

# 機械工学セミナー Mechanical Engineering Seminar

2019年度第5回 (No.20) 2019-No.5 (No.20)

主催：慶應義塾大学工学部機械工学科  
Department of Mechanical Engineering, Keio University

日時 (Date):

2019年8月7日 (水) (August. 7, 2019 (Wed.)) 15:00~16:30

場所 (Venue):

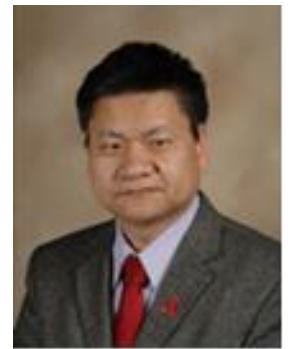
マルチメディアルーム (Multimedia Room) (14-B2F)

講演題目 (Title):

**Spectrally, Spatially, and Temporally Controlled Laser Processing  
and Characterization**

講演者 (Speaker):

**Yongfeng Lu**, Lott Distinguished Professor  
(SPIE Fellow, LIA Fellow, OSA Fellow)  
Department of Electrical and Computer Engineering  
University of Nebraska-Lincoln



Abstract:

Lasers can be used to deliver energy with extremely wide spectral, spatial, and temporal ranges. These laser properties have provided many opportunities for material science and engineering. In this presentation, the speaker will introduce his lab's research activities in processing and characterizing materials in various forms, including metals, polymers, diamond, carbon nanotubes, carbon nanooxions, graphene, gallium nitride, and biomedical materials. Laser-matter interactions can be spatially, spectrally, and temporally controlled and optimized to produce and characterize materials with desired efficiency and accuracy. The talk will cover the following research areas:

1. Laser-assisted micro/nanofabrication and additive manufacturing (e.g., target fabrication for laser fusion);
2. Highly efficient material synthesis using resonant vibrational excitation of molecules (formation of diamond structures for thermal management of high-power high-frequency electronics);
3. Laser-assisted optical spectroscopy, imaging, spectrometry, artificial intelligence in spectroscopic imaging (cancer diagnostics, nuclear forensics, and corrosion detection); and
4. Surface coating and modification (anticorrosion of ships and deactivation of underwater munitions).