

Yanna Ding

CONTACT (838) 200-5371 yannading10@gmail.com

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

- ◇ Ph.D. program in Computer Science
Advisor: Prof. Jianxi Gao
GPA: 4.0/4.0 Spring 2022 - Current

University of Toronto, Toronto, Ontario, Canada

- ◇ Honours Bachelor of Science in Computer Science and Mathematics
GPA: 3.92/4.0 2017 - 2021

- PUBLICATION
- ◇ **Predicting Time Series of Networked Dynamical Systems without Knowing Topology**
Yanna Ding, Zijie Huang, Malik Magdon-Ismael, Jianxi Gao
arXiv, <http://arxiv.org/abs/2412.18734>
 - ◇ **EMO: Epigraph Based Multilevel Optimization For Enhancing Chain Of Thought Reasoning Capabilities**
Songtao Lu, Yanna Ding, Lior Horesh, Jianxi Gao, Malik Magdon-Ismael
Accepted by IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2025
 - ◇ **Architecture-Aware Learning Curve Extrapolation via Graph Ordinary Differential Equation**
Yanna Ding, Zijie Huang, Xiao Shou, Yihang Guo, Yizhou Sun, Jianxi Gao
Accepted by AAAI Conference on Artificial Intelligence (AAAI) 2025, <https://arxiv.org/abs/2412.15554>
 - ◇ **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)
Accepted by the 4th Efficient Natural Language and Speech Processing workshop (NeurIPS ENLSP) 2024
 - ◇ **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
Published in Phys. Rev. E 109, 034301 (2024), <https://doi.org/10.1103/PhysRevE.109.034301>

◇ **Learning Network Dynamics via Noisy Steady States**

Yanna Ding, Jianxi Gao, Malik Magdon-Ismaïl

Published in IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM) 2023, <https://doi.org/10.1145/3625007.3631184>

RESEARCH
EXPERIENCE

IBM RESEARCH (SUMMER 2024)

◇ **In-context Learning**

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

◇ **Multi-level Optimization**

- 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.

◇ **Systematic Evaluation of Decoding-Free Candidate Selection Methods for Generative Language Models**

- Benchmarked state-of-the-art decoding-free candidate selection methodologies across diverse domains.

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 ◇ 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

- ◇ **Mitacs Research Training Award** Fall 2020

- ◇ **Department of Computer Science, Undergraduate Research Award** University of Toronto Summer 2020

- ◇ **Admission Scholarships**, University of Toronto Fall 2017

- ◇ **Dean's List Scholar**, Faculty of Arts and Science, University of Toronto 2018 - 2021

- ◇ **The Chancellor's Scholarship** for high academic achievement St. Hilda's Fund 2019, 2020

SKILLS ◇ Programming in python, L^AT_EX, C, C++, MATLAB, Java and JavaScript.
 ◇ Pytorch
 ◇ Relevant courses: Machine Learning and Optimization, Machine Learning from Data, Frontiers in Network Science

MENTORING **Kerui Wu**, undergraduate student at *Rensselaer Polytechnic Institute* **Sept. 2024 – Present**
 Research topic: Efficient networked dynamical system simulation via Mean-field Approach