Electrical & Computer ENGINEERING **SEMINAR**

Thursday, April 2

Scaife Hall Auditorium
Room 125
4:30 p.m.
Refreshments at 4:00 p.m.

Professor Scott Acton

University of Virginia
ECE and Biomedical Engineering

Scott Acton is Professor of Electrical & Computer Engineering and of Biomedical Engineering at the University of Virginia. He received his M.S. and Ph.D. degrees at the University of Texas at Austin. He received his B.S. degree at Virginia Tech.

Professor Acton's laboratory at UVA is called **VIVA - Virginia Image and Video Analysis**. They specialize in image analysis problems and are sponsored by the NSF, the NIH, the NRO, and the ARO among others. The research emphasis of VIVA is video tracking and segmentation. Video surveillance and content based image and video retrieval are current topics of interest in the laboratory. Professor Acton has over 200 publications in the image analysis area including the recent book *Biomedical Image Analysis: Tracking* and the sequel *Biomedical Image Analysis: Segmentation*. He has served as General Chair of the Asilomar Conference on Signals, Systems and Computers and as keynote speaker at the International Conference on Machine Vision and Image Processing this year. A few of his awards include the Eta Kappa Nu Outstanding Young Electrical Engineer award (national), the Outstanding New Teacher award at UVA, and the Walter N. Munster Chair for Intelligence Enhancement at UVA.

Professor Acton has been at the University of Virginia since 2000. Before that time, he worked in the academic world for Oklahoma State University and in the engineering world for AT&T, Motorola and the Mitre Corporation.

Biomedical Image Analysis at the Cellular Level

The **future of biomedical image analysis** is no longer in anatomical imaging but in imaging of pathways and mechanisms at the cellular level and below. In this talk I present **image analysis techniques for rolling leukocytes observed *in vivo***. Rolling leukocytes are activated white blood cells. The motion, shape, flux, number and position of these cells are important indicators of the inflammatory process. Measuring image-derived parameters are vital to validating anti-inflammatory drugs and to understanding the basic mechanism of inflammatory diseases such as atherosclerosis and arthritis. To date, these image features are typically derived manually due to the difficulty associated with intravital image clutter, noise, occlusion, instability, poor contrast, contrast changes and shape deformation.

The first part of the talk details **tracking methods** used for rolling leukocytes. These are divided into two categories: **active contour approaches and particle filter approaches**. The second portion of the talk focuses on **novel cell detection methods for intravital microscopy**. The methods include the gradient inverse coefficient of variation (GICOV) technique and the more recent Poisson inverse gradient approach. For both detection and tracking, real video data examples show the efficacy of the developed techniques.

New directions in cellular image analysis are discussed including high content screening and future work in image analysis for systems biology.

ECE Seminar Hosts

Yi Luo y1827@andrew.cmu.edu
Marios Savvides marioss@andrew.cmu.edu
Bruno Sinopoli brunos@andrew.cmu.edu

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