

# Junyi Li

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## Research Interests

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Foundation Models, Federated Learning, Artificial General Intelligence (AGI), Large-scale Optimization, Trustworthy AI, Efficient Machine Learning

## Education

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Ph.D. in Computer Science, **University of Maryland, College Park**, expected to graduate at Spring 2025

M.S. in Signal and Image Processing & ML, **University of Michigan, Ann Arbor**, Winter 2019

B.S. in Micro-electronics Engineering, **Fudan University**, Summer 2017

## Publications

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### CONFERENCE AND JOURNAL PAPERS

Provably Faster Algorithms for Bilevel Optimization via Without-Replacement Sampling

**Junyi Li**, Heng Huang

*Advances in Neural Information Processing Systems (NeurIPS2024)*

Device-Wise Federated Network Pruning

**Junyi Li**, Shangqian Gao, Zeyu Zhang, Yanfu Zhang, Weidong Cai, Heng Huang

*Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR2024)*

FedDA: Faster Adaptive Gradient Methods for Federated Constrained Optimization

**Junyi Li**, Feihu Huang, Heng Huang

*The Twelfth International Conference on Learning Representations (ICLR2024)*

Dropout Enhanced Bilevel Training

Peiran Yu, **Junyi Li**, Heng Huang

*The Twelfth International Conference on Learning Representations (ICLR2024 (Spotlight))*

The steerability of large language models toward data-driven personas

**Junyi Li**, Charith Peris, Ninareh Mehrabi, Palash Goyal, Kai-Wei Chang, Aram Galstyan, Richard Zemel, Rahul Gupta

*Proceedings of the Conference of the North American Chapter of the Association for Computational Linguistics (Long Papers) (NAACL 2024)*

Adaptive federated minimax optimization with lower complexities

Feihu Huang, Xinrui Wang, **Junyi Li**, Songcan Chen

*International Conference on Artificial Intelligence and Statistics (AISTATS2024)*

Hessian Free Efficient Single Loop Iterative Differentiation Methods for Bi-Level Optimization Problems

Peiran Yu, **Junyi Li**, Heng Huang

*Transactions on Machine Learning Research (TMLR2024)*

FedSep: Separating Communication and Learning in Federated Learning

**Junyi Li**, Heng Huang

*Advances in Neural Information Processing Systems (NeurIPS2023)*

Communication-Efficient Federated Bilevel Optimization with Local and Global Lower Level Problems

**Junyi Li**, Feihu Huang, Heng Huang

*Advances in Neural Information Processing Systems (NeurIPS2023)*

Federated Conditional Stochastic Optimization

Xidong Wu, Jianhui Sun, Zhengmian Hu, **Junyi Li**, Aidong Zhang, Heng Huang

*Advances in Neural Information Processing Systems (NeurIPS2023)*

FedGRec: Federated Graph Recommender System with Lazy Update of Latent Embeddings

**Junyi Li**, Heng Huang

*FL: Recent Advances and New Challenges (FL-NeurIPS'22)*

Enhanced bilevel optimization via bregman distance

Feihu Huang, **Junyi Li**, Shangqian Gao, Heng Huang

*Advances in Neural Information Processing Systems (NeurIPS2022)*

Communication-efficient robust federated learning with noisy labels

**Junyi Li**, Jian Pei, Heng Huang

*Proceedings of the 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD2022)*

On the convergence of local stochastic compositional gradient descent with momentum

Hongchang Gao, **Junyi Li**, Heng Huang

*International Conference on Machine Learning (ICML2022)*

A fully single loop algorithm for bilevel optimization without hessian inverse

**Junyi Li**, Bin Gu, Heng Huang

*Proceedings of the AAAI Conference on Artificial Intelligence (AAAI2022)*

Super-adam: faster and universal framework of adaptive gradients

Feihu Huang, **Junyi Li**, Heng Huang

*Advances in Neural Information Processing Systems (NeurIPS2021)*

Faster secure data mining via distributed homomorphic encryption

**Junyi Li**, Heng Huang

*Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD2020)*

Generating realistic stock market order streams

**Junyi Li**, Xintong Wang, Yaoyang Lin, Arunesh Sinha, Michael Wellman

*Proceedings of the AAAI Conference on Artificial Intelligence (AAAI 2020)*

## PREPRINTS AND IN SUBMISSION

Sharper Analysis of Data Echoing and New Communication-Efficient Algorithm for Data Parallelism

**Junyi Li**, Heng Huang

*In Submission*

SAE: Efficient Large Language Model Inference via Sketching-based Attention Extrapolation

**Junyi Li**, Heng Huang

*In Submission*

Provably Mitigating Corruption, Overoptimization, and Verbosity Simultaneously in Offline and Online RLHF/DPO Alignment

Ziyi Chen, **Junyi Li**, Peiran Yu, Heng Huang

*In Submission*

Enhancing Prompt Tuning for Classification via Task-Related Hard Prompts

Peiran Yu, Shirkavand Reza, Tong Zheng, **Junyi Li**, Heng Huang

*In Submission*

Biadam: Fast adaptive bilevel optimization methods

Feihu Huang, **Junyi Li**, Shangqian Gao

*arXiv preprint arXiv:2106.11396*

Compositional federated learning: Applications in distributionally robust averaging and meta learning

Feihu Huang, **Junyi Li**, Heng Huang

*arXiv preprint arXiv:2106.11264*

Improved bilevel model: Fast and optimal algorithm with theoretical guarantee

**Junyi Li**, Bin Gu, Heng Huang

*arXiv preprint arXiv:2009.00690*

## Internship Experience

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### Alexa AI Natural Understanding, Amazon.com

Boston, MA

Applied Scientist Intern

May 2023 - Aug 2023

Project: Work on the steerability of large language models with a focus on aligning LLMs with data-driven personas through prompt tuning.

### On Amp, Amazon.com

Los Angeles, CA

Applied Scientist Intern

May 2022 - Aug 2022

Project: Address the cold-start problem in recommendation by using users' auxiliary information.

### JD Digits

Mountain View, CA

Research Intern

May 2019 - Aug 2019

Project: Work on accelerating homomorphic encryption-based distributed learning.

## Academic Services

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**Conference Reviewer:** NeurIPS, ICML, ICLR, AAAI, AISTATS, ICCV, CVPR, ACL, NAACL, KDD

**Journal Reviewer:** Transactions on Pattern Analysis and Machine Intelligence (TPAMI)

**Journal Reviewer:** Transactions on Signal Processing (TSP)

## Teaching and Mentoring Experience

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**Teaching Assistant:** C++ Programming (Fall 2019, Spring 2020), Digital Electronics (Fall 2019)

**Co-instructor:** Advanced Machine Learning and Deep Learning (Spring 2021), Introduction to Machine Learning (Fall 2021)

**Guest Lecturer:** Neuro-signal modeling & analysis (Fall 2023), Data Mining and Decision Making (Fall 2023)

**Mentoring Experience:** Mentoring Undergraduate students, Master students and junior PhD students

## Awards and Honors

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**Travel Grant/Scholar Award:** ICML, NeurIPS