

Kathrin Schilling, Ph.D.

Location: Columbia University, Mailman School of Public Health

Telephone: +1 646-240-0433

Email: ks3759@columbia.edu

LinkedIn: <https://www.linkedin.com/in/kathrin-schilling-32752173/>

Academic Education

- 2011 – Ph.D.** Earth Sciences/ Geography
Johannes Gutenberg University Mainz, Germany
Thesis title: Stable isotope fractionation of selenium by biomethylation in soil.
- 2007 – Diplom** Geology and Geochemistry
University of Leipzig/ Helmholtz Centre for Environmental Research (UFZ), Halle/Saale
Dissertation title: Assessing hydrogeochemical processes and natural bioremediation in former lignite mining landscapes using sulfur and oxygen isotopes.

Current Position

- 07/2021** Assistant Professor (non-tenure)
Columbia University, Mailman School of Public Health

Professional Appointments

- 2019 – 2021** Associate Research Scientist
Columbia University, Department of Earth Sciences
- 2017 – 2019** Postdoctoral Researcher (John Fell Fund)
University of Oxford, Department of Earth Sciences (affiliated Dept. Organic Chemistry and Molecular Medicine)
- 2016 – 2017** Teaching Fellow
Royal Holloway University of London
Department of Earth Sciences
- 2014 – 2016** Research Fellow
University of California Berkeley, Department of Environmental Science, Policy and Management & **Lawrence Berkeley National Laboratory**, USA
- 2011 – 2014** Postdoctoral Fellow
Utrecht University, Netherlands
Department of Earth Science (Petrology)
- 2012** Visiting Research Scientist
University of Illinois, Urbana-Champaign, USA
Department of Geology
- 2006 – 2007** Research Assistant (25%)
Helmholtz Centre for Environmental Research (UFZ), Halle/Saale, Germany
Catchment Hydrology Division

Research Funding and Awards

- 2021** **AGU Community Science Fellowship**; Thriving Earth Exchange Program
- 2019** **RFP Funding**; Metal Isotope Constraints on Changes in Metabolic Activities of Soil Microbiomes due to Warming Climate", LDEO Climate Center, \$10,186.00
- 2019** **Earth Frontiers Seed Fund** "Zinc Isotope Constraints on Zinc Availability in Soil-Crop System combating Zinc Deficiency", Earth Institute Columbia University, \$54,926.00
- 2019** **Stipend Science-in-Residence program**, New York Academy of Sciences, \$500
- 2019** **Metallomics Young Investigator's Award**, The Royal Society of Chemistry
- 2018** **Hester Cordelia Parson Fund** £4,400.00

- 2017** **ESF grant**; Kess 2 PhD project, "Nickel groundwater contamination and surface (soil) contamination". Adviser, £43,000.00 (2017-2020)
- 2015** **NSF Collaborative Research** (Geobiology & Low-temperature geochemistry) "Selenium redox reactions and isotope ratios: The role of microbial and abiotic selenium oxidation" Co-Investigator- \$338,096.00 (2015-2018)
- 2007** **Excellence Scholarship**, German Research Foundation (DFG) (GRK826, 2007-2010) €54,000.00

Peer-reviewed Publications

1. Ravalli, F., Yu, Y., Bostick, B.C., Chillrud, S.N., **Schilling, K.**, Basu, A., Navas-Acien, A., Nigra, A. (2021) Sociodemographic inequalities in uranium and other metals in community water systems across the US, 2006-2011 (*submitted to Lancet Public Health*)
2. Basu A., **Schilling K.**, Wasserman N., Johnson T.M. (2021). Reaction kinetics, mechanism and Te isotopic fractionation. *Environmental Science & Technology* (*under revision Environ. Sci. Technol.*)
3. Sullivan K., Moore R.E.T., Capper M.S., **Schilling K.**, Goddard K., Ion C., Layton-Matthews D., Leybourne M.I., Coles B., Kreissig K., Antsygina O., Coombes C., Larner F., Rehkämper, M. (2021). Changes in the zinc homeostasis of breast tumours and adjacent histologically normal tissue constrained by Zn concentrations and stable isotopes. *Metallomics* (in print)
4. Wasserman N.L., **Schilling K.**, Johnson T.M., Pallud C. (2021). Selenium isotope shifts during the oxidation of selenide-bearing minerals. *ACS Earth & Space Chemistry* 5: 1140-1149
5. **Schilling, K.**, Moore E.T., Sullivan K.V., Capper M.S., Rehkämper M. Goddard K., Ion C., Coombes C., F., Vesty-Edwards, L., Lamb, A.D., Halliday, A. Larner F. (2021). Zinc stable isotopes in urine as diagnostic for cancer of secretory organs *Metallomics* 13(5)
6. Johnson T.M., Druhan J., Basu A., Jemison N., Wang X., **Schilling K.**, Wasserman N. (2021). Development of Cr, Se, U, Sb, Te isotopes as indicators of redox reactions, contaminant fate, and contaminant transport in aqueous systems: A review. AGU Books, Wiley Blackwell (*in print*)
7. **Schilling, K.**, Basu A., Kaplan A., Perkins W.T. (2021). Metal distribution, bioavailability and isotope variations in polluted soils from Lower Swansea Valley, UK. *Environ. Geochem. Health*
8. **Schilling, K.**, Larner, F., Kocher, H.M., Blyuss, O., Halliday, A.N., Crnogorac-Jurevic (2020). Urine metallomics signature in pancreatic cancer. *Metallomics* 12: 752-757.
9. **Schilling, K.**, Basu, A., Sanford, R., Johnson, T.M., Pallud, C., Mason, P.R.D (2020). Diversity of mass-dependent isotopic fractionation of selenium by microbial reduction of Se-oxyanions. *Geochimica et Cosmochimica Acta* 276: 274-288.
10. Kersemans, V., Allen, P.D., Wallington, S., Gilchrist, S., Kinchesh, P., **Schilling, K.**, Holdship, P., Lee-Anne Stork, L.A., Smart, S (2020). Mn²⁺-free chow, a refined non-invasive solution to reduce gastrointestinal signal for T1w MRI of the mouse abdomen. *Laboratory Animals* 54: 353-364.
11. Goff, J., Terry, L., Mal, J., **Schilling, K.**, Pallud, C., Yee, N (2019). Role of extracellular reactive sulfur metabolites on microbial Se(0) dissolution. *Geobiology* 17: 320-329.
12. **Schilling, K.**, Borch, T., Rhoades, C., Pallud, C (2019). Temperature sensitivity of microbial Fe(III) reduction kinetics in subalpine wetland soils. *Biogeochemistry* 142: 19-35.
13. **Schilling, K.**, Brown, S.T.; Lammers, L. (2018). Mineralogical, nanostructural, and Ca isotopic evidence for non-classical calcium phosphate mineralization at circum-neutral pH. *Geochimica et Cosmochimica Acta* 241: 255-271.
14. **Schilling, K.**, VillaRomero, J., Pallud, C. (2018). Selenate reduction rates and kinetics across depth in littoral sediment of the Salton Sea, California. *Biogeochemistry* 140: 285-298.
15. Basu, A., **Schilling, K***, Brown, S.T, Johnson, T.M., Christensen, J., Hartmann, M., Reimus, P., Heikoop, J., WoldeGabriel, G., DePaolo, D.J. (2016). Selenium isotope ratios as groundwater redox indicators: Detecting natural attenuation of Se at an In-Situ Recovery U mine. *Environmental Science and Technology* 50: 10833-10842. (*Joint First Author)
16. **Schilling, K.**, Johnson, T.M., Dhillon, K.S., Mason, P.R.D. (2015). Fate of selenium in soils at a seleniferous site recorded by high precision Se isotope measurements. *Environmental Science and Technology* 49: 9690–9698.
17. **Schilling, K.**, Johnson, T.M., Mason, P.R.D. (2014). A sequential extraction technique for mass-balanced stable selenium isotope analysis of soil samples. *Chemical Geology* 381: 125-130.

18. **Schilling, K.**, Johnson, T.M., Wilcke, W. (2013). Isotope fractionation of selenium by biomethylation in microcosm incubations of soil. *Chemical Geology* 352: 101-107.
19. **Schilling, K.**, Wilcke, W. (2011). A method to quantitatively trap volatilized organoselenides for stable selenium isotope analysis. *Journal of Environmental Quality* 40: 1021-1027.
20. **Schilling, K.**, Johnson, T.M., Wilcke, W. (2011). Isotope fractionation of selenium during fungal biomethylation by *Alternaria alternata*. *Environmental Science and Technology* 45: 2670-2676.
21. **Schilling, K.**, Johnson, T.M., Wilcke, W. (2011). Selenium partitioning and stable isotope ratios in urban soils. A method to quantitatively trap volatilized organoselenides for stable selenium isotope analysis. *Soil Science Society of America Journal* 75: 1354-1364.
22. **Schilling, K.**, Johnson, T.M., Wilcke, W. Isotopic fractionation biomethylation of inorganic selenium species, *Geochimica et Cosmochimica Acta* 74: A922

Peer-reviewed Publications (in preparation)

- Dwivedi P., **Schilling K.**, Wasserman N.L., Johnson T.M., Pallud C. Effect of pH and birnessite morphology on selenite adsorption and oxidation and its associated isotopic fractionation. *Chemical Geology* (in prep)
- Schilling, K.**, Basu, A., Perkins, W.T. Selenium isotopes as environmental fingerprint: From the source to sink. *Frontiers in Environmental Chemistry* (in prep)

Invited Presentations

- 2021** **Schilling, K.** Tellurium, an emerging contaminant. Solution to Pollution seminar, **Columbia University**, USA, 09th February
- 2020** **Schilling, K.** High precision isotopic measurements as a tool for cancer detection. HICCC seminar, **Columbia University**, USA, 20th May
- 2020** **Schilling, K.** What selenium isotopes can tell us about environmental processes and human health, Superfund Research Program Spring 2020 Seminar/Webinar, **Columbia University**, USA, 11th May
- 2019** **Schilling, K.** Application of Se stable isotopes: From microbial redox reaction to environmental cycling of Se, Geochemistry Seminar, **Columbia University**, USA, 25th September
- 2019** **Schilling, K.** Altered zinc metabolic pathways in pancreatic cancer detectable by urinary zinc stable isotope signature. **ISZB 2019**, Kyoto, Japan, 10th September
- 2018** Application of non-traditional isotopes: From environmental to biomedical sciences, Geological Sciences Seminar, **Jadavpur University**, Kolkata India 02nd April
- 2017** **Schilling, K.** Wetland's climate footprints: Biogeochemical hotspots turning a carbon sink to a source, Lyell Day, **Royal Holloway, University of London**, UK 10th February
- 2016** **Schilling, K.** Application of Se stable isotopes: From microbial redox reaction to environmental cycling of Se, Earth Science Seminar, **University of Cambridge**, UK 18th October
- 2014** **Schilling, K.** SoS Selenium and Tellurium. **NERC Workshop**, Leicester, UK, January 12th -14th January
- 2012** **Schilling, K.** Environmental fate of selenium toxicity of an agricultural site in Punjab, India: A novel tool to look at Se cycling in soils. Health related issues in Geology, **Dutch Geology Conference (NAC11) Meeting**, Netherlands
- 2012** **Schilling, K.**, Mason, P.R.D. Application of stable isotope in environmental systems: Stable selenium isotope ratios in soils. **Punjab Agricultural University**, India
- 2012** **Schilling, K.** Versatility of selenium isotopes as a new approach to assess redox reactions. Joint Seminar Series, **Utrecht University**. 6th March

Teaching and Mentoring Activities

1. Teaching and field courses

- 2016** **Field Tutor** 1st-year geological field trip Scotland; Royal Holloway, University of London
- 2014** **Tutor:** Freshman seminar (ESPM 24); University of California Berkeley; *Carbon loss and sequestration in terrestrial systems*, (Guest Lecture)
- 2008** **Lab Tutor:** Introduction to soil chemical properties: Laboratory practice, Johannes

Gutenberg University Mainz
2008 **Field Tutor:** Soil classification and sampling; Johannes Gutenberg University Mainz

2. Mentoring

2018 - 2019 **Advisor**, 4th Year student project, Oxford University
2018 - present **Co-advisor**, PhD student, University of California, Berkeley
2017-2018 **Co-advisor**, Postdoctoral researcher, University of California, Berkeley
2016 **Co-advisor**, 2 MSci students in Environmental Geology, Royal Holloway University of London
2016 **Mentor** for young scientists, Goldschmidt Conference 2016 (one MSc student, one PhD student)
2013-2016 **Co-advisor** (University of California Berkeley) of 4 graduate students (one received NSF Graduate Fellowship), 4 undergraduate students
2012 **Supervising 3 visiting scientists** in isotope geochemistry (Karlsruhe Institute of Technology, Germany; University Tübingen, Germany, Chinese Academy of Sciences, China)

Professional and Community Services

2019 - 2020 **Science-in-Residence** program, New York Academy of Science, City of New York
2016 - 2019 **Lab manager** (metal-free lab) University of Oxford
since 2011 **Reviewer (13 international peer-reviewed journals)**
Environmental Science and Technology, Environmental Research, Geochimica et Cosmochimica Acta, Chemical Geology, Science of Total Environment, Geology, Analytical and Bioanalytical Chemistry, Applied Geochemistry, Isotopes in Environmental & Health Studies, Geostandards and Geoanalytical Research, International Journal of Mass Spectrometry, Journal of Environmental Quality, Environmental Technology, PeerJ, Pedosphere, Cambridge Elements
2017 **Project proposal referee** Sêr Cymru II fellowship
2015 **Service to elementary educational institutions** (STEM club) at Monte Vista High School, Danville, CA (USA)
Judge for student poster and oral awards:
2014: Wetland Soil Student Oral Paper Contest; ASA, CSSA & SSSA *International Annual Meeting*, Long Beach, CA
2013: Earth, Society and Environment Research Review, University of Illinois Urbana-Champaign
2012: Student Oral/Poster Contest; *Goldschmidt Conference*, Montreal (Canada)
2009 **Student conference organizer** for 12th Workshop on Progress in Analytical Methodologies for Trace Metal Speciation, Mainz (Germany)
2007-2010 **Graduate student representative** at the Graduate school (GRK826) "Trace analysis of elemental species: development of methods and application"

Press coverage

Metal in urine provides potential noninvasive test for pancreatic cancer, **Medical Express**, April 2020

Metal analysis of urine provides a promising potential diagnostic for pancreatic cancer, **MPLS Division, Oxford University**, 23rd April 2020

Professional Associations

since 2015 Member of Earth Science Women's Network (ESWN)
since 2019 Member of New York Academy of Science