

Research Activities and Interests

Collaborative research work with companies and institutions including:

Maxentric Technologies, Fort Lee, NJ
InDorse Technologies, New York, NY
Weill-Cornell Medical College, New York, NY
NASA Ames Research Center, Palo Alto, CA
Stevens Institute of Technology, Hoboken, NJ

Projects include:

Radar imaging.

DSP algorithms for radar and wideband beamforming implemented on advanced processors (FPGA, multi-core).

Feature extraction and pattern classification for large data sets.

Multi-channel MRI receiver design: processing of multidimensional signals with non-uniform sampling patterns; electromagnetic analysis.

Image processing using wavelets and PDE methods.

Remote geo-sensing: analysis of large data sets of partially polarized light reflected off plant canopies, employing SVD.

Robust signal processing and passivity theory.

Papers

J. H. Kim, F. L. Fontaine, "MR Image Reconstruction from Pseudo-Hex Lattice Sampling Patterns Using Separable FFT," Proc. 2007 ICSIE Conf., London, UK, 2007.

I. Dalal, F. L. Fontaine, "Economical Multichannel Integrated Receiver / Reconstruction System for MRI," Proc. 2006 IEEE/NLM LSSA Conf., Washington, DC, 2006.

O. Agrawal, F. L. Fontaine, "Beyond Team Teaching: Coordinating Mathematics and Electrical Engineering Curricula," Proc. 2005 Annual ASEE Conf., Portland, OR, 2005.

F. L. Fontaine, "Student Ownership of Education Plans: The New Electrical Engineering Curriculum at The Cooper Union," Proc. 2005 Annual ASEE Conf., Portland, OR, 2005.

F. L. Fontaine, S. Basu, "The Partial Realization Problem for Complex Hamburger Series and Complex Lossless Multiport Networks," IEEE Trans. on CAS I, vol. 45, no. 1, pp. 161-177, 1999.

F. L. Fontaine, S. Basu, "Wavelet Based Solution to Anisotropic Diffusion Equation for Edge Detection," *Int. J. Imag. Sys & Tech.*, vol. 9, no. 5, p. 356-368, 1998.