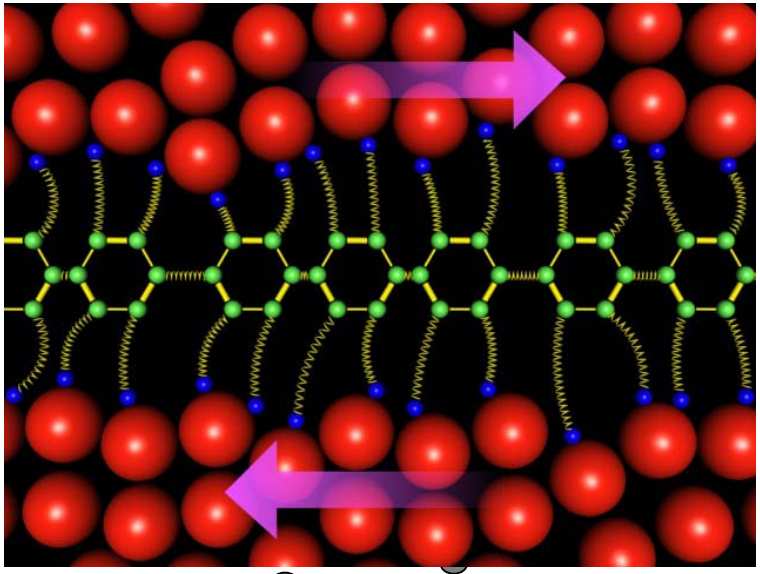
Quartz Crystal Microbalance Studies of Atomic-Scale Friction
Jacqueline Krim, National Science Foundation, DMR0072030

Nanotribology

Our research program is unique world-wide, exploring the nano-scale origins of friction with a quartz crystal microbalance technique that the PI developed in the late 1980's with the support of NSF.

We are currently exploring the energy transfer and frictional heating effects at atomically uniform sliding interfaces, and this year established the first direct link between nanoscopic dynamics and macroscopic friction coefficients.



Top: Reaction films that vibrate for *picoseconds* during sliding are linked to low friction coefficients. Rigid reaction films yield high coefficients and lubricant failure.
Bottom: The Quartz Crystal Microbalance

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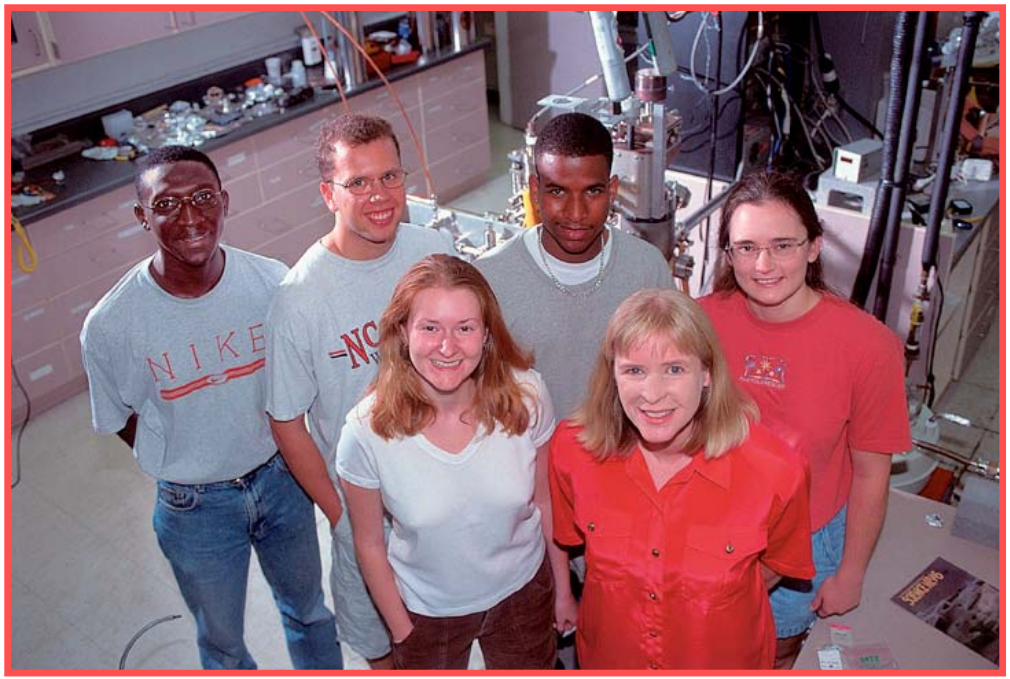
Educational:
2 Undergraduates
3 Graduate students

- **J. Krim is a Sigma Xi Distinguished Lecturer for 2002-2003, presenting numerous lectures to general audiences on the topic of atomic-scale friction**

- **An article devoted to Krim's research on nanotribology was featured in the August 2003 edition of Popular Mechanics' science section, entitled "A Little Friction".**



REU students Meagan Miller (front, left) and Daryl Purcell (back, 2cd from right) alongside their graduate student mentors Cherno Jaye, (back, left) Robert Trubic (back, 2cd from left), Tonya Coffey (back, right) and P.I. Krim (front, right)