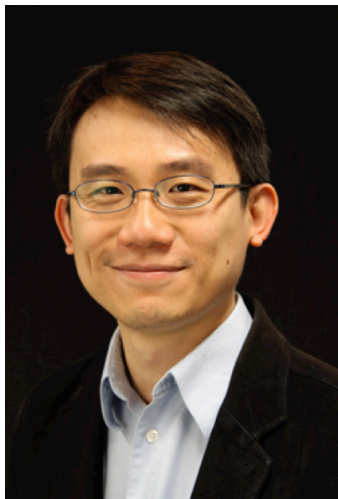


Visionary Seminar Series at USC

Wednesday, October 14, 2015 at 12 Noon

Ray R Irani Hall Conference Room 101



Changhuei Yang

**Professor of Electrical Engineering,
Bioengineering and Medical Engineering
California Institute of Technology**

**“Fourier Ptychography and deep tissue
imaging with optical time-reversal”**

Fourier Ptychography – Using computation to address physical optical challenges

Microscopes are complex and fussy creatures that are capable of delivering limited image information. This is because physical optical lenses are intrinsically imperfect. The perfect lenses we draw in high school ray diagrams simply do not exist. I will discuss our recent work on Fourier Ptychographic Microscopy - a computational microscopy method that enables a standard microscope to push past its physical optical limitations to provide gigapixel imaging ability.

Deep tissue imaging with optical time-reversal

We appear opaque because our tissues scatter light very strongly. Interestingly, optical scattering is deterministic and can be time-reversed in much the same way a ricocheting billiard ball can be made to retrace its trajectory if nudged appropriately. I will discuss our recent results in using ultrasound tagging in combination with digital optical phase conjugation to focus light tightly and deeply within biological tissues. I will also report on our experiments using digital optical phase conjugation to tightly focus light on a moving target in a scattering medium. These technologies can potentially enable incisionless laser surgery, targeted optogenetic activation, high-resolution biochemical tissue imaging and more.

Host: Provost Professor Scott Fraser
<http://bioimaging.usc.edu/> Tel: 213-740-2233