



Center for Nanoscale  
Chemical-Electrical-Mechanical  
Manufacturing Systems

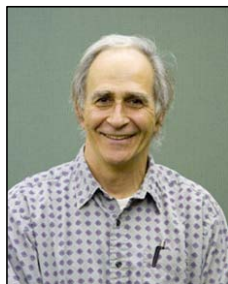
## Nanoscale Technologies Using Membranes Supported on Nanoporous Substrates

Biological membranes are adapted to many different functions, including osmosis, chemical signal reception sending and receiving, electrical signaling, electrical energy production, and energy transduction. The NIH National Center for Design of Biomimetic Nanoconductors is focused on understanding how the structure of membrane components and how they are assembled into functional membranes can give rise to the myriad functions of membranes, and how that understanding can be translated into devices and medical technologies at the nanoscale.

The image on the right is the symbol of the National Center for the Design of Biomimetic Nanoconductors. The orange and blue regions show the superimposed cross-sections of a closed and open potassium selective protein ion channel. The circuit elements, represented in white, show the locations in the channel of the electromotive force and the variable resistance that constitute an engineering definition of the channel function.



This image represents the work of three Nobel prizes (Hodgkin and Huxley for the equivalent circuit; Neher and Sakmann for functional characterization of the single protein, and MacKinnon for the protein structure). The goal of the Center is to translate such fundamental science about membrane transport into nanoscale technology.



Wednesday, March 14, 2007

4:00 pm

B02 Coordinated Science Lab

**Eric Jakobsson**

**Molecular and Integrative Physiology & the National Center for Supercomputing Applications  
University of Illinois at Urbana-Champaign**

*Professor Jakobsson served from 2003 to 2005 as Director of the Center for Bioinformatics and Computational Biology at the National Institute of General Medical Sciences and the Chair of the Biomedical Information Science and Technology Initiative Consortium at the National Institutes of Health, in Bethesda, Maryland. Jakobsson's research and academic interests are centered on computational studies of membrane structure and transport, and on the use of computation in education. He is the Director and Principal Investigator of the NIH National Center for the Design of Biomimetic Nanoconductors. Jakobsson is a Fellow of the American Physical Society in recognition of his work on ion and water permeation in channels. Professor Jakobsson also has major commitments to the Center for Biophysics and Computational Biology and the Beckman Institute for Advanced Science and Technology at UIUC.*