



UNIVERSITY OF  
**GEORGIA**  
College of Engineering

2017-2018  
**Lecture  
Series**



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Statler College of Engineering and  
Mineral Resources  
West Virginia University

## *Multi-spectral Face Imaging: From Human Identification to Physiology and Beyond*

### **ABSTRACT**

Among the most insidious problems of visible-spectrum based FR algorithms are (1) the variation in level and nature of illumination, (2) the fact that as the level of illumination decreases, the signal to noise ratio rises quickly, and thus automatic processing and recognition become very difficult, (3) dealing with severely degraded face images. In order to address these issues recent research has moved into (a) the use of infrared (IR) imagery (e.g., intensified near infrared (NIR), Short Wave IR, Middle/ Long Wave IR - thermal), and (b) the development of techniques that can eliminate the noise present in degraded images, and restore their quality before matching. In the first part of the presentation, the latest research efforts on Multi-spectral FR will be discussed. Then, the presentation will go one step further and the importance of using passive sensing to monitoring the human face, and capitalize upon the permanency of innate facial characteristics that are under the skin will be presented. It will be shown that by exploiting the continuous (facial-based) physiological patterns, using the bioheat information contained in thermal imagery, an accurate, contact-free, cardiac pulse measurement capability is achieved. The presentation will conclude with a discussion on an approach developed that is focused on quantifying stress by measuring transient perspiration-based responses (indicator of stress processes in the brain) on the peri-nasal area through thermal imaging.

**FRIDAY**  
**FEBRUARY 19, 2018**

**NOON - 1:30 P.M.**

**COVERDELL CENTER**  
**AUDITORIUM**  
**(Room 175)**

### **BIOGRAPHY**

Thirimachos Bourlai is an associate professor in the Lane Department of Computer Science and Engineering at WVU. He also serves as an adjunct assistant professor in the WVU School of Medicine, Department of Ophthalmology, and the Department of Forensic and Investigative Science. He is the founder and director of the Multi-Spectral Imagery Lab at WVU. Bourlai earned his Ph.D. in face recognition and completing a post-doctoral appointment at the University of Surrey (U.K.).

The primary focus of Bourlai's research is on designing and developing technology for supporting, confirming and determining human identity in challenging conditions using primarily face images, captured across the imaging spectrum (including ultraviolet, visible, near-infrared, short-wave IR, mid-wave IR and long-wave IR).