R•I•T College of Science

Chester F. Carlson Center for IMAGING SCIENCE

Seminar Series

Shells: A New Data Acquisition Method for 3D MRI

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Rochester, Minnesota

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Auditorium of the Center for Imaging Science

Magnetic Resonance (MR) angiography images blood vessels without the ionizing radiation associated with x-ray or CT. There are many different ways to acquire and process 3D MR image data to obtain angiograms. One popular method is called contrast-enhanced MR angiography (CE-MRA), which will be reviewed. A new MRI acquisition method for CE-MRA based on a shells trajectory is then described. The shells method allows under-sampling to accelerate the data acquisition, and retrospective motion correction. High spatial resolution CE-MRA images of the arteries of the neck can be obtained with shells MRI, while suppressing the unwanted signal from surrounding veins.

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Speaker Bio

Matt Bernstein received a B.S. degree from SUNY-Binghamton in mathematical physics in 1980, and a doctorate in theoretical nuclear physics from the University of Wisconsin-Madison in 1985. He then switched fields to medical physics, starting with a two-year postdoctoral fellowship in the Radiology Department at Madison, followed by an 11-year stint at GE Medical Systems in Milwaukee, WI. There he worked in computer engineering on MRI data acquisition software, and then later in R&D as a senior physicist in the Applied Science Lab. Since 1998 he has been on staff at the Mayo Clinic as a clinical medical physicist and a researcher in the Department of Radiology. He co-teaches graduate level courses in MRI and mathematical methods.

His main research interests include MRI engineering methods and their clinical applications including angiography, high-field imaging, and neuroscience. He was a Whitaker investigator from 2001-2004, and recently developed the imaging protocol for the ADNI multi-center study. He reviews for 8 journals, and serves on the Editorial Board for the journals Magnetic Resonance Engineering and Magnetic Resonance in Medicine. He has published more than 50 journal articles and holds over 30 U.S. patents. He is co-author of the Handbook of MRI Pulse Sequences, and is a member of the APS, AAPM, and ISMRM.

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