



ESE Seminar Announcement

Alper Kiraz

**Department of Physics
Koç University**



Friday, March 27, 2015
Green Hall, Room 0120
2:10PM

OPTOFLUIDIC LASERS AND WAVEGUIDES FOR APPLICATIONS IN BIO AND ENERGY PHOTONICS

Abstract: This talk will summarize the recent results we obtained on optofluidic lasers and waveguides. Due to their perfect spherical geometry and smooth surface, microdroplets host high quality whispering gallery modes. I will present FRET lasing and bio-lasing observed in microdroplets located on a superhydrophobic surface. I will also present quantum dot lasing using optofluidic ring resonators and discuss our theoretical analysis showing increased sensitivity in DNA detection when FRET lasing is used in conjunction with the molecular beacon approach. Finally, I will report on three methods to obtain liquid-core optofluidic waveguides. In the first case, optofluidic waveguides are formed by liquid filaments on laser ablated regions of a superhydrophobic surface. In the second and third cases hydrophobic silica aerogels are employed as a low refractive index ($n \sim 1.04$) host medium. I will emphasize the potential of such structures for photocatalysis and algae-based biofuel applications.

Bio: Alper Kiraz is currently a Fulbright visiting researcher in the biomedical engineering department at the University of Michigan, Ann Arbor. He has been a faculty member – now a professor of physics - at Koç University since 2004. He received his BS degree in electrical-electronics engineering from Bilkent University in 1998, MS and PhD degrees in electrical and computer engineering from the University of California, Santa Barbara in 2000 and 2002, respectively. Between 2002 and 2004 he worked as a post-doctoral associate at the Institute for Physical Chemistry in the Ludwig-Maximilians University, and received Alexander von Humboldt fellowship. His current research interests include optofluidics, single molecule spectroscopy/microscopy, and optical manipulation.

Host: Dr. Lan Yang