Electrical & Computer ENGINEERING

SPECIAL SEMINAR

TUESDAY FEBRUARY 5, 2008

Hamerschlag Hall 1112

2:30 p.m.
Refreshments—2:00 p.m.

Dwight L. Woolard
U.S. Army Research Office
Durham. NC

Dr. Dwight L. Woolard manages the U.S. Army Research Laboratory (ARL) – U.S. Army Research Office (ARO) Program on Solid-State & High-Frequency Electronics which emphasizes: (1) THz-Frequency Science & Technology, (2) Nanoelectronic Engineering Science, and (3) Advanced Solid-State Device Concepts. Dr. Woolard presently leads one of the largest U.S. Research Program in THz-Frequency Science & Technology and pioneered the development of THz Spectroscopy for biological agent sensing. Dr. Woolard has been active in the research areas of THz-Frequency Bio-Sensing Science and THz-Frequency Oscillations in Solid-State Tunneling Devices since joining the ARL in 1993. Dr. Woolard is a graduate of North Carolina State University – Raleigh and was elected to IEEE Fellow in 2004 "for leadership in the discovery and development of novel sensing methodologies and advanced electronic devices at terahertz frequencies

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Advanced Architectures for THz Detection of Biological Agents

The U.S. Army Research Office (ARO) and the U.S. Army Edgewood Chemical Biological Center (ECBC) have strategic interests in advancing the state-of-the-art in nanoelectronic engineering towards new research applications that have relevance to national defense and security. Hence, ARO and ECBC have been long-time supporters of terahertz (THz) frequency sensing science and electronic technology as a potentially new long-wavelength counterpart to the more established hyperspectral technological capability. An important driver of this interest are spectroscopic measurements conducted on biological materials and agents which produced spectral features within the THz frequency regime (i.e., ~ 300 GHz to 1000 GHz) that appear to be representative of the internal structure and characteristics of the biological samples under study – e.g., DNA, RNA and bacterial spores. However, the THz spectroscopic approach is problematic in that the spectral features observed from bulk samples of the biological materials tends to be very weak (i.e., ~ 1-5% local variation in spectral absorption) and of limited number within the band (i.e., < 50-100 spectral features). One fundamental approach for avoiding the previously cited limitations is to prescribe novel techniques whereby the THz-frequency absorption signatures could be collected from individual biological molecules at the nanoscale. To this end, ARO and ECBC have launched THz signatures from target bio-molecules. This presentation will overview these teamed research projects that are working towards novel methodologies for THz-frequency sensing and imaging at the nanoscale.

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