

Yanna Ding

PORTFOLIO	https://dingyanna.github.io
AFFILIATION	Department of Computer Science Rensselaer Polytechnic Institute 110 8th St, Troy, NY 12180
EDUCATION	Rensselaer Polytechnic Institute , Troy, New York, United States <ul style="list-style-type: none">◇ Ph.D. program in Computer Science Advisor: Prof. Jianxi Gao GPA: 4.0/4.0 Spring 2022 - Current University of Toronto , Toronto, Ontario, Canada <ul style="list-style-type: none">◇ Honours Bachelor of Science in Computer Science and Mathematics GPA: 3.92/4.0 2017 - 2021
PUBLICATION	<ul style="list-style-type: none">◇ EMO: Epigraph Based Multilevel Optimization For Enhancing Chain Of Thought Reasoning Capabilities Songtao Lu, Yanna Ding, Lior Horesh, Jianxi Gao, Malik Magdon-Ismael <i>Accepted by IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2025</i>◇ Architecture-Aware Learning Curve Extrapolation via Graph Ordinary Differential Equation Yanna Ding, Zijie Huang, Xiao Shou, Yihang Guo, Yizhou Sun, Jianxi Gao <i>Accepted by AAAI Conference on Artificial Intelligence (AAAI) 2025, https://arxiv.org/abs/2412.15554</i>◇ Inferring from Logits: Exploring Best Practices for Decoding-Free Generative Candidate Selection Mingyu Derek Ma*, Yanna Ding*, Zijie Huang, Jianxi Gao, Yizhou Sun, Wei Wang (* Equal contribution) <i>Accepted by the 4th Efficient Natural Language and Speech Processing workshop (NeurIPS ENLSP) 2024</i>◇ Efficient Parameter Inference in Networked Dynamical Systems via Steady States: A Surrogate Objective Function Approach Integrating Mean-field and Nonlinear Least Squares Yanna Ding, Jianxi Gao, Malik Magdon-Ismael <i>Published in Phys. Rev. E 109, 034301 (2024), https://doi.org/10.1103/PhysRevE.109.034301</i>◇ Learning Network Dynamics via Noisy Steady States Yanna Ding, Jianxi Gao, Malik Magdon-Ismael <i>Published in IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM) 2023, https://doi.org/10.1145/3625007.3631184</i>
RESEARCH EXPERIENCE	IBM RESEARCH (SUMMER 2024)

◇ **In-context Learning**

IBM Mentors: Dr. Yingdong Lu, Dr. Tomasz Nowicki, Dr. Songtao Lu

- Advanced theoretical understanding of transformers' capacity for in-context learning of dynamic processes.

◇ **Multi-level Optimization**

IBM Mentor: Dr. Songtao Lu

- Designed optimization algorithms and conducted experiments enabling Language Models to in-context learn stepwise functions through chain-of-thought, achieving reduced stepwise error relative to previous methods.

UNIVERSITY OF CALIFORNIA, LOS ANGELES (SPRING 2024)

◇ **Training Dynamics of Neural Networks**

- Applied advanced techniques to develop a machine learning model that leveraged the network architecture and an initial observed time window to capture and predict the dynamics of training trajectories.

RENSSELAER POLYTECHNIC INSTITUTE (SPRING 2022 - PRESENT)

◇ **Reverse Engineering Networked Dynamical Systems**

- Developed and published an efficient algorithm to infer the dynamical parameters via observed system equilibrium and applied the algorithm in a diverse range of fields, including ecology, biology, epidemiology, and neural network training
- Exploring data-driven approaches to infer the governing dynamics of complex systems from time-series data

◇ **Dimension Reduction for Dynamical Complex Systems**

- Developing effective low-dimensional representation of high-dimensional dynamical complex systems
- Applying dimension reduction approaches to study the conditions for the tipping point leading to network collapses

◇ **Network Inference**

- Developed an approach to infer network structure from system equilibrium

UNIVERSITY OF TORONTO

◇ **Social Network Analysis on Stigmatizing Tweets Related to COVID-19 (with Prof. Syed Ishtiaque Ahmed, University of Toronto)**

2020.05 - present

Collected and maintained a dataset of 650+ million tweets. Accomplished statistical analysis on stigmatizing tweets, including calculating correlation between proportion of stigmatizing tweets and political status of states in North America. Constructed a network of hashtags and a retweet network of Twitter users, using Python and Gephi, to find influential hashtags and Twitter users in the networks, respectively. Contributed to a submission to the CPHA's COVID-19 & Public Health Forum in April 2021.

◇ **Inter-rater Reliability App Implementation (with Prof. Priyank Chandra, University of Toronto)**

2020.05 - 2020.09

Worked on the algorithms that calculate the degree of agreement among different raters.

Implemented a standalone app that computes various inter-coder reliability statistics (e.g., Fleiss' Kappa) using ElectronJS and React.

HONOURS AND AWARDS	<ul style="list-style-type: none"> Selected as a graduation spotlight student at the University of Toronto: https://web.cs.toronto.edu/news-events/news/graduation-spotlight-yanna-ding Spring 2021 	
	<ul style="list-style-type: none"> Mitacs Research Training Award 	Fall 2020
	<ul style="list-style-type: none"> Department of Computer Science, Undergraduate Research Award University of Toronto 	Summer 2020
	<ul style="list-style-type: none"> Admission Scholarships, University of Toronto 	Fall 2017
	<ul style="list-style-type: none"> Dean's List Scholar, Faculty of Arts and Science, University of Toronto 	2018 - 2021
	<ul style="list-style-type: none"> The Chancellor's Scholarship for high academic achievement St. Hilda's Fund 	2019, 2020
SKILLS	<ul style="list-style-type: none"> Programming in python, \LaTeX C, C++, MATLAB, Java and JavaScript. 	
	<ul style="list-style-type: none"> Pytorch 	
	<ul style="list-style-type: none"> Relevant courses: Machine Learning and Optimization, Machine Learning from Data, Frontiers in Network Science 	