Name: Hao Ji

Dr. Hao Ji's Curriculum Vitae

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Current Position:
Data Scientist, Center for Advanced Research Computing
University of Southern California

Part-time Lecturer
Viterbi School of Engineering
University of Southern California

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Education

Ph.D Mechanical Engineering, University of Southern California, 08/2021 GPA: 4.0/4.0

M.Eng Mechanical Engineering, University of California at Berkeley, 05/2014 GPA: 3.8/4.0

B.Eng Mechanical Engineering, Donghua University, Shanghai, 07/2013 GPA: 3.7/4.0

Work Experience

9/2021-Current **Data Scientist**, Center for Advanced Research Computing, University of Southern California, Los Angeles, CA

- Taught USC Viterbi Senior Class TAC450 'High Performance Computing in Applied Machine Learning'
- Developed distributed GPU training algorithms on GPU clusters: focusing on distributed data parallel algorithms using PyTorch
- Fine-tuned Large Language Model Llama-3.1-8b-Instruct model and used it as a based model for RAG for Q&A tasks with CARC user tickets data
- Worked on using surrogate model algorithms to optimize Slurm job configuration parameters to reduce overall job wait time for users on the cluster
- Benchmarked deep learning training algorithms on computing nodes: Resnet50 model with CIFAR10 dataset, GPU models include: A100, A40, V100, P100, H100
- Benchmarked storage performance on Samsung SHIPs, Vast storage systems using ML Perf Storage benchmark with 3D Unet algorithm and compared the performance to spinning disk storage
- Supported hybrid cloud virtual machine setup and development: Ubuntu VM, Windows VM and etc.
- Built singularity containers from docker image to maintain the reproductivity of research codes and ran test codes using singularity commands
- Taught different deep learning workshops and summer bootcamps: building deep neural networks on HPC, running deep learning jobs in HPC environment, data analysis and visualization using Python
- Tested Science-DMZ DTN data transfer speed using bbcp and iperf3 among Southern California local schools
- Held weekly office hours to help researchers trouble research codes and workflows
- Build software packages on the cluster using spack
- GPU direct storage testing vs CPU-GPU testing on vast storage system, benchmarked sequential read, sequential write, random read and random write

8/2015-8/2021 **Research Assistant**, University of Southern California, IMPACT lab, Los Angeles, CA

- Implemented multi-agent independent dueling DQN algorithms and achieved autonomous multi-agent box-pushing and self-assembly tasks in a game simulator (Pygame) environment
- Ran multiple simulations simultaneously using parallel shell command and used matplotlib package to visualize results
- Generated research findings on stability and scalability of multi-agent deep reinforcement learning to various team sizes and proposed effective entropy measurement to predict optimal team sizes without training the agents
- Analyzed sensitivity of self-organizing system performance regarding weights of reward with different types of tasks

5/2019-8/2019 **Data Scientist Intern,** Procter & Gamble, Cincinnati, OH

- Developed parallel code to extract images from videos based on timestamp information using OpenCV
- Generated key points of 18 body parts using tf-openpose and cropped images based on keypoints
- Trained Mobilenet/Resnet to generate zone prediction based on image dataset of 600GB and ground truth labels
- Used trained Resnet50 to generate feature vectors of 2048 as dataset and pushed to bidirectional GRU model for time-series training
- Combined image & sensor dataset, ensemble two separate bi-directional RNN predictions to auto-label image and sensor data
- Increased current auto-label performance by 7%

6/2016-8/2016 **Dimension Engineer Intern,** Karma Automotive LLC., Costa Mesa, CA

- Developed, validated and incorporated total vehicle GD&T requirements
- Creating, revising and releasing 2D drawings in CATIA and Smart Team
- Analyzed data coming from suppliers for same interfaces and learned how requirements specified on drawings translate to checking fixtures, manufacturing or assembly tooling and final product
- Worked on DTS Specifications of the karma K1 2.0 Platform, specifications on the gap and flush requirements of the critical components
- Certificate holder of GDTP -1994 Technologist (ASME Y14.5.2 Standard)

7/2014-4/2015 **Affiliate Researcher**, UC Berkeley, BEST Lab, Berkeley, CA

- Performed literature review on tensegrity spine designs
- Generated concepts of a mechanical, actuated tensegrity spine, chose the best candidate
- Designed a CAD model of the most promising concept
- Selected the most optimum brushless motor with hall sensors and gears for the design

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Awards and affiliations

- Provost's Fellowship of University of Southern California
- Volunteer of 2010 World Expo
- Volunteer of 2011 World Swimming Championship
- Torchbearer of 2008 Olympic Games
- National Merit Scholarship by Chinese government (Top 1%)
- Shanghai Excellent Student Award (Top 3%)
- Reviewer of Journal AI EDAM (Artificial Intelligence for Engineering Design, Analysis and Manufacturing)
- Reviewer of Journal Smart Energy
- Reviewer of Journal Building Engineering (Q1, Top Journal)
- Reviewer of Journal Automation in Construction (Q1, Top Journal)
- Reviewer of Journal Computer Aided Design (Top Journal in the field)
- Reviewer of Journal of Mechanical Design (Top Journal in the field)

- Reviewer of Journal PLOS ONE
- Reviewer of Journal Neural Processing Letters
- Reviewer of International Journal of Machine Learning and Cybernetics
- Reviewer of Journal Discover Artificial Intelligence
- Reviewer of Journal of Computing and Information Science in Engineering
- Reviewer of Journal Future Generation Computer Systems
- Reviewer of Journal Processes
- Reviewer of Journal Computers
- Reviewer of Journal Big Data and Cognitive Computing
- Reviewer of Journal Make
- Reviewer of Journal Biomimetics
- Reviewer of Journal AI
- Reviewer of Journal Electronics
- Reviewer of ASME IDETC Conference 2022 – 2025
- Reviewer of PEARC Conference 2024 & 2025
- Editorial Board Member of Journal Mathematics and Computer Science
- Participated in NSF CyberTraining Program, awarded 300k USD
- Participated in NSF Hybrid Cloud Platform, awarded 300k USD
- Participated in NSF Grant: Regional Computing Program, awarded 1million USD

Publications

1 Sabelhaus, Andrew P., Ji, Hao et al. "Mechanism design and simulation of the ULTRA spine: a tensegrity robot." ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers, 2015.

2 Ji, Hao, Jin, Yan. “Adoption of Social Rules in Teams of Different Sizes”. Engineering Management Reviews, 2017, 6(1), 6-15. doi: 10.14355/emr.2017.0601.002

3 Ji, Hao and Yan Jin. “Modeling trust in self-organzing systems with heterogeneity.” ASME 2018 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers, 2018.

4 Ji, Hao, and Yan Jin. "Designing Self-Organizing Systems with Deep Multi-agent Reinforcement Learning." ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers, 2019.

5 Ji, Hao, and Yan Jin. "Designing Self-Assembly Systems with Deep Multi-agent Reinforcement Learning. "Design Computing and Cognition, 2020

6 Ji, Hao, and Yan Jin. "Evaluating the Learning and Performance Characteristics of Self-organizing Systems with Different Task Features.” AIEDAM Artificial Intelligence for Engineering Design, Analysis and Manufacturing, 2021

7 Ji, Hao, and Yan Jin. "Knowledge Acquisition of Self-Organizing Systems with Deep Multiagent Reinforcement Learning." ASME Journal of Computing and Information Science in Engineering. American Society of Mechanical Engineers, 2022 **(Journal Spotlight of JCISE Journal at IDETC 2022 Conference)**

8 Ji, Hao, and Yan Jin. "Impact of Task Constraint on Agent Team Size of Self-Organizing Systems Measured by Effective Entropy." ASME Journal of Computing and Information Science in Engineering. American Society of Mechanical Engineers, 2024 **(Editor’s Pick Award of JCISE Journal)**

9 Huang Bingling, Ji Hao, and Yan Jin. "Impact of Social Learning on Teamwork Efficiency in Learning-Based Self-Organized Systems." ASME 2024 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers, 2024

10 Ji, Hao, et al. "Sensitivity Analysis of Reward Weights in Multi-Agent Learning: A Box-Pushing Case Study." International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Vol. 89220. American Society of Mechanical Engineers, 2025

11 Ge, David, Hao Ji, and Bingling Huang. "Efficient training in multi-agent reinforcement learning: A communication-free framework for the box-pushing problem." International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Vol. 89213. American Society of Mechanical Engineers, 2025

12 Huang, Bingling, Maximillian Haaga, and Hao Ji. "Emergent Role Specialization in Self-Organized Systems via K-Means-Based Behavioral Analysis." International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Vol. 89206. American Society of Mechanical Engineers, 2025

13 Ji, H., Aditya, K., Escalante, S., & Qiu, Y. (2026). CodeGen-3D: A Benchmark for Evaluating LLMs in Zero-Shot and Iterative 3D Modeling in Blender. IEEE Access.