Lianli Liu

Contact Information

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Education

University of Michigan — Ann Arbor, MI USA

Medical Physics Certificate Program — 2017-2018.04 (expected)

- Six courses including Anatomy, Radiobiology, Imaging, Dosimetry, Radiotherapy Physics and Medical Radiological Health Engineering

Ph.D. in Electrical Engineering: System — 2013-2018.02 (expected)

- Research focus: optimizing magnetic resonance imaging for radiotherapy
- Co-advised by Prof. James Balter and Prof. Jeffrey Fessler
- GPA: 4.0/4.0

M.S. in Electrical Engineering: System — 2013-2014

- GPA: 4.0/4.0

Xi'an Jiaotong University (XJTU) — Xi'an, Shaanxi, China

B.S. in Information Engineering, with highest honor — 2009-2013

The Special Class for the Gifted Young of China — 2007-2009

Research Experience

Research Assistant, University of Michigan — 2013-present

- Built a statistical pelvic bone shape model from training data, in support of bone/air separation on pelvic MRI data for synthetic CT generation
- Developed a probabilistic classification technique for MR images, using joint shape and intensity information to support MRI-only radiotherapy
- Developing a model-based image reconstruction algorithm for accelerated high b-value diffusion-weighted MRI, using a low-rank tensor model

Undergraduate Senior Design, XJTU — 2013.02-06

- Developed a scalable image retrieval algorithm using hierarchical sparse coding, mentored by Prof. Xueming Qian

Visiting Student, Laboratory of Neuro Imaging (LONI), UCLA — 2012.07-09

- Developed a group-wise image registration algorithm, applying regularized anisotropic anti-diffusion to improve accuracy, mentored by Prof. Ivo Dinov

Journal Papers

[J1] **L.Liu**, S.Jolly, Y.Cao, K.Vineberg, J.A.Fessler, J.M.Balter, 'Female pelvic Synthetic CT generation based on joint intensity and shape analysis', *Physics in Medicine and Biology, 62(8): 2935-2949, 2017*

[J2] J.Bredfeldt, **L.Liu**, M.Feng, Y.Cao, J.M.Balter, 'Synthetic CT for MRI-based liver stereotactic body radiotherapy treatment planning', *Physics in Medicine and Biology, 62(8): 2922-2934, 2017*

[J3] **L.Liu**, Y.Cao, J.A.Fessler, S.Jolly, J.M.Balter, 'A female pelvic bone shape model for air/ bone separation in support of synthetic CT generation for radiation therapy', *Physics in Medicine and Biology, 61(1): 169-182, 2017*

Conference Papers

[C1] **L.Liu**, A.Johansson, J.M.Balter, J.A.Fessler, Y.Cao, 'Accelerated high b-value diffusion-weighted MRI for higher-order diffusion analysis using a phase-constrained low-rank tensor model', *submitted to annual meeting of ISMRM, 2018*

[C2] **L.Liu**, A.Johansson, J.M.Balter, Y.Cao, J.A.Fessler, 'Accelerated high b-value diffusion-weighted MR imaging via phase-constrained low-rank tensor model', *submitted to IEEE international symposium on biomedical imaging (ISBI), 2018*

[C3] **L.Liu**, S.Jolly, Y.Cao, K.Vineberg, J.A.Fessler, J.M.Balter, 'Female pelvic synthetic CT generation based on joint shape and intensity analysis', *Medical Physics, 43(6): 3343, 2016.* Oral presentation at AAPM 2016.

[C4] J.Bredfeldt, **L.Liu**, M.Feng, Y.Cao, J.M.Balter, 'Abdominal synthetic CT generation in support of liver SBRT dose calculation', *Medical Physics, 43(6): 3733, 2016.* Oral presentation at AAPM 2016.

[C5] **L.Liu**, J.M.Balter, Y.Cao, S.Jolly, J.A.Fessler, 'Automated bone segmentation to support synthetic CT in the pelvis', *3rd MR in RT Symposium, 2015*

[C6] **L.Liu**, Y.Cao, J.A.Fessler, J.M.Balter, 'Investigation of a pelvic bone shape model in support of bone classification for synthetic CT generation', *Medical Physics, 42(6): 3541, 2015.* Oral presentation at AAPM 2016.

[C7] **L.Liu**, S.Hsu, J.M.Balter, Y.Cao, 'A joint classification and bias field estimation algorithm for synthetic CT generation', *2nd MR in RT symposium, 2014*

[C8] X.Yang, **L.Liu**, X.Qian, T.Mei, J.Shen, Q.Tian, 'Mobile visual search via hierarchical sparse coding', *IEEE International Conference on Multimedia and Expo, 2014*

Working Papers

[W1] **L.Liu**, A.Johansson, J.M.Balter, J.A.Fessler, Y.Cao, 'Accelerated high b-value diffusion-weighted MRI using a phase-constrained low-rank tensor mode', in preparation for *Magnetic Resonance in Medicine*

[W2] **L.Liu**, C.Morris, D.Spratt, J.Hearn, Y.Cao, K.Vineberg, J.A.Fessler, J.M.Balter, 'Synthetic CT for MRI-only prostate radiotherapy treatment planning', in preparation for *Physics in Medicine and Biology*

Professional Service

Reviewer, International Journal of Radiation Oncology*Biology*Physics	2016-2017
Student Representative, Rackham Student Goverment	2016-2017

Honors and Awards

1st place, young investigator competition of AAPM GLC chapter meeting	2017.04
Rackham Barbour Scholarship	2017.03
2nd place, technical session, Engineering Graduate Symposium, UofM	2016.11
2nd place, young investigator competition of the 4th MR in RT Symposium	2016.06
Elected into Tau Beta Pi engineering honor society	2014.12
Rackham Travel Grant	2015-2016
2nd place, young investigator competition of the 2nd MR in RT Symposium	2014.06
2nd place, KLA-Tencor image processing contest	2013.04
Outstanding Student, XJTU, highest honor for only 10 undergraduate	2012.10
UCLA-CSST Scholarship	2012.07
Meritorious Winner of Mathematical Contest in Modeling	2012.04

Clinical Experience

Shadowing of **brachytherapy** and **linear accelerator QA**

Selected Course Projects

Machine learning project: Travel recommendation using bandit algorithm	2013.09
Image processing project: MRI bias field correction using tissue labeling	2013.02
Machine learning project: Subspace clustering from incomplete data	2014.09

Skills	Programing language: C++, Matlab Image processing libraries: ITK (Insight Segmentation and Registration Toolkit) Experience with Siemens Skyra scanner
MEMBERSHIPS	1) AAPM student member: 2016-present; 2) IEEE student member: 2016-present