UNH Materials Science Seminar

11:10-12:00, Thursday, March 8, 2007
Murkland Hall 202, University of New Hampshire

Photoconductors for Affordable Sensors: An Application of Materials Physics

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Man-in-the-loop self-protection systems no longer have the ability to detect, identify, and avoid potential harm due to the short timelines associated with modern threats. The challenge is to develop autonomous sensor systems that can successfully see the unseen, identify potential threats, and provide accurate and affordable threat location to a defensive system. In this presentation, we will discuss the materials issues associated with the development of a new polycrystalline infrared photoconductor-based imager.

Vacuum deposited polycrystalline semiconductor materials have revolutionized modern display and solar cell technologies by providing adequate electronic performance at very low cost. As we learn to overcome the negative electronic aspects associated with randomly oriented semiconductor grains in these thin film materials, the list of applications grows.

Polycrystalline lead selenide and lead sulfide were first employed as infrared detectors in the late 1930's and are

commonly employed for spectrographic instrument and medical applications. Recent requirements for low-cost large-area high-resolution non-cryogenic infrared focal plane arrays has created renewed interest in overcoming the limitations of this thin film technology to produce infrared imagers for both industrial and military applications. During the course of this presentation we will describe our attempts to reinvent this archeological relic to meet these challenges through the application of modern semiconductor materials science.

Dr. Jost received his PhD and MSEE from Princeton University, and MS/BS from M.I.T. He has more than 30 years experience in industrial research and development with emphasis in compound semiconductor physics and electro-optics. He was responsible for development efforts in compound semiconductor optoelectronic devices including infrared focal plane arrays (IRFPAs), flat panel displays and solar cells. He managed the team that demonstrated the first successful cadium telluride passivated mercury cadmium telluride detectors in the USA, and participated in development of production CdTe passivation processes at Texas Instruments (now DRS Technologies) and at BAE Systems. He also led the development effort of two-color uncooled focal plane technology for low-cost missile warning sensors.