Matthew J. Muckley

Research Engineer
Meta AI

Education

University of Michigan, Ann Arbor, MI
Ph.D., Biomedical Engineering — Apr., 2016
M.S.E., Electrical Engineering: Systems — Dec., 2014
M.S., Biomedical Engineering — May, 2013

Dissertation: Acceleration Methods for MRI — Apr., 2016
Advisers: Jeffrey A. Fessler and Douglas C. Noll

Purdue University, West Lafayette, IN
B.S., Biomedical Engineering — May, 2011

Research Positions

Research Engineer, Meta AI, New York, NY — Feb., 2020 - Present
- Open-sourced NeuralCompression, a library for compression with neural networks.
- Developed a self-supervised method for predicting deterioration in COVID patients.
- Organized and executed the 2020 fastMRI Reconstruction Challenge.

Research Scientist, NYU School of Medicine, New York, NY — Jan., 2018 - Jan., 2020
- Built torchkbnufft, a high-level, non-uniform FFT open-source package in PyTorch.
- Published dldegibbs, a simulation-based deep learning noise and Gibbs correction technique.
- Processed and published the fastMRI MRI knee raw k-space data set consisting of 1,594 MRI k-space volumes.

Postdoctoral Research Fellow, NYU School of Medicine, New York, NY — Jun., 2016 - Jan., 2018
- Implemented a reconstruction pipeline for an interruped-beam x-ray CT prototype system.

Graduate Student, University of Michigan, Ann Arbor, MI — Aug., 2011 - Apr., 2016
- Created BARISTA, a fast algorithm for subsampled MR image reconstruction.
- Wrote an image processing method for assessing collagen fibril disorder in 2,000 AFM images.
- Programmed and tested pulse sequences for fMRI data acquisition.

Undergraduate Student, Purdue University, West Lafayette, IN — May, 2009 - Aug., 2011
- Built a processing pipeline for quantifying geometric properties in femurs from 336 micro-CTs.
- Implemented a processing pipeline for fMRI data analysis on 24 subjects.
- Assessed the use of a hyperspectral imaging method for measuring nanoscale bone deformation.

Teaching Experience

New York University, New York, NY

Course Number	Title	Role	Enrl	Term	Year
BMSC-GA 4428	Practical MRI II	Lab. Asst.	4	Fall	2019
BMSC-GA 4428	Practical MRI II	Lab. Asst.	3	Fall	2018
BMSC-GA 4428	Practical MRI II	Lab. Asst.	2	Fall	2016

University of Michigan, Ann Arbor, MI

Course Number	Title	Role	Enrl	Term	Year
BIOMEDE 516	Medical Imaging Systems	Guest Lecturer	22	Fall	2015
BIOMEDE 503	Stat. Meth. for Biomed. Eng.	Grad. Stud. Inst.	94	Winter	2015
BIOMEDE 516	Medical Imaging Systems	Guest Lecturer	19	Fall	2014
BIOMEDE 499	Training Course in fMRI	Lab. Asst.	60	Fall	2014
BIOMEDE 499	Training Course in fMRI	Lab. Asst.	60	Fall	2013
EECS 556	Image Processing	Guest Lecturer	22	Winter	2013
BIOMEDE 510	Medical Imaging Laboratory	Grad. Stud. Inst.	13	Winter	2013
BIOMEDE 499	Training Course in fMRI	Lab. Asst.	60	Fall	2012

Honors and Awards

Summa Cum Laude Abstract Award, ISMRM, for "Results of the 2020..."	May, 2021
Cum Laude Award, SCBT-MR Workshop	Oct., 2018
Rackham Predoctoral Fellowship	May, 2015 - May, 2016
Grad, Asst. in Areas of National Need (GAANN) Fellowship	Sep., 2012 - May, 2013
First Place, Michigan KLA-Tencor Image Processing Contest	Apr., 2012
Rollin M. Gerstacker Foundation Fellowship	Sep., 2011 - Aug., 2012
Graduated With Distinction, Purdue University	May, 2011
Dean's List and Semester Honors, Purdue University (8 semesters)	Dec., 2007 - May, 2011
Member, Alpha Eta Mu Beta BME Honor Society	Dec., 2010
Member, Tau Beta Pi Engineering Honor Society	Mar., 2009

Service/Affiliations

Professional Societies

Member, ISMRM	Nov., 2021 - Present
Member, IEEE	Jul., 2014 - Dec. 2021
Trainee Member, ISMRM	May, 2012 - Dec., 2020
Member, BME Graduate Student Council, University of Michigan	Jun., 2013 - Apr., 2016
President, BME Graduate Student Council, University of Michigan	Aug., 2014 - Oct., 2015

Reviews

Listed by time of first review

International Conference on Learning Representations	Oct., 2022
Radiology: Artificial Intelligence	Apr., 2022
International Conference on Machine Learning	Mar., 2022
Advances in Neural Information Processing Systems	Jun., 2021
Medical Physics	Jun., 2021
American Journal of Neuroradiology	Feb., 2021
IEEE Transactions on Computational Imaging	Jul., 2019
Nature Scientific Reports	May, 2019
Physics in Medicine and Biology	Apr., 2018
Magnetic Resonance in Medicine	Oct., 2017
Journal of Magnetic Resonance Imaging	Feb., 2017
IEEE Transactions on Signal Processing	Jun., 2016
IET Image Processing	Feb., 2016
Journal of Biomedical Signal Processing and Control	Jul., 2015
IEEE Journal of Selected Topics in Signal Processing	May, 2015
IEEE Transactions on Medical Imaging	Nov., 2013

Open-Source Repositories

List of repositories with major contributions.

fastMRI: A large-scale dataset of raw MRI measurements and code for training DNN models.
`https://github.com/facebookresearch/fastMRI`

NeuralCompression: A collection of tools for neural compression enthusiasts.
`https://github.com/facebookresearch/NeuralCompression`

CovidPrognosis: COVID patient deterioration prediction via deep learning on X-ray images.
`https://github.com/facebookresearch/CovidPrognosis`

torchkbnufft: A robust, easy-to-deploy non-uniform Fast Fourier Transform in PyTorch.
`https://github.com/mmuckley/torchkbnufft`

dldegibbs: Deep learning models for Gibbs artifact and noise removal in diffusion MRI.
`https://github.com/mmuckley/dldegibbs`

Publications

Preprints

1. Anuroop Sriram, Matthew Muckley, Koustuv Sinha, Farah Shamout, Joelle Pineau, Krzysztof J. Geras, Lea Azour, Yindalon Aphinyanaphongs, Nafissa Yakubova, and William Moore. COVID-

19 prognosis via self-supervised representation learning and multi-image prediction. *arXiv preprint arXiv:2101.04909*, 2021.

2. Jure Zbontar, Florian Knoll, Anuroop Sriram, Tullie Murrell, Zhengnan Huang, Matthew J. Muckley, Aaron Defazio, Ruben Stern, Patricia Johnson, Mary Bruno, et al. fastMRI: An open dataset and benchmarks for accelerated MRI. *arXiv preprint arXiv:1811.08839*, 2018.

Book Chapters

1. L. Hernandez-Garcia and M. J. Muckley. fMRI artifacts and their correction. In A. W. Toga, editor, *Brain Mapping: An Encyclopedic Reference*. Elsevier, 2015.

Journal Articles

1. Alireza Radmanesh, Matthew J. Muckley, Tullie Murrell, Emma Lindsey, Anuroop Sriram, Florian Knoll, Daniel K. Sodickson, and Yvonne W. Lui. Exploring the acceleration limits of deep learning variational network–based two-dimensional brain MRI. *Radiology: Artificial Intelligence*, 4(6):e210313, 2022.

2. Matthew J. Muckley, Bruno Riemenschneider, Alireza Radmanesh, Sunwoo Kim, Geunu Jeong, Jingyu Ko, Yohan Jun, Hyungseob Shin, Dosik Hwang, Mahmoud Mostapha, et al. Results of the 2020 fastMRI challenge for machine learning MR image reconstruction. *IEEE Transactions on Medical Imaging*, 40(9):2306–2317, 2021.

3. Matthew J Muckley, Benjamin Ades-Aron, Antonios Papaioannou, Gregory Lemberskiy, Eddy Solomon, Yvonne W Lui, Daniel K Sodickson, Els Fieremans, Dmitry S Novikov, and Florian Knoll. Training a neural network for Gibbs and noise removal in diffusion MRI. *Magnetic Resonance in Medicine*, 85(1):413–428, 2021.

4. Florian Knoll, Tullie Murrell, Anuroop Sriram, Nafissa Yakubova, Jure Zbontar, Michael Rabbat, Aaron Defazio, Matthew J. Muckley, Daniel K. Sodickson, C. Lawrence Zitnick, and Michael P. Recht. Advancing machine learning for MR image reconstruction with an open competition: Overview of the 2019 fastMRI challenge. *Magnetic Resonance in Medicine*, 84(6):3054–3070, 2020.

5. Michael P. Recht, Jure Zbontar, Daniel K. Sodickson, Florian Knoll, Nafissa Yakubova, Anuroop Sriram, Tullie Murrell, Aaron Defazio, Michael Rabbat, Leon Rybak, et al. Using deep learning to accelerate knee MRI at 3 T: Results of an interchangeability study. *American Journal of Roentgenology*, 215(6):1421–1429, 2020.

6. Florian Knoll, Jure Zbontar, Anuroop Sriram, Matthew J Muckley, Mary Bruno, Aaron Defazio, Marc Parente, Krzysztof J Geras, Joe Katsnelson, Hersh Chandarana, et al. fastMRI: A publicly available raw k-space and DICOM dataset of knee images for accelerated MR image reconstruction using machine learning. *Radiology: Artificial Intelligence*, 2(1):e190007, 2020.

7. Teodora Chitiboi, Matthew Muckley, Bari Dane, Chuanshu Huang, Li Feng, and Hersh Chandarana. Pancreas deformation in the presence of tumors using feature tracking from free-breathing XD-GRASP MRI. *Journal of Magnetic Resonance Imaging*, 50(5):1633–1640, 2019.

8. Matthew J Muckley, Baiyu Chen, Thomas Vahle, Thomas O'Donnell, Florian Knoll, Aaron D Sodickson, Daniel K Sodickson, and Ricardo Otazo. Image reconstruction for interrupted-beam x-ray CT on diagnostic clinical scanners. *Physics in Medicine and Biology*, 64(15):155007, 2019.

9. Baiyu Chen, Erich Kobler, Matthew J Muckley, Aaron D Sodickson, Thomas O'Donnell, Thomas Flohr, Bernhard Schmidt, Daniel K Sodickson, and Ricardo Otazo. SparseCT: System concept and design of multislit collimators. *Medical Physics*, 46(6):2589–2599, 2019.

10. Meagan A Cauble, Matthew J Muckley, Ming Fang, Jeffrey A Fessler, Kathleen Welch, Edward D Rothman, Bradford G Orr, Le T Duong, and Mark M Banaszak Holl. Estrogen depletion and drug treatment alter the microstructure of type I collagen in bone. *Bone Reports*, 5:243–251, 2016.

11. Matthew J Muckley, Douglas C Noll, and Jeffrey A Fessler. Fast parallel MR image reconstruction via B1-based, adaptive restart, iterative soft thresholding algorithms (BARISTA). *IEEE Transactions on Medical Imaging*, 34(2):578–588, 2015.

12. Ziwei Zhong, Matthew Muckley, Serife Agcaoglu, Morgan E Grisham, Hansi Zhao, Michael Orth, Michael S Lilburn, Ozan Akkus, and Darrin M Karcher. The morphological, material-level, and ash properties of turkey femurs from 3 different genetic strains during production. *Poultry Science*, 91(11):2736–2746, 2012.

13. Zhengbin Xu, Xuanhao Sun, Jingjing Liu, Qinghai Song, Matthew Muckley, Ozan Akkus, and Young L Kim. Spectroscopic visualization of nanoscale deformation in bone: interaction of light with partially disordered nanostructure. *Journal of Biomedical Optics*, 15(6):060503, 2010.

High-Impact Conference Articles

1. Tim Bakker, Matthew J. Muckley, Adriana Romero-Soriano, Michal Drozdzal, and Luis Pineda. On learning adaptive acquisition policies for undersampled multi-coil MRI reconstruction. In *Medical Imaging with Deep Learning*, 2022.

2. Zizhao Zhang, Adriana Romero, Matthew J Muckley, Pascal Vincent, Lin Yang, and Michal Drozdzal. Reducing uncertainty in undersampled MRI reconstruction with active acquisition. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pages 2049–2058, 2019.

Conference Papers

Workshop and 4-page proceedings papers.

1. Patricia M. Johnson, Geunu Jeong, Kerstin Hammernik, Jo Schlemper, Chen Qin, Jinming Duan, Daniel Rueckert, Jingu Lee, Nicola Pezzotti, Elwin De Weerdt, et al. Evaluation of the robustness of learned MR image reconstruction to systematic deviations between training and test data for the models from the fastMRI challenge. In *International Workshop on Machine Learning for Medical Image Reconstruction*, pages 25–34, 2021.

2. Shizhan Gong, Matthew Muckley, Nan Wu, Taro Makino, Gene S. Kim, Laura Heacock, Linda Moy, Florian Knoll, and Krzysztof J. Geras. Large-scale classification of breast MRI exams using deep convolutional networks. In *Medical Imaging Meets NeurIPS Workshop*, 2019.

3. Patricia M Johnson, Matthew J Muckley, Mary Bruno, Erich Kobler, Kerstin Hammernik, Thomas Pock, and Florian Knoll. Joint multi-anatomy training of a variational network for reconstruction of accelerated magnetic resonance image acquisitions. In *International Workshop on Machine Learning for Medical Image Reconstruction*, pages 71–79, 2019.

4. Matthew J. Muckley, Baiyu Chen, Thomas O'Donnell, Matthias Berner, Thomas Allmendinger, Karl Stierstorfer, Thomas Flohr, Bernhard Schmidt, Aaron Sodickson, Daniel Sodickson, and Ricardo Otazo. Reconstruction of reduced-dose SparseCT data acquired with an interrupted-beam prototype on a clinical scanner. In *Proceedings of the International Meeting on Image Formation in X-ray Computed Tomography*, pages 56–59, 2018.

5. Baiyu Chen, Matthew J. Muckley, Aaron Sodickson, Thomas O'Donnell, Matthias Berner, Thomas Allmendinger, Karl Stierstorfer, Thomas Flohr, Bernhard Schmidt, Daniel Sodickson, and Ricardo Otazo. First multislit collimator prototype for SparseCT: design, manufacturing and initial validation. In *Proceedings of the International Meeting on Image Formation in X-ray Computed Tomography*, pages 52–55, 2018.

6. Erich Kobler, Matthew J. Muckley, Baiyu Chen, Florian Knoll, Kerstin Hammernik, Thomas Pock, Daniel K. Sodickson, and Ricardo Otazo. Variational network learning for low-dose CT. In *Proceedings of the International Meeting on Image Formation in X-ray Computed Tomography*, pages 430–434, 2018.

7. Erich Kobler, Matthew Muckley, Baiyu Chen, Florian Knoll, Kerstin Hammernik, Thomas Pock, Daniel Sodickson, and Ricardo Otazo. Variational deep learning for low-dose computed tomography. In *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing*, pages 6687–6691, 2018.

8. Baiyu Chen, Matthew Muckley, Aaron Sodickson, Thomas O'Donnell, Florian Knoll, Daniel Sodickson, and Ricardo Otazo. Evaluation of SparseCT on patient data using realistic undersampling models. In *SPIE Proceedings, Medical Imaging: Physics of Medical Imaging*, volume 10573, page 1057342, 2018.

9. Matthew Muckley, Baiyu Chen, Thomas Vahle, Florian Knoll, Aaron Sodickson, Daniel K Sodickson, and Ricardo Otazo. Regularizer performance for SparseCT image reconstruction with practical subsampling. In *Proceedings of the International Meeting on Fully 3D Reconstruction in Radiology and Nuclear Medicine*, pages 572–575, 2017.

10. Baiyu Chen, Matthew J. Muckley, Thomas O'Donnell, Aaron Sodickson, Thomas Flohr, Karl Stierstorfer, Bernhard Schmidt, Florian Knoll, Andrew Primak, David Faul, et al. Realistic undersampling model for compressed sensing using a multi-slit collimator. In *Proceedings of the International Meeting on Fully 3D Reconstruction in Radiology and Nuclear Medicine*, pages 314–317, 2017.

11. Matthew J Muckley and Jeffrey A Fessler. Fast MR image reconstruction with orthogonal wavelet regularization via shift-variant shrinkage. In *Proceedings of the IEEE International Conference on Image Processing*, pages 3651–3655, 2014.

Conference Abstracts

1. Florian Knoll, Matthew J. Muckley, Yvonne W. Lui, and Daniel K. Sodickson. Insights into the reliability of deep learning reconstructions with research challenges. In *Biomedical and Astronomical Signal Processing Frontiers*, 2023. To appear.

2. Matthew J. Muckley, Tullie Murrell, Alireza Radmanesh, Florian Knoll, Zhengnan Huang, Anuroop Sriram, Daniel K. Sodickson, and Yvonne W. Lui. Properties of 2D MR image reconstructions with deep neural networks at high acceleration rates. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 849, 2022.

3. Bruno Riemenschneider, Matthew J. Muckley, Alireza Radmanesh, Sunwoo Kim, Geunu Jeong, Jingyu Ko, Yohan Jun, Hyungseob Shin, Dosik Hwang, Mahmoud Mostapha, et al. Results of the 2020 fastMRI brain reconstruction challenge. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 63, 2021.

4. Matthew J. Muckley, Tullie Murrell, Suvrat Booshan, Hersh Chandarana, Florian Knoll, and Daniel K. Sodickson. Unsupervised reconstruction of continuous dynamic radial acquisitions via CNN-NUFFT self-consistency. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 3605, 2020.

5. Shizhan Gong, Matthew Muckley, Nan Wu, Taro Makino, Gene S. Kim, Laura Heacock, Linda Moy, Florian Knoll, and Krzysztof J. Geras. Large-scale classification of breast MRI exams using deep convolutional networks. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 569, 2020.

6. Tullie Murrell, Matthew J. Muckley, Florian Knoll, Hersh Chandarana, and Daniel K. Sodickson. Self-supervised dynamic MR image reconstruction with a sequence-to-sequence NUFFT-CNN. In *ISMRM Workshop on Data Sampling & Image Reconstruction*, 2020.

7. Matthew J. Muckley, Ruben Stern, Tullie Murrell, and Florian Knoll. TorchKbNufft: A high-level, hardware-agnostic non-uniform fast Fourier transform. In *ISMRM Workshop on Data Sampling & Image Reconstruction*, 2020.

8. Matthew J. Muckley, Antonios Papaioannou, Benjamin Ades-Aron, Daniel K. Sodickson, Yvonne W. Lui, Els Fieremans, Dmitry S. Novikov, and Florian Knoll. Learned Gibbs removal in partial Fourier acquisitions for diffusion MRI. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 3402, 2019.

9. Florian Knoll, Matthew Muckley, Jure Zbontar, Anuroop Sriram, Aaron Defazio, Michal Drozdzal, Krzysztof Geras, Mary Bruno, Marc Parente, Nafissa Yakubova, et al. fastMRI: a publicly available raw k-space dataset for accelerated MRI reconstruction using machine learning. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 657, 2019.

10. Zizhao Zhang, Adriana Romero, Matthew J Muckley, Pascal Vincent, and Michal Drozdzal. Active acquisition for MRI reconstruction. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 1093, 2019.

11. Matthew J. Muckley, Antonios Papaioannou, Benjamin Ades-Aron, Daniel K. Sodickson, Yvonne W. Lui, Els Fieremans, Dmitry S. Novikov, and Florian Knoll. Improving mean kurtosis measurements in diffusion MRI via learned Gibbs removal. In *ISMRM Machine Learning Workshop, Part 2*, 2018.

12. Matthew J. Muckley, Jeffrey A. Fessler, and Marcelo V. W. Zibetti. Accelerating non-Cartesian, sparsity-promoting image reconstruction via line search FISTA. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 2809, 2018.

13. Matthew J. Muckley, Li Feng, Hersh Chandarana, Daniel K. Sodickson, and Ricardo Otazo. Respiratory motion-field reconstruction using low-rank plus sparse (L+S) approach for dynamic MRI of the lungs. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 3864, 2017.

14. Rebecca Ramb, Michael Zenge, Li Feng, Matthew J. Muckley, Christoph Forman, Leon Axel, Daniel K. Sodickson, and Ricardo Otazo. Low-rank plus sparse tensor reconstruction for high-dimensional cardiac MRI. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 1199, 2017.

15. Matthew J. Muckley, Douglas C. Noll, and Jeffrey A. Fessler. Fast, iterative subsampled spiral reconstruction via circulant majorizers. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 521, 2016.

16. Matthew J. Muckley, Douglas C. Noll, and Jeffrey A. Fessler. Majorizer design for non-Cartesian MRI with sparsity-promoting regularization. In *ISMRM Workshop on Data Sampling & Image Reconstruction*, 2016.

17. Matthew J. Muckley, Douglas C. Noll, and Jeffrey A. Fessler. Momentum optimization for iterative shrinkage algorithms in parallel MRI with sparsity-promoting regularization. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 3413, 2015.

18. Matthew J. Muckley, Douglas C. Noll, and Jeffrey A. Fessler. Accelerating SENSE-type MR image reconstruction algorithms with incremental gradients. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 4400, 2014.

19. Matthew J. Muckley, Scott J. Peltier, Douglas C. Noll, and Jeffrey A. Fessler. Model-based reconstruction for physiological noise correction in functional MRI. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, page 2623, 2013.

20. Matthew J. Muckley, Scott J. Peltier, Jeffrey A. Fessler, and Douglas C. Noll. Group sparsity reconstruction for physiological noise correction in functional MRI. In *ISMRM Workshop on Data Sampling & Image Reconstruction*, 2013.

21. Matthew Muckley, Serife Agcaoglu, Ziwei Zhong, Hansi Zhao, Morgan Grisham, Darrin Karcher, Michael Orth, Michael Lilburn, and Ozan Akkus. The effect of selective breeding for body weight on geometric properties in turkey femurs. In *Proceedings of the ASME Summer Bioengineering Conference*, pages 901–902, 2011.

22. Ziwei Zhong, Serife Agcaoglu, Matthew Muckley, Hansi Zhao, Darrin Karcher, Michael Orth, Michael Lilburn, and Ozan Akkus. Changes in turkey femora mechanical properties resulting from selective breeding for body weight. In *Proceedings of the ASME Summer Bioengineering Conference*, pages 897–898, 2011.

Symposia, Seminars

1. Matthew J. Muckley, Scott J. Peltier, Jeffrey A. Fessler, and Douglas C. Noll. Improving fMRI scans using low rank modeling. In *University of Michigan Graduate Symposium*, 2015.

2. Matthew J. Muckley, Scott J. Peltier, Jeffrey A. Fessler, and Douglas C. Noll. Physiological noise removal using partially-separable models. In *University of Michigan FMRI Symposium*, 2015.

3. Matthew J. Muckley, Douglas C. Noll, and Jeffrey A. Fessler. BARISTA: A fast algorithm for MR image reconstruction with sparsity-promoting regularization. In *University of Michigan Graduate Symposium*, 2014.

4. Matthew J. Muckley, Anna Gilbert, Jeffrey A. Fessler, and Douglas C. Noll. Imaging fleeting thoughts. In *University of Michigan M-Cubed Symposium*, 2014

5. M. J. Muckley, A. C. Gilbert, J. A. Fessler, and D. C. Noll. Imaging fleeting thoughts. In *University of Michigan M-Cubed Symp.*, 2013.

6. Matthew J. Muckley, Scott J. Peltier, Jeffrey A. Fessler, and Douglas C. Noll. Physiological noise removal using model-based reconstruction. In *University of Michigan FMRI Symposium*, 2013.

7. Matthew J. Muckley, Jeffrey A. Fessler, and Douglas C. Noll. Reducing physiological noise in functional MRI by model-based reconstruction. In *University of Michigan Graduate Symposium*, 2012.