



The Engineering in Medicine and Biology Society Chapter of the
IEEE Southern Alberta Section

Biomedical Engineering Graduate Program and the

Centre for Bioengineering Research and Education

Invite you to a Seminar on

**FUNDUS IMAGE ANALYSIS FOR RETINOPATHY USING
SIGNAL PROCESSING AND MACHINE LEARNING**

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ICT 516, INFORMATION AND COMMUNICATION TECHNOLOGIES BUILDING

ABSTRACT: This talk will present approaches to analyze fundus images for retinopathy using signal processing and machine learning approaches. Two novel approaches will be presented for vessel segmentation of fundus images. One approach is based on a two-step method where the major vessel is first extracted. The remainder subimage is segmented next using a Gaussian Mixture Model (GMM) classifier. In yet another approach, the vessels are extracted using an iterative approach. An adaptive stopping criterion is proposed for terminating the iterative vessel segmentation. An approach to detect the vessel origin and the optic disc boundary will be described next. The talk will end with a tool for diabetic retinopathy screening (DREAM) developed at the University of Minnesota. The DREAM tool relies on a two-step hierarchical classification approach. This talk describes the speaker's joint work with his colleagues Sohini Roychowdhury, Ph.D., and Dara D. Koozekanani, M.D., Ph.D.

Keshab K Parhi is Edgar F. Johnson Professor and a Distinguished McKnight University Professor in the Electrical & Computer Engineering department at the University of Minnesota. His current research interests include: architecture design of signal and image processing systems, error control coders, stochastic computing, hardware security, molecular computing, and biomedical/health informatics. He has published over 550 papers, is the inventor/coinventor of 29 issued US patents, and is the author of the text book "VLSI Digital Signal Processing Systems: Design and Implementation" (Wiley, 1999). He has received numerous awards including the 2013 Distinguished Alumnus award from the Indian Institute of Technology, Kharagpur, the 2012 Charles A. Desoer Technical Achievement award from the IEEE Circuits and Systems society, the 2004 F.E. Terman award from the American Society of Engineering Education, and the 2003 IEEE Kiyo Tomiyasu Technical Field Award. He was elected a Fellow of IEEE in 1996.