



**Department of
Electrical and Computer Engineering**

SEMINAR

Speaker
Dr. Karim Karim
School of Engineering Science
Simon Fraser University
Invited By: Prof. Andrei Sazonov

Topic
**Intelligent pixel architectures for digital imaging
applications**

Date
Monday, November 20, 2006

Time
11:00am – 12:00pm
EIT 3142

Room
ALL ARE WELCOME!
Please see attached abstract.

Intelligent pixel architectures for digital imaging applications

Large area, flat panel digital x-ray imagers provide benefits such as tele-diagnosis, immediate viewing of radiographs, convenient computer storage and portability due to the compact nature of flat panel technology. Amorphous silicon (a-Si) active matrix flat panel imagers (AMFPI) based on thin-film transistor (TFT) switch based pixels comprise the majority of large area digital imagers today and find application in static, diagnostic X-ray imaging modalities such as chest radiography and mammography. The primary hurdles to the widespread adoption of large area digital imaging technology are cost and manufacturing complexity. This talk focuses on on-going research at the Silicon Thin-film Applied Research (STAR) laboratory to overcome these hurdles by developing pixel architectures that perform increasingly sophisticated functions at the pixel level and provide new functionality while using industry standard fabrication processes. Here, we introduce (1) high dynamic range multi-mode pixel architectures, (2) high resolution, two-transistor pixel amplifiers, (3) low noise, on-pixel voltage controlled oscillators and (4) low dose, selective photon counting pixels. These novel pixel technologies are poised to usher in a new generation of large area digital imagers to enable emerging imaging modalities such as dual mode Radiography/Fluoroscopy (R/F) applications, 3-D mammography tomosynthesis, multi-slice Computed Tomography and Palladium Breast Seed Implantation (PBSI) imaging for breast cancer treatment.

Biography

Karim S. Karim received his Ph.D. (electrical engineering) from the University of Waterloo (Canada) and joined the School of Engineering Science at Simon Fraser University in January 2003 as an Assistant Professor. His research group, Silicon Thin-film Applied Research (STAR) focuses on developing circuit, device, and fabrication processes in silicon semiconductor technology for large area digital imaging applications. He has published over 70 articles in journals and conferences including IEEE Electron Device Letters, IEEE Transactions on Electron Devices, and the IEEE International Electron Devices Meeting. Dr. Karim has received three national awards in Canada for his contributions to the field of large area electronics and medical imaging: the NSERC Doctoral Prize, the CAGS-UMI Distinguished Dissertation award, and the Douglas Colton medal. Recently, he was a co-recipient of the 2004 IEE Institution Premium Best Journal Paper Award, two Best Poster awards at the SPIE International Medical Imaging Symposium (in 2004 and 2006), and the 2006 Best Paper award at the 18th Canadian Medical and Biological Engineering Society conference.