



UNIVERSITÄT  
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Fakultät für Physik und  
Geowissenschaften

Prof. Dr. J. Deiglmayr  
Prof. Dr. J. Vollmer

# Physics Colloquium

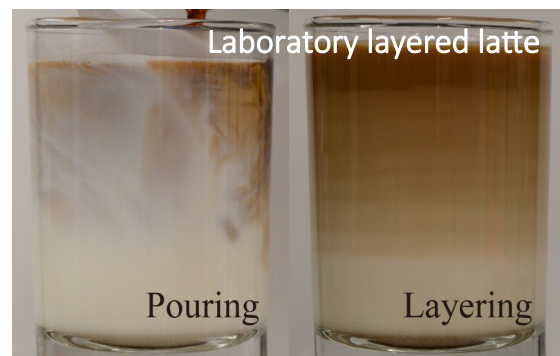
Tuesday, 13 July 2021 at 17:00

**Prof. Dr. Howard Stone**

Princeton University, USA

## Short Stories in Fluid Mechanics: Intersections of thin films, self-similarity, elasticity and molecular biology

My research is at the intersections of fluid mechanics, applied mathematics, and the physics of soft materials, which is sometimes referred to as complex fluids. Wherever possible I seek to combine mathematical models with experimental measurements and these efforts have led us to tackle various problems from the fields of engineering, biophysics, the geosciences, applied physics, *etc.* In this talk, I provide a glimpse into fluid mechanics and soft-condensed matter flow problems that we have studied in recent years.



In particular, I will describe *(i)* problems of fluid-structure interactions at low Reynolds numbers, where the flow of a liquid and the deformation of a solid are coupled, and a solution is provided via an integral equation representation; *(ii)* an experimentally motivated similarity solution involving three independent variables, which is rationalized with a nonlinear theory; and *(iii)* the observation of a condensed protein phase on growing microtubules during spindle formation, after which discrete droplets form, which we rationalize in terms of the Plateau-Rayleigh capillary instability and a kinetic argument for its role in biological function. The research described was performed by many people in my research group, as well as some external collaborations.

Online Colloquium broadcasted by BigBlueButton at

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