RAN LIU

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EDUCATION

Georgia Institute of Technology, Atlanta, GA — Aug 2019 - Present
Ph.D. student in Computer Engineering (minor in Computer Science)

Fudan University, Shanghai, China — Sep 2015 - Jun 2019
Bachelor of Science in Physics — GPA: 3.6/4.0

University of California, Berkeley, Berkeley, CA — Jan 2017 - May 2017
Exchange Student in Physics — GPA: 3.9/4.0

RESEARCH EXPERIENCES (SELECTED)

Project: Structure Modeling and Prediction of Controversial Posts — Aug 2019 - Present
Advisor: Prof. Diyi Yang, School of Interactive Computing, Georgia Institute of Technology

- Developed and applied state-of-the-art machine learning models (including BERT, BiLSTM, CRF, etc.) on a classification task of discourse acts and achieved record-high F1 score.
- Designed and extracted domain knowledge features about controversy-causing posts and employed those features on an early prediction task.
- Conducted temporal modeling of controversial posts' discussion structures with linguistic analysis of discourse acts and feature engineering results.

Project: Link Recommendation Based on Hierarchical Graph Analysis — Jan 2019 - Jun 2019
Advisor: Prof. Deqing Yang, School of Data Science, Fudan University

- Constructed hierarchical information graph based on user connection and geo-location from a self-crawled Twitter dataset.
- Conducted community detection based on modified fast unfolding algorithm.
- Designed a heterogeneous recommendation system via link prediction algorithms (including Neural Collaborative Filtering and Factorization Machine).

Project: Characteristic Analysis of Complex Networks — Jul 2018 - Jan 2019
Advisor: Prof. Zhongzhi Zhang, School of Computer Science, Fudan University

- Analytically derived the Laplacian spectrums of several special scale-free complex networks with identical degree sequence.
- Calculated characteristic invariants (including the spanning trees enumeration) of the studied complex networks related to consensus problem.
- Obtained the relationship between power-law degree distribution and consensus behavior on scale-free networks via the differences between fractal and non-fractal complex networks.

Project: Design of Advanced Two-dimensional Electronics — Jun 2018 - Oct 2018
Advisor: Prof. Xiaodong Xu, Department of Electrical Engineering, University of Washington

- Fabricated Van der Waals heterostructures up to seven layers.
- Built dual-gated tunnel junctions based on few-layer h-BN and few-layer CrI_3 as tunneling barriers and investigated the Landau level quantization of monolayer graphene contact.
- Built magnetic tunnel junctions based on novel ferromagnetic electrodes Fe_5GeTe_2 and explored its thickness-dependent hysteresis.

Project: Investigation on Physical Properties of Innovative Nanodevices — May 2017 - May 2018
Advisor: Prof. Faxian Xiu, Department of Physics, Fudan University

- Discovered a new type of quantum Hall effect in wedge-like Cd_3As_2 thin films (see Publications).
- Explored proximity-induced Fermi-arc superconductivity in Nb/Cd_3As_2 heterostructures and supercurrent in Nb/Cd_3As_2/Nb Josephson junctions (see Publications).
- Fabricated $NbSe_2$/WTe_2 hybrid structures and investigated the proximity-induced superconductivity in topological Weyl materials (see Publications).

PUBLICATIONS

C. Huang, B. Zhou, H. Zhang, B. Yang, **R. Liu**, et al. "Proximity-induced surface superconductivity in Dirac semimetal Cd_3As_2", **Nature Communications**, May. 2019.

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", **Nature**, Jan. 2019.

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", **ACS nano**, June 2018.

AWARDS AND HONORS

Georgia Tech ECE Fellowship 2019

China National Scholarship | highest undergraduate scholarship nationally 2018

Chun-Tsung Scholar | honored by Chinese Undergraduate Research Endowment(CURE), awarded to less than 400 undergraduates nationally since its foundation 2018

First Prize of Outstanding Students Scholarship | awarded to top 5% 2016

Outstanding Leadership Awards | honored to 10 student activity organizers per year 2018

TEACHING EXPERIENCE

Graduate Teaching Assistant at Georgia Institute of Technology 2019 Fall
Introduction to Signal Processing | Electrical and Computer Engineering

SKILLS

Programming Languages	Python, MATLAB, SQL, C/C++
Open Source Libraries	PyTorch, Keras, TensorFlow, scikit-learn, Gensim, NLTK, etc.

LEADERSHIP ACTIVITIES

Vice President at the Student Union of Physics Department 2017 - 2018

Student Representative at Fudan University 2016 - 2017

Senior Student Manager at Shanghai Fudan Guanghua Information Technology Co., Ltd. 2016 - 2017

Online Education Support at Technology and Education: Connecting Cultures (TECC) 2016 - 2017

Voluntary Education Support in Henan Province 2016