Tianyue H. Zhang

tianyue.zhang@mila.quebec · https://tianyuehz.github.io/

Education

Sept. 2023 - Present	**Mila/Université de Montréal** *Ph.D. Computer Science* Supervised by Dr. Simon Lacoste-Julien
Sept. 2021 - Sept. 2023	**University of British Columbia - 95.3%** *M.Sc. Computer Science, Lab of Computational Intelligence* Supervised by Dr. Mark Schmidt Thesis (in progress): Strategic Exploration in Reinforcement Learning
Sept. 2015 - Sept. 2019	**University of British Columbia - Major 87.3%** *B.Sc. Combined Honours in Computer Science and Mathematics* Graduated with Distinction

Publications

AISTATS 2024 (In submission)	**Posterior Sample Efficient Algorithms for Stochastic Bandits** *B. Hu, **T. Zhang**, M. Lecuyer, N. Hegde*
Neurips Opt 2023	**From 623514908081161688290923870 8 to 29: Vanilla Thompson Sampling Revisited** *B. Hu, **T. Zhang***
UAI 2023	**Optimistic Thompson Sampling for Episodic Reinforcement Learning** *B. Hu, **T. Zhang**, N. Hegde, M. Schmidt*

Research Experience

Sept. 2022 - May. 2023	**Optimistic Thompson Sampling: Strategic Exploration in Bandits and Reinforcement Learning (Ms. Thesis)** *UBC · Department of Computer Science* Supervised by Dr. Mark Schmidt and Dr. Bingshan Hu - Designed and analyzed sample efficiency via regret bound of optimistic Thompson Sampling method for multi-armed bandits and episodic RL - Implemented numerical simulations to experiment with practical performance
Sept. 2022 - Dec. 2022	**Optimization in Safe RL** *UBC · Department of Computer Science* Supervised by Dr. Mark Schmidt and Dr. Sharan Vaswani (SFU) - Researching safe reinforcement learning modeled by constrained Markov Decision Process, its linear programming formulation, and existing convergence bounds - Approaching zero constraint violation in tabular online learning via Interior Point Method, and exploring extension to linear function approximation via policy mixture
May 2019 - Aug. 2019	**Safe Set Reachability Analysis - Undergraduate Research Assistant** *UBC · Department of Computer Science* Supervised by Dr. Ian Mitchell - Investigated finite horizon invariant kernel of an affine system using zonotopes - Improved approximation of heuristic objectives and proving its convexity under scaling - Formulated optimization and automated test routines in Julia using convex.jl and JuMP

Jan. 2019 - Apr. 2019 **Mini-max games on Galton-Watson Trees - Directed Studies**
UBC · Department of Mathematics

Supervised by Dr. Omer Angel

- Studied minimax game and its convergence and endogeny on Galton-Watson tree
- Analysed uniqueness of distribution function via numerical Taylor series expansions

Scholarships and Awards

2022 **UBC Cloud Innovation Center Fellowship, $20000**
- Assistantship and scholarship funding based on academic performance and experience

2019 **NSERC Undergraduate Student Research Award, $6000**
- Awarded to students demonstrating exemplary qualities for research in natural sciences

2018 **UBC Faculty of Science International Student Scholarship, $10000**
- Awarded to students demonstrating strong academic achievement, engagement in the faculty, and potential to make scholarly contributions within their chosen field of study

2016, 2017, 2018, 2019 **UBC Science Faculty Dean's Honour List**
- Awarded to students maintaining an academic average above 80%

2015 **UBC Outstanding International Student Award, $6000**
- Entrance scholarship awarded to qualified students showing strength academically and displaying involvement outside of the classroom

Course Projects

Jan. 2022 - Apr. 2022 **Stability of Stochastic Gradient Descent**
UBC · CPSC 532S: Statistical Learning Theory

- Conducted literature review on generalization error and uniform stability of SGD and its practical implications in differential privacy and online learning

Jan. 2022 - Apr. 2022 **Deep Generative Models**
UBC · CPSC 540: Machine Learning

- Studied architecture of Variational Auto-encoder, Generative Adversarial Networks, and normalizing flows, compared advantages, limitations, and applications of each model

Sept. 2021 - Dec. 2021 **Transfer Learning in Dynamic Environment**
UBC · CPSC 533V: Learning to Move

- Implemented Soft Actor-Critic method on OpenAI gym classic control games with Proximal Policy optimization method and GAE lambda advantage function
- Trained universal policy with dynamic system identification to reduce Sim-to-Real gap

Sept. 2021 - Dec. 2021 **Mitigating Bias in Hate Speech Detection**
UBC · CPSC 503: Computational Linguistics

- Fine-tuned and compared BERT, LSTM, and RNN for online hate speech detection
- Mitigated bias by generating synthetic identity words via LDA topic modeling

Sept. 2021 - Dec. 2021 **Graph Recommendation System**
UBC · EECE 571F: Deep Learning with Structures

- Implemented experiments on feature transformations and activations on Graph Convolutional Neural Network-based collaborative filtering recommendation system
- Combine knowledge graph with GCN models to exploit auxiliary information

Teaching

Sept. 2023 - Present
Graduate Teaching Assistant
Mila/Polytechnique Montreal INF8245E - Machine Learning
- Design and implement coding assignments in applied machine learning including backpropagation and optimization in multi-layer perceptron
- Automate testing and grading for coding assignments

Sept. 2021 - May 2023
Graduate Teaching Assistant
UBC · CPSC 532M/340: Machine Learning and Data Mining
- Gave guest lectures on Deep Reinforcement Learning and Autonomous Driving
- Hosted weekly tutorials on topics in algorithms for dimensionality reduction, nonlinear regression, classification, clustering, and unsupervised learning

Jan. 2018 - Apr. 2018
Undergraduate Teaching Assistant
UBC · Math 152: Linear Systems
- Designed and graded homework assignments and exam questions for 2D and 3D geometry, vectors and matrices, eigenvalues and vibration, physical applications
- Hosted lab sessions to demonstrate computer solutions of large systems using MATLAB

Sept. 2017 - Apr. 2018
Undergraduate Teaching Assistant
UBC · CPSC 121: Models of Computation
- Hosted weekly tutorials on physical and mathematical structures of computation, sets and relations, and proof techniques
- Directed weekly lab sessions on Boolean algebra and combinations logic circuits, functions and sequential circuits, finite state machines, and sequential instruction execution

July 2017 - Aug. 2017
Undergraduate Teaching Assistant
UBC · Math 102: Integral Calculus
- Graded homework assignments and exams on functions, derivatives, optimization, growth and decay, and discrete probability

Jan. 2017 - Apr. 2017
Mathematics Mentor
Windermere Secondary School
- Mentored around 25 high-school students with math or science homework

Competitions

Dec. 2018
Putnam Competition, Mathematical Association of America
Ranked top 1500 in North America

Sept. 2014
Chinese Physics Olympiad (CPhO)
Guangdong provincial secondary prize

Presentations

Aug. 2023
Optimistic Thompson Sampling: Strategic Exploration in Bandits and RL
UBC · Thesis presentation

Apr. 2023
Deep exploration via randomized value function
UBC · Reinforcement Learning Reading Group

Oct. 2022
Language Models are Few Shot Learners (GPT-3)
UBC · Machine Learning Reading Group

June 2022
Active Learning and Image Segmentation
UBC · Machine Learning Reading Group

Mar. 2022
Oops I Took a Gradient: Scalable Sampling for Discrete Distributions
UBC · Machine Learning Reading Group

Dec. 2021
Understanding The Origins of Bias in Word Embeddings
UBC · Machine Learning Reading Group

Dec. 2021
Reinforcement Learning and Autonomous Driving
UBC · CPSC 340: Machine Learning and Data Mining

Nov. 2021
Probabilistic Topic Modeling
UBC · CPSC 503: Computational Linguistics

Additional Work Experience

May 2022 - Dec. 2022 **Research Developer**
UBC-AWS Cloud Innovation Center
- Advised undergraduate students with machine learning knowledge to build an innovation dashboard for the Office of the Vice-President, Research and Innovation of UBC
- Processed NSERC and CIHR data with AWS Glue Studio, developed a web application to display researchers' profiles and contributions to assist grant resource allocation

Sept. 2019 - Apr. 2021 **Software Engineer**
Magnitude - Simba Technologies
- Developed JDBC driver releases for Amazon Redshift Database using Java and SQL
- Designed customer test packages and its website BigSight using React.js and HTML/CSS
- Implemented installation package file directory and test automation Python scripts

July 2018 - Aug. 2018 **Research Intern**
Bank of China International, London
- Trained a US Treasury prediction model using linear regression, analyzed the company's earning calls, and composed financial reports on futures and options predictions

May 2018 - June 2018 **Research Intern**
China CITIC Bank International Limited, Shanghai
- Processed and analyzed companies' financial statement data, investigated backgrounds of their competitors, buyers, and suppliers and assessed future market value and risks

July 2016 - Aug. 2016 **Customer Manager Intern**
Guotai Junan Securities Co., Ltd, Shanghai
- Constructed personalized securities investment portfolios, calculated and visualized expected rate of return and risk levels

Certificates

Dec. 2018 **Instructional Skills Workshop Completion Certificate**
UBC Centre for the Integration of Research, Teaching, and Learning (CIRTL)

Volunteering and Extracurricular Activities

Dec. 2023	Student Volunteer in Neurips 2023
Sept. 2023 -Present	Organization team for Women@Mila
Aug. 2023	Student Volunteer in UAI 2023
Jan. 2022 - Aug.2023	Member, UBC Mathematics of Information, Learning, and Data research group
Sept. 2017 - Apr.2023	Representative, UBC Dance Horizon Club
Apr. 2022	Volunteer, Graduate Student Orientation
Dec. 2021	Student Helper, Graduate Recruiting Committee
Sept. 2015 - Apr. 2019	Member, UBC Math Club
Sept. 2018	Volunteer, UBC Computer Science Tri-Mentoring Program
Apr. 2017	Volunteer, Greater Vancouver Regional Science Fair (GVRSF) Lab Tour