

ABBAS NASIRAEI MOGHADDAM

Amirkabir University of Technology (Tehran Polytechnic)
Hafez Ave, Faculty of Biomedical Engineering
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AREAS OF INTEREST

- MRI, Sequence Development, Image Processing, Image Reconstruction, Image-based Modeling
- Cardiovascular MRI, Strain Imaging, Angiography, Structure-Function relation
- Myocardium Development, Heart Biomechanics, Biofluid dynamics

EDUCATION

CALIFORNIA INSTITUTE OF TECHNOLOGY **PhD, Bioengineering** 2007
Thesis: Measurement and Analysis of Structure and Function of Myocardium in Embryonic and Adult Heart
Advisor: Prof. Morteza Gharib GPA: 3.8/4.00

UNIVERSITY OF TEHRAN, IRAN **M.S., Electrical Engineering: Biomedical** 1998
Thesis: Analysis of Electromagnetic Fields Distribution in MRI systems in Human Head
Advisor: Prof. Hamid Soltanian Zadeh

UNIVERSITY OF TEHRAN, IRAN **B.S., Electrical Engineering: Electronics** 1995

RESEARCH EXPERIENCE

Assistant Professor August 2010-present
Amirkabir University of Technology, Faculty of Biomedical Engineering, Tehran, Iran

- Teaching courses in graduate level (MRI, Medical imaging system, Cardiovascular Mechanics)
- Defining research projects and advising graduate students towards performing their thesis

Assistant Researcher - Magnetic Resonance Physicist April 2009-present
UCLA, Diagnostic Cardio-Vascular Imaging section, Los Angeles, CA

- Design, development and performance of novel MR imaging techniques for cardiovascular diagnosis
- Collaboration with research scientists from industry (Siemens Medical Solutions)
- Sequence development and pulse programming of the Siemens scanner in the IDEA environment

Magnetic Resonance Staff Research Associate 2006-2009
UCLA, Diagnostic Cardio-Vascular Imaging section, Los Angeles, CA

- Software/algorithm design/development for cardiovascular system modeling & image processing
- Lecturing research MDs in relevant aspects of physics and mathematics

Research Assistant 2003-2006
California Institute of Technology, Pasadena, CA

- Assessment of cardiovascular dynamics and muscle band theory through Medical Imaging
- Quantitative analysis of biofluid dynamics and image velocimetry

Technician Researcher 2001-2003
Washington university/Barnes-Jewish hospital, Saint Louis, MO
CVIA Lab/Cardiology Division

- Performing research on Cardiovascular MRI (Phase Contrast): imaging and factor analysis

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- Studying the hydrodynamics of pathological vessels through PC MRI and CFD

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PATENT

A. N. Moghaddam, M. Gharib, "Method for obtaining strain from radially-tagged magnetic resonance imaging," Publication number: US 2008/0009704 A1(pending).

A. N. Moghaddam, "Method of Reducing SSFP MRI banding artifact," Provisional patent.

A. N. Moghaddam, "Cardiac MRI Circular Tagging," US 61/439,292, Provisional patent.

PROFESSIONAL EXPERIENCE

Bioengineering Visiting Associate 2006-present
California Institute of Technology, Pasadena, CA

- Developing a fast MRI-based method for encoding circumferential strain; patent pending
- Proposing a new model for heart structure and function based on macroscopic tissue tracking
- Advising on the imaging side of the heart modeling project

Assistant Director, Bioelectric Laboratory 1999-2001
University of Tehran, Tehran, Iran

- Developing and directing experiments for Master students
- Organizing the lab (set up & equipment)

Biomedical Engineer 1998
Kaavandishcompany, Tehran, Iran

- Design & development of bio-electric instruments related to electrosurgical generator

Electronics Engineer 1994-1995
Institute of Electrotechnique, Tehran, Iran

- Design of a digital controller based on microcontroller technology to control Fitotron plant rooms

TEACHING EXPERIENCE

Lecturer

▪ **Amirkabir University of Technology, Faculty of Biomedical Engineering**

- *Course:* MRI (special topics)
 - ❖ Designed the curriculum and **initiated** this course at Department of Biomedical Engineering 2010
- *Course:* Medical Imaging Systems, Cardiovascular Mechanics 2011

▪ **University of California Los Angeles (UCLA)**

- *Course:* Mathematics and Physics Principles for MD Researchers/Residents/Fellows: Lecturer
 - ❖ Designed the curriculum and **initiated** this course at Department of Radiological Sciences
 - ❖ Taught the course to MDs in the Departments of Radiology and Cardiology 2007-present

▪ **University of Tehran**

- *Course:* An Introduction to Biomedical Engineering: Lecturer
 - ❖ Designed the curriculum and **initiated** this course in University of Tehran
 - ❖ Taught the course for senior undergraduate students for two successive years 1999-2001
- *Course:* Special topics in Biomedical Engineering (Lecturer assistant)
 - ❖ Taught the principles of MRI to graduate students in 5 lectures 1999

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❖ Designed and guided the experiments in simulation and image processing

▪ **Islamic Azad university of Tehran**

- *Course:* Taught Logic Circuits

1999

PROFESSIONAL AFFILIATIONS

IEEE: Institute of Electrical and Electronics Engineers, Medicine and Biology Society (since 2003)

ISMRM: International society for Magnetic Resonance in Medicine (since 2006)

SCMR: Society for Cardiovascular Magnetic Resonance (since 2007)

REVIEWER OF PROFESSIONAL JOURNALS

IEEE Transactions on Medical Imaging

Magnetic resonance in medicine

Journal of Magnetic Resonance

Physics in Medicine and Biology

Medical Physics

HONORS & AWARDS

The Early Career Award finalist in SCMR

2011

The Michael Merickel Best Student Paper Award (3rd Place) in SPIE, Medical Imaging

2007

Hami Scholarship Award, Fanni Reunion Foundation

2007

Award of the Outstanding Graduates of the Iranian Heritage

2007

ISMRM Student Travel Award

2006

Bechtel fellowship from Caltech

2003-2004

PUBLICATIONS

• **FULL PAPERS**

1. Vahidi B., Fatouree N., Imanparast A., **Nasiraei-Moghaddam A** “A Mathematical Simulation of the Ureter: Effects of the model parameters on ureteral pressure/flow relations,” *Journal of Biomechanical Engineering*, 133: (2011)
2. **Nasiraei-Moghaddam A.**, Saber N.R., Wen H., Finn J.P., Ennis D.B., Gharib M. “Analytical method to measure three-dimensional strain patterns in the left ventricle,” *Journal of Cardiovascular Magnetic Resonance*, 12:33, (2010)
3. Saleh R, Finn JP, Fenchel M, **Nasiraei-Moghaddam A**, Krishnam M, Abrazado M, Ton A, Habibi R, Fonkalsrud EW, Cooper CB “Cardiovascular magnetic resonance in patients with pectusexcavatum compared with normal controls,” *Journal of Cardiovascular Magnetic Resonance*, 12:73, (2010)
4. **Nasiraei-Moghaddam A.**, and Gharib M. “Evidence for the existence of a functional helical myocardial band,” *American Journal of Physiology - Heart and Circulatory Physiology*, 296: H127-131, (2009)
5. Tomasian A., Krishnam M.S., Lohan, D.G., **Nasiraei-Moghaddam A.**, Finn J.P. “Adult Tetralogy of Fallot: Quantitative Assessment of Pulmonary Perfusion With Time-Resolved Three Dimensional Magnetic Resonance Angiography.” *investigative Radiology* 44(1):31-37, (2009)
6. **Moghaddam A.N.**, Finn J.P. “Accelerated Circumferential Strain Quantification of the Left Ventricle Using CIRCOME: Simulation and Factor Analysis” Proceedings of *SPIE*, 6916: 691604-1-8 (2008)

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7. **Moghaddam A.N.**, Balawi T., Habibi R., Panknin C., Laub G., Ruehm S.G., Finn J.P. "A Predictive Software Tool for Optimal Timing in Contrast Enhanced Carotid MR Angiography," Proceedings of *SPIE*, 6913: 691340-1-7 (2008)
8. **Moghaddam A.N.**, M. Gharib "Structure and Function Relationship of Human Heart from DENSE MRI," Proceedings of *SPIE*, 6511: 65111L-1-8 (2007)
9. Forouhar A.S., Liebling M., Hickerson A., **Nasiraei-Moghaddam A.**, Tsai H-J., Hove J.R., Fraser S.E., Dickinson M.E, Gharib M. "The Embryonic Vertebrate Heart Tube Is a Dynamic Suction Pump," *Science*, 312: 751-753 (2006)
10. **Moghaddam A.N.**, Arian S. Forouhar, Michael Liebling, Tsai H., Morteza Gharib "Structure and function relationship of zebrafish embryonic heart from confocal microscopy images," Proceedings of *SPIE*, 6143: 614301-1-8 (2006)
11. Wang Y., **Moghaddam A.N.**, Fatouree N., Behrens G., Cebra J., Choi E.T., Amini A.A. "Pulsatile Pressure Measurements Via Harmonics-Based Orthogonal Projection of Noisy Pressure Gradients," Proceedings of *SPIE*, 6143: 61430C-1-16 (2006)
12. **Nasiraei-Moghaddam A.**, Behrens G., Fatouree N., Agarwal R., Choi E., and Amini A. "Factors Affecting Accuracy in Measurement of Intravascular Pressure from Phase-Contrast MRI," *Magnetic Resonance in Medicine*, 52: 300-309 (2004)
13. **Moghaddam A.N.**, Fatouree N., Choi E.T., Amini A.A., "A Fast method for Computation of the Static Pressure field in Stenotic geometries by PC MRI," Proceedings of *SPIE*, 5031: 31-42 (2003)
14. **Nasiraei-Moghaddam A.**, Liebling M., Forouhar A.S., Tsai H-J., Fraser S.E., and Gharib M. "A Lagrangian Approach Reveals the Active and Passive Regions in the Embryonic Zebrafish Heart," Submitted to the *annals of Biomedical Engineering*, under second revision.

• CONFERENCE PAPERS & ABSTRACTS

1. **Moghaddam A.N.**, Abd-Elmoniem K.Z., Heidari G., Ruehm S., Finn J.P. "Left Ventricular Strain through Radial Tagging: Efficiency and Validity," *ISMRM 19th Scientific Meeting*, 2011, Montreal, Canada. (E-poster)
2. **Moghaddam A.N.**, Natsuaki Y., Finn J.P. "CMR tagging in the polar coordinate system," *SCMR 2011*, Nice, France. (oral presentation)
3. **Moghaddam A.N.**, Natsuaki Y., Finn J.P. "Radial Tagging of MR images: a continuous RF excitation approach," *ISMRM 18th Scientific Meeting*, 2010, Stockholm, Switzerland. (oral presentation)
4. **Moghaddam A.N.**, Finn J.P. "Measuring the myocardial angular information through the Radial Tagging," *ISMRM 18th Scientific Meeting*, 2010, Stockholm, Switzerland. (E-poster)
5. **Moghaddam A.N.**, Finn J.P., Ennis, D.B. "Off-resonance banding maps with low flip angle balanced steady-state free precession," *ISMRM 18th Scientific Meeting*, 2010, Stockholm, Switzerland. (poster presentation)
6. **Moghaddam A.N.**, Balawi T., Habibi R., Laub G., Finn J.P. "Dynamics of Contrast Agents in MRA: Analytical basis and experimental validation," *ISMRM 17th Scientific Meeting*. 2009, Hawaii, USA. (E-poster)
7. **Moghaddam A.N.**, Habibi R., Balawi T., Finn J.P. "Critical Concentration of Contrast Agents for Quantification of Enhancement: Another reason for Dose Reduction," *ISMRM 17th Scientific Meeting*. 2009, Hawaii, USA. (oral presentation)

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8. Saleh R., Cameron R., **Moghaddam A.N.**, Mahidhara R., Goldin J., Finn J.P. "Chest Dynamics in Malignant Pleural Mesothelioma (MPM) Patients Using Real Time Respiratory Cine MRI," *RSNA2008*, Chicago, USA.
9. **Moghaddam A.N.**, Saleh R., Nguyen T., Finn J.P. "Regional Evaluation of Diaphragm Biomechanics Using Magnetic Resonance Imaging," *BMES conf.* 2008, St Louis, USA.
10. **Moghaddam A.N.**, Natsuaki Y., Ullal A., Patel N., Saleh R., Laub G., Finn J.P. "Assessment of Cardiac Torsion and its Correlation with Left Ventricular Volume," *BMES conf.* 2008, St Louis, USA. (oral presentation)
11. **Moghaddam A.N.**, Finn J.P., Gharib M. "Functional Spiral Myocardial Structure and Active Filling of the Left Ventricle from Cardiac MRI," *BMES conf.* 2008, St Louis, USA. (oral presentation)
12. Barkhordarian F., Lohan D.G, Singhal A. , Habibi R., **Moghaddam A.N.**, Saleh R., Villablanca P., Finn P.J. "Phase contrast flow quantification of carotico-vertebral blood flow in patients with normal MR Angiography at 3 Tesla," *ISMRM 16th Scientific Meeting.* 2008, Toronto, Canada.
13. **Moghaddam A.N.**, Finn J.P. "Circumferential Strain Encoding of the Left Ventricle Using CIRCUME: Sequence, Algorithm and Factor Analysis," *SCMR 2008*, Los Angeles, USA.
14. Lipnick S.L., **Moghaddam A.N.**, Finn J.P. "Material Point Tracking with Enforced Incompressibility using MRI," *SCMR 2008*, Los Angeles, USA.
15. Tomasian A., Krishnam M.S., Lohan, D.G., **Moghaddam A.N.**, Finn J.P. "Quantitative Assessment of Pulmonary Circulation in Adult Tetralogy of Fallot With Time-Resolved 3D Magnetic Resonance Angiography," *RSNA2007*, Chicago, USA.
16. **Moghaddam A.N.**, Saleh R., Jalili M., Finn J.P. "Assessment of Diaphragmatic Mechanics using Real Time Respiratory Cine Magnetic Resonance Imaging," *BMES conf.* 2007, Los Angeles, USA.
17. **Moghaddam A.N.**, Finn J.P., Gharib M. "Muscle-band Structure of Myocardium from Cardiac MRI," *BMES conf.* 2007, Los Angeles, USA.
18. Lipnick S.L., **Moghaddam A.N.**, Finn J.P. "Material point tracking using Cine-DENSE data; enforced incompressibility and physiological smoothing," *BMES conf.* 2007, Los Angeles, USA.
19. **Moghaddam A.N.**, Finn J.P., Gharib M. "CIRCumferential COMpression Encoding (CIRCUME)," *ISMRM 15th Scientific Meeting.* 2007, Berlin, Germany.
20. **Moghaddam A.N.**, M. Gharib "Spatial Distribution of the Heart Function from MRI," *SBE's 2nd International Conference on Bioengineering and Nanotechnology.* 2006, Santa Barbara, USA.
21. **Moghaddam A.N.**, H. Wen, M. Gharib "More Comprehensive Cardiac DENSE MR Imaging by Combination of Short Axis and Long Axis Data," *ISMRM 14th Scientific Meeting.* 2006, Seattle, USA.
22. **Moghaddam A.N.**, Saber N.R., Wen H., Gharib M. "Analytical Methods for 3D Measurement of Cardiac Deformation from DENSE-MRI data," *BMES conf.* 2005, Baltimore, USA. (oral presentation)
23. G Behrens, R Agarwal, **A.N Moghaddam**, E.T Choi, A. Amini "Numerical Simulation of Steady and Pulsatile Flow Through Vascular Stenoses and Comparisons with Experiments Using Phase Contrast Magnetic Resonance Imaging," *American Physical Society, Division of Fluid Dynamics 56th Annual Meeting*, November 23-25, 2003, East Rutherford, New Jersey, USA.
24. G. Behrens, R. Agarwal, **A.Moghaddam** and A. Amini "Computational Study of Aortic Stenosis and Aneurysm and Comparisons with Experiments Using Phase Contrast Magnetic Resonance Imaging," *3rd AIAA Fluid Dynamics Conference and Exhibit*, Orlando, Florida, June 23-26, 2003
25. **Moghaddam A.N.**, Choi E.T., Amini A.A., "Fast Computation of Static Flow Pressure Maps from Phase-Contrast MRI in Axi-Symmetric Coordinates," *2nd joint EMBS/BMES Conf.* 2002, Huston, Texas, USA. (Proceedings of EMBS/BMES Vol. 2 (2002), pp.931-932.) (oral presentation)

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26. **Moghaddam A.N.**, SoltanianZadeh H., "Simulation and Correction of MRI Distortions Caused by Nonuniformity of Static Magnetic Field," *9th Iranian Conference of Biomed. Engineering*, 2000, Tehran, Iran.
27. **Moghaddam A.N.**, SoltanianZadeh H., Faraji-Dana R. "Calculation of Static Magnetic Field Distortions in MRI System By F.D. Method," *7th Iranian Conference of Electrical Engineering(ICEE)*, 1999, Tehran, Iran.

REFERENCES

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