involved isolating of the gene responsible for ammonia removal from laboratory grown cultures of the microbial community obtained from the ponds

Central Leather Research Institute (CLRI), Chennai, India

Apr 2005-Jun 2005

Undergraduate Intern

Worked on the treatment of Cr (VI) from leather industry. Bacterial cultures were grown in bio-reactors with wastewater from leather industry supplied as the feed-stock solution. The role of bacteria in remediating Cr (VI) was investigated

PUBLICATIONS AND BOOK CHAPTERS

*graduate student major advisee

**graduate student at MSU

¥visiting scholar mentee

***undergraduate student research advisee

After MSU appointment

Peer-reviewed journal articles

1. Chang, T.¥, Feng, G., Paul, V.G., Adeli, A. & Brooks, J.P. (2022). Soil Health Assessment Methods: Progress, Applications and Comparison, *Advances in Agronomy* (**IF 6.919**), 172, 129-210.

2. Nguyen, A.** , Gabitov, R., Jimenez, A.** , Dygert, A., Varco, J., Pérez-Huerta, A., Migdisov, A., Paul, V., Kirkland, B. and Dash, P. (2021). Retaining Geochemical Signatures during Aragonite-Calcite Transformation at Hydrothermal Conditions. *Minerals* (**IF 2.644**), 11(10), 1052.
3. Ferdush, J.* , & Paul, V.G. (2021). A review on the possible factors influencing soil inorganic carbon under elevated CO₂. *CATENA* (**IF 5.198**), 204, 105434.
4. Delia, K. A.** , Haney, C. R., Dyer, J. L., & Paul, V. G. (2021). Spatial Analysis of a Chesapeake Bay Sub-Watershed: How Land Use and Precipitation Patterns Impact Water Quality in the James River. *Water* (**IF 3.103**), 13(11), 1592.
5. Paul, V.G., Vattikutti, S.* , Dash, P., & Arslan, Z. (2021). Evaluating Hydrogeochemical Characteristics of Groundwater and Surface Water in the Upper Pearl River Watershed, USA. *Environmental Monitoring and Assessment* (**IF 2.513**)193, 296
6. Wickramarathna S.** , Chandrajith R., Senaratne A., Paul V.G., Dash P., Wickramashinghe S., Li X., Briggs, P. (2021). Bacterial influence in the formation of Hematite: Implications for Martian Dormant Life. *International Journal of Astrobiology* (**IF 2.026**) 1-15.
7. Gabitov, R., Migdisov, A., Nguyen, A.** , Hartesveldt, N.V., Perez-Huerta, A., Sadekov, A., Sauer, K. B., Baker, J., Paul, V.G., Caporuscio, F., Xu, H., & Roback, R.. (2021). Uptake of uranium by carbonate crystallization from reduced and oxidized hydrothermal fluids. *Chemical Geology* (**IF 4.015**) 564, 120054.
8. Paul, V.G., Sankar, M. S., Vattikutti, S.* , Dash, P., & Arslan, Z. (2021). Pollution Assessment and Land Use Land Cover Influence on Trace Metal Distribution in Sediments from Five Aquatic Systems in Southern USA. *Chemosphere* (**IF 7.086**), 128243.
9. Paul, V., Banerjee, Y., Ghosh, P., & Busi, S. B. (2020). Depthwise microbiome and isotopic profiling of a moderately saline microbial mat in a solar saltern. *Scientific Reports* (**IF 4.379**), 10(1), 1-16.
10. Sankar, M. S.** , Dash, P., Lu, Y., Paul, V., Mercer, A. E., Arslan, Z.,...& Rodgers, J. C. (2019). Dissolved organic matter and trace element variability in a blackwater-fed bay following precipitation. *Estuarine, Coastal and Shelf Science* (**IF 2.929**), 231, 106452.
11. Paul, V.G., & Mormile, M.R. (2017). A case for the preservation of saline and hypersaline environments: a microbiological perspective, *FEMS Microbiology Ecology* (**IF 4.194**), 93
12. Paul, V. G., Wronkiewicz, D. J., & Mormile, M. R. (2017). Impact of elevated CO₂ concentrations on carbonate mineral precipitation ability of sulfate-reducing bacteria and implications for CO₂ sequestration. *Applied Geochemistry* (**IF 3.524**), 78, 250-271

Book Chapters

13. Paul, V.G., & Mormile, M.R. (2020). Potential Energy Production and Utilization Pathways of the Martian Subsurface: Clues from Extremophilic Microorganisms on Earth. In. (Eds. J. Seckbach, and H. Stan-Lotter), *Extremophiles as Astrobiological Models*, 291-315

Prior to MSU Appointment

14. Paul, V.G., Wronkiewicz, D.J. & Mormile, M.R., (2016), Characterization of microbialites and the ecosystem of Storr's Lake, San Salvador Island, *in* Glumac, B., and Savarese, M., eds., *Proceedings of the 16th Symposium on the Geology of the Bahamas and other Carbonate Regions*, Gerace Research Centre, San Salvador, Bahamas, p. 95-110

15. Paul, V.G., Wronkiewicz, D.J., Mormile, M.R., & Foster, J.S., (2016), Mineralogy and microbial diversity of the microbialites in the hypersaline Storr's Lake, the Bahamas. *Astrobiology* (**IF 4.091**) 16 (4), 282-300
16. Paul, V.G., Mormile, M.R., Minter, S.D. & Treu, B.L., (2014), Ability of a haloalkaliphilic bacterium isolated from Soap Lake, Washington to generate electricity at pH 11.0 and 7% salinity, *Environmental Technology* (**IF 3.247**) 35(8), 1003-1011
17. Begemann, M.B., Mormile, M.R., Paul, V.G., & Vidt, D.J. Book chapter: Potential enhancement of biofuel production through enzymatic biomass degradation activity and biodiesel production by halophilic microorganisms. *Halophiles and Hypersaline Environments: Current Research and Future Trends*, Springer; 1st Edition, 2011

In Preparation

- Paul, V., Peacock, E., & Belk, R***. Elemental Characterization of Freshwater Mussel Shells from Different River Systems in eastern North America using ICP-OES. MDPI Water.
- Paul, V., Makowsky, D.*, Jimenez, A.***, and Varco, J. Geochemical influences on the periodicity of galena and sphalerite formation within MVT deposits. *Geochimica et Cosmochimica Acta*

White Papers and Reports

- Stamenković, V. et al., 2020. Deep Trek: Science of Subsurface Habitability & Life on Mars. A Window into Subsurface Life in the Solar System. <https://hdl.handle.net/20.500.11753/1678>
- Edwards, C.D., et al., 2020. Deep Trek: Mission Concepts for Exploring Subsurface Habitability & Life on Mars: A Window into Subsurface Life in the Solar System. <https://hdl.handle.net/20.500.11753/1677>
- Wronkiewicz, D., Paul, V.G., Abousif, A., & Ryback, K., (2013), Geoscience perspectives in carbon sequestration-educational training and research through classroom, field, and laboratory investigations. University of Missouri System. DOI: [10.2172/1162097](https://doi.org/10.2172/1162097)

CONFERENCE ABSTRACTS (#presenting author)

After MSU appointment

1. Tucker, E.**, Dash, P., Paul, V. Using an Autonomous Surface Vessel to Determine Algae Growth Conditions. Mississippi Academy of Science 86th Annual Meeting. March 31-April 1 2022 (Oral)
2. Paul, V. #, Arwenyo, B., Mlsna, T., Dygert, A., Ferdush, J., Varco, J. Comparing the metal sorption capacity of biochar and flax fibers. AGU Fall Meeting 2021: December 13-17, 2021. (Poster)
3. Ferdush, J.**, Paul, V., Varco, J., Dygert, A., Jones, K. Does Elevated Carbon Dioxide Affect Soil Inorganic Carbon And Cation Depletion through Acidification? AGU Fall Meeting 2021: December 13-17, 2021. (Poster)
4. Ferdush, J.**, Ahmed, Z., Rahman, G.K.M., Abdullah, H.M., Paul, V. Digital Mapping of Organic Carbon in Low-lying Paddy Soil of Bangladesh. Mississippi Association for Geospatial Technologies (MAST) Ninth Annual Meeting. University of Southern Mississippi Gulf Park, Long Beach, MS. October 21-22, 2021. (Poster)
5. Makowsky, D.**, Paul, V., Jimenez, A., Dygert, A., and Varco, J. Geochemical influences on the periodicity of galena and sphalerite formation within MVT deposits. GSA Southeastern Section Meeting, April 1-2, 2021 (Oral)
6. Ferdush, J.**, Paul, V., Varco, J., Dygert, A., Jones, K. Consequences of Elevated Carbon Dioxide on Soil Inorganic Carbon, Cation Depletion, And Acidification: A Case Study with Mississippian Soils.

- Mississippi Academy of Sciences (MAS) Eighty-Fifth Annual Meeting. Mississippi Gulf Coast and Convention Center, Biloxi, MS. August 5-6, 2021. (Oral)
7. Ferdush, F[#], Paul, V., Ahmed, Z., Abdullah, H.M. Digital Mapping of Organic Carbon in Low-lying Paddy Soil of Bangladesh. Mississippi Academy of Sciences (MAS) Eighty-Fifth Annual Meeting. Mississippi Gulf Coast and Convention Center, Biloxi, MS. August 5-6, 2021. (Poster)
 8. Chang, T.[#], Feng, G., Paul, V.G., Reginelli, D.B., Brooks, J.P., Jenkins, J., Soil health as affected by long-term application of poultry litter and cropping patterns under humid subtropical climates. 2021. ASA-CSSA-SSSA International Annual Meeting. November 7-10 (Oral)
 9. Chang, T.[#], Feng, G., Paul, V., Reginelli, D., & Jenkins, J. Soil Health As Affected By Long-Term Wheat Cover Crop No-till and Conventional Tillage Systems. 2021. ASA, CSSA, SSSA International Annual Meeting. November 7-10 (Oral)
 10. Jimenez, A.^{***}, Gabitov, R., Nguyen, A., Makowsky, D., Navarathna, C., Mlsna, T., Paul, V.G., Migdisov, A., Roback, R. Uranium Uptake by Apatite at Hydrothermal Conditions. Goldschmidt 2021 (Poster)
 11. Chang, T.[#], Feng, G., Adeli, A., Paul, V.G., Jenkins, J., Reginelli, D.B. Spatial Variability of Soil Chemical Properties Following Long-Term Poultry Litter Application. ASA Southern Branch 2021 Annual Meeting. 01/30/21 (Poster)
 12. Chang, T.[#], Paul, V.G., Feng, G., Adeli, A., Tewolde, H. Impact of Poultry Litter on Soil Chemical Health in Four Agroecosystems in Mississippi. 2020 ASA-CSSA-SSSA International Annual Meeting. 11/09/20 (Poster)
 13. Paul, V.G.[#], Chang, T.[¥], Feng, G., Adeli, A. Soil Health Assessment Methods: A Comparative Study. 2020 ASA-CSSA-SSSA International Annual Meeting. 11/09/20 (Oral-invited)
 14. Chang, T.[#], Paul, V.G., Feng, G., Adeli, A., Brooks, J. Determining a Minimum Data Set for Assessing Soil Health in Mississippi. 2020 ASA-CSSA-SSSA International Annual Meeting. 11/09/20 (Oral-invited)
 15. Chang, T.[#], Paul, V.G., Feng, G., Adeli, A., Tewolde, H. Impact of Poultry Litter on Soil Chemical Health in Four Agroecosystems in Mississippi. 2020 ASA-CSSA-SSSA International Annual Meeting. 11/09/20 (Poster)
 16. Banerjee, Y.[#], Paul, V.G., Ghosh, P., and Bhanu, B.S. Depth-wise Microbiome and Isotopic Profiling of a Moderately Saline Microbial Mat in a Solar Saltern and Its Implications Towards for Planetary Science. Indian Planetary Science Conference (IPSC-2020). 02/19/20 (Poster)
 17. Paul, V.G.[#], and Vattikuti, S. Discerning Hydrogeochemical Properties in the Groundwater and Surface Waters of the Upper Pearl River Watershed in Mississippi. AEG. 09/17/19 (Poster)
 18. Jimenez A.L.^{***}, Nguyen A.V.^{**}, Paul V.G., Migdisov, A.A., Roback R., and Gabitov R.I.^{*}. Evaluation of Uranium Entrapment by Apatite crystallization in hydrothermal fluid. Goldschmidt 09/30/19 (Poster)
 19. Wickramarathna, S.[#], Paul V.G., Dash P., Chandrajith R., Senaratne A., Wickramashinghe S., Li X., Brinckerhoff W., and Van Amerom F. Characterizing Organic and Inorganic Constituents in Hematite-rich Soils on Earth: Implications for Martian Shallow Subsurface Life. AbSciCon. 06/25/19 (Poster)
 20. Sankar, M. S.[#], Dash, P., Lu, Y. H., Paul, V.G., Mercer, A. E., Arslan, Z. Application of multivariate statistics to geochemical and precipitation data to evaluate dissolved organic matter-trace element variability in a Coastal Bay, AGU, 12/10/18 (Poster)
 21. Kidiwela, M.^{****}, Paul, V.G., Mercer, A., Skarke, A. Influence of Geomagnetic Fluctuations on Temporal Atmospheric Water Vapor Variability, AGU Virtual Poster Showcase, 12/10/18 (Poster)
 22. Vattikuti, S.^{**}, Paul, V.G. Characterizing the Shallow Groundwater Quality of a Clay-Dominated Watershed in Central Mississippi, AGU Virtual Poster Showcase, 12/10/18 (Poster)

23. Griffith, E.M.[#], Wogsland, B., Li, Z., Wronkiewicz, D.J., Paul V.G., Fan, M., Fantle, M.S. Stable calcium, magnesium and carbon isotopic compositions of two modern Bahamian lake stromatolites. Goldschmidt. 08/12/18 (Poster)
24. Wickramaratna S.[#], Chandrajith R., Senaratne A., Wickramashinghe S., Paul V. and Dash P. Microbial diversity in hematitic bearing rock from tropical Sri Lanka. Goldschmidt. 08/12/18 (Poster)
25. Kidiwela, M.^{****}, and Paul, V.G. Influence of Geomagnetic Fluctuations on Temporal Atmospheric Water Vapor Variability. Summer Undergraduate Research Symposium. 08/01/18 (Poster)
26. Vattikuti, S.^{**}, and Paul, V.G. Characterizing the Groundwater Quality of the Upper Pearl River Watershed. MS Academy of Science Symposium. 07/26/18 (Poster)
27. Paul, V.G.[#] Microbial Diversity in the Hypersaline Mats of Solar Salterns in India. Gordon Research Conference-Geobiology. 01/21/18 (Poster)
28. Sankar, M S.[#], Dash, P., Paul, V., Singh, S., Lu, Y., Arslan, Z., Varco, J., Phipps, S., Rodgers, J. R. The Nature of Dissolved Organic Matter and its effect on Biogeochemical Cycling of Toxic Trace Metals in Weeks Bay Estuary. SEDAAG. 11/19/17 (Oral)
29. Vattikuti, S.^{**}, and Paul, V.G. The Hydrochemistry and Landuse/Landcover Classification of the Upper Pearl River Watershed in Central Mississippi. SEDAAG. 11/19/17 (Oral)
30. Vattikuti, S.^{**}, and Paul, V.G. Characterizing the Groundwater of the Upper Pearl River Watershed in Central Mississippi. GSA Annual Meeting, Seattle, Washington. 10/25/17 (Poster)
31. Griffith, E.[#], Li, Z., Gaines, E., Wronkiewicz, D., Paul, V.G., Fan, M. and Fantle, M. First Measurements of Magnesium Isotopic Compositions of Two Modern Bahamian Island Lake Stromatolites. GOLDSCHMIDT. 08/13/17 (Poster)
32. Li, Z.[#], Griffith, E. M., Gaines, E., Wronkiewicz, D. J., Paul, V.G. and Fan, M. Geochemistry of Microbialites and Water in Storr's Lake, San Salvador, Bahamas, 51st South-Central Section-GSA Annual Meeting. 03/14/17 (Oral)

Prior to MSU Appointment

33. Paul, V.G.[#], Wronkiewicz, D.J., and Mormile, M.R., Biogeochemical Cycling and Microbial Diversity in the Microbialites of Storr's Lake, Bahamas, American Society of Microbiology, Columbia, Missouri. 03/23/13 (Oral)
34. Paul, V.G.[#], Wronkiewicz, D.J., and Mormile, M.R., Microbialites in the Hypersaline, Light-limiting Waters of Storr's Lake, Bahamas, Gordon Research Seminar and Conference (Geobiology), Ventura Beach, CA. 01/26/13 (Poster)
35. Paul, V.G.[#], Wronkiewicz, D.J., and Mormile, M.R., A Biogeochemical Investigation of the Ecosystem and the Microbialites in Storr's Lake, San Salvador Island, Bahamas, Geological Society of America Annual Meeting and Exposition, Charlotte, North Carolina. 11/04/12 (Poster)
36. Wronkiewicz, D.J. [#], and Paul, V.G., Mineral and Chemical Characteristics of Microbialites from Storr's Lake, San Salvador Island, Bahamas, 16th Geology Conference, Gerace Research Center, Bahamas. 06/14/12 (Oral)
37. Paul, V.G.[#], Wronkiewicz, D.J., and Mormile, M.R., Characterization of Microbialites and The Ecosystem of Storr's Lake, San Salvador Island, 16th Geology Conference, Gerace Research Center, Bahamas. 06/14/12 (Oral)
38. Paul, V.G.[#], Wronkiewicz, D.J., and Mormile, M.R., Sulfate Reducing Bacteria and Their Potential Role in CO₂ Sequestration, American Society of Microbiology Warrensburg, Missouri. 03/31/2012 (Oral)

39. Paul, V.G. #, Wronkiewicz, D.J., and Mormile, M.R., Biomineralization of Carbonates in Modern Microbial Sediments, Geological Society of America Annual Meeting and Exposition, Minneapolis, Minnesota. 10/09/11 (Oral)
40. Paul, V.G. #, Wronkiewicz, D.J., and Mormile, M.R., Biomineralization of Carbonates in Modern Microbial Sediments and its Applications in CO₂ Sequestration, AIPG National Conference, Bloomingdale, Illinois. 09/10/11 (Oral)
41. Paul, V.G. #, and Mormile, M.R., Microbial Fuel Cell: Electricity and Bacteria, 44th ACS Midwest Regional Meeting. 10/21/09 (Oral)

LECTURES AND WORKSHOPS

- Hydrological Sciences and Indigenous voices (CUAHSI) 2022
- Gulf-South Summit, "Cultivating Community Resilience Through Engagement" 2022
- HydroLearn Virtual Hackathon & Workshop (\$3,000 scholarship) 2021
- Community-Engaged Learning Fellow, MSU (\$1,000 scholarship) 2021
- Inclusive Pedagogy and Implicit Bias, MSU 2020
- Grant Proposal Writing Workshop, MSU 2020
- Subsurface Biospheres on Mars, Session Co-Chair, AGU AbSciCon 2019
- NSF grant writing workshop for early career faculty, MSU 2018
- Maroon Institute of Writing Excellence, MSU (\$3,000 scholarship) 2018
- Early Career Geoscience Faculty Workshop: Teaching, Research, and Managing Your Career 2017
- SEC Conference: Future of Water, Starkville, MS 2017
- Brown Bag Lunch Seminar, Department of Geosciences, MSU 2016
- NSF Workshop on the Geothermal Potential of Sedimentary Basins 2011

Invited Lectures

- ASA-CSSA-SSSA International Annual Meeting 2020
- 35th Southern Biomedical Engineering Conference 2019
- Energy Working Group, MSU 2018
- Department of Geology, University of Mississippi-Oxford 2017
- Centre for Earth Sciences, Indian Institute of Science, Bengaluru, India 2017
- Materials Working Group, MSU 2017
- Environmental Research Center, Missouri S&T 2013 and 2016

EXTRAMURAL FUNDING

Value in brackets [] indicate percentage contribution included in Internal Approval Sheet (IAS)

- Southern Sustainable Agriculture Research and Education On-Farm Research Grant: Enhancing Soil Organic Carbon Storage using Cover Crops in the Mississippi Delta, 04/01/22-03/31/24
Role: PI [75%]
Total=\$19,779; Paul=\$14,374
- Gulf Coast Association of Geological Societies: Assessing $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ isotopic signatures in the Pascagoula bay system to evaluate paleoenvironmental conditions and sea-level changes, 10/01/20-09/30/22
Role: PI [100%]
Total=\$2,500

Pending

- NSF AISL PILOTS AND FEASIBILITY STUDIES Virtual Experiences in the Singing River (Pascagoula) Watershed (Virtual Singing River), 01/01/23-12/31/24
Role: Co-PI [30%]
Total= \$299,959, Paul = \$18,240
- NSF MRI: Acquisition of Scanning XPS Microprobe for Cross-College Research and Education, 01/08/22-07/31/25
Role: Co-PI [5%]
Total=\$671,986, Paul= instrument usage time, \$3,000

INTRAMURAL FUNDING

- MSU ORED Undergraduate Research Program: Biochar-based Water Filter, 2020
Role: PI [100%]
Total= \$1,966
- College of Arts & Sciences, MSU Strategic Research Initiative: Iodine Uptake by Apatite, 2018
Role: co-PI
Total: PI Rinat Gabitov= \$7,250; Paul = \$750

Other Proposals Submitted

- NSF CAREER: Product of the Environment: Constraining Effects of Varying Temperature, Salinity and Photic conditions on the Biogeochemistry of Microbial Mats, \$517,702 (PI [75%], 2021)
- NSF AISL INNOVATION IN DEVELOPMENT: Virtual Investigations in the Singing River (Pascagoula) Watershed (Virtual Singing River), \$2,999,323 (Co-PI[30%], 2021)
- Southern Sustainable Agriculture Research and Education On-Farm Research Grant: Enhancing Soil Organic Carbon Storage using Cover Crops in the Mississippi Delta, \$19,958 (PI [75%], 2021)
- NSF MRI: Acquisition of a High Resolution Analytical Aberration Corrected Scanning Transmission Electron Microscope for Materials Design Research and Education (Track 2, listed as Senior Personnel/Beneficiary, 2021)
- NSF AISL INNOVATION IN DEVELOPMENT: Virtual Investigations in the Singing River (Pascagoula) Watershed (Virtual Singing River), \$2,999,981 (Co-PI [30%], 2020)
- Southern Sustainable Agriculture Research and Education On-Farm Research Grant: Enhancing Soil Organic Carbon Storage using Cover Crops in the Mississippi Delta, \$19,901 (PI [75%], 2020)
- EPA STAR: Removing Nitrate and Phosphate from Runoff and Baseflow using Low-cost, Engineered Biochar, \$937,912 (Co-PI [25%], 2019)
- DOE: Addressing Challenges in Multi-Scale Modeling, Characterization and Socioeconomic Visibility of Emerging Tuscaloosa Marine Shale with Advanced Technologies, \$7,612,467 (Co-PI [7%], 2019)
- Southern Sustainable Agriculture Research and Education Graduate Student Grant: Determining the effects of elevated carbon dioxide on soil inorganic carbon, weathering potential and acidification: A case study with Mississippian soils (Graduate Student grant, \$14,910, 2019)
- NSF Chemistry: Engineering Biochar – Low cost adsorbents for nitrate and phosphate nutrients for landscape architecture applications, \$349,966 (Co-PI [25%], 2018)

- NSF CAREER: A Holistic Approach to Study Combined Organic and Inorganic Carbon Fluxes in Soils due to Elevated Carbon dioxide: Implications for Soil Acidification, \$534,709 (PI [100%]), 2018)
- NASA Water Resources: A Hybrid Approach to Improve Transboundary Groundwater Resource Management: Satellite-based Supply-Demand Mapping with Economics Modeling in Sparta-Memphis Sand Aquifer, Pre-proposal, (PI [20%], 2018)
- NSF C-DEBI: Microbial metabolism and mineralized products as a response to environmental conditions, \$79,999 (Co-PI [25%], 2017)
- DOE Fostering Economic Development with Advanced Technology in Emerging Unconventional Resources, \$6,907,817(Co-PI [5%], 2017)
- DOE MSRC-Mississippi Storage and Recovery Complex: Developing Economically Viable Uses for Captured Carbon Dioxide in Mississippi, \$1,246,585 (Co-PI [5%], 2016)

AWARDS AND SCHOLARSHIPS

After MSU appointment

- Vernier Software and Technology, 40th Anniversary Grant, \$1000 2021
- AEG Young Professional Travel Grant, \$500 2019
- Minority Faculty Writing Grant, MSU, \$250 2019

Prior to MSU appointment

- Geology and Geophysics, Jeffrey Spooner Outstanding Graduate Scholar, Missouri S&T, \$500 2013
- Annual Graduate Student Showcase, Missouri S&T. Third Place, \$150 2013
- Geology and Geophysics, Outstanding Graduate Scholar (honorable mention) 2012
- Gordon Research Conference and Seminar, \$500 2012
- Graduate Student Showcase, Missouri S&T. Second Place, \$300 2012
- Geology and Geophysics Scholarship. Missouri S&T, \$100 2011
- AIPG-AIH National Conference. Student scholarship, \$100 2011
- Graduate Student Showcase, Missouri S&T. Third place, \$150 2009
- NASA Planetary Biology Internship, Kennedy Space Center, \$3200 2010

Mentored Student Awards

- Jannatul Ferdush, Graduate Student, Graduate Student Research Award, and Mississippi Academy of Sciences Poster Award 2020-2021
- Ramon Richardson, Undergraduate student, NEMDJ Research award (\$500) 2018
- Maleen Kidiwela, Undergraduate student
 - Honors Undergraduate Research Program (\$1,396) 2018
 - NEMDJ Research award (\$400) 2018
- Shannon Vattikutti, Graduate Student, A&S Graduate Student Travel Support (\$400) 2018

SYNERGISTIC ACTIVITIES

Professional

- Reviewer Panel, NASA FINESST Program, 2022
- Reviewer Panel, NSF Hydrology Program, 2021
- Reviewer Panel, NASA Exobiology Program, 2019 & 2020
- Topical Advisory Panel: MDPI Water, 2021-present
- Journal Reviewer:
 - Nature Communications-Earth & Environment (n=1; *IF N/A*)

- Science of the Total Environment (n=1; *IF 7.963*)
- Environmental Monitoring and Assessment Journal (n=1; *IF 2.513*)
- Astrobiology (n=1; *IF 4.091*)
- MDPI Water (n=3; *IF 3.103*)
- MDPI Processes (n=1; *IF 2.847*)
- MDPI Land (n=1; *IF 3.395*)
- MDPI International Journal of Environmental Research & Public Health (n=2; *IF 3.390*)
- MDPI Energies (n=2; *IF 2.702*)
- Microbial Ecology (n=1; *IF 3.356*)
- Hydrological Processes Journal (n=1; *IF 3.256*)
- Plant and Soil (n=1; *IF 4.192*)
- Judge for GLOBE Science Fair, 2019
- Secretary, Association of Environmental and Engineering Geologists (AEG), Lower Mississippi Valley chapter, 2019-present
- Judge for AGU Virtual Poster Showcase, 2018
- External reviewer for UT-Permian Basin's Geology M.S. Program, 2018
- Judge for Mississippi Academy of Sciences Conference, MSU, 2018, 2019
- Judge for Region V Mississippi Science and Engineering Fair, MSU, 2017
- Judge for Undergraduate Research Conference, Missouri S&T, 2016

University, College, Department

- Judge for Earth Day Competition, Dunn Seiler Museum, 2019 & 2022
- ASBOG review sessions for Professional Geology majors, 2018-present
- MSU College of Arts and Science Scholarship Committee, 2021
- Volunteer for MSU Career Expo Process (resume feedback/mock interviews), 2021
- Museum Committee & Diversity and Inclusion Committee, Department of Geosciences, MSU, 2019-present
- Cultural Awareness Training-Panel member, International Services, MSU, 2019
- MSU Search Committees:
 - Geology faculty, 2019 and 2022
 - Associate Director, Office of Institutional Diversity and Inclusion, 2019
 - Geology department head, 2018
- Hail State Giving Days, participated in A&S Faculty Funding Video, 2018
- Judge for Plants and Soil Science Department Symposium, MSU, 2018
- Judge for Undergraduate Research Symposium, MSU, 2017, 2018, 2020
- Teaching Assistant Workshop Evaluator, MSU, 2017

Outreach

- Science Night at the Museum, demonstrated 'Trashcano', 2022
- Community Engaged Learning: Partnership Middle School, and Facilities Department (MSU), 2022
- Starkville Library, Boys & Girls Club, Geology Day, 2021
- MSU Representative at Mississippi Gem and Mineral Show in Jackson, MS, 2018

PROFESSIONAL AFFILIATIONS

- Global Learning and Observation to Benefit the Environment (GLOBE) program
- Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI)
- Water Resources Research Institute (WRRI)
- American Geophysical Union (AGU)
- Association of Environmental and Engineering Geologists (AEG)
- Geological Society of America (GSA)
- American Society for Microbiology (ASM)

ACADEMIC/INSTITUTIONAL AFFILIATIONS

External Collaborators

Gary Feng (USDA, Starkville), David Wronkiewicz (Missouri University of Science and Technology, Ph.D. Advisor), Melanie Mormile (Missouri University of Science and Technology, M.S. and Ph.D. Advisor), Xiang Li (NASA Goddard Space Flight Center, University of Maryland, Baltimore), Emmitt Witt (USGS, Rolla), Honglan Shi (Missouri University of Science and Technology), Jamie Foster (University of Florida-Gainesville, NASA), Jeannie Barlow (USGS), Prosenjit Ghosh and Yogaraj Banerjee (Indian Institute for Science, Bengaluru, India), Busi Susheel Bhanu (University of Luxembourg, Luxembourg)

Student Mentorship (*graduated)

Dissertation/Thesis and Visiting Scholar, Main Advisor

Shannon Vattikuti (MS* 2018)

Tingting Chang (Visiting Scholar*, 2021)

Daniel Makowsky (MS*, 2021)

Jannatul Ferdush (Ph.D, Defense completed, 2022)

Charlie Bills (MS, 2023)

Austin Brister (MS, 2022)

Ben Taylor (MS, 2022)

Emma Tucker (MS, 2022)

Mac Temple (MS, 2022)

Dissertation/Thesis Committee Member

PhD, Earth and Atmospheric Science

Courtney Killian*

Angel Jiminez*

Maurice Testa*

Derek Anderson

Scott Dykes

Van Anh Nyugen

Ankita Katkar

MS, Geology

Van Anh Nyugen*

Lauren Parker*

Kristina Delia*

Sudeera Wickramarathna*

Brendan Lomago*

Tim Palmer*

Daniel Adcock*

Allison Bohanon*

Zach Peoples*

Undergraduate Research Advisor

Geology: Devin Terza, Jessica Yaich, James Steverson, Ashton Martin*, Reagan Belk*, Connor Kitchens*, Ramon Richardson*, Matt Berry*, Maleen Kidiwela*, Katherine Herries* and Kayla Haneline* (Missouri S&T)

Chemical Engineering: Jordan Caskey*