Linjian Ma

+1 217 979 7114 ⋄ lma16@illinois.edu ⋄ linjianma.github.io
github/Linkedin: linjianma

RESEARCH STATEMENT

My research interests lie in the intersection of numerical linear algebra, high performance computing and quantum computing. In particular, I'm now focusing on developing efficient numerical algorithms and parallel systems for tensor computations with applications in data analytics and quantum simulations. Previously, I worked on optimization and efficient compression methods of neural networks.

EDUCATION BACKGROUNDS

University of Illinois at Urbana-Champaign — August 2019 - Expected 2023
PhD, Computer Science, Advisor: *Edgar Solomonik* — GPA: 3.95/4.0
Area: Scientific Computing

University of California, Berkeley — August 2018 - May 2019
MEng, Computer Science, Advisor: *Michael Mahoney* — Major GPA: 3.94/4.0
Track: Data Science & Systems

University of Illinois at Urbana-Champaign — August 2016 - May 2018
MS, Mechanical Engineering, Advisor: *N.R. Aluru* — GPA: 3.97/4.0
Concentration: Computational Science and Engineering

Zhejiang University — August 2012 - June 2016
BE, Energy Engineering, Advisor: *Tao Wang and Zhongyang Luo* — GPA: 3.95/4.0
Graduate with Honors, Chu Kochen Honors College

HONORS AND AWARDS

Kuck Computational Science & Engineering Scholarship, UIUC — 2020

Computer Science Gene Golub Fellowship, UIUC — 2019

Graduate with Honor, ZJU — 2016

Meritorious Winner, Mathematical Contest In Modeling (MCM) — 2015

National Scholarship for Undergraduate, ZJU — 2014

The First Class Scholarship for Outstanding Students, ZJU — 2013 - 2014

The First Prize in China Undergraduates Mathematical Contest — 2013

PRESENTATIONS

Upcoming presentations	SIAM'LA 2021, IPDPS 2021
First author presentations	SIAM'CSE 2021, PACT 2020, SIAM'PP 2020, Berkeley'SCseminar 2019, USNCCM 2017
Posters	SIAM'PP 2020, AAAI 2020

PUBLICATIONS

[1] Navjot Singh, **Linjian Ma**, Hongru Yang, Edgar Solomonik, Comparison of Accuracy and Scalability of Gauss-Newton and Alternating Least Squares for CP Decomposition, *SIAM Journal on Scientific Computing (SISC)*, 2021. [link]

[2] **Linjian Ma** and Edgar Solomonik, Efficient Parallel CP Decomposition with Pairwise Perturbation and Multi-sweep Dimension Tree, *International Parallel and Distributed Processing Symposium (IPDPS'21)*, 2021. [link]

[3] **Linjian Ma***, Jiayu Ye*, and Edgar Solomonik, AutoHOOT: Automatic High-Order Optimization for Tensors, *International Conference on Parallel Architectures and Compilation Techniques (PACT'20)*, 2020. [link]

[4] Sheng Shen, Zhen Dong, Jiayu Ye, **Linjian Ma**, Zhewei Yao, Amir Gholami, Michael W. Mahoney, Kurt Keutzer, Q-BERT: Hessian Based Ultra Low Precision Quantization of BERT, *AAAI'20,* 2020. [link]

[5] **Linjian Ma***, Gabe Montague*, Jiayu Ye*, Zhewei Yao, Amir Gholami, Kurt Keutzer, Michael W. Mahoney, Inefficiency of K-FAC for Large Batch Size Training, *AAAI'20,* 2020. [link]

[6] **Linjian Ma**, Pikee Priya, and N. R. Aluru, A Multiscale Model for Electrochemical Reactions in LSCF Based Solid Oxide Cells, *Journal of the Electrochemical Society*, 2018. [link]

PREPRINTS AND TECHNICAL REPORTS

[1] **Linjian Ma** and Edgar Solomonik, Fast and Accurate Randomized Algorithms for Low-rank Tensor Decompositions, *arXiv:2104.01101,* 2021. [link]

[2] **Linjian Ma** and Edgar Solomonik, Accelerating Alternating Least Squares for Tensor Decomposition by Pairwise Perturbation, *arXiv:1811.10573,* 2018. [link]

[3] **Linjian Ma**, A Multiscale Model for the Oxide Ion Conducting and Proton Conducting Solid Oxide Cells, *MS thesis, University of Illinois at Urbana-Champaign*, 2018. [link]

RESEARCH EXPERIENCES

Lab for Parallel Numerical Algorithms, UIUC August 2019 - Now
Research Assistant, Advisor: *Edgar Solomonik*
Topic: *On efficient algorithms and systems for numerical tensor algebra*

Lawrence Berkeley National Laboratory May 2020 - August 2020
Research Intern, Advisor: *Chao Yang*
Topic: *Low-rank approximation in simulations of quantum algorithms*

Wave Computing & Berkeley AI Research (BAIR) May 2019 - August 2019
Machine Learning Intern
Topic: *Compressing large scale neural networks based on second-order information*

RiseLab, UC Berkeley August 2018 - May 2019
Research Assistant, Advisor: *Michael Mahoney*
Capstone project: *Second-order optimization of neural network learning*

Beckman Institute, UIUC August 2016 - December 2017
Research Assistant, Advisor: *N.R. Aluru*
Thesis: *A multiscale model for the oxide ion conducting and proton conducting solid oxide cells*

SERVICES

Teaching Assistant CS 450 Numerical Analysis (Fall 2020)

SKILLS

Programming Languages C/C++, Python, Go, Bash, Matlab, CUDA
ML Frameworks Pytorch, TensorFlow