Ran Liu

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EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY (GT) Atlanta, GA
Ph.D. in Machine Learning w/ minor in Statistics Aug 2019 - Aug 2024

FUDAN UNIVERSITY Shanghai, China
B.S. in Physics Sep 2015 - Jun 2019

SELECTED EXPERIENCES

GT - NEURAL DATA SCIENCE LAB Atlanta, GA
Graduate Research Assistant Jan 2020 - Present
- Developed novel **self-supervised methods** and **generative learning methods** to study brain imagery and neural activities
- Proposed a **multitask U-Net** to perform fine-scale segmentation of brain's microstructure and classification of brain areas
- Developed **deep learning interpretation techniques** to explain low-dimensional latent representation of deep nets

FACEBOOK, INC. Menlo Park, CA
Research Intern at Physical modeling team May 2021 - Aug 2021
- Applied deep learning model **U-Net** to study partial differential equation and the related physical effect on hardware
- The proposed model was put on the infrastructure team roadmap and was planned to be put into production

GT - SOCIAL AND LANGUAGE TECHNOLOGIES LAB Atlanta, GA
Graduate Research Assistant Aug 2019 - Jan 2020
- Applied state-of-the-art language model **BERT** on a classification task of discourse acts and achieved **record-high F1 score**
- Conducted **temporal modeling** of controversial posts' discussion structures with linguistic analysis of discourse acts

FUDAN - THE INSTITUTE OF BIG DATA Shanghai, China
Research Intern Jul 2018 - Jun 2019
- Constructed **hierarchical information graph** based on user connection and geo-location from a self-crawled Twitter dataset
- Conducted **community detection** with a fast unfolding algorithm and designed a **heterogeneous recommendation system**
- Analytically derived the Laplacian spectrums of several scale-free complex networks with identical degree sequence

PUBLICATIONS

• **R. Liu**, M. Azabou, M. Dabagia, C-H. Lin, M. Gheshlaghi Azar, K. B. Hengen, M. Valko, E. L. Dyer. **Drop, Swap, and Generate: A Self-Supervised Approach for Generating Neural Activity**. In Conference on Neural Information Processing Systems (**NeurIPS 2021**) **(oral presentation: top 1%)** [**Paper**] [**Webpage**] [**Code**]
• M. Azabou, M. Gheshlaghi Azar, **R. Liu**, C-H. Lin, E.C. Johnson, K. Bhaskharan-Nair, M. Dabagia, K.B. Hengen, W. Gray-Roncal, M. Valko, E. Dyer. **Mine Your Own vieW: Self-supervised learning through across-sample prediction** [**Paper**] [**Code**]
• A. Balwani, J. Miano, **R. Liu**, L. Kitchell, J. Prasad, E. Johnson, W. Gray-Roncal, E. Dyer. **Multi-scale modeling of neural structure in X-ray imagery** In Conference on Image Processing (**ICIP 2021**). [**Paper**]
• **R. Liu**, C. Subakan, A. H. Balwani, J. Whitesell, J. Harris, S. Koyejo, E. Dyer. **A generative modeling approach for interpreting population-level variability in brain structure**. In International Conference on Medical Image Computing and Computer Assisted Intervention **(MICCAI 2020)** [**Paper**] [**Webpage**]
• C. Huang, B. Zhou, H. Zhang, B. Yang, **R. Liu**, et al. **Proximity-induced surface superconductivity in Dirac semimetal Cd_3As_2**. In **Nature Communications** (May 2019) [**Paper**]
• C. Zhang, Y. Zhang, X. Yuan, S. Lu, J. Zhang, A. Narayan, Y. Liu, H. Zhang, Z. Ni, **R. Liu**, et al. **Quantum Hall effect based on Weyl orbits in Cd_3As_2**. In **Nature** (Dec 2018) [**Paper**]
• C. Huang, A. Narayan, E. Zhang, Y. Liu, X. Yan, J. Wang, C. Zhang, W. Wang, T. Zhou, C. Yi, S. Liu, J. Ling, H. Zhang, **R. Liu**, et al. **Inducing Strong Superconductivity in WTe_2 by Proximity Effect**. In **ACS nano** (Jun 2018) [**Paper**]

SKILLS

- **Programming Languages:** Python, C/C++, MATLAB, SQL, LaTeX, CSS, JavaScript
- **Open Source Libraries:** PyTorch, TensorFlow, Keras, scikit-learn, OpenCV, Gensim

LEADERSHIP AND HONORS

- GT - Cox Fellowship 2019 - 2020
- China National Scholarship (highest undergraduate scholarship nationally) 2018
- Outstanding Leadership Awards (honored to 10 student activity organizers per year) 2018