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EDUCATION

- Johns Hopkins University, Baltimore, USA*
Ph.D. in Computer Science **Nov 2010**
Thesis: Motion estimation in ultrasound images
Advisors: Professors Gregory Hager, Gabor Fichtinger and Emad Boctor
Reader: Professor Stanislav Emelianov
- Johns Hopkins University, Baltimore, USA*
M.S. in Computer Science **Dec 2007**
Advisors: Professors Gregory Hager and Gabor Fichtinger
- University of British Columbia, Vancouver, Canada*
M.S. in Mechanical Engineering **Sept 2005**
Thesis: Development of a hand-held device for ultrasound elastography
Advisor: Professor Robert Rohling
Readers: Professors Tim Salcudean and Anthony Hodgson
- Sharif University of Technology, Tehran, Iran*
B.S. in Mechanical Engineering **May 2003**
Thesis: Computational fluid dynamics in porous media
Academic advisor: Professor Ali Amirfazli. Thesis Advisor: Prof. Mehrdad Manzari

AWARDS

- NSERC post-doctoral fellowship. \$80,000 **2012**
- Montreal Neurological Institute's Jeanne Timmins Costello Fellowship. Proposal: Robust deformable registration of ultrasound and MRI for neurosurgery. \$40,000 **2011**
- DoD Breast Cancer Pre-Doctoral Traineeship Award (PI). Proposal: Breast irradiation planning based on multi-modality fusion of CT, 3D ultrasound, and tracked ultrasound elastography. \$97,000 **2008-2011**
- Link Foundation Fellowship. Proposal: Simulation and training system for ablation surgery using ultrasound elastography. \$25,000 **2008-2010**
- Medical Image Computing and Computer Assisted Intervention (MICCAI) Travel Grant. \$700 **2009**
- Best Presentation Award at Johns Hopkins Division of Medical **2008**

Imaging Physics (DMIP) Annual Retreat

- University of British Columbia (UBC) International Students Scholarship. \$3,500 **2003-2005**
- UBC Graduate Entrance Award. \$3,000 **2003**
- University of Toronto Connaught Scholarship (declined). \$25,000 **2003**
- Bronze Medal, 7th Iranian National Universities Olympiad **2002**
- 2/15,000, Iranian National University Entrance Exam for Graduate Studies. Permanently exempted from Iranian military service for this achievement **2002**
- 5/150,000, Iranian National University Entrance Exam **1999**
- Silver Medal, 12th Iranian National Physics Olympiad **1998**

TEACHING EXPERIENCE

Johns Hopkins University

Instructor

Jan 2009 & Jan 2010

Designed a new course titled "Introduction to Medical Imaging" 600.146, at the undergraduate level (with Ioana Fleming)

Johns Hopkins University

Guest Lecturer

2009-2010

Modern Biomedical Imaging 520.434 (Spring 2010)

Computer Vision 600.361 (Fall 2009)

Johns Hopkins University

Students Advised

Ehsan Jahangiri, ECE PhD student, Computer Vision Final Project

Oct-Dec 2010

Nishikant Deshmukh, CS Master's student. Parallel Programming in Ultrasound Elasticity Imaging

Dec 2009

Shahin Sefati, Mech. PhD student, computer vision final project. Ultrasound Elasticity Imaging Using Phase of the RF-data. Winner of the First place for Technical Accomplishment

Jan-Jun 2009

Joy Salib and Peter Kamel, High school students. Research Experience in Ultrasound Imaging at JHU

Jun-Aug 2007

SELECTED PROFESSIONAL EXPERIENCE

Dept. of Biomedical Engineering, MNI, McGill University

Post-doctoral Fellow

Jan 2011-Date

Real-Time Non-rigid Registration of Ultrasound to MRI for Neurosurgery. Advisor: Prof. Louis Collins

Siemens Medical Solutions, Malvern, PA

Internship

Jun-Sept 2008

Developed a novel electronic colon cleansing method for CT colonography (virtual colonoscopy). Advisors: Dr. Yoshihisa Shinagawa and Dr. Jianming Liang

NSF ERC for Computer Integrated Surgery, Johns Hopkins University

Graduate Research Assistant

Jan 2006-Date

- Developed an analytical method for ultrasound elastography and utilized it in
 - Patient trials of guided breast radiation therapy using tracked ultrasound
 - Patient trials of liver ablation monitoring/guidance
 - Laparoscopic prostatectomy
- Developed a novel real time 2D ultrasound elastography technique based on dynamic programming
- Developed a statistical model for discriminating different types of tissue in ultrasound images
- Integration of a 5 DOF robot with ultrasound to acquire 3D volumes using 2D ultrasound images

Robotics, Control and Medical Imaging Laboratory, University of British Columbia

Graduate Research Assistant

2003-2006

- Developed an active vibration cancellation device for a hand-held elastography probe
- Developed system identification for estimating viscosity and elasticity of tissue using ultrasound

INVITED TALKS

T1. Motion Estimation in Ultrasound Imaging, Siemens Corporate Research, Princeton NJ, USA, Sept. 2010.

T2. Motion Estimation in Ultrasound Imaging, University of Toronto Health Network, Toronto ON, Canada, Sept. 2010.

T3. Statistical Methods in Imaging, Resonant Medical, Montreal QC, Canada, Aug. 2010.

T4. Rivaz, H., "Ultrasonic Guidance and Visualization In Medical Operations", Dept. of Elec. Comp. Eng., McGill University, Sept., 2009

T5. Rivaz, H., "Computer Assisted Surgery", Dept. of Biomed. Eng., Sharif University of Technology, Jul., 2008

PATENTS PENDING

P1. **Rivaz, H.**, Boctor, E., Hager, G. and Fichtinger, G., "High Resolution Freehand 3D ultrasound," US patent 26148.073.00, Utility US Patent filed in Jan. 2008

P2. Boctor, E., Fichtinger, G., Hager, G. and **Rivaz, H.**, Apparatus and Method for Computing 3D Ultrasound Elasticity Images, US patent 26148.071.00us

PUBLICATIONS

Journal Articles

- J1. **Rivaz, H.**, Boctor, E., Choti, M., Hager, G., "Ultrasound Elastography Using Multiple Images", IEEE Ultras. Ferr. Freq. Cont. (submitted)
- J2. **Rivaz, H.**, Boctor, E., Choti, M., Hager, G., "Real-Time Regularized Ultrasound Elastography", IEEE Trans. Medical Imaging [Impact factor 3.6] April 2011 vol. 30 pp 928-945
- J3. Van Vledder, M., Boctor, E., Assumpcao, L., **Rivaz, H.**, Foroughi, P., Hager, G., Hamper, U., Pawlik, T., Choti, M. "Intra-operative ultrasound elasticity imaging for monitoring of hepatic tumour thermal ablation", HPB, 2010, 12: 717-723
- J4. **Rivaz, H.**, Boctor, E., Foroughi, P., Zellars, R., Fichtinger, G., Hager, G., "Ultrasound Elastography: a Dynamic Programming Approach", IEEE Trans. Medical Imaging [Impact factor 3.6] Oct. 2008, vol. 27 pp 1373-1377
- J5. **Rivaz, H.**, Rohling, R., "An Active Dynamic vibration Absorber for a Hand-Held Vibro-Elastography Probe," ASME Trans. Vibration & Acoustics, Feb. 2007, vol. 129, pp 101-112 [Top 10 most downloaded articles from this journal in March 2008]

Conference Proceedings

- C1. **Rivaz, H.**, Boctor, E., Choti, M., Hager, G., "Ultrasound Elastography Using Three Images", Medical Image Computing and Computer Assisted Intervention, MICCAI, Toronto, Canada, Sept. 2011, pp 371-378 [Acceptance rate: 30%]
- C2. **Rivaz, H.**, Kang, H., Stolka, P., Boctor, E. "Is it possible to measure thermal expansion in real-time?", SPIE Med. Imag., 2011 (accepted)
- C3. Foroughi, P., **Rivaz, H.**, Fleming, I., Hager, G., Boctor, E. "Tracked Ultrasound Elastography (TrUE)", Medical Image Computing and Computer Assisted Intervention, MICCAI, Beijing, China, Sept. 2010, pp 9-16 [Acceptance rate: 32%]
- C4. **Rivaz, H.**, Kang, H., Stolka, P., G. Hager, Boctor, E. "Novel reconstruction and feature exploitation techniques for sensorless freehand 3D ultrasound", SPIE Med. Imag., 2010, pp 76291D1-76291D9
- C5. **Rivaz, H.**, Kapoor, A., Fleming, I., Hager, G., Boctor, E. "A novel method for monitoring liver ablation using ultrasound elastography", SPIE Med. Imag., 2010, 7629131-7629138
- C6. **Rivaz, H.**, Foroughi, P., Fleming, I., Zellars, R., Boctor, E., Hager, G., "Tracked Regularized Ultrasound Elastography for Targeting Breast Radiotherapy", Medical Image Computing and Computer Assisted Intervention, MICCAI, London, UK, Sept. 2009, pp 507-515. [Acceptance rate: 32%] [Awarded MICCAI Travel Grant. 7 total grants awarded.]
- C7. **Rivaz, H.**, Liang, J., Shinagawa Y., "Electronic Colon Cleansing of the Unprepared Colon", SPIE Med. Imag., Orlando, FL, 2009, Vol. 726019, pp 1901-1912
- C8. Fleming, I., **Rivaz, H.**, Hamper, U., Hager, G., Boctor, E., "Ultrasound elastography: Enabling technology for image guided laparoscopic prostatectomy", SPIE Medical Imaging, Orlando, FL, Feb. 2009, Vol. 72612I

C9. Foroughi, P., Csoma, C., **Rivaz, H.**, Fichtinger, G., Zellars, R., Hager, G., Boctor, E., "Multi-modality fusion of CT, 3D ultrasound, and tracked strain images for breast irradiation planning", SPIE Medical Imaging, Orlando, FL, Feb. 2009.

C10. Boctor, E., Matinfar, M., Ahmad, O, **Rivaz, H.**, Choti, M. Taylor, R. "Elasticity-based three dimensional ultrasound real-time volume rendering", SPIE Medical Imaging, Orlando, FL, Feb. 2009, Vol. 72612V

C11. **Rivaz, H.**, Fleming, I., Matinfar, M., Khamene, A., Choti, M., Hager, G., Boctor, E., "Ablation Monitoring with a Regularized 3D Elastography Technique", IEEE Int. Ultrasonics Symposium, Beijing, China, Oct. 2008 pp 308 – 312

C12. **Rivaz, H.**, Fleming, I., Assumpcao, L., Fichtinger, G., Hamper, U., Choti, M., Hager, G., Boctor, E., "Ablation Monitoring with Elastography: 2D In-vivo and 3D Ex-vivo Studies", Medical Image Computing and Computer Assisted Intervention, MICCAI, New York, NY, Sept. 2008, pp 458-466 [Acceptance rate: 32%]

C13. **Rivaz, H.**, Zellars, R., Hager, G. Fichtinger, G., Boctor, E., "Beam Steering Approach to Speckle Characterization and Out-of-Plane Motion Estimation in Real Tissue", IEEE Int. Ultrasonics Symposium, New York, NY, Oct. 2007 pp 781-784

C14. **Rivaz, H.**, Boctor, E., Fichtinger, G., "A Robust Meshing and Calibration Approach for Sensorless Freehand 3D Ultrasound", SPIE Medical Imaging, San Diego, CA, Feb. 2007, Vol. 6513, pp 181-188

C15. **Rivaz, H.**, Boctor, E., Fichtinger, G., "Ultrasound Speckle Detection using Low Order Statistics," IEEE Int. Ultras. Symp., Vancouver, Canada, 2006, pp 2092 – 2095

C16. **Rivaz, H.**, Rohling, R., "A Hand-Held Device for Vibro-Elastography," Medical Image Computing and Computer Assisted Intervention, MICCAI, Palm Springs, CA, Oct. 2005, pp 613-620 [Acceptance rate: 34%]

Workshops and Abstracts (Selected from 11)

W1. **Rivaz, H.**, Boctor, E., Hager, G., "2D Robust Motion Estimation" 9th Int. elastography Conf., Snowbird, UT, Oct 2010, p 129 (oral presentation)

W2. **Rivaz, H.**, Choti, M., Hager, G., Boctor E. "Strain Estimation Using Kalman Filter: Simulation and Clinical Results", 9th Int. elastography Conf., Snowbird, UT, Oct 2010, p 104 (oral presentation)

W3. **Rivaz, H.**, Foroughi, P., Boctor, E., Zellars, R., Fichtinger, G., Hager, G., "High Resolution Ultrasound Elastography: a Dynamic Programming Approach", MICCAI Workshop, Brisbane, Australia, Oct. 2007, pp 113-121

W4. **Rivaz, H.**, Foroughi, P., Boctor, E., Zellars, R., Fichtinger, G., Hager, G., "Toward Real-Time 2D Ultrasound Elastography Using Global Optimization of a Regularized Displacement Field", 6th Int. elastography Conf., Santa Fe, NM, Nov. 2007, p 137 (oral presentation)

W5. **Rivaz, H.**, Hager, G., Zellars, R., Fichtinger, G., Boctor, E., "Speckle Characterization and Out-of-Plane Motion Estimation in Tissue", 6th Int. elastography Conf., Santa Fe, NM, Nov. 2007, p 116 (oral presentation)

W6. **Rivaz, H.**, Rohling, R., "Design of a hand-held probe for vibro-elastography," 4th Int. elastography Conf., Austin, TX, Oct. 2005, p 61 (oral presentation)

PROFESSIONAL ACTIVITIES

- Grant Review for the PSI Foundation <http://www.psifoundation.org/>
- Peer reviewer for
 - IEEE Trans. Medical Imaging (IEEE TMI)
 - IEEE Trans. Biomedical Engineering (IEEE TBME)
 - Journal of Royal Society Interface Focus
 - Journal of Medical Image Analysis (MedIA)
 - Medical Image Computing and Computer Assisted Intervention (MICCAI)
- IEEE, MICCAI and SPIE Medical Imaging student member
- Elected as a student leader in 2006-2007 and 2007-2008 academic years in the computer science department at the Johns Hopkins University. Responsibilities included managing departmental budget for improving graduate student life