Hejie Cui

Ph.D. Student
Department of Computer Science
Emory University

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Homepage: hejiecui.com

Research Interests

AI for Health: AI for multimodality in health and neuroscience including tabular, networks, images, texts, and dynamics.
Knowledge Extraction: language and vision knowledge extraction with large models, zero/few-shot reasoning.
Graph Machine Learning & Data Mining: structured knowledge mining, graph neural networks, interpretability and causality.

Education

Emory University, Atlanta, GA, USA — Sept 2019 – Present
Ph.D., Department of Computer Science
Emory Graph Mining Lab
Advisor: Prof. Carl J. Yang

Tongji University, Shanghai, CHINA — Sept 2015 – Jul 2019
B.E., School of Software Engineering
Advisor: Prof. Lin Zhang
GPA: 4.96/5.0, Rank: 1/164

Professional Experience

Microsoft Research, Redmond, WA, USA — May 2023 – Aug 2023
Research Intern @ Augmented Learning and Reasoning Group
Worked on bias-reduced graph recommendation.
Mentors: Tobias Schnabel, Jennifer Neville; Mengting Wan, Longqi Yang; Stojan Trajanovski, Lu Cao

Amazon, Seattle, WA, USA — May 2022 – Aug 2022
Applied Scientist Intern @ Product Knowledge Graph Team
Worked on multimodal attributed extraction for Amazon product knowledge graph construction.
Mentors: Rongmei Lin, Nasser Zalmout, Manager: Xian Li

Google, Remote — Jan 2022 – Apr 2022
Google's CS Research Mentorship Program
Discussed project ideas on GNN for retrieval and recommendation and initiated a research proposal.
Mentor: Masrour Zoghi

Emory University, Atlanta, GA, USA — Dec 2019 – May 2020
Rotation RA @ Information Retrieval Lab
Worked on graph-based scientific document retrieval.
Advisor: Prof. Eugene Agichtein

Queens University, Kingston, ON, CANADA — Jul 2018 – Oct 2018
Research Intern @ Perk Lab (The Laboratory for Percutaneous Surgery)
Worked on real-time web-cam video images classification.
Advisor: Prof. Gabor Fichtinger

Microsoft, Beijing, CHINA — Aug 2017 – Aug 2017
Visiting Student @ Microsoft Research Asia
Worked on the prototype of HoloLens mix reality applications.
Best work award for university summer camp Hackathon.

Honors and Awards

EECS Rising Star — 2023
KDD Student Travel Award — 2023
CHIL Student Travel Award — 2023

NeurIPS AI4Science Workshop Travel Award	2022
Emory University Laney Graduate Student Council Research Grant	2022
NSF Student Travel Grant Award	2022
MICCAI Student Travel Grant Award	2022
Award for CRA-WP Grad Cohort for Women	2021
Mitacs Globalink Research Award	2018
Valedictorian of the School of Software Engineering Class 2019, Tongji University	2019
Outstanding Graduates Award, the City of Shanghai	2019
Outstanding Graduates Award, Tongji University	2019
Best Work Award for Microsoft Student Camp Hackathon	2017
MCM: American Mathematical Contest in Modeling (Meritorious Winner)	2017
Tongji University Programming Competition (Silver Prize)	2017
National Scholarship	2017,2018,2019

Publications

* indicates equal contribution.

Google Scholar https://scholar.google.com/citations?user=r0Vh6GEAAAAJ&hl=en

Tutorials

[ICIBM 2023] **Brain Network Analysis with Graph Neural Network**
Hejie Cui, Xuan Kan, Xiaoxiao Li, Lifang He, Liang Zhan, Ying Guo, Carl Yang
*Tutorial at the International Conference on Intelligent Biology and Medicine (**ICIBM**), 2023*

Conference and Journal Papers

[NeurIPS 2023] **Open Visual Knowledge Extraction via Relation-Oriented Multimodality Model Prompting**
Hejie Cui, Xinyu Fang, Zihan Zhang, Ran Xu, Xuan Kan, Xin Liu, Manling Li, Yangqiu Song, Carl Yang
*Neural Information Processing Systems (**NeurIPS**),2023*

[PSB 2024] **BrainSTEAM: A Practical Pipeline for Connectome-based fMRI Analysis towards Subject Classification**
Alexis Li (Mentored High-Schooler), Owen Yang, **Hejie Cui**, Carl Yang
*Pacific Symposium on Biocomputing (**PSB**), **Oral**,2024*

[PSB 2024] **FedBrain: Federated Training of GNNs for Connectome-based Brain Imaging Analysis**
Yi Yang, Han Xie, **Hejie Cui**, Carl Yang
*Pacific Symposium on Biocomputing (**PSB**),2024*

[IEEE-BHI 2023] **Dynamic Brain Transformer with Multi-Level Attention for Functional Brain Network Analysis**
Xuan Kan, Tony Gu, **Hejie Cui**, Ying Guo, Carl Yang
*International Conference on Biomedical and Health Informatics (**IEEE-BHI**), 2023*

[KDD 2023] **R-Mixup: Riemannian Mixup for Biological Networks**
Xuan Kan, Zimu Li, **Hejie Cui**, Yue Yu, Ran Xu, Shaojun Yu, Zilong Zhang, Ying Guo, Carl Yang
*ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), 2023*

[ACL 2023] **PV2TEA: Patching Visual Modality to Textual-Established Information Extraction**
Hejie Cui, Rongmei Lin, Nasser Zalmout, Chenwei Zhang, Jingbo Shang, Carl Yang, Xian Li
*Annual Meeting of the Association for Computational Linguistics (**ACL-Findings**), 2023*
*KDD Workshop on Knowledge Augmented Methods for NLP (**KnowledgeNLP**), **Oral**, 2023*

[CHIL 2023] **PTGB: Pre-Train Graph Neural Networks for Brain Network Analysis**
Yi Yang, **Hejie Cui**, Carl Yang
*The Conference on Health, Inference, and Learning (**CHIL**), **Oral**, 2023*

[ISBI 2023] **Deep DAG Learning of Effective Brain Connectivity for fMRI Analysis**
Yue Yu, Xuan Kan, **Hejie Cui**, Ran Xu, Yujia Zheng, Xiangchen Song, Yanqiao Zhu, Kun Zhang, Razieh Nabi, Ying Guo, Chao Zhang, Carl Yang
*IEEE International Symposium on Biomedical Imaging (**ISBI**), 2023*

[ISBI 2023] **Transformer-based Hierarchical Clustering for Brain Network Analysis**
Wei Dai, **Hejie Cui**, Xuan Kan, Ying Guo, Sanne van Rooij, Carl Yang
*IEEE International Symposium on Biomedical Imaging (**ISBI**), 2023*

[AAAI 2023] **Neighborhood-regularized Self-Training for Learning with Few Labels**
Ran Xu, Yue Yu, **Hejie Cui**, Xuan Kan, Yanqiao Zhu, Joyce C. Ho, Chao Zhang, Carl Yang
*International Conference on Artificial Intelligence (**AAAI**), **Oral**, 2023*

[IEEE TMI] **BrainGB: A Benchmark for Brain Network Analysis with Graph Neural Networks**
Hejie Cui, Wei Dai, Yanqiao Zhu, Xuan Kan, Antonio Aodong Chen Gu, Joshua Lukemire, Liang Zhan, Lifang He, Ying Guo, Carl Yang
*IEEE Transactions on Medical Imaging (**TMI**), **IF: 11.037**, **117 GitHub Stars**, 2022*

[BIBM 2022] **Multi-View Brain Network Analysis with Cross-View Missing Network Generation**
Gongxu Luo, Chenyang Li, **Hejie Cui**, Lichao Sun, Lifang He, Carl Yang
*IEEE International Conference on Bioinformatics and Biomedicine (**BIBM**), 2022*

[NeurIPS 2022] **Brain Network Transformer**
Xuan Kan, Wei Dai, **Hejie Cui**, Zilong Zhang, Ying Guo, Carl Yang
*Proceedings of the Conference on Neural Information Processing Systems (**NeurIPS**), **Spotlight**, 2022*

[CIKM 2022] **On Positional and Structural Node Features for Graph Neural Networks on Non-attributed Graphs**
Hejie Cui, Zijie Lu, Pan Li, Carl Yang
*International Conference on Information and Knowledge Management (**CIKM** Short), **Spotlight**, 2022*

[KDD 2022] **Data-Efficient Brain Connectome Analysis via Multi-Task Meta-Learning**
Yi Yang*, Yanqiao Zhu*, **Hejie Cui**, Xuan Kan, Lifang He, Ying Guo, Carl Yang
*ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), 2022*

[MICCAI 2022] **Interpretable GNNs for Connectome-Based Brain Disorder Analysis**
Hejie Cui, Wei Dai, Yanqiao Zhu, Xiaoxiao Li, Lifang He, Carl Yang
*International Conference on Medical Image Computing & Computer-Assisted Intervention (**MICCAI**), **Oral**, 2022*

[EMBC 2022] **Joint Embedding of Structural and Functional Brain Networks with Graph Neural Networks for Mental Illness Diagnosis**
Yanqiao Zhu, **Hejie Cui**, Lifang He, Lichao Sun, Carl Yang
*International Conference of the IEEE Engineering in Medicine and Biology Society (**EMBC**), 2022*

[MIDL 2022] **FBNetGen: Task-aware GNN-based fMRI Analysis via Functional Brain Network Generation**
Xuan Kan, **Hejie Cui**, Joshua Lukemire, Ying Guo, Carl Yang
*International Conference on Medical Imaging with Deep Learning (**MIDL**), **Oral**, 2022*

[SDM 2022] **Structure-Aware Hard Negative Mining for Heterogeneous Graph Contrastive Learning**
Yanqiao Zhu, Yichen Xu, **Hejie Cui**, Carl Yang, Qiang Liu, Shu Wu
*SIAM International Conference on Data Mining (**SDM**), 2022*

[ECIR 2022] **How Can Graph Neural Networks Help Document Retrieval: A Case Study on CORD19 with Concept Map Generation**
Hejie Cui, Jiaying Lu, Yao Ge, Carl Yang
*The European Conference on Information Retrieval (**ECIR** Short), 2022*

[ECML 2021] **Zero-Shot Scene Graph Relation Prediction through Commonsense Knowledge Integration**
Xuan Kan, **Hejie Cui**, Carl Yang
*The European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (**ECML-PKDD**), 2021*

[MICCAI 2019] **Pulmonary Vessel Segmentation based on Orthogonal Fused U-Net++ of Chest CT Images**
Hejie Cui, Xinglong Liu, Ning Huang
*International Conference on Medical Image Computing and Computer-Assisted Intervention (**MICCAI**), 2019*

Preprints and Submissions

[ICML-KLR] **Open Visual Knowledge Extraction via Relation-Oriented Multimodality Model Prompting**
Hejie Cui, Xinyu Fang, Zihan Zhang, Ran Xu, Xuan Kan, Xin Liu, Manling Li, Yangqiu Song, Carl Yang
ICML Workshop of Knowledge and Logical Reasoning in the Era of Data-driven Learning, 2023

[ICML-IMLH] **A Survey on Knowledge Graphs for Healthcare: Resources, Applications, and Promises**
Hejie Cui, Jiaying Lu, Shiyu Wang, Ran Xu, Wenjing Ma, Shaojun Yu, Yue Yu, Xuan Kan, Chen Ling, Joyce Ho, Fei Wang, Carl Yang
ICML Workshop on Interpretable Machine Learning in Healthcare, 2023

[Preprint] **Knowledge-Infused Prompting: Assessing and Advancing Clinical Text Data Generation with Large Language Models**
Ran Xu, **Hejie Cui**, Yue Yu, Xuan Kan, Wenqi Shi, Yuchen Zhuang, Wei Jin, Joyce Ho, Carl Yang
In Submission, 2023

[Preprint] **Beyond One-Model-Fits-All: A Survey of Domain Specialization for Large Language Models**
Chen Ling, Xujiang Zhao, Jiaying Lu, Chengyuan Deng, Can Zheng, Junxiang Wang, Tanmoy Chowdhury, Yun Li, **Hejie Cui**, Tianjiao Zhao, Amit Panalkar, Wei Cheng, Haoyu Wang, Yanchi Liu, Zhengzhang Chen, Haifeng Chen, Chris White, Quanquan Gu, Carl Yang, Liang Zhao
In Submission, 2023

Grant Proposal

III: Medium: VirtualLab: Integrating Deep Graph Learning and Causal Inference for Multi-Agent Dynamical Systems
PI: Dr. Wei Wang, Dr. Yizhou Sun, and Dr. Carl Yang
Role: Contributed to the methodology designs and initial results in the proposal.
Result: **1 Million** Fund from NSF NCS Foundation Award.

Talks & Presentations

Invited Talks

Serendipitous Recommendation over Communication Graph via Group Fairness	Microsoft Research 2023
Introduction to Multimodal Learning and Knowledge Acquisition	Amazon Inc. 2022
GNNs for Brain Network	University of Rochester 2022
Effective GNNs for Multimodality Graph Mining	Microsoft AI 2022

Conference & Workshop Oral Presentations

PV2TEA: Patching Visual Modality to Textual-Established Information Extraction	KnowledgeNLP-KDD'23
PTGB: Pre-Train Graph Neural Networks for Brain Network Analysis	CHIL'23
Interpretable GNNs for Connectome-Based Brain Disorder Analysis	MICCAI'22
BrainNNExplainer	Interpretable Machine Learning in Healthcare ICML'21
Node Feature Choice for GNNs on Non-attributed Graphs	Deep Learning on Graphs KDD'21

Open-Source Projects

BrainGB [Link]
The first benchmark for brain network analysis with graph neural networks.
With a Python pip package, tutorials, and benchmark website.
Received 129 GitHub stars.

Teaching Experience

CS 253 Data Structures and Algorithms, Exercise Lesson Instructor and Head TA — Spring 2021
CS 584 Natural Language Processing for Biomedical Applications, Head TA — Fall 2020
CS 584 Deep Learning, Head TA — Spring 2020

Mentoring

Alexis Li (Female), Senior High School Student in Hamilton High School at Chandler — 08/2022 – 03/2023
Co-authored paper: PSB'24

David Dai, Undergraduate in Emory, Master in Stanford — 05/2021 – 11/2022
Co-authored paper: MICCAI'22, ISBI'23

Owen Yang, Undergraduate in Emory, PhD in Duke — 02/2022 – Present
Co-authored paper: KDD'22, CHIL'23, PSB'24

Tony Gu, Undergraduate at Georgia Institute of Technology — 01/2022 – 08/2023
Co-authored paper: TMI, IEEE-BHI'23

Xinyu Fang, Undergraduate at Tongji University — 05/2022 – Present
Co-authored paper: NeurIPS'23, ICML-KLR'23
Ongoing Project: Clinical Notes Understanding with Large Language Models

Services

Program Committee Member | Reviewer

International Conference on Learning Representations (**ICLR**) — Since 2023
Machine Learning for Health (**ML4H**) — Since 2023
Conference on Neural Information Processing Systems (**NeurIPS**) — Since 2023
ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**SIGKDD**) — Since 2022
International Conference on Data Mining (**ICDM**) — Since 2022
The Web Conference (**WWW**) — 2022
Conference on Artificial Intelligence, Main Track and Social Impact Track (**AAAI**) — 2022
International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**) — Since 2020
SIAM International Conference on Data Mining (**SDM**) — 2022
Learning on Graphs Conference (**LOG**) — 2022
IEEE Transactions on Knowledge and Data Engineering (**TKDE**) — Since 2022
IEEE Transactions on Big Data (**Big Data**) — Since 2021
NeurIPS Workshop on Generative AI & Biology — 2023
ICML Workshop on Knowledge and Logical Reasoning in the Era of Data-driven Learning — 2023
NeurIPS Workshop on AI for Science: Progress and Promises — 2022
NeurIPS Workshop on Temporal Graph Learning — 2022
CIKM Workshop on Federated Learning with Graph Data — 2022
COLING Workshop on Graph-Based Natural Language Processing — 2022
ICML Workshop on Interpretable Machine Learning in Healthcare — Since 2021
ICCV Workshop on Computer Vision for Automated Medical Diagnosis — 2021
NeurIPS Workshop on Medical Imaging — 2021

Workshop Organizer

IEEE BigData Workshop on Neural Networks for Brain Connectome Analysis: Theories, Methods, and Applications — 2022
CIKM Workshop on Federated Learning with Graph Data — 2022

Diversity, Equity, and Inclusion (DEI)

Laney-EDGE Graduate School Diverse Scholars in the Sciences
Member of Emory ACM-W Women in Computing Chapter