

## Department of Electrical and Computer Engineering

**Title:** " *Science on the Interface: multiphase microfluidics and surface enhanced Raman spectroscopy for chemical detection* "

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**Wednesday, 19<sup>th</sup> June 2013, 17:30 – 18:30**  
**Room GP414 – Green Park**  
**University of Cyprus**

**Abstract:** Taking advantage of the processing techniques developed for the IC industry, microfluidics enables the development of systems that control sub-microliter volumes of fluids with unprecedented precision. By using combinations of miscible and immiscible fluid phases (e.g. water/oil, gas/liquid) in microfluidic devices we create controlled interfaces on which we can limit or enhance the transport of chemical species, exploring effects that may not be attainable using traditional methods. Surface enhanced Raman spectroscopy (SERS) is a powerful spectroscopic technique that exploits plasmonic effects to enhance light scattering of molecular bond vibrations, with the potential to detect and identify even single molecules. By controlling the interactions of plasmonic silver nanoparticles and analyte molecules in microfluidic devices we can not only optimize systems for chemical detection via SERS but also explore the relevant physics, gaining insight into how these phenomena occur. In my talk I will present my experimental work on using controlled microfluidic interfaces for chemical detection, and an application of this research for the detection of methamphetamine in saliva.

**Biography:** Chrysafis is a fifth-year graduate student, currently pursuing his Ph.D. in the interdepartmental program in Biomolecular Science and Engineering at University of California, Santa Barbara. His Ph.D. project is centered on using microfluidics and surface enhanced Raman spectroscopy (SERS) for chemical detection, focusing on the experimental development and application of these tools. His Masters degree is from the Electrical and Computer Engineering department of the University of Cyprus, where he used electrokinetic phenomena for on-chip manipulation and separation of cells, based on their dielectric properties. As an undergraduate, he completed two degrees, in Physics and Mathematics, at the Pennsylvania State University, where he also worked as an undergraduate researcher in a low-temperature physics lab, studying superconductivity. Chrysafis is a firm believer in interdisciplinary sciences, and hopes that with his diverse background will one day contribute to the academic and scientific communities.