

# Ruochen Wang (王若宸)

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## Research Interests

My research interests lie in Efficient and Automated Methods for Machine Learning, with the goal of developing data-efficient machine learning pipelines with minimal human aid and prior knowledge. More specifically, I work on:

- AutoML: Neural Architecture Search [6, 7, 8, 9], Optimizer Search [3], and Hyperparameter Optimization [5]
- AIGC / Data-Centric ML: Auto-Prompting for (ongoing) large generative models, and Dataset Distillation [1, 2, 4]

## Education

01/2020 to present	<b>University of California at Los Angeles (UCLA)</b> <i>Computer Science Department</i>	U.S.
	<ul style="list-style-type: none"><li>• Ph.D. in Computer Science; Advisor: Prof. Cho-Jui Hsieh</li><li>• M.S. in Computer Science; GPA=4.0/4.0; Advisor: Prof. Cho-Jui Hsieh</li></ul>	
09/2015 to 08/2019	<b>The University of Michigan-Ann Arbor (UMich)</b> <i>Department of Electrical Engineering and Computer Science (EECS)</i>	U.S.
	<ul style="list-style-type: none"><li>• B.S. in Computer Science &amp; B.S. in Statistics; GPA: 4.0/4.0</li></ul>	
09/2013 to 06/2015	<b>(Transferred) Shanghai University of Finance and Economics (SUFU)</b> <i>School of Finance</i>	China
	<ul style="list-style-type: none"><li>• Financial Experimental Class; GPA: 3.93/4.0; Program Rank: 1/30</li></ul>	

## 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, \* denote equal contribution)

- [1] Yuanhao Xiong\*, **Ruochen Wang\***, Minhao Cheng, Cho-Jui Hsieh. FedDM: Iterative Distribution Matching for Communication-Efficient Federated Learning. (*CVPR 2023*)
- [2] Justin Cui, **Ruochen Wang**, Si Si, Cho-Jui Hsieh. Scaling Up Dataset Distillation to ImageNet-1K with Constant Memory. (*ICML 2023*)
- [3] **Ruochen Wang**, Yuanhao Xiong, Minhao Cheng, Cho-Jui Hsieh. Efficient Non-Parametric Optimizer Search for Diverse Tasks. (*NeurIPS 2022*)
- [4] Justin Cui, **Ruochen Wang**, Si Si, Cho-Jui Hsieh. DC-BENCH: Dataset Condensation benchmark. (*NeurIPS 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. (*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. (*ICLR 2021*).

## Research Experience

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05/2022 to Present	<b>Google Research</b> <i>Student Researcher on ML Vision Synergy, with Dr. Boqing Gong and Dr. Ting Liu</i>	<b>U.S.</b>
	<ul style="list-style-type: none"> <li>• Auto-Prompting for large generative models (ongoing)</li> <li>• Efficient CNN-Transformer hybrid video architecture with linear attention.</li> </ul>	
01/2020 to Present	<b>UCLA Samueli School of Engineering</b> <i>Graduate Student Researcher with Prof. Cho-Jui Hsieh</i>	<b>Los Angeles</b>
	<b>AutoML:</b> <ul style="list-style-type: none"> <li>• Proposed the <u>first efficient, scalable, and generalizable optimizer search framework for diverse tasks</u> (NeurIPS 2022).</li> <li>• Proposed a method to measure and alleviate the adverse effects of weight-sharing in One-Shot NAS; obtained <u>SOTA on all major NAS search spaces and datasets</u> (ICLR 2022).</li> <li>• <u>Analyzed and explained the failure modes of Differentiable NAS from the long-overlooked architecture selection perspective</u> (ICLR 2021 Oral, Outstanding Paper Award).</li> <li>• 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).</li> </ul> <b>Data-Centric A.I.:</b> <ul style="list-style-type: none"> <li>• Investigating the effectiveness of Dataset Distillation for Federated Learning (NeurIPS 2022 workshop &amp; under review).</li> <li>• Co-developing a benchmark for Dataset Distillation methods. (NeurIPS 2022).</li> <li>• Co-developed the first SOTA Dataset Distillation method that scales to ImageNet-1K. (under review)</li> </ul>	
05/2019 to 09/2019	<b>Microsoft Research</b> <i>Research Intern</i>	<b>Beijing</b>
	<b>Neural Architecture Search:</b> <ul style="list-style-type: none"> <li>• Conducted research on <u>resource-constrained neural architecture search</u> for production purposes.</li> </ul> <b>Reinforcement Learning:</b> <ul style="list-style-type: none"> <li>• Drafted a paper on improving the optimization of the Proximal Policy Gradient via Interior Point methods.</li> </ul>	
09/2018 to 03/2019	<b>SenseTime</b> <i>Research Intern</i>	<b>Shanghai</b>
	<b>Adversarial Robustness:</b> <ul style="list-style-type: none"> <li>• Conducted research on the <u>adversarial robustness in the frequency domain</u>; developed evolution and gradient-based method to generate adversarial frequencies.</li> </ul>	
09/2017 to 04/2018	<b>UMich College of Engineering</b> <i>Research Assistant with Prof. Honglak Lee</i>	<b>Ann Arbor</b>
	<b>Vision &amp; Language:</b> <ul style="list-style-type: none"> <li>• Worked on <u>natural language queried object detection</u> with a word-sensitive discriminative bimodal network that aimed at solving dataset bias problems utilizing Bayesian reformulation.</li> </ul>	

## Professional Services

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- Reviewer for ICML 2021~2023, NeurIPS 2021~2023, ICLR 2022~2023, TMLR, CVPR 2023, ICCV 2023, ECV2023