

## ***Interfacial Laboratory, King Abdullah University of Science and Technology***

**OUR research Group at KAUST**—composed of experimentalists and theorists—is geared towards solving grand challenges in **water desalination, enhanced oil recovery, and climate change**. To that end, we investigate (1) physical and chemical phenomena at the ever-fluctuating interface of water with gases, solids, and liquids; and (2) materials and devices for energy conversion, sensing and tailored wettability. We combine tools and techniques from physics, chemistry, and engineering to quantify surface forces, rates of interfacial reactions, and characteristics of materials. These approaches include utilization of the Surface Forces Apparatus (**SFA**), Electrospray Ionization Mass Spectrometry (**ESIMS**), High-Speed Imaging (**HSI**), Contact Angle Cells (**CAC**), Atomic Force Microscopy (**AFM**), and Electrochemical Cells (**EC**), along with micro-/nano-fabrication facilities at the cleanroom, the microfluidics lab, machine shops, and supercomputers. A partial list of ongoing projects and relevant techniques follows:

- Measurement of **surface forces** (vdW, electrostatics, hydration, hydrophobic, etc.) **along with separation distances**, between (functionalized) mica surfaces down to the **nanometer** scale (@SFA, AFM, CAC)
- Measurement of **friction, lubrication, corrosion, and electrochemistry** in confined pores (@SFA, AFM, CAC, EC)
- Tuning **interfacial tensions at the rock-oil-water interface** for enhanced oil recovery (@SFA, CAC)
- **Proton and electron transfer reactions**, catalysis, & specific-ion effects at the air-water interface (@ESIMS, HSI)
- Creation of (transparent) **omniphobic and anti-biofouling surfaces** (@bio-inspired, CAC, HSI, AFM, lithography)
- Evaporation mediated self-assembly, contact angle hysteresis, stick-slip phenomenon (@HSI, CAC, microscopy)
- Synthesis of efficient bulk **thermoelectric materials** (@EC, lithography, electrical and thermal characterization)
- Manufacturing inexpensive devices for **(bio)chemical sensing** (@chemistry, paper-based microfluidics)

We are always looking for brilliant, curiosity-driven postdoctoral scholars and MS/PhD students who thrive in a multi-disciplinary atmosphere. In addition to exceptional infrastructure for scientific research, KAUST offers generous salaries to PhD (USD 30,000) and postdoctoral scholars (>USD 50,000). Additional benefits, such as free housing, medical insurance, etc., apply. Please visit <http://www.kaust.edu.sa> and contact us for further details.

