Yanna Ding

PORTFOLIO https://dingyanna.github.io

AFFILIATION Department of Computer Science Rensselaer Polytechnic Institute
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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

- ◊ **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)
  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-Ismail
  Physics Review E, 2024, https://doi.org/10.1103/PhysRevE.109.034301
- ◊ **Learning Network Dynamics via Noisy Steady States**
  Yanna Ding, Jianxi Gao, Malik Magdon-Ismail
  ASONAM, 2023, https://doi.org/10.1145/3625007.3631184

PAPER IN REVIEW

- ◊ **EMO: Epigraph Based Multilevel Optimization for Enhancing Chain of Thought Reasoning Capabilities**
  Songtao Lu, Yanna Ding, Lior Horesh, Jianxi Gao, Malik Magdon-Ismail
- ◊ **Towards Understanding In-context Learning**
  Yanna Ding, Songtao Lu, Yingdong Lu, Tomasz Nowicki, Jianxi Gao
- ◊ **Learning Curve Extrapolation from a Dynamics-based Approach**
  Yanna Ding, Zijie Huang, Yihang Guo, Yizhou Sun, Jianxi Gao
- ◊ **Reconstructing Network Dynamics Without Topology Information**
  Yanna Ding, Zijie Huang, Malik Magdon-Ismail, Jianxi Gao

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

- 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, LaTeX C, C++, MATLAB, Java and JavaScript.
- Pytorch
- Relevant courses: Machine Learning and Optimization, Machine Learning from Data, Frontiers in Network Science