Kinnari Shah | *kms2313@columbia.edu* | *(908)763-6610*

Ph.D. Candidate
Department of Earth and Environmental Engineering
Columbia University
Faculty Advisor: Ngai Yin Yip

FIELD OF SPECIALIZATION

Emerging technologies at the energy-water-environment nexus, including switchable-solvent separations, high-salinity desalination, and zero-liquid discharge applications, with a strong foundation in thermodynamic analyses of these processes.

EDUCATION

Columbia University, New York, NY 2019–Present
Department of Earth and Environmental Engineering
Doctor of Philosophy, expected graduation June 2024, GPA: 4.0
Masters of Science, February 2021, GPA: 4.0

Princeton University, Princeton, NJ 2010–2014
Department of Chemical and Biological Engineering
Bachelor of Engineering (with High Honors), June 2014, GPA: 3.7

ACHIEVEMENTS & AWARDS

National Science Foundation Graduate Research Fellowship (2021)

American Chemical Society Division of Environmental Chemistry: Graduate Student Awardee in Environmental Chemistry (2023)

Columbia University Engineering Graduate Student Council Professional Development Award (2023)

Association of Environmental Engineering and Science Professors Travel Award (2022)

Lead Teaching Fellow, Columbia University's Center for Teaching and Learning (2022)

Columbia University's 3 Minute Thesis Competition Winner (2022)

Columbia University Provost's Diversity Fellow (2020)

PUBLICATIONS

Shah, K.M., Billinge, I.H., Dach, E.M., Yip, N.Y., "Advancing the Productivity Selectivity Tradeoff of Temperature Swing Solvent Extraction with Intermediate-Step Release*." Environmental Science & Technology Letters,* Accepted.

Shah, K.M., Dach, E.M., Winton, R.K., Fan, H., Yip, N.Y., "Phase Equilibria Insights into Amine-Water-NaCl Interactions in Liquid-Liquid Biphasic Systems for Temperature Swing Solvent Extraction*."* *Desalination* 548 (2023): 116259.

Shah, K.M., Billinge, I.H., Chen, X., Fan, H., Huang, Y., Winton, R.K., Yip, N.Y., "Drivers, Challenges, and Emerging Technologies for Desalination of High-Salinity Brines: A Critical Review*."* *Desalination* 538 (2022): 115827.

Boo, C., Qi, H., Billinge, I.H., Shah, K.M., Fan, H., and Yip, N.Y., "Thermomorphic Hydrophilicity Base-Induced Precipitation for Effective Descaling of Hypersaline Brines." *ACS ES&T Engineering* 1, no. 9 (2021): 1351-1359.

Boo, C., Billinge, I.H., Chen, X., Shah, K.M., and Yip, N.Y., "Zero liquid discharge of ultrahigh-salinity brines with temperature swing solvent extraction." *Environmental Science & Technology* 54, no. 14 (2020): 9124-9131.

Shah, K.M., Yip, N.Y. "Thermodynamics and Activity Coefficient Modeling of Liquid-Liquid Equilibrium Systems for Temperature Swing Solvent Extraction using Amines." *In preparation*.

Shah, K.M., van der Made, J., Chandran, K., Yip, N.Y. "Fate of Organic Contaminants in Temperature Swing Solvent Extraction." *In preparation*.

Billinge, I.H., Dach, E.M., Shah, K.M., Yip, N.Y., "Removal of Trace Ions from Hypersaline Brines using Temperature Swing Solvent Extraction." *In preparation*.

Dach, E.M., Shah, K.M., Billinge, I.H., Yip, N.Y., "Electrolyte Properties Governing Ion Transport in Temperature Swing Solvent Extraction." *In preparation*.

SEMINARS & CONFERENCES

Shah, K.M., Billinge, I.H., Dach, E.M., Yip, N.Y., "Temperature swing solvent extraction hypersaline desalination with stepwise release to advance the productivity-selectivity tradeoff," oral presentation, American Institute of Chemical Engineers Annual Conference, Orlando, FL, November 2023.

Shah, K.M., Billinge, I.H., Dach, E.M., Yip, N.Y., "Temperature swing solvent extraction hypersaline desalination with intermediate-step release to advance the productivity-selectivity tradeoff," oral presentation, Association of Environmental Engineering and Science Professors Annual Conference, Boston, MA, June 2023.

Shah, K.M., Billinge, I.H., Dach, E.M., Yip, N.Y., "Temperature swing solvent extraction hypersaline desalination with intermediate-step release to advance the productivity-selectivity tradeoff," oral presentation, Association of Environmental Engineering and Science Professors: Distinguished Lecture Series Oral Session, New Jersey Institute of Technology, April 2023.

Shah, K.M., Dach, E.M., Winton, R.K., Fan, H., Yip, N.Y., "Phase Equilibria Insights into Temperature Swing Solvent Extraction for Sustainable Hypersaline Desalination," oral presentation, Elsevier International Congress on Separation and Purification Technology, virtual, December 2022.

Shah, K.M., Winton, R.K., Yip, N.Y., "Sustainable Hypersaline Desalination via Solvent Extraction: Fundamental Molecular Insights from Thermodynamic Analysis," poster, Association of Environmental Engineering and Science Professors: Environmental Engineering at the Confluence, St. Louis, MO, June 2022.

Shah, K.M., Winton, R.K., Yip, N.Y., "Sustainable Hypersaline Desalination via Solvent Extraction: Molecular Insights from Thermodynamic Analysis," oral presentation, American Chemical Society Spring 2022: Bonding Through Chemistry, San Diego, CA & virtual, March 2022.

Shah, K.M., Winton, R.K., Yip, N.Y., "Solvent extraction desalination: Key insights from temperature dependence analysis," oral presentation, American Chemical Society Spring 2021: Macromolecular Chemistry: The Second Century, virtual, April 2021.

PATENTS

Yip, N.Y., Boo, C., Shah, K.M., Billinge, I.H., Winton, R.K., Dach, E.M., "Temperature swing solvent extraction for descaling of feedstreams." U.S. Patent Application No. 17/348,139.

TEACHING & PROFESSIONAL EXPERIENCE

Columbia University, New York, NY

Teaching Assistant:

EAEE 4003x: Aquatic Chemistry — Fall 2020

EAEE 2022: Alternative Energy Resources — Spring 2021

Center for Teaching and Learning Teaching Development Program — 2022-2023

ExxonMobil Corporation, Houston, TX — 2014-2019

Sustainability Coordinator in Utilities Optimization and Planning Section

Commercial Associate for Catalyst and Chemicals Acquisitions

Project Engineer for Upstream Technical Computing

The Breakthrough Institute, Generation Fellow — June–August 2014

PROFESSIONAL MEMBERSHIPS

Association of Environmental Engineering & Science Professors (AEESP)

American Chemical Society (ACS)

American Institute of Chemical Engineering (AIChE)