



The Physics & Astronomy Department  
of the Faculty of Science  
presents the annual

## Elizabeth Laird Memorial Lecture

### **“Biological Nanotricks: Shuttling and Switching at the Nanoscale”**

*(This talk is intended for a general audience)*

**Dr. VIOLA VOGEL**

Laboratory of Biologically Oriented Materials  
Department of Materials  
ETH Zürich, Switzerland

**Thursday, September 22nd, 2005**

**Pre-lecture Reception**  
**5:00 p.m.**  
**Physics & Astronomy Rm. 123**

**Dr. Vogel's LAIRD LECTURE**  
**6:00 p.m.**  
**South Valley Building Rm. 40**

*Parking available at South Valley Parking Lot – coin entry \$4.00 after 4 p.m.  
or at Alumni Thompson attended lot – \$5.00 after 4 p.m.*

#### **Abstract:**

*One key objective in bionanotechnology is to convert discoveries in the molecular sciences of how biological nanosystems work into new technologies even envisioning applications that can go far beyond their natural uses. Examples to be discussed will include the use of motor proteins in lab-on-the-chip applications and the utilization of bacterial adhesion proteins as force-enhanced nanoadhesives. The molecular motor protein project is motivated by the fact that a large number of specialized motor proteins are used by cells to actively transport specific molecules and organelles along cytoskeletal filaments to defined locations. This ATP-driven process enables cells to dynamically reconfigure their intracellular building blocks to meet specific cellular tasks. Borrowing from nature, we are developing insights how to engineer nanoscale transport systems based on biological motors that allow to shuttle cargo between user-specified locations. Asking how to utilize catch-bonds that strengthen under loads was stimulated by our recent discovery that bacterial adhesion to surfaces can be enhanced under flow conditions.*