Eric Gibbons

CONTACT
INFORMATION

Department of Electrical and Computer Engineering
Weber State University
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Ogden, Utah 84408

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RESEARCH
INTERESTS

My research interests are in magnetic resonance physics and image formation with the aim of improving the quality of magnetic resonance imaging (MRI). This work spans MR physics, biophysics, RF pulse design, image reconstruction algorithms, machine learning, and clinical implementation, all with the purpose of advancing human health care.

EDUCATION

Stanford University, Stanford, California, USA

Ph.D., Bioengineering, June 2017
- Minor: Electrical Engineering
- Advisor: John Pauly
- Thesis: Robust body diffusion-weighted magnetic resonance imaging

M.S., Bioengineering, June 2013
- Concentration: Medical imaging and signal processing

University of Utah, Salt Lake City, Utah, USA

B.S., Biomedical Engineering, May 2011
- Concentration: Medical imaging and signal processing
- Minor: Mathematics
- Thesis: Correlation-based retrospective concatenation of multi-volume 3D microCT data

ACADEMIC
POSITIONS

Weber State University, Ogden, Utah USA

Assistant Professor, Department of Electrical and Computer Engineering, 2019–Present

University of Utah, Salt Lake City, Utah USA

Postdoctoral Research Associate, Department of Radiology, 2017–2019

AWARDS

- NIH T32 Cardiovascular Imaging Training Grant, 2017
- ISMRM Educational Stipend Award, 2013, 2014, 2015, 2016
- National Science Foundation Graduate Fellowship, 2012
- Stanford University School of Engineering Dean's Doctoral Diversity Fellowship, 2011
- University of Utah College of Engineering Arel Berrier Scholarship, 2010
- University of Utah Presidential Scholarship, 2005 - 2011
- Member of Tau Beta Pi, 2009 - Present
- Eagle Scout, 2003

PUBLICATIONS

[1] **E. K. Gibbons**, Y. Tian, A. S. Chaudhari, and E. V. R. DiBella, "Rapid STCR cardiac perfusion reconstruction using convolutional neural networks," *Magnetic Resonance in Medicine*, in preparation for submission in August 2021.

[2] A. S. Chaudhari, K. J. Stevens, J. P. Wood, A. K. Chakraborty, **E. K. Gibbons**, Z. Fang, A. D. Desai, J. H. Lee, G. E. Gold, and B. A. Hargreaves, "Utility of deep learning super-resolution in the context of osteoarthritis MRI biomarkers," *Journal of Magnetic Resonance Imaging*, 2019.

[3] **E. K. Gibbons**, K. K. Hodgson, A. S. Chaudhari, L. G. Richards, J. J. Majersik, G. Adluru, and E. V. DiBella, "Simultaneous NODDI and GFA parameter map generation from subsampled q-space imaging using deep learning," *Magnetic Resonance in Medicine*, vol. 81, no. 4, pp. 2399–2411, 2019.

[4] A. S. Chaudhari, Z. Fang, F. Kogan, J. Wood, K. J. Stevens, **E. K. Gibbons**, J. H. Lee, G. E. Gold, and B. A. Hargreaves, "Super-resolution musculoskeletal MRI using deep learning," *Magnetic Resonance in Medicine*, vol. 80, no. 5, pp. 2139–2154, 2018.

[5] **E. K. Gibbons**, S. S. Vasanawala, J. M. Pauly, and A. B. Kerr, "Body diffusion-weighted imaging using magnetization prepared single-shot fast spin echo and extended parallel imaging signal averaging," *Magnetic Resonance in Medicine*, vol. 79, no. 6, pp. 3032–3044, 2018.

[6] **E. K. Gibbons**, P. Le Roux, S. S. Vasanawala, J. M. Pauly, and A. B. Kerr, "Robust self-calibrating nCPMG aquisition: Application to body diffusion-weighted imaging," *IEEE Transactions on Medical Imaging*, vol. 37, no. 1, pp. 200–209, 2018.

[7] **E. K. Gibbons**, P. Le Roux, J. M. Pauly, and A. B. Kerr, "Slice profile effects on nCPMG SS-FSE," *Magnetic Resonance in Medicine*, vol. 79, no. 1, pp. 430–438, 2018.

[8] **E. K. Gibbons**, P. Le Roux, S. S. Vasanawala, J. M. Pauly, and A. B. Kerr, "Body diffusion weighted imaging using non-CPMG fast spin echo," *IEEE Transactions on Medical Imaging*, vol. 36, no. 2, pp. 549–559, 2017.

CONFERENCE PROCEEDINGS

[1] **E. K. Gibbons**, A. S. Chaudhari, G. Adluru, and E. V. R. DiBella, "Rapid myocardial perfusion mri reconstruction using deep learning networks," in *Proceedings of International Society for Magnetic Resonance in Medicine, 27th Annual Meeting, Sydney, Australia*, 2020, p. 7047.

[2] **E. K. Gibbons**, K. K. Hodgson, A. S. Chaudhari, L. G. Richards, J. J. Majersik, G. Adluru, and E. V. R. DiBella, "Deep learning for DSI parameter map generation without image pre-processing," in *Proceedings of International Society for Magnetic Resonance in Medicine, 27th Annual Meeting, Montreal, Canada*, 2019, p. 3359.

[3] A. S. Chaudhari, Z. Fang, **E. K. Gibbons**, J. H. Lee, G. E. Gold, and B. A. Hargreaves, "Super-resolution enhances morphological and quantitative MRI on prospectively-sampled low-resolution data," in *Proceedings of Medical Imaging Meets NIPS, 32nd Conference on Neural Information Processing Systems, Montreal, Canada*, 2019.

[4] A. S. Chaudhari, Z. Fang, F. Kogan, J. Wood, K. J. Stevens, **E. K. Gibbons**, J. H. Lee, G. E. Gold, and B. A. Hargreaves, "Using artificial intelligence to enhance MRI efficiency for imaging OA," in *International Workshop on Osteoarthritis Imaging, Menton, France*, 2018.

[5] E. V. R. DiBella, **E. K. Gibbons**, J. Mendes, Y. Tian, and G. Adluru, "Using artificial intelligence to transform cardiac MRI reconstruction methods," in *Engineering in Medicine and Biology Society (EMBC), 2018 Annual International Conference of the IEEE*, 2018.

[6] **E. K. Gibbons**, A. S. Chaudhari, and E. V. DiBella, "Deep slice: expanding cardiac SMS coverage through deep learning slice interpolation," in *Proceedings of International Society for Magnetic Resonance in Medicine, 26th Annual Meeting, Paris, France*, 2018, p. 3514.

[7] A. S. Chaudhari, Z. Fang, F. Kogan, J. Wood, K. J. Stevens, **E. K. Gibbons**, J. H. Lee, G. E. Gold, and B. A. Hargreaves, "Enhancing MRI resolution and fully-automating tissue segmentation using deep learning," in *Proceedings of the Nvidia GPU Technology Conference (GTC), San Jose, California, USA*, *Best poster award.

[8] **E. K. Gibbons**, A. S. Chaudhari, and E. V. R. DiBella, "Expanding SMS coverage in cardiac perfusion MRI through deep learning for temporal interpolation," in *Proceedings of the ISMRM Workshop on Machine Learning, Pacific Grove, California, USA*, 2018.

[9] A. S. Chaudhari, Z. Fang, F. Kogan, J. Wood, K. J. Stevens, **E. K. Gibbons**, J. H. Lee, G. E. Gold, and B. A. Hargreaves, "Deep-learning-based super-resolution and segmentation for clinical and research musculoskeletal MRI," in *Proceedings of the ISMRM Workshop on Machine Learning, Pacific Grove, California, USA*, 2018.

[10] **E. K. Gibbons**, P. LeRoux, S. Vasanawala, J. M. Pauly, and A. B. Kerr, "Robust nCPMG SS-FSE with accelerated acquisition and reconstruction," in *Proceedings of International Society for Magnetic Resonance in Medicine, 25th Annual Meeting, Honolulu, Hawaii*, 2017, p. 3514.

[11] **E. K. Gibbons**, J. M. Pauly, and A. B. Kerr, "Slice profile effects on non-CPMG SS-FSE acquisitions," in *Proceedings of International Society for Magnetic Resonance in Medicine, 24rd Annual Meeting, Singapore, Singapore*, 2016, p. 1894.

[12] **E. K. Gibbons**, S. S. Vasanawala, J. M. Pauly, and A. B. Kerr, "Body DWI using nCPMG FSE," in *Proceedings of International Society for Magnetic Resonance in Medicine, 23rd Annual Meeting, Toronto, Canada*, 2015, p. 2540.

[13] **E. K. Gibbons**, J. M. Pauly, and A. B. Kerr, "Single-shot isotropic diffusion weighting with eddy current compensation," in *Proceedings of International Society for Magnetic Resonance in Medicine, 22nd Annual Meeting, Milan, Italy*, 2014, p. 2559.

[14] **E. K. Gibbons**, J. M. Pauly, M. Saranathan, B. Rutt, and A. B. Kerr, "A T2-diffusion-prepared cube sequence for brain lesion detection at 7T," in *Proceedings of International Society for Magnetic Resonance in Medicine, 21st Annual Meeting, Salt Lake City, Utah, USA*, 2013, p. 2512.

[15] **E. K. Gibbons**, S. J. Holdsworth, M. Aksoy, M. B. Ooi, and R. Bammer, "Analysis of ghosting artifacts for real-time motion correction using EPI," in *Proceedings of International Society for Magnetic Resonance in Medicine, 20th Annual Meeting, Melbourne, Australia*, 2012, p. 3431.

[16] C. Petty, **E. K. Gibbons**, R. A. Normann, and G. A. Clark, "Containment for the Utah Slanted Electrode Array," in *5th Annual Mountain West Biomedical Engineering Conference*, 2009.

INVITED TALKS

- *Reviewing LTI systems and convolution*, Department of Engineering, Weber State University, February 5, 2019
- *Deep learning applications for MRI data acquisition and reconstruction*, NIH Biomedical Data Science Summer School, University of Utah, July 31, 2018

TEACHING EXPERIENCE

Weber State University, Department of Electrical and Computer Engineering

ECE 1270: Introduction to Electrical Circuits
ECE 1400: Fundamentals of Engineering Computing
ECE 2260: Fundamentals of Electrical Circuits
ECE 3210: Signals and Systems
ECE 5210: Digital Signal Processing
ECE 5220: Image Processing

Stanford University, Department of Electrical Engineering

EE 102A: Signals and Systems (Instructor of record and TA)
EE 369B: Medical Imaging Systems II (TA)
EE 369C: Medical Imaging Reconstruction (TA)
EFS/Lang 688: Writing for Engineering and Sciences (TA)

University of Utah, Department of Bioengineering

BIOEN 3900: Biosignals Analysis (TA)
BIOEN 5101: Bioinstrumentation (TA)

STUDENT ADVISING

Graduate Committee Member

Ying Liang, 2021
- Degree: MSCE
- Project: Applying knowledge graph and natural language processing to question answer system

Taylor Hansen, 2020
- Degree: MSEE
- Project: Open-source antenna pattern measurement system using coherent DSB-SC amplitude modulation

ACADEMIC SERVICE

Weber State University ECE Program Coordinator, 2021-Present
Weber State University Faculty Senate Executive Committee, 2020-Present

Weber State University Faculty Senate Member, 2020-Present
Weber State University ECE Department Faculty Search Committee, 2019-2021
Trainee Member, UCAIR Operations Council, 2019
Organizer, University of Utah Radiology Machine Learning Working Group, 2017-2019
Reviewer, IEEE Transactions on Biomedical Engineering
Reviewer, International Society of Magnetic Resonance in Medicine
Reviewer, Magnetic Resonance in Medicine
Reviewer, Medical Physics
Reviewer, New England Journal of Medicine

PROFESSIONAL MEMBERSHIPS	International Society for Magnetic Resonance in Medicine IEEE
TECHNICAL SKILLS	Proficient in MRI pulse programming within the General Electric EPIC environment, Matlab, Python, C/C++, PyTorch, TensorFlow/Keras, MultiSim, LTSpice
LANGUAGES	English, native language Mandarin Chinese, conversational spoken and basic reading/writing skills
INTERESTS	Cycling, skiing, fly fishing, backpacking, analog stereo equipment