**The IEEE South Alberta Section's Computer Society
presents a seminar titled:**

Model-Driven Embedded Software Generation: A Generative Approach to Safety

Speaker: Dr. Sandeep K. Shukla
Associate Professor, Virginia Tech. University, USA
An IEEE Distinguished Speaker

Monday, August 2, 2010 @ 3-5 PM

LOCATION: ICT 516, University of Calgary
(For the campus map and parking locations, please see www.ucalgary.ca/map)

COST: Free to everyone. Refreshments will be served.

Abstract:

Avionics, automotive, power plant control, and many other safety-critical embedded systems require safe, predictable, and statically analyzable software. Moreover, as the complexity of these applications mounts, performance and safety both become increasingly important. This increasing performance requirement drives the current market trend of multi-core processors (single chip multiprocessors) in the desktop market. However, recently embedded processors have started to surface with multiple homogeneous or heterogeneous cores. Multi-threaded or concurrent applications seem to be the best way to exploit these available parallel processing resources.

Those with any experience with multi-threaded programming would admit that design and implementation of multi-threaded programs is extremely difficult and prone to subtle concurrency and synchronization bugs, even without the use of advanced techniques such as speculative threading, or wait-free synchronization etc are.

In this talk, first, we elaborate on multi-rate specification formalism Polychrony. Then we explain the difficulties of deterministic and semantics preserving code generation from such specifications. Then we discuss endochrony, inadequacy of which leads to the weak endochrony concept, and how this provides a sufficient condition for safe multi-threaded code generation. Finally, we discuss future directions in our work on deterministic multi-threaded code generation for safety-critical applications.

Speaker's Biography:

Sandeep K. Shukla is an associate professor of computer engineering at Virginia Tech. He is also a founder and deputy director of the center for embedded systems for critical applications (CESCA), and director of his research lab FERMAT. Sandeep was awarded the Presidential Early Career Award for Science at Engineering (PECASE) award for his research in design automation for embedded systems design, which in particular focuses on system level design languages, formal methods, formal specification languages, probabilistic modeling and model checking, dynamic power management, application of stochastic models and model analysis tools for defect-tolerant system design, and reliability measurement of defect-tolerant systems. Sandeep has published more than 125 articles in journals, books and conference proceedings. Sandeep co-authored three research monographs, and four edited volumes. Sandeep is a senior member of IEEE and ACM. He is also an IEEE Computer Society Distinguished visitor, and an ACM distinguished speaker.

Seminar Coordinator:

Dr. Vahid Garousi, PEng, vgarousi@ucalgary.ca, Computer Society Chair of the IEEE South Alberta Section. For more information, visit: http://sas.ieee.ca/computer

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