

Exponent®
Engineering & Scientific Consulting

Joanna Schneider, Ph.D.

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Professional Profile

Dr. Schneider is a chemical engineer with expertise in multiphase flows in porous media and fabrication of reactive nanomaterials. She has extensive experience using experimental and computational techniques coupled with mathematical modeling to solve problems in complex flow systems. Since joining Exponent, Dr. Schneider has contributed to projects covering a variety of subject matter, including consumer products, industrial combustion equipment, and hazardous waste treatment. She is also interested in working with clients to solve problems in carbon capture and storage processes and renewable energy systems.

Prior to joining Exponent, Dr. Schneider received her PhD in Chemical Engineering from Princeton University where she studied interactions between colloids and immiscible fluids in porous media. Her overall goal was to develop a better understanding of how these materials could be used for remediation of non-aqueous phase liquids in groundwater aquifers. Dr. Schneider used experimental, computational, and theoretical tools to study how colloidal nanomaterials flowed through complex environments and fabricated reactive colloidal particles motivated by their flow behavior in aquifer-like systems. Through this work, she developed expertise in experimental fluid dynamics and nanoparticle fabrication by leveraging confocal microscopy, transmission electron microscopy (TEM), and Flash NanoPrecipitation (FNP). Dr. Schneider is also experienced in using MATLAB for image and video processing, pore network simulations, and reservoir simulations.

Dr. Schneider earned her bachelor's degree in Chemical and Biomolecular Engineering with a focus in Molecular and Cellular Bioengineering at Johns Hopkins University. In her undergraduate research, she developed reconfigurable DNA nanotube architectures with the goal of constructing synthetic analogs of cytoskeletal networks. She also learned mammalian cell culture at Imperial College London while helping to develop a cell-free protein synthesis system.

In addition to her diverse research background, Dr. Schneider is also passionate about diversity and inclusion in the workplace and was elected to serve on Princeton University's Diversity, Equity, Climate, and Inclusion (DECI) Committee and Graduate Student Council in the Chemical and Biological Engineering department. She was also recognized with two awards for her roles as an Assistant in Instruction while at Princeton.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, Princeton University, 2023

B.S., Chemical & Biomolecular Engineering, Johns Hopkins University, 2018

Maeder Graduate Fellowship in Energy and the Environment, 2022-2023

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Jui Dasgupta Outstanding Assistant in Instruction Award, 2022

Graduate School Teaching Award, 2022

School of Engineering and Applied Science Award for Excellence, 2021

Mary and Randall Hack ’69 Graduate Award for Water and the Environment, 2020-2021

Gordon Y.S. Wu Fellowship in Engineering, 2018-2023

Licenses and Certifications

40-Hour Hazardous Waste Operation and Emergency Response Certification (HAZWOPER)

Certified Fire and Explosion Investigator (CFEI)

Prior Experience

Engineering & Computational Physics Intern, ExxonMobil, 2022

Professional Affiliations

American Institute of Chemical Engineers (AIChE)

American Physical Society (APS)

Society of Rheology

American Chemical Society (ACS)

Publications

Schneider J, Browne CA, Quirk CA, Slutzky M, Amchin DB, Datta SS. Fluid drainage in erodible porous media. Physical Review Research 2023; 5: 043015.

Schneider J, Liu JX, Lee VE, Prud’homme RK, Datta SS, Priestley RD. Tuning morphologies and reactivities of hybrid organic-inorganic nanoparticles. ACS Nano 2022; 16: 16133-16142.

Browne CA*, Amchin DB*, Schneider J*, Datta SS. Infection percolation: A dynamic network model of disease spreading. Frontiers in Physics 2021; 9. (* denotes co-first authors)

Schneider J, Priestley RD, Datta SS. Using colloidal deposition to mobilize immiscible fluids from porous media. Physical Review Fluids 2021; 6: 014001.

Xia S, Ding Z, Luo L, Chen B, Schneider J, Yang J, Eberhart CG, Stark WJ, Xu Q. Shear-thinning viscous materials for subconjunctival injection of microparticles. AAPS PharmSciTech 2020; 22: 8.

Schaffter SW*, Schneider J*, Agrawal DK, Pacella MS, Rothchild E, Murphy T, Schulman R. Reconfiguring DNA nanotube architectures via selective regulation of terminating structures. ACS Nano 2020; 14:13451-13462. (* denotes co-first authors)

Bizmark N, Schneider J, Priestley RD, Datta SS. Multiscale dynamics of colloidal deposition in porous media. Science Advances 2020; 6: 46.

Bizmark N, Schneider J, De Jong EK, Datta SS. Transport of Polymer Colloids in Porous Media, Polymer Colloids: Formation, Characterization and Applications. Eds Robert K. Prud'homme and Rodney D. Priestley. Royal Society of Chemistry Publishing (Soft Matter Series) 2019; 289-321.

Schaffter SW, Green LN, Schneider J, Subramanian HKK, Schulman R, Franco E. T7 RNA polymerase non-specifically transcribes and induces disassembly of DNA nanostructures. Nucleic Acids Research 2018; 46: 5332-5343.

Presentations

Schneider J, Browne CA, Quirk CA, Slutzky M, Amchin DB, Datta SS. Erosion percolation: modeling immiscible fluid flow in erodible porous media. Oral presentation, American Physical Society Division of Fluid Dynamics, Indianapolis, IN, 2022.

Schneider J, Liu JX, Lee VE, Prud'homme RK, Datta SS, Priestley RD. Tuning morphologies and reactivities of hybrid organic-inorganic nanoparticles. Poster presentation, American Institute of Chemical Engineers Annual Meeting, Phoenix, AZ, 2022.

Schneider J, Priestley RD, Datta SS. Going with the flow: colloidal dynamics at moving immiscible fluid interfaces. Oral presentation, American Physical Society March Meeting, Chicago, IL, 2022.

Schneider J, Liu JX, Lee VE, Prud'homme RK, Datta SS, Priestley RD. Designer hybrid colloids: a study of gold adsorption onto polystyrene to control morphologies of reactive nanoparticles. Oral presentation, American Institute of Chemical Engineers Annual Meeting, Boston, MA, 2021.

Schneider J, Bizmark N, Priestley RD, Datta SS. Going with the flow: colloidal dynamics at moving immiscible fluid interfaces. Poster presentation, American Institute of Chemical Engineers Annual Meeting, Boston, MA, 2021.

Schneider J, Bizmark N, Priestley RD, Datta SS. Going with the flow: multiscale dynamics of colloidal deposition, erosion, and interactions with immiscible fluids. Oral presentation, Society of Rheology Annual Meeting, Bangor, ME, 2021.

Schneider J, Bizmark N, Priestley RD, Datta SS. Multi-scale dynamics of colloidal deposition and oil mobilization. Poster presentation, Virtual Microfluidics & Energy Symposium, 2021.

Schneider J, Priestley RD, Datta SS. Using colloids to remove immiscible contaminants from porous media. Oral presentation, Virtual American Chemical Society Colloid & Surface Science Symposium, 2021.

Schneider J, Priestley RD, Datta SS. Using colloidal deposition to remove immiscible contaminants from porous groundwater aquifers. Oral presentation, Virtual American Geophysical Union Fall Meeting, 2020.

Schneider J, Priestley RD, Datta SS. Using colloids to remove trapped oil in porous media. Oral presentation, Northeast Complex Fluids & Soft Matter Workshop, Bronx, NY, 2020.