

THE MATERIALS SCIENCE AND ENGINEERING DEPARTMENT  
FALL COLLOQUIUM SERIES PRESENTS:

# Angela Pitenis

Assistant Professor, Materials  
University of California, Santa Barbara



## *The Slippery Physics of Aqueous Gels*

Aqueous gels are found across all biological sliding interfaces (e.g. cartilaginous joints, mucinated ocular surfaces). These materials are often characterized as "fragile" or "weak" yet they manage engineering-like mechanical and transport challenges by reducing contact pressures, mitigating shear stresses, and sustaining adequate lubrication over a lifetime. Efforts to characterize the structure and properties of aqueous proteinaceous gels in natural interfaces have been limited by their high water content, low biopolymer concentration, high sample variability, low sample volume, and sample degradation. We use high water content hydrogels as model materials to understand fundamental energy-dissipation mechanisms within buried biological interfaces and use scaling concepts from polymer physics to relate microscale structure to macroscale tribological properties.

**Angela Pitenis** is an assistant professor in the Materials Department at the University of California, Santa Barbara. Her research group studies interfacial engineering, with a particular focus on soft, biological, and biologically-inspired material systems. Current activities include designing in situ instrumentation, constructing bespoke hydrogel systems, recapitulating the 3D tissue and tumor microenvironment, and her group's research uses contact mechanics, soft condensed matter physics, surface science, and biomedicine. Angela's previous work has ranged from exploring the mechanochemistry of fluoropolymer tribology, to hydrogel lubricity, to uncovering mechanisms of friction-induced inflammation by gently sliding contact-lens-like hydrogels against corneal epithelial cells *in vitro*.

**Tuesday, October 27 • 4 pm CT • Zoom**

[Registration is required. RSVP here.](#)

*Questions? Contact [Kristina.lugo@northwestern.edu](mailto:Kristina.lugo@northwestern.edu).*