



William A. Brookshire  
Department of Chemical  
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# ChBE Seminar Series

## Modeling and Design of Drying-Induced Self-Assembly of Colloidal Particles



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Materials made by drying colloidal suspensions into solid structures have numerous uses — ranging from household products such as latex paints to advanced materials for catalysis, adsorption, and photonics—but the nonequilibrium process by which they form is complex and incompletely understood. I will first overview our uses of multiscale modeling, including both particle-based simulations and continuum theory, to more accurately describe drying particle suspensions. I will then discuss a surrogate-modeling framework we have developed to codesign particles and processing conditions to assemble targeted dried structures. Taken together, this work makes progress toward a multiscale framework for engineering new colloidal materials.

Michael P. Howard is an Assistant Professor of Chemical Engineering at Auburn University. He received his B.S. in Chemical Engineering from Penn State University and his Ph.D. in Chemical Engineering from Princeton University. His research aims to use computer simulations to shorten the time and reduce the cost of designing soft materials. A key focus is on modeling self-assembling materials under realistic processing and use conditions. He received an ACS PRF Doctoral New Investigator grant in 2023 and NSF CAREER award in 2025.

**02/13/2026, 10:30 – 11:30am, L2D2**