

Emerging Membrane Materials and Manufacturing Methods

Sunday

8:00 AM

Lecturers:

Bruce Hinds, University of Washington, bjhinds@uw.edu

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ABSTRACT:

This workshop will focus on emerging new membrane materials (polymeric and inorganic/organic hybrids). The workshop will not present state-of-the-art techniques for membrane fabrication. Recent developments will be presented and their potential for future industrial applications will be discussed. Topics include: membrane manufacturing by molecular self-assembly of block copolymers and other components, preparation of isoporous membranes, carbon nanotubes as selective membrane channels, graphene and graphene oxide as membrane components, nanostructured mixed matrix membranes for gas and liquid separation, recent developments in the field of reverse and forward osmosis membranes, bio-mimetic/inspired membrane systems, membranes for controlled drug release, tailoring and properties of multicomponent membranes, The most important recent patents in these fields will be reviewed.

Klaus-V. Peinemann has more than 25 years academic and industrial experience in the field of membrane materials and application. He was head of the department of Membrane Development at GKSS, Germany, coordinating a number of European projects in this field. He is co-founder of GMT Membrantechnik GmbH, one of the few European companies developing and producing gas separation membranes. Klaus-V. Peinemann served as President of the European Membrane Society, he organised or coorganised 15 international workshops on membrane preparation. Since many years he is honorary Professor at the Leibniz University of Hannover on membranes for medical applications and he is currently Professor for Chemical Engineering at the Advanced Membranes and Porous Materials Center at KAUST, Saudi Arabia.

Suzana P. Nunes is Professor of Environmental Science and Engineering and Associate Dean at King Abdullah University of Science and Technology (KAUST), where she heads the Nanostructured Polymer Membranes Lab. She has been working on polymer and membrane science for more than 30 years, previously as Humboldt Fellow in Mainz, as head of department of Membranes for Sustainable Energy at Helmholtz Research Center, Germany, having been visiting scientist at Tokyo Institute of Technology, Max-Planck for Polymer Research and Associate Professor at University of Campinas in Brazil. Her current research topics are polymer self-assembly, membranes for water treatment, liquid separations for chemical industry and biomolecules separation (For details see <http://npm.kaust.edu.sa>). She edited 6 books, has more than 180 papers in scientific journals, is fellow of the Royal Society of Chemistry and member of the Advisory Board of the Barrer Membrane Center at Imperial College London.

Bruce Hinds is Professor of Materials Engineering at the University of Washington, heading a laboratory on nanoscale fabrication for active membranes platforms. He has been working in the membrane field for 15 years bringing a prior experience in microfabrication and chemistry. His

initial membrane research, for over a decade, at the University of Kentucky created a new method to form carbon nanotube membranes, demonstrating nano-fluidic flow thousands of times faster than conventional materials by harnessing a near perfect slip-boundary condition over atomically smooth graphite tubes. Using this phenomena his group developed a smart-phone activated skin patch membrane to treat nicotine dependence for new active membrane applications in health care. Current research efforts are focused on electrochemically active membrane systems that mimic natural protein pumping cycles. He received an NSF Early Career Award, Presidential Early Career Award with NIH/NIDA, and a Kavli Frontiers of Science Fellowship from the National Academy of Science.