



## Daniel Bruce Ennis

Professor of Radiology (Veterans Affairs) and, by courtesy, of Bioengineering

### CONTACT INFORMATION

- **Administrative Contact**

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**Tel** 650.721.4641

### Bio

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#### BIO

Daniel Ennis is a Professor in the Department of Radiology and Bioengineering (by courtesy). As an MRI scientist for nearly twenty-five years, he has worked to develop advanced basic science and translational cardiovascular MRI methods for quantitatively assessing structure, function, flow, and remodeling in both adult and pediatric populations. He began his research career as a Ph.D. student in the Department of Biomedical Engineering at Johns Hopkins University during which time he formed an active collaboration with investigators in the Laboratory of Cardiac Energetics at the National Heart, Lung, and Blood Institute (NIH/NHLBI). Thereafter, he joined the Departments of Radiological Sciences and Cardiothoracic Surgery at Stanford University as a postdoc and began to establish an independent research program with an NIH K99/R00 award focused on "Myocardial Structure, Function, and Remodeling in Mitral Regurgitation."

For ten years he led a group of clinicians and scientists at UCLA working to develop and evaluate advanced cardiovascular MRI exams as PI of several NIH funded studies. In 2018 he returned to the Department of Radiology at Stanford University as faculty in the Radiological Sciences Lab to bolster programs in cardiovascular MRI. He was a member of the committee that founded the Biomedical Physics (BMP) PhD program in the School of Medicine and continues to serve on the Executive Committee. He is also the Director of Radiology Research for the Veterans Administration Palo Alto Health Care System where he oversees a growing radiology research program. In 2025 he became the Division Chief for the Radiological Sciences Lab, a division within the Department of Radiology and home to about 80 faculty, staff, and trainees focused on advanced medical imaging research.

#### ACADEMIC APPOINTMENTS

- Professor, Radiology
- Professor (By courtesy), Bioengineering
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Wu Tsai Human Performance Alliance
- Member, Maternal & Child Health Research Institute (MCHRI)

## ADMINISTRATIVE APPOINTMENTS

- Radiological Sciences Lab, Division Chief, Department of Radiology, Stanford University, (2025- present)
- Program Director, Stanford Translational Biomedical Imaging Instrumentation (TBI2) Training Program (NIH T32), (2023- present)
- Research Space and Technology, Director, Department of Radiology, Stanford University, (2020- present)
- Radiology Research, Director, Veterans Affairs Palo Alto Health Care System, (2018- present)

## HONORS AND AWARDS

- Fellow, International Society for Magnetic Resonance in Medicine (ISMRM) (2020)
- Distinguished Investigator, Academy for Radiology and Biomedical Imaging Research (2020)
- Fellow, American Heart Association (AHA), Council on Cardiovascular Radiology and Intervention (2020)
- Fellow, Society for Cardiovascular Magnetic Resonance (SCMR) (2018)
- Outstanding Basic Science Faculty Teaching Award, Department of Radiology, University of California, Los Angeles (2014, 2016, 2017)
- Young Investigator Award (Moore Award) {Mentor}, International Society for Magnetic Resonance in Medicine (2012)
- Distinguished Reviewer Award, Magnetic Resonance in Medicine (2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019)

## BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Executive Committee, Member, Biomedical Physics PhD Program at Stanford University (2019 - present)
- Deputy Editor, Magnetic Resonance in Medicine (2016 - 2022)
- Chair (Founder), ISMRM Research Exchange Program (2016 - 2020)
- Annual Meeting Program Committee, Member, International Society for Magnetic Resonance in Medicine (ISMRM) (2012 - 2015)
- Charter Member & Chair, NIH Imaging Technology Development (ITD) Study Section (2020 - 2022)
- Charter Member, NIH Imaging Technology Development (ITD) Study Section (2019 - 2020)
- Member, NIH Biomedical Imaging Technology (BMIT) A & B Study Section (2017 - 2018)
- Editorial Board, Journal of Cardiovascular Magnetic Resonance (2016 - present)

## PROFESSIONAL EDUCATION

- Post-Doc, Stanford University , Radiology and Cardiothoracic Surgery (2008)
- Ph.D., Johns Hopkins University , Biomedical Engineering (2004)
- B.S., University of California, San Diego , Bioengineering (1997)

## LINKS

- Google Scholar Profile: <https://scholar.google.com/citations?user=wte2o4oAAAAJ&hl=en>
- NIH MyBibliography Profile: <https://www.ncbi.nlm.nih.gov/myncbi/daniel.ennis.1/bibliography/public/>
- PubMed Profile: <https://pubmed.ncbi.nlm.nih.gov/?term=ennis+db&sort=date>
- CMR Group's Lab Page: <http://med.stanford.edu/cmrgroup.html>

## Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

The Cardiac MRI Group seeks to invent and validate methods to quantify cardiac performance. We are broadly interested in MRI-based technologies that advance basic science understanding and have translational impact. Our methods developments and applications focus on characterizing cardiac structure, function, flow, and remodeling.

Cardiac Diffusion Tensor Imaging – We have pioneered techniques to measure cardiac structure in vivo using diffusion-based MRI methods, i.e. cardiac diffusion tensor imaging (cDTI). This enables us to estimate the orientation and organization of cardiomyocytes in small voxel volumes of about 2 x 2 x 8mm in vivo, i.e. at the mesostructural scale. To do so, we leverage high-performance 3T MRI systems ( $G_{max} = 200$  mT/m;  $S_{max} = 200$  T/m/s) and our Gradient Optimization (GrOpt) toolbox to numerically and optimally design gradient waveforms that maximize SNR-efficiency and motion robustness, while also avoiding peripheral nerve stimulation (PNS).

Cardiac Displacement Imaging – We have also developed several methods to quantify regional cardiac function using both MRI tagging and cine DENSE imaging. Both of these methods encode cardiac motion in the magnitude and phase (respectively) of the MRI signal. With appropriate image processing, one can obtain 2D+time or 3D+time displacement vector maps for each myocardial pixel. This enables direct computation of myocardial strain. In fact, we have pioneered methods that combined cDTI mesostructural information with regional displacement calculations to estimate local “myofiber” strain. This is the only approach to estimating in vivo “myofiber” strain, which provides the most direct measure of mechanistic performance.

Cardiac Flow Imaging – We also develop advanced methods for 2D (plus time) and 4D (3D+time) cardiovascular flow measurements using phase contrast MRI. Herein, we also use our GrOpt toolbox to design optimal gradient waveforms that maximize SNR-efficiency and minimize systemic measurement errors. Our approach enables the fastest-possible MRI scanning while minimizing velocity estimation errors. These approaches are useful for clinical estimates of cardiovascular flow. In fact, our most recent developments enable estimates of relative pressure losses.

Gradient System Characterization – MRI gradient systems have exceptional performance characteristics that enable ultra-fast imaging and strong encoding capabilities. Nevertheless, these same systems are also known to be imperfect owing to existing engineering limitations. We work to develop measurement methods to characterize MRI gradient systems using the Gradient Impulse Response Function (GIRF) and Gradient System Transfer Function (GSTF) frameworks. Once a gradient system is well characterized, we can use the GIRF/GSTF to prospectively design gradient waveforms that mitigate encoding errors or correct them retrospectively.

Patient-Specific 3D-Printed Compliant Cardiovascular Models – We leverage advanced 3D-printing technologies to build patient-specific compliant cardiovascular models that enable in vitro testing and system optimization. Our in vitro systems are powered by a computer-controlled dynamic flow pump for which the hemodynamics (pressures) are controlled with a system of resistors and capacitors. We can evaluate these systems with bench-top flow and pressure probes, then place the entire MRI-compatible system in the MRI scanner for MRI-based evaluation of hemodynamics with 2D/4D flow. This system enables us to test novel MRI methods in a controlled experiment and entirely eliminates the need for animal experimentation in the lab.

Together, we form a strong team with a depth of capabilities focused on cardiovascular MRI technical and translational developments. Research in the lab is supported by the NIH, NSF, AHA, ARPA-H, and industry partners.

## Teaching

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### COURSES

#### 2025-26

- Medical Imaging Ethics: RAD 255 (Win)
- The Magic of Medical Imaging: RAD 21Q (Win)

#### 2024-25

- MRI Sequences and Signals: BMP 229, RAD 229 (Spr)

- The Magic of Medical Imaging: RAD 21Q (Aut)

#### 2023-24

- The Magic of Medical Imaging: RAD 21Q (Aut)

#### 2022-23

- MRI Sequences and Signals: BMP 229, RAD 229 (Spr)

### STANFORD ADVISEES

#### Postdoctoral Faculty Sponsor

Carlos Castillo Passi, Tyler Cork, Charles McGrath, Simon Thalen, Ruiyang Zhao

#### Doctoral Dissertation Advisor (AC)

Jacob Blum, Ariel Hannum, Xitong Wang

#### Doctoral Dissertation Co-Advisor (AC)

Priya Nair

### GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Biomedical Physics (Phd Program)
- Pediatric Radiology (Fellowship Program)

## Publications

### PUBLICATIONS

- **Diffusion-weighted Imaging of the Liver: Primed for New Business.** *Radiology*  
Brunsing, R. L., Syed, A. B., Hargreaves, B. A., Ennis, D. B.  
2026; 319 (2): e250157
- **Toward Modality- and Sampling-Universal Learning Strategies for Accelerating Cardiovascular Imaging: Summary of the CMRxRecon2024 Challenge** *IEEE TRANSACTIONS ON MEDICAL IMAGING*  
Wang, F., Wang, Z., Li, Y., Lyu, J., Qin, C., Wang, S., Guo, K., Sun, M., Huang, M., Zhang, H., Tanzer, M., Li, Q., Chen, et al  
2026; 45 (5): 1872-1887
- **Cardiac Mechanics Modeling: Recent Developments and Current Challenges** *JOURNAL OF ELASTICITY*  
Brown, A. L., Liu, J., Ennis, D. B., Marsden, A. L.  
2026; 158 (2)
- **Personalized biventricular mechanics and sensitivity to model morphology.** *bioRxiv : the preprint server for biology*  
Brown, A. L., Shi, L., Salvador, M., Kong, F., Ennis, D. B., Chen, I., Vedula, V., Marsden, A. L.  
2025
- **The Effect of Voxel Volume and Voxel Shape on Cardiac Diffusion Tensor Imaging Metrics** *MAGNETIC RESONANCE IN MEDICINE*  
Hannum, A. J., Cork, T. E., Setsompop, K., Ennis, D. B.  
2025
- **Regional heterogeneity in left atrial stiffness impacts passive deformation in a cohort of patient-specific models.** *PLoS computational biology*  
Baptiste, T. M., Rodero, C., Sillett, C. P., Strocchi, M., Lanyon, C. W., Augustin, C. M., Lee, A. W., Alonso Solís-Lemus, J., Roney, C. H., Ennis, D. B., Rajani, R., Rinaldi, C. A., Plank, et al  
2025; 21 (11): e1013656
- **Evaluation of EPI-Based Distortion Correction Techniques for Cardiac Diffusion Tensor Imaging.** *NMR in biomedicine*  
Cork, T. E., Middione, M. J., Loecher, M., Liao, C., Setsompop, K., Ennis, D. B.

2025; 38 (11): e70147

- **Cardiac mechanics modeling: recent developments and current challenges.** *ArXiv*  
Brown, A. L., Liu, J., Ennis, D. B., Marsden, A. L.  
2025
- **Multi-centre Investigation of Cardiac Diffusion Tensor Imaging in Healthy Volunteers by SCMR Cardiac Diffusion Special Interest Group NETWORK (SIGNET).** *Journal of cardiovascular magnetic resonance : official journal of the Society for Cardiovascular Magnetic Resonance*  
Teh, I., Moulin, K., Ferreira, P. F., Absil, J., Afzali, M., Agger, P., Akbari, B., Aletras, A. H., Aono, S., Benton, C., Bhattacharya, S., Croisille, P., De Bruecker, et al  
2025: 101948
- **Multi-Shot Diffusion Imaging Using Motion Compensation Diffusion Encoding Waveforms and EPI With Keyhole.** *NMR in biomedicine*  
Moulin, K., Cork, T., Troalen, T., Chow, K., Ennis, D. B., Croisille, P., Viallon, M.  
2025; 38 (7): e70022
- **Is regional atrial strain a useful surrogate of regional atrial fibrosis in atrial cardiomyopathy?** *European heart journal. Imaging methods and practice*  
Lee, A. W., Sillett, C., Solis-Lemus, J. A., Kessler Iglesias, C., Hopman, L. H., Hua, A., Wheen, P., Qayyum, A., Strocchi, M., Roney, C., Booth, T., Ismail, T. F., Chubb, et al  
2025; 3 (2): qyaf068
- **Experiments and Simulations to Assess Exercise-Induced Pressure Drop Across Aortic Coarctations.** *Journal of biomechanical engineering*  
Nair, P. J., Perra, E., McElhinney, D. B., Marsden, A., Ennis, D. B., Dual, S.  
2025: 1-16
- **Comprehensive Analysis of Relative Pressure Estimation Methods Utilizing 4D Flow MRI.** *ArXiv*  
Hardy, B., Zimmermann, J., Lechner, V., Bonini, M., Sotelo, J. A., Burris, N. S., Ennis, D. B., Marlevi, D., Nordsletten, D. A.  
2025
- **DENSE-SIM: A modular pipeline for the evaluation of cine DENSE images with sub-voxel ground-truth strain.** *Journal of cardiovascular magnetic resonance : official journal of the Society for Cardiovascular Magnetic Resonance*  
Barbaroux, H., Loecher, M., Brackener, Y., Kunze, K. P., Neji, R., Pennell, D. J., Ennis, D. B., Nielles-Vallespin, S., Scott, A. D., Young, A. A.  
2025: 101866
- **Characterizing variability in passive myocardial stiffness in healthy human left ventricles using personalized MRI and finite element modeling.** *Scientific reports*  
Kolawole, F. O., Wang, V. Y., Freytag, B., Loecher, M., Cork, T. E., Nash, M. P., Kuhl, E., Ennis, D. B.  
2025; 15 (1): 5556
- **An axis-specific mitral annuloplasty ring eliminates mitral regurgitation allowing mitral annular motion in an ovine model.** *Communications medicine*  
Zhu, Y., Imbrie-Moore, A. M., Park, M. H., Cork, T. E., Yajima, S., Wilkerson, R. J., Tran, N. A., Marin-Cuartas, M., Mullis, D. M., Baker, S. W., Tada, Y., Ueyama, T., Leipzig, et al  
2025; 5 (1): 40
- **Left Ventricular Twist and Circumferential Strain from MRI Tagging Predict Early Cardiovascular Disease in Duchenne Muscular Dystrophy.** *Diagnostics (Basel, Switzerland)*  
Liu, Z. Q., Magrath, P., Maforo, N. G., Loecher, M., Wu, H. H., Prosper, A., Renella, P., Halnon, N., Ennis, D. B.  
2025; 15 (3)
- **Motion-Compensated Multishot Pancreatic Diffusion-Weighted Imaging With Deep Learning-Based Denoising.** *Investigative radiology*  
Wang, K., Middione, M. J., Loening, A. M., Syed, A. B., Hannum, A. J., Wang, X., Guidon, A., Lan, P., Ennis, D. B., Brunsing, R. L.  
2025
- **Evaluating Cardiac Strains from One and Two Short-Axis Slice Models Based on DENSE and Cine MRI**  
Marques, A., Jahromi, M., Wellner, L., Hannum, A. J., Liu, Z., Wu, D., Ennis, D. B., Perotti, L. E.  
edited by Chabiniok, R., Zou, Q., Hussain, T., Nguyen, H. H., Zaha, V. G., Gusseva, M.  
SPRINGER INTERNATIONAL PUBLISHING AG.2025: 126-136
- **Characterizing Global and Regional Cardiac Diffusion Tensor Imaging Metrics in Healthy Subjects**

Hannum, A. J., Cork, T. E., Perotti, L. E., Ennis, D. B.  
edited by Chabiniok, R., Zou, Q., Hussain, T., Nguyen, H. H., Zaha, V. G., Gusseva, M.  
SPRINGER INTERNATIONAL PUBLISHING AG.2025: 186-196

- **Evaluating the Effect of Post-processing Steps When Analyzing Cardiac Diffusion Tensor Data**  
Cork, T. E., Hannum, A. J., Loecher, M., Perotti, L. E., Ennis, D. B.  
edited by Chabiniok, R., Zou, Q., Hussain, T., Nguyen, H. H., Zaha, V. G., Gusseva, M.  
SPRINGER INTERNATIONAL PUBLISHING AG.2025: 137-149
- **Automated Global and Regional Segmentation of Cardiac Diffusion Tensor Images**  
Stocker, S. W., Hannum, A. J., Cork, T. E., Ennis, D. B.  
edited by Chabiniok, R., Zou, Q., Hussain, T., Nguyen, H. H., Zaha, V. G., Gusseva, M.  
SPRINGER INTERNATIONAL PUBLISHING AG.2025: 174-185
- **Assessing the Impact of Cardiac Output and Valve Orientation on Bioprosthetic Pulmonary Valve Hemodynamics Using In Vitro 4D-Flow MRI and High-Speed Imaging.** *Cardiovascular engineering and technology*  
Schiavone, N. K., Nair, P. J., Elkins, C. J., McElhinney, D. B., Ennis, D. B., Eaton, J. K., Marsden, A. L.  
2024
- **MRI-Based Circumferential Strain in Boys with Early Duchenne Muscular Dystrophy Cardiomyopathy.** *Diagnostics (Basel, Switzerland)*  
Liu, Z. Q., Maforo, N. G., Magrath, P., Prosper, A., Renella, P., Halnon, N., Wu, H. H., Ennis, D. B.  
2024; 14 (23)
- **Cardiac diffusion-weighted and tensor imaging: a Society for Cardiovascular Magnetic Resonance (SCMR) special interest group consensus statement.** *Journal of cardiovascular magnetic resonance : official journal of the Society for Cardiovascular Magnetic Resonance*  
Dall'Armellina, E., Ennis, D. B., Axel, L., Croisille, P., Ferreira, P. F., Gotschy, A., Lohr, D., Moulin, K., Nguyen, C., Nielles-Vallespin, S., Romero, W., Scott, A. D., Stoeck, et al  
2024: 101109
- **Phase contrast MRI with minimized background phase errors.** *Magnetic resonance in medicine*  
Loecher, M., Ennis, D. B.  
2024
- **Diffusion Tensor MRI of the Heart: Now Feasible on Your Neighborhood Scanner.** *Journal of cardiovascular magnetic resonance : official journal of the Society for Cardiovascular Magnetic Resonance*  
Sosnovik, D. E., Ennis, D. B.  
2024: 101101
- **Design and implementation of a cost-effective, open-source, and programmable pulsatile flow system** *HARDWAREX*  
Herwald, S. E., Sze, D. Y., Ennis, D. B., Vezeridis, A. M.  
2024; 19
- **Design and implementation of a cost-effective, open-source, and programmable pulsatile flow system.** *HardwareX*  
Herwald, S. E., Sze, D. Y., Ennis, D. B., Vezeridis, A. M.  
2024; 19: e00561
- **SDF4CHD: Generative modeling of cardiac anatomies with congenital heart defects.** *Medical image analysis*  
Kong, F., Stocker, S., Choi, P. S., Ma, M., Ennis, D. B., Marsden, A. L.  
2024; 97: 103293
- **Phase stabilization with motion compensated diffusion weighted imaging.** *Magnetic resonance in medicine*  
Hannum, A. J., Cork, T. E., Setsompop, K., Ennis, D. B.  
2024
- **A deep learning approach for fast muscle water T2 mapping with subject specific fat T2 calibration from multi-spin-echo acquisitions.** *Scientific reports*  
Barbieri, M., Hooijmans, M. T., Moulin, K., Cork, T. E., Ennis, D. B., Gold, G. E., Kogan, F., Mazzoli, V.  
2024; 14 (1): 8253
- **A three-dimensional left atrial motion estimation from retrospective gated computed tomography: application in heart failure patients with atrial fibrillation** *FRONTIERS IN CARDIOVASCULAR MEDICINE*

- Sillett, C., Razeghi, O., Lee, A. W. C., Solis Lemus, J., Roney, C., Mannina, C., de Vere, F., Ananthan, K., Ennis, D. B., Haberland, U., Xu, H., Young, A., Rinaldi, et al  
2024; 11: 1359715
- **Pre-excitation gradients for eddy current nulled convex optimized diffusion encoding (Pre-ENCODE).** *Magnetic resonance in medicine*  
Middione, M. J., Loecher, M., Cao, X., Setsompop, K., Ennis, D. B.  
2024
  - **Non-invasive Estimation of Pressure Drop Across Aortic Coarctations: Validation of 0D and 3D Computational Models with In Vivo Measurements.** *Annals of biomedical engineering*  
Nair, P. J., Pfaller, M. R., Dual, S. A., McElhinney, D. B., Ennis, D. B., Marsden, A. L.  
2024
  - **SCMR Expert Consensus Statement for Cardiovascular Magnetic Resonance of Patients with a Cardiac Implantable Electronic Device.** *Journal of cardiovascular magnetic resonance : official journal of the Society for Cardiovascular Magnetic Resonance*  
Kim, D., Collins, J. D., White, J. A., Hanneman, K., Lee, D. C., Patel, A. R., Hu, P., Litt, H., Weinsaft, J. W., Davids, R., Mukai, K., Ng, M. Y., Luetkens, et al  
2024: 100995
  - **An nnU-Net Model to Enhance Segmentation of Cardiac Cine DENSE-MRI Using Phase Information**  
Jahromi, M., Marques, A., Ahmed, M., Liu, Z., Hannum, A. J., Ennis, D. B., Perotti, L. E., Wu, D., IEEE COMPUTER SOC  
IEEE COMPUTER SOC.2024: 670-673
  - **Hemodynamic effects of entry and exit tear size in aortic dissection evaluated with in vitro magnetic resonance imaging and fluid-structure interaction simulation.** *Scientific reports*  
Zimmermann, J., Bäuml, K., Loecher, M., Cork, T. E., Marsden, A. L., Ennis, D. B., Fleischmann, D.  
2023; 13 (1): 22557
  - **SDF4CHD: Generative Modeling of Cardiac Anatomies with Congenital Heart Defects.** *ArXiv*  
Kong, F., Stocker, S., Choi, P. S., Ma, M., Ennis, D. B., Marsden, A.  
2023
  - **Coil sketching for computationally efficient MR iterative reconstruction.** *Magnetic resonance in medicine*  
Oscanoa, J. A., Ong, F., Iyer, S. S., Li, Z., Sandino, C. M., Ozturkler, B., Ennis, D. B., Pilanci, M., Vasanaawala, S. S.  
2023
  - **Abbreviated cardiac magnetic resonance imaging versus echocardiography for interval assessment of systolic function in Duchenne muscular dystrophy: patient satisfaction, clinical utility, and image quality.** *The international journal of cardiovascular imaging*  
Chandrasekar, H., Kaufman, B. D., Beattie, M. J., Ennis, D. B., Syed, A. B., Zucker, E. J., Maskatia, S. A.  
2023
  - **Non-invasive estimation of pressure drop across aortic coarctations: validation of 0D and 3D computational models with in vivo measurements.** *medRxiv : the preprint server for health sciences*  
Nair, P. J., Pfaller, M. R., Dual, S. A., McElhinney, D. B., Ennis, D. B., Marsden, A. L.  
2023
  - **Quinapril treatment curtails decline of global longitudinal strain and mechanical function in hypertensive rats.** *Journal of hypertension*  
Wilson, A. J., Sands, G. B., Wang, V. Y., Pontre, B., Ennis, D. B., Young, A. A., LeGrice, I. J., Nash, M. P.  
2023
  - **StrainNet: Improved Myocardial Strain Analysis of Cine MRI by Deep Learning from DENSE** *RADIOLOGY-CARDIOTHORACIC IMAGING*  
Wang, Y., Sun, C., Ghadimi, S., Auger, D. C., Croisille, P., Viallon, M., Mangion, K., Berry, C., Haggerty, C. M., Jing, L., Fornwalt, B. K., Cao, J., Cheng, et al  
2023; 5 (3)
  - **StrainNet: Improved Myocardial Strain Analysis of Cine MRI by Deep Learning from DENSE.** *Radiology. Cardiothoracic imaging*  
Wang, Y., Sun, C., Ghadimi, S., Auger, D. C., Croisille, P., Viallon, M., Mangion, K., Berry, C., Haggerty, C. M., Jing, L., Fornwalt, B. K., Cao, J. J., Cheng, et al  
2023; 5 (3): e220196
  - **In Vivo Cardiac Diffusion Imaging Without Motion-Compensation Leads to Unreasonably High Diffusivity.** *Journal of magnetic resonance imaging : JMRI*

- Moulin, K., Stoeck, C. T., Axel, L., Broncano, J., Croisille, P., Dall'Armellina, E., Ennis, D. B., Ferreira, P. F., Gotschy, A., Miro, S., Schneider, J. E., Scott, A. D., Sosnovik, et al  
2023
- **Hemodynamic Effects of Entry and Exit Tear Size in Aortic Dissection Evaluated with In Vitro Magnetic Resonance Imaging and Fluid-Structure Interaction Simulation.** *ArXiv*  
Zimmermann, J., Bäuml, K., Loecher, M., Cork, T. E., Marsden, A. L., Ennis, D. B., Fleischmann, D.  
2023
  - **Validating MRI-Derived Myocardial Stiffness Estimates Using In Vitro Synthetic Heart Models.** *Annals of biomedical engineering*  
Kolawole, F. O., Peirlinck, M., Cork, T. E., Levenston, M., Kuhl, E., Ennis, D. B.  
2023
  - **Deep Learning-Based Reconstruction for Cardiac MRI: A Review.** *Bioengineering (Basel, Switzerland)*  
Oscanoa, J. A., Middione, M. J., Alkan, C., Yurt, M., Loecher, M., Vasanaawala, S. S., Ennis, D. B.  
2023; 10 (3)
  - **Seeing the Unseen in Cardiac Remodeling: Cardiac Diffusion Tensor Imaging as a Structural Biomarker in STEMI.** *JACC. Cardiovascular imaging*  
Ennis, D. B., Salerno, M.  
2023; 16 (2): 172-174
  - **Myocardial Segmentation of Tagged Magnetic Resonance Images with Transfer Learning Using Generative Cine-To-Tagged Dataset Transformation.** *Bioengineering (Basel, Switzerland)*  
Dhaene, A. P., Loecher, M., Wilson, A. J., Ennis, D. B.  
2023; 10 (2)
  - **Hemodynamic Effects of Entry Versus Exit Tear Size and Tissue Stiffness in Simulations of Aortic Dissection**  
Bauml, K., Zimmermann, J., Ennis, D. B., Marsden, A. L., Fleischmann, D.  
edited by Tavares, J. M., Bourauel, C., Geris, L., Slote, J. V.  
SPRINGER INTERNATIONAL PUBLISHING AG.2023: 143-152
  - **Multishot Diffusion-Weighted MRI of the Breasts in the Supine vs. Prone Position.** *Journal of magnetic resonance imaging : JMRI*  
Moran, C. J., Middione, M. J., Mazzoli, V., McKay-Nault, J. A., Guidon, A., Waheed, U., Rosen, E. L., Poplack, S. P., Rosenberg, J., Ennis, D. B., Hargreaves, B. A., Daniel, B. L.  
2022
  - **4D flow cardiovascular magnetic resonance recovery profiles following pulmonary endarterectomy in chronic thromboembolic pulmonary hypertension.** *Journal of cardiovascular magnetic resonance : official journal of the Society for Cardiovascular Magnetic Resonance*  
Dong, M. L., Azarine, A., Haddad, F., Amsallem, M., Kim, Y., Yang, W., Fadel, E., Aubregé, L., Loecher, M., Ennis, D., Pavéc, J. L., Vignon-Clementel, I., Feinstein, et al  
2022; 24 (1): 59
  - **Electrohydraulic Vascular Compression Device (e-VaC) with Integrated Sensing and Controls** *ADVANCED MATERIALS TECHNOLOGIES*  
Pirozzi, I., Kight, A., Liang, X., Han, A., Ennis, D. B., Hiesinger, W., Dual, S. A., Cutkosky, M. R.  
2022
  - **Accelerated two-dimensional phase-contrast for cardiovascular MRI using deep learning-based reconstruction with complex difference estimation.** *Magnetic resonance in medicine*  
Oscanoa, J. A., Middione, M. J., Syed, A. B., Sandino, C. M., Vasanaawala, S. S., Ennis, D. B.  
2022
  - **Validation of the Reduced Unified Continuum Formulation Against In Vitro 4D-Flow MRI.** *Annals of biomedical engineering*  
Lan, I. S., Liu, J., Yang, W., Zimmermann, J., Ennis, D. B., Marsden, A. L.  
2022
  - **Framework for patient-specific simulation of hemodynamics in heart failure with counterpulsation support.** *Frontiers in cardiovascular medicine*  
Arduini, M., Pham, J., Marsden, A. L., Chen, I. Y., Ennis, D. B., Dual, S. A.  
2022; 9: 895291

- **Myocardial Mesostructure and Mesofunction.** *American journal of physiology. Heart and circulatory physiology*  
Wilson, A. J., Sands, G. B., LeGrice, I. J., Young, A. A., Ennis, D. B.  
2022
- **Reproducibility of global and segmental myocardial strain using cine DENSE at 3T: a multicenter cardiovascular magnetic resonance study in healthy subjects and patients with heart disease.** *Journal of cardiovascular magnetic resonance : official journal of the Society for Cardiovascular Magnetic Resonance*  
Auger, D. A., Ghadimi, S., Cai, X., Reagan, C. E., Sun, C., Abdi, M., Cao, J. J., Cheng, J. Y., Ngai, N., Scott, A. D., Ferreira, P. F., Oshinski, J. N., Emamifar, et al  
2022; 24 (1): 23
- **In Vivo Super-Resolution Cardiac Diffusion Tensor MRI: A Feasibility Study.** *Diagnostics (Basel, Switzerland)*  
Le Bars, A., Moulin, K., Ennis, D. B., Felblinger, J., Chen, B., Odille, F.  
2022; 12 (4)
- **Validation of cardiac diffusion tensor imaging sequences: A multi-centre test-retest phantom study.** *NMR in biomedicine*  
Teh, I., Romero, W., Boyle, J., Coll-Font, J., Dall'Armellina, E., Ennis, D. B., Ferreira, P. F., Kalra, P., Kolipaka, A., Kozerke, S., Lohr, D., Mongeon, F., Moulin, et al  
1800: e4685
- **Diffusion biomarkers in chronic myocardial infarction.** *Functional imaging and modeling of the heart : ... International Workshop, FIMH ..., proceedings. FIMH*  
Rahman, T., Moulin, K., Ennis, D. B., Perotti, L. E.  
2021; 12738: 137-147
- **Reproducibility of Left Ventricular CINE DENSE Strain in Pediatric Subjects with Duchenne Muscular Dystrophy.** *Functional imaging and modeling of the heart : ... International Workshop, FIMH ..., proceedings. FIMH*  
Liu, Z. Q., Maforo, N. G., Renella, P., Halnon, N., Wu, H. H., Ennis, D. B.  
2021; 12738: 232-241
- **Optimisation of Left Atrial Feature Tracking Using Retrospective Gated Computed Tomography Images.** *Functional imaging and modeling of the heart : ... International Workshop, FIMH ..., proceedings. FIMH*  
Sillett, C., Razeghi, O., Strocchi, M., Roney, C. H., O'Brien, H., Ennis, D. B., Haberland, U., Rajani, R., Rinaldi, C. A., Niederer, S. A.  
2021; 12738: 71-83
- **Arbitrary Point Tracking with Machine Learning to Measure Cardiac Strains in Tagged MRI.** *Functional imaging and modeling of the heart : ... International Workshop, FIMH ..., proceedings. FIMH*  
Loecher, M., Hannum, A. J., Perotti, L. E., Ennis, D. B.  
2021; 12738: 213-222
- **Right Ventricular Function and T1-Mapping in Boys With Duchenne Muscular Dystrophy.** *Journal of magnetic resonance imaging : JMIR*  
Dual, S. A., Maforo, N. G., McElhinney, D. B., Prosper, A., Wu, H. H., Maskatia, S., Renella, P., Halnon, N., Ennis, D. B.  
2021
- **Fully-automated global and segmental strain analysis of DENSE cardiovascular magnetic resonance using deep learning for segmentation and phase unwrapping.** *Journal of cardiovascular magnetic resonance : official journal of the Society for Cardiovascular Magnetic Resonance*  
Ghadimi, S., Auger, D. A., Feng, X., Sun, C., Meyer, C. H., Bilchick, K. C., Cao, J. J., Scott, A. D., Oshinski, J. N., Ennis, D. B., Epstein, F. H.  
2021; 23 (1): 20
- **Myofiber strain in healthy humans using DENSE and cDTI.** *Magnetic resonance in medicine*  
Moulin, K., Croisille, P., Viallon, M., Verzhbinsky, I. A., Perotti, L. E., Ennis, D. B.  
2021
- **On the impact of vessel wall stiffness on quantitative flow dynamics in a synthetic model of the thoracic aorta.** *Scientific reports*  
Zimmermann, J. n., Loecher, M. n., Kolawole, F. O., Bäumlner, K. n., Gifford, K. n., Dual, S. A., Levenston, M. n., Marsden, A. L., Ennis, D. B.  
2021; 11 (1): 6703
- **Using synthetic data generation to train a cardiac motion tag tracking neural network.** *Medical image analysis*  
Loecher, M., Perotti, L. E., Ennis, D. B.  
2021; 74: 102223

- **Evaluation of Patient Positioning to Mitigate RF-induced Heating of Cardiac Implantable Electronic Devices for Pediatric MRI Exams.** *Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference*  
Martinez, J. A., Cork, T. E., Chubb, H., Vasanaawala, S., Ennis, D. B.  
2021; 2021: 5027-5030
- **A gradient optimization toolbox for general purpose time-optimal MRI gradient waveform design.** *Magnetic resonance in medicine*  
Loecher, M., Middione, M. J., Ennis, D. B.  
2020; 84 (6): 3234-3245
- **A gradient optimization toolbox for general purpose time-optimal MRI gradient waveform design** *MAGNETIC RESONANCE IN MEDICINE*  
Loecher, M., Middione, M. J., Ennis, D. B.  
2020
- **INTRA-MYOCARDIAL ALGINATE HYDROGEL INJECTION ACTS AS A LEFT VENTRICULAR MID-WALL CONSTRAINT IN SWINE.** *Acta biomaterialia*  
Sack, K. L., Aliotta, E., Choy, J. S., Ennis, D. B., Davies, N., Franz, T., Kassab, G. S., Guccione, J. M.  
2020
- **4D Flow MR Imaging to Improve Microwave Ablation Prediction Models: A Feasibility Study in an InVivo Porcine Liver.** *Journal of vascular and interventional radiology : JVIR*  
Chiang, J., Loecher, M., Moulin, K., Meloni, M. F., Raman, S. S., McWilliams, J. P., Ennis, D. B., Lee, E. W.  
2020
- **Evaluation of a Workflow to Define Low Specific Absorption Rate MRI Protocols for Patients With Active Implantable Medical Devices.** *Journal of magnetic resonance imaging : JMIR*  
Martinez, J. A., Moulin, K. n., Yoo, B. n., Shi, Y. n., Kim, H. J., Villablanca, P. J., Ennis, D. B.  
2020
- **Motion-Induced Signal Loss in In Vivo Cardiac Diffusion-Weighted Imaging** *JOURNAL OF MAGNETIC RESONANCE IMAGING*  
Stoeck, C. T., Scott, A. D., Ferreira, P. F., Tunnicliffe, E. M., Teh, I., Nielles-Vallespin, S., Moulin, K., Sosnovik, D. E., Viallon, M., Croisille, P., Kozerke, S., Firmin, D. N., Ennis, et al  
2020; 51 (1): 319–20
- **Optimization methods for magnetic resonance imaging gradient waveform design.** *NMR in biomedicine*  
Middione, M. J., Loecher, M. n., Moulin, K. n., Ennis, D. B.  
2020: e4308
- **Estimating cardiomyofiber strain in vivo by solving a computational model.** *Medical image analysis*  
Perotti, L. E., Verzhbinsky, I. A., Moulin, K. n., Cork, T. E., Loecher, M. n., Balzani, D. n., Ennis, D. B.  
2020; 68: 101932
- **Probing cardiomyocyte mobility with multi-phase cardiac diffusion tensor MRI.** *PLoS one*  
Moulin, K. n., Verzhbinsky, I. A., Maforo, N. G., Perotti, L. E., Ennis, D. B.  
2020; 15 (11): e0241996
- **T1-Mapping and extracellular volume estimates in pediatric subjects with Duchenne muscular dystrophy and healthy controls at 3T.** *Journal of cardiovascular magnetic resonance : official journal of the Society for Cardiovascular Magnetic Resonance*  
Maforo, N. G., Magrath, P. n., Moulin, K. n., Shao, J. n., Kim, G. H., Prosper, A. n., Renella, P. n., Wu, H. H., Halnon, N. n., Ennis, D. B.  
2020; 22 (1): 85
- **Real-time 3T MRI-guided cardiovascular catheterization in a porcine model using a glass-fiber epoxy-based guidewire.** *PLoS one*  
Li, X., Perotti, L. E., Martinez, J. A., Duarte-Vogel, S. M., Ennis, D. B., Wu, H. H.  
2020; 15 (2): e0229711
- **Prostate diffusion MRI with minimal echo time using eddy current nulled convex optimized diffusion encoding.** *Journal of magnetic resonance imaging : JMIR*  
Zhang, Z., Moulin, K., Aliotta, E., Shakeri, S., Afshari Mirak, S., Hosseiny, M., Raman, S., Ennis, D. B., Wu, H. H.  
2019
- **It's the little things: On the complexity of planar electrode heating in MRI** *NEUROIMAGE*

- Erhardt, J. B., Lottner, T., Martinez, J., Oezen, A. C., Schuettler, M., Stieglitz, T., Ennis, D. B., Bock, M.  
2019; 195: 272–84
- **MRI of Patients with Cardiac Implantable Electronic Devices** *CURRENT CARDIOVASCULAR IMAGING REPORTS*  
Martinez, J. A., Ennis, D. B.  
2019; 12 (7)
  - **MRI of Patients with Cardiac Implantable Electronic Devices.** *Current cardiovascular imaging reports*  
Martinez, J. A., Ennis, D. B.  
2019; 12 (7)
  - **Model of Left Ventricular Contraction: Validation Criteria and Boundary Conditions.** *Functional imaging and modeling of the heart : ... International Workshop, FIMH ..., proceedings. FIMH*  
Ponnaluri, A. V., Verzhbinsky, I. A., Eldredge, J. D., Garfinkel, A., Ennis, D. B., Perotti, L. E.  
2019; 11504: 294–303
  - **Highly accelerated, model-free diffusion tensor MRI reconstruction using neural networks** *MEDICAL PHYSICS*  
Aliotta, E., Nourzadeh, H., Sanders, J., Muller, D., Ennis, D. B.  
2019; 46 (4): 1581–91
  - **It's the little things: On the complexity of planar electrode heating in MRI.** *NeuroImage*  
Erhardt, J. B., Lottner, T., Martinez, J., Ozen, A. C., Schuettler, M., Stieglitz, T., Ennis, D. B., Bock, M.  
2019
  - **Time-optimized 4D phase contrast MRI with real-time convex optimization of gradient waveforms and fast excitation methods.** *Magnetic resonance in medicine*  
Loecher, M., Magrath, P., Aliotta, E., Ennis, D. B.  
2019
  - **Highly Accelerated, Model-Free Diffusion Tensor MRI Reconstruction Using Neural Networks.** *Medical physics*  
Aliotta, E., Nourzadeh, H., Sanders, J., Muller, D., Ennis, D. B.  
2019
  - **Motion-Induced Signal Loss in In Vivo Cardiac Diffusion-Weighted Imaging.** *Journal of magnetic resonance imaging : JMRI*  
Stoeck, C. T., Scott, A. D., Ferreira, P. F., Tunnicliffe, E. M., Teh, I. n., Nielles-Vallespin, S. n., Moulin, K. n., Sosnovik, D. E., Viallon, M. n., Croisille, P. n., Kozerke, S. n., Firmin, D. N., Ennis, et al  
2019
  - **Estimating Aggregate Cardiomyocyte Strain Using In Vivo Diffusion and Displacement Encoded MRI.** *IEEE transactions on medical imaging*  
Verzhbinsky, I. A., Perotti, L. E., Moulin, K. n., Cork, T. E., Loecher, M. n., Ennis, D. B.  
2019
  - **Patient Orientation Affects Lead-Tip Heating of Cardiac Active Implantable Medical Devices during MRI.** *Radiology. Cardiothoracic imaging*  
Martinez, J. A., Serano, P. n., Ennis, D. B.  
2019; 1 (3): e190006
  - **High-Resolution Ex Vivo Microstructural MRI After Restoring Ventricular Geometry via 3D Printing.** *Functional imaging and modeling of the heart : ... International Workshop, FIMH ..., proceedings. FIMH*  
Cork, T. E., Perotti, L. E., Verzhbinsky, I. A., Loecher, M. n., Ennis, D. B.  
2019; 11504: 177–86
  - **Cardiac MRI biomarkers for Duchenne muscular dystrophy.** *Biomarkers in medicine*  
Magrath, P., Maforo, N., Renella, P., Nelson, S. F., Halnon, N., Ennis, D. B.  
2018
  - **Effect of flow-encoding strength on intravoxel incoherent motion in the liver.** *Magnetic resonance in medicine*  
Moulin, K., Aliotta, E., Ennis, D. B.  
2018
  - **Quantifying precision in cardiac diffusion tensor imaging with second-order motion-compensated convex optimized diffusion encoding** *MAGNETIC RESONANCE IN MEDICINE*

- Aliotta, E., Moulin, K., Magrath, P., Ennis, D. B.  
2018; 80 (3): 1074–87
- **Microstructural Infarct Border Zone Remodeling in the Post-infarct Swine Heart Measured by Diffusion Tensor MRI** *FRONTIERS IN PHYSIOLOGY*  
Kung, G. L., Vaseghi, M., Gahm, J. K., Shevtsov, J., Garfinkel, A., Shivkumar, K., Ennis, D. B.  
2018; 9: 826
  - **Velocity reconstruction with nonconvex optimization for low-velocity-encoding phase-contrast MRI** *MAGNETIC RESONANCE IN MEDICINE*  
Loecher, M., Ennis, D. B.  
2018; 80 (1): 42–52
  - **Construction and Validation of Subject-Specific Biventricular Finite-Element Models of Healthy and Failing Swine Hearts From High-Resolution DT-MRI** *FRONTIERS IN PHYSIOLOGY*  
Sack, K. L., Aliotta, E., Ennis, D. B., Choy, J. S., Kassab, G. S., Guccione, J. M., Franz, T.  
2018; 9: 539
  - **Evaluation of the impact of strain correction on the orientation of cardiac diffusion tensors with in vivo and ex vivo porcine hearts** *MAGNETIC RESONANCE IN MEDICINE*  
Ferreira, P. F., Nielles-Vallespin, S., Scott, A. D., de Silva, R., Kilner, P. J., Ennis, D. B., Auger, D. A., Suever, J. D., Zhong, X., Spottiswoode, B. S., Pennell, D. J., Arai, A. E., Firmin, et al  
2018; 79 (4): 2205–15
  - **Eddy current-nulled convex optimized diffusion encoding (EN-CODE) for distortion-free diffusion tensor imaging with short echo times** *MAGNETIC RESONANCE IN MEDICINE*  
Aliotta, E., Moulin, K., Ennis, D. B.  
2018; 79 (2): 663–72
  - **Simultaneous measurement of T-2 and apparent diffusion coefficient (T-2+ADC) in the heart with motion-compensated spin echo diffusion-weighted imaging** *MAGNETIC RESONANCE IN MEDICINE*  
Aliotta, E., Moulin, K., Zhang, Z., Ennis, D. B.  
2018; 79 (2): 654–62
  - **TIME RESOLVED DISPLACEMENT-BASED REGISTRATION OF IN VIVO CDTI CARDIOMYOCYTE ORIENTATIONS**  
Verzhbinsky, I. A., Magrath, P., Aliotta, E., Ennis, D. B., Perotti, L. E., IEEE  
IEEE.2018: 474–78
  - **Method for the unique identification of hyperelastic material properties using full-field measures. Application to the passive myocardium material response** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN BIOMEDICAL ENGINEERING*  
Perotti, L. E., Ponnaluri, A. V. S., Krishnamoorthi, S., Balzani, D., Ennis, D. B., Klug, W. S.  
2017; 33 (11)
  - **Terahertz Imaging of Cutaneous Edema: Correlation With Magnetic Resonance Imaging in Burn Wounds** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*  
Bajwa, N., Sung, S., Ennis, D. B., Fishbein, M. C., Nowroozi, B. N., Ruan, D., Maccabi, A., Alger, J., St John, M. A., Grundfest, W. S., Taylor, Z. D.  
2017; 64 (11): 2682–94
  - **Phase-contrast MRI with hybrid one and two-sided flow-encoding and velocity spectrum separation** *MAGNETIC RESONANCE IN MEDICINE*  
Wang, D., Shao, J., Ennis, D. B., Hu, P.  
2017; 78 (1): 182–92
  - **Microstructurally Anchored Cardiac Kinematics by Combining In Vivo DENSE MRI and cDTI. Functional imaging and modeling of the heart : ... International Workshop, FIMH ..., proceedings. FIMH**  
Perotti, L. E., Magrath, P., Verzhbinsky, I. A., Aliotta, E., Moulin, K., Ennis, D. B.  
2017; 10263: 381–91
  - **Sympathetic modulation of electrical activation in normal and infarcted myocardium: implications for arrhythmogenesis** *AMERICAN JOURNAL OF PHYSIOLOGY-HEART AND CIRCULATORY PHYSIOLOGY*  
Ajijola, O. A., Lux, R. L., Khahera, A., Kwon, O., Aliotta, E., Ennis, D. B., Fishbein, M. C., Ardell, J. L., Shivkumar, K.  
2017; 312 (3): H608–H621

- **Assessment of Myocardial Microstructural Dynamics by In Vivo Diffusion Tensor Cardiac Magnetic Resonance** *JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY*  
Nielles-Vallespin, S., Khalique, Z., Ferreira, P. F., de Silva, R., Scott, A. D., Kilner, P., McGill, L., Giannakidis, A., Gatehouse, P. D., Ennis, D., Aliotta, E., Al-Khalil, M., Kellman, et al  
2017; 69 (6): 661–76
- **Convex optimized diffusion encoding (CODE) gradient waveforms for minimum echo time and bulk motion-compensated diffusion-weighted MRI** *MAGNETIC RESONANCE IN MEDICINE*  
Aliotta, E., Wu, H. H., Ennis, D. B.  
2017; 77 (2): 717–29
- **Effect of free-breathing on left ventricular rotational mechanics in healthy subjects and patients with duchenne muscular dystrophy** *MAGNETIC RESONANCE IN MEDICINE*  
Reyhan, M. L., Wang, Z., Kim, H. J., Halnon, N. J., Finn, J., Ennis, D. B.  
2017; 77 (2): 864–69
- **Scar voltage threshold determination using ex vivo magnetic resonance imaging integration in a porcine infarct model: Influence of interelectrode distances and three-dimensional spatial effects of scar** *HEART RHYTHM*  
Tung, R., Kim, S., Yagishita, D., Vaseghi, M., Ennis, D. B., Ouadah, S., Ajjola, O. A., Bradfield, J. S., Mahapatra, S., Finn, P., Shivkumar, K.  
2016; 13 (10): 1993–2002
- **Electrophysiology of Heart Failure Using a Rabbit Model: From the Failing Myocyte to Ventricular Fibrillation** *PLOS COMPUTATIONAL BIOLOGY*  
Ponnaluri, A. V. S., Perotti, L. E., Liu, M., Qu, Z., Weiss, J. N., Ennis, D. B., Klug, W. S., Garfinkel, A.  
2016; 12 (6): e1004968
- **Testing Foundations of Biological Scaling Theory Using Automated Measurements of Vascular Networks** *PLOS COMPUTATIONAL BIOLOGY*  
Newberry, M. G., Ennis, D. B., Savage, V. M.  
2015; 11 (8): e1004455
- **Left ventricular twist and shear in patients with primary mitral regurgitation** *JOURNAL OF MAGNETIC RESONANCE IMAGING*  
Reyhan, M., Wang, Z., Li, M., Kim, H. J., Gupta, H., Lloyd, S. G., Dell'Italia, L. J., Denney, T., Ennis, D. B.  
2015; 42 (2): 400–406
- **Phase Contrast MRI with Flow Compensation View Sharing** *MAGNETIC RESONANCE IN MEDICINE*  
Wang, D., Shao, J., Rapacchi, S., Middione, M. J., Ennis, D. B., Hu, P.  
2015; 73 (2): 505-513
- **Free-breathing variable flip angle balanced SSFP cardiac cine imaging with reduced SAR at 3T.** *Magnetic resonance in medicine*  
Srinivasan, S. n., Kroeker, R. M., Gabriel, S. n., Plotnik, A. n., Godinez, S. R., Hu, P. n., Halnon, N. n., Finn, J. P., Ennis, D. B.  
2015
- **CARDIAC MRI DERIVED EPICARDIAL FAT MAPS TO ASSIST VT ABLATION PROCEDURES FOR SUBJECTS WITH IMPLANTABLE DEVICES**  
Zimmermann, J., Rashid, S., Hu, P., Katouzian, A., Navab, N., Ennis, D. B., IEEE  
IEEE.2015: 747–50
- **Simulation Methods and Validation Criteria for Modeling Cardiac Ventricular Electrophysiology** *PLOS ONE*  
Krishnamoorthi, S., Perotti, L. E., Borgstrom, N. P., Ajjola, O. A., Frid, A., Ponnaluri, A. V., Weiss, J. N., Qu, Z., Klug, W. S., Ennis, D. B., Garfinkel, A.  
2014; 9 (12): e114494
- **Convex Gradient Optimization for Increased Spatiotemporal Resolution and Improved Accuracy in Phase Contrast MRI** *MAGNETIC RESONANCE IN MEDICINE*  
Middione, M. J., Wu, H. H., Ennis, D. B.  
2014; 72 (6): 1552-1564
- **Velocity Encoding with the Slice Select Refocusing Gradient for Faster Imaging and Reduced Chemical Shift-Induced Phase Errors** *MAGNETIC RESONANCE IN MEDICINE*  
Middione, M. J., Thompson, R. B., Ennis, D. B.  
2014; 71 (6): 2014-2023

- **Modeling and incorporating cardiac-induced lung tissue motion in a breathing motion model** *MEDICAL PHYSICS*  
White, B. M., Santhanam, A., Thomas, D., Min, Y., Lamb, J. M., Neylon, J., Jani, S., Gaudio, S., Srinivasan, S., Ennis, D., Low, D. A.  
2014; 41 (4)
- **Accelerating Dynamic Magnetic Resonance Imaging (MRI) for Lung Tumor Tracking Based on Low-Rank Decomposition in the Spatial-Temporal Domain: A Feasibility Study Based on Simulation and Preliminary Prospective Undersampled MRI** *INTERNATIONAL JOURNAL OF RADIATION ONCOLOGY BIOLOGY PHYSICS*  
Sarma, M., Hu, P., Rapacchi, S., Ennis, D., Thomas, A., Lee, P., Kupelian, P., Sheng, K.  
2014; 88 (3): 723–31
- **Intra- and Interscan Reproducibility Using Fourier Analysis of STimulated Echoes (FAST) for the Rapid and Robust Quantification of Left Ventricular Twist** *JOURNAL OF MAGNETIC RESONANCE IMAGING*  
Reyhan, M., Kim, H. J., Brown, M. S., Ennis, D. B.  
2014; 39 (2): 463–68
- **Device artifact reduction for magnetic resonance imaging of patients with implantable cardioverter-defibrillators and ventricular tachycardia: Late gadolinium enhancement correlation with electroanatomic mapping** *HEART RHYTHM*  
Stevens, S. M., Tung, R., Rashid, S., Gima, J., Cote, S., Pavez, G., Khan, S., Ennis, D. B., Finn, J., Boyle, N., Shivkumar, K., Hu, P.  
2014; 11 (2): 289–98
- **Off-Resonance Insensitive Complementary SPAtial Modulation of Magnetization (ORI-CSPAMM) for Quantification of Left Ventricular Twist** *JOURNAL OF MAGNETIC RESONANCE IMAGING*  
Reyhan, M., Natsuaki, Y., Ennis, D. B.  
2014; 39 (2): 339–45
- **Optimal flip angle for high contrast balanced SSFP cardiac cine imaging.** *Magnetic resonance in medicine : official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine*  
Srinivasan, S. n., Ennis, D. B.  
2014
- **The effects of noise over the complete space of diffusion tensor shape** *MEDICAL IMAGE ANALYSIS*  
Gahm, J., Kindlmann, G., Ennis, D. B.  
2014; 18 (1): 197–210
- **A framework for modeling and visualizing cardiovascular deformation under normal and altered circulatory conditions.** *Studies in health technology and informatics*  
Santhanam, A., Benharash, P., Frank, P., White, B., Min, Y., Ennis, D., Kupelian, P., Dutson, E.  
2014; 196: 378–83
- **In vivo Confirmation of Hydration Based Contrast Mechanisms for Terahertz Medical Imaging using MRI**  
Bajwa, N., Sung, S., Garritano, J., Nowroozi, B., Tewari, P., Ennis, D. B., Alger, J., Grundfest, W., Taylor, Z.  
edited by Razeghi, M., Baranov, A. N., Zavada, J. M., Pavlidis, D.  
SPIE-INT SOC OPTICAL ENGINEERING.2014
- **Fast 3D T2 -weighted imaging using variable flip angle transition into driven equilibrium (3D T2 -TIDE) balanced SSFP for prostate imaging at 3T.** *Magnetic resonance in medicine : official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine*  
Srinivasan, S. n., Wu, H. H., Sung, K. n., Margolis, D. J., Ennis, D. B.  
2014
- **Complementary radial tagging for improved myocardial tagging contrast.** *Magnetic resonance in medicine : official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine*  
Wang, Z. n., Nasiraei-Moghaddam, A. n., Reyhan, M. L., Srinivasan, S. n., Finn, J. P., Ennis, D. B.  
2014
- **Effect of stellate ganglia stimulation on global and regional left ventricular function as assessed by speckle tracking echocardiography** *AMERICAN JOURNAL OF PHYSIOLOGY-HEART AND CIRCULATORY PHYSIOLOGY*  
Zhou, W., Yamakawa, K., Benharash, P., Ajijola, O., Ennis, D., Hadaya, J., Vaseghi, M., Shivkumar, K., Mahajan, A.  
2013; 304 (6): H840–H847

- **Quantitative assessment of systolic and diastolic left ventricular twist using Fourier Analysis of Stimulated echoes (FAST) and CSPAMM** *JOURNAL OF MAGNETIC RESONANCE IMAGING*  
Reyhan, M., Ennis, D. B.  
2013; 37 (3): 678–83
- **Chemical shift-induced phase errors in phase-contrast MRI** *MAGNETIC RESONANCE IN MEDICINE*  
Middione, M. J., Ennis, D. B.  
2013; 69 (2): 391–401
- **Variable flip angle balanced steady-state free precession for lower SAR or higher contrast cardiac cine imaging.** *Magnetic resonance in medicine : official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine*  
Srinivasan, S. n., Ennis, D. B.  
2013
- **Multi-scale, multi-modal image integration for image-guided clinical interventions in the head and neck anatomy.** *Studies in health technology and informatics*  
Santhanam, A. P., Dou, T., Neylon, J., Min, Y., Kupelian, A., Sheng, K., Ennis, D., Rolland, J., Low, D., Kupelian, P.  
2013; 184: 380–86
- **WEIGHTED COMPONENT-BASED TENSOR DISTANCE APPLIED TO GRAPH-BASED SEGMENTATION OF CARDIAC DT-MRI**  
Gahm, J., Kung, G. L., Ennis, D. B., IEEE  
IEEE.2013: 504–7
- **Injection of gadolinium contrast through pediatric central venous catheters: a safety study** *PEDIATRIC RADIOLOGY*  
Moriarty, J. M., Kung, G. L., Ramos, Y., Moghaddam, A. N., Ennis, D. B., Finn, J.  
2012; 42 (9): 1064–69
- **The dependence of radiofrequency induced pacemaker lead tip heating on the electrical conductivity of the medium at the lead tip** *MAGNETIC RESONANCE IN MEDICINE*  
Langman, D. A., Goldberg, I. B., Judy, J., Finn, J., Ennis, D. B.  
2012; 68 (2): 606–13
- **Fourier analysis of STimulated echoes (FAST) for the quantitative analysis of left ventricular twist** *JOURNAL OF MAGNETIC RESONANCE IMAGING*  
Reyhan, M., Natsuaki, Y., Ennis, D. B.  
2012; 35 (3): 587–93
- **Contribution of myocardium overlying the anterolateral papillary muscle to left ventricular deformation** *AMERICAN JOURNAL OF PHYSIOLOGY-HEART AND CIRCULATORY PHYSIOLOGY*  
Itoh, A., Stephens, E. H., Ennis, D. B., Carlhall, C., Bothe, W., Nguyen, T. C., Swanson, J. C., Miller, D. C., Ingels, N. B.  
2012; 302 (1): H180-H187
- **3D Reconstruction and Image Fusion using Transurethral Ultrasound**  
Natarajan, S., Culjat, M., Singh, R., Ennis, D., Marks, L., Grundfest, W. S., IEEE  
IEEE.2012: 138–41
- **The Presence of Two Local Myocardial Sheet Populations Confirmed by Diffusion Tensor MRI and Histological Validation** *JOURNAL OF MAGNETIC RESONANCE IMAGING*  
Kung, G. L., Tom C Nguyen, T. C., Itoh, A., Skare, S., Ingels, N. B., Miller, D. C., Ennis, D. B.  
2011; 34 (5): 1080-1091
- **Pacemaker Lead Tip Heating in Abandoned and Pacemaker-Attached Leads at 1.5 Tesla MRI** *JOURNAL OF MAGNETIC RESONANCE IMAGING*  
Langman, D. A., Goldberg, I. B., Finn, J., Ennis, D. B.  
2011; 33 (2): 426–31
- **Analytical method to measure three-dimensional strain patterns in the left ventricle from single slice displacement data** *JOURNAL OF CARDIOVASCULAR MAGNETIC RESONANCE*  
Moghaddam, A., Saber, N. R., Wen, H., Finn, J., Ennis, D. B., Gharib, M.  
2010; 12: 33

- **Cardiac Active Contraction Parameters Estimated from Magnetic Resonance Imaging**  
Wang, V. Y., Lam, H. I., Ennis, D. B., Cowan, B. R., Young, A. A., Nash, M. P.  
edited by Camara, O., Pop, M., Rhode, K., Sermesant, M., Smith, N., Young, A.  
SPRINGER-VERLAG BERLIN.2010: 194-+
- **Mitral annular hinge motion contribution to changes in mitral septal-lateral dimension and annular area** *88th Annual Meeting of the American-Association-for-Thoracic-Surgery*  
Itoh, A., Ennis, D. B., Bothe, W., Swanson, J. C., Krishnamurthy, G., Nguyen, T. C., Ingels, N. B., Miller, D. C.  
MOSBY-ELSEVIER.2009: 1090-99
- **Regional Mitral Leaflet Opening During Acute Ischemic Mitral Regurgitation** *4th Biennial Meeting of the Society-for-Heart-Valve-Disease*  
Bothe, W., Ennis, D. B., Carlhall, C. J., Nguyen, T. C., Timek, T. A., Lai, D. T., Itoh, A., Ingels, N. B., Miller, D. C.  
I C R PUBLISHERS.2009: 586-96
- **Modelling passive diastolic mechanics with quantitative MRI of cardiac structure and function**  
Wang, V. Y., Lam, H. I., Ennis, D. B., Cowan, B. R., Young, A. A., Nash, M. P.  
ELSEVIER SCIENCE BV.2009: 773-84
- **Active stiffening of mitral valve leaflets in the beating heart** *AMERICAN JOURNAL OF PHYSIOLOGY-HEART AND CIRCULATORY PHYSIOLOGY*  
Itoh, A., Krishnamurthy, G., Swanson, J. C., Ennis, D. B., Bothe, W., Kuhl, E., Karlsson, M., Davis, L. R., Miller, D. C., Ingels, N. B.  
2009; 296 (6): H1766-H1773
- **Reduced Systolic Torsion in Chronic "Pure" Mitral Regurgitation** *CIRCULATION-CARDIOVASCULAR IMAGING*  
Ennis, D. B., Nguyen, T. C., Itoh, A., Bothe, W., Liang, D. H., Ingels, N. B., Miller, D. C.  
2009; 2 (2): 85-92
- **QUANTIFICATION OF IN VIVO STRESSES IN THE OVINE ANTERIOR MITRAL VALVE LEAFLET** *ASME Summer Bioengineering Conference*  
Krishnamurthy, G., Ltoh, A., Bothe, W., Ennis, D. B., Swanson, J. C., Kuhl, E., Miller, D. C., Ingels, N. B.  
AMER SOC MECHANICAL ENGINEERS.2009: 131-132
- **Myofiber angle distributions in the ovine left Ventricle do not conform to computationally optimized predictions** *JOURNAL OF BIOMECHANICS*  
Ennis, D. B., Nguyen, T. C., Riboh, J. C., Wigstroem, L., Harrington, K. B., Daughters, G. T., Ingels, N. B., Miller, D. C.  
2008; 41 (15): 3219-3224
- **Alterations in transmural myocardial strain - An early marker of left ventricular dysfunction in mitral regurgitation?** *80th Annual Scientific Session of the American-Heart-Association (AHA)*  
Carlhaell, C. J., Nguyen, T. C., Itoh, A., Ennis, D. B., Bothe, W., Liang, D., Ingels, N. B., Miller, D. C.  
LIPPINCOTT WILLIAMS & WILKINS.2008: S256-S262
- **Material properties of the ovine mitral valve anterior leaflet in vivo from inverse finite element analysis** *AMERICAN JOURNAL OF PHYSIOLOGY-HEART AND CIRCULATORY PHYSIOLOGY*  
Krishnamurthy, G., Ennis, D. B., Itoh, A., Bothe, W., Swanson, J. C., Karlsson, M., Kuhl, E., Miller, D. C., Ingels, N. B.  
2008; 295 (3): H1141-H1149
- **The effect of pure mitral regurgitation on mitral annular geometry and three-dimensional saddle shape** *87th Annual Meeting of the American-Association-for-Thoracic-Surgery*  
Nguyen, T. C., Itoh, A., Carlhall, C. J., Bothe, W., Timek, T. A., Ennis, D. B., Oakes, R. A., Liang, D., Daughters, G. T., Ingels, N. B., Miller, D. C.  
MOSBY-ELSEVIER.2008: 557-65
- **Non-uniform transmural remodeling in ovine chronic mitral regurgitation**  
Ennis, D. B., Nguyen, T. C., Itoh, A., Carlhaell, C. J., Oakes, R. A., Bothe, W., Liang, D., Miller, D. C., Ingels, N. B.  
FEDERATION AMER SOC EXP BIOL.2008
- **Effects of acute ischemic mitral regurgitation on three-dimensional mitral leaflet edge geometry** *21st Annual Meeting of the European-Association-for-Cardio-Thoracic-Surgery (EACTS)*  
Bothe, W., Nguyen, T. C., Ennis, D. B., Itoh, A., Carlhall, C. J., Lai, D. T., Ingels, N. B., Miller, D. C.  
OXFORD UNIV PRESS INC.2008: 191-97

- **Diffusion tensor analysis with invariant gradients and rotation tangents** *IEEE TRANSACTIONS ON MEDICAL IMAGING*  
Kindlmann, G., Ennis, D. B., Whitaker, R. T., Westin, C.  
2007; 26 (11): 1483-1499
- **Alterations in transmural myocardial strain: An early marker of left ventricular dysfunction in mitral regurgitation?** *80th Annual Scientific Session of the American-Heart-Association (AHA)*  
Nguyen, T. C., Carlhall, C. J., Itoh, A., Oakes, R. A., Ennis, D. B., Bothe, W., Liang, D., Daughters, G. T., Ingels, N. B., Miller, D. C.  
LIPPINCOTT WILLIAMS & WILKINS.2007: 368-68
- **Altered myocardial shear strains are associated with chronic ischemic mitral regurgitation** *42nd Annual Meeting of the Society-of-Thoracic-Surgeons*  
Nguyen, T. C., Cheng, A., Langer, F., Rodriguez, F., Oakes, R. A., Itoh, A., Ennis, D. B., Liang, D., Daughters, G. T., Ingels, N. B., Miller, D. C.  
ELSEVIER SCIENCE INC.2007: 47-54
- **Dobutamine myocardial strain rate response is transmurally inhomogeneous** *79th Annual Scientific Session of the American-Heart-Association*  
Itoh, A., Nguyen, T. C., Cheng, A., Oakes, R. A., Ennis, D. B., Kameda, Y., Daughters, G. T., Ingels, N. B., Miller, D. C.  
LIPPINCOTT WILLIAMS & WILKINS.2006: 570-70
- **Detection of myocardial capillary orientation with intravascular iron-oxide nanoparticles in spin-echo MRI** *MAGNETIC RESONANCE IN MEDICINE*  
Vignaud, A., Rodriguez, Ennis, D. B., DeSilva, R., Kellman, P., Taylor, J., Bennett, E., Wen, H.  
2006; 55 (4): 725-30
- **The visible heart - Analysis of myocardial fiber structure using three-dimensional histology** *Experimental Biology 2006 Annual Meeting*  
Wigstrom, L., Ennis, D. B., Nguyen, T. C., Miller, D. C., Ingels, N. B.  
FEDERATION AMER SOC EXP BIOL.2006: A1198-A1198
- **Regional heterogeneity of myofiber orientation in the ovine left ventricle**  
Ngyuen, T. C., Ennis, D. B., Riboh, J. C., Harrington, K. B., Wigstrom, L., Daughter, G. T., Miller, C. D., Ingels, N. B.  
FEDERATION AMER SOC EXP BIOL.2006: A1195
- **Noninvasive measurement of myocardial tissue volume change during systolic contraction and diastolic relaxation in the canine left ventricle** *MAGNETIC RESONANCE IN MEDICINE*  
Rodriguez, Ennis, D. B., Wen, H.  
2006; 55 (3): 484-90
- **Transmural left ventricular shear strain alterations adjacent to and remote from infarcted myocardium** *JOURNAL OF HEART VALVE DISEASE*  
Cheng, A., Langer, F., Nguyen, T. C., Malinowski, M., Ennis, D. B., Daughters, G. T., Ingels, N. B., Miller, D. C.  
2006; 15 (2): 209-218
- **Evidence of structural remodeling in the dyssynchronous failing heart** *CIRCULATION RESEARCH*  
Helm, P. A., Younes, L., Beg, M. F., Ennis, D. B., Leclercq, C., Faris, O. P., McVeigh, E., Kass, D., Miller, M. I., Winslow, R. L.  
2006; 98 (1): 125-32
- **Orthogonal tensor invariants and the analysis of diffusion tensor magnetic resonance images** *MAGNETIC RESONANCE IN MEDICINE*  
Ennis, D. B., Kindlmann, G.  
2006; 55 (1): 136-46
- **Visualization of tensor fields using superquadric glyphs** *MAGNETIC RESONANCE IN MEDICINE*  
Ennis, D. B., Kindlman, G., Rodriguez, Helm, P. A., McVeigh, E. R.  
2005; 53 (1): 169-76
- **3D breath-held cardiac function with projection reconstruction in steady state free precession validated using 2D cine MRI** *JOURNAL OF MAGNETIC RESONANCE IMAGING*  
Peters, D. C., Ennis, D. B., Rohatgi, P., Syed, M. A., McVeigh, E. R., Arai, A. E.  
2004; 20 (3): 411-16
- **Endocardial versus epicardial electrical synchrony during LV free-wall pacing** *AMERICAN JOURNAL OF PHYSIOLOGY-HEART AND CIRCULATORY PHYSIOLOGY*  
Faris, O. P., Evans, F. J., Dick, A. J., Raman, V. K., Ennis, D. B., Kass, D. A., McVeigh, E. R.

2003; 285 (5): H1864–H1870

- **Assessment of regional systolic and diastolic dysfunction in familial hypertrophic cardiomyopathy using MR tagging** *MAGNETIC RESONANCE IN MEDICINE*  
Ennis, D. B., Epstein, F. H., Kellman, P., Fananapazir, L., McVeigh, E. R., Arai, A. E.  
2003; 50 (3): 638–42
- **High-resolution MRI of cardiac function with projection reconstruction and steady-state free precession** *MAGNETIC RESONANCE IN MEDICINE*  
Peters, D. C., Ennis, D. B., McVeigh, E. R.  
2002; 48 (1): 82–88
- **Measurement of F-actin mechanics with laser tracking microrheology: Role of particle surface chemistry.**  
McGrath, J. L., Ennis, D. B., Kuo, S. C.  
*AMER SOC CELL BIOLOGY*.1999: 21A
- **Time resolved displacement-based registration of in vivo cDTI cardiomyocyte orientations**  
Verzhbinsky, I. A., Magrath, P., Aliotta, E., Moulin, K., Ennis, D. B., Perotti, L. E.  
2018