Ruochen Wang (王若宸)

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Research Interests

My research interests lie in Automated Machine Learning and Data-Centric AI, with the goal of developing data-efficient machine learning pipelines with minimal human aid and prior knowledge. More specifically, I have worked on:

- AutoML: Neural Architecture Search [6, 7, 8, 9], Optimizer Search [2], and Hyperparameter Optimization [5]
- Data-Centric AI: Dataset Selection & Distillation [1, 2, 4], leveraging synthetic data for model training & diagnosis

Education

01/2020 to present	**University of California at Los Angeles (UCLA)** *Computer Science Department* ● Ph.D. in Computer Science; Advisor: Prof. Cho-Jui Hsieh ● M.S. in Computer Science; GPA=4.0/4.0; Advisor: Prof Cho-Jui Hsieh	**U.S.**
09/2015 to 08/2019	**The University of Michigan-Ann Arbor (UMich)** *Department of Electrical Engineering and Computer Science (EECS)* ● B.S. in Computer Science & B.S. in Statistics; GPA: 4.0/4.0	**U.S.**
09/2013 to 06/2015	**(Transferred) Shanghai University of Finance and Economics (SUFE)** *School of Finance* ● Financial Experimental Class; GPA: 3.93/4.0; Program Rank: 1/30	**China**

Selected Honors

- Outstanding Graduate Student (for Master's degree, 1 per department), ***UCLA CS Department***, 05/2022.
- Outstanding Paper Award, ***ICLR 2021***, 04/2021.
- Award of Excellence (10%), ***Microsoft Research Asia (MSRA)***, 09/2019.
- Highest Distinction Graduate Award, ***The University of Michigan***, 08/2019.
- Berkeley Fung's Excellence Scholarship, ***UC Berkeley Graduate Admission Committee***, 03/2019.
- Outstanding Intern Award, ***SenseTime***, 01/2019.
- James B. Angell Scholar, ***The University of Michigan***, 2017-2019.
- Shanghai City Scholarship (0.6%), ***Shanghai City Government***, 09/2014.

Publications & Preprints (1st-author marked blue)

- [1] Justin Cui, **Ruochen Wang**, Si Si, Cho-Jui Hsieh. Scaling Up Dataset Distillation to ImageNet-1K with Constant Memory. (Under Review 2023)
- [2] **Ruochen Wang**, Yuanhao Xiong, Minhao Cheng, Cho-Jui Hsieh. Efficient Non-Parametric Optimizer Search for Diverse Tasks. (*NeurIPS 2022*)
- [3] Justin Cui, **Ruochen Wang**, Si Si, Cho-Jui Hsieh. DC-BENCH: Dataset Condensation benchmark. (*NeurIPS 2022 Dataset and Benchmark*)
- [4] Yuanhao Xiong*, **Ruochen Wang***, Minhao Cheng, Cho-Jui Hsieh. FedDM: Iterative Distribution Matching for Communication-Efficient Federated Learning. (*Arxiv Preprint 2022*)
- [5] Yuanhao Xiong, Li-Cheng Lan, Xiangning Chen, **Ruochen Wang**, Cho-Jui Hsieh. Learning to Schedule Learning rate with Graph Neural Networks. (*ICLR 2022*).
- [6] Shoukang Hu*, **Ruochen Wang***, Lanqing Hong, Zhenguo Li, Cho-Jui Hsieh, Jiashi Feng. Generalizing Few-Shot NAS with Gradient Matching. (* equal contribution) (*ICLR 2022*).
- [7] **Ruochen Wang**, Xiangning Chen, Minhao Cheng, Xiaocheng Tang, Cho-Jui Hsieh. RANK-NOSH: Efficient Predictor-Based Architecture Search via Non-Uniform Successive Halving. (*ICCV 2021*).
- [8] **Ruochen Wang**, Minhao Cheng, Xiangning Chen, Xiaocheng Tang, Cho-Jui Hsieh. Rethinking architecture selection in differentiable NAS. (*ICLR 2021*). **Outstanding Paper Award**.

- [9] Xiangning Chen*, **Ruochen Wang***, Minhao Cheng*, Xiaocheng Tang, Cho-Jui Hsieh. DrNAS: Dirichlet Neural Architecture Search. (* equal contribution) (*ICLR 2021*).

Research Experience

05/2022 to Present	**Google Research** *Student Researcher on ML Vision Synergy, with Dr. Boqing Gong and Dr. Ting Liu*	**U.S.**

- Leveraging Text-to-Image diffusion model for debugging & training classifiers.
- Efficient CNN-Transformer hybrid video architecture with linear attention.

01/2020 to Present	**UCLA Samueli School of Engineering** *Graduate Student Researcher with Prof. Cho-Jui Hsieh*	**Los Angeles**

AutoML:
- Proposed the first efficient, scalable, and generalizable optimizer search framework for diverse tasks (NeurIPS 2022).
- Proposed a method to measure and alleviate the adverse effects of weight-sharing in One-Shot NAS; obtained SOTA on all major NAS search spaces and datasets (ICLR 2022).
- Analyzed and explained the failure modes of Differentiable NAS from the long-overlooked architecture selection perspective (ICLR 2021 Oral, Outstanding Paper Award).
- Proposed (together with collaborators) a method to improve the robustness of differentiable NAS via Bayesian learning with Dirichlet distribution; derived a theoretical bound to prove the effectiveness of the proposed method utilizing Laplacian Approximation (ICLR 2021).

Data-Centric A.I.:
- Investigating the effectiveness of Dataset Distillation for Federated Learning (NeurIPS 2022 workshop & under review).
- Co-developing a benchmark for Dataset Distillation methods. (NeurIPS 2022).
- Co-developed the first SOTA Dataset Distillation method that scales to ImageNet-1K. (under review)

05/2019 to 09/2019	**Microsoft Research** *Research Intern*	**Beijing**

Neural Architecture Search:
- Conducted research on resource-constrained neural architecture search for production purposes.

Reinforcement Learning:
- Drafted a paper on improving the optimization of the Proximal Policy Gradient via Interior Point methods.

09/2018 to 03/2019	**SenseTime** *Research Intern*	**Shanghai**

Adversarial Robustness:
- Conducted research on the adversarial robustness in the frequency domain; developed evolution and gradient-based method to generate adversarial frequencies.

09/2017 to 04/2018	**UMich College of Engineering** *Research Assistant with Prof. Honglak Lee*	**Ann Arbor**

Vision & Language:
- Worked on natural language queried object detection with a word-sensitive discriminative bimodal network that aimed at solving dataset bias problems utilizing Bayesian reformulation.

Professional Services

- Reviewer for ICML 2021~2023, NeurIPS 2021~2022, ICLR 2022~2023, TMLR, CVPR 2023, ICCV 2023
- Co-organizing the 1st workshop on dataset distillation at ICML 2023 (under review)