Department of Chemical Engineering
Distinguished Seminar Speaker

Klavs Jensen

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"Chemical and Biological Microfluidics- Advantages of going small"

December 11, 2014
102 West Village G
11:45 a.m. – 1:00 p.m.

Refreshments will be served.

ABSTRACT Miniaturization has fueled spectacular advances in the electronic and telecommunications industries, and more recently, in microanalysis chips for chemical and biological applications. These systems promise to transform classical laboratory procedures into integrated systems capable of providing new understanding of fundamental chemical and biological processes as well as rapid, continuous discovery and development of new products with less use of resources and waste generation. Chemical microsystems combine chemical-synthesis-on-a chip and microscale separation to enable multiple synthesis steps, which are further enhanced by information gained from integrating miniaturized sensors and actuators. Biological studies are similarly accelerated by the integration of cell manipulation and biochemical detection. Applications of chemical and biological microfluidics are illustrated with case studies drawn from chemical transformations, synthesis and assembly of nano structures, and cellular manipulation. Emphasis is placed on applications that are enabled by microfluidic systems and are difficult to perform by conventional techniques. Selecting the right scale - nano, micro, and milli - is also touched upon. Chemistry examples include the creation of modular reconfigurable chemical plants for on demand small scale pharmaceutical production. Cellular manipulation focuses on microfluidic devices for delivery of macromolecules and nanoparticles to the cytosol.

BIOGRAPHY Dr. Klavs Jensen received an MSc from the Technical University of Denmark, and PhD from the University of Wisconsin. His particular research interests include microsystems for chemical and biological applications, materials synthesis and processing, and multiscale simulation of reactive processes. Throughout his extensive career, Dr. Jensen has received various honors and awards, including the NSF Presidential Young Investigator Award, the John Simon Guggenheim Fellowship, and the IUPAC-ThalesNano International Prize. He is an elected AIChE fellow, and member of the National Academy of Engineering, Royal Society of Chemistry, and the American Academy of Arts & Sciences.

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