Jiaen Liu, Ph.D.

Assistant Professor, Advanced Imaging Research Center and Radiology
University of Texas Southwestern Medical Center, Dallas, TX, USA
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EDUCATION

Ph.D. Biomedical Engineering, University of Minnesota, Minneapolis, MN 2015

Minor in Neuroscience, 2011

M.S. Instruments Science and Technology, Tsinghua University, Beijing, China 2007

B.S. Environmental Engineering, Tsinghua University, Beijing, China 2005

RESEARCH EXPERIENCE

Assistant Professor 2021-present
Advanced Imaging Research Center and Radiology
UT Southwestern Medical Center, Dallas, Texas, USA
Research focus: *High resolution MRI, neurological disorders and degeneration*

Postdoctoral Fellow 2015-2020
National Institute of Neurological Disorders and Stroke, Bethesda, Maryland, USA
Research focus: *Improving detection of cortical lesion of multiple sclerosis by developing robust high-resolution T_2^*-weighted MRI*
Advisor: Dr. Jeff H. Duyn

Graduate Research Assistant 2009-2015
University of Minneosta, Minneapolis, Minnesota, USA
Dissertation: *Imaging Electrical Properties Using MRI and In Vivo Applications*
Advisor: Dr. Bin He

Graduate Research Assistant 2005-2007
Tsinghua University, , Beijing, China
Thesis: *Body Fat Analysis Based on Bioimpedance Measurement*
Advisor: Dr. Yonggui Dong

GRANTS and SCHOLARSHIP

Doctoral Dissertation Fellowship, University of Minnesota 2013
NIH Neuroimaging Graduate Training Fellowship 2010

AWARDS and HONORS

Junior Fellow, International Society for Magnetic Resonance in Medicine (ISMRM) 2019
NIH Fellows Award for Research Excellence 2019
Distinguished Reviewer for Magnetic Resonance in Medicine 2019
Second place in Best Abstract Presentation in ISMRM Motion Study Group 2017
Best Dissertation Award in Biomedical Engineering, University of Minnesota 2017
Second place in IEEE EMBS Student Paper Competition 2014
Second place in IEEE EMBS Best Paper Award in BRAIN Competition 2014
ISMRM Magna Cum Laude Merit Award 2013

Invited Seminars

Center for Vital Longevity, University of Texas in Dallas, Dallas, TX 2022
Department of Physics, University of Houston-Clear Lake, Houston, TX 2022
Department of Mechanical Engineering, University of Texas in Dallas, Dallas, TX 2021
Advanced Imaging Research Center, UT Southwestern Medical School, Dallas, TX 2020
F. M. Kirby Research Center for Functional Brain Imaging, Johns Hopkins University, Baltimore, MD 2019
Translational Neuroradiology Section, NINDS, NIH, Bethesda, MD 2019
Advanced MRI Section, NINDS, NIH, Bethesda, MD 2015

Platform Oral Presentations

Annual meetings of the ISMRM 2013, 2016, 2019, 2020-2022
Annual meeting of the IEEE Engineering in Medicine and Biology Society 2014

Industrial Experience

Imaging Algorithm Scientist Intern 2014
Vital Images, Inc., Toshiba Medical System Group, Minnetonka, MN, USA
Project: development of bone segmentation tool in medical image analysis

Senior Electrical Engineer 2007-2009
Nuctech Co., Ltd., Beijing China
Project: development of hand-held explosive detection device for airport security screening

Publications

Peer-reviewed Journal Papers

1. **Liu J**[*], Beck E[*], Filippini S, van Gelderen P, de Zwart J, Norato G, Sati P, Al-Louzi O, Kolb H, Donadieu M, Morrison M, Duyn J, Reich D. "Navigator-Guided Motion and B_0 Correction of T_2^*-Weighted Magnetic Resonance Imaging Improves Multiple Sclerosis Cortical Lesion Detection". ***Investi Radiol***. 2021; 56(7):409-416 (* co-first authors)

2. **Liu J**, van Gelderen P, de Zwart J, Duyn J. "Reducing motion sensitivity in 3D high-resolution T_2^*-weighted MRI by navigator-based motion and nonlinear magnetic field correction". ***Neuroimage***. 2019; 2:116332

3. Wang Y, Shao Q, Van de Moortele P-F, Racila E, **Liu J**, Bischof J, He B. "Mapping electrical properties heterogeneity of tumor using boundary informed electrical properties tomography (BIEPT) at 7T". ***Magn Reson Med***. 2019;81(1):393-409

4. Hancu I, **Liu J**, Hua Y, Lee SK. "Electrical properties tomography: Available contrast and reconstruction capabilities". ***Magn Reson Med***. 2019;81(2):803-810

5. **Liu J**, de Zwart J, van Gelderen P, Murphy-Boesch J, Duyn J. "Effect of head motion on MRI B_0 field distribution". ***Magn Reson Med***. 2018;80(6):2538-2548

6. de Zwart J, van Gelderen P, Schindler MK, Sati P, **Liu J**, Reich DS, Duyn J. "Impulse response timing differences in BOLD and CBV weighted fMRI". ***Neuroimage***. 2018;181: 292-300

7. **Liu J**, Wang Y, Katscher U, He B. "MR-based Electrical Properties Tomography: Principles, Applications and Challenges". ***IEEE Trans BioMed Eng***. 2017;64(11): 2515-2530

8. **Liu J**, Shao Q, Wang Y, Adriany G, Bischof J, Van de Moortele P-F, He B. "In Vivo Imaging of Electrical Properties of Implanted Rat Tumor with an 8-channel Transceiver Array at 7T Using Electrical Properties Tomography". ***Magn Reson Med***. 2017;78(6):2157-2169

9. **Liu J**, Van de Moortele P-F, Zhang X, Wang Y, He B. "Simultaneous Quantitative Imaging of Electrical Properties and Proton Density from B_1 Maps Using MRI". ***IEEE Trans Med Imaging***. 2016;35(9):2064-2073

10. **Liu J**, Zhang X, Schmitter S, Van de Moortele P-F, He B. "Gradient-based electrical properties tomography (gEPT): A robust method for mapping electrical properties of biological tissues in vivo using magnetic resonance imaging". ***Magn Reson Med***. 2015;74(3):634-646

11. Zhang X, Van de Moortele PF, **Liu J**, Schmitter S, He B. "Quantitative prediction of radio frequency induced local heating derived from measured magnetic field maps in magnetic resonance imaging: A phantom validation at 7 T". ***Appl Phys Lett***. 2014;105(24):244101

12. Zhang X, **Liu J**, He B. "Magnetic-resonance-based electrical properties tomography: a review". ***IEEE Rev Biomed Eng***. 2014;7:87-96

13. **Liu J**, Zhang X, Van de Moortele PF, Schmitter S, He B. "Determining electrical properties based on B_1 fields measured in an MR scanner using a multi-channel transmit/receive coil: a general approach". ***Phys Med Biol***. 2013;58(13):4395-4408.

14. Zhang X, Schmitter S, Van de Moortele PF, **Liu J**, He B. "From complex B_1 mapping to local SAR estimation for human brain MR imaging using multi-channel transceiver coil at 7T". ***IEEE Trans Med Imaging***. 2013;32(6):1058-1067

15. Zhou X, Shi H, Qiu Y, **Liu J**. "Effect of structural parameters on the performances of a combined oxygen microelectrode". ***Journal of Tsinghua University (Science and Technology)***. 2008;48(6):991-4

16. **Liu J**, Dong Y, Ge K. "Bioimpedance measurement system for household healthcare". ***Journal of Tsinghua University (Science and Technology)***. 2007;47(8):1330-33

Conference Papers

1. **Liu J**, Zhang X, Van de Moortele PF, Schmitter S, He B. "Gradient-based Magnetic Resonance Electrical Properties Imaging of Brain Tissues". ***Proceedings of 36th Annual Conference of IEEE Engineering in Medicine and Biology Society***. 2014; 6056-59.

2. Zhang X, **Liu J**, Schmitter S, Van de Moortele PF, He B. "Predicting temperature increase through local SAR estimation by B_1 mapping: A phantom validation at 7T". ***Proceedings of 36th Annual Conference of IEEE Engineering in Medicine and Biology Society***. 2014; 1107-10.

3. **Liu J**, Perdoni C, He B. "Hand movement decoding by phase-locking low frequency EEG signals". ***Proceedings of 33th Annual Conference of IEEE Engineering in Medicine and Biology Society***. 2011; 6335-38.

Conference Abstracts

1. **Liu, J**, Gelderen P, Li X, de Zwart J, Lai K, Sulam J, Beck E, Okar S, van Zijl P, Reich D and Duyn J. "In vivo quantitative laminar R_2^* and susceptibility imaging at 0.3 mm in-plane resolution". ***Proceedings of 30th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2022

2. **Liu, J**, Gelderen P, de Zwart J and Duyn J. "Imaging intracortical structure using navigator-based, motion and B_0-corrected T_2^*-weighted MRI at 7 T". ***Proceedings of 29th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2021

3. **Liu, J**, Beck E, Gelderen P, Sati P, de Zwart J, Kolb H, Al-Louzi O, Morrison M, Reich D and Duyn J. "Improved T_2^*-weighted MRI of multiple sclerosis through joint motion and B_0 correction". ***Proceedings of 28th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2020

4. **Liu J**, van Gelderen P, Özbay P, de Zwart J, Duyn J. "Reducing Motion Sensitivity in 3D High-resolution T_2^*-weighted and QSM MRI By Navigator-based Motion and Nonlinear Magnetic Field Correction". ***Proceedings of 5th International Workshop on MRI Phase Contrast & Quantitative Susceptibility Mapping***. 2019

5. **Liu J**, van Gelderen P, de Zwart J, Duyn J. "Motion-insensitive 3D T_2^*-weighted MRI using a motion- and B_0 field-navigator". ***Proceedings of 27th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2019; 0072

6. **Liu J**, Ozbay P. "How should we compare QSM results? A correlation based analysis as an alternative to traditional error metrics". ***Proceedings of 26th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2018; 2656

7. **Liu J**, van Gelderen P, de Zwart J, Duyn J. "Motion correction of T_2^*-weighted MRI with consideration of B_0 and B_1 effect". ***Proceedings of 26th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2018; 2656

8. Hua Y, Hancu I, Lee SK, Yeo D, **Liu J**. "Evaluation of the Noise Behavior of Gradient-based vs. Helmholz-based Reconstruction of Electrical Properties Tomography in Simulation". ***Proceedings of 26th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2018; 5103

9. **Liu J**, van Gelderen P, de Zwart J, Duyn J. "3D Motion Estimation of Head Using Three Orthogonal Navigator Echoes and Coil Sensitivity Profiles". ***Proceedings of 25th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2017; 1301 (Poster-Second place winner in Best Abstract Presentation in Motion Study Group)

10. **Liu J**, de Zwart J, van Gelderen P, Duyn J. "Motion-induced Magnetic Field Changes Inside the Brain". ***Proceedings of 25th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2017; 1302

11. **Liu J**, Qi S, Wang Y, Adriany G, Bischof J, Van de Moortele PF, He B. "In Vivo Conductivity Imaging of Rat Tumor Model Using MRI". ***Proceedings of 24th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2016; 195

12. **Liu J**, Wang Y, Zhang X, Van de Moortele PF, He B. "PDE Solution of Electrical Properties Tomography With Multi-channel B_1 Transmission". ***Proceedings of 23th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2015; 3300

13. **Liu J**, Zhang X, Wang Y, Van de Moortele PF, He B. "Local Electrical Properties Tomography With Global Regularization By Gradient". ***Proceedings of 23th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2015; 3297

14. Zhang X, **Liu J**, Van de Moortele PF, He B. "Local SAR Estimation via Electrical Properties Tomography: Physical Phantom Validations at 7T". ***Proceedings of 23th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2015; 1855

15. Wang Y, Zhang X, **Liu J**, Van de Moortele PF, He B. "Total Variance Constrained Electrical Properties Tomography Using a 16-channel Transceiver Array Coil at 7T". ***Proceedings of 23th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2015; 3303

16. **Liu J**, Zhang X, Van de Moortele PF, Schmitter S, He B. "Simultaneous Determination of Electrical Properties and Proton Density in a Generalized Gradient-Based Electrical Properties Tomography". ***Proceedings of 22th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2014; 3194

17. Zhang X, **Liu J**, Van de Moortele PF, Schmitter S, He B. "The Feasibility of Predicting Temperature Increase Through Local SAR Estimation Via Electrical Properties Tomography: A Phantom Study at 7T". ***Proceedings of 22th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2014; 4893

18. Zhang X, Van de Moortele PF, **Liu J**, Schmitter S, He B. "Virtual Tissue Electrical Properties: A New Concept for Fast, Robust Local SAR Estimation Based on B_1 Measurement". ***Proceedings of 22th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2014; 181

19. **Liu J**, Zhang X, Schmitter S, Van de Moortele PF, He B. "In vivo Imaging of Electrical Properties of Human Brain Using a Gradient Based Algorithm". ***Proceedings of 21th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2013; 463

20. **Liu J**, Zhang X, Schmitter S, Van de Moortele PF, He B. "A Gradient Based Algorithm For Imaging Electrical Properties Using Magnetic Resonance Imaging". ***Proceedings of 19th Annual Conference of Organization for Human Brain Mapping***. 2013; 1038

21. **Liu J**, Zhang X, Schmitter S, Van de Moortele PF, He B. "Determining Electrical Properties Based on Complex B_1-Fields Measured in an MR Scanner Using a Multiple Transmit/Receive Coil: A General Approach". ***Proceedings of 21th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2013; 4191

22. Zhang X, Schmitter S, **Liu J**, Van de Moortele PF, He B. "Local SAR Estimation for Human Brain Imaging Using Multi-channel Transceiver Coil at 7T". ***Proceedings of 21th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2013; 288

23. Zhang X, **Liu J**, Schmitter S, Van de Moortele PF, He B. "B_1-based SAR Estimation for Human Brain Imaging with Average Brain Property Values Substitution". ***Proceedings of 21th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2013; 4429

24. **Liu J**, Zhang X, He B. "Imaging Electrical Properties of Human Head with Tumor Using Multi-channel Transceiver Coil at UHF: A Simulation Study". ***Proceedings of 20th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2012; 3486

25. Zhang X, **Liu J**, He B. "From Single Element Complex B_1 Mapping to Local SAR Estimation using Multi-channel Transceiver Coil at 7T". ***Proceedings of 20th Annual Conference of International Society for Magnetic Resonance in Medicine***. 2012; 2669

SERVICES

Scientific Committee
Co-chair of Student Paper Competition Committee for IEEE EMBS 2022
Editorial Board
Review Editor for Frontiers in Neuroscience and Frontiers in Neurology
Reviewer
Magnetic Resonance in Medicine
Physics in Medicine and Biology
IEEE Transactions on Medical Imaging
IEEE Transactions on Biomedical Engineering
Journal of Neural Engineering
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Journal of Medical Imaging and Health Informatics
Volunteer
NIH Graduate Student Research Symposium Judge 2020
ISMRM Annual Meeting Program Comittee 2019-2020
Contributor to MRM Highlight 2017-2019
Medical Device conference, Minneapolis, Minnesota, USA 2011
The 31th IEEE EMBS conference, Minneapolis, Minnesota, USA 2009