

**Daniel S. Weller, Ph.D.**

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**Research Interests:**

Signal processing, magnetic resonance imaging, medical imaging, computational imaging.

**Education:**

Ph.D., Electrical Engineering, Massachusetts Institute of Technology, Cambridge, MA, June 2012.

Thesis: "Accelerating Magnetic Resonance Imaging by Unifying Sparse Models and Multiple Receivers"

Supervisor: Professor Vivek Goyal.

S.M., Electrical Engineering, Massachusetts Institute of Technology, Cambridge, MA, June 2008.

Thesis: "Mitigating Timing Noise in ADCs through Digital Post-Processing"

Supervisor: Professor Vivek Goyal.

B.S., Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA, May 2006.

**Professional Employment History**

Assistant Professor, August 2014 – present

University of Virginia, Charles L. Brown Department of Electrical and Computer Engineering,  
Department of Biomedical Engineering (courtesy), Department of Radiology and Medical Imaging  
(courtesy)

Postdoctoral Research Fellow, July 2012 – July 2014

University of Michigan, Department of Electrical Engineering and Computer Science

Advisors: Professor Jeffrey Fessler and Professor Douglas Noll

**Honors and Awards:**

NIH National Research Service Award (NRSA) Postdoctoral Fellowship (F32 EB015914), 2012-2014.

Finalist, Student Paper Competition, IEEE International Symposium on Biomedical Imaging, 2011.

National Defense Science and Engineering Graduate (NDSEG) Fellowship, awarded 2007.

National Science Foundation (NSF) Graduate Research Fellowship, awarded 2007.

Finalist, Hertz Foundation Graduate Fellowship, 2007.

University Honors and College Honors, Carnegie Mellon University, May 2006.

Meeting of the Minds, Carnegie Mellon University, May 2006:

First Place, Sixth Annual Lockheed Martin/Eta Kappa Nu/ECE Project Awards;

Updated 10/24/2018

Third Place, CIT Honors Poster Competition;  
Honorable Mention, Sigma Xi Poster Competition.

**Students Directed:**

PhD Students: 3

Tanjin Taher Toma, January 2018 – present

Gulam Mohammed Haras (Haris) Jeelani, August 2015 – present

Haoyi Liang, August 2014 - present

ME Students: 1

Luonan Wang, January 2015 – August 2018

Undergraduate Advisees: 9      MS/ME Advisees: 2

**Research Grants/Contracts:**

Active Grants/Contracts:

(PI) Imaging Seizure and Memory Engrams, UVA Center for Engineering in Medicine Seed Grant, January 2019 – December 2019

(PI) ABI: Innovation: Analyzing Neuroglial Cell Dynamics in their Natural Environment with Video Microscopy, NSF 1759802, August 2018 – July 2021

(PI) Fast and Automatic Reconstruction of High Frame-Rate Cardiac Magnetic Resonance, UVA Center for Engineering in Medicine Seed Grant, January 2018 – December 2018

(PI) Perceptually Aware Model Training for Image Reconstruction, Jeffress Memorial Trust, June 30, 2017 – March 30, 2019

(co-investigator) Motion-Robust Methods for Rapid Pediatric MRI without Sedation, NIH R21 EB022309, August 2016 – June 2019 (PI: Craig Meyer)

Completed Grants/Contracts:

(PI) Automating Glia Neuroimaging, UVA BRAIN Institute Seed Grant, January 2017 – December 2017

(PI) Breaking Barriers to Building Better Brains, SEAS Research Innovation Award, August 2016 – August 2017

(PI) Adaptive Techniques for Robust High-Resolution Functional Magnetic Resonance Imaging, NIH F32 EB015914, August 2012 – July 2014 (Supervisor: Jeffrey Fessler)

**Publications:**Journal Papers:

1. Haoyi Liang, Dabrowska, Natalia, Kapur, Jaideep, and Weller, Daniel S. "Structure-based Intensity Propagation for 3D Brain Reconstruction with Multilayer Section Microscopy." *IEEE Trans. Med. Imaging*, in press.
2. Weller, Daniel S., Wang, Luonan, Mugler III, John P., and Meyer, Craig H. "Motion-compensated reconstruction of magnetic resonance images from undersampled data." *Magnetic Resonance Imaging*, vol. 55, pp. 36-45, January 2019.
3. Weller, Daniel S., Salerno, Michael, and Meyer, Craig H. "Content-Aware Compressive Magnetic Resonance Image Reconstruction." *Magnetic Resonance Imaging*, vol. 52, pp. 118-130, October 2018.
4. Zhou, R., Huang, W., Yang, Y., Chen, X., Weller, D. S., Kramer, C. M., Kozerke, S., and Salerno, M. "Simple motion correction strategy reduces respiratory-induced motion artifacts for k-t accelerated and compressed-sensing CMR perfusion imaging." *J Cardiovascular Magnetic Resonance*, vol. 20, no. 1, p. 6, February 2018.
5. Haoyi Liang and Weller, D. S. "Comparison-based Image Quality Assessment for Selecting Image Restoration Parameters." *IEEE Trans. Image Process.*, vol. 25, no. 11, pp. 5118-5130, November 2016.
6. Weller, D. S., Pnueli, A., Divon, G., Radzyner, O., Eldar, Y. C., and Fessler, J. A. "Undersampled Phase Retrieval with Outliers." *IEEE Trans. Comput. Imaging*, vol. 1, no. 4, pp. 247-258, December 2015.
7. Weller, D. S., Ramani, S., Nielsen, J.-F., and Fessler, J. A. "Monte Carlo SURE-Based Parameter Selection for Parallel Magnetic Resonance Imaging Reconstruction." *Magn. Reson. Med.*, vol. 71, no. 5, pp. 1760-1770, May 2014.
8. Weller, D. S., Ramani, S., and Fessler, J. A. "Augmented Lagrangian with Variable Splitting for Faster Non-Cartesian L1-SPIRiT MR Image Reconstruction." *IEEE Trans. Med. Imaging*, vol. 33, no. 2, pp. 351-361, February 2014.
9. Ramani, S., Weller, D. S., Nielsen, J.-F., and Fessler, J. A. "Non-Cartesian MRI Reconstruction With Automatic Regularization Via Monte-Carlo SURE." *IEEE Trans. Med. Imaging*, vol. 32, no. 8, pp. 1411-1422, August 2013.
10. Weller, D. S., Polimeni, J. R., Grady, L., Wald, L. L., Adalsteinsson, E., and Goyal, V. K. "Sparsity-Promoting Calibration for GRAPPA Accelerated Parallel MRI Reconstruction." *IEEE Trans. Med. Imaging*, vol. 32, no. 7, pp. 1325-1335, July 2013.

11. Weller, D. S., Polimeni, J. R., Grady, L., Wald, L. L., Adalsteinsson, E., and Goyal, V. K. "Denoising Sparse Images from GRAPPA Using the Nullspace Method." *Magn. Reson. Med.*, vol. 68, no. 4, pp. 1176-1189, Oct. 2012.
12. Weller, D. S. and Goyal, V. K. "Bayesian Post-Processing Methods for Jitter Mitigation in Sampling." *IEEE Trans. Signal Process.*, vol. 59, no. 5, pp. 2112-2123, May 2011.
13. Weller, D. S. and Goyal, V. K. "On the Estimation of Nonrandom Signal Coefficients from Jittered Samples." *IEEE Trans. Signal Process.*, vol. 59, no. 2, pp. 587-597, Feb. 2011.

#### Conference Papers and Abstracts:

1. Jeelani, H., Martin, J., Vasquez, F., Salerno, M., and Weller, D. S. "Image Quality Affects Deep Learning Reconstruction of MRI." 2018 IEEE Int. Symp. on Biomedical Imaging. Washington, DC, USA, April 2018, pp. 357-360.
2. Haoyi Liang, Dabrowska, N., Kapur, J., and Weller, D. S. "Structure Correction for 3D Mouse Brain Reconstruction." 2018 IEEE Int. Symp. On Biomedical Imaging. Washington, DC, USA, April 2018, abstract.
3. Haoyi Liang, Dabrowska, N., Kapur, J., and Weller, D. "Whole Brain Reconstruction from Multilayered Sections of a Mouse Model of Status Epilepticus." 2017 IEEE Asilomar Conf. on Signals, Systems, and Computers. Pacific Grove, CA, USA, October 2017, pp. 1260-1263. *Invited paper.*
4. Haoyi Liang, Acton, S. T., and Weller, D. S. "Content-Aware Neuron Image Enhancement." 2017 IEEE Int. Conf. on Image Processing. Beijing, China, September 2017, pp. 3510-3514.
5. Jeelani, H., Yang, Y., Salerno, M., and Weller, D. S. "Evaluation of k-Space and Image-Space Motion Correction Schemes for CMR Perfusion." 20th Annual SCMR Scientific Sessions, Washington, DC, USA, February 2017, abstract.
6. Yang, Y., Zhao, L., Chen, X., Weller, D. S., Hagspiel, K., Norton, P., Kramer, C. M., and Salerno, M. "Motion-compensated spiral simultaneous multi-slice myocardial perfusion." 20th Annual SCMR Scientific Sessions, Washington, DC, USA, February 2017, abstract.
7. Weller, D. S. "Robust Phase Retrieval with Sparsity under Nonnegativity Constraints." 2016 IEEE Asilomar Conf. on Signals, Systems, and Computers. Pacific Grove, CA, USA, November 2016, pp. 1043-1047. *Invited paper.*
8. Haoyi Liang and Weller, D. S. "Denoising method selection by comparison-based image quality assessment." 2016 IEEE Int. Conf. on Image Processing. Phoenix, AZ, USA, Sep. 2016, pp. 3106-3110.
9. Haoyi Liang and Weller, D. S. "Edge-Based Texture Granularity Detection." 2016 IEEE Int. Conf. on Image Processing. Phoenix, AZ, USA, Sep. 2016, pp. 3563-3567.
10. Luonan Wang and Weller, D. S. "Joint Motion Estimation and Image Reconstruction Using Alternating Minimization." ISMRM 24th Scientific Meeting. Singapore, May 2016, p. 1800.

11. Cai, X., Chen, X., Yang, Y., Salerno, M., Weller, D. S., Meyer, C. H., and Epstein, F. H. "Free-breathing 2D cine DENSE MRI using localized signal generation, image-based navigators, motion compensation and compressed sensing." ISMRM 24th Scientific Meeting. Singapore, May 2016, p. 3126.
12. Weller, D. S. "Analysis-Form Sparse Phase Retrieval Using Variable-Splitting." 2016 IEEE Southwest Symposium on Image Analysis and Interpretation. Santa Fe, NM, USA, March 2016, pp. 61-64.
13. Weller, D. S. "Reconstruction with Dictionary Learning for Accelerated Parallel Magnetic Resonance Imaging." 2016 IEEE Southwest Symposium on Image Analysis and Interpretation. Santa Fe, NM, USA, March 2016, pp. 105-108.
14. Cai, X., Chen, X., Yang, Y., Salerno, M., Weller, D., Meyer, C. H., and Epstein, F. H. "Free-breathing 2D Cine DENSE with Localized Excitation, Self-navigation and Motion Correction." J. Cardiovascular Magnetic Resonance, vol. 18, suppl. 1, p. P319, January 2016. (presented at 19th Annual SCMR Scientific Sessions, Los Angeles, CA)
15. Haoyi Liang and Weller, D. S. "Regularization Parameter Trimming for Iterative Image Reconstruction." 2015 IEEE Asilomar Conf. on Signals, Systems, and Computers. Pacific Grove, CA, USA, November 2015, pp. 755-759.
16. Weller, D. S., Pnueli, A., Radzyner, O., Divon, G., Eldar, Y. C., and Fessler, J. A. "Phase Retrieval of Sparse Signals Using Optimization Transfer and ADMM." 2014 IEEE Int. Conf. on Image Processing. Paris, France, Oct. 2014, pp. 1342-1346.
17. Weller, D. S. and Fessler, J. A. "Fast non-Cartesian L1-SPIRiT with Field Inhomogeneity Correction." ISMRM 22<sup>nd</sup> Scientific Meeting. Milan, Italy, May 2014, p. 84. *Summa cum laude award*.
18. Weller, D. S., Noll, D. C., and Fessler, J. A. "Prospective Motion Correction for Functional MRI Using Sparsity and Kalman Filtering." Proc. SPIE Wavelets and Sparsity XV, vol. 8858, pp. 885823-1-10, Aug. 2013.
19. Weller, D. S., Ramani, S., Nielsen, J.-F., and Fessler, J. A. "Automatic L1-SPIRiT Regularization Parameter Selection Using Monte-Carlo SURE." ISMRM 21<sup>st</sup> Scientific Meeting. Salt Lake City, USA, April 2013, p. 2602.
20. Weller, D. S., Ramani, S., Nielsen, J.-F., and Fessler, J. A. "SURE-Based Parameter Selection for Parallel MRI Reconstruction using GRAPPA and Sparsity." 2013 IEEE Int. Symp. on Biomedical Imaging. San Francisco, USA, April 2013, pp. 954-957.
21. Sun, H., Weller, D. S., Chu, A., Ramani, S., Yoon, D., Nielsen, J.-F., and Fessler, J. A. "Spoke Pulse Design in Magnetic Resonance Imaging Using Greedy Minimax Algorithm." 2013 IEEE Int. Symp. on Biomedical Imaging. San Francisco, USA, April 2013, pp. 696-699.

22. Weller, D. S., Polimeni, J. R., Grady, L., Wald, L. L., Adalsteinsson, E., and Goyal, V. K. "Accelerated Parallel Magnetic Resonance Imaging Reconstruction Using Joint Estimation with a Sparse Signal Model." 2012 IEEE Statist. Signal Process. Workshop. Ann Arbor, USA, Aug. 2012, pp. 221-224.
23. Weller, D. S., Polimeni, J. R., Grady, L., Wald, L. L., Adalsteinsson, E., and Goyal, V. K. "Greater Acceleration Through Sparsity-Promoting GRAPPA Kernel Calibration." ISMRM 20th Scientific Meeting. Melbourne, Australia, May 2012, p. 3354.
24. Weller, D. S., Polimeni, J. R., Grady, L., Wald, L. L., Adalsteinsson, E., and Goyal, V. K. "Regularizing GRAPPA using simultaneous sparsity to recover de-noised images." Proc. SPIE Wavelets and Sparsity XIV, vol. 8138, no. 1, pp. 81381M-1-9, Aug. 2011.
25. Weller, D. S., Polimeni, J. R., Grady, L., Wald, L. L., Adalsteinsson, E., and Goyal, V. K. "Combined Compressed Sensing and Parallel MRI Compared for Uniform and Random Cartesian Undersampling of  $k$ -Space." 2011 IEEE Int. Conf. on Acoustics, Speech, and Signal Processing. Prague, Czech Republic, May 2011, pp. 553-556.
26. Weller, D. S., Polimeni, J. R., Grady, L., Wald, L. L., Adalsteinsson, E., and Goyal, V. K. "SpRING: Sparse Reconstruction of Images using the Nullspace method and GRAPPA." ISMRM 19th Scientific Meeting. Montreal, Canada, May 2011, p. 2861.
27. Weller, D. S., Polimeni, J. R., Grady, L., Wald, L. L., Adalsteinsson, E., and Goyal, V. K. "Evaluating Sparsity Penalty Functions for Combined Compressed Sensing and Parallel MRI." 2011 IEEE Int. Symp. on Biomedical Imaging. Chicago, USA, March-April 2011, pp. 1589-1592. *Finalist, Student Paper Competition.*
28. Weller, D. S., Polimeni, J. R., Grady, L. J., Wald, L. L., Adalsteinsson, E., and Goyal, V. K. "Combining nonconvex compressed sensing and GRAPPA using the nullspace method." ISMRM 18th Scientific Meeting. Stockholm, Sweden, May 2010, p. 4880.
29. Weller, D. S. and Goyal, V. K. "Jitter compensation in sampling via polynomial least squares estimation." 2009 IEEE Int. Conf. on Acoustics, Speech, and Signal Processing. Taipei, Taiwan, April 2009, p. 3341-3344.
30. Mangharam, R., Weller, D. S., Rajkumar, R., Mudalige, P., and Bai, F. "GrooveNet: A Hybrid Simulator for Vehicle-to-Vehicle Networks." 2nd Int. Workshop on Vehicle-to-Vehicle Communications. San Jose, CA, July 2006, p. 1-8. *Invited Paper.*
31. Mangharam, R., Weller, D. S., Stancil, D. D., Rajkumar, R., and Parikh, J. S. "GrooveSim: A Topography-Accurate Simulator for Geographic Routing in Vehicular Networks." 2nd ACM Int. Workshop on Vehicular Ad hoc Networks. Cologne, Germany, Sep. 2005, p. 59-68.

Theses:

1. Weller, D. S. "Accelerating Magnetic Resonance Imaging by Unifying Sparse Models and Multiple Receivers." Ph.D. thesis, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, June 2012.
2. Weller, D. S. "Mitigating Timing Noise in ADCs through Digital Post-Processing." S.M. thesis, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, June 2008.

Patents and Patent Applications:

1. H. Liang and Weller, D. "System, Method, and Computer Readable Medium for Quality Assessment for Parameter Selection." US Provisional Patent Application Serial No. 62/254,335, filed Nov. 2015.
2. Weller, D., Grady, L., Wald, L., and Goyal, V. K. "System for Accelerated Magnetic Resonance Imaging Using Parallel Coils." US Patent No. 9,594,141, Mar. 2017.
3. Weller, D., Grady, L., Wald, L., and Goyal, V. K. "System for Reconstructing MRI Images Acquired in Parallel." US Patent No. 9,588,207, Mar. 2017.
4. Weller, D., Goyal, V. K., Polimeni, J. R., and Grady, L. "System for Accelerated MR Image Reconstruction." US Patent No. 8,823,374, Sep. 2014.

Invited Talks:

1. Weller, D. S. "Learning Dictionaries for Accelerated Parallel MRI Reconstruction." Conference on Information Sciences and Systems. Baltimore, MD, USA, March 2017.
2. Weller, D. S. "Advancing MRI to See Right through the Way You Move." Department of Electrical Engineering, University of Southern California, Los Angeles, CA, August 2016.
3. Weller, D. S. "Primal-Dual Optimization of Phase Retrieval Via Optimization Transfer." SIAM Imaging Science. Albuquerque, NM, USA, May 2016.
4. Weller, D. S. "Advanced Reconstruction Techniques for Medical and Computational Imaging." Department of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, May 2016.

**Courses Taught:**University of Virginia, Department of Electrical and Computer Engineering

ECE 2066 Science of Information: How the iPhone Works – Fall 2016

ECE 4750/6750 Digital Signal Processing – Spring 2015, Spring 2016, Spring 2017, Spring 2018

ECE 5755 Digital Signal Processing Laboratory – Spring 2015, Spring 2016, Spring 2017

ECE 6711 Probability and Stochastic Processes – Fall 2014

ECE 7776 Advanced Digital Signal Processing – Fall 2015, Fall 2017, Fall 2018

**Professional Service:**

Professional Society Memberships:

Member, International Society for Magnetic Resonance in Medicine (ISMRM), since 2010

Member, Institute of Electrical and Electronics Engineers (IEEE), since 2004

Member, IEEE Signal Processing Society (SPS)

Member, IEEE Engineering in Medicine and Biology Society (EMBS)

Full Member, IEEE SPS Computational Imaging Special Interest Group

Affiliate Member, IEEE SPS Bioimaging Signal Processing Technical Committee

Member, Eta Kappa Nu (HKN), 2005

Member, Tau Beta Pi, 2005

Journal Review:

Associate Editor and Reviewer, IEEE Transactions on Medical Imaging

Reviewer, IEEE Signal Processing Letters

Reviewer, IEEE Transactions on Computational Imaging

Reviewer, IEEE Transactions on Image Processing

Reviewer, IEEE Transactions on Signal Processing

Reviewer, Magnetic Resonance Imaging

Reviewer, Magnetic Resonance in Medicine

Conference Review:

Organizing Committee, IEEE International Symposium on Biomedical Imaging, 2018

Co-Chair, Challenges Subcommittee

Reviewer, IEEE International Conference on Acoustics, Speech, and Signal Processing

Reviewer, IEEE International Conference on Image Processing

Reviewer, IEEE International Symposium on Biomedical Imaging

Reviewer, ISMRM Scientific Meeting

Reviewer, Medical Image Computing and Computer Assisted Intervention

University of Virginia:

UVA CHARGE Implementation Team, 2015 – 2018

Portrait Project

Faculty and Candidate Guide

Proctor, IEEEExtreme Programming Competition, 2015

SEAS Website Redesign Selection Committee, 2016 – 2017

ECE Awards Committee, 2017 – present

EE Graduate Program Committee, 2017 – present

EE Graduate Admissions, 2014 – present

ECE Ad-Hoc Marketing Committee, 2015 – 2016

Organizer, Image Processing Seminar Series, 2016 – 2017

Co-Organizer, ECE Department Seminar Series, 2018 – present

**References:**

References are available upon request.