Mira M. Liu

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Education

University of Chicago **Oct. 2019 – Jun. 2023**
Ph.D. in Medical Physics (CAMPEP-Accredited) *Chicago, IL*

University of Chicago **Oct. 2014 – Jun. 2018**
B.A. with General Honors, Special Honors in Physics; Minor in Philosophy *Chicago, IL*

Research Experience

Astrazeneca, Radiology & Theranostics Team **Aug. 2026 - Present**
Senior AI Scientist - Computational Radiology *Cancer Biomarker Development*
Multimodal Modeling and Medical Image Biomarkers *Boston, MA*

- Working within a team on the development of new biomarkers, enabling indication selection, early assessment of biological activity, and optimal patient stratification in early oncology and late development strategy of the oncology pipeline. Focused on development and application of advanced physics-informed multimodal modeling and simulation algorithms of medical image data

Icahn School of Medicine at Mount Sinai **Sept. 2026 - Present**
Adjunct Faculty Instructor (Research Affiliate) *Body MRI*
Abdominal Multiparametric MRI and Multicompartment DWI *Remote*

- Continuing research affiliation as adjunct faculty instructor in Dept. of Diagnostic, Molecular And Interventional Radiology maintaining projects from postdoctoral collaborations to continue contributing to publications, analysis, biophysical interpretation, and quantitative MRI analysis.

Icahn School of Medicine at Mount Sinai, BMEII **Aug. 2023 - Aug. 2026**
Postdoctoral Fellow, NCATS TL1 Clinical Translational Science Fellow *Drs. Lewis, Bane, Taouli*
Abdominal Multiparametric MRI and Multicompartment DWI *New York, NY*

- Multicompartment approximation of kidney flow using multi-b-value spectral diffusion MRI in kidney transplants for detection of pathophysiology (NIH TL1TR004420, Liu; MM Liu et al. MRM 2025) .
- Multiparametric MRI compared to histopathology and outcome (NIH R01DK129888 NCT05058170, Lewis/Bane; MM Liu et al. Sci Rep 2025).
- Multiparametric MRI in diagnosis and prediction of development chronic kidney disease in patients undergoing partial nephrectomy(Bayer Healthcare, Lewis; MM Liu et al. JMRI 2026).
- Multiparametric MRI for immuno-oncologic and histopathological classification of renal masses (Bayer Healthcare, Lewis; MM Liu et al. JITC 2025).
- Multi b-value diffusion and diffusion tensor imaging of female pelvis in assessment of muscle and nerve damage in patients undergoing pelvic radiotherapy in collaboration with radiation oncology (NIH P30CA196521; Taouli/Marshall)
- Expert consensus reports, clinical recommendations, and textbooks on perfusion MRI, diffusion MRI, intravoxel incoherent motion, and large language models in radiology (P. van Houdt et al. Eur Rad 2026 & M. Tordjman et al. JCM 2025 & S. Rauh et. al. JMRI & Diffusion MRI Chapters: MM Liu et al. (IVIM) and A. Meribout et al. (Abdominal DWI)).
- Leading multicompartment DWI and Luminal water imaging MRI phantom and corresponding MR sequence protocol development and optimization on 3T Siemens Skyra for standardized MR acquisitions. (*In Progress*)

UMass Chan Medical School, Biomedical Imaging **Aug. 2024 - Present**
External Post-Doctoral Collaborator *Drs. Shazeeb, Gounis*
IVIM Perfusion and Diffusion MRI of Stroke *Remote*

- Post-processing and quantification of longitudinal perfusion and diffusion MRI from IVIM in stroke therapeutics for prediction of future infarction and therapeutic response (NIH R44NS076272; MM Liu et al. ISMRM 2026) .

University of Chicago, Dept. of Medical Physics **Oct. 2019 - Jul. 2023**

Doctoral Candidate, National Science Foundation GRFP Fellow *Dr. Timothy Carroll*

Perfusion MRI of Cerebrovascular Disease *Chicago, IL*

- Validated IVIM perfusion-diffusion mismatch for prediction of infarct growth speed and collateral supply compared to Local-AIF dynamic susceptilibity contrast MRI (NSF DGE-1746045, Liu; MM Liu et al. AJNR 2025).
- Proposed theory, simulation, and validation of water transport model of intravoxel incoherent motion (IVIM) with multi b-value DWI compared to neutron capture microsphere deposition through simulation and pre-clinical model (NSF DGE-1746045, Liu; MM Liu et al. JMI 2023).
- Measured leptomeningeal pial collateral score and predicted infarct growth rate *in vivo* with delay and dispersion corrected local-AIF dynamic susceptilibity contrast MRI (NIH R01-NS093908, Christoforidis/Carroll; MM Liu et al. AJNR 2024)
- Applied quantitative dynamic susceptibility perfusion to image novel stroke therapeutics in pre-clinical model under parent study (NIH R01-NS093908, Christoforidis/Carroll; & MM Liu et al. JNIS 2022 & G. Christoforidis et al. JNIS 2021 & N. Saadat et al. JNIS 2020).
- Compared quantitative susceptibility mapping and functional connectivity to local-AIF dynamic susceptibility contrast MRI (C. Warioba et al. AJNR 2024 & A. Dimov et al. MRM 2022)

PhD Rotation *Dr. Patrick La Riviere*

High-resolution Muon Tomography of Pyramids of Giza *Chicago, IL*

- Developed and wrote a simulation of geometric tracks of muon trajectories, simulated proposed two-place detector for one-sided muon tomography of the Pyramids of Giza. Provided method of calculating detector positions needed for high-resolution cosmic-ray tomographic reconstruction of Pyramids (Exploring the Great Pyramid (EGP) Mission collaboration between University of Chicago and Fermilab; A. Bross et al. JAIS 2022)

University of Chicago, Dept. of Radiology **Jun. 2018 - Oct. 2019**

Research Specialist *Dr. Timothy Carroll*

Perfusion MRI of Cerebrovascular Disease *Chicago, IL*

- Analyzed stroke models with quantitative dynamic susceptibility contrast for diagnosis and prognosis of novel therapeutics (NIH R01-NS093908, Carroll/Christoforidis; MM Liu et al. ISMRM 2019).
- Post-processing MRI perfusion and diffusion for glioblastoma subtypes

University of Chicago, Dept. of Astrophysics **Sept. 2015 – Dec. 2020**

Research Assistant, Honors Physics Thesis, Walter and Fay Selove Award *Dr. Stephan Meyer*

Observational Cosmology and Astrophysics *Chicago, IL*

- Derived and programmed data analysis to extract spectrum from output of lab-designed Compact Fourier Transform Spectrometer (FTS). Compiled and wrote code to run the instrument properly, store and retrieve data, and translated code to GUIs to be sent out with the FTS to the South Pole Telescope. (NSF PHY-1125897; Z. Pan et al. AO 2019)
- Developed simulation to analyze the time constant modulating data using Markov Chain Monte Carlo and to execute Fourier analysis to extract the spectrum through deconvolution and demodulation. Wrote a ray tracing simulation designed to test the percentage of light that was lost in our designed compact Fourier transform spectrometer (FTS) due to scattering within the instrument, to address resolution and scattering effects observed from previous runs, and to provide statistical proof of results of data analysis. Extended simulation to be a full numerical model of FTS using ray tracing and semiclassical quantum statistics to be used to understand the interferograms and spectra produced by the physical FTS, as well as confirm instrumental limitations and data analysis. (NSF PHY-1125897; MM Liu et al. AO 2020)

New York University, Dept. of Physics **Jun. 2015 – Sept. 2015**
Research Assistant *Dr. Marc Gershow*
Soft Matter Physics *New York, NY*

- Ran and recorded experiments on sensorimotor structure of drosophila larva phototaxis in study of the effects of genetic inactivation of photosensory neurons.

Honors and Awards

——— Major Awards ———

- 2026 W.S. Moore Young Investigator Award of the International Society of Magnetic Resonance in Medicine *for exceptional original research contributions in the clinical science of magnetic resonance* ($2500)
- 2026 Young Investigator Award Invited Finalist at the International Society of Magnetic Resonance in Medicine ($1000)
- 2024 - 2026 NIH National Center for Advancing Translational Sciences TL1 Postdoctoral Fellowship at Mount Sinai ($120,000)
- 2024 Program Award for Outstanding Performance in the General Field of Medical Physics at the University of Chicago ($500)
- 2022 University of Chicago Harper Dissertation Award Finalist (Top three, one award per university division)
- 2019 - 2024 National Science Foundation Graduate Research Fellowship ($138,000)
- 2017 Walter and Fay Selove Prize for Outstanding Undergraduate Research in Physics at the University of Chicago ($5,000)

——— Conference Awards ———

- 2026 Magna Cum Laude Award for *"Multi-b-value Diffusion, T1, R2*, and ASL MRI Classify Renal Allograft Pathology and Allograft Outcome: Interim Results"* by the International Society of Magnetic Resonance in Medicine
- 2025 Certificate of Merit Award for *"Multi-B-Value Diffusion MRI Predicts The Banff Classification Of Renal Transplant Biopsies"* from the Radiological Society of North America Science Council
- 2025 1st Place Oral Presentation for *"Functional multiparametric MRI for noninvasive Banff Classification of Kidney Allografts"* at the Mount Sinai Radiology Retreat
- 2025 1st Place Kidney MRI Trainee Abstract for *"Spectral diffusion MRI detects early fibrosis in renal allografts in a pilot clinical translational study"* by the International Society of Magnetic Resonance in Medicine
- 2024 2nd Place Oral Presentation for *"Assessment & Prediction of Renal Function with Non-Contrast MRI in Patients Undergoing Surgical Management of Solid Renal Masses"* by the International Society of Magnetic Resonance in Medicine IVIM Workshop
- 2023 Graduate Program in Medical Physics Flash Talk Award for *"Non-contrast Perfusion MRI from the point of view of Medicine and Physics"*

——— Educational and Stipend Awards ———

- 2026 International Society of Magnetic Resonance in Medicine Stipend ($1125)
- 2025 International Society of Magnetic Resonance in Medicine Stipend ($475)
- 2025 NIH TL1 Mount Sinai Postdoctoral Scholar Travel Award ($1000)

- 2025 International Society of Magnetic Resonance in Medicine Body MRI Workshop Trainee Stipend Award ($238)
- 2024 NIH TL1 Mount Sinai Postdoctoral Scholar Travel Award ($1000) IVIM Workshop Trainee Stipend Award($865)
- 2024 Society of Abdominal Radiology Travel Scholarship Award for Trainees ($1000)
- 2024 International Society of Magnetic Resonance in Medicine Stipend
- 2024 Department of Medical Physics Nominee for the University of Chicago Best PhD Dissertation (June 2024)
- 2023 International Society of Magnetic Resonance in Medicine Stipend ($700)
- 2022 Graduate Council Research Fund Award 2022 ($600)
- 2021 International Society of Magnetic Resonance in Medicine Stipend ($700)
- 2018 University of Chicago Bachelors with General Honors
- 2018 Honors Physics Bachelors Thesis
- 2014 - 2018 Dean's List all years attended full time
- 2014 Presidential Scholar Semifinalist for New York State

Peer-Reviewed Publications

————————Peer-Reviewed Scientific Publications ————————

P1. X. Mu, **MM. Liu**, H. Al-Mubarak, P. Kennedy, P. Robson; J Cuevas, B Kuhn, K Badani, B Taouli, S Lewis, O Bane. "*Streamlined calculation of kidney function using dynamic contrast-enhanced MRI with population-based arterial input function and a whole-kidney model*". European Radiology Experimental, 2026. DOI: 10.1186/s41747-026-00704-3

P2. HK. Sharma, HF Al-Mubarak, J. Loret Del Hoyo, G. Abboud, O. Bane, M. Tordjman, **MM. Liu**, V. Wagaskar, A. Tewari, B. Taouli, S. Lewis. "*Reproducibility of MRI radiomics measurements in men with prostate cancer undergoing active surveillance.*" Cancers, 2026. DOI: 10.3390/cancers18050778

P3. **MM. Liu**, O. Bane, X. Mu, H. Al-Mubarak, A.M. Reddy, I. Bolger, G. Abboud, P. Kennedy, P. Robson, K. Meilika, A. Horowitz, B. Kuhn, S. Farouk, K. Badani, B. Taouli, S. Lewis. "*Multiparametric MRI for predicting renal function deterioration and chronic kidney disease development in patients undergoing nephrectomy for renal masses: a pilot study.*" Journal of Magnetic Resonance Imaging, 2026. PMID: 41532966, DOI: 10.1002/jmri.70213.

- JMRI Editorial on this publication: *Editorial for "Multiparametric MRI for Predicting Renal Function Deterioration and Chronic Kidney Disease Development in Patients Undergoing Nephrectomy for Renal Masses: A Pilot Study", Journal of Magnetic Resonance Imaging, 2026. DOI: 10.1002/jmri.70226)*
- Aunt Minnie article on this publication: *PreSurgical mpMRI helps predict Chronic Kidney Disease Risk* in Clinical News | MRI by Kate Madden Yee
- Renal+Urology News article on this publication: *Multiparametric MRI Anticipates Post-Nephrectomy Kidney Decline* | by Megan Garlapow
- W.S. Moore Young Investigator Award for exceptional original clinical research in the field of magnetic resonance imaging for this work
- Mount Sinai Press Release on this work
- HealthDay News Article on this work

P4. **MM. Liu**, O. Bane, X. Mu, H. Al-Mubarak, G. Abboud, P. Kennedy, P. Robson, K. Meilika, L. Zuluaga, A. Horowitz, B. Kuhn, T.H. Thin PhD, M. Garcia-Barros, R. Brody, K. Badani, B. Taouli, S. Lewis. "*Immuno-Oncologic Profiling of Renal Masses using Multiparametric MRI: A Pilot Study*". Journal for ImmunoTherapy of Cancer, 2025. PMCID: PMC12684148, DOI: 10.1136/jitc-2025-012833.

P5. **MM. Liu**, J. Dyke, T. Gladytz, J. Jasse, I. Bolger, S. Calle, S. Pavuluri, T. Crews, A. Kimm-Drapeau, S. Seshan, S. Salvatore, I. Stillman, T. Muthukumar, B. Taouli, S. Farouk, S. Lewis and O. Bane. "*Detecting Early Kidney Allograft Fibrosis with Multi-b-value Diffusion MRI*". Scientific Reports, 2025. PMID: 41266411, DOI: 10.1038/s41598-025-24701-5

P6. **MM. Liu**, T. Gladytz, J. Dyke, I. Bolger, J. Jasse, S. Calle, S. Seshan, S. Salvatore, I. Stillman, T. Muthukumar, B. Taouli, S. Farouk, S. Lewis and O. Bane. "*Estimation of Multi-Component Flow in the Kidney with Multi-b-value Spectral Diffusion*", Magnetic Resonance in Medicine, 2025. PMID: 40720675, DOI: 10.1002/mrm.30644

P7. **MM. Liu**, N. Saadat, S. Roth, M. Niekrasz, M.S. Shazeeb, T.J. Carroll, G. Christoforidis. "*A Method for Imaging the Ischemic Penumbra with MRI using IVIM*" American Journal of NeuroRadiology, 2025. PMID: 39805668, DOI: 10.3174/ajnr.A8656

P8. **MM. Liu**, N. Saadat, S. Roth, M. Niekrasz, G. Christoforidis, T.J. Carroll. "*Quantification of Collateral Supply with Local-AIF Dynamic Susceptibility Contrast MRI Predicts Infarct Growth*" American Journal of NeuroRadiology, 2024. PMID: 39134367, DOI: 10.3174/ajnr.A8441

P9. C.S. Warioba, **MM. Liu**, Sagada Penano, T.J. Carroll, S. Foxley, G.A. Christoforidis. "*Efficacy Assessment of Cerebral Perfusion Augmentation Through Functional Connectivity in an Acute Canine Stroke Model*" American Journal of NeuroRadiology, 2024. PMID: 38684318, DOI: 10.3174/ajnr.A8320

P10. **MM. Liu**, N. Saadat, Y. Jeong, S. Roth, M. Niekrasz, G. Christoforidis, T.J. Carroll. "*Quantitative perfusion and water transport time model from multi b-value diffusion magnetic resonance imaging validated against neutron capture microspheres.*" Journal of Medical Imaging, 2023. PMID: 38090645, DOI: 10.1117/1.JMI.10.6.063501

P11. **MM. Liu**, N. Saadat, Y. Jeong, S. Roth, M. Niekrasz, G. Christoforidis, T.J. Carroll. "*Augmentation of Perfusion with Simultaneous Vasodilator and Inotropic Agents in Experimental Acute Middle Cerebral Artery Occlusion: A Pilot Study*". Journal of NeuroInterventional Surgery, 2022. PMID: 35803730 DOI: 10.1136/jnis-2022-018990

P12. A. Bross, E.C. Dukes, R. Ehrlich, E. Fernandez, S. Dukes, M. Gobashy, I. Jamieson, P. La Riviere, **MM. Liu**, G. Marouard, N. Moeller, A. Pla-Dalmau, P. Rubinov, O. Shohoud, P. Vargas, T. Welch. "*Tomographic Muon Imaging of the Great Pyramid of Giza*". Journal for Advanced Instrumentation in Science, 2022. OSTI ID: 1844785, DOI: 10.31526/jais.2022.280

P13. G. Christoforidis, N. Saadat, **MM. Liu**, Y. Jeong, S. Roth, M. Niekrasz, T.J. Carroll. "*Effect of Early SANGUINATE® (PEGylated carboxyhemoglobin bovine) Infusion on Cerebral Blood Flow to the Ischemic Core in Experimental Middle Cerebral Artery Occlusion.*" Journal of NeuroInterventional Surgery, 2021. PMID: 34907008 DOI: 10.1136/neurintsurg-2021-018239

P14. A. Dimov, G. Christoforidis, N. Saadat, **MM. Liu**, Y. Jeong, S. Roth, M. Niekrasz, T.J. Carroll. "*QSM in canine model of acute cerebral ischemia: A pilot study*". Mag. Reson. Med, 2020. PMID: 33034078 DOI: 10.1002/mrm.28498

P15. N. Saadat, G. Christoforidis, Y. Jeong, **MM. Liu**, A. Dimov, S. Roth, M. Niekrasz, S. Ansari, T.J. Carroll. "*Influence of simultaneous pressor and vasodilatory agents on the evolution of infarct growth in experimental acute middle cerebral artery occlusion.*" Journal of NeuroInterventional Surgery, 2020.PMID: 32900906 DOI: 10.1136/neurintsurg-2020-016539

P16. **MM. Liu**, Z. Pan, R. Basu Thakur, S. Meyer. "*Simulation and Calibration of a Compact Fourier Transform Spectrometer*". Optical Society of America, Applied Optics, 2020. PMID: 32902475 DOI: 10.1364/AO.397312

P17. Z. Pan, **MM. Liu**, R. Basu Thakur, B.A. Benson, D.J. Fixsen, H. Goksu, E. Rath, S. Meyer. "A Compact Millimeter-Wavelength Fourier-Transform Spectrometer". Optical Society of America, Applied Optics, 2019. PMID: 31503767 DOI: 10.1364/AO.58.006257

———— Reviews, Consensus Reports, and Book Chapters ————

P18. **MM. Liu**, C. Federau, "*Intravoxel Incoherent Motion: From Theory to Practice*" M. Iima, S. Huang, D. Le Bihan (Ed.), "Diffusion MRI: A window to biological tissue architecture and to medical applications" Springer Nature. (*In Press*)

P19. A. Meribout, M. Yuce, **MM. Liu**, B. Taouli "*Applications of Diffusion MRI in Liver and Pancreatic Disease*" M. Iima, S. Huang, D. Le Bihan (Ed.), "Diffusion MRI: A window to biological tissue architecture and to medical applications" Springer Nature. (*In Press*)

P20. S. Rauh, E. Sigmund, C. Federau, D. Hernando, M. Iima, O. Jalnefjord, J. Jansen, J. Jasse, NP. Jerome, M. Kaandorp, S. Kurugol, FB. Laun, **MM. Liu**, A. Ljimani, T. Niendorf, DA. Reiter, MS. Shazeeb, A. Shukla-Dave, J. Stabinska, A. Wetscherek, PT. While, D. Wu, D. Le Bihan, O. Gurney-Champion. "*Towards Clinical Translation of Intravoxel Incoherent Motion MRI: Acquisition and Analysis Guidelines*" Journal of Magnetic Resonance Imaging, 2026. DOI: 10.1002/jmri.70278

P21. P. van Houdt, L. Vaclavu, S. Sourbron, E. Shalom, C. Federau, M. Iima, **MM. Liu**, L. Knuttson, R. Wirestam, M. van Osch, M. Gunther, R. van der Heijden. "*ESR Essentials: Perfusion MRI—practice recommendations by the European Society for Magnetic Resonance in Medicine and Biology*" European Radiology, 2026. PMID: 41591472, DOI: 10.1007/s00330-025-12306-5

P22. M. Tordjman, I. Bolger, M. Yuce, F. Restrepo, Z. Liu, L. Dercle, J. McGale, A. Meribout, **MM. Liu**, A. Beddok, H. Lee, S. Rohren, R. Yu, X. Mei, B. Taouli. "*Large Language Models in Cancer Imaging: Applications and Future Perspectives*" Journal of Clinical Medicine, 2025. PMID: 40429281, DOI: 10.3390/jcm14103285.

————Publications In progress ————

P23. M. Tordjman, A. Dimitrakakis, M. Yuce, **MM. Liu**, A. Meribout, Z. Liu, H. Ahmed, I. Bolger, A. Colvin, M. Huang, C. Ishak, C. Zhang, C. Horst, H. Almansour, A. Doshi, P. Guiseppe, B. Taouli, T. Beyer, Z. Fayad, H. Lee, X. Mei. "*Vision Language Models and Foundation Models in Magnetic Resonance Imaging: A Systematic Review of Emerging Methods and Clinical Applications*". Cell Reports Medicine (*Resubmitted*)

P24. F. Restrepo, O. Bane, E. Bhuiyan, E. Ozakaya, P. Kennedy, M. Shareef, A. Geahchan, D. Hamdan, **MM. Liu**, S. Pavuluri, P. Hamon, M. Buckup, S. Hectors, L. Brennan, K. Cygan, N. Fiaschi, T. Uldrick, Z. Zhao, M. Fiel, SC. Ward, M. Schwartz, M. Buckstein, TU. Marron, M. Merad, B. Taouli "*Multiparametric MRI predicts HCC immunophenotype, CTNNB1 mutational status, and response to neoadjuvant immunotherapy*". (*Under Review*)

P25. **MM. Liu** et al. "*Characterization of Renal Allograft Pathology and Prediction of Patient Outcome with BOLD-R2* and Arterial Spin Labeled MRI*" (*Submitted*)

P26. **MM. Liu** et al. "*Quantifying Vascular, Tubular and Parenchymal Volumes with Renal Diffusion and Luminal Water Imaging in Phantoms and Volunteers.*" (*Internal Review*)

P27. **MM. Liu** et al. "*Intravoxel Incoherent Motion MRI Tracks Longitudinal Perfusion, Penumbra, and Infarct Evolution in Acute Large Vessel Occlusion*" (*Internal Review*)

PhD Dissertation

MM. Liu. "Use, Optimization, and Expansion of Quantitative Magnetic Resonance Perfusion Imaging in Cerebrovascular Disease." PhD Dissertation, University of Chicago, 2023. doi: 10.6082/uchicago.7506
Advisor: Timothy J. Carroll, PhD. Chair: Patrick La Riviere, PhD. Committee members: Zheng Feng Lu, PhD, Sean Foxley, PhD, Michael Hurley, MD, External member: Gregory Christoforidis, MD.

Invited Talks

T1. Medical Physics Seminar at Memorial Sloan Kettering Department of Medical Physics "*Clinical Translation of Quantitative Perfusion and Diffusion MRI: Kidney and Cerebrovascular Disease*". (2026)

T2. International Society for Magnetic Resonance in Medicine Educational Session 'How Do I Do it?': A Tour from the Experts. "*Quantitative Diffusion Weighted Imaging and Relaxometry in the Body*". (2026)

T3. NCATS ISMMS Clinical and Translational Science Award External Advisory Board Meeting: "*Translation of Advanced MRI into Clinical Practice: Noninvasive detection of renal pathology, prediction of patient outcome, and characterization of renal mass and immuno-oncologic pathology*". (2026)

T4. ISMRM Renal MRI study group virtual meeting Probing Renal Microstructure and Metabolism: Quantifying Vascular, Tubular, and Parenchymal Volumes: "*Spectral DWI measurement of tubular, vascular and parenchyma components in renal transplant*". (2026)

T5. NCATS ISMMS Clinical and Translational Science Award External Advisory Board Meeting: "*Clinical Translation of Advanced Multi-b-value Diffusion MRI in Kidney Disease: Detection of Early Fibrosis, Prediction of Chronic Kidney Disease Progression, and Characterization of Renal Mass and Immuno-Oncologic Pathology*". (2025)

T6. Institutes for Translational Sciences at the Icahn School of Medicine Translational Science Research Day: "*Application of Advanced Diffusion and Multiparametric MRI in Nephrology*". (2024).

Select Peer-Reviewed Conference Presentations

— *A full list of 50+ proceeding papers and presentations is available upon request.*

———— Postdoctoral Fellowship ————

C1. **MM. Liu**, J. Dyke, I. Bolger, S. Calle, S. Pavuluri, S. Seshan, S. Salvatore, I. Stillman, T. Muthukumar, B. Taouli, S. Farouk, S. Lewis and O. Bane. "Characterization of Renal Allograft Pathology and Prediction of Outcome with R2* and Arterial Spin Labeled MRI" Society for Advanced Body Imaging 2026 (Oral Presentation)
- Presentation at Exceptional Scientific Session

C2. **MM. Liu**, O. Bane, X. Mu, H. Al-Mubarak, A.M. Reddy, I. Bolger, G. Abboud, P. Kennedy, P. Robson, K. Meilika, A. Horowitz, B. Kuhn, S. Farouk, K. Badani, B. Taouli, S. Lewis. "Multiparametric MRI Predicting Renal Function Deterioration and CKD Development in Patients Undergoing Nephrectomy". International Society of Magnetic Resonance in Medicine 2026 (Young Investigator Award Oral Talk and Poster)
- W.S. Moore Young Investigator Award 2026 International Society of Magnetic Resonance in Medicine Annual Meeting

C3. **MM. Liu**, J. Dyke, I. Bolger, S. Calle, S. Pavuluri, S. Seshan, S. Salvatore, I. Stillman, T. Muthukumar, B. Taouli, S. Farouk, S. Lewis and O. Bane. "Multi-b-value Diffusion, T1, R2*, and ASL MRI Classify Renal Allograft Pathology and Allograft Outcome: Interim Results" International Society of Magnetic Resonance in Medicine 2026 (Oral Presentation)
- Magna Cum Laude Award at 2026 International Society of Magnetic Resonance in Medicine Annual Meeting

C4. VN. Anthony, D. Xia, **MM. Liu**, S. Farouk, O. Bane, S. Lewis, L. Feng, X. Xu "Chemical Exchange Saturation Transfer (CEST) MRI for Non-invasive Molecular Imaging in Renal Transplant Recipients" International Society of Magnetic Resonance in Medicine 2026 (Flash Talk)
- Finalist for Kidney MRI Trainee Abstract Award 2026 International Society of Magnetic Resonance in Medicine

C5. **MM. Liu**, R. King, Z. Vardar, J. Kolstad, A. Kuhn, V. Anagnosstakou, C. Raskeett, J. Winger, A. Krtolica, N. Henninger, M. Gounis. M.S. Shazeeb. "Imaging Infarct Progression, Penumbra, and Future Infarction using IVIM MRI in Stroke" International Society of Magnetic Resonance in Medicine 2026 (Poster Presentation)

C6. **MM. Liu**, J. Dyke, I. Bolger, S. Calle, S. Pavuluri, S. Seshan, S. Salvatore, I. Stillman, T. Muthukumar, B. Taouli, S. Farouk, S. Lewis and O. Bane. "Functional multiparametric MRI for noninvasive Banff Classification of Kidney Allografts" Mount Sinai Radiology Annual Retreat 2025 (Oral Presentation)
- 1st Place Oral Presentation at the Mount Sinai Radiology Retreat

C7. **MM. Liu**, J. Dyke, S. Seshan, S. Salvatore, I. Stillman, T. Muthukumar, B. Taouli, S. Farouk, S. Lewis and O. Bane. "Multi-B-Value Diffusion MRI Predicts The Banff Classification Of Renal Transplant Biopsies" Radiological Society of North America 2025 (Poster Presentation and Hard Back Poster)
- Certificate of Merit from the Radiological Society of North America Science Council 2025

C8. **MM. Liu**, J. Dyke, T. Gladytz, J. Jasse, S. Calle, S. Seshan, S. Salvatore, I. Stillman, T. Muthukumar, B. Taouli, S. Farouk, S. Lewis and O. Bane. "Spectral diffusion MRI detects early fibrosis in renal allografts in a pilot clinical translational study" International Society of Magnetic Resonance in Medicine 2025 (Oral Presentation)
- 1st Place Kidney MRI Trainee Abstract Award at ISMRM 2025

C9. **MM. Liu**, M. S. Shazeeb, N. Saadat, S. Roth, M. Niekrasz, M.S. Shazeeb, T.J. Carroll, G. Christoforidis. "A Method for Imaging the Ischemic Penumbra with MRI using Intravoxel Incoherent Motion" International Society of Magnetic Resonance in Medicine 2025 (Oral Presentation)

C10. **MM. Liu**, O. Bane, X. Mu, H. Al-Mubarak, A.M. Reddy, P. Kennedy, P. Robson, J. Cuevas, K. Meilika, A. Horowitz, B. Kuhn, K. Badani, B. Taouli, S. Lewis. "Functional MRI and clear cell likelihood score for classification of subtype and immuno-oncologic markers of solid renal masses" American Urological Association 2025 (Poster Presentation)

C11. **MM. Liu**, J. Dyke, T. Gladytz, J. Jasse, S. Calle, I. Bolger, S. Seshan, S. Salvatore, I. Stillman, T. Muthukumar, B. Taouli, S. Farouk, S. Lewis and O. Bane. "Spectral Diffusion MRI Detects Early Fibrosis in Renal Allografts in a Pilot Clinical Translational Study" ISMRM Workshop on Body MRI 2025 (Power Pitch)

C12. **MM. Liu**, O. Bane, X. Mu, H. Al-Mubarak, A.M. Reddy, P. Kennedy, P. Robson, J. Cuevas, K. Meilika, A. Horowitz, B. Kuhn, K. Badani, B. Taouli, S. Lewis. "Solid renal mass subtyping with functional MRI and clear cell likelihood score in patients undergoing surgical management of solid renal masses." Society of Abdominal Radiology 2025. (Oral Presentation)

C13. **MM. Liu**, O. Bane, H. Al-Mubarak, A.M. Reddy, P. Kennedy, P. Robson, J. Cuevas, K. Meilika, A. Horowitz, B. Kuhn, K. Badani, B. Taouli, S. Lewis. "Assessment And prediction of chronic kidney disease with non-contrast functional MRI in patients undergoing surgical management of solid renal masses." Radiological Society of North America 2025. (Oral Presentation)

C14. **MM. Liu**, O. Bane, H. Al-Mubarak, A.M. Reddy, P. Kennedy, P. Robson, J. Cuevas, K. Meilika, A. Horowitz, B. Kuhn, K. Badani, B. Taouli, S. Lewis. "Assessment & Prediction of Renal Function with Non-Contrast MRI in Patients Undergoing Surgical Management of Solid Renal Masses." International Society for Magnetic Resonance in Medicine Workshop on IVIM 2024. (Oral Presentation)
- 2nd Place Oral Presentation Award

C15. **MM. Liu**, O. Bane, H. Al-Mubarak, A.M. Reddy, P. Kennedy, P. Robson, J. Cuevas, K. Meilika, A. Horowitz, B. Kuhn, K. Badani, B. Taouli, S. Lewis. "Characterization of solid renal masses with functional MRI in patients undergoing surgical management." Society of Abdominal Radiology 2024. (Oral Presentation)

———— PhD Student ————

C16. **MM. Liu**, C.S. Warioba, J. Bertini, N. Saadat, T.J. Carroll, G. Christoforidis. "Validation and Machine Learning of a New Method for Quantifying CBF with IVIM". Annual Meeting of the American Society of Neuroradiology, 2023. (Oral Presentation)

C17. **MM. Liu**, S. Prabhakaran, J. Bertini, C.S. Warioba, S. Ansari, Y. Pu, A. Al-Smadi, T.J. Carroll. "Local-AIF DSC Perfusion in Intracranial Atherosclerotic Disease". 61st Annual Meeting of the American Society of Neuroradiology, 2023. (Oral Presentation)

C18. **MM. Liu**, J. Bertini, C.S. Warioba, N. Saadat, D. Gorre, T.J. Carroll, G. Christoforidis. "Machine Learning for Quantitative IVIM (qIVIM) Cerebral Perfusion Imaging" 31st Annual International Society for Magnetic Resonance in Medicine conference, 2023 (Poster Presentation)

C19. **MM. Liu**, N. Saadat, Y. Jeong, S. Roth, M. Niekrasz, G. Christoforidis, T.J. Carroll. "Augmented Perfusion Quantified by MRI Depends on Collateral Recruitment in Middle Cerebral Artery Occlusion: A Pilot Study". 30th Annual International Society for Magnetic Resonance in Medicine Conference, 2022. (Power Pitch)

C20. **MM. Liu**, N. Saadat, Y. Jeong, S. Roth, M. Niekrasz, G. Christoforidis, T.J. Carroll. "Quantitative IVIM Perfusion at Normocapnia, Hypercapnia, Acute Stroke and Stroke Treatment Predicts Neutron Capture Microspheres." International Society for Magnetic Resonance in Medicine Perfusion Conference, 2022. (Oral Presentation)

C21. **MM. Liu**, Y. Jeong, N. Saadat, S. Roth, M. Niekrasz, G. Christoforidis, T.J. Carroll. "IVIM Perfusion Correlates with Quantitative DSC MRI at Baseline, Hypercapnia, and Infarct." 58th Annual Meeting of the American Society of Neuroradiology, 2020. (Oral Presentation)

———— Undergraduate ————

C22. Z. Pan, **MM. Liu**, R. Basu Thakur, H. Goksu, E. Rath, D. Fixsen, B. Benson, S. Meyer. "A Compact millimeter-wavelength Fourier-Transform Spectrometer". March 2019. Presented at CMB-S4 Collaboration, Fermilab. (Invited Talk)

C23. Z.Pan, R. Basu Thakur, **M. Liu-Sarkar**. "Cosmic Microwave Background Radiation Summer School – Fourier Transform Spectrometer test". August 9, 2017. CMB Detectors and Instrumentation at the University of Chicago Summer School. (Oral Presentation)

Clinical Medical Physics Experience

Clinical Shadowing of an MR-Linac **Jun. 2018 - Oct. 2019**

Department of Medical Physics, Memorial Sloan Kettering Cancer Center *Dr. Eric Aliotta*

- Clinical Shadowing of clinical medical physicist for real-time online adaptive radiation therapy with a MR-Linac (Observed 5 cases of adaptive RT for prostate cancer)

Practicum in Imaging 1 **Jun. 2021 - Sept. 2021**

Department of Medical Physics, University of Chicago *Drs. Giger, Reiser, Sammet, Lu*

- CAMPEP-accredited Practicum in Imaging including Magnetic Resonance Imaging Daily QC, measurement of image quality and radiation dose of Computed Tomography, measurement of dose and performance of FFDM and DBT Mammography, influence of mAs and kV on effective dose and automatic exposure control in radiography, and measurement of occupational exposure from fluoroscopy

Practicum in Imaging 2 **Jan. 2021 - Sept. 2021**

Department of Medical Physics, University of Chicago *Drs. O'Brien-Penney, Bader*

- CAMPEP-accredited Practicum in Imaging 2 including daily QC procedure of scintillators, imaging of ACR accreditation PET phantom for pass/fail criteria of standardized uptake values, quality control of ultrasound linear array probe with a multi-tissue phantom, exposure rate and dose calibration with radionuclides, and measurement of image quality of a gamma camera.

Practicum in Radiation Therapy **Jan 2020 - April 2020**

Department of Medical Physics, University of Chicago *Drs. Al-Hallaq, Aydogan, Wang*

- CAMPEP-accredited Practicum in Radiation Therapy including output calibration of a linear accelerator following AAPM TG-51, quality assurance of intensity-modulated radiation beam, dose calculation for brachytherapy treatment planning with thermoluminescent detectors, and montecarlo simulation and validation in radiotherapy treatment planning

Selected Professional Leadership and Activities

Deputy Editor Trainee Fellow - Journal of Magnetic Resonance Imaging 2026 - 2027

- A one-year immersive term on the JMRI editorial board to participate in regular editorial board meetings, decision conference calls, and the peer-review process.

Ad-hoc Peer-Reviewer **2023 - Present**

- European Radiology, Journal of Magnetic Resonance Imaging, Kidney International Reports, NMR in Biomedicine, Nature Scientific Reports, Quantitative Imaging in Medicine and Surgery, International Urology and Nephrology, BMC Cardiovascular Disorders, International Society of Magnetic Resonance in Medicine Annual Meeting Conference Papers

Invited Moderator **May 2026**

- Invited Moderator at International Society for Magnetic Resonance Conference, Session "Advanced MRI Techniques for Spinal Cord Structure, Function, and Physiology"

ISMRM Renal MRI Study Group Trainee Representative **May 2025 - May 2026**

- Nominated and elected as a trainee member of the Renal MRI study group to continue to grow and promote fellow junior members in renal MRI and involvement in the ISMRM

Invited Moderator **May 2025**

- Invited Moderator at International Society for Magnetic Resonance Conference, Session "Body Diffusion MRI: Modeling, Microstructure & Analysis"

Invited BMEII Symposium Poster judge **Mar. 2024**

- Invited judge at Biomedical Engineering and Imaging Institute Symposium in NYC

Invited Moderator **Mar. 2024**

- Invited co-moderator at International Society for Magnetic Resonance in Medicine IVIM Workshop, Session "Acquisition Settings"

Mount Sinai Science Policy Group **Aug. 2023 - Jan. 2026**

- **Director of Content and Communications** working to keep members of the Mount Sinai graduate school and post doctoral community up to date on Science Policy events, fellowships, and courses available through a newsletter co-written with the President of MSSPG.

Graduate Program in Medical Physics **Oct. 2019 - Jun. 2023**

- **Co-President of Student Body** of Medical Physics PhD program. Responsibilities include being main facilitator between students and faculty, faculty meetings, bi-weekly journal club, chair and department meetings, the mock oral exam, program-wide events, career development talks, program retreat, and student awards.
- **Graduate Student Representative** of the UChicago graduate program in medical physics for all external contact regarding medical physics, the graduate or certificate program, or specifically admissions.

Biological Sciences Division Dean's Council **Sept. 2020 - Oct. 2022**

- **Representative of Medical Physics** in the graduate student organization, Dean's Council, run by student representatives from each graduate program.
- **Community Service Chair**. First elected Chair of a new position of division-wide community service, starting service at the Greater Chicago Food Depository, Food Pantry volunteering, and outreach events on the South Side of Chicago.

Graduate Recruitment Initiative Team **Sept. 2020 - Oct. 2022**

- **Webmaster**. Elected to reorganize and restructure the website to improve publicity, outreach and community service.
- **Team Lead** elected to serve as a team lead focused on recruitment and retention of graduate students at UChicago including a university-wide Alumni Panel with Office of Career Advancement, social events, and monthly community support meetings

Medical Physics Outreach Committee **Oct. 2020 - June. 2023**

- **Student Member** of the Outreach committee of the University of Chicago Graduate Program in Medical Physics which aims to promote communication between the student body, faculty, and surrounding Southside Chicago.

Vice President of University of Chicago Women in Science **Jun. 2016 - Jun 2018**

- **Vice President** of Women in Science Undergraduate student organization at UChicago dedicated to fostering a community of women in STEM fields

Outreach Director of the Society of Women in Physics **Jun. 2016 - Jan. 2017**

- **Outreach Director** of the Society of Women in Physics dedicated to forming a support group for undergraduates pursuing a degree in physics.

Teaching Experience

Dissertation Proposal Workshop **Mar. 2023**

- As a fourth year, younger students asked and I organized and ran a talk and workshop on writing a dissertation proposal and proposal defense for the second and third years. Focused on going through rigorous and concise academic writing, grant submissions, and proposal defense with a workshop.

Teachers Assistant in Particle Interactions **Oct. 2022 - Dec. 2022**

- T.A. to Particle Interactions course of graduate program of Medical Physics at the University of Chicago, Autumn quarter of 2021. Led one discussion per week, four hours of office hours per week, and graded.
- Led full lecture on neutron interactions.

Lead Facilitator of University of Chicago Undergraduate Orientation **Oct. 2021**

- Led a 60-person workshop 'Hearing One Another' for incoming undergraduates focusing on communication, and recognition of biases and steps to work on them.
- Led a talk about 'Engage Chicago' focusing on civic engagement with the University on the South Side of Chicago as well as ways to get more involved.

Medical Physics Mock Qualifying Exam Organizer **Sept. 2021, Sept. 2022**

- Organized and led a mock oral qualifying exam for the first years of the program. Planned rooms, timing, rotation, and other volunteering underclassmen to help them prepare for the qualifying exam.

Teachers Assistant in Practicum of Physics of Radiation Therapy Jan. 2021 - Mar. 2021

- T.A. to Practicum of Physics of Radiation Therapy course winter quarter 2021. Assisted faculty with adjustments for remote nature due to Covid-19, led two discussions per week, graded all lab reports, introduced basic coding, EGnrc, uncertainty, operation of linear accelerators, dosimeters, Monte Carlos, and film.
- Created virtual presentations of in person practicums from previous notes and student photos.
- Led full lecture on thermoluminescent detectors.

University of Chicago Society of Women in Engineering Girls' Day in STEM May 2019

- Co-Led a workshop on efficiency, durability, and practicality of Lego car designs on a Girls' Day in STEM dedicated to teaching middle school and high school girls from the south side of Chicago about college, careers, and experiments in STEM.

University of Chicago Women in Science and Math LaTeX Workshop Nov. 2018

- Invited to lead an Intro to Latex workshop for undergraduate students focused on introducing them to basic LaTeX equations, environments, figures, and formatting to be used in research papers.

University of Chicago Cosmic Microwave Background Summer School lab Aug. 2017

- Co-led a Cosmic Microwave Background lab for Kavli Institute of Cosmological Physics Graduate school focused on an introduction to cosmological spectrometry with our lab's FTS, and the mathematics behind the analysis. Wrote the programs used in the lab and led the explanation of the FTS' functioning, the working of the code, and one way to use it to find optical efficiency.

Professional Associations

- 2025 – present Trainee member, American Association of Physicists in Medicine New York City Chapter
- 2025 – present Associate member, American Association for Cancer Research (AACR)
- 2018 – present Trainee member, International Society for Magnetic Resonance in Medicine (ISMRM)
- 2023 – 2025 Trainee member, American Society for Neuroradiology (ASNR)
- 2019 – 2023 Trainee member, American Association of Physicists in Medicine Midwest Chapter
- 2019 – 2023 Trainee member, American Association of Physicists in Medicine (AAPM)
- 2019 – 2023 Trainee member, Radiological Society of North America (RSNA)

Select Service and Outreach

Biomedical Engineering And Imaging Art Show Leader Mar. 2024

- Led collection and organization of the charity auction of scientists' art at the 2024 BMEII Symposium in NYC

Hyde Park Union Church Food Pantry Jan. 2022 - Jul. 2023

- As Community Service Chair I went weekly for any graduate students interested in joining to help pre-pack, unload, and distribute food for the food pantry within the church. I continued after stepping down to volunteer weekly with colleagues.

Greater Chicago Food Depository Nov. 2020 - Dec. 2021

- Led community service groups of graduate students to travel to the GCFD to re-pack bulk products into family-sized portions, sort, and categorize donated food items at the depository, helping with the distribution process.

Chicago Public Schools Outreach Organizer and Speaker Jul. 2020 - Jan. 2023

- Outreach organizer and speaker with CPS on curriculum development for senior physics courses introducing medical physics to high schools. Specifically planning to lead a lab tour and talk about MRI research in January 2023.

South Side Science Fair Exhibitor Sept. 2022

- Wrote simulations and led workshop showing connection between the sound of a guitar chord and its fourier decomposition to how MRI data is acquired through pulse sequences and gradients.

Physics with a Bang **Dec. 2019**

- Volunteered for the Medical Physics table for a public interactive physics program for people of all ages with a workshop involving ultrasound, Geiger counters, and x-ray projection demonstrations.

Soapbox Science **Jul. 2019**

- Soapbox Science is a public outreach platform to promote science to the public. I volunteered at the second ever Soapbox Science in Chicago helping run the event, survey the public, answer questions, guide visitors, and assist speakers at Navy Pier.

Open Books **May 2019 - Mar. 2020**

- Open Books is a non-profit dedicated to promoting literacy through literacy workshops, sale of donated books, volunteer tutors, and book grants delivering books to schools, non-profits, and kids in Chicago. Weekly volunteer organizing and stacking shelves until Covid stopped volunteers

Relevant Advanced Coursework

- Physics of Medical Imaging Didactic I (mammography, CT, CAD, radiography, MR, angiography)
- Physics of Medical Imaging Practicum I
- Physics of Medical Imaging Didactic II (gamma cameras, SPECT, PET, ultrasound, scintillator and gas detectors)
- Physics of Medical Imaging Practicum II
- Physics of Radiation Therapy Didactic
- Physics of Radiation Therapy Practicum
- Mathematics for Medical Physics
- Interactions of Ionizing Radiation with Matter
- Anatomy and Physiology
- Cancer and Radiation Biology
- Health Physics
- Biomedical Ethics for Medical Physicists
- Statistical Methods and Applications
- Computational Physics
- Responsible, Rigorous, and Reproducible Conduct of Research
- Inverse Problems in Imaging
- Introduction to AI/Deep Learning in Biomedical Research and the Clinic (Audit)
- Mathematical Foundations of Machine Learning (Audit)

Skills

Analytics: Python, MATLAB, SPM12, R, FSL, HTML, NifTi
Communications: LaTeX, GitHub, Overleaf, Wordpress