



Dr. Anbo Wang

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Optical Sensors for Energy Systems

Energy strategy is often complicated by the entanglement between energy supply security, economic growth sustainability and climate change. This complexity compels energy systems to operate at higher temperatures toward greater fossil fuel efficiency with lower greenhouse gas emissions. In the mean time, this trend poses a great challenge to the applicability of traditional sensors in the harsh environments associated with future energy systems. Many optical materials are known to be able to operate reliably in extreme physical and chemical conditions. Optical sensors thus become especially attractive for meeting this rapidly increasing global need.

This talk will give a brief review of the recent optical sensor research in the Center for Photonics Technology at Virginia Tech. These sensors include extrinsic and intrinsic Fabry-Perot (FP) interferometry, optical fiber Bragg gratings and their multiplexing, long period grating sensors and single-crystal sapphire fiber sensors. Recent discoveries of additional interference phases in both the extrinsic and intrinsic FP sensors and their significance in the sensor signal processing will be discussed. Some of the sensor applications to various energy systems will also be presented.

Anbo received his Ph.D. degree in applied optics from Dalian University of Technology, Dalian, China in 1990. After spending a few years in the Fiber & Electro-Optics Research Center in the Department of Electrical and Computer Engineering at Virginia Tech as a visiting scientist, he subsequently joined the faculty of the same department in 1993. He founded the Photonics Laboratory in 1997, which later became the Center for Photonics Technology in 2000. Dr. Wang is an author/co-author of 122 journal papers and 16 granted patents in the field of optics and sensors. His invention of laser bonded fiber interferometric sensor technology and its applications to oil downhole measurement earned him an R&D 100 Award in 2004. He is a recipient of several major national special initiative awards, including the NSF/EPRI Sensor Initiative (1995), the DOE Energy Efficiency Science Initiative (2001) and the NSF Sensor Initiative (2004). He also received Virginia Tech Dean's Award for Excellence in Research in 2000 and in 2011 respectively. During his tenure at Virginia Tech, he has been responsible for more than \$25M research funding mostly in the area of optical sensors for harsh environments and has supervised more than 100 graduate students, postdocs and research staff. Dr. Wang currently holds the Clayton Ayre Professorship and is a Fellow of the International Optics and Photonics Society (SPIE).

Friday, April 1, 2011

237 Scott Engineering Center

1:30-2:30 pm

UNL City Campus

(Refreshments provided)

Host:
Dr. Yongfeng Lu
Department of
Electrical Engineering

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