Exponent®
Engineering & Scientific Consulting

Hannah Sterling, Ph.D.

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Professional Profile

Dr. Sterling has bachelors and doctoral degrees in chemical engineering with expertise in hydrates with applications for flow assurance in the oil and gas industry. Her other core areas of expertise include thermodynamics and fluid mechanics, including multiphase flow.

Before joining Exponent, Dr. Sterling received her PhD in Chemical Engineering from the Colorado School of Mines while working with the Center for Hydrate Research. She performed research on cyclopentane hydrate interfaces to study the contact angle of water on the hydrate surface, as well as the micromechanical force behavior between hydrate particles at the microscale in the presence of crude oil and asphaltenes and/or some chloride salts. Her overall goal was to provide information to industry partners on how their oils behave under different thermophysical and chemical conditions. Dr. Sterling used experimental techniques developed specifically for hydrate study, including an estimated contact angle technique and the use of a micromechanical force apparatus. She also used MATLAB for image processing and analysis for particle video microscope images from an industry flow loop to study the evolution of emulsion and hydrate particle size during hydrate forming events.

Dr. Sterling earned her B.S. in Chemical Engineering, also from Colorado School of Mines where she played 4 years of DII women's soccer. In addition to her athletic and academic studies, she completed undergraduate research projects also on gas hydrate contact angles. During and after her undergraduate studies, Dr. Sterling completed two industry internships. The first was in a process engineering role with Vista Engineering Group at the Coors plant in Golden, CO where she assisted with multiple engineering projects including creation of construction and demolition packages, editing of P&IDs, and statistical analyses to recommend new process equipment sizes. The second internship was in a metallurgy engineering role with Freeport McMoRan at the Technology Center in Safford, Arizona. Here, she performed an extensive statistical analysis to recommend best practices for standard copper-ore splitting techniques by Freeport.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, Colorado School of Mines, 2023

B.S., Chemical Engineering, Colorado School of Mines, 2019

IX Power Foundation Colorado Women's Day "Shattered Glass" Award Finalist

Licenses and Certifications

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

Professional Affiliations

American Institute of Chemical Engineers (AIChE)

National Fire Protection Association (NFPA)

National Association of Fire Investigators (NAFI)

Publications

Publications under name H. Stoner

Stoner, H. Wetting and Film Growth Phenomena for Cyclopentane Hydrates and Potential Non-Plugging Behavior. Colorado School of Mines, PhD Dissertation. 2023.

Pickarts, M.; Ravichandran, S.; Ismail, N.; Stoner, H.; Delgado-Linares, J.; Sloan, E.; Koh, C.A. Perspective on the oil-dominated gas hydrate plugging conceptual picture as applied to transient Shut-In/Restart. In Fuel, 2022.

Stoner, H.; Moak, J.; Delgado-Linares, J.; Koh, C. A.; Cyclopentane Hydrate Wettability Measurements used to evaluate the Efficacy of Oil Natural Surfactants Using Ultra-Low Volume Samples. In Fuel, 2023.

Stoner, H.; Phan, A.; Striolo, A.; Koh, C.A., Water Wettability Coupled with Film Growth on Realistic Cyclopentane Hydrate Surfaces. In Langmuir, 2021.

Stoner, H.; Koh, C.A., Perspective on the Role of Particle Size Measurements in Gas Hydrate Agglomeration Predictions. In Fuel, 2021

Phan, A.; Stoner, H.; Stamatakis, M.; Striolo, A.; Koh, C.A. Surface Morphology Effects on Clathrate Hydrate Wettability. In Journal of Colloid and Interface Science, 2021.

Delgado-linares, J.; Salmin, D.; Stoner, H.; Wu, D.; Zerpa, L.; Koh, C.A. Effect of Alcohols on AsphalteneParticle Size and Hydrate Non-Plugging Behavior of Crude Oils. Offshore Technology Conference. Houston, TX. 2020.

Presentations

Presentations under name H. Stoner

Stoner, H., Delgado, J., Phan, A., Striolo, A., Koh, C.A., “Water Content Effects Cyclopentane Hydrate Contact Angle and Film Growth in the Presence of Natural Surfactants,” 96th ACS Colloids and Surface Science Symposium – Wetting and Adhesion, Golden, CO (July, 2022).

Stoner, H., Phan, A., Striolo, A., Koh, C.A., “Wetting Behavior of Clathrate Hydrates,” ACS Spring – Division of Colloid and Surface Chemistry (April, 2021).

Stoner, H., Phan, A., Striolo, C.A., Koh, C. A., “Clathrate Hydrate Contact Angle/Wettability Investigations for Multiphase Agglomeration Models,” Twenty-First Symposium on Thermophysical Properties – Wetting, Interfaces, Membranes, and Hydrates, Boulder, CO (June, 2021).

Stoner, H., Delgado-Linares, J.G., Salmin, D.C., Ismail, N.A., Koh, C.A., " Contact Angle Analysis of Water Droplet and Hydrate Surface Interactions," Twenty-First Symposium on Thermophysical Properties – Poster Session, Boulder, CO (June, 2021).

Stoner, H., Delgado-Linares, J.G., Salmin, D.C., Ismail, N.A., Koh, C.A., " Interfacial Activity of Gas Hydrates with Natural and Commercial Anti-Agglomerants," Gordon Research Conference and Seminar on Gas Hydrates Poster Session, Galveston, TX (February, 2020).

Project Experience

Graduate Research Assistant, Center for Hydrate Research, 2019-2023

Metallurgy Intern, Freeport McMoRan, 2019

Undergraduate Research Assistant, Center for Hydrate Research, 2019

Process Engineering Intern, Vista Engineering Group, 2018-201

Peer Reviews

SPE Journal