3-D Virtual Colonoscopy Portfolio

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“By offering the capability to screen lots of people quickly, easily, inexpensively and non-invasively, the virtual colonoscopy can change the way people throughout the world view colorectal screening and start to save thousands of lives worldwide through early detection and treatment”, says Dr. Ari Kaufman, the technology’s team director.

Background: Colorectal cancer is a leading cause of cancer-related deaths worldwide and claims over a half million men and women annually, according to the World Health Organization. This cancer burden can be decreased if cases are detected and treated early. Unfortunately, most individuals over the age of 50 avoid the unpleasant and invasive tests that can screen for colorectal cancer and precancerous growths – until now.

Technology Description: A new 3-D Virtual colonoscopy, also known as computerized tomographic (CT) colonography, is changing the way people view colorectal screening. It is expected to become more commonly used than conventional optical colonoscopy thanks to its non-invasive nature.

This safe, fast and cost effective procedure is based on patented diagnostic 3-D imaging software, techniques and computer systems developed by a Stony Brook University research team led by inventor, Arie E. Kaufman, a Distinguished Professor and Chairman of the Department of Computer Science who pioneered the field of “volumetric representation”. Unlike an ordinary 2-D computer image, a 3-D volumetric representation is a stack of 2-D images laid on top of each other forming a continuous 3-D space. Development of volumetric representation, which was funded by the National Science Foundation, has led to a number of advances in software for graphics display and graphics acceleration hardware.

In the case of 3-D Virtual Colonoscopy, approved for use in the United States by the Food and Drug Administration, this innovative computer graphics technology compiles the CT images together into a high quality 3-D computerized image of the colon so a physician can see 100 percent of its surface versus the estimated 77 percent that can be seen during a conventional colonoscopy.

Applications: To date, more than 100 potentially lifesaving 3-D Virtual Colonoscopy systems have been used in the United States to screen thousands of patients. In 2008, two major CAT scan manufacturers, including Siemens Healthcare of Germany, signed non-exclusive licenses for the portfolio of innovations developed by Professor Kaufman and his team.

Advantages: After the pictures of the colon are collected by the CT scanner, a radiologist can actually “fly through” the patient’s ‘virtual colon’, from beginning to end and around all folds, thoroughly searching for polyps that are as small as a few millimeters. By contrast, a conventional colonoscopy uses a long, lighted flexible tube, called a colonoscope, that is used to view the inside of the colon. With the conventional procedure, patients are required to be sedated, unlike that of the virtual colonoscopy.

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