

**Electro-Optics
and
Electrical & Computer Engineering**

Distinguished Speaker Colloquia Series

**Seduced and Murdered:
*an optical suspense***

*Akhlesh Lakhtakia
Penn State University*

**Zinc Oxide:
*sunscreen, electronics, plasmonics***

*David Look
Wright State University*

Friday, Nov 14, 2014, 3 pm KL 304

Refreshments are available at 2:45 pm

Seduced and Murdered: *an optical suspense*

Bioinspiration, biomimetics, and bioreplication constitute a progression of concepts and practices in the area of engineered biomimicry. The goal in bioinspiration is to reproduce a biological function but not necessarily the biological structure. Biomimetics is the replication of the functionality of a biological structure by approximately reproducing an essential feature of that structure. Bioreplication is the direct replication of a structure found in natural organisms, and thereby aims at copying one or more functionalities. After exemplifying these concepts, I promise to relate an optical tale of intrigue, but will not deflate the suspense in this abstract.

Akhlesh Lakhtakia, Fellow, OSA, SPIE, AAAS, IoP, APS, is the Charles Godfrey Binder (Endowed) Professor of Engineering Science and Mechanics at the Pennsylvania State University. Preferring to retain a modicum of anonymity even in the internet age, he has managed to publish enough journal papers and educate enough students that the Pennsylvania State University has continuously employed him for 31 years.

Zinc Oxide: *sunscreen, electronics, plasmonics*

ZnO is an old material, but keeps reinventing itself as new applications come to mind. Used traditionally for sunscreen, it evoked new interest as a potential large-area substrate for GaN-based LEDs, laser diodes, and microwave transistors, as a UV LED, and more recently as cheaper transparent electrodes, which are used in nearly all solar cells. Another new application is the formation and processing of light/plasmon waves in electronic circuits. Although Ag and Au are used for visible wavelengths, gallium zinc oxide (GZO) is a good candidate for near IR. Both the transparent electrode and plasmonic applications involve thin GZO films grown on lattice-mismatched substrates such as Si, and we will discuss new ways of characterizing and improving such films.

David C. Look, Fellow APS, is Senior Research Physicist and Director of the Semiconductor Research Center at Wright State University, Dayton, Ohio. He has carried out extensive electrical, optical, and magnetic resonance studies of many compound semiconductors, most recently ZnO and GaN. He has authored one textbook and over 500 journal articles. He received William Fowler award from APS in 2014.