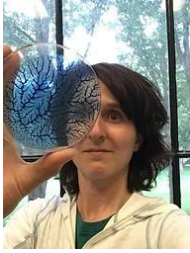


# Department of Mechanical Engineering Seminar

2PM, 3/28/2024 Thursday

Steinman Hall Room 254 (Conference Room)



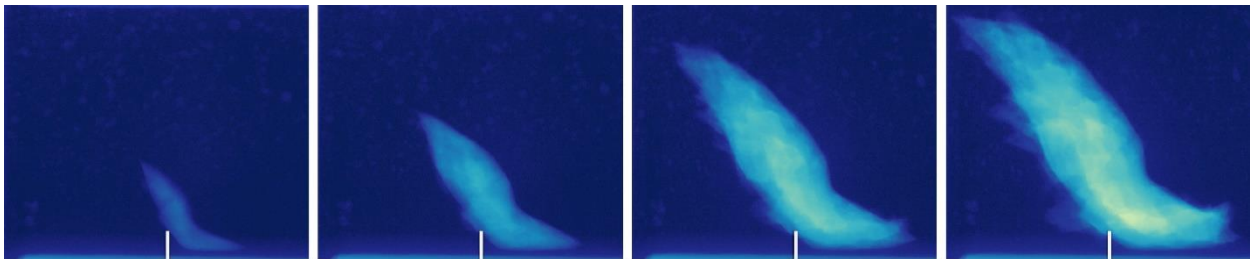
## Under Pressure: Suspension Pushed Too Far

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### ABSTRACT

Particle suspensions can fracture into intricate patterns as they are pushed out of equilibrium. We probe the fracture and relaxation characteristics of a dense aqueous cornstarch suspension that exhibits discontinuous shear-thickening behavior. Air injection into three-dimensional bulk suspensions can lead to smooth bubbles that rise upwards under the action of buoyancy or to sharp cracks that remain attached to the injection nozzle. We link the shape and the relaxation dynamics of the air cavity to the cornstarch rheology. In a second example, we report the crack dynamics and morphology occurring as drops of aqueous nanoparticle suspensions evaporate on a glass surface and leave behind a solid particle deposit. We show that in the final stage of drying, the stresses in the deposit can be released in two distinct ways: by bending out of plane or by forming a second generation of cracks.



### BIO

Irmgard Bischofberger is an experimentalist working in the fields of fluid dynamics and soft condensed matter. She obtained her Ph.D. degree in Physics from the University of Fribourg and has been a postdoctoral fellow in the Physics Department at the University of Chicago. She is an associate professor in the Department of Mechanical Engineering at MIT. Her research interests include the spontaneous pattern formation from fluid instabilities and drying processes and non-equilibrium phenomena in soft gels. Irmgard is passionate about communicating science to a diverse audience and has a longstanding 'Science and Arts' collaboration with artists and musicians.