Mechanical & Industrial Engineering
UNIVERSITY OF TORONTO

FACULTY OF APPLIED SCIENCE & ENGINEERING

Seminars in Mechanical & Industrial Engineering

Distinguished Lecture

Friday, September 18 · 2:10PM · Room MC102
5 King's College Road

The Fluid Trampoline: Droplets Bouncing on a Soap Film

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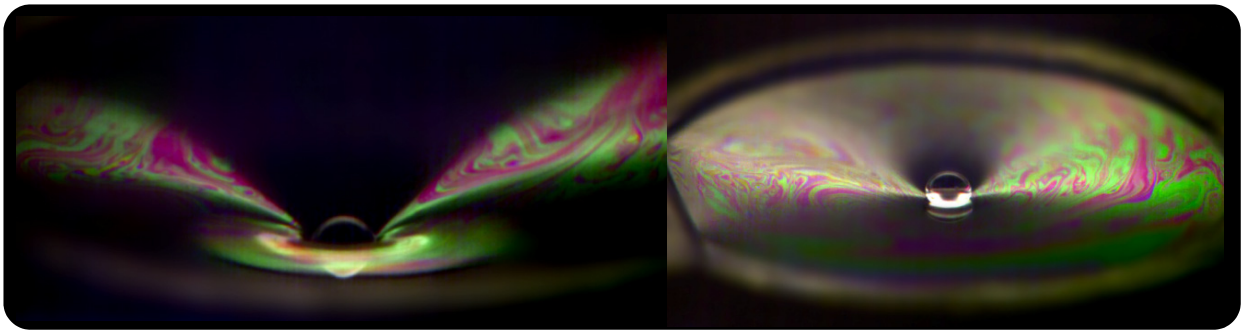
Abstract. We present the results of a combined experimental and theoretical investigation of droplets falling onto a horizontal soap film. Both static and vertically vibrated soap films are considered. A quasi-static description of the soap film shape yields a force-displacement relation that allows us to model the film as a nonlinear spring, and yields an accurate criterion for the transition between droplet bouncing and crossing. On the vibrating film, a variety of bouncing behaviours were observed, including simple and complex periodic states, multiperiodicity and chaos. A simple theoretical model is developed that captures the essential physics of the bouncing process, reproducing all observed bouncing states. The system is among the very simplest fluid mechanical chaotic oscillators. The relevance of our model to a seemingly unlikely biological system is discussed.



All visitors are welcome!

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The next seminar will take place on Sept 25 at 2:10pm in MC102. Professor Chang Liu from Northwestern University will talk about "Biologically Inspired Sensors".