

**JOINT INSTITUTE FOR MOLECULAR AND NANOSCALE INNOVATION (IMNI)
AND DIVISION OF ENGINEERING**

“Life and Death in the Nanoworld”

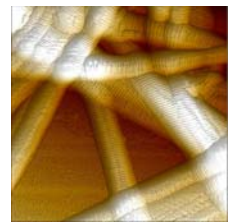
**Georg E. Fantner, Ph.D.
Biomolecular Material Lab
Massachusetts Institute of Technology**

April 14, 2009

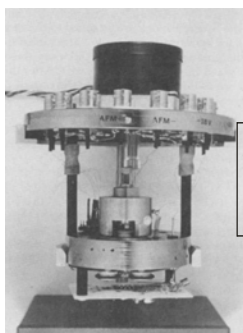
Barus & Holley, Room 190

10:00 AM

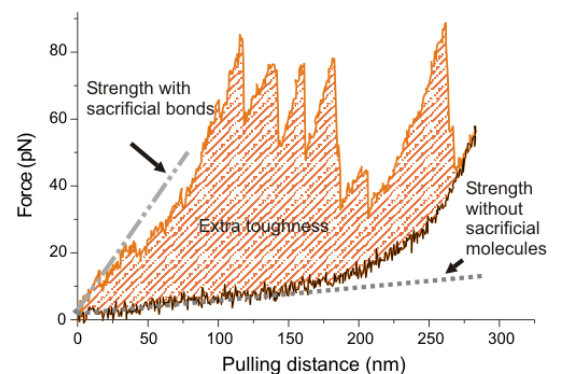
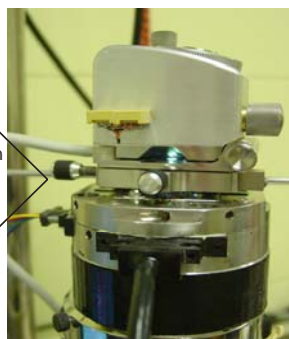
Abstract



Many fundamental processes that determine life or death of organisms occur at the molecular or sub-cellular level. Measuring such processes directly in real time is difficult and most of the techniques used in nanobiology are either bulk measurements or only provide snapshots. Atomic Force Microscopy (AFM) is one of the few techniques that can probe biological systems (such as live cells) in their native environment with nanometer resolution. However, taking a high resolution AFM image takes tens of minutes, making dynamic observations of processes impossible. Combining advances in MEMS fabrication, mechanical engineering and modern control methods we have developed a AFM which is capable of taking images 1000 times faster than conventional AFM while achieving better force resolution. In my talk, I will discuss this novel technique and it's application to investigations into the molecular mechanisms during bone fracture as well as studies of the kill-mechanism of antimicrobial peptides on bacteria. The success of this technology is one example of how new things can be learned when using a multidisciplinary engineering approach to develop tools for life science questions.



optical lever detection
MEMS cantilevers
AFM in Liquid
Small cantilevers



Host: Professor Jimmy Xu

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