

PEZHMAN FOROUGHI

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EDUCATION

Johns Hopkins University, Baltimore, USA, September 2006 - Date
PhD candidate (Department of Computer Science) Area of research: Ultrasound Image Analysis and Elastography (main Application: breast cancer)

Johns Hopkins University, Baltimore, USA, 2006 - 2008
Master of Science (Department of Computer Science)

Queen's University, Kingston, Canada, 2004 - 2006
Master of Science in Engineering (Department of Electrical and Computer Science)
Thesis: Fast Elastic Registration of Ultrasound Images.

Isfahan University of Technology, Isfahan, Iran, 2000 - 2004
Bachelor of Science (Department of Electrical and Computer Science) Thesis Project: Adaptive Audio Noise Cancellation using Adaptive Filters

RESEARCH

MUSIIC/CIRL Lab, Johns Hopkins University, 2007 - Date
Robust elasticity imaging using external tracker: the synchronized data from an external tracker is employed to reduce this dependency and to increase the overall quality of elasticity images.
Tracked Ultrasound Elastography for Neo-adjuvant Chemotherapy: Tracked ultrasound elastography is employed to monitor the changes in breast tumor characteristics over the course of neo-adjuvant chemotherapy.
Multi-modality fusion of CT, 3D ultrasound, and tracked strain images for breast irradiation planning: 3D ultrasound and tracked strain images are utilized as complementary modalities to reduce uncertainties associated with current CT planning workflow.
Elastography based on Dynamic Programming: a fast technique is developed that computes strain images from pre- and post-compression ultrasound data based on global optimization.

ERC-CISST Lab, Johns Hopkins University, 2006 - 2008
Ultrasound-based localization of pelvic anatomical coordinate system: the need for pre-operative CT is obviated in image-guided total hip replacement by registering the ultrasound data to an atlas of pelvis.

Medical Image Analysis Lab, Queen's University at Kingston, 2004 - 2006
Fast 3D and 4D elastic ultrasound registration: the motion within ultrasound images are compensated by elastically registering the images to a template.
Volume reconstruction and visualization: the 2D freehand ultrasound images are tracked and combined to construct a 3D volume.

IUT Robotic Center, Isfahan University of Technology, 2002 - 2004

Member of "IUT-Flash" and "Persia" RoboCup teams: fully automated robots were designed and built to play soccer. I mainly contributed in computer vision part of the project for which I developed real-time software to identify, localize, and measure the speed of mobile robots.

Adaptive Audio Noise Cancellation using Adaptive Filters: I implemented a real-time adaptive filter on a TMS320C31 digital signal processor to cancel background audio noise.

HONORS AND AWARDS**Distinguished Predoctoral Poster Award**, Era of Hope, August 4, 2011

The abstract was also ranked among the top 30% of all entries in the first tier of the competition.

Predoctoral Traineeship Award, DoD Breast Cancer Research Program: September 2009

This prestigious fellowship award has been the main source of funding for my PhD studies.

The Micheal B. Merickel **Best Student Paper Award** for the Second Place Paper: SPIE Medical Imaging, Orlando, February 2009

Cum Laude **Best Poster Award**: SPIE Medical Imaging, Orlando, February 2009

Sisyphus Award: the center for Computer-Integrated Surgical Systems and Technology: May, 2007

The 3rd place award for the best poster: Intelligent Systems conference, Montreal, 2007

PhD Admission, Johns Hopkins University: March, 2006

Precarn Scholar's Award: Kingston, Canada, 2006

Queen's Discretionary Conference Award: Kingston, Canada, November 2004-2006

Queen's University Graduate Award: Kingston, Canada, 2004-2006

Second best demo: IRIS, Quebec City, Canada, 2004

M.Sc. Admission, Queen's University: Kingston, Canada, September 2004

IUT Research Award: Robotic Center of Isfahan University of Tech., Isfahan, Iran, 2003

Third Place in the World RoboCup Competitions, Middle-size: Padova, Italy, 2003

Third Place in the German-Open RoboCup, Small-size: Paderborn, Germany, 2002 & 2003

RoboCup Certified Scientists, RoboCup Camp: Paderborn, Germany, 2002

Second place in the National Robotic Competitions: Tabriz, Iran, 2001

PATENTS PENDING

P. Foroughi, E. Boctor, G. D. Hager "Methods and Apparatus for Ultrasound Strain Imaging," US Patent filed in March 2011.

PUBLICATIONS**Journal Articles**

1. M. Van Vledder, E. Boctor, L. Assumpcao, H. Rivaz, **P. Foroughi**, G. Hager, U. Hamper, T. Pawlik, and M. Choti "Intra-operative ultrasound elasticity imaging for monitoring of hepatic tumour thermal ablation," *HPB*, 12: 717723, 2010
2. C. Leung, K. Hashtrudi-Zaad, **P. Foroughi**, and P. Abolmaesumi, "A Real-time Intra-subject Elastic Registration Algorithm for Dynamic 2D Ultrasound Images," *Ultrasound in Medicine and Biology*, Vol 35, Issue 7, 1159–1176, July 2009
3. H. Rivaz, E. Boctor, **P. Foroughi**, R. Zellars, G. Fichtinger, G. Hager, "Ultrasound Elastography: a Dynamic Programming Approach," *IEEE Transaction in Medical Imaging*, 27(10), 1373–1377, October 2008
4. **P. Foroughi**, P. Abolmaesumi, and K. Hashtrudi-Zaad "Intra-subject Elastic Registration of 3D Ultrasound Images," *Medical Image Analysis*, Vol 10, Issue 5, 713–725, October 2006

Refereed Conference Papers

5. Z. Yaniv, **P. Foroughi**, H. Kang, and E. Boctor "Ultrasound calibration framework for the image-guided surgery toolkit (IGSTK)," in *SPIE Medical Imaging*, 79641N, 2011
6. **P. Foroughi**, H. Rivaz, I. Fleming, G. Hager, and E. Boctor "Tracked Ultrasound Elastography (TrUE)" *Medical Image Computing and Computer Assisted Intervention (MICCAI) 2010*
7. **P. Foroughi**, G. D. Hager, and E. Boctor "Application of external tracking in ultrasound elasticity imaging," in *SPIE Medical Imaging*, 76291B, 2010
8. S. Ghanavati, P. Mousavi, G. Fichtinger, **P. Foroughi**, and P. Abolmaesumi, "Multi-slice to volume registration of ultrasound data to a statistical atlas of human pelvis," in *SPIE Medical Imaging*, 76250O, 2010
9. A. Rasoulian, P. Mousavi, M. H. Moghari, **P. Foroughi**, and P. Abolmaesumi, "Group-wise feature-based registration of CT and ultrasound images of spine," in *SPIE Medical Imaging*, 76250R, 2010
10. H. Rivaz, **P. Foroughi**, I. Fleming, R. Zellars, E. Boctor, and G. Hager, "Tracked Regularized Ultrasound Elastography for Targeting Breast Radiotherapy," *Medical Image Computing and Computer Assisted Intervention (MICCAI) 2009*
11. **P. Foroughi**, G. Hager, and E. Boctor, "Robust Elasticity Imaging Using External Tracker," in *IEEE International Symposium on Biomedical Imaging*, 2009
12. **P. Foroughi**, C. Csoma, H. Rivaz, G. Fichtinger, R. Zellars, G. Hager, and E. Boctor, "Multi-modality Fusion of CT, 3D Ultrasound, and Tracked Strain Images For Breast Irradiation Planning," in *SPIE Medical Imaging*, 2009
13. **P. Foroughi**, D. Song, G. Chintalapani, R. H. Taylor and G. Fichtinger, "Localization of Pelvic Anatomical Coordinate System Using US/Atlas Registration for Total Hip Replacement", *Eleventh International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 2008
14. **P. Foroughi**, D. Song, R. H. Taylor, and G. Fichtinger, "Ultrasound Based Localization of Pelvic Anatomical Coordinate System", *Computer Assisted Orthopedic Surgery*, 2008
15. **P. Foroughi**, R. H. Taylor, and G. Fichtinger, "Automatic Initialization for 3D Bone Registration," in *SPIE*, 2008
16. C. Leung, K. Hashtrudi-Zaad, **P. Foroughi**, P. Abolmaesumi, "Experimental validation of a 4D elastic registration algorithm," in *IEEE EMBS*, 2008

17. **P. Foroughi**, E. Boctor, M. J. Schwartz, R. H. Taylor, and G. Fichtinger, "Ultrasound bone segmentation using dynamic programming," in IEEE Ultrasonics Symposium, pp. 2523-2526, 2007
18. **P. Foroughi**, P. Abolmaesumi, and K. Hashtrudi-Zaad "Towards Realtime Registration of 4D Ultrasound Images," EMBC, 2006
19. **P. Foroughi**, P. Abolmaesumi, "Elastic Registration of 3D Ultrasound Images," Medical Image Computing and Computer Assisted Intervention (MICCAI) 2005
20. **P. Foroughi**, P. Abolmaesumi, "A Modified HAMMER Algorithm for Deformable Registration of Ultrasound Images," Computer-assisted Radiology and Surgery (CARS), Berlin, Germany, June 2005

Abstracts and Workshops

21. **P. Foroughi**, G. Hager, E. Boctor, and V. Stearns "Tracked Ultrasound Elastography for Neoadjuvant Chemotherapy", Era of Hope conference, August 2011
22. C. Leung, P. Abolmaesumi, **P. Foroughi**, K. Hashtrudi-Zaad, "Experimental Validation of a Temporal Elastic Registration Algorithm for 2D Ultrasound Images", 2nd Canadian Student Conference on Biomedical Computing, University of Western Ontario, March 2007
23. H. Rivaz, **P. Foroughi**, E. Boctor, R. Zellars, G. Fichtinger, G. Hager, "Toward Real-Time 2D Ultrasound Elastography Using Global Optimization Of A Regularized Displacement Field," 6th Int. Elastography Conf., Santa Fe, 2007
24. H. Rivaz, **P. Foroughi**, E. Boctor, R. Zellars, G. Fichtinger, G. Hager, "High Resolution Ultrasound Elastography: a Dynamic Programming Approach," MICCAI Workshop, 2007
25. A. R. Fadaei, P. Amini, H. Moballegh, **P. Foroughi**, O. Teheri, B. Touri, A. Movahedian, and M. Ajoodanian, "IUT Flash Team Description," RoboCup Symposium, Robot Soccer World Cup, 2003, Padova , Italy
26. A. R. Fadaei, P. Amini, H. Moballegh, **P. Foroughi**, M. Habibi, A. Haghshenas, "IUT Flash Team Description," RoboCup Symposium, Robot Soccer World Cup, 2002, Fukuoka, Japan

Thesis

27. "Elastic Registration of Ultrasound Images," Master of Science in Engineering, Department of Electrical and Computer Science, Queen's University, Kingston, Canada. Advisors: Dr. Purang Abolmaesumi and Dr. Keyvan Hashtrudi-Zaad.

TEACHING ASSISTANTSHIP

Introduction to Robotics: Mechanics and Control, Electrical and Computer Engineering Department, Queen's University at Kingston, Fall 2005

Discrete Mathematics and its Applications, Electrical and Computer Engineering Department, Queen's University at Kingston, winter 2004

PROGRAMMING EXPERIENCE

Programming Languages: C++, C, Pascal, BASIC, MATLAB, Visual Studio.

Graphical User Interfaces: wxWidgets, QT, MFC, Windows Forms.

Other: VTK, ITK, OpenCV, OpenGL, MySQL.