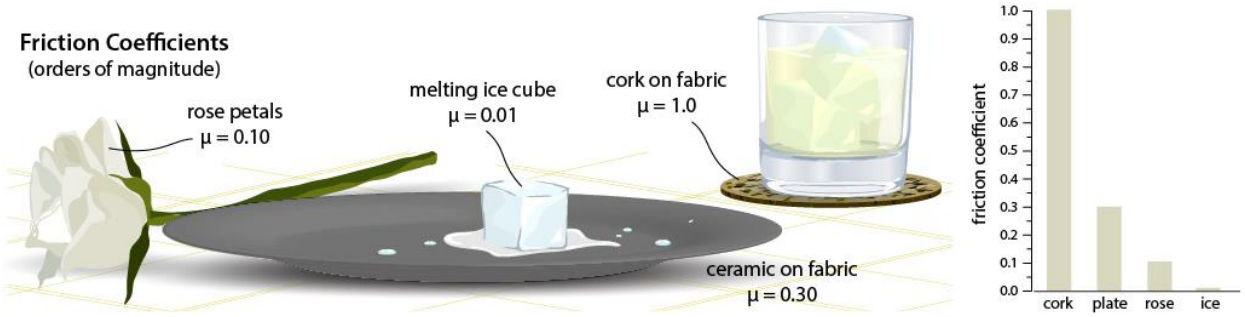
MATERIALS TRIBOLOGY LABORATORY
ILLINOIS

Material behavior at the interface

Alison C. Dunn, PhD



How slippery is a material? Under what conditions, and what drives the slipperiness? Medical prostheses such as orthopedic implants, contact lenses, arterial stents, and urethral catheters are performance critical components which experience complex shear loading against hydrated biological tissue surfaces.

Our research explores the surfaces of soft and hydrated materials, specifically the friction response and aqueous lubrication properties. Drawing from physics, mechanics, materials science, and biology, we bring together hydrogel synthesis and design, soft material and surface characterization, microtribology instrumentation design and fabrication, and friction and wear modeling and analysis. The immediate impacts of this research will contribute to fields of fluid mechanics, in situ biomedical imaging, surface engineering, soft matter physics, tissue mechanics, and performance prediction. Furthermore, uncovering the scaling laws and appropriate models for a lubrication theory of hydrated materials is readily transferrable to industrial applications and medical device design.

If you have enjoyed courses in Mechanical Design, Mechanics of Materials, Materials Science, and Viscous Fluids, you will be able to readily apply this knowledge and continue to build your expertise.

Hands-on experience with tools is not required, but interest in incorporating instrument design/fabrication with experiments and analysis will contribute substantially to success.

Please contact Alison C. Dunn at acd@illinois.edu about research opportunities starting in Fall 2014.