Junshen Xu

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Education

- **Massachusetts Institute of Technology** — Cambridge, MA
  PhD. Electrical Engineering and Computer Science — *Sep 2018 – Present*
- **Tsinghua University** — Beijing, China
  BSc, Engineering Physics — *Aug 2014 – Jul 2018*

Experience

- **Massachusetts Institute of Technology** — Cambridge, MA
  Research Assistant — *Sep 2018 - Present*
  - **Fetal Motion Prediction**: Time series analysis of fetal motion and motion prediction using autoregressive tree and recurrent neural network
  - **Fetal Pose Estimation**: Estimate keypoints of fetus from 3D MR images using convolution neural network.
- **United Imaging Healthcare** — Shanghai, China
  Research Collaborator — *Mar 2018 - Jun 2018*
  - **Statistical Analysis of Lung Cancer Data**: Feature extraction and selection from PET and CT images, statistical analysis of radiomics and genomics data ,and fitting predictive models (logistic regression, SVM, ...)
  - **Diffusion Image Enhancement**: Improve the quality of single-shot diffusion weighted images (super-resolution and denoising) using generative adversarial network.
- **Stanford University** — Stanford, CA
  Research Assistant — *Jun 2017 - Aug 2017*
  - **Low-Dose PET reconstruction**: Denoise low-dose PET images using deep convolution network with structural information of multi-contract MRI.
- **Tsinghua University** — Beijing, China
  Research Assistant — *Sep 2015 - Jun 2018*
  - **MR-based PET Attenuation Correction**: Estimate PET attenuation maps from MR images using machine learning algorithm (SVM, GMM, ...)
  - **Joint Reconstruction with Motion Correction in PET/MRI**: Reconstruct PET and MR images simultaneously with motion correction using convex optimization

Other Projects

- **MRI-Recon**: A Matlab toolbox for solving convex optimization in MR reconstruction with automatic differentiation
- **Segmentation of Left Atrial Appendage**: Segmentation of Left Atrial Appendage in CT using random forest and active contour model
- **Wearable PET**: Design image reconstruction algorithm for a wearable PET device

Skills

- **Programming Languages**: Python, Matlab, R, C++
- **Knowledge**: Machine Learning, Statistics, Deep Learning, Optimization
- **Technologies**: LaTeX, Git, TensorFlow, PyTorch, scikit-learn

Scholarship and Fellowship

- **MIT EECS Nathaniel Durlach Fellowship**
- **Boeing Scholarship**

Publications

Preprint:

[1] Xu, J., Gong, E., Pauly, J., & Zaharchuk, G. 200x Low-dose PET reconstruction using deep learning. arXiv preprint arXiv:1712.04119.

Journal:

[1] Chen, K., Gong, E., Macruz, F., Xu, J., Boumis, A., Khalighi, M., Poston, K., Sha, S., Greicius, M., Mormino, E., Pauly, J., Srinivas, S., & Zaharchuk, G. Ultra-low-dose 18F-florbetaben Amyloid PET Imaging using Deep Learning with Multi-contrast MRI Inputs. Radiology (2018).

Conference Proceedings:

[1] Xu, J., Zhang, M., Zhang, L., Grant, E., Golland, P., Adalsteinsson, E. Fetal motion prediction from volumetric MRI using machine learning. ISMRM (2019)

[2] Zhang, M., Xu, J., Turk, E., Zhang, L., Grant, E., Ying, K., Golland, P., Adalsteinsson, E. Fetal Pose Estiamation by Deep Neural Network. ISMRM (2019)

[3] Xu, J., Cao, T., Zhang, Z., Hu, L., Gong, N., Shi, H., et al. Joint Reconstruction of Low-Count PET and Undersampled MR in PET/MR Using Deep Learning. RSNA (2018)

[4] Xu, J., Liu, N., Ma, X., Xie, J., Li, G., Wang, Z., et al. Improving Resolution, Distortion, and SNR of Clinical Diffusion Weighted Images Using Deep Learning. RSNA (2018)

[5] Xu, J., Gong, E., Khalighi, M., Pauly, J., Zaharchuk, G. Multi-contrast MRI Enhance Ultra-low-dose PET Reconstruction. ISMRM (2018)

[6] Chen, K., Gong, E., Macruz, F., Xu, J., Khalighi, M., Pauly, J., Zaharchuk, G. Ultra-low-dose Amyloid PET Reconstruction using Deep Learning with Multi-contrast MRI Inputs. ISMRM (2018)

[7] Niu, Y., Gong, E., Xu, J., Thamm, T., Pauly, J., Zaharchuk, G. Improved Prediction of the Final Infarct from Acute Stroke Neuroimaging Using Deep Learning. ISMRM (2018)

[8] Niu, Y., Gong, E., Xu, J., Pauly, J., Zaharchuk, G. Improved Prediction of the Final Infarct from Acute Stroke Neuroimaging Using Deep Learning. ISC (2018)

[9] Niu, Y., Gong, E., Xu, J., Pauly, J., Zaharchuk, G. Multi-scale Patch-wise 3D CNN for Ischemic Stroke Lesion Segmentation. ISLES (2017)

[10] Gong, E., Xu, J., Pauly, J. Zaharchuk, G. Deep Learning reduces 99.5% radiation risk for nuclear medicine functional imaging. NIPS Medical Imaging Workshop (2017)

[11] Xu, J., Gong, E., Niu, Y., Khalighi, M., Pauly, J., Zaharchuk, G. Ultra-low-dose PET Reconstruction enabled by Deep Learning and Simultaneous PET/MR. ISMRM-SNMMI Co-Provided Workshop on PET/MRI (2017)

[12] Xu, J., Gong, E., Niu, Y., Khalighi, M., Pauly, J., Zaharchuk, G. Evaluation on the Contribution of Multi-contrast MRI to Low-dose PET Reconstruction. ISMRM-SNMMI Co-Provided Workshop on PET/MRI (2017)

[13] Gong, E., Xu, J., Pauly, J., Zaharchuk, G. Deep Learning Enables at Least 100-fold Dose Reduction for PET Imaging. RSNA (2017)

[14] Xu, J., Zhao, Y., Ying, K. Joint Reconstruction of Simultaneous PET/MR Imaging with Motion Correction Using a B-spline Motion Model. ISMRM (2017)

[15] Gao, C., Xu, J., Fan, B., Liu, J., Ying, K. Comparison of UTE based Attenuation Correction Methods for simultaneous PET/MR Imaging of the Children's Brain. ISMRM (2017)