

Jeff Fessler, PhD



Medical Imaging Inverse Problems Using Optimization and Machine Learning

Monday October 8, 2018 4:30PM in 1123 LBME

Medical imaging systems like X-ray CT and MRI scanners produce raw data that must be processed by inverse problem solvers to yield interpretable images. The design of the image reconstruction algorithm can greatly affect image quality, and hence diagnostic accuracy, affecting patient health and even safety. This talk will briefly mention summarize some of the health and safety aspects of medical imaging and then focus on how optimization algorithms and machine learning methods can influence image quality.

Joint work with Sai Ravishankar, Il Yong Chung, and Raj Nadakuditi, among others.

Jeff Fessler is the William L. Root Professor of EECS at the University of Michigan. He received the BSEE degree from Purdue University in 1985, the MSEE degree from Stanford University in 1986, and the M.S. degree in Statistics from Stanford University in 1989. From 1985 to 1988 he was a National Science Foundation Graduate Fellow at Stanford, where he earned a Ph.D. in electrical engineering in 1990. He has worked at the University of Michigan since then. From 1991 to 1992 he was a Department of Energy Alexander Hollaender Post-Doctoral Fellow in the Division of Nuclear Medicine. From 1993 to 1995 he was an Assistant Professor in Nuclear Medicine and the Bio-engineering Program. He is now a Professor in the Departments of Electrical Engineering and Computer Science, Radiology, and Biomedical Engineering. He became a Fellow of the IEEE in 2006, for contributions to the theory and practice of image reconstruction. He received the Francois Erbsmann award for his IPMI93 presentation, and the Edward Hoffman Medical Imaging Scientist Award in 2013. He has served as an associate editor for IEEE Transactions on Medical Imaging, the IEEE Signal Processing Letters, and the IEEE Transactions on Image Processing, and is currently serving as an associate editor for the IEEE Transactions on Computational Imaging. He has chaired the IEEE T-MI Steering Committee and the ISBI Steering Committee. He was co-chair of the 1997 SPIE conference on Image Reconstruction and Restoration, technical program co-chair of the 2002 IEEE International Symposium on Biomedical Imaging (ISBI), and general chair of ISBI 2007. His research interests are in statistical aspects of imaging problems, and he has supervised doctoral research in PET, SPECT, X-ray CT, MRI, and optical imaging problems.

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