

David Pierson Bradway, Ph.D.

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Senior Research Scientist, Biomedical Engineering
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Objective

- Use technical and administrative skills to facilitate projects advancing state of the art imaging techniques
- Utilize and grow knowledge of data science, visualization, imaging, and research operations at Duke
- Further refine skills in project and program management, science and engineering, and research and development

Work Experience

- **Duke University** (Durham, NC, USA)

Senior Research Scientist/Research Scientist, Biomedical Engineering, 2014 - present

- Coordinating and carrying out clinical research studies on ultrasound imaging in the engineering lab and hospital fetal and liver clinics
- Collaborating with industry and academic partners and Duke graduate students on NIH grants
- Developing technical tools, managing data and documentation for the lab group

- **Technical University of Denmark (DTU)** (Kongens Lyngby, Denmark)

Postdoctoral Researcher, Laboratory of Jørgen Jensen, 2013 - 2014

- Wrote OpenCL code to process 3-D vector flow imaging data on an AMD GPU
- Presented a conference presentation, a poster, and proceedings (SPIE 2014 & 2015)
- Contributed as co-author to another peer-reviewed journal article
- Examined feasibility of transthoracic cardiac vector flow imaging on a phased-array probe

- **Duke University** (Durham, NC, USA)

Graduate Research and Teaching Assistant, 2005 - 2013

- PhD project using ultrasound to noninvasively measure the heart's mechanical properties
- Organized and conducted clinical studies at Duke University Medical Center
- Presented results in conferences and proceedings and via peer-reviewed journal articles
- Graduate-level medical imaging coursework and labs covering CT, MR, OCT and nuclear imaging

- **Siemens Healthcare** (Issaquah, WA, USA)

Graduate Student Research Intern, 2008

- Worked within a research and development team in a large corporation
- Added multiple focal zone ARFI excitation to research mode of Acuson S2000 ultrasound scanner
- Learned version control and MS Visual Studio IDE tools

Education

- **Duke University** (Durham, NC, USA)
Ph.D. in Biomedical Engineering, May 2013.
- **The Ohio State University (OSU)** (Columbus, OH, USA)
B.S. in Electrical and Computer Engineering, June 2005.

Teaching

- Instructor, Signal Processing and Applied Mathematics, BME 671L (2024)
- Co-Instructor, Instructor, Adv. Top. Lab for Grads in BME - Intro. to Electronics Biomedical Engineering 790L (2018, 2019)
- Instructor, Ultrasound module of Medical Physics 731 (2015, 2016)
- Guest lecturer, Biomedical Engineering 590 (2016)
- Co-Instructor, International Summer School on Advanced Ultrasound Imaging, Technical University of Denmark (2015)

Grants and Contracts

- 2019 Research Germinator Award, Duke Institute for Brain Sciences (DIBS) Ravikanth Velagapudi, PhD, Anesthesiology, School of Medicine; and William Huffman and David Bradway, PhD, Biomedical Engineering, Pratt School of Engineering. Targeting Autophagy with Non-Invasive Vagal Nerve Stimulation to Treat Delirium Superimposed on Dementia.

Invention Disclosures and Patents

- Duke IDF #T-004547: “Low-Cost, Portable Ultrasound Shear Wave Device for Characterization of Material Viscoelasticity”
- Duke IDF #T-006652: “Split Aperture ARFI / SWEI”
- Duke IDF #T-005110: “Visual Feedback for Improved Triggered Acquisitions for Ultrasound Imaging” - Licensed Non-Exclusive
- Trahey, G., Long, W., Hollender, P., Bradway, D., Kakkad, V. and Bottenus, N., Duke University, 2021. Methods, systems and computer program products for triggering ultrasound data acquisition. U.S. Patent 10,969,487.

Honors and Activities

- Whitaker International Program Scholar (2013)
- National Science Foundation Graduate Research Fellow (2005-2008)
- Goldwater Research Scholar (2004-2005)
- Organized engineering design and build trip to Honduran orphanage (2004)
- Founded engineering community service group at Ohio State (2003)

Professional Activities

- Early Career Professional Development in Medical Imaging Workshop, SPIE Medical Imaging (2015)
- Associate Editor, Ultrasonic Imaging journal (2016-)
- Associate Editor, Open Journal of IEEE UFFC (2025-)
- Reviewer for the journals Ultrasound in Medicine and Biology, Physics in Medicine and Biology, Ultrasonic Imaging, eBioMedicine, IEEE Transactions on Medical Imaging, and Journal of Medical Imaging
- Duke Machine Learning Summer School (2019)
- Hands-On Deep Learning for Processing of Biosignals Short Course. ASSIST Center, North Carolina State University (2021)

Skills

- Advanced signal and imaging processing programming: Matlab and Python
- Tools and languages: Git, C/C++, OpenCL/CUDA, Docker, Linux
- Problem solving, signal and image analysis, data science, scientific computing, and experimental design
- Strong written and verbal communication, data visualization
- Successfully written fellowships, scholarships, proposals
- Personal hardware and software projects in embedded systems: Arduino, Raspberry Pi

Journal Articles

[1–17]

Book Chapters

[18,19]

Abstracts and Proceedings

[20–52]

Publications

1. Fahey BJ, Nelson RC, Bradway DP, Hsu SJ, Dumont DM, et al. (2008) In vivo visualization of abdominal malignancies with acoustic radiation force elastography. *Physics in medicine and biology* 53: 279–93. doi:10.1088/0031-9155/53/1/020
2. Fahey BJ, Nelson RC, Hsu SJ, Bradway DP, Dumont DM, et al. (2008) In vivo guidance and assessment of liver radio-frequency ablation with acoustic radiation force elastography. *Ultrasound in medicine & biology* 34: 1590–603. doi:10.1016/j.ultrasmedbio.2008.03.006
3. Nightingale K, Palmeri M, Zhai L, Frinkley K, Wang M, et al. (KR) Impulsive acoustic radiation force: imaging approaches and clinical applications. *The Journal of the Acoustical Society of America* 123: 3792. doi:10.1121/1.2935460
4. Nightingale K, Palmeri M, Dahl J, Bradway D, Hsu S, et al. (2009) Elasticity imaging with acoustic radiation force: Methods and clinical applications. *Japanese journal of medical ultrasonics* 36: 116.
5. Wolf PD, Eyerly SA, Bradway DP, Dumont DM, Bahnson TD, et al. (2011) Near real time evaluation of cardiac radiofrequency ablation lesions with intracardiac echocardiography based acoustic radiation force impulse imaging. *The Journal of the Acoustical Society of America* 129: 2438. doi:10.1121/1.3587978
6. Eyerly SA, Bahnson TD, Koontz JI, Bradway DP, Dumont DM, et al. (2012) Intracardiac acoustic radiation force impulse imaging: A novel imaging method for intraprocedural evaluation of radiofrequency ablation lesions. *Heart rhythm: the official journal of the Heart Rhythm Society* 9: 1855–1862. doi:10.1016/j.hrthm.2012.07.003
7. Hollender P, Bradway D, Wolf P, Goswami R, Trahey G (2013) Intracardiac acoustic radiation force impulse (ARFI) and shear wave imaging in pigs with focal infarctions. *IEEE transactions on ultrasonics, ferroelectrics, and frequency control* 60: 1669–1682. doi:10.1109/TUFFC.2013.2749
8. Patel V, Dahl JJ, Bradway DP, Doherty JR, Lee SY, et al. (2014) Acoustic Radiation Force Impulse Imaging (ARFI) on an IVUS Circular Array. *Ultrasonic Imaging* 36: 98–111. doi:10.1177/0161734613511595

9. Eyerly SA, Bahnson TD, Koontz JI, Bradway DP, Dumont DM, et al. (2014) Contrast in Intracardiac Acoustic Radiation Force Impulse Images of Radiofrequency Ablation Lesions. *Ultrasonic Imaging* 36: 133–148. doi:10.1177/0161734613519602
10. Jensen JA, Rasmussen MF, Pihl MJ, Holbek S, Villagómez HCA, et al. (2016) Safety assessment of advanced imaging sequences i: measurements. *IEEE transactions on ultrasonics, ferroelectrics, and frequency control* 63: 110–119. doi:10.1109/TUFFC.2015.2502987
11. Bottenus N, Long W, Zhang H, Jakovljevic M, Bradway D, et al. (2016) Feasibility of swept synthetic aperture ultrasound imaging. doi:10.1109/TMI.2016.2524992
12. Long W, Hyun D, Roy Choudhury K, Bradway D, McNally P, et al. (2018) Clinical utility of fetal short-lag spatial coherence imaging. *Ultrasound in Medicine and Biology* 44: 794–806. doi:10.1016/j.ultrasmedbio.2017.12.006
13. Flint K, Bottenus N, Bradway D, McNally P, Ellestad S, et al. (2021) An Automated ALARA Method for Ultrasound: An Obstetric Ultrasound Feasibility Study. *Journal of Ultrasound in Medicine* 40: 1863–1877. Available: <https://onlinelibrary.wiley.com/doi/abs/10.1002/jum.15570>.
14. Long W, Bradway D, Ahmed R, Long J, Trahey GE (2022) Spatial coherence adaptive clutter filtering in color flow imaging—part i: Simulation studies. *IEEE Open Journal of Ultrasonics, Ferroelectrics, and Frequency Control* 2: 106–118. Available: <http://dx.doi.org/10.1109/OJUFFC.2022.3184914>.
15. Long W, Bradway D, Ahmed R, Long J, Trahey GE (2022) Spatial coherence adaptive clutter filtering in color flow imaging—part II: Phantom and in vivo experiments. *IEEE Open Journal of Ultrasonics, Ferroelectrics, and Frequency Control* 2: 119–130. Available: <http://dx.doi.org/10.1109/OJUFFC.2022.3184909>.
16. Jin F, Kakkad V, Bradway D, LeFevre M, Kisslo J, et al. (2023) Evaluation of myocardial stiffness in cardiac amyloidosis using acoustic radiation force impulse and natural shear wave imaging. *Ultrasound in medicine & biology* 49: 1719–1727. doi:10.1016/j.ultrasmedbio.2023.03.016
17. Huber MT, Bradway DP, McNally PJ, Ellestad SC, Trahey GE (2024) In vivo demonstration of a real-time temporal SNR acoustic output adjustment method. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* 71: 960–971. Available: <http://dx.doi.org/10.1109/TUFFC.2024.3402530>.
18. Dobbins JT, Frush DP, Kigongo CJ, MacFall JR, Reiman RE, et al. (2019) Medical imaging safety in global health radiology. *Radiology in global health*. Springer. pp. 85–105.
19. Eyerly-Webb SA, Vejdani-Jahromi M, Kakkad V, Hollender P, Bradway D, et al. (2018) Acoustic radiation force-based ultrasound elastography for cardiac imaging applications. *Ultrasound elastography for biomedical applications and medicine*. John Wiley & Sons. pp. 504–519.
20. Hsu SJ, Bradway DP, Fahey BJ, Trahey GE (2007) Transthoracic Acoustic Radiation Force Impulse Imaging of the Cardiac Cycle. *Ultrasonic measurement and imaging of tissue elasticity*.
21. Bradway DP, Hsu SJ, Fahey BJ, Dahl JJ, Nichols TC, et al. (2007) 6B-6 Transthoracic Cardiac Acoustic Radiation Force Impulse Imaging: A Feasibility Study. *IEEE*. pp. 448–451. doi:10.1109/ULTSYM.2007.121

22. Fahey BJ, Nelson RC, Hsu SJ, Bradway DP, Dumont DM, et al. (2007) 6B-4 In Vivo Acoustic Radiation Force Impulse Imaging of Abdominal Lesions. 2007 IEEE ultrasonics symposium proceedings. IEEE. pp. 440–443. doi:10.1109/ULTSYM.2007.119
23. Bradway DP, Fahey BJ, Nelson RC, Trahey GE (2009) ARFI imaging of abdominal ablation and liver lesion biopsy. International symposium on ultrasonic imaging and tissue characterization, 2009. Available: http://uitc-symposium.org/2009_abstracts.pdf.
24. Husarik DB, Nelson RC, Bradway DP, Fahey BJ, Nightingale KR, et al. (2009) First Clinical Experience with Sonographic Elastography of the Liver Using Acoustic Radiation Force Impulse (ARFI) Imaging. RSNA. Available: <http://rsna2009.rsna.org/search>.
25. Nelson RC, Bradway DP, Fahey BJ, Trahey GE (2009) Future Application of Ultrasound: Acoustic Radiation Force Impulse (ARFI) Imaging. AIUM. Available: <http://www.aium.org/loginRequired/membersOnly/proceedings/2009.pdf>.
26. Bradway DP, Fahey BJ, Nelson RC, Trahey GE (2009) Recent Clinical Results of Acoustic Radiation Force Impulse Imaging of Abdominal Ablation. International tissue elasticity conference. Available: http://www.elasticityconference.org/prior_conf/2009/PDF/2009Proceedings.pdf.
27. Hsu SJ, Bradway DP, Bouchard RR, Hollender PJ, Wolf PD, et al. (2010) Parametric pressure-volume analysis and acoustic radiation force impulse imaging of left ventricular function. 2010 IEEE international ultrasonics symposium. IEEE. pp. 698–701. doi:10.1109/ULTSYM.2010.5935661
28. Hollender PJ, Bouchard RR, Hsu SJ, Bradway DP, Wolf PD, et al. (2010) Intracardiac measurements of elasticity using Acoustic Radiation Force Impulse (ARFI) methods: Temporal and spatial stability of shear wave velocimetry. 2010 IEEE international ultrasonics symposium. IEEE. pp. 698–701. doi:10.1109/ULTSYM.2010.5935946
29. Bradway DP, Hsu SJ, Wolf PD, Trahey GE (2010) Acoustic Radiation Force Impulse Imaging of Acute Myocardial Ischemia and Infarct. International symposium on ultrasonic imaging and tissue characterization. Available: http://uitc-symposium.org/2010_abstracts.pdf.
30. Bradway DP, Hsu SJ, Wolf PD, Trahey GE (2010) Transthoracic Acoustic Radiation Force Impulse Imaging of Cardiac Function. International tissue elasticity conference. Available: http://www.elasticityconference.org/prior_conf/2010/PDF/2010Proceedings.pdf.
31. Bradway DP, Rosenzweig SR, Doherty JR, Hyun D, Trahey GE (2011) Recent Results and Advances in Transthoracic Cardiac Acoustic Radiation Force Impulse Imaging. International symposium on ultrasonic imaging and tissue characterization. Available: http://www.elasticityconference.org/prior_conf/2011/PDF/2011ITECProceedings.pdf.
32. Byram BC, Gianantonio DM, Bradway DP, Hyun D, Jakovljevic M, et al. (2011) Direct in vivo Myocardial Infarct Visualization Using 3D Ultrasound and Passive Strain Contrast. International tissue elasticity conference. Available: http://www.elasticityconference.org/prior_conf/2011/PDF/2011ITECProceedings.pdf.
33. Byram BC, Bradway DP, Jakovljevic M, Gianantonio D, Hyun D, et al. (2011) Direct In Vivo Myocardial Infarct Visualization Using 3D Ultrasound and Passive Strain Contrast. IEEE ultrasonics symp. doi:10.1109/ULTSYM.2011.0007

34. Bradway DP, Hollender PJ, Goswami R, Wolf PD, Trahey GE (2012) Feasibility and safety of transthoracic cardiac acoustic radiation force impulse imaging methods. 2012 IEEE international ultrasonics symposium. IEEE. pp. 2027–2030. doi:10.1109/ULTSYM.2012.0507
35. Bradway DP, Hollender PJ, Goswami R, Wolf PD, Trahey GE (2012) Transthoracic Cardiac Acoustic Radiation Force Impulse Imaging: in vivo Feasibility, Methods, and Initial Results. International symposium on ultrasonic imaging and tissue characterization, 2012. Available: http://uitc-symposium.org/2012_abstracts.pdf.
36. Hollender PJ, Bradway DP, Goswami R, Wolf PD, Trahey GE (2012) Acoustic radiation force techniques for imaging cardiac infarct in vivo: methods and initial results. International symposium on ultrasonic imaging and tissue characterization. Available: http://uitc-symposium.org/2012_abstracts.pdf.
37. Eyerly SA, Bahnson T, Koontz J, Bradway DP, Dumont DM, et al. (2012) Confirmation of Cardiac Radiofrequency Ablation Treatment Using Intra-Procedure Acoustic Radiation Force Impulse Imaging. IEEE ultrasonics symposium. doi:10.1109/ULTSYM.2012.0509
38. Hollender PJ, Bradway DP, Wolf PD, Goswami R, Trahey GE (2012) Intracardiac ARF-driven Shear Wave Velocimetry to Estimate Regional Myocardial Stiffness and Contractility in Pigs with Focal Infarctions. IEEE ultrasonics symposium. doi:10.1109/ULTSYM.2012.0508
39. Goswami R, Bradway D, Kisslo J, Trahey G (2013) Novel Application of Acoustic Radiation Force Impulse Imaging in Transthoracic Echocardiography. Journal of the american college of cardiology. American College of Cardiology Foundation, Vol. 61. p. E1090. doi:10.1016/S0735-1097(13)61090-6
40. Patel V, Dahl JJ, Bradway DP, Doherty JR, Smith SW (2013) Acoustic radiation force impulse imaging on an IVUS circular array. 2013 IEEE international ultrasonics symposium (IUS). IEEE. pp. 773–776. doi:10.1109/ULTSYM.2013.0199
41. Bradway DP, Pihl MJ, Krebs andreas, Tomov BG, Kjær CS, et al. (2014) Real-time GPU implementation of transverse oscillation vector velocity flow imaging. SPIE medical imaging. Vol. 9040. pp. 90401Y-90401Y-6. doi:10.1117/12.2043582
42. Bradway DP, Hansen KL, Nielsen MB, Jensen JA (2015) Transverse oscillation vector flow imaging for transthoracic echocardiography. SPIE medical imaging. pp. 941902-941902-7. doi:10.1117/12.2081145
43. Bottenus N, Long W, Bradway D, Trahey G (2015) Phantom and in vivo demonstration of swept synthetic aperture imaging. 2015 IEEE international ultrasonics symposium (IUS). pp. 1–4. doi:10.1109/ULTSYM.2015.0075
44. Kakkad V, Kuo L, Bradway D, Trahey G, Sivak J, et al. (2015) In vivo transthoracic measurements of acoustic radiation force induced displacements in the heart over the cardiac cycle. 2015 IEEE international ultrasonics symposium (IUS). pp. 1–5. doi:10.1109/ULTSYM.2015.0155
45. Kakkad V, Ferlauto H, Bradway D, Heyde B, Kisslo J, et al. (2017) Clinical feasibility of a noninvasive method to interrogate myocardial function via strain and acoustic radiation force-derived stiffness. IEEE international ultrasonics symposium, IUS. doi:10.1109/ULTSYM.2017.8092067
46. Hollender P, Bottenus N, Bradway D, Trahey G (2017) Single track location comb-push ultrasound shear elastography (STL-CUSE). IEEE international ultrasonics symposium, IUS. doi:10.1109/ULTSYM.2017.8092809

- 47. Long W, Hyun D, Choudhury K, Bradway D, McNally P, et al. (2017) Translation of fetal short-lag spatial coherence (SLSC) imaging into clinical practice: A pilot study. 2017 IEEE international ultrasonics symposium (IUS). pp. 1–1. doi:10.1109/ULTSYM.2017.8091968
- 48. Flint K, Bottenus N, Long W, Bradway D, McNally P, et al. (2018) Implementation and clinical evaluation of a fetal ALARA ultrasound system. 2018 IEEE international ultrasonics symposium (IUS). pp. 1–4. doi:10.1109/ULTSYM.2018.8579734
- 49. Bernard O, Bradway D, Hansen HHG, Kruizinga P, Nair A, et al. (2018) The Ultrasound File Format (UFF) - First Draft. 2018 IEEE international ultrasonics symposium. IEEE.
- 50. Hollender P, Noor S, Bradway D, Trahey G (2019) Force-Map Normalization for ARFI Imaging. 2019 IEEE international ultrasonics symposium. IEEE. pp. 411–414.
- 51. Huber M, Flint K, Barre E, Bradway D, McNally P, et al. (2021) Mechanisms affecting ALARA MI selected in adaptive ultrasound imaging. 2021 IEEE international ultrasonics symposium (IUS). pp. 1–4. doi:10.1109/IUS52206.2021.9593860
- 52. Srinivasan S, Yoon D, Ruding M, Eckstein K, Rouze N, et al. (2024) Characterization of anisotropic lattice structured phantoms using 3D-rotational shear wave elasticity imaging (3D-RSWEI). IEEE ultrasonics, ferroelectrics, and frequency control joint symposium, UFFC-JS 2024 - proceedings. doi:10.1109/UFFC-JS60046.2024.10793726