Soudabeh Kargar, Ph.D.

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SUMMARY

- 9+ years of experience in MRI research and development
- Outstanding interpersonal and communication skills

EDUCATION

Mayo Graduate School, Rochester, MN (Ph.D. in Biomedical Eng. and Physiology)	2019
University of Alabama in Huntsville, Huntsville, AL (M.Sc. in Mechanical Eng.)	2012
Sharif University of Technology, Tehran, Iran (M.Sc. in Earthquake Eng.)	2008
Isfahan University of Technology, Isfahan, Iran (B.Sc. in Civil Eng.)	2005

WORK AND RESEARCH EXPERIENCE

University of Colorado – Anschutz Medical Campus (MRI Image Analyst)   April 2023 – present
Cancer Center

- *MRI Image analysis (pre-clinical research)*
  - I do MRI image analysis for the Cancer Center. I work with a lot of researchers and help them design the MRI protocol and specify the best measurement in MRI images for their research. I especially enjoy protocol development and optimization for a new project. In case of an artifact in the images, I work on finding a solution to eliminate or reduce the artifact for a better image quality.

Memorial Sloan Kettering Cancer Center (Research Scholar)   Feb 2021 – Mar 2023
Lab of Ricardo Otazo, Ph.D.

- *Application of Deep Learning in Perfusion Parameter Estimation for DCE-MRI*
  - Developed a numeric simulation to train fully connected neural network to estimate perfusion parameters as well as T1 and BAT for Extended Tofts model for DCE-MRI images acquired with DISCO-STAR sequence and reconstructed with GRASP reconstruction.

University of Wisconsin – Madison (Post-doctoral Fellow)   Nov 2019 – Nov 2020
Lab of Scott Reeder, M.D., Ph.D.

- *Heavily T2-Weighted Imaging with Phase-Based RF Modulated GRE Imaging*
  - Applied a novel strategy using RF phase modulated gradient echo (GRE) with small RF phase increments to encode T2 information into the phase of the signal.
  - Optimized this strategy for long T2 species to achieve heavily T2-weighted imaging, including the introduction of a novel cross-product strategy to highlight signal in tissues with long T2 and suppress signal in tissues with shorter T2 values.

Mayo Graduate School (Ph.D. student)   Jul 2013 – Oct 2019
Lab of Stephen Riederer, Ph.D.

- *Pharmacokinetic Parameter Estimation for Dynamic Contrast-Enhanced MRI*
  - Developed a robust and efficient method for DCE-MRI perfusion parameter estimation for the Tofts and Extended Tofts Model using the Variable Projection (VARPRO) approach.
  - Demonstrated the effectiveness of VARPRO method with numeric simulations, phantoms and in vivo experiments, thus confirming the superiority of my proposed perfusion estimation strategy.

- *Achieving Sub-mm Through Plane Resolution for Prostate Imaging*
  - Improved the through-plane resolution for multi-slice T2-weighted spin-echo (T2SE) imaging, as this imaging technique is limited by its spatial resolution along the slice select direction.

- o Developed a new multi-slice T2SE imaging approach in which only one orientation diagnostic images are acquired and are used to reconstruct the images for the other orientations.
  - o Conducted experiments with a prostate phantom, a resolution phantom, and in vivo prostate MRI including 16 patient volunteers using my proposed methodology.

- *Reduced Motion Artifact in Super Resolution T2 FSE Multislice MRI: Application to Prostate*

  - o Reduced the "scalloping" artifact that was observed in the previous project due to subtle ≈1 mm motion between passes by subdivision of each pass into multiple segments. Interleaving of segments from the multiple passes causes all slices to be acquired over substantially the same time, reducing pass-to-pass motion effects.
  - o Implemented in phantoms and in 14 prostate MRI patients and demonstrated that new segmented acquisition significantly reduces the scalloping motion artifact due to decreases sensitivity to motion by increasing the temporal footprint of the acquisition.

Division of Engineering, Mayo Clinic, Rochester, MN (Intern)   Sep 2012 – Jun 2013
Mentor: Dan Dragomir-Daescu, Ph.D.
- *Brain Aneurysm Modeling and Analysis Using Computational Fluid Dynamics (CFD)*
- *Finite Element Analysis (FEA) of Femurs to Predict Fracture Risk in Osteoporotic Patients*

SELECT PEER-REVIEWED PUBLICATIONS (3 OF 7)

- S. Kargar, E.A. Borisch, A.T. Froemming, R.C. Grimm, A. Kawashima, B.F. King, E.G. Stinson, S. J. Riederer, 2020, "Modified acquisition strategy for reduced motion artifact in super resolution T2 FSE multislice MRI: Application to prostate", Magnetic Resonance in Medicine, 2020 May;84:2537-2550.

- S. Kargar, E.A. Borisch, A.T. Froemming, R.C. Grimm, A. Kawashima, B.F. King, E.G. Stinson, S. J. Riederer, "Use of kZ-Space for High Through-Plane Resolution in Multislice MRI: Application to Prostate", Magnetic Resonance in Medicine, 2019 Jun;81(6):3691-3704

- S. Kargar, E.A. Borisch, A.T. Froemming, A.Kawashima, L.A. Mynderse, E.G. Stinson, J.D. Trzasko, S. J. Riederer, 2018, "Robust and efficient pharmacokinetic parameter non-linear least squares estimation for dynamic contrast enhanced MRI of the prostate", Magnetic Resonance Imaging, 2018 (48), 50-61

Full list of publications: https://scholar.google.com/citations?hl=en&user=HfjtJ3MAAAAJ

SKILLS	Software	Personal Skills
MRI Research		
• MR Physics	• MATLAB, C++/C, Python	• Outgoing/Excellent Communication
• Scientific Communication	• GE EPIC Pulse sequence programming	• Great Team Player
• Volunteer and Patient Studies	• Deep Learning (PyTorch)	• Goal Oriented Personality
• Collaboration with Clinicians and Researchers	• Horos and 3D Slicer	• Excellent Ability to Focus/Attention to Detail
	• Inkscape	• Enjoy Traveling
	• LaTeX	• Passionate Tennis player
		• Painting

AWARDS
- Poster award: Best application award, ISMRM Workshop on Data Sampling & Image Reconstruction, Sedona AZ, 2016
- Outstanding Graduate Student in Mechanical Engineering, University of Alabama in Huntsville, 2011
- ISMRM Travel award – 2017, 2019,2020, 2022

TEACHING AND MENTORSHIP EXPERIENCE

- Mayo Graduate School, Rochester, MN
  - Graduate Teaching Assistant (Magnetic Resonance Imaging Systems) 2019
  - Rotation student mentor 2017,2018
- University of Alabama in Huntsville, Huntsville, AL
  - Lab Instructor – Mechanics of Materials/Fluid Mechanics 2010
  - Course instructor - Numerical Method and Computational Engineering 2011

PATENTS

- Patent Application Title: Systems and methods for controlling breathing, Application #: 16643343
  Inventors: Brent M Berry, Carlos B Mantilla, Obaid Khurram, Soudabeh Kargar, Joseph D Mozingo, Michal T Kucewicz, Erik S Daniel, Gary C Sieck, 2020/8/13
- Patent Application Title: Synthetic Three-Dimensional Magnetic Resonance Imaging, Application#: 16965146
  Inventors: Eric A Borisch, Stephen J Riederer, Roger C Grimm, Soudabeh Kargar, 2021/2/11

REFERENCES

Brian Welch, Ph.D. (brian.welch@inkspaceimaging.com)

Stephen J. Riederer, Ph.D. (riederer@mayo.edu)

Houchun Harry Hu, Ph.D. (houchun.hu@cuanschutz.edu)

Joshua D. Trzasko, Ph.D. (trzasko.joshua@mayo.edu)

Eric G. Stinson, Ph.D. (stinson.eric@mayo.edu)

Ricardo Otazo, Ph.D. (otazotoj@mskcc.org)