Neha Sharma, PhD

neha.sharma@wustl.edu ● https://www.linkedin.com/in/nshrma/
● Google Scholar ● (314) 332 6588

SUMMARY

PhD student with focused research in the field of environmental geochemistry and water treatment. Expertise in studying the interactions of inorganic contaminants with minerals and organic assemblages in natural and engineered environments via experimental and modeling techniques.

EDUCATION

PhD in Energy, Environmental and Chemical Engineering — Sep 2022
Washington University in St. Louis, MO — GPA: 4.00 / 4.00

M.Tech in Environmental Science and Engineering — June 2016
Indian Institute of Technology (IIT), Bombay, India — GPA: 9.90/10.0

B.E. in Civil Engineering — May 2013
PEC University of Technology, Chandigarh, India — GPA: 8.51/10.0

RELEVANT RESEARCH EXPERIENCE

Washington University in St. Louis, MO — Jan 2018 – Sep 2022
Thesis Advisor: Daniel E. Giammar
Trace metal cycling in natural aquatic systems

- Performed extensive incubation experiments under anoxic conditions to evaluate the effect of Cu on nitrous oxide emissions from natural systems
- Studied the effect of fluctuating redox conditions on the bioavailability of trace metals in riparian wetland soils and stream sediments
- Fabricated in-situ samplers for deployment in stream sediments to estimate the bioavailable fraction of trace metals
- Quantified the speciation of trace metals (Cu, An, and Ni) in soils using X-ray Absorption Spectroscopy and linear combination fitting technique in ATHENA
- Conducted field sampling at Tyson Research Center to assess the abundance of trace metals in soils and sediments

Uranium sorption

- Synthesized and characterized bilayer coated magnetite nanoparticles and goethite
- Developed a surface complexation model to predict uranium adsorption behavior onto organic surfactant-coated iron oxide nanoparticle
- Conducted isotope exchange experiments between ^{238}U and ^{236}U in the presence of montmorillonite

Geochemistry of rare earth elements

- Conducted batch experiments to understand the adsorption of rare earth elements (Dy, Nd, and Yb) on the synthesized goethite

SLAC National Accelerator Laboratory Dec 2019

- Collected Cu, Zn, and Ni X-ray absorption spectra at Beamline 11-2
- Collected Nd and Yb X-ray absorption spectra at Beamline 4-3

Indian Institute of Technology (IIT), Bombay, India Aug 2014- Jun 2016
Thesis Advisor: Suparna Mukherji
Trihalomethane formation in water and wastewater

- Studied the effect of dissolved organic matter on the formation of trihalomethane in water and wastewater treatment plants
- Quantified the organic moieties present in water and wastewater using fluorescence spectroscopy and Parallel Factor Analysis (PARAFAC)

Energy recovery from municipal solid waste

- Conducted an extensive review on options available for recovering energy from municipal solid waste (MSW) in India

TEACHING EXPERIENCE

Nano Research and Environmental Facility (NREF) Mar 2021-Sep 2022

- Provided support to instrument manager in routine maintenance of instruments and training new users

Washington University in St. Louis, MO

Engineering Analysis of Chemical Systems Aug 2018 - Dec 2018

- Served as an assistant to instructor by conducting recitations and designing course-related assignments and exams

Air Quality Engineering with Lab Jan 2019 – May 2019

- Assisted Dr. Avni Solanki in this undergraduate level course by grading assignments and preparing exams
- Took lectures on "Air pollution control techniques" implemented in industries for particulate matter and gaseous emissions control

Environment Engineering Laboratory Jan 2021 – May 2021

- Designed experiments, prepared reagents, and graded assignments
- Lead a field visit to Tyson Research Center

Indian Institute of Technology (IIT), Bombay, India

Introduction to Environmental Engineering Aug 2015 – Dec 2015

- Assisted instructors in this undergraduate course of 240 students by grading assignments, quizzes, and exams

Environmental Statistics Jan 2016 – May 2016

- Conducted tutorial sessions for graduate students and graded quizzes/assignments/exams

Lecturer at Lovely Professional University, India July 2013 – Nov 2013

- Taught "Traffic and Transport Engineering' and "Building Construction Materials" to undergraduate civil engineering students
- Served as an instructor for "Construction Materials Laboratory"

WORK EXPERIENCE

Environmental Consultant at Gist Advisory, India Oct 2016 – July 2017

- Developed a tool kit for natural capital externality valuation of industries' environmental and health impacts

Associate Consultant at Thinkstep, India Aug 2016 – Sep 2016

- Worked in the area of sustainability reporting, corporate carbon footprint estimation, and KPIs framework using SoFi software
- Worked on GRI Reporting for companies such as Mahindra Susten, Tech Mahindra, and TATA Motors

PUBLICATIONS

Published

Sharma, N., Flynn, E. D., Catalano, J. G., & Giammar, D. E. (2022). Copper availability governs nitrous oxide accumulation in wetland soils and stream sediments. *Geochimica et Cosmochimica Acta*.

Sharma, N., Wang, Z., Catalano, J. G., & Giammar, D. E. (2022). Dynamic Responses of Trace Metal Bioaccessibility to Fluctuating Redox Conditions in Wetland Soils and Stream Sediments. *ACS Earth and Space Chemistry*.

Chatterjee, A., Zhang, K., Rao, Y., **Sharma, N.,** Giammar, D. E., & Parker, K. M. (2022). Metal-Catalyzed Hydrolysis of RNA in Aqueous Environments. *Environmental Science & Technology,* 56(6), 3564-3574.

Bae, Y., Crompton, N. M., **Sharma, N.,** Yuan, Y., Catalano, J. G., & Giammar, D. E. (2022). Impact of dissolved oxygen and pH on the removal of selenium from water by iron electrocoagulation. *Water Research*, 213, 118159.

Yan J., Flynn E., **Sharma N.,** Giammar D., Schwartz G., Brooks S., Weisenhorn P., Kemner K., O'Loughlin E., Kaplan D. and Catalano J. (2021). Consistent Controls on Trace Metal Micronutrient Speciation in Wetland Soils and Stream Sediments. *Geochimica et Cosmochimica Acta,* 317, 234-254.

Sharma, N., Mohapatra, S., Padhye, L. P., & Mukherji, S. (2021). Role of precursors in the formation of trihalomethanes during chlorination of drinking water and wastewater effluents from a metropolitan region in western India. *Journal of Water Process Engineering*, *40*, 101928.

Mohapatra, S., **Sharma, N.,** Mohapatra, G., Padhye, L. P., & Mukherji, S. (2021). Seasonal variation in fluorescence characteristics of dissolved organic matter in wastewater and identification of proteins through HRLC-MS/MS. *Journal of Hazardous Materials*, *413*, 125453.

Sharma, N., Ghosh, A., Fortner, J. D., & Giammar, D. E. (2020). Modeling performance of rhamnolipid-coated engineered magnetite nanoparticles for U(vi) sorption and separation. *Environmental Science: Nano*, *7*(7), 2010-2020.

Submitted

Sharma, N., Yan, J., Flynn, E. D., Catalano, J. E., & Giammar, D. E. Understanding the relationship between extents of trace metal uptake and their speciation in wetland soils and stream sediments. *(*Submitted to *Environmental Science & Technology).*

CONFERENCE PRESENTATIONS

Oral Presentations

Sharma, N., Brooks, S.C., Catalano, J. G., & Giammar, D. E. Quantifying labile trace metal concentrations and desorption kinetics in freshwater sediments using diffusion-based sampling devices (2022, March). The 263rd ACS National Conference, San Diego, CA.

Sharma, N., Wang, Z., Catalano, J. G., & Giammar, D. E. Effect of redox fluctuations on trace metal mobilization in natural aquatic systems (2022, March). The 263rd ACS National Conference, San Diego, CA.

Yan, J., **Sharma, N.,** Flynn, E., Giammar, D., Catalano, J.G., Schwartz, G., Brooks, S.C., Weisenhorn, P., Kemner, K., O'Loughlin, E. and Kaplan, D. (2021, July). Speciation and availability of trace metal micronutrient in wetland soils and stream sediments. *Goldschmidt 2021, Virtual.*

Sharma, N., Yan, J., Flynn, E. D., Catalano, J. E., & Giammar, D. E. (2021, March). Effect of Cu on Denitrification in Natural Aquatic Systems. The 261st ACS National Conference, Online.

Sharma, N., Yan, J., Flynn, E. D., Catalano, J. E., & Giammar, D. E. Exploring variability in metal uptake by different wetland soils and stream sediments (2019, October). Mid-American Environmental Engineering Conference, Columbia, MO.

Sharma, N., Fortner, J., & Giammar, D. (2019, March). U (VI) removal using rhamnolipid stabilized iron oxide nanoparticles. The 257th ACS National Conference, Orlando, FL.

Ghosh, A., **Sharma, N.,** Li, W., & Fortner, J. (2018, August). Adsorption of rhamnolipid biosurfactant and its effect on the aggregation kinetics of iron oxide (Fe3O4) nanoparticles in monovalent and divalent electrolyte solutions. The 256th ACS National Conference, Boston, MA.

Mohapatra, S., **Sharma, N.,** Mukherji, S., Padhye, L. P. (2016, June). Characterization and Quantification of DOM in Wastewater and its Interaction with Pharmaceuticals. The Eighth International Conference on Environmental Science and Technology, Houston, TX.

Poster Presentations

Sharma, N., Yan, J., Flynn, E. D., Catalano, J. E., & Giammar, D. E. Role of copper on nitrous oxide accumulation during denitrification in wetland soils and stream sediments (2022. June). Association of Environmental Engineering and Science Professors (AEESP), St. Louis, MO.

Sharma, N., Yan, J., Flynn, E. D., Catalano, J. E., & Giammar, D. E. Understanding Copper Dynamics and Limitations on Nitrogen Cycling in Natural Aquatic Systems (2022, June). Gordon Research Conference Environmental Sciences: Water, Holderness, NH.

AWARDS & FELLOWSHIPS

- Poster Recognition at Gordon Research Conference-Environmental Sciences Water
- ENVR ACS Graduate Student Award
- McDonnell Scholar Fellowship, McDonnell International Scholars Academy
- Institute Silver Medal at IIT Bombay, Mumbai
- Rajit Bhagwati Memorial Gold Medal at IIT Bombay, Mumbai

PROFESSIONAL DEVELOPMENT

- Reviewed research proposal for SSRL
- Reviewed research articles for Environmental Science: Processes & Impacts and for Environmental Science: Water Research & Technology
- Professional member for American Chemical Society (ACS), Association of Environmental Engineering and Science Professors (AEESP), American Water Works Association (AWWA) and Water Environment Federation (WEF)

MENTORING & VOLUNTEERING EXPERIENCE

Washington University in St. Louis, MO

- Co-organized the student reception at the in-person AEESP conference at Washington University in St. Louis in June 2022
- Assisted the conference chairs to organize virtual “appetizer” for Association of Environmental Engineering and Science Professors (AEESP) 2021
- Guided graduate and undergraduate students in their independent research by underlying research objectives and ensuring timely execution
- Acted as a student companion to incoming PhD student

Indian Institute of Technology (IIT), Bombay, India

- Acted as a student companion to incoming Masters’ students by helping them in selecting courses and advisors for independent research

TECHNICAL SKILLS

Analytical techniques

Total Organic Carbon Analysis, Gas chromatography along with headspace sampler, Ion chromatography, Nutrient Analyzer, UV-Vis spectrometry, Inductively coupled plasma Mass spectrometry, Inductively coupled plasma optical Emission spectrometry

Characterization techniques

X-ray absorption spectroscopy, XRD, BET Surface Area and Pore Size analyzer, Fluorescence spectrophotometer, Transmission electron microscopy, Scanning electron microscopy, Dynamic Light Scattering

Software

MINEQL, Visual-MINTEQ, MATLAB, R, STATISTICA, ATHENA, LINGO, STAAD pro, EPANET, BioWin, AERMOD, SoFi, GABI- LCA, AutoCAD, Microsoft Office