# 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** *Aug 2020 - May 2025 (expected)*
Ph.D. candidate in Computer Science, Advisor: Dr. Xia (Ben) Hu and Dr. Vladimir Braverman

**University of Science and Technology of China** *Sep 2016 - May 2019*
M.S. in Electrical and Computer Engineering, Advisor: Dr. Chen Gong and Dr. Zhengyuan Xu

**Dalian University of Technology** *Sep 2012 - May 2016*
B.S. in Electrical and Computer Engineering

## Publications [Google Scholar]

**Conference and Journal Publications:** (∗ denotes equal contributions)

**[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

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|---|---|
| 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. Xuanting 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

**Junhao Ran** — *May 2024 - Aug 2024*
M.S. Student, Rice University — Large Language Models for Rare Disease Diagnosis

**Lingxi Zhang** — *May 2024 - Present*
Ph.D. Student, Rice University — Large Language Models for Text-style Transfer

**Songchen Li** — *Oct 2023 - July 2024*
M.S. Student, Rice University — Foundational Models for Time-series Forecasting

**Khushbu Pahwa** — *Oct 2023 - Jan 2024*
Ph.D. Student, Rice University — Large Language Models for Medical Applications

**Yao Rong** — *Aug 2022 - May 2023*
Ph.D. Student, Technical University of Munich — Explainable Graph Neural Networks

**Chia-yuan Chang** — *Aug 2022 - May 2023*
Ph.D. Student, Texas A&M University — Domain Generalization of Deep Neural Networks

**Ryan Beckwith** — *June 2022 - Aug 2022*
Undergraduate Student, Tufts University — Medical Anomaly Detection

**Yu-Neng Chuang** — *Mar 2022 - Sep 2022*
Ph.D. Student, Rice University — Real-time Explanations of Deep Neural Networks

**Zaid Pervaiz Bhat** — *Sep 2021 - Jan 2022*
M.S. Student, Texas A&M University — 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.

## Reference List

**Xia (Ben) Hu** — Associate Professor
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Address: 6100 Main Street, Houston, TX 77005 — Phone: 480-265-6388

**Vladimir Braverman** — Professor
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**Zhandong Liu**
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