

Mehdi Sadighi, PhD
Boston, MA 02115
sadighi.mehdi@gmail.com | 617.818.8670

SUMMARY

Results-driven biomedical imaging scientist, specializing in the development of novel methods for cardiovascular and brain MRI with 10+ years of research experience. Deep expertise in advancing imaging techniques to explore new contrast mechanisms, including conductivity and elasticity of biological tissues using MRI technologies. Proven track record of leading and executing impactful research projects, driving innovation, and delivering tangible results. Skilled in cross-functional collaboration, project management, and strategic planning. Adept at translating complex scientific concepts into actionable insights. Strong leadership and communication skills, fostering collaborative environments and mentoring teams.

PROFESSIONAL EXPERIENCE

CLEVELAND CLINIC, Cleveland, OH **Aug 2022 - Present**

Medical Imaging Scientist — Cardiovascular Innovation Research Center

- Worked in a multisite cardiac MRI harmonization project in collaboration with principal investigators accessing national resources, embedded project data, dedicated scanner time and phantoms.
- Developed and implemented pulse sequence and analysis standardization methods in cardiac and skeletal muscle imaging methods across a range of clinical and research scanners.
- Characterized several biomarkers to detect the cardiomyopathy associated with Heart Failure with Preserved Ejection Fraction and right heart failure.
- Developed MRI methods and a computational modeling framework to estimate changes in microstructure in patients with acute coronary syndrome.
- Developed MRI methods that measure Flow, Motion, Diffusion, Conductivity and Perfusion with particular emphasis on clever approaches to optimal gradient waveform design.
- Developed novel methods for Dynamic Intravoxel Incoherent Motion (IVIM).
- Designed structured protocols, objectives, methodologies, and procedures for clinical experiments with human subjects; Evaluated the feasibility, safety, effectiveness, and side effects of new interventions tested.
- Trained cardiology and radiology residents and research scientists in the operation and utilization of Siemens MRI scanners (Prisma, CIMA)
- Worked with a cross-functional team of researchers and clinicians, fostering a collaborative research environment while providing mentorship and guidance. Successfully led and conducted clinical experiments and trials, resulting in the publication of eight scientific journal articles.

MHG / HARVARD MEDICAL SCHOOL, Boston, MA **Feb 2022 - Aug 2022**

Postdoctoral Researcher — Athinoula A. Martinos Center for Biomedical Imaging

- Developed and implemented pulse sequences and the associated reconstruction algorithms for cardiac MRI.

- Designed and implemented asynchronous magnetic resonance elastography (aMRE), a novel technique for noninvasive measurement of biological tissue elasticity to robustly characterize soft tissue mechanics for a wide array of biomedical engineering and clinical applications.

MIDDLE EAST TECHNICAL UNIVERSITY, Ankara, Turkey **July 2021 - Jan 2022**
Postdoctoral Researcher — Magnetic Resonance Imaging Research Lab

- Developed and implemented a cutting-edge MRI pulse sequence and associated reconstruction algorithms for Multi-Physics Multi-Contrast MRI. This innovative method enables simultaneous imaging of various contrasts and tissue properties (T2, Diffusion, magnetohydrodynamic flow, current density and conductivity) within a single pulse sequence scan, significantly reducing acquisition time while providing valuable multiple biological information for diagnostic purposes. The successful implementation of this approach demonstrates expertise in advanced imaging techniques, algorithm development, and optimization for enhanced clinical applications.

Aug 2013 - March 2020

Research Assistant — Magnetic Resonance Imaging Research Lab

- Simultaneous Magnetic Resonance Diffusion and Conductivity Tensor Imaging
- Induced Current Magnetic Resonance Electrical Impedance Tomography
- Design and Implement an MRI Compatible Current Source

EDUCATION

MIDDLE EAST TECHNICAL UNIVERSITY, Ankara, Turkey **Feb 2014 – June 2021**
 • **PhD, Electrical and Electronics Engineering**
Focus: Biomedical Imaging and Signal Processing

MIDDLE EAST TECHNICAL UNIVERSITY, Ankara, Turkey **Feb 2014 – June 2021**
 • **Master of Science, Electrical and Electronics Engineering**
Focus: Biomedical Engineering

TABRIZ AZAD UNIVERSITY, Tabriz, Iran **Sept 2003 – April 2009**
 • **Bachelor of Science, Electrical and Electronics Engineering**
Focus: Electronics

PUBLICATIONS

Journal Papers:

- **M. Sadighi**, K. D. Nguyen, D. Kara, and C. T. Nguyen, “Cardiac diffusion magnetic resonance imaging using short axis PROPELLER: A feasibility study,” *Magn Reson Med*. Accepted Paper, DOI: 10.1002/mrm.30020, Jan 2024.
- **M. Sadighi**, A. N. Foster, K. D. Nguyen, O. Perlman, R. A. Eder, S. Chen, P. Natarajan, D. Mai, C. T. Farrar, J. Coll-Font, and C. T. Nguyen, “Dynamic Intravoxel Incoherent Motion MRI During Continuous Low Intensity Exercise,” *Magn Reson Med*. Submitted Paper, Aug 2023.

- K. D. Nguyen, B. P. Bonner, A. N. Foster, **M. Sadighi**, C. T. Nguyen, "Asynchronous magnetic resonance elastography: Shear wave speed reconstruction using noise correlation of incoherent waves," *Magn Reson Med.* 2022; 1- 12. doi:10.1002/mrm.29502.
- **M. Sadighi**, M. Şişman, B. M. Eyüboğlu, "SNR and Total Acquisition Time Analysis of ICNE-ME-FLASH Pulse Sequence for MRCDI," *Journal of Magnetic Resonance*, vol. 333, 107098.
- **M. Sadighi**, M. Şişman, B. C. Açıkgöz, H. H. Eroğlu, B. M. Eyüboğlu, "Low-Frequency Conductivity Tensor Imaging with a Single Current Injection Using DT-MREIT," *Physics in Medicine & Biology*, IOP, vol. 66, no 5, 055011.
- H. H. Eroğlu, **M. Sadighi**, B. M. Eyüboğlu, "Magnetohydrodynamic flow imaging of ionic solutions using electrical current injection and MR phase measurements," *Journal of Magnetic Resonance*, vol. 303, pp. 128-137, 2019.
- H. H. Eroğlu, **M. Sadighi**, B. M. Eyüboğlu, "Induced Current Magnetic Resonance Electrical Conductivity Imaging with Oscillating Gradients," *Transactions on Medical Imaging*, IEEE, vol. 37, no. 7, pp. 1606-1617, 2018.

Conference Papers:

- **M. Sadighi**, K. D. Nguyen, D. Kara, and C. T. Nguyen, "Mitigating Geometric Distortion & Susceptibility-Related Artifacts in High BMI Subjects with Multi-shot DT-MRI using SAP-M2-EPI," The global CMR conference, London, 2024.
- **M. Sadighi**, M. Şişman, B. M. Eyüboğlu, "Multi-Physics Multi-Contrast Magnetic Resonance Imaging," at the 2021 ISMRM & SMRT Virtual Conference & Exhibition, #1239, ISMRM, 2021.
- **M. Sadighi**, M. Şişman, B. M. Eyüboğlu, "Optimization of SNR and the total acquisition time of the current-induced magnetic flux density \vec{B}_z in MRCDI," at the 2021 ISMRM & SMRT Virtual Conference & Exhibition, #3789, ISMRM, 2021.
- M. Şişman, **M. Sadighi**, B. M. Eyüboğlu, "Simultaneous Magnetic Resonance Magnetohydrodynamic Flow Velocity and Diffusion Tensor Imaging," at the 2021 ISMRM & SMRT Virtual Conference & Exhibition, #1257, ISMRM, 2021.
- M. Şişman, **M. Sadighi**, H. H. Eroğlu, B. M. Eyüboğlu, "Experimental Evaluation of Spin Echo based Magnetic Resonance Magnetohydrodynamic Flow Velocimetry," at the 2021 ISMRM & SMRT Virtual Conference & Exhibition, #1256, ISMRM, 2021.
- **M. Sadighi**, M. Şişman, B. C. Açıkgöz, B. M. Eyüboğlu, "Single Current Diffusion Tensor Magnetic Resonance Electrical Impedance Tomography: A Simulation Study," at the 2020 ISMRM & SMRT Virtual Conference & Exhibition, #3233, ISMRM, 2020.
- **M. Sadighi**, M. Şişman, B. C. Açıkgöz, B. M. Eyüboğlu, "Experimental Realization of Single Current Diffusion Tensor Magnetic Resonance Electrical Impedance Tomography at the 2020 ISMRM & SMRT Virtual Conference & Exhibition, #0179, ISMRM, 2020.

- **M. Sadighi**, H. H. Eroğlu, B. M. Eyüboğlu, "Effect of Intense Utilization of Gradients in Magnetic Resonance Current Density Imaging and its Removal," in 27th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), #5068, ISMRM, 2019, Montreal, Canada.
- H. H. Eroğlu, **M. Sadighi**, B. M. Eyüboğlu, "Magnetohydrodynamic Flow Imaging Using Spin-Echo Pulse Sequence," 27th Signal Processing and Communications Applications Conference (SIU), IEEE, 2019, pp. 1-4, Sivas, Turkey.
- **M. Sadighi**, S. F. Oktem, B. M. Eyüboğlu, "Diffusion Tensor Magnetic Resonance Electrical Impedance Tomography versus Magnetic Resonance Conductivity Tensor Imaging," in 26th joint annual meeting ISMRM &ESMRMB, #5086, ISMRM, 2018, Paris, France.
- H.H. Eroğlu, **M. Sadighi**, and B.M. Eyüboğlu " Low frequency magnetic resonance conductivity imaging by means of oscillating gradient fields." in 26th joint annual meeting ISMRM &ESMRMB, 2018, Paris, France.
- K. Sümser, N. Naji, **M. Sadighi**, H. H. Eroğlu, B. M. Eyüboğlu, "MRI-SPAMM Based Magnetic Resonance Electrical Impedance Tomography," in Proc. Intl. Soc. Mag. Reson. Med. 24, 2016, p.1940.
- N. Naji, H. H. Eroğlu, K. Sümser, **M. Sadighi**, B. M. Eyüboğlu, "Enhancing Induced Current Magnetic Resonance Electrical Impedance Tomography (ICMREIT) Image Reconstruction," in Proc. 12th IASTED Int. Conf. Biomed. Eng. BIOMED 2016, Innsbruck, 2016, pp. 832-834.
- H. H. Eroğlu, **M. Sadighi**, K. Sümser, N. Naji, B. M. Eyüboğlu, "Experimental Realization of Induced Current Magnetic Resonance Current Density Imaging," in Proc. IEEE Int. Conf. EMBC 2015, Milano, 2015, pp. 614-617.
- C. Göksu, **M. Sadighi**, H. H. Eroğlu, B. M. Eyüboğlu, "Realization of Magnetic Resonance Current Density Imaging at 3 Tesla," in Proc. IEEE Int. Conf. EMBC 2014, Chicago, 2014, pp. 1115-1118.
- **M. Sadighi**, C. Göksu, and M. Eyüboğlu, "J-based Magnetic Resonance Conductivity Tensor Imaging (MRCTI) at 3 T," in Proc. IEEE Int. Conf. EMBC 2014, Chicago, 2014, pp. 1139-1142.

PATENTS

- C. T. Nguyen, **M. Sadighi**, D. Kara, " Distortion mitigated multi-shot in vivo diffusion cardiac MRI" Disclosure Date: May 3, 2023.
- B. M. Eyüboğlu, H. H. Eroğlu, **M. Sadighi**, "An induced current magnetic resonance electrical impedance tomography (ICMREIT) pulse sequence based on monopolar slice selection gradient pulses." European Patent Office (EPO) [Application](#), application no. EP18163817.2, 2018.
- B. M. Eyüboğlu, H. H. Eroğlu, **M. Sadighi**, "Induced current magnetic resonance electrical impedance tomography (ICMREIT) pulse sequence based on monopolar slice selective gradient pulses." Turkish Patent Institute (TPE) [Application](#), application no. P17/0601, 2017.

- B. M. Eyüboğlu, H. H. Eroğlu, **M. Sadighi**, K. Sümser, N. Naji, "Induced current magnetic resonance electrical impedance tomography (ICMREIT) pulse sequence based on bipolar slice selective gradient pulses." Turkish Patent Institute (TPE) Application, application no. P16/0494, 2016.
- B. M. Eyüboğlu, K. Sümser, H. H. Eroğlu, **M. Sadighi**, N. Naji, "Spin tagged magnetic resonance current density and electrical impedance imaging pulse sequence." Turkish Patent Institute (TPE), patent no. TR 2015 13995 B, 2015.

SKILLS

Medical Imaging Expertise: Proficient in MRI techniques (cardiac and brain), including designing pulse sequences and reconstruction algorithms, with a track record of biomarker discovery.

MRI Conductivity Pioneer: Innovative methods for electrical conductivity imaging, transitioning from ex vivo to in vivo studies with human subjects.

Advanced DTI Proficiency: Expert in Diffusion Tensor Imaging (DTI), creating specialized pulse sequences and algorithms for cardiac tissue analysis.

Interdisciplinary Collaboration: Solid foundation in X-ray and ultrasound modalities, facilitating effective collaboration across diverse imaging domains.

Diverse Team Leadership: Led a diverse group of 6 scientists, orchestrating experiments and fostering exploration of new biomarkers.

Student Mentorship: Guided and mentored 5 graduate students, nurturing academic growth and collaborative biomarker research during PhD.

Algorithm Development: Accomplished in creating algorithms for processing complex imaging data, contributing to biomarker identification.

Programming and Software: Proficient in Python and MATLAB for data analysis, algorithm development, and process automation. Experienced with specialized tools including IDEA (Integrated Development Environment for Applications), COMSOL Multiphysics, and FSL (FMRIB Software Library) for advanced imaging data processing and analysis.

AWARDS & CERTIFICATIONS

- Magna Cum Laude Merit Award at the 2020 ISMRM & SMRT Virtual Conference & Exhibition August 2020
- SIEMENS IDEA Sequence Programming VE11

LANGUAGES

English: Fluent, Turkish: Native, Persian: Native, Azeri: Native

REFERENCES

Christopher Nguyen, PhD FSCMR FACC

Director

Cardiovascular Innovation Research Center (CIRC)

Director of MRI Research

Heart, Vascular, and Thoracic Institute

Departments of Cardiovascular Medicine, Radiology, and Biomedical Engineering

Cleveland Clinic

Email: nguyenc6@ccf.org

Phone: +1 (216) 219 7053