GENERAL LECTURE
“Computational Microscopy of the Living Cell”
Thursday, September 18, 2008
7:30 p.m., PS H-150

The biological cell is a society of molecules that individually are not alive. Through a hierarchical association, cells are capable of sustaining, repairing, and duplicating themselves, rendering the cells alive. In order to learn how life works, one needs to know the entire cell atom-by-atom. Researchers are beginning to create a dynamic portrait of the cell rendered from a combination of experimentation and computing. The lecture presents cellular processes, viewed recently through an advanced computational microscope. The images reveal the synthesis of proteins from their genetic blue print, as well as protein folding, the mechanics of blood clots, the removal of cholesterol, the sculpting of the cell interior, and even the formation of entire cellular organelles.

TECHNICAL PRESENTATION
“Physics of Photosynthesis in Purple Bacteria”
Friday, September 19, 2008
3:40 p.m., PS H-152

Advances in the structural resolution of photosynthetic proteins and in the large scale modeling of cellular processes at both classical and quantum mechanical levels begin to furnish dynamic views of photosynthesis at the cell level. The lecture will report structural views of an entire photosynthetic organelle in purple bacteria, how the organelle is formed, and how its multi-protein components function together. The views are established from the electronic level governing light absorption, exciton migration and electron transfer to the classical level of protein dynamics and electrostatics. Our aspiration to eventually simulate the entire photosynthetic process from light absorption to ATP synthesis is outlined.

Klaus Schulten received his Ph.D. from Harvard University in 1974. He joined the Department of Physics at the University of Illinois at Urbana-Champaign in 1988 where he is a Swanlund Professor. He is an expert in theoretical and computational biophysics and for 18 years has directed the NIH Resource for Macromolecular Modeling and Bioinformatics at his university. His molecular analysis and dynamics programs, VMD and NAMD, are used by over 100,000 registered users and are considered the fastest in the field. His research in photobiology includes ab initio molecular dynamics simulations of retinal photoisomerization in bacteriorhodopsin, the structural solution of light harvesting complex II, the construction of an atomic level model of an entire photosynthetic organelle from crystallographic, NMR, EM and AFM data, and the physical basis for biological magnetotaxis. His 500 publications have been cited over 20,000 times. Schulten also contributed to the fields of cellular mechanics, membrane biology, bionanotechnology, and computational neurobiology. Dr. Schulten has received the Award in Computational Biology, International Society of Quantum Biology and Pharmacology (2008); the Humboldt Award of the German Humboldt Foundation (2004), the University of Illinois Scholar (1996); Fellow of the American Physical Society (1993); Nernst Prize of the Physical Chemistry Society of Germany (1981).
EYRING LECTURES IN CHEMISTRY AND BIOCHEMISTRY

The Department of Chemistry and Biochemistry at Arizona State University is pleased to announce the Eyring Lectures in Chemistry and Biochemistry for Fall 2008. This interdisciplinary distinguished lecturer series is dedicated to stimulating discussions by renowned scientists who are at the cutting edge of their respective fields. Each lecture series consists of a lead-off presentation to help communicate the excitement and challenge of this central science to the University and community, followed by a more specialized colloquium to help bring the audience to the scientific frontiers of the topics under discussion. Speakers will be scholars in residence in the Department during their lecture series and will be available for informal discussions with faculty, students, and other interested individuals.

The Eyring Lectures in Chemistry and Biochemistry bears the name of LeRoy Eyring, Regents' Professor of Chemistry, whose extraordinary instructional and research accomplishments and professional leadership at Arizona State University helped to bring the Department of Chemistry and Biochemistry into international prominence.

Sponsored by:
Department of Chemistry & Biochemistry, ASU
and
Central Arizona Section of the American Chemical Society

Fall 2008