



## Eleanor Spielman-Sun

Research Engineer, Earth System Science

### Bio

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#### ACADEMIC APPOINTMENTS

- Research Engineer, Earth System Science

#### PROFESSIONAL EDUCATION

- PhD, Carnegie Mellon University , Civil & Environmental Engineering (2019)
- MS, Carnegie Mellon University , Civil & Environmental Engineering (2016)
- BS, Oberlin College , Chemistry (2014)

#### LINKS

- ORCID: <https://orcid.org/0000-0001-9626-2969>
- Google Scholar: [https://scholar.google.com/citations?user=11\\_GWgoAAAAJ&hl=en](https://scholar.google.com/citations?user=11_GWgoAAAAJ&hl=en)

### Publications

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#### PUBLICATIONS

- **The Role of Oxygen Vacancies in Copper Amended Titanium Dioxide-Carbon Nanofiber Electrodes in Electrochemical Nitrate Reduction in Water** *ACS ES&T ENGINEERING*  
Lee, K., Yan, C., Hesterberg Butzlaff, A., Spielman-Sun, E., Cwiertny, D. M., Mubeen, S., Werth, C. J.  
2026
- **Unravelling electro-chemo-mechanical interplay in layered oxide cathode degradation in solid-state batteries.** *Science advances*  
Zheng, X., Xue, Z., Hao, H., Cho, Y., Li, Y., Kim, C., Czaja, P., Lee, S. S., Bone, S., Spielman-Sun, E., Jiang, Z., Gu, X. W., Weker, et al  
2025; 11 (41): eady7189
- **Chemically Generated Liquid Sulfur Droplets at Room and Subzero Temperatures.** *ACS nano*  
Subramaniam-Venkatesh, P., Gao, Z., Hao, H., Xie, X., Karrar, T., Xia, Z., Spielman-Sun, E., Wang, X., Zheng, X., Yang, A.  
2025
- **A Critical Look at Colloid Generation, Stability, and Transport in Redox-Dynamic Environments: Challenges and Perspectives** *ACS EARTH AND SPACE CHEMISTRY*  
Spielman-Sun, E., Boye, K., Dwivedi, D., Engel, M., Thompson, A., Kumar, N., Noel, V.  
2024
- **Environmental impact of solution pH on the formation and migration of iron colloids in deep subsurface energy systems.** *The Science of the total environment*  
Spielman-Sun, E., Bland, G., Wielinski, J., Frouté, L., Kovscek, A. R., Lowry, G. V., Bargar, J. R., Noël, V.  
2023: 166409

- **Impact of Acid-Base Stimulation Sequence on Mineral Stability for Tight/Impermeable Unconventional Carbonate-Rich Rocks: A Delaware Basin Case Study** *ENERGY & FUELS*  
Spielman-Sun, E., Jew, A. D., Bargar, J. R.  
2022; 36 (9): 4746-4756
- **Geochemical Modeling of Celestite (SrSO<sub>4</sub>) Precipitation and Reactive Transport in Shales.** *Environmental science & technology*  
Esteves, B. F., Spielman-Sun, E., Li, Q., Jew, A. D., Bargar, J. R., Druhan, J. L.  
2022
- **A Critical Review of the Physicochemical Impacts of Water Chemistry on Shale in Hydraulic Fracturing Systems.** *Environmental science & technology*  
Khan, H. J., Spielman-Sun, E., Jew, A. D., Bargar, J., Kavscek, A., Druhan, J. L.  
2021
- **Protein coating composition targets nanoparticles to leaf stomata and trichomes.** *Nanoscale*  
Spielman-Sun, E., Avellan, A., Bland, G. D., Clement, E. T., Tappero, R. V., Acerbo, A. S., Lowry, G. V.  
2020
- **Differential Reactivity of Copper- and Gold-Based Nanomaterials Controls Their Seasonal Biogeochemical Cycling and Fate in a Freshwater Wetland Mesocosm.** *Environmental science & technology*  
Avellan, A., Simonin, M., Anderson, S. M., Geitner, N. K., Bossa, N., Spielman-Sun, E., Bernhardt, E. S., Castellon, B. T., Colman, B. P., Cooper, J. L., Ho, M., Hochella, M. F., Hsu-Kim, et al  
2020
- **CuO Nanoparticles Alter the Rhizospheric Bacterial Community and Local Nitrogen Cycling for Wheat Grown in a Calcareous Soil.** *Environmental science & technology*  
Guan, X. n., Gao, X. n., Avellan, A. n., Spielman-Sun, E. n., Xu, J. n., Laughton, S. n., Yun, J. n., Zhang, Y. n., Bland, G. D., Zhang, Y. n., Zhang, R. n., Wang, X. n., Casman, et al  
2020
- **Nanoparticle surface charge influences translocation and leaf distribution in vascular plants with contrasting anatomy** *ENVIRONMENTAL SCIENCE-NANO*  
Spielman-Sun, E., Avellan, A., Bland, G. D., Tappero, R., Acerbo, A. S., Unrine, J. M., Giraldo, J., Lowry, G.  
2019; 6 (8): 2508–19
- **Effect of Soil Organic Matter, Soil pH, and Moisture Content on Solubility and Dissolution Rate of CuO NPs in Soil** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Gao, X., Rodrigues, S. M., Spielman-Sun, E., Lopes, S., Rodrigues, S., Zhang, Y., Avellan, A., Duarte, R. O., Duarte, A., Casman, E. A., Lowry, G. V.  
2019; 53 (9): 4959–67
- **Nanoparticle Size and Coating Chemistry Control Foliar Uptake Pathways, Translocation, and Leaf-to-Rhizosphere Transport in Wheat** *ACS NANO*  
Avellan, A., Yun, J., Zhang, Y., Spielman-Sun, E., Unrine, J. M., Thieme, J., Li, J., Lombi, E., Bland, G., Lowry, G. V.  
2019; 13 (5): 5291–5305
- **Gold nanoparticle biodissolution by a freshwater macrophyte and its associated microbiome** *NATURE NANOTECHNOLOGY*  
Avellan, A., Simonin, M., McGivney, E., Bossa, N., Spielman-Sun, E., Rocca, J. D., Bernhardt, E. S., Geitner, N. K., Unrine, J. M., Wiesner, M. R., Lowry, G.  
2018; 13 (11): 1072–+
- **Temporal Evolution of Copper Distribution and Speciation in Roots of Triticum aestivum Exposed to CuO, Cu(OH)<sub>2</sub>, and CuS Nanoparticles** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Spielman-Sun, E., Lombi, E., Donner, E., Avellan, A., Etschmann, B., Howard, D., Lowry, G. V.  
2018; 52 (17): 9777–84
- **Effect of silver concentration and chemical transformations on release and antibacterial efficacy in silver-containing textiles** *NANOIMPACT*  
Spielman-Sun, E., Zaikova, T., Dankovich, T., Yun, J., Ryan, M., Hutchison, J. E., Lowry, G. V.  
2018; 11: 51–57
- **Elucidating nanoparticle-plant leaf interactions, uptake, and mobility for designing highly efficient foliar-applied agrochemicals**  
Avellan, A., Yun, J., Spielman-Sun, E., Lowry, G.

AMER CHEMICAL SOC.2018

- **Toward improving agrochemical efficiency: Impact of Cu-based nanoparticle solubility on metal uptake, speciation, translocation, and distribution in *Triticum aestivum* (wheat)**  
Spielman-Sun, E., Lombi, E., Donner, E., Etschmann, B., Howard, D., Lowry, G.  
AMER CHEMICAL SOC.2018
- **Impact of Surface Charge on Cerium Oxide Nanoparticle Uptake and Translocation by Wheat (*Triticum aestivum*)** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Spielman-Sun, E., Lombi, E., Donner, E., Howard, D., Unrine, J. M., Lowry, G. V.  
2017; 51 (13): 7361–68
- **Tuning NP properties for optimizing plant uptake and translocation**  
Lowry, G., Spielman-Sun, E., Lombi, E., Unrine, J.  
AMER CHEMICAL SOC.2017
- **Time and Nanoparticle Concentration Affect the Extractability of Cu from CuO NP-Amended Soil** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Gao, X., Spielman-Sun, E., Rodrigues, S. M., Casman, E. A., Lowry, G. V.  
2017; 51 (4): 2226–34
- **In Situ Measurement of CuO and Cu(OH)(2) Nanoparticle Dissolution Rates in Quiescent Freshwater Mesocosms** *ENVIRONMENTAL SCIENCE & TECHNOLOGY LETTERS*  
Vencalek, B. E., Loughton, S. N., Spielman-Sun, E., Rodrigues, S. M., Unrine, J. M., Lowry, G. V., Gregory, K. B.  
2016; 3 (10): 375–80
- **Impact of metal and metal oxide nanoparticle speciation and solubility on their bioavailability to terrestrial and aquatic plants**  
Lowry, G., Stegemeier, J., Gao, X., Spielman-Sun, E., Rodrigues, S.  
AMER CHEMICAL SOC.2016
- **Thermal decomposition of nano-enabled thermoplastics: Possible environmental health and safety implications** *JOURNAL OF HAZARDOUS MATERIALS*  
Sotiriou, G. A., Singh, D., Zhang, F., Chalbot, M. G., Spielman-Sun, E., Hoering, L., Kavouras, I. G., Lowry, G. V., Wohlleben, W., Demokritou, P.  
2016; 305: 87–95
- **Toward a mechanistic understanding of the effect of natural organic matter coatings on nanoparticle aggregation**  
Lowry, G., Louie, S., Spielman-Sun, E., Tilton, R.  
AMER CHEMICAL SOC.2015
- **Correlation of the Physicochemical Properties of Natural Organic Matter Samples from Different Sources to Their Effects on Gold Nanoparticle Aggregation in Monovalent Electrolyte** *ENVIRONMENTAL SCIENCE & TECHNOLOGY*  
Louie, S. M., Spielman-Sun, E. R., Small, M. J., Tilton, R. D., Lowry, G. V.  
2015; 49 (4): 2188–98
- **Properties of various natural organic matter samples that control gold nanoparticle aggregation**  
Louie, S. M., Spielman-Sun, E., Tilton, R. D., Lowry, G. V.  
AMER CHEMICAL SOC.2014