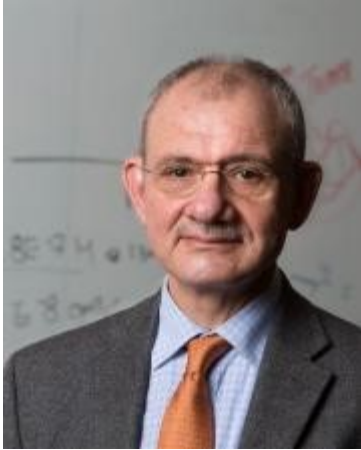


PURDUE MECHANICAL ENGINEERING



The Hawkins Memorial Lecture in Heat Transfer

Dr. Costas Grigoropoulos

Department of Mechanical Engineering

University of California, Berkeley

Thursday October 4, 2018

4:30pm, WALC 1055 (Hiler Theater)

Laser Materials Processing and Nanomanufacturing

Abstract:

The Laser Thermal Laboratory has conducted work on the fundamental study of laser material interactions across length and time scales in the context of laser microprocessing and maskless nanomanufacturing. Understanding of the associated energy transport phenomena has opened the way to applications on micro/nanofabrication, the synthesis of nanomaterials and their integration into electronic and energy devices. New methods have been introduced for the localized structural modification, growth and assembly of nanostructures. Laser-effected thinning and stable doping of two-dimensional layered semiconductors has been demonstrated. Maskless fabrication of functional devices on flexible substrates has been conducted by using nanoparticles in conjunction with laser processing and printing. High-performance devices have been realized on flexible substrates. Ultrafast laser radiation drives nonlinear interactions that can be utilized for nanoprocessing. Quantitative studies have been carried out addressing biological cell response to nanodomains patterned via multiphoton ablation lithography. Fabrication of filamentous model structures for the growth and differentiation of biological cells has also been studied. New concepts on the ultrafast laser fabrication of three-dimensional mechanical metamaterials and the directed self-assembly of nanostructures are discussed.

Biography:

Costas Grigoropoulos received his Diploma Degrees in Naval Architecture and Marine Engineering (1978), and in Mechanical Engineering (1980) from the National Technical University of Athens, Greece. He holds a M.Sc. degree (1983), and a Ph.D. (1986), both in Mechanical Engineering from Columbia University. He was faculty in the Mechanical Engineering at the University of Washington in 1986-1990. In 1990 he joined the Department of Mechanical Engineering at the University of California at Berkeley. He has conducted research at the Xerox Mechanical Engineering Sciences Laboratory, the IBM Almaden Research Center and the Institute of Electronic Structure and Laser, FORTH, Greece. His current research interests are in micro/nano engineering, laser materials processing, laser-biomaterial interactions, microscale energy sources, microscale and nanoscale transport. His laboratory is focused on advanced methods for the manufacture of functional micro/nanoscale devices. He was a Miller Professor for basic research in science in 1999, a visiting Professor at ETH Zurich in 2000 and 2009 and a visiting Professor in Johannes Kepler University, Linz, Austria in 2008. He is a Fellow of ASME and SPIE, and recipient of the ASME Heat Transfer Memorial Award (2007). He is Editor of the *International Journal of Heat and Mass Transfer*.

Student Poster Show & Reception @ 3:00 p.m. – 4:20 p.m.— Gatewood Atrium in Mechanical Engineering Bldg.

GRADUATE SEMINAR SERIES: ME 691