

Guanchu (Gary) Wang

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Research Interests & Highlights [Google Scholar]

My research centers on artificial intelligence (AI), machine learning (ML), including the following topics:

- **Trustworthy Artificial Intelligence:** Interpretable AI, Explainable AI, ML Safety and Fairness.
- **Large Language Models (LLM):** LLM interpretability/Reasoning, Retrieval-augmented Generation.
- **Health Informatics:** AI for Healthcare, Fairness in Healthcare.

The highlights of my research are as follows:

- **CIKM'22 Best Demo Award, CIKM'23 Best Demo Honorable Mention, ICML'22 Spotlight.**
- 23 peer-reviewed research papers (12 first-author) published in top venues.
- 650 citations; h-index: 12; i10-index: 13; Ken Kennedy Institute Fellowship.

Education

Rice University Ph.D. candidate in Computer Science, Advisor: Dr. Xia (Ben) Hu and Dr. Vladimir Braverman	<i>Aug 2020 - May 2025 (expected)</i>
University of Science and Technology of China M.S. in Electrical and Computer Engineering, Advisor: Dr. Chen Gong and Dr. Zhengyuan Xu	<i>Sep 2016 - May 2019</i>
Dalian University of Technology B.S. in Electrical and Computer Engineering	<i>Sep 2012 - May 2016</i>

Publications [Google Scholar]

Conference and Journal Publications: (* denotes equal contributions)

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|--------------------|---|
| [ICML' 24] | TVE: Learning Meta-attribution for Transferable Vision Explainer
Guanchu Wang , Yu-Neng Chuang, Fan Yang, Mengnan Du, Chia-Yuan Chang, Shaochen Zhong, Zirui Liu, Zhaozhuo Xu, Kaixiong Zhou, Xuanting Cai, Xia Hu |
| [ICML' 23] | DIVISION: Memory Efficient Training via Dual Activation Precision
Guanchu Wang , Zirui Liu, Zhimeng Jiang, Ninghao Liu, Na Zou, Xia Hu |
| [ECML' 23] | Mitigating Algorithmic Bias with Limited Annotations
Guanchu Wang , Mengnan Du, Ninghao Liu, Na Zou, Xia Hu |
| [ICML' 22] | Accelerating Shapley Explanation via Contributive Cooperator Selection
Guanchu Wang , Yu-Neng Chuang, Mengnan Du, Fan Yang, Quan Zhou, Pushkar Tripathi, Xuanting Cai, Xia Hu
Spotlight Paper |
| [EMNLP' 24] | Secured Weight Release for Large Language Models via Taylor Expansion
Guanchu Wang* , Yu-Neng Chuang*, Ruixiang Tang, Shaochen Zhong, Jiayi Yuan, Hongye Jin, Zirui Liu, Vipin Chaudhary, Shuai Xu, James Caverlee, Xia Hu |
| [ICLR' 23] | CoRTX: Contrastive Learning for Real-time Explanations
Guanchu Wang* , Yu-Neng Chuang*, Fan Yang, Quan Zhou, Pushkar Tripathi, Xuanting Cai, Xia Hu |

- [NeurIPS' 23]** **Winner-Take-All Column Row Sampling for Memory Efficient Adaptation of Language Model**
Guanchu Wang*, Zirui Liu*, Shaochen Zhong, Zhaozhuo Xu, Daochen Zha, Ruixiang Tang, Zhimeng Jiang, Kaixiong Zhou, Vipin Chaudhary, Shuai Xu, Xia Hu
- [CIKM' 22 Demo]** **BED: A Real-Time Object Detection System for Edge Devices**
Guanchu Wang*, Zaid Pervaiz Bhat*, Zhimeng Jiang*, Yi-Wei Chen*, Daochen Zha*, Alfredo Costilla Reyes*, Afshin Niktash, Gorkem Ulkar, Erman Okman, Xuanting Cai, Xia Hu
Best Demo Award
- [TKDD' 23]** **Efficient GNN Explanation via Learning Removal-based Attribution**
Yao Rong, **Guanchu Wang**, Qizhang Feng, Ninghao Liu, Zirui Liu, Enkelejda Kasneci, Xia Hu
ACM Transactions on Knowledge Discovery from Data
- [CIKM' 23 Demo]** **DiscoverPath: A Knowledge Refinement and Retrieval System for Interdisciplinarity on Biomedical Research**
Yu-neng Chuang, **Guanchu Wang**, Chia-Yuan Zhang, Kwei-Herng Lai, Ruixiang Tang, Fan Yang, Alfredo Costilla-Reyes, Kaixiong Zhou, Xiaoqian Jiang and Xia Hu
Best Demo Final-list
- [EMNLP' 24 Findings]** **KV Cache Compression, But What Must We Give in Return? A Comprehensive Benchmark of Long Context Capable Approaches**
Jiayi Yuan, Hongyi Liu, Shaochen Zhong, Yu-Neng Chuang, Songchen Li, **Guanchu Wang**, Duy Le, Hongye Jin, Vipin Chaudhary, Zhaozhuo Xu, Zirui Liu, Xia Hu
- [NeurIPS' 23]** **Chasing Fairness under Distribution Shift: a Model Weight Perturbation Approach**
Zhimeng Jiang, Xiaotian Han, Hongye Jin, **Guanchu Wang**, Rui Chen, Na Zou, Xia Hu
- [NeurIPS' 21]** **Fairness via Representation Neutralization**
Mengnan Du, Subhabrata Mukherjee, **Guanchu Wang**, Ruixiang Tang, Ahmed Hassan Awadallah, Xia Hu
- [NeurIPS' 21]** **Revisiting Time Series Outlier Detection: Definitions and Benchmarks**
Kwei-Herng Lai, Daochen Zha, Junjie Xu, Yue Zhao, **Guanchu Wang**, Xia Hu
- [IJCNN' 21]** **Learning Transitional Skills with Intrinsic Motivation**
Qiangxing Tian, Jinxin Liu, **Guanchu Wang**, Donglin Wang
- [AAAI' 21 Demo]** **TODS: An Automated Time Series Outlier Detection System**
Kwei-Herng Lai, Daochen Zha, **Guanchu Wang**, Junjie Xu, Yue Zhao, Junjie Xu, Yue Zhao, Devesh Kumar, Yile Chen, Purav Zumkhawaka, Minyang Wan, Diego Martinez, Xia Hu
- [IJCAI' 20]** **Independent Skill Transfer for Deep Reinforcement Learning**
Qiangxing Tian, **Guanchu Wang**, Jinxin Liu, Donglin Wang
- [JOCN' 23]** **Graph-based Conflict-free MAC Protocol and Conflict Analysis for Two-layer Ultraviolet Communication Network**
Yuchen Pan, **Guanchu Wang**, Yubo Zhang, Jingyin Tang, Chen Gong, Zhengyuan Xu
IEEE Journal of Optical Communications and Networking
- [TCOM' 21]** **On the Achievable Rate and Capacity for a Sample-based Practical Photon-counting Receiver**
Zhimeng Jiang, Chen Gong, **Guanchu Wang**, Zhengyuan Xu
IEEE Transaction on Communication
- [PJ' 19]** **Multi-layer Superimposed Transmission for Optical Wireless Scattering Communication**

Guanchu Wang, Chen Gong, Zhimeng Jiang, Zhengyuan Xu
IEEE Photonics Journal

[TCOM' 18] **Signal Characterization for Multiple Access Non-line of Sight Scattering Communication**
Guanchu Wang, Chen Gong, Zhengyuan Xu
IEEE Transaction on Communication

[PJ' 18] **A 1Mbps Real-time NLOS UV Scattering Communication System with Receiver Diversity over 1km**
Guanchu Wang, Kun Wang, Chen Gong, Difan Zou, Zhimeng Jiang, Zhengyuan Xu IEEE Photonics Journal

[Globcom' 17] **Signal Detection and Achievable Rates for Multiple Access Optical Wireless Scattering Communication**
Guanchu Wang, Chen Gong, Zhengyuan Xu IEEE Global Communication Conference

Preprints:

[Under review, **NEJM-AI**] **Benchmarking Large Language Models for the Genetic Diagnosis of Rare Mendelian Diseases**
Guanchu Wang*, Matthew B. Neeley*, Guantong Qi*, Ruixiang Tang, Dongxue Mao, Chaozhong Liu, Sasidhar Pasupuleti, Bo Yuan, Fan Xia, Hugo Bellen, Pengfei Liu, Zhandong Liu, Xia Hu

[Under review, JBI] **Assessing and Enhancing Large Language Models in Rare Disease Question-answering**
Guanchu Wang, Junhao Ran, Ruixiang Tang, Chia-Yuan Chang, Yu-Neng Chuang, Zirui Liu, Vladimir Braverman, Zhandong Liu, Xia Hu **Under review of Journal of Biomedical Informatics**

[Under review, ARR] **FaithLM: Towards Faithful Explanations for Large Language Models**
Yu-Neng Chuang, **Guanchu Wang**, Chia-Yuan Chang, Ruixiang Tang, Shaochen Zhong, Fan Yang, Mengnan Du, Xuanting Cai, Xia Hu

[Under review, TMLR] **Understanding Different Design Choices in Training Large Time Series Models**
Yu-Neng Chuang*, Songchen Li*, Jiayi Yuan*, **Guanchu Wang***, Kwei-Herng Lai, Leisheng Yu, Sirui Ding, Chia-Yuan Chang, Qiaoyu Tan, Daochen Zha, Xia Hu

[Under review, AAAI] **LEMO: Learning Shapley Manifold from Feature Ablation**
Guanchu Wang, Yu-Neng Chuang, Huiyuan Chen, Yuzhong Chen, Zhimeng Jiang, Zirui Liu, Jiayi Yuan, Xia Hu

[Under review, KDD] **DISPEL: Domain Generalization via Domain-Specific Liberating**
Chia-Yuan Chang, Yu-Neng Chuang, **Guanchu Wang**, Mengnan Du, Na Zou

[Under review, TKDD] **Efficient XAI Techniques: A Taxonomic Survey**
Yu-Neng Chuang, **Guanchu Wang**, Fan Yang, Zirui Liu, Xuanting Cai, Mengnan Du, Xia Hu

Research Proposal Experimence

Health Equity and Access Responsible Transplanation

2024

PI: Dr. Cheryl Brown (UNC Charlotte), Dr. Felesia Stukes (HBCU), Dr. Na Zou (HSI), Dr. Xia Hu (RICE), Dr. Xiaoqian Jiang (UTHeath), Dr. Yafen Liang (UTHeath)

Status of Support: Current

Source of Support: AIM-AHEAD Programs

Contribution: Leading the project of knowledge graph-based search engine for biomedical research

ReDDDoT Phase 2: Responsible Multi-Modal AI Systems for Multi-Hazard Resilience and Situational Awareness 2024

PI: Dr. Jamie Padgett; Co-PI: Dr. Xia Hu

Status of Support: Current

Source of Support: National Science Foundation

Contribution: Proposal writing in research thrust: Foundational time-series models for hazard analysis

Collaborative Research: III: Medium: Towards Effective Detection and Mitigation for Shortcut Learning: A Data Modeling Framework 2023

PI: Dr. Xia Hu

Status of Support: Current

Source of Support: National Science Foundation

Contribution: Proposal writing in research objective: Shortcut detection via DNN interpretation

Awards

Invited Attendee to Future Leader Summit	Feb 2024
Best Demo Honorable Mention in CIKM' 23	Oct 2023
Ken Kennedy Institute Fellowship	Dec 2022
Best Demo Award in CIKM' 22	Oct 2022
Spotlight in ICML' 22	Sep 2022
Doctoral Forum Travel Award in SDM' 24	Mar 2024
Graduate Fellowship of Rice University	Aug 2021

Academic & Industrial Experience

Research Scientist Intern	May 2024 - Aug 2024
Mentor: Dr. Yuzhong Chen and Dr. Huiyuan Chen	VISA Research, Foster City, CA, USA
Industrial Collaboration with Visa	Aug 2023 - present
Mentor: Dr. Huiyuan Chen	
Industrial Collaboration with Meta Platforms	Aug 2021 - present
Mentor: Dr. Xuanning Cai	
Graduate Research Assistant	Aug 2021 - present
Advisor: Dr. Xia (Ben) Hu	Rice University, Houston, TX, USA
Research Assistant	Aug 2019 - Jan 2020
Advisor: Dr. Donglin Wang	Westlake University, Hangzhou, Zhejiang, P.R.C.

Teaching & Talks

Introduction to Information Retrieval	Spring 2023
Teaching Assistant	Rice University, Houston, TX, USA
Machine Learning with Graph	Spring 2022
Teaching Assistant	Rice University, Houston, TX, USA
Introduction of Large Language Models	Sep 2024
Guest Lecture in Graduate Research Seminar	Rice University, Houston, TX, USA
Efficient Algorithms of Shapley Values	Mar 2023
Guest Lecture in Graduate Seminar of CS Department	Rice University, Houston, TX, USA
Matrix Analysis	Fall 2018
Teaching Assistant	University of Science and Technology of China, P.R.C.

Mentorship

James Zhong Ph.D. Student, Rice University	Aug 2024 - now Uncertainty Quantification for Large Language Models
Haochen Zhang Ph.D. Student, Rice University	Aug 2024 - Dec 2024 Efficiency of Large Language Models
Junhao Ran M.S. Student, Rice University	May 2024 - Aug 2024 Large Language Models for Rare Disease Diagnosis
Lingxi Zhang Ph.D. Student, Rice University	May 2024 - Present Large Language Models for Text-style Transfer
Songchen Li M.S. Student, Rice University	Oct 2023 - July 2024 Foundational Models for Time-series Forecasting
Khushbu Pahwa Ph.D. Student, Rice University	Oct 2023 - Jan 2024 Large Language Models for Medical Applications
Yao Rong Ph.D. Student, Technical University of Munich	Aug 2022 - May 2023 Explainable Graph Neural Networks
Chia-yuan Chang Ph.D. Student, Texas A&M University	Aug 2022 - May 2023 Domain Generalization of Deep Neural Networks
Ryan Beckwith Undergraduate Student, Tufts University	June 2022 - Aug 2022 Medical Anomaly Detection
Yu-Neng Chuang Ph.D. Student, Rice University	Mar 2022 - Sep 2022 Real-time Explanations of Deep Neural Networks
Zaid Pervaiz Bhat M.S. Student, Texas A&M University	Sep 2021 - Jan 2022 Real-Time Object Detection on Edge Devices

Academic Services

Program Committee Member: NeurIPS, ICML, KDD, AAAI, SIGIR, CIKM.

Journal Reviewer: ACM TIST, TAI, TCDS; IEEE IS, CL.