

***USC Department of Aerospace & Mechanical Engineering***

***∞ Laufer Keynote Lecture Series 2020 ∞***

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**Modern applications of classical ideas in fluid mechanics: thin films, molecular biology and oceanography in a café latte**

Abstract: Fluid mechanics has a rich history. Modern research themes introduce new questions, some of which can be understood using fundamental concepts. We will provide three examples of research discoveries from the subjects of thin film dynamics, cellular biology and buoyancy-driven flows and in each case illuminate the phenomenon using fundamental ideas in fluid dynamics. In the first example, we will document the time and (three-dimensional) space variations of the shape of a falling film near an edge, and rationalize the quantitative features using a similarity solution. In the second example, we discuss the formation of the spindle in the dividing cell, and report experiments documenting the role of a condensed protein phase on growing microtubules, followed by the Rayleigh-Plateau instability that then drives branching nucleation. Finally, we describe and explain patterns naturally formed in a café latte.

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**Wednesday, March 11, 2020**

**12:00 Noon**

***Location: The Franklin Suite  
Tutor Campus Center, 3<sup>rd</sup> Floor***

**Reception will begin promptly at 12 noon.  
Seminar immediately after the reception.**