Gary Y. Li(EB1A)

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Education

Johns Hopkins University **Baltimore, MD**
Ph.D., Electrical and Computer Engineering *Nov. 2020*
Thesis fields: Medical image computing, Computer-aided diagnosis, Medical imaging physics

Johns Hopkins University **Baltimore, MD**
M.S.E., Electrical and Computer Engineering *May 2016*

University of Illinois at Urbana-Champaign **Urbana, IL**
B.S., Radiological Engineering *May. 2014*
Minor: Physics

Work Experience

Philips Healthcare **Cambridge, MA**
AI Scientist, Point-of-care Ultrasound Global Business *August 2022 - Present*

- Developed generative AI frameworks to synthesize pathology-present Ultrasound images for improving performance of AI models for video pathology detection.
- Developed SOTA algorithms for the detection and classification of physiological and pathological patterns in medical ultrasound data
- Conducted large-scale training for deployments of AI algorithms in two Philips Lumify applications (FDA CADe/x 510K submission in preparation) designed for assisting physicians in lung consolidation and pleural effusion detection and classification tasks
- Mentored and co-mentored three summer interns in developing novel AI algorithms in areas of generative AI, weakly-supervised learning, and domain adaptation
- Participated validation study design of two CADe/x AI-based applications for concept proven and function proven milestones in Philips' Product Development, Launch, and Maintenance life-cycle
- Prepared large-scale annotations of medical ultrasound data using MD.ai APIs and Pandas for AI model training

Center for Advanced Medical Computing and Analysis, MGH/HMS **Boston, MA**
Postdoctoral Research Fellow *May 2021 - August, 2022*

- Developed a novel noise-level-aware framework for PET image denoising
- Developed a multi-modal transformer-based segmentation network that allows multi-modal feature fusions at multiple resolutions.

Johns Hopkins University **Baltimore, MD**
Ph.D. student and Postdoctoral Research Fellow *Aug. 2014 - May. 2021*

- Developed a deep learning-based anthropomorphic model observer for image quality evaluation of multi-orientation, multi-slice image sets with respect to a clinically realistic 3D defect detection task
- Co-developed a deep learning-based image registration method for creating highly anatomically detailed anthropomorphic phantoms
- Co-developed a deep learning-based segmentation method for quantitative bone SPECT
- Developed an image database to investigate factors affecting image quality in pediatric molecular imaging
- Generated data needed by standards bodies to develop next-generation dosing guidelines for pediatric molecular imaging (worked as a postdoc in the same group)

IBM Research - Almaden **San Jose, CA**
Deep Learning Intern *May 2018 - Aug. 2018*

- Developed a local image similarity evaluation algorithm for chest X-ray images using Siamese network

- Developed a nodule detection algorithm for chest X-ray images using organ-ROI-confined attention map
- Conducted experiments for comparing classification performance by using one multi-label classifier vs. multiple binary classifiers for chest X-ray images
- Work resulted a patent filed within IBM

Brigham and Women's Hospital **Boston, MA**
Deep Learning Intern *June 2017 - Aug. 2017*

- Applied U-net and FusionNet to segment cross-sections of muscle fibers in histopathology image
- Work published in a journal paper (IF: 6.7)

Oak Ridge National Laboratory **Oak Ridge, TN**
Software Development Intern *June 2013 - Aug. 2013*

- Developed a virtual reality software that allows users to virtually visit a laboratory using Unity3D, C#, and Javascript

Selected Publications

Articles in Press

1. Y. Chou, **G.Y. Li**, L. Chen, M. Zahiri, N. Balaraju, S. Patil, B. Hicks, N. Schnittke, D. Kessler, J. Shupp, M. Parker, C. Baloescu, C. Moore, C. Gregory, K. Gregory, B. Raju, J. Kruecker, A. Chen, "Ultrasound Image Synthesis Using Generative AI for Lung Consolidation Detection", (**arXiv**), 2024
2. **G.Y. Li**, L. Chen, B. Hicks, N. Schnittke, D. Kessler, J. Shupp, M. Parker, C. Baloescu, C. Moore, C. Gregory, K. Gregory, B. Raju, J. Kruecker, A. Chen, "Spatiotemporal Learning with Context-aware Video Tubelets for Ultrasound Video Analysis", (**arXiv**), 2024
3. S. Jang, T. Pan, **G.Y. Li**, P. Heidari, J. Chen, Q.Li, K. Gong, "Spach transformer: spatial and channel-wise transformer based on local and global self-attentions for pet image denoising", IEEE Transactions in Medical Imaging(**TMI**), 2023
4. **G.Y. Li**, L. Chen, M. Zahiri, N. Balaraju, S. Patil, C. Mehanian, C. Gregory, K. Gregory, B. Raju, J. Kruecker, A. Chen, "Weakly Semi-Supervised Detector-Based Video Classification with Temporal Context for Lung Ultrasound", Proceedings of the IEEE/CVF International Conference on Computer Vision (**ICCV**), 2023
5. **G. Y. Li**, J. Chen, S.-I. Jang, K. Gong and Q. Li. "Swin Cross: Cross-modal Swin Transformer for Head-and-Neck Tumor Segmentation in PET/CT Images", **Medical Physics**, 2023
6. **Y. Li**, J.L. Brown, J. Xu, J. Chen, M. Ghaly, M. Dugan, X. Cao, Y. Du, F.H. Fahey, W.E. Bolch, G. Sgouros and E.C. Frey. "Girth-based Administered Activity for Pediatric 99mTc-DMSA SPECT", **Medical Physics**, 2023
7. J. Ouyang, L. Chen, **G. Y. Li**, N. Balaraju, S. Patil, C. Mehanian, S. Kulhare, R. Millin, K. Gregory, C. Gregory, M. Zhu, D. Kessler, L. Malia, A. Dessie, J. Rabiner, D. Coneybeare, B. Shopsin, A. Hersh, C. Madar, J. Shupp, L. Johnson, J. Avila, K. Dwyer, P. Weimersheimer, B. Raju, J. Kruecker, A. Chen. "Weakly Semi-Supervised Detection in Lung Ultrasound Videos", International Conference on Information Processing in Medical Imaging (**IPMI**), 2023
8. **Y. Li**, J. Chen, S.-I. Jang, K. Gong and Q. Li. "Investigation of Network Architecture for Multimodal Head-and-Neck Tumor Segmentation", IEEE Medical Imaging Conference (**MIC**), 2022
9. S.-I. Jang, C. Lois, J.A. Becker, E. Thibault, **Y. Li**, J. C. Price, G. El Fakhri, Q. Li, K. A. Johnson, K. Gong "Low-Dose Tau PET Imaging Based on Swin Restormer with Diagonally Scaled Self-Attention", IEEE Medical Imaging Conference (**MIC**), 2022
10. **Y. Li**, J. Cui, J. Chen, G. Zeng, S. Wollenweber, F. Jansen, S.-I. Jang, K. Kim, K. Gong and Q. Li. "A Noise-Level-Aware Framework for PET Image Denoising", International Workshop on Machine Learning for Medical Image Reconstruction (**MLMIR**), 2022
11. J. Chen, Y. Du, Y. He, W.P. Segars, **Y. Li** and E.C. Frey. "TransMorph: Transformer for unsupervised medical image registration", **Medical Image Analysis**, 2022
12. D. Plyku, M. Ghaly, **Y. Li**, J.L. Brown, S. O'Reill, K. Khamwan, A.B. Goodkind, B. Sexton-Stallone, X. Cao, D. Zurakowski, F.H. Fahey, S.T. Treves, W.E. Bolch, E.C. Frey and G. Sgouros. "Renal 99mTc-DMSA pharmacokinetics in pediatric patients", **EJNMMI Physics**, 2021
13. **Y. Li**, J. Chen, J. Brown, S.T. Treves, X. Cao, F.H. Fahey, G. Sgouros, W.E. Bolch, and E.C. Frey. "DeepAMO: A Multi-slice, Multi-view Anthropomorphic Model Observer for Visual Detection Tasks Performed on Volume Images", **Journal of Medical Imaging**' special section: Perspectives in Human and Model Observer Performance, 2021

14. J. Chen, Y. He, E.C. Frey, **Y. Li** and Y. Du. "ViT-V-Net: Vision Transformer for Unsupervised Volumetric Medical Image Registration", **Medical Imaging with Deep Learning**, 2021
15. J. Chen, **Y. Li**, S.P. Rowe, H.W. Chung, Y. Du, L.B. Solnes, M.A. Jacobs, and E.C. Frey. "Learning Fuzzy Clustering for SPECT Segmentation via Convolutional Neural Networks", **Medical Physics**, 2021
16. J. Chen, **Y. Li**, Y. Du, and E.C. Frey. "Generating Anthropomorphic Phantoms Using Fully Unsupervised Deformable Image Registration with Convolutional Neural Networks", **Medical Physics**, 2020
17. J. Brown, B. Sexton-Stallone, **Y. Li**, E.C. Frey, S.T. Treves, F.H. Fahey, D. Plyku, X. Cao, G. Sgouros, and W.E. Bolch. "Body Morphometry Appropriate Computational Phantoms for Dose and Risk Optimization in Pediatric Renal Imaging with Tc-99m DMSA and Tc-99m MAG3", **Physics in Biology and Medicine**, 2020
18. J. Brown, B. Sexton-Stallone, **Y. Li**, E.C. Frey, S.T. Treves, F.H. Fahey, D. Plyku, X. Cao, C. Choi, C.H. Kim, G. Sgouros, J. P. Aris and W.E. Bolch. "Dosimetric considerations of Tc-99m MDP uptake within the epiphyseal plates of the long bones of pediatric patients", **Physics in Biology and Medicine**, 2020
19. **Y. Li**, S. O'Reilly, D. Plyku, S.T. Treves, F.H. Fahey, Y. Du, X. Cao, J. Brown, G. Sgouros, W.E. Bolch, and E.C. Frey. "Current Pediatric Administered Activity Guidelines for 99mTc-DMSA SPECT Based on Patient Weight Do Not Provide the Same Task-based Image Quality", **Medical Physics**, 2019
20. **Y. Li**, Z. Yang, Y. Wang, X. Cao, X. Xu. "A Neural Network Approach to Analyze Cross-sections of Muscle Fibers in pathological images," Computers in Biology and Medicine", **Computers in Biology and Medicine**, 2018
21. **Y. Li**, S. O'Reilly, D. Plyku, S.T. Treves, Y. Du, F.H. Fahey, X. Cao, A.K. Jha, G. Sgouros, W.E. Bolch, and E.C. Frey . "A Projection Image Database to Investigate Factors Affecting Image Quality in Weight-based Dosing: Application to Pediatric Renal SPECT", **Physics in Medicine and Biology**, 2018
22. E. Ghodoosi, C. D'Alessandria, **Y. Li**, A. Bartel, M. Köhner, V. Höllriegl, N. Navab, M. Eiber, W. Li, E.C. Frey, S. Ziegler. "The Effect of Attenuation Map, Scatter Energy Window Width, and Volume of Interest on the Calibration Factor Calculation in Quantitative 177Lu SPECT Imaging: Simulation and Phantom Study", **Medica Physica**, 2018
23. F.H. Fahey, A.B. Goodkind, D. Plyku, K. Khamwan, S.E. O'Reilly, X. Cao, E.C. Frey, **Y. Li**, W.E. Bolch, G.Sgouros, S.T. Treves. "Dose Estimation in Pediatric Nuclear Medicine", **Seminars in Nuclear Medicine**, 2017

Fellowships & Awards

Fully Funded Graduate Assistantship 2014 - 2020
Division of Medical Imaging Physics, JHU SOM

ECE Graduate Fellowship 2014 - 2020
ECE, JHU

Outstanding Undergraduate Research Award 2013
NPRE, UIUC

Coursework

ECE 651: Random Signal Analysis
ECE 435: Digital Signal Processing
ECE 433: Medical Image Analysis
ECE 414: Image Processing and Analysis
ECE 432: Medical Imaging Systems
CS 476: Machine Learning
CS 485: Probabilistic Models of the Visual Cortex
ECE 434: Modern Biomedical Imaging Instrumentation and Techniques
ECE 648: Compressed Sensing and Sparse Recovery
AMS 431: Introduction to Statistics

Teaching Experiences

Medical Image Analysis Fall 2017
Teaching Assistant (Prof. Jerry Prince)
Developed the course final project that covers inter-modality registration, segmentation, and visualization.

Image Processing and Analysis Fall 2015
Teaching Assistant (Prof. John Goutsias)

Skills

Programming Languages: Python, C/C++,
Libraries: Pytorch, Tensorflow