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**ΔΙΑΛΕΞΗ**

**“Soft Materials and Complex Fluids via Self-Assembly:  
From (Nano)Structure to Function to Applications”**

**Prof. Paschalis Alexandridis**

**Department of Chemical and Biological Engineering  
University at Buffalo (UB) - The State University of New York  
(SUNY)**

**Τετάρτη 24 Ιουνίου 2015, ώρα 10:00**

**Αίθουσα σεμιναρίων στο ισόγειο του ΕΙΕ**

## **Soft Materials and Complex Fluids via Self-Assembly: From (Nano)Structure to Function to Applications**

Paschalis Alexandridis

UB Distinguished Professor  
Department of Chemical and Biological Engineering  
University at Buffalo (UB) - The State University of New York (SUNY)  
Buffalo, NY 14260-4200, USA  
<http://www.cbe.buffalo.edu/alexandridis>

Soft materials, also known as complex fluids, present diverse and interesting properties and function which emanate from nano- and meso-scale organization of constituents such as polymers, particles and solvents. Prime examples of tunable materials are polymers, in particular, copolymers comprising covalently-linked blocks of different chemical nature or conformation. Selective solvents may disrupt certain types of polymer organization but can promote others. Added solvents thus provide valuable degrees of freedom for controlling the morphology and, hence, structure/property relationships, of polymers and can dramatically affect the local mobility. Incorporation of "hard" nanoparticles into a "soft" matrix can modify dramatically the structure and dynamics, and also confer novel properties (optical, electrical, catalytic).

The presentation will highlight the interplay between (A) fundamental aspects (interactions, thermodynamics, structure, dynamics) of soft materials based on block copolymer self-assembly in selective solvents, and (B) applications of such self-assembled systems in the (a) structuring of waterborne complex fluids with properties tailored for pharmaceuticals, (b) environmentally benign synthesis of nanoparticles in a size- and shape-controlled manner, and (c) formulation of polymer gels with ionic liquids as potential electrolytes for energy applications.