Lu Zhang

CONTACT INFORMATION

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RESEARCH INTERESTS

- **Artificial Intelligence (AI), Brain Inspired AI**
  Leveraging insights from neuroscience to design effective, efficient, and trustworthy Artificial Intelligence systems.
- **Neuroimaging, Computational Neuroscience**
  Leveraging AI technologies to deepen our understanding of the fundamental organization principles of the brain, as well as to investigate diverse brain disorders, including Alzheimer's disease and Autism.

EDUCATION

Ph.D. in Computer Science and Engineering, advised by Dr. Dajiang Zhu   2018 – present
University of Texas at Arlington, Texas, USA

M.S. in Computer Science and Technology, advised by Dr. Xiaoan Li   2015 – 2018
Northwestern Polytechnical University, Xi'an, China

B.S. in Computer Science and Technology   2011 – 2015
Northwestern Polytechnical University, Xi'an, China

AWARDS and HONORS

- Trainee Professional Development Award (TPDA) at SfN   2023
- NIH-MICCAI STudent-Author Registration (STAR) Award   2023
- The ICMA PhD Fellowship Award (**5 Fellows Elected Annually World-wide**)   2023
- MICCAI 2020 Young Scientist Award (**Best Paper Award, Rate: 4/1809=0.2%**)   2020
- MICCAI 2020 Student Travel Award   2020
- MMML **Best Oral Paper Award (Rate: 10%)**   2019
- UTA Doctoral Student Research and Travel Grant Award   2019

GRANTS

- **Applied independently for the 2022 NIH Director's Early Independence Awards (DP5) as the sole Principal Investigator (PI).**
- NIH R01AG075582 Total Funding Amount: $2,708,267 over 5 years (a main contributor)
- NIH RF1NS128534 Total Funding Amount: $2,867,032 over 5 years (a main contributor)
  ($1,686,621 for the first three years, the 4th and 5th years of support will be funded contingent upon administrative progress review)

PUBLICATIONS

Journal Paper

7. [**Meta-Radiology'23**] Lin Zhao*, **Lu Zhang***, Zihao Wu, Yuzhong Chen, Haixing Dai, Xiaowei Yu, Zhengliang Liu, Tuo Zhang, Xintao Hu, Xi Jiang, Xiang Li, Dajiang Zhu, Dinggang Shen, Tianming Liu. When brain-inspired ai meets agi. *Meta-Radiology.* *** co-first authors**

6. [**MIA'22**] **Lu Zhang**, Li Wang and Dajiang Zhu. Predicting brain structural network using functional connectivity. *Medical Image Analysis.* (**Impact Factor: 13.828**)

5. [**Cerebral Cortex'22**] **Lu Zhang**, Lin Zhao, David Liu, Zihao Wu, Xianqiao Wang, Tianming Liu and Dajiang Zhu. Cortex2vector: Anatomical Embedding of Cortical Folding Patterns. *Cerebral Cortex.* (**Impact Factor: 5.998**)

4. [**MIA'21**] **Lu Zhang**, Li Wang, Jean Gao, Shannon L. Risacher, Jingwen Yan, Gang Li, Tianming Liu and Dajiang Zhu. Deep fusion of brain structure-function in mild cognitive impairment. *Medical Image Analysis.* (**Impact Factor: 13.828**)

3. [**TNNLS'23**] Yuzhong Chen, Zhenxiang Xiao, Yu Du, Lin Zhao, **Lu Zhang**, Zihao Wu, David Weizhong Liu, Dajiang Zhu, Tuo Zhang, Xintao Hu, Tianming Liu, Senior Member, IEEE, and Xi Jiang, A Unified and Biologically-Plausible Relational Graph Representation of Vision Transformers. *IEEE Transactions on Neural Networks and Learning Systems.* (**Impact Factor: 14.255**)

2. [**Cerebral Cortex'23**] Songyao Zhang, Tuo Zhang, Zhibin He, Xiao Li, **Lu Zhang**, Dajiang Zhu, Xi Jiang, Tianming Liu, Junwei Han, Lei Guo. Gyral peaks and patterns in human brains. *Cerebral Cortex.* (**Impact Factor: 5.998**)

1. [**IEEE TCDS'23**] Lin Zhao, Haixing Dai, Zihao Wu, Zhenxiang Xiao, **Lu Zhang**, David Weizhong Liu, Xintao Hu, Xi Jiang, Sheng Li, Dajiang Zhu, and Tianming Liu. Coupling Visual Semantics of Artificial Neural Networks and Human Brain Function via Synchronized Activations. *IEEE Transactions on Cognitive and Developmental Systems.* (**Impact Factor: 4.546**)

Manuscripts

3. [**TNNLS'23**] **Lu Zhang**, Zhengwang Wu, Xiaowei Yu, Yanjun Lyu, Haixing Dai, Lin Zhao, Li Wang, Gang Li, Xianqiao Wang, Tianming Liu, Dajiang Zhu. Learning Lifespan Brain Anatomical Correspondence via Cortical Developmental Continuity Transfer. *IEEE Transactions on Neural Networks and Learning Systems.* (**Impact Factor: 14.255**) (Under review)

2. [**TPAMI'23**] Xiaowei Yu*, **Lu Zhang***, Haixing Dai, Yanjun Lyu, Lin Zhao, Zihao Wu, David Liu, Tianming Liu and Dajiang Zhu. Core-Periphery Principle Guided Redesign of Self-Attention in Transformers. *IEEE Transactions on Pattern Analysis and Machine Intelligence.* *** co-first authors** (**Impact Factor: 24.314**) (Under review)

1. [**TMM'23**] **Lu Zhang***, Haixing Dai*, Lin Zhao, Xiaowei Yu, Zihao Wu, Yanjun Lyu, Zhengliang Liu, Changying Li, Dajiang Zhu, Tianming Liu. STree-E: Hierarchical Semantic Tree Embedding for Image Understanding. *IEEE Transaction on Multimedia,* *** co-first authors**. (**Impact Factor: 8.182**) (Under review)

Conference Paper

9. [**MICCAI'23**] **Lu Zhang**, Saiyang Na, Tianming Liu, Dajiang Zhu and Junzhou Huang. Multimodal Deep Fusion in Hyperbolic Space for Mild Cognitive Impairment Study. *The 26th International Conference on Medical Image Computing and Computer-Assisted Intervention* (**MICCAI**). (**Early Accepted, Rate: 13.6%; NIH-MICCAI STudent-Author Registration (STAR) Award; Oral**)

8. [**ISBI'23**] **Lu Zhang**, Xiaowei Yu, Yanjun Lyu, Tianming Liu, and Dajiang Zhu. Representative Functional Connectivity Learning for Multiple Clinical Groups in Alzheimer's Disease. *IEEE 20th International Symposium on Biomedical Imaging* (**ISBI**).

7. [**MICCAI'20**] **Lu Zhang**, Li Wang, and Dajiang Zhu. Recovering brain structural connectivity from functional connectivity via multi-gcn based generative adversarial network. *The 23th International Conference on Medical Image Computing and Computer-Assisted Intervention* (**MICCAI**). (**Young Scientist Award (Best Paper Award), Rate: 4/1809=0.2%**)

6. [**ISBI'20**] **Lu Zhang**, Li Wang, and Dajiang Zhu. Jointly Analyzing Alzheimer's Disease Related Structure-Function Using Deep Cross-Model Attention Network. *IEEE 17th International Symposium on Biomedical Imaging* (**ISBI**). (**Oral**)

5. [**MICCAI'23**] Xiang Gao, **Lu Zhang**, Dajiang Zhu, Xiangmin Xu and Xin Zhang. Predicting Diverse Functional Connectivity from Structural Connectivity Based on Multi-Contexts Discriminator GAN. *The 26th International Conference on Medical Image Computing and Computer-Assisted Intervention* (**MICCAI**).(**Early Accepted, Rate: 13.6%**)

4. [**ISBI'23**] Xiaowei Yu, **Lu Zhang**, Yanjun Lyu, Tianming Liu, and Dajiang Zhu. Supervised Deep Tree in Alzheimer's Disease. *IEEE 20th International Symposium on Biomedical Imaging* (**ISBI**).

3. [**MICCAI'22**] Xiaowei Yu, Dan Hu, **Lu Zhang**, Ying Huang, Zhengwang Wu, Tianming Liu, Li Wang, Weili Lin, Dajiang Zhu, Gang Li. Longitudinal Infant Functional Connectivity Prediction via Conditional Intensive Triplet Network. *The 25th International Conference on Medical Image Computing and Computer-Assisted Intervention* (**MICCAI**).

2. [**ISBI'20**] Li Wang, **Lu Zhang**, and Dajiang Zhu. Learning Latent Structure Over Deep Fusion Model of Mild Cognitive Impairment. *IEEE 17th International Symposium on Biomedical Imaging* (**ISBI**).

1. [**ISBI'19**] Li Wang, **Lu Zhang**, and Dajiang Zhu. Accessing Latent Connectome of Mild Cognitive Impairment via Discriminant Structure Learning. *IEEE 16th International Symposium on Biomedical Imaging* (**ISBI**).

Workshop Paper

3. [**MLMI'19**] **Lu Zhang**, Akib Zaman, Li Wang, Jingwen Yan and Dajiang Zhu. A Cascaded Multi-Modality Analysis in Mild Cognitive Impairment. *10th International Workshop on Machine Learning in Medical Imaging held in Conjunction with MICCAI* (**MLMI**).

2. [**MLMI'22**] Haixing Dai, Qing Li, Lin Zhao, Liming Pan, Cheng Shi, Zhengliang Liu, Zihao Wu, **Lu Zhang**, Shijie Zhao, Xia Wu, Tianming Liu, Dajiang Zhu. Graph Representation Neural Architecture Search for Optimal Spatial/Temporal Functional Brain Network Decomposition. *13th International Workshop on Machine Learning in Medical Imaging held in Conjunction with MICCAI* (**MLMI**).

1. [**MMMI'19**] Akib Zaman, **Lu Zhang**, Jingwen Yan and Dajiang Zhu. Multi-Modal Image Prediction via Spatial Hybrid U-Net. *1st International Workshop on Multiscale Multimodal Medical Imaging held in Conjunction with MICCAI* (**MMMI**). (**Best Oral Paper, Rate:10%**)

Abstract

3. [**SfN'23**] **Lu Zhang**, Xiaowei Yu, Yanjun Lyu. and Dajiang Zhu. Unveiling the Complexity of Cortical Folding: Introducing a Novel Graphical Representation Pipeline. *Society for Neuroscience.* (**Trainee Professional Development Award (TPDA)**)

2. [**SfN'22**] **Lu Zhang**, Li Wang, Xiaowei Yu, Yanjun Lyu. and Dajiang Zhu. Modeling Alzheimer's progression by supervised deep tree. *Society for Neuroscience.*

1. [**Alzheimer's & Dementia'21**] Xiaowei Yu, Norman Scheel, **Lu Zhang**, David C. Zhu, Rong Zhang, and Dajiang Zhu. Free water in T2 FLAIR white matter hyperintensity lesions. *Alzheimer's & Dementia*, 17, p.e057398.

Pre-print Paper

7. Xiang Li, **Lu Zhang**, Zihao Wu, Zhengliang Liu, Lin Zhao, Yixuan Yuan, Jun Liu, Gang Li, Dajiang Zhu, Pingkuan Yan, Quanzheng Li, Wei Liu, Tianming Liu, Dinggang Shen, (2023). Artificial General Intelligence for Medical Imaging. arXiv preprint arXiv:2306.05480.

6. Zhenxiang Xiao, Yuzhong Chen, **Lu Zhang**, Junjie Yao, Zihao Wu, Xiaowei Yu, Yi Pan, Lin Zhao, Chong Ma, Xinyu Liu, Wei Liu, Xiang Li, Yixuan Yuan, Dinggang Shen, Dajiang Zhu, Tianming Liu, Xi Jiang, (2023). Instruction-vit: Multi-modal prompts for instruction learning in vit. arXiv preprint arXiv:2305.00201.

5. Zihao Wu*, **Lu Zhang***, Chao Cao*, Xiaowei Yu, Haixing Dai, Chong Ma, Zhengliang Liu, Lin Zhao, Gang Li, Wei Liu, Quanzheng Li, Dinggang Shen, Xiang Li, Dajiang Zhu, Tianming Liu, (2023). Exploring the trade-offs: Unified large language models vs local fine-tuned models for highly-specific radiology NLI task. arXiv preprint arXiv:2304.09138. *** co-first authors**.

4. Lian Zhang, Zhengliang Liu, **Lu Zhang**, Zihao Wu, Xiaowei Yu, Jason Holmes, Hongying Feng, Haixing Dai, Xiang Li, Quanzheng Li, Dajiang Zhu, Tianming Liu, Wei Liu, (2023). Segment Anything Model (SAM) for Radiation Oncology. arXiv preprint arXiv:2306.11730.

3. Xiaowei Yu, **Lu Zhang**, Lin Zhao, Yanjun Lyu, Tianming Liu, and Dajiang Zhu, (2022). Disentangling Spatial-Temporal Functional Brain Networks via Twin-Transformers. arXiv preprint arXiv:2204.09225.

2. Chong Ma, Lin Zhao, Yuzhong Chen, **Lu Zhang**, Zhenxiang Xiao, Haixing Dai, David Liu, Zihao Wu, Zhengliang Liu, Sheng Wang, Jiaxing Gao, Changhe Li, Xi Jiang, Tuo Zhang, Qian Wang, Dinggang Shen, Dajiang Zhu, Tianming Liu, (2022). Eye-gaze-guided Vision Transformer for Rectifying Shortcut Learning. arXiv preprint arXiv:2205.12466.

1. Heng Huang, Lin Zhao, Xintao Hu, Haixing Dai, **Lu Zhang**, Dajiang Zhu, Tianming Liu, (2022). BIAVAN: Brain inspired Adversarial Visual Attention Network. arXiv preprint arXiv:2210.15790.

TEACHING

TA Experience

- UTA, CSE5350, Computer Architecture II   Fall 2021
- UTA, CSE6331, Cloud Computing   Summer 2021
- UTA, CSE6363, Machine Learning   Spring 2021
- UTA, CSE6363, Machine Learning   Fall 2020
- UTA, CSE4344/5344, Computer Network Organization   Summer 2020
- UTA, CSE6363, Machine Learning   Spring 2020
- UTA, CSE6363, Machine Learning   Fall 2019
- UTA, CSE5334/4334, Data Mining   Spring 2019

Volunteer Service

- I volunteered as a weekly tutor for families experiencing financial hardship for 6 months during my undergraduate stage. 2012

ACADEMIC SERVICES

Academic Conference/Workshop Organizer

- The leading organizer of international workshop, IAIHI, held in conjunction with the international conference on Brain Informatics (BI 2023) 08/2023
- Invited as an Area Chair at the 16th international conference on Brain Informatics (BI 2023) 08/2023
- Program Committee at the 16th international conference on Brain Informatics (BI 2023) 08/2023

Conference Reviewer

- The 23th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) 2020
- The 24th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) 2021
- The 18th IEEE International Symposium on Biomedical Imaging (ISBI) 2021
- The 25th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) 2022
- The 39th International Conference on Machine Learning (ICML) 2022
- The 37th AAAI Conference on Artificial Intelligence (AAAI) 2023
- The 26th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) 2023
- The 38th AAAI Conference on Artificial Intelligence (AAAI) 2024

Journal Reviewer

- IEEE Transactions on Medical Imaging (TMI)
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- Cerebral Cortex
- Frontiers in Human Neuroscience
- Journal of Biomedical and Health Informatics
- Frontiers in Computational Neuroscience
- Machine Intelligence Research

INVITED TALKS

- Invited talk about "Applying Deep Neural Networks to Study the Brain Networks" at Stevens Institute of Technology 03/2023
- Invited talk about "Brain Structural and Functional Networks" at Harvard Medical School 06/2022
- Invited talk about "Some Thoughts on My PhD Training" at University of Texas at Arlington 03/2021
- Guest lecture about "Hierarchical Semantic Tree Embedding for Image Understanding" (UTA CSE 6363) 04/2022
- Guest lecture about "Recurrent Neural Network and Transformer" (UTA CSE 6363) 11/2021