KEYNOTE TALK
Wednesday, December 3, 2008
8:30 AM – 9:30 AM / Ballroom 4-5

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Virtual Colonoscopy for Colon Cancer Screening

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Abstract

A combination of computed tomography (CT) scanning and volume visualization technology, called *virtual colonoscopy* (VC), is rapidly gaining popularity. VC is poised to become the procedure of choice in lieu of the conventional optical colonoscopy (OC) for mass screening for colon polyps – the precursor of colorectal cancer. The patient abdomen is imaged in a few seconds by a helical CT scanner. A 3D model of the colon is then reconstructed from the CT scan by automatically segmenting the colon and employing "electronic cleansing" for computer-based removal of the residual material. VC allows the physician to interactively navigate through the colon using volume rendering. An intuitive user interface with customized tools supports 3D measurements, "virtual biopsy" to inspect suspicious regions, and "painting" to help in visualizing 100% of the colon surface. Unlike OC, VC is patient friendly, fast, non-invasive, more accurate, cost-effective procedure for mass screening of polyps. Our VC further incorporates a novel pipeline of computer-aided detection (CAD) of polyps. It automatically detects polyps by integrating volume rendering, conformal colon flattening, clustering, and texture/shape analysis. Along with the reviewing physician, CAD provides a second pair of "eyes" for locating polyps.

Speaker Bio-Sketch: Arie Kaufman is the Chair of the Computer Science Department, Director of the Center of Visual Computing (CVC), Chief Scientist of the Center of Excellence in Wireless and Information Technology (CEWIT), and Distinguished Professor of Computer Science and Radiology at Stony Brook University. He has conducted research for over 35 years in visualization, graphics, user interfaces and VR and their applications, primarily in biomedicine. He is an *IEEE Fellow* and recipient of I*EEE Visualization Career Award* ('05). He was further awarded the IEEE Outstanding Contribution ('95), ACM Service ('98), IEEE CS Meritorious Service ('99), State of New York Entrepreneur ('02), IEEE Harold Wheeler ('04), and State of New York Innovative Research ('05), and is a member European Academy of Sciences (from '02). He was founding Editor-in-Chief of *IEEE Transactions on Visualization & Computer Graphics (TVCG)*, '95-'98. He has been co-founder, papers/ program co-chair, and steering committee member of *IEEE Visualization Conferences*; co-founder/chair of *Volume Graphics Workshops*; co-chair of *Eurographics/SIGGRAPH Graphics Hardware Workshops*; and papers/program co-chair of *ACM Volume Visualization Symposia*. He has been chair and director of IEEE CS Technical Committee on Visualization & Graphics (VGTC). He received BS ('69) in Math/Physics from Hebrew University, MS ('73) in Computer Science from Weizmann Institute, and PhD ('77) in Computer Science from Ben-Gurion University, Israel.