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Yi Ding

Brief Biography

I am a **machine learning for systems** researcher. My research co-designs machine learning and systems approaches that enhance computer system performance and resource efficiency. My work draws from, combines, and contributes to methods in the areas of machine learning, computer systems, computer architecture, and software engineering. Meta is deploying one of my solutions (for predicting system maintenance time) on their hyperscale datacenters that serve billions of users.
I am a CRA/CCC/NSF Computing Innovation Fellow, a Rising Stars in EECS Workshop participant, and a recipient of Meta Research Award. My work has appeared in top-tier machine learning venues including NeurIPS, AISTATS, AAAI, and ICDM, along with computer systems, architecture, and software engineering venues including ISCA, MLSys, ASPLOS, and ESEC/FSE.

Professional Employment

1/2021-present **Massachusetts Institute of Technology**, Cambridge, MA, USA
Postdoctoral Associate & NSF Computing Innovation Fellow. Mentor: Michael Carbin.

10/2021-present **Meta**, Cambridge, MA, USA
Visiting Researcher. Leading a team to improve maintenance efficiency of millions of servers in datacenters.

Summer 2019 **Google**, Sunnyvale, CA, USA
Research Intern. Introduced causal analysis to fleet understanding and automated confounder discovery.

Education

2015–2020 **The University of Chicago**, Chicago, IL, USA
PhD & MS in Computer Science. Advisor: Henry Hoffmann
PhD Dissertation: *Learning Structure for Computer Systems Management*

2013–2015 **Nanyang Technological University**, Singapore
Doctoral Student in Computer Science. Passed Qualification Exam.

2008–2012 **Beijing Jiaotong University**, Beijing, China
B.E. in Electronic Science and Technology. Graduated with *Highest Honor*.

Selected Awards and Honors

2020-2023 CRA/CCC/NSF Computing Innovation Fellowship [Link].
59 awardees from 550 newly PhD graduates in computer science researchers across the US.

2021 Meta Research Award [Link].
On Statistics for Improving Insights, Models, and Decisions. 10 winners from 134 applications across the US.

2020 EECS Rising Stars at UC Berkeley [Link]

Publications

Selected Conference Publications

ASPLOS 2023 Gokul Subramanian Ravi, Pranav Gokhale, Yi Ding, William M. Kirby, Kaitlin N. Smith, Jonathan M. Baker, Peter J. Love, Henry Hoffmann, Kenneth R. Brown, Frederic T. Chong. "CAFQA: A Classical Simulation Bootstrap for Variational Quantum Algorithms". *ACM International Conference on Architectural Support for Programming Languages and Operating Systems*, 2023.

MLSys 2022 Yi Ding, Avinash Rao, Hyebin Song, Rebecca Willett, Henry Hoffmann. "NURD: Negative-Unlabeled Learning for Online Datacenter Straggler Prediction". *Conference on Machine Learning and Systems*, 2022.

ESEC/FSE 2021 Yi Ding, Ahsan Pervaiz, Michael Carbin, Henry Hoffmann. "Generalizable and Interpretable Learning for Configuration Extrapolation". *ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, 2021.

ISCA 2019 Yi Ding, Nikita Mishra, Henry Hoffmann. "Generative and Multi–phase Learning for Computer Systems Optimization". *International Symposium on Computer Architecture*, 2019.

Other Conference Publications

Onward! 2021 Alex Renda, Yi Ding, Michael Carbin. "Programming with Neural Surrogates of Programs". *ACM SIGPLAN International Symp. on New Ideas, New Paradigms, and Reflections on Programming and Software*, 2021.

AISTATS 2020 Yi Ding, Panos Toulis. "Dynamical Systems Theory for Causal Inference with Application to Synthetic Control Methods". *International Conference on Artificial Intelligence and Statistics*, 2020.

NeurIPS 2020 Ming Gao, Yi Ding, Bryon Aragam. "A Polynomial-time Algorithm for Learning Nonparametric Causal Graphs". *Advances in Neural Information Processing Systems*, 2020.

NeurIPS 2017 Yi Ding, Risi Kondor, Jonathan Eskreis-Winkler. "Multiresolution Kernel Approximation for Gaussian Process Regression". *Advances in Neural Information Processing Systems*, 2017. (Top 4%, Spotlight)

ICDM 2017 Yi Ding, Chenghao Liu, Peilin Zhao, Steven CH Hoi. "Large Scale Kernel Methods for Online AUC Maximization". *IEEE International Conference on Data Mining*, 2017. (Top 9%, Long Oral)

AAAI 2015 Yi Ding, Peilin Zhao, Steven CH Hoi, Yew-Soon Ong. "An Adaptive Gradient Method for Online AUC Maximization". *AAAI Conference on Artificial Intelligence*, 2015. (Oral)

AAAI 2014 Pengcheng Wu, Yi Ding, Peilin Zhao, Chunyan Miao, Steven CH Hoi. "Learning Relative Similarity by Stochastic Dual Coordinate Ascent". *AAAI Conference on Artificial Intelligence*, 2014.

Journal Publications

Biometrika 2022 Guillaume Basse, Yi Ding, Panos Toulis. "Minimax Designs for Causal Effects in Temporal Experiments with Treatment Habituation". *Biometrika*, 2022. (Top theoretical statistics journal)

npj Urban Sus. 2021 Kathryn Schertz, James Saxon, Carlos Cardenas-Iniguez, Luís Bettencourt, Yi Ding, Henry Hoffmann, Marc G Berman. "Neighborhood Street Activity and Greenspace Usage Uniquely Contribute to Predicting Crime". *npj Urban Sustainability, Nature Research Journal*, 2021.

Preprints

In Submission Yi Ding, Aijia Gao, Thibaud Ryden, Kaushik Mitra, Sukumar Kalmanje, Yanai Golany, Michael Carbin, Henry Hoffmann. "Acela: Predictable Datacenter-level Maintenance Job Scheduling". 2022.

In Submission Alex Renda, Yi Ding, Michael Carbin. "Optimal Sampling to Train Neural Surrogates of Programs". 2022.

In Submission Yi Ding, Hyunji Kim, Ahsan Pervaiz, Henry Hoffmann, Michael Carbin. "Saxon: Safe Exploration for On-Node Resource Control". 2022.

In Submission Yi Ding, Alex Renda, Ahsan Pervaiz, Michael Carbin, Henry Hoffmann. "Cello: Efficient Computer Systems Optimization with Predictive Early Termination and Censored Regression". 2022.

Workshop Contributions

WiML 2020 Yi Ding, Avinash Rao, Henry Hoffmann.. "Causal and Interpretable Learning for Datacenter Latency Prediction". *Women in Machine Learning Workshop co-located with NeurIPS*, 2020.

WiML 2020 Ming Gao, Yi Ding, Bryon Aragam. "A Polynomial-time Algorithm for Learning Nonparametric Causal Graphs". *Women in Machine Learning Workshop co-located with NeurIPS*, 2020.

CausalML 2019 Yi Ding, Guillaume Basse, Panos Toulis. "Minimax Crossover Designs". *NeurIPS Workshop on "Do the right thing": machine learning and causal inference for improved decision making*, 2019.

CODE@MIT 2019 Guillaume Basse, Yi Ding, Panos Toulis. "Minimax Crossover Designs for Digital Experimentation". *Conference on Digital Experimentation at MIT*, 2019.

WiML 2019 Yi Ding, Nikita Mishra, Henry Hoffmann. "Generative and Multi–phase Learning for Computer Systems Optimization". *Women in Machine Learning Workshop co-located with NeurIPS*, 2019.

WiML 2018 Yi Ding, Panos Toulis. "Nonparametric Causal Inference in Dynamical Systems with Synthetic Controls". *Women in Machine Learning Workshop co-located with NeurIPS*, 2018.

Teaching

Four types of machine learning courses targeting for different levels of students, application domains, and depths. Responsible for class materials, problem sets, exams, lab sessions, and office hours for all courses.

Spring 2017 **Teaching Assistant**, Machine Learning and Large Scale Data Analysis (CMSC 25025), UChicago

Winter 2017 **Teaching Assistant**, Machine Learning (CMSC 25400), UChicago

Spring 2016 **Teaching Assistant**, Machine Learning (MPCS 53111), UChicago

Winter 2016 **Teaching Assistant**, Machine Learning for Public Policy (CAPP 30255), UChicago

Mentoring

2021–2022 **Hyunji Kim**, *MIT*, master thesis, leading to a paper under submission

2019–2020 **Avinash Rao**, *UChicago*, undergraduate research project, leading to an MLSys 2022 paper

Grant Writing Experience

2020–2023 **CRA/CCC/NSF Computing Innovation Fellow Award**, $295,704

2021 **Meta Research Award**, $46,000

Service

Program Committee

Onward! 2022 SPLASH Onward!

MLSys 2022 Conference on Systems and Machine Learning

ApSys 2021 ACM Asia-Pacific Workshop on Systems

JSY 2021 Journal of Systems Research

Technical Reviewing

NeurIPS 2022 Neural Information Processing Systems

ICLR 2022 International Conference on Learning Representations

ICML 2022 International Conference on Machine Learning

NeurIPS 2021 Neural Information Processing Systems

AAAI 2021 AAAI Conference on Artificial Intelligence

AAAI 2020 AAAI Conference on Artificial Intelligence

NeurIPS 2019 Neural Information Processing Systems

ICML 2019 International Conference on Machine Learning

Talks

2022 "NURD: Negative-Unlabeled Learning for Online Datacenter Straggler Prediction"
- Conference presentation at MLSys, Santa Clara, USA (Aug. 2022)

2022 "Predictable Maintenance Job Planning in Datacenters"
- Meta Infrastructure Data Science Faculty Workshop at KDD, DC, USA (Aug. 2022)

2021 "Generalizable and Interpretable Learning for Configuration Extrapolation"
- Conference presentation at ESEC/FSE, Virtual (Nov. 2021)

2020 "Dynamical Systems Theory for Causal Inference with Application to Synthetic Controls"
- Causal Data Science Meeting, Virtual (Nov. 2020)
- Conference presentation at AISTATS, Virtual (Aug. 2020)

2019-2020 "Generative and Multi–phase Learning for Computer Systems Optimization"
- Xiapeisu Youth Forum at ICT, Chinese Academy Of Sciences, Virtual (Sep. 2020)
- Conference presentation at ISCA, Phoenix, USA (Jun. 2019)

2017 "Multiresolution Kernel Approximation for Gaussian Process Regression"
- Conference presentation at NeurIPS, Long Beach, USA (Dec. 2017)

2017 "Large Scale Kernel Methods for Online AUC Maximization"
- Conference presentation at ICDM, New Orleans, USA (Nov. 2017)

2015 "An Adaptive Gradient Method for Online AUC Maximization"
- Conference presentation at AAAI, Austin, USA (Jan. 2015)

Leadership in Equity, Diversity, and Inclusion

2018-2020 **Prime Minister of PhD Student Representatives in UChicago CS department**. Acted as the primary interface between faculty and PhD students and responsible for handling faculty-grad interactions and concerns to improve departmental equity and inclusion.

2018-2019 **Co-chair of Graduate Women in UChicago CS department (GWiCS)**. Managed funding for events that foster a community of peer mentorship, which have been attended by 75% of the female PhD students. Also advocated for better department-wide dissemination of resources for female-identifying graduate students.

References

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