

Eric Peterson

SRI International

Center for Health Sciences

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Education

Ph. D., Biomedical Engineering; University of Wisconsin – Madison	2010
M. S., Biomedical Engineering; University of Wisconsin – Madison	2007
B. S., Biomedical Engineering; University of Iowa	2005

Research Experience

Research Scientist

June 2015 – Present

SRI International: Center for Health Sciences, Biosciences Division

- Scientific study of alcoholism, sleep, and brain development
 - Develop free-water elimination DTI for use in human and animal studies
 - Study flow-sensitive IVIM imaging in repeatability and aging
 - Mentor for Google Summer of Code 2017 for Dipy
 - Develop scan protocols for optogenetic fMRI
 - Develop advanced diffusion and fMRI of Parkinson's Disease
 - Study the deposition of iron in the brain of adolescents
 - Develop a pipeline to analyze primate brain scans
- Manage SRI's Pfefferbaum Animal Imaging Facility
 - Recruit and consult with potential users of the facility
 - Train new and current facility users
 - Provide ongoing guidance for current facility users
- Manage day-to-day operations of human and animal studies
 - Improve and update scan protocols
 - Analyze images for longitudinal quality control
- Edit a book
 - Imaging the Addicted Brain with Natalie Zahr
- Review papers and conference abstracts
- Write papers and grants and present at national and international conferences

Staff Scientist**November 2012 – May 2015**

Stanford University: Radiological Sciences Laboratory

- Managed day-to-day operations of a clinical stroke study
 - Development and maintenance of processing pipeline
 - Study of structure and (dys)-function using diffusion and perfusion MRI
- Developed simultaneous multi-slice imaging for diffusion and perfusion EPI
 - Investigation of EPI ghost correction methods
 - Investigation of the effects of slice acceleration on DSC perfusion imaging
- Developed robust time series EPI ghost correction methods for use with parallel imaging acquisitions
- Developed fast T_1 mapping methods for stroke evaluation
- Wrote papers and grants and present at conferences
- Wrote book chapters on diffusion tensor MRI and perfusion MRI

Postdoctoral Researcher**2011 – 2012**

University of Bordeaux: Mixed Imaging and Biology Research Laboratory

- Investigated high-resolution diffusion tensor imaging
 - Developed a high-resolution EPI-based propeller-type DTI imaging sequence for studying the effects of aging and age-related diseases
 - Developed an advanced image reconstruction for minimal geometric distortion and high SNR at high resolutions

Research Assistant**2005 – 2011**

University of Wisconsin – Madison: Medical Physics CT and MR Research Laboratory

- Developed hyperpolarized ^{13}C imaging techniques
 - Developed a simultaneous acquisition of ^1H and hyperpolarized ^{13}C spectroscopic images for enhanced metabolic quantification
 - Investigated optimal sampling methods to improve parametric SNR for biological modeling
- Investigated asthma using hyperpolarized Helium MRI
 - Analyzed CT airway measurements in asthmatics in relation to clinical measurements and hyperpolarized helium imaging markers
 - Analyzed adult and pediatric airways with respect to asthma using MRI based airway segmentation and a dynamic 3D projection imaging sequence

Research Assistant**2003 – 2005**

University of Iowa: Biomedical Engineering Image Processing Laboratory

- Analyzed ovine lung deformation and mapping using CT and implanted markers

Professional Memberships

- Member, Research Society on Alcoholism 2016 – Present
- Member, ISMRM 2011 – Present
 - Member, Subcommittee on Trainee Stipends 2016 – Present
- Student Member, ISMRM 2006 – 2010
- Student Member, American Thoracic Society 2007 – 2010

Work History

Research Scientist SRI International	June 2015 – Present
Staff Scientist Stanford University	November 2012 – May 2015
Postdoctoral Researcher University of Bordeaux	2011 – 2012
Research Assistant University of Wisconsin-Madison	2005 – 2011
Research Assistant University of Iowa	2004 – 2005

General Skills and Interests

- MR physics
- Programming
- Image processing
- Signal processing
- Statistics
- Healthcare
- Medical Imaging
- Computer Vision

Technical Skills

Proficient in:

- Python/Numpy/Scipy
- MATLAB
- C/C++
- R

- Bruker PSD environment
- GE PSD environment
- OpenCV

Familiar with:

- Philips PSD environment
- Bruker PSD environment
- ITK
- SQLite
- Varian PSD environment

Publications

Rafael Neto Henriques, Ariel Rokem, Eleftherios Garyfallidis, Samuel St-Jean, Eric Thomas Peterson, Marta Morgado Correia. [Re] Optimization of a free water elimination two-compartment model for diffusion tensor imaging. ReScience, <https://github.com/ReScience/ReScience-submission/pull/26>.

Jeremy W. Gordon, Sean B. Fain, David J. Niles, Kai D. Ludwig, Kevin M. Johnson, Eric T. Peterson. Simultaneous Imaging of ^{13}C Metabolism and ^1H Structure: Technical Considerations and Potential Applications. NMR in Biomedicine. January 2015.

E. T. Peterson, J. W. Gordon, M. G. Erickson, S. B. Fain, I. J. Rowland. Dynamic Nuclear Polarization System Output Volume Reduction Using Inert Fluids. Journal of Magnetic Resonance Imaging Vol 33, Issue 4 April 2011 pp. 1003-1008.

Eric T Peterson, Jionghan Dai, James H Holmes, Sean B Fain. Measurement of lung airways in three dimensions using hyperpolarized helium-3 MRI. Physics in Medicine and Biology 56 (2011) 3107–3122. (PMB featured article, Medical Physics Web editor's choice)

Rafael O'Halloran, Murat Aksoy, Eric Aboussouan, Eric Peterson, Anh Van, Roland Bammer. Real-time correction of rigid body motion-induced phase errors for diffusion-weighted steady-state free precession imaging. Magnetic Resonance in Medicine. February 2015. Vol 73. Issue 2. Pages 565-576

Joseph J Grudzinski, John M Floberg, Sarah R Mudd, Justin J Jeffery, Eric T Peterson, Alice Nomura, Ronald R Burnette, Wolfgang A Tomé, Jamey P Weichert and Robert

Jeraj. Application of a whole-body pharmacokinetic model for targeted radionuclide therapy to NM404 and FLT. *Physics in Medicine and Biology*, 57, 6; 1641. March 2012.

Matthew R Smith, Eric T Peterson, Jeremy W Gordon, David J Niles, Sean B Fain. In Vivo Imaging and Spectroscopy of Dynamic Metabolism Using Simultaneous ^{13}C and ^1H MRI. *IEEE Transactions on Biomedical Engineering*, 59, 1; 45-49. January 2012.

Ian J Rowland, Eric T Peterson, Jeremy W Gordon, Sean B Fain. Hyperpolarized ^{13}C Carbon MR. *Current Pharmaceutical Biotechnology*, Vol. 11, No. 6, September 2010, pp. 709-719(11)

S. B. Fain, E. T. Peterson, R. L. Sorkness, S. Wenzel, M. Castro, W. W. Busse. Severe Asthma Research Program – Phenotyping and Quantification of Severe Asthma. *Imaging Decisions MRI*, Vol 13, Issue 1: 24-27. Spring 2009.

S. Fain, G. Gonzalez-Fernandez, E. Peterson, M. Evans, R. Sorkness, N. Jarjour, W. Busse, J. Kuhlman. Evaluation of structure-function relationships in asthma using multi-detector CT (MDCT) and hyperpolarized (HP) He-3 MRI. *Academic Radiology*, 15,6; 753-762. June 2008.

Book Editor

Natalie M Zahr and Eric T Peterson (Eds). *Imaging the Addicted Brain*, Volume 129. Elsevier, Oxford, UK. 2016

Book Chapters

E Peterson and R. Bammer. *Survivor's Guide to DTI Acquisition*. In: *Diffusion Tensor Imaging: A Practical Handbook*. Ed: S. Sunaert, W. Van Hecke, L. Emsell, Springer, New York, USA. 2016

E Peterson and R. Bammer. *MR Pulse Sequences for DSC*. In: *MR and CT Perfusion and Pharmacokinetic Imaging: Clinical Applications and Theory*. Ed: R. Bammer. Springer, New York, USA. 2016

Patents

Segmentation of the Airway Tree Using Hyperpolarized Noble Gases and Diffusion Weighted Magnetic Resonance Imaging. S. B. Fain, E. T. Peterson. US Patent # 7,885,702

Awards and Funding

- Finalist: Inaugural SRI Shark Tank
- Google Summer of Code 2016 Mentor: Dipy

- ISMRM Student Stipend: 2006-2008
- Varian Image Award 2009: Simultaneous ^1H and Hyperpolarized ^{13}C Imaging

Conference Proceedings

Eric Thomas Peterson, Dongjin Kwon, Beatriz Luna, Bart Larsen, Devin Prouty, Edith Vioni Sullivan, and Adolf Pfefferbaum. Greater Relaxivity in Brain Regions Indicates Tissue Iron Deposition in Adolescence to Adulthood. ISMRM 2017, Abstract # 868

Eric Thomas Peterson, Natalie May Zahr, Edith Vioni Sullivan, and Adolf Pfefferbaum. Fast Linear Fitting of Bi-Exponential Intra-Voxel Incoherent Motion (IVIM) Models. ISMRM 2017, Abstract # 867

E.T. Peterson, N.M. Zahr, D. Kwon, E.V. Sullivan, A. Pfefferbaum. Longitudinal Regional Brain Iron Accumulation in Adolescence: Findings from NCANDA. RSoA 2017

Eric T Peterson, Natalie M Zahr, Dongjin Kwon, Matthew Serventi, Cheshire Hardcastle, Edith V Sullivan, and Adolf Pfefferbaum. Intra Voxel Incoherent Motion (IVIM) in Brain Regions: a Repeatability and Aging Study, ISMRM 2016, Program # 3410

Eric Peterson, Murat Aksoy, Julian Maclaren, and Roland Bammer. Acquisition-free Nyquist ghost correction for parallel imaging accelerated EPI. ISMRM 2015, Program # 635

Eric Peterson, Heiko Schmiedeskamp, Julian Maclaren, Nils Forkert, Samantha Holdsworth, Rafael O'Halloran, Eric Aboussouan, William Grissom, Salil Soman, Roland Bammer. Slice Accelerated Spin and Gradient Echo (SAGE) Perfusion Imaging. ISMRM 2014, Program # 2728

Eric Peterson, Samantha Holdsworth, Rafael O'Halloran, Eric Aboussouan, Roland Bammer. Readout-Segmented Diffusion Tensor Imaging (RS-DTI) Acceleration Using Simultaneously Acquired Slices. ISMRM 2014, Program # 2560.

Eric Peterson, Samantha Holdsworth, Rafael O'Halloran, Julian Maclaren, Eric Aboussouan, William Grissom, Roland Bammer. Slice-Wise Nyquist Ghost Correction for Slice-Accelerated EPI. ISMRM 2014, Program # 1637.

Eric Peterson, Olivier Periot, Gwénaëlle Catheline, Jean-Michel Franconi, Michèle Allard, Bassem Hiba. Could high-resolution acquisition performed using a classic pulse sequence available on clinical 3T scanner increase the quality of DTI data? SFRMBM 2012, Poster # 60.

Eric Peterson, Olivier Periot, Gwénaëlle Catheline, Jean-Michel Franconi, Michèle Allard, Bassem Hiba. Could high-resolution acquisition performed using a classic pulse sequence available on clinical 3T scanner increase the quality of DTI data? OHBM 2012, Poster # 669.

ET Peterson, J Dai, A Dattawadkar, NN Jarjour, WW Busse, SB Fain. Hyperpolarized Helium MRI Airway Measurements In Three Dimensions On Adults And Children With Asthma. ATS 2011 Oral Presentation, Abstract ID # 20229

Eric T Peterson, Jeremy W Gordon, Sean B Fain, Ian J Rowland Hepatic Hyperpolarized ^{13}C Pyruvate Studies: Origin of Additional in vivo Pyruvate Resonances. ISMRM 2011

E. T. Peterson, M. R. Smith, J. J. Grudzinski, J. W. Gordon, and S. B. Fain. Determination of Optimal Model Sampling Parameters for Hyperpolarized Contrast Agents. ISMRM 2011

Eric T Peterson, Kang Wang, and Sean B Fain. Bloch Equation Simulations for bSSFP, Spin Echo, and SPGR Sequences When Using Hyperpolarized Carbon-13. ISMRM 2010 poster no. 3265

ET Peterson, K Wang, KN Kurpad, MG Erickson, IJ Rowland, and SB Fain. Simultaneous Proton and Hyperpolarized Carbon Imaging. ISMRM 2010 poster no. 1020.

ET Peterson, A Dattawadkar, K Samimi, NN Jarjour, WB Busse, SB Fain. Airway Measures on MDCT in Asthma at Locations of Ventilation Defect Identified by He-3 MRI. ATS 2010 poster no. 3720

E. T. Peterson, J. W. Gordon, K. N. Kurpad, S. B. Fain, and I. J. Rowland. Probing the in vivo compartmentalization of hyperpolarized pyruvate using Gadodiamide-induced T1 relaxation. ISMRM 2009, poster no. 2417.

E.T. Peterson, M.G. Erickson, S.B. Fain, and I.J. Rowland. Increased volumetric activity for hyperpolarized DNP solutions. ISMRM 2009, poster no. 2446.

E.T. Peterson, J.H. Holmes, A. Dattawadkar, G. Agrawal, J. Dai, N.N. Jarjour, S.B. Fain. Measurement of Large Airways Using Dynamic 3D Hyperpolarized Helium-3 MR Imaging. ATS 2009, poster no. D28 419.

Eric T Peterson, Jeremy W Gordon, Krishna N Kurpad, Sean B Fain, and Ian J Rowland. Probing the in vivo compartmentalization of hyperpolarized pyruvate using Gadodiamide induced T1 relaxation. The Second International Workshop on Hyperpolarized Carbon-13 and its Applications in Metabolic Imaging. 2009. Oral Presentation

Eric T Peterson, Matthew G Erickson, Sean B Fain, Ian J Rowland. Increased volumetric activity for hyperpolarized DNP solutions. The Second International Workshop on Hyperpolarized Carbon-13 and its Applications in Metabolic Imaging. 2009. Poster Presentation

E.T. Peterson, BS, J. Merfeld, BS, J.H. Holmes, PhD, G. Gonzalez-Fernandez, MS, N.N. Jarjour, MD, R.L. Sorkness, PhD, J.E. Kuhlman, MD, W.W. Busse, MD, S.B. Perlman, MD, S.B. Fain, PhD. Evaluation of large airway morphology near sites of airway obstruction in asthma. ATS 2008, abstract no. 4378.

E. T. Peterson, J. H. Holmes, and S. B. Fain. Airway Measurement in 3D using Dynamic Hyperpolarized He-3 Multi-Echo VIPR. ISMRM 2008, abstract no. 2645.

E. T. Peterson, G. Gonzalez-Fernandez, and S. B. Fain. A method of regional assessment of lung structure and function using MDCT and Helium-3 MRI. ISMRM 2008, abstract no. 2674.

E.T. Peterson, J. H. Holmes, S. B. Fain. Airway Measurement in 3D using Dynamic Hyperpolarized He-3 Multi-Echo VIPR. The Future of Quantitative and Functional Lung Imaging 2008, Presentation no. 5.5.

E. Peterson, G. Gonzalez-Fernandez, N. Jarjour, R. Sorkness, J. Kuhlman, W. Busse, S. Perlman, S. Fain. Imaging in Viral-Induced Asthma Exacerbation Reveals Complex Patterns of Inflammation and Airway Obstruction. ATS 2007, abstract no. 4775

E. Peterson, G. Gonzalez-Fernandez, N. Jarjour, R. Sorkness, J. Kuhlman, W. Busse, S. Perlman, S. Fain. Imaging in Viral-Induced Asthma Exacerbation Reveals Complex Patterns of Inflammation and Airway Obstruction. ICEAD 2007.

E. Peterson, J. Holmes, G. Gonzalez-Fernandez, R. O'Halloran, E. Brodsky, W. Block S. Fain. Airway Segmentation in 3D using Dynamic Hyperpolarized He-3 Multi-Echo VIPR. ISMRM 2007, poster no. 4911

E. Peterson, S. Fain, R. O'Halloran, J. Holmes, R. Pyzalski. Feasibility of Using Hyperpolarized He-3 Diffusion Weighted Images to Segment the Airway Tree. ISMRM 2006, poster no. 2976