

BIOEN 509 – DEPARTMENTAL SEMINAR SERIES

Thursday, Mar. 4th 2010, 12:30-1:20 PM

Foege Bioengineering Building N130A

On the protonic conductivity of polysaccharide nanofibers

Dr. Marco Rolandi

*Department of Materials Science and Engineering
Assistant Professor, University of Washington*

Nanoscale ionic conductivity has attracted increasing technological interest with the advent of nanofluidic transistors, the demonstration of solid-state oxide memristors, and the fabrication of hybrid nanowire/nanotube ion channel gated devices. Amongst ionic conductors, hydrogen bonded networks found in some biological macromolecules, or in the highly structured water that surrounds them, can be efficient proton conductors via the Grotthuss mechanism. In this talk, I will present preliminary measurements of the protonic transport in hydrated nanoscale biological nanofibers (chitin and maleic chitosan) integrated in solid-state devices. I will then speculate on the potential applications of these proton-conducting materials such as nanoscale logic devices or fuel cell proton exchange membranes.

Dr. Marco Rolandi started as an Assistant Professor of Materials Science and Engineering at the University of Washington in August 2008. His research involves the investigation of nanostructured and nanopatterned biological, organic, and inorganic materials and it focuses on hybrid constructs and their applications. Main topics include self-assembled biological protonic conductors and transistors, novel solid-state nanowire electronics, and the fabrication of complex structures via surface patterning.

Before arriving to UW, he graduated with an MSci in Physics from Queen Mary and Westfield College, University of London (now Queen Mary University of London) in 2000 and received a PhD in Applied Physics from Stanford University in 2005, under the supervision of Professor Hongjie Dai. He then became a postdoctoral fellow in the Materials Sciences Division at Lawrence Berkeley National Laboratory and the Department of Chemistry at the University of California, Berkeley working in the laboratories of Professor Jean M.J Fréchet.

