HARSHAN RAVI, Ph.D.

ABMP Board-Eligible, MRI Physicist

Houston, TX

harshanster@gmail.com

| 682-225-0375

LinkedIn: www.linkedin.com/in/harshan-ravi-ph-d-20b62545/

PROFESSIONAL SUMMARY

ABMP board-eligible MRI physicist with 8+ years of experience supporting human and animal imaging cores in academic medical centers. Extensive expertise in MR protocol development, optimization, troubleshooting, and quality control across clinical MRI (3T) and small animal ultra-high-field (7T) MRI. Proven track record serving as an MRI advisor, providing technical consultation to multidisciplinary investigators, resolving MR sequence-related issues, and ensuring performance, image quality, and study reproducibility. Strong background in Phantom-based QC, translational imaging research, and good understanding of MR pulse sequence development. More recently, I acquired knowledge on preclinical PET/MR workflow.

IMAGING CORE & FACULTY ADVISOR EXPERTISE

- MR physics consultation for investigators developing **human and animal MRI studies**
- Development and implementation of **MR imaging protocols** on:
  - **3T clinical MRI**
  - **Small-animal MRI (7T-class systems)**
- Support for preclinical **hybrid PET/MR** acquisition workflows
- Routine protocol QC, image-level QC across multi-study environments, and help with clinical scanner QC
- Troubleshooting of MRI **sequence and system-related issues**
- Development and validation of **phantoms mimicking physiological conditions**
- Familiarity with MR sequence development and optimization on all the major vendor scanners.
- Image quality assurance, reproducibility, and harmonization across platforms
- Support for **IRB protocols, MTAs, and imaging-related regulatory documentation**
- Training and mentorship of faculty users, trainees, and technical staff

TECHNICAL SKILLS

MRI Techniques: Structural MRI, diffusion MRI (DTI/IVIM), perfusion MRI, SWI/QSM, rs-fMRI, CVR

Systems & Vendors: Siemens, GE, Philips MRI, and Bruker; clinical and preclinical platforms
Pulse sequence programming: beginner user of Sequence tree, familiarity with Siemens, GE and Phillips pule sequence programming
Hybrid Imaging: Prelinical PET/MR
Programming: MATLAB (expert) and acquaintance with Python, PyTorch, C++, R
Image Analysis: FSL, AFNI, SPM, Conn, Explore DTI, DSI studio
QC & QA: Phantom-based testing and protocol validation

ACADEMIC & RESEARCH APPOINTMENTS

Principal Research Scientist (MRI Physics & Translational Imaging)
MD Anderson Cancer Center — Houston, TX
March 2023 – Present

- Serve as MRI physics advisor for investigators conducting clinical and pre-clinical imaging studies in Quarles Advanced Imaging Lab
- Consult on study design and implementation of MR imaging protocols for oncological and neuroimaging applications
- Develop, optimize, and troubleshoot MR protocols on clinical and preclinical MRI systems
- Conduct and oversee routine QC of protocols, and acquired images
- Support hybrid PET/MR imaging workflows, including logistical coordination and image quality oversight
- Develop physiologically relevant phantoms for protocol validation and QC testing
- Optimized an overnight DTI acquisition and analysis pipeline for high resolution ex-vivo multibrain mouse imaging
- Lead iron-oxide–based MRI cell tracking studies for translational immunotherapy applications
- Co-PI on the development of imaging methodology to predict tumor invasion using rs-fMRI, DTI, and light sheet microscopy.
- Supervise postdoctoral fellows, graduate students, and research staff
- Serve as primary point of contact for translational neuroimaging needs
- Assist with IRB submissions, MTAs, and cross-institutional imaging collaborations

Applied Research Scientist I
Moffitt Cancer Center — Tampa, FL
September 2022 – February 2023

- Developed MRI acquisition and analysis pipelines for MR-guided focused ultrasound clinical trials
- Provided MR protocol optimization and technical consultation for clinical investigators
- Designed MRI biomarkers for immunotherapy-treated glioblastoma studies

Applied Postdoctoral Fellow
Moffitt Cancer Center — Tampa, FL
August 2018 – September 2022

- Developed ferumoxytol-enhanced MRI biomarkers for therapy response assessment
- Led multiparametric MRI studies supporting early-phase clinical trials
- Provided MR physics support for protocol optimization and data quality assurance
- Developed MATLAB-based image processing, segmentation, and QA tools
- Supported DCE-MRI and diffusion biomarker development

Postdoctoral Fellow
National Institutes of Health (NIH), Bethesda, MD
February 2016 – August 2018

- Developed ultra-high-resolution SWI and QSM methodologies for neurological applications
- Designed and executed gas-challenge MRI experiments
- Performed MRI scans on healthy volunteers and patient populations
- Built and validated MR phantoms for scanner and protocol QC
- Assisted MRI physicists with daily scanner operations and troubleshooting
- Trained and certified researchers in specialized MRI procedures

Full-Time Trainee
Johns Hopkins University – Department of Radiology
January 2015 – December 2015

- Developed MATLAB-based tools for multi-site MRI sequence testing
- Implemented multiband BOLD MRI techniques
- Assisted in the development of physiological models for BOLD response in CVR.

Graduate Research Assistant
UT Southwestern Medical Center
September 2011 – December 2014

- Programmed and optimized MRI pulse sequence for investigating intravoxel incoherent motion-based venous oxygen measurement.
- Performed MRI scans on human research participants
- Developed in-silico MRI optimization models
- Provided MR protocol support for multiple investigator-initiated studies
- Managed imaging infrastructure and Linux servers

EDUCATION

Ph.D., Biomedical Engineering — University of Texas at Arlington, 2015

M.S., Biomedical Engineering — University of Texas at Arlington, 2011

B.S., Biomedical Engineering — Jawaharlal Nehru Technological University, 2008

GRANTS (SELECTED)

- Co-PI, *Leveraging MRI-Based Detection of Glioma Neuronal Connectivity*, MD Anderson CNS (Funded, 2024)
- Co-Investigator, *Brain & Biofluid Biomarkers Underlying Cognitive Decline*, MD Anderson CNS (Funded, 2024)

PUBLICATIONS

• Harshan Ravi, Neha Damodar, Deborah Healey, Ellen Ackerstaff, Joy Gumin, Frederick F. Lang, Elizabeth J. Shpall, Mayela Mendt Vilchez, C Shian-Jy Wang, and Christopher Chad Quarles, 'Development of a clinically feasible protocol for labeling mesenchymal stem cells with iron oxide particles and oncolytic virus'. In preparation

• Poonam Choudhary, Harshan Ravi, Yuxiang Zhou, Sudarshan Ragunathan, Ethan Mathew, Natenael Semmineh, Aliya Anil, John P Karis, Leland S. Hu, Kathleen M. Schmainda, Ashley M. Stokes, and C. Chad Quarles "Multi-vendor, Multi-site Repeatability and Reproducibility of Spin and Gradient Echo (SAGE) MRI", In preparation

• Indranil Guha, Harshan Ravi, Rania M. Mohamed1, Sahil Bajaj, Vinodh A. Kumar, Max Wintermark, C. Chad Quarles, Ho-Ling Liu, "Establishing Higher-Fidelity Diffusion Tensor Imaging using Deep Learning in Brain Cancer Patients", In review

• Shraddha Pandey, Tugce Kutuk, MD; Mahmoud A Abdalah, Olya Stringfield, Harshan Ravi, Matthew N Mills, Jasmine A Graham, Kujtim Latifi, Wilfrido A Moreno, Kamran A Ahmed, Raghunand Natarajan, "Prediction of Radiologic Outcome-Optimized Dose Plans and Post-Treatment Magnetic Resonance Images: a Proof-of-Concept Study in Breast Cancer Brain Metastases Treated with Stereotactic Radiosurgery", Phys Imaging Radiat Oncol.,202424:31:100602

• Harshan Ravi, Samuel H. Hawkins, Olya Stringfield, Malesa Pereira, Dung-Tsa Chen, Heiko Enderling, Hsiang-Hsuan Michael Yu, John A. Arrington, Solmaz Sahebjam, Natarajan Raghunand "Rules-based Volumetric Segmentation of Multiparametric MRI for Response Assessment in Recurrent High-Grade Glioma", 11 September 2023, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-3318286/v1]

• Harshan Ravi, Andres M. Arias Lorza, Daniel K. Jeong, Kenneth L. Gage, Stephan G. Klinz, Ramesh Ramanathan, Hyo Sook Han, Jimmy Costello, Ronald L. Korn, Natarajan Raghunand "Pre-Therapy Ferumoxytol-Enhanced Magnetic Resonance Imaging Predicts Response of Metastatic Breast Cancer to Liposomal Irinotecan", Radiol Imaging Cancer. 2023;5(2):e220022. doi:10.1148/rycan.220022

• Shraddha Pandey, A. David Snider, Wilfrido A. Moreno, Harshan Ravi, Ali Bilgin, Natarajan Raghunand "Joint Reconstruction of Multiparameter MRI for Imaging Intratumoral Subpopulations", NMR in Biomedicine 34(12):e4597, 2021.

• Andres M. Arias Lorza, Harshan Ravi, Rohit C. Philip, Jean-Philippe Galons, Theodore P. Trouard, N. Andres Parra, William L. Read, Raoul Tibes, Ronald L. Korn, Natarajan Raghunand,

"Quantitative MRI in a Phase 1 Clinical Study of the Anti-Cancer Vascular Disrupting Agent Crolibulin" Scientific reports (2020). Vol 10, Article number: 14449.

• Xirui Hou, Peiying Liu, Yang Li, Dengrong Jiang, Jill De Vis, Zixuan Lin, Sandeepa Sur, Zachary Baker, Deng Mao, Harshan Ravi, Karen Rodrigue, Marilyn Albert, Denise Park, Hanzhang Lu, "The association between BOLD-based cerebrovascular reactivity (CVR) and end-tidal CO2 in healthy subjects" NeuroImage (2019), Vol 27; Article 116365.

• Min Sheng, Hanzhang Lu, Peiying Liu, Harshan Ravi, Shin-Lei Peng, Ramon Diaz-Arrastia, Michael D. Devous, Kyle B. Womack. "Sildenafil alters vascular and metabolic function in patients with Alzheimer's Disease" Journal of Alzheimer's Disease (2017), Vol 60(4): 1351-1364; PMID: 29036811.

• Jill B. Vis, Hanzhang Lu, Harshan Ravi, Jeroen Hendrikse, Peiying Liu, "Spatial distribution of flow and oxygenation in the cerebral venous drainage system", Journal of Magnetic Resonance Imaging (2017), Vol 47(4):1091-1098. PMID: 28791759

• Shin-Lei Peng, Harshan Ravi, Min Sheng, Binu Thomas, Hanzhang Lu. "Searching for a 'truly iso-metabolic' gas challenge in physiological MRI". JCBFM (2016), Vol 37(2): 715-725; PMID: 26980756

• Harshan Ravi, Peiying Liu, Shin-lei Peng, Hanli Liu, and Hanzhang Lu. "Simultaneous-multi-slice (SMS) acquisition enhances the sensitivity of hemodynamic mapping using gas challenges" NMR in Biomedicine (2016), Vol 29(11): 1511–1518. PMID: 27598821

• Harshan Ravi, Binu Thomas, Shin-lei Peng, Hanli Liu, and Hanzhang Lu. "On the optimization of imaging protocol for the mapping of cerebrovascular reactivity (CVR)". JMRI (2015), Vol 43(3): 661–668; PMID: 26268541

PROCEEDING PAPERS AND CONFERENCE PRESENTATIONS

• Harshan Ravi, Neha Damodar, Deborah Healey, Ellen Ackerstaff, Joy Gumin, Frederick F. Lang, Elizabeth J. Shpall, Mayela Mendt Vilchez, Shian-Jy Wang, and Christopher Chad Quarles. "On the development of a clinically feasible protocol for labeling mesenchymal stem cells with iron oxide particles and oncolytic virus: A pilot study", Society of Neuro-oncology (SNO), 2025. Abstract Code: BIOM-45

• Harshan Ravi, Neha Damodar, Deborah Healey, Ellen Ackerstaff, Joy Gumin, Frederick F. Lang, Elizabeth J. Shpall, Mayela Mendt Vilchez, Shian-Jy Wang, and Christopher Chad Quarles. "MRI relaxation parameters could reveal information on intact iron oxide particles labeled mesenchymal stem cells", Society of Neuro-oncology (SNO), 2025. Abstract Code: BIOM-46

• Harshan Ravi, Samuel Hawkins, Olya Stringfield, Malesa M. Pereira, Dung-Tsa Chen; Hsiang-Hsuan Michael Yu, John A. Arrington, Solmaz Sahebjam; Natarajan Raghunand "Rules-based Volumetric Segmentation of Multiparametric MRI for Response Assessment in Recurrent High-Grade Glioma", Radiological Society of North America (RSNA), 2023. Control # 4238

• Harshan Ravi, Andres M. Arias Lorza, James R. Costello, Hyo Sook Han, Daniel K. Jeong, Stephan G. Klinz, Jasgit C. Sachdev, Ronald L. Korn, and Natarajan Raghunand. "Intensity-Based Segmentation of Tumor on Multiparametric MRI to Aid Response Assessment of High-

Grade Gliomas Treated with Immunoradiotherapy", International Society of Magnetic Resonance in Medicine (ISMRM) Conference, 2023. Abstract # 3600

• Harshan Ravi, Andres M. Arias Lorza, James R. Costello, Hyo Sook Han, Daniel K. Jeong, Stephan G. Klinz, Jasgit C. Sachdev, Ronald L. Korn, and Natarajan Raghunand "Pre-Therapy Ferumoxytol-Enhanced Magnetic Resonance Imaging (MRI) Predicts Response of Metastatic Breast Cancer to Liposomal Irinotecan", International Society of Magnetic Resonance in Medicine (ISMRM) Conference, 2022. Abstract # 3418

• Harshan Ravi, Andres M. Arias Lorza, James R. Costello, Hyo Sook Han, Daniel K. Jeong, Stephan G. Klinz, Jasgit C. Sachdev, Ronald L. Korn, and Natarajan Raghunand "R1 and R2*Mismatch on Ferumoxytol-Enhanced MRI Predicts Response of Breast Cancer Brain Metastases to Liposomal Irinotecan", International Society of Magnetic Resonance in Medicine (ISMRM) Conference, 2022. Abstract # 3419

• Ching-Nung Lin, Harshan Ravi, Olya Stringfield, John Arrington, Joachim Farinhas, Natarajan Raghunand "Deep Learning-Based Resolution Enhancement of Glioblastoma Magnetic Resonance Images", Society for Imaging Informatics in Medicine (SIIM) Conference, 2022.

• Ching-Nung Lin, Harshan Ravi, Olya Stringfield, John Arrington, Joachim Farinhas, Natarajan Raghunand "A Clinically Useful Deep Learning Model for Skull-Stripping Brain MRI Images of Glioblastoma", Society for Imaging Informatics in Medicine (SIIM) Conference, 2022

• Andres M. Arias Lorza, Harshan Ravi, Rohit C. Philip, Jean-Philippe Galons, Theodore P. Trouard, N. Andres Parra, William L. Read, Raoul Tibes, Ronald L. Korn, Natarajan Raghunand, "Quantitative MRI in a Phase 1 Clinical Study of the Vascular Disrupting Agent Crolibulin" International society of Magnetic Resonance in Medicine (ISMRM) conference, 2020. Abstract #2370

• Harshan Ravi, Olya Stringfield, Gustavo De Leon, Sandra Johnston, Russell Rockne, Behnam Badie, Christine E Brown, Kristin Swanson, Robert Gatenby, Natarajan Raghunand "Multiparameter mri investigation of high-grade glioma response to car T cell immunotherapy", Neuro-Oncology. Vol 21, Issue Supplement_6, November 2019, Page vi178

• Harshan Ravi, Wen-Tung Wang, Andrew Knutsen, Dzung L Pham, and John A Butman, "Ultra high resolution SWI at 3T" International society of Magnetic Resonance in Medicine (ISMRM) conference, 2018. Abstract #1878

• Wen-Tung Wang, Harshan Ravi, Dzung L Pham, and John A Butman, "Improving susceptibility mapping using multiple thresholding k-space division", International society of Magnetic Resonance in Medicine (ISMRM) conference, 2018.

• Jill B. De Vis, Xirui Hou, Peiying Liu, Zheyu Wang, Siyuan Cheng, Yang Li, Harshan Ravi, Hanzhang Lu. "Influence of end-tidal CO2 on cerebrovascular reactivity mapping: within-subject and across-subject effects". International society of Magnetic Resonance in Medicine (ISMRM) conference, 2018. Abstract #0053

• Harshan Ravi, Wen-Tung Wang, Andrew Knutsen, Dzung L Pham, and John A Butman ,"Ultra high resolution susceptibility weighted imaging in TBI patients" National Capital Area TBI Research Symposium 2018

• Harshan Ravi, Wen-Tung Wang, Andrew Knutsen, Dzung L Pham, and John A Butman “Ultra high-resolution susceptibility weighted imaging AT 3 tesla” Neurotrauma 2017. Vol. 34, No. 13, pp. A56-A56

• Harshan Ravi, Wen-Tung Wang, Andrew Knutsen, Dzung L Pham, and John A Butman, “Modulating the Conspicuity of Cerebral Vasculature in Susceptibility Weighted Imaging by Gas Inhalation” National Capital Area TBI Research Symposium 2017

• Harshan Ravi, Wen-Tung Wang, Andrew Knutsen, Dzung L Pham, and John A Butman, “Differential modulation of arterial and venous oxygenation through inhalation of carbogen (95%O2/5%CO2) vs. 100% O2” International society of Magnetic Resonance in Medicine (ISMRM) conference, 2017. Abstract # 3802

• Harshan Ravi, Wen-Tung Wang, Andrew Knutsen, Dzung L Pham, and John A Butman, “Optimization of multiple orientation QSM for building a clinically feasible protocol” International society of Magnetic Resonance in Medicine (ISMRM) conference, 2017. Abstract # 1457

• Jill B. De Vis, Hanzhang Lu, Harshan Ravi, Jeroen Hendrikse, and Peiying Liu. “Traffic and cargo on the venous highway: distribution of venous flow and oxygenation in the human brain”, International society of Magnetic Resonance in Medicine (ISMRM) conference, 2016. (Received magna cum laude honors). Abstract # 0421

• Hanzhang Lu, Min Sheng, Peiying Liu, Harshan Ravi, Shin-Lei Peng, Ramon Diaz-Arrastia, Michael D. Devous Sr., and Kyle B. Womack, “Sildenafil improves vascular and metabolic function in patients with Alzheimer’s Disease”, International society of Magnetic Resonance in Medicine (ISMRM) conference, 2016. Abstract # 4031

• Harshan Ravi, Peiying Liu, Shin-lei Peng, and Hanzhang Lu. “Multiband acquisition enhances the sensitivity of cerebrovascular reactivity (CVR) mapping”, International society of Magnetic Resonance in Medicine (ISMRM) conference, 2015. (Received magna cum laude honors). Abstract # 0213

• Shin-lei Peng, Harshan Ravi, Min Sheng, Binu Thomas, and Hanzhang Lu. “Searching for a ‘truly iso-metabolic’ gas challenge for the use in calibrated fMRI and cerebrovascular reactivity mapping”. ISMRM conference, 2015. (Received suma cum laude honors). Abstract # 0215

• Min Sheng, Kevin King, Adam Sheffield, Harshan Ravi, Shin-lei Peng, Peiying Liu, Zohre German, and Hanzhang Lu. “A multi-parametric investigation of vascular alterations in elderly with hypertension” ISMRM conference, 2015. (Received magna cum laude honors). Abstract # 0164

• Harshan Ravi, Binu Thomas, Shin-lei Peng, and Hanzhang Lu. “An artifact free imaging protocol for the mapping of cerebrovascular reactivity”, ISMRM Conference, 2014. Abstract # 1537

• Harshan Ravi, Jinsoo uh, Peiying Liu, Lisa Krishnamurthy, and Hanzhang Lu “Quantitative Estimation of Cerebral Oxygenation in Micro-Vessels”, ISMRM Conference, 2013. Abstract #2178

PROFESSIONAL SERVICE

Abstract Reviewer, International Society for Magnetic Resonance in Medicine (ISMRM)

Peer Reviewer: Scientific Reports, BMJ Open, frontiers in oncology

INVITED TALKS

"MRI of cerebrovascular reactivity using gas inhalation challenge", clinical center, National institute of health, November 30, 2015

"A journey in MRI optimization: Sensitizing imaging methodology to physiology/pathophysiology", Md Anderson Cancer Center, September 1, 2022.

FACULTY & CORE INTERESTS

MRI core facility supports and leadership

Human and animal MRI protocol consultation

Scanner and image quality control programs

PET/MR integration in translational research

Faculty, trainee, and staff mentorship

References:

Available upon request