

**Joint ECE/CCT/HITP\* Seminar**

**Numerical analysis of light interactions with metallic  
nanosystems for novel device applications**

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**Center for Computation and Technology  
Louisiana State University**

**Friday, May 4, 2007, 10:00 – 11:00 AM  
Room 117 Electrical Engineering Building CEBA**

When light interacts with metallic nanostructures, strong and highly localized near fields can be induced through surface plasmon (SP) excitations. With strong and complex near field interactions, such plasmonic nanosystems have great potential for many photonic device applications. First-principles numerical tools provide invaluable insights about the complex near-field phenomena inherent in such nanophotonic systems. They also can be used to conduct inexpensive feasibility studies of proposed novel device ideas and to optimize device designs prior to fabrication. In this direction, a general concept of computer aided research and development (CARD) will be addressed. We will discuss how CARD can be systematically structured to facilitate photonics researches. Quasi 3-D plasmonic crystals will be presented as an example of this research activity. Next, we will present computer modeling enabled research outcomes with possible device applications: 1) coherent excitations of local SP's for encoding/decoding digitally mastered optical signals, 2) regenerated SP with potential device applications for monitoring DNA binding events, and 3) sub-wavelength scale light redirection by metallic slit waveguides for high density photonic integrated circuits.

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**Everyone is invited to attend**