Quantitative blood flow imaging with laser speckle

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ABSTRACT
Many optical techniques have been developed for real-time imaging of blood flow. Laser speckle contrast imaging has become one of the most widely used techniques due to its simple instrumentation and its ability to visualize blood flow over a wide range of spatial scales. However, obtaining quantitative blood flow information remains a challenge for laser speckle imaging. Recently, an extension to laser speckle imaging, called Multi-Exposure Speckle Imaging (MESI), was introduced that increases the quantitative accuracy of CBF images. This talk will describe technical developments in laser speckle imaging as well as new methods for three-dimensional visualization of blood vessels and neurons that can be used to improve our understanding of blood flow measures inferred from speckle images.

BIO
Andrew Dunn is a professor of biomedical engineering and the Edward S. Hyman Endowed Chair in Engineering at The University of Texas at Austin (UT Austin) and the director of the Center for Emerging Imaging Technologies. He received his undergraduate degree in physics from Bates College and his doctorate in biomedical engineering from UT Austin. Dr. Dunn was a postdoctoral fellow at the Beckman Laser Institute at the University of California at Irvine and served on the faculty at Harvard Medical School from 2000-05, where he developed laser-based methods for functional brain imaging. In 2005, he joined the Department of Biomedical Engineering at UT Austin and served as interim chair of the department in 2015-16. He was a visiting professor at Institut Langevin at Université Pierre et Marie Curie in Paris in 2016. Dr. Dunn is a fellow of the American Institute for Medical and Biological Engineering and has received numerous awards, including the Peter and Edith O’Donnell Award, The University of Texas Regents’ Outstanding Teaching Award, the American Heart Association Established Investigator Award, a National Science Foundation CAREER Award, a Wallace Coulter Foundation Translational Research Award, a Dana Foundation Brain and Immunoiaging Award, a Whitaker Foundation Scientist Development Award, and a National Institutes of Health Career Development Award.