Jessica Tang

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Research Interests: Natural Language Processing, Interpretability, Human-Computer Interaction, Philosophy

EDUCATION

BASc in Engineering Science in Machine Intelligence　　　　　　　　　　　**Sep 2022 – Apr 2026**

University of Toronto

RESEARCH EXPERIENCE

Undergraduate Research Intern　　　　　　　　　　　　　　　　　　　　　**May 2025 – Aug 2025**

Microsoft Research | Dr. Sharad Agrawal and Dr. Shraddha Barke

- Investigating interpretability in multi-agent LLM systems.

Machine Learning Researcher (NLP)　　　　　　　　　　　　　　　　　　**Apr 2024 – May 2025**

KITE Research Institute | Dr. Shehroz Khan

- Led the design and implementation of an end-to-end Python pipeline leveraging LLMs for quality assessment and textual feedback for virtual physical rehabilitation, creating an adapted Auto-CoT algorithm.
- Developed a graph network (ST-GCN) for classification tasks and applied Grad-CAM for model explainability.
- Programmed tokenization of spatial-temporal skeletal data with a variational autoencoder for input to LLMs.

Computational Neuroscience Research Assistant　　　　　　　　　　　　　**May 2023 – May 2025**

Cognitive Neuroscience and Sensorimotor Integration Lab | Dr. Matthias Niemeier

- Designed a task-agnostic CNN architecture to model robotic hand grasp predictions and object classification as biological control systems, achieving 81.5% and 85% test accuracy, respectively.
- Conducted neural network explainability analysis (Neuron Shapley, activation maximization) for ML and brain correlation. Exploring methods of information flow with linkage prediction in graph convolution networks.
- Compared reinforcement learning reacher with TD3 to brain functionality, observing minimal feature task integration between realistic and unrealistic physics environments. Used DCI-ES framework and beta weight regression to analyze predictor effects.
- Programmed a fully automated EEG experiment with synchronized motion capture sensors, user interface, and data collection, writing Python wrappers for Motive software.

Perception Software Engineer (Computer Vision)　　　　　　　　　　　　　**Feb 2024 – Mar 2025**

Toronto Robotics and AI Lab (TRAIL) | Dr. Steven Waslander

- Implemented lane clustering and validation algorithms to develop an automatic scene labeller, achieving 95% mean average precision using multimodal data from topological maps, LiDAR, GPS, and cameras.
- Trained a transformer architecture on a dataset for autonomous vehicles under adverse weather conditions.
- Optimized a Python conversion pipeline of a 100,000+ node DMP map to a fully connected HD map.

PAPERS & PROJECTS

- [Paper] **J. Tang**, A. Abedi, T. Colella, S. Khan. Rehabilitation Exercise Quality Assessment and Feedback Generation Using Large Language Models with Prompt Engineering. *IJCAI 2025 ARIAL Workshop. Communications in Computer and Information Science (CCIS), Springer Nature, 2025.*

- [Workshop] **J.Tang,** N. Yang, H. Hussain (2025). Spatio-temporal Multimodal Wildfire Spread Prediction: Exploring Vision Transformers and Lightweight Models. *ECE324 Final Project.*

- [Poster] **J.Tang,** A. Abedi, S. Som, T. Colella, S. Khan (2024). Large Language Models into Virtual Cardiac Rehabilitation to Provide Real-Time Assistance to Heart Failure Patients. *TransformHF Symposium.*

- [Poster] T. Reza, S. Luo, E. Jordan, **J. Tang**, K. Patel, M. Niemeier (2024). Emergence of dorsal-like and ventral-like properties in artificial neural network. *Society of Neuroscience Conference.*

- [Poster] T. Reza, S. Luo, G. Singh, **J. Tang**, R. Jain, M. Niemeier (2024). [Comparative analysis of optimization trends in dorsal and ventral stream using computation model](#). *Cognitive Neuroscience Society Conference.*

- [Workshop] T. Cai, K. Howard, B. Zhou, **J. Tang**, V. He, D. Liu (2022). [Modular Can-Sized Satellite System with Active Attitude Control](#). *European Space Agency, International CanSat Competition.*

- [Workshop] **J. Tang**. (2021). [Deep Reinforcement Learning Controller for Indoor Farming](#). *Nanyang Technological University, International Student Conference on Artificial Intelligence.*

SCHOLARSHIPS & AWARDS

$30,000 Award for Diversity and Innovation in Technology, *Royal Bank of Canada*	2024
$7500 Research Award, *Transform HF*	2024
$400 Best Project Overall, *Cohere*	2023
$2000 Dean's Merit Award, *University of Toronto*	2022
$1000 Ingenious+ National Finalist and Regional Innovation Winner	2022
$1250 District/Authority Scholarship in Technical and Trades Training	2022
SGD 1000 Best Presenter, *International Student Conference On Artificial Intelligence*	2021
$560 AI4Impact Grant Award, *AI4ALL*	2021

LEADERSHIP, TEACHING, & FELLOWSHIPS

President and Founder, *IlluminAIte Academy*   **Jul 2020 – Present**
- Increased accessibility to ethical computer science (CS) & AI education by leading an executive team of over 20 and reaching 1000+ participants from 42 cities and 11 countries worldwide.
- Directed and hosted 16 interdisciplinary AI workshops, hackathons and events featuring guest speakers from organizations including Zoom, IBM, MIT, University of Toronto (UofT), and Simon Fraser University.
- Organized the UofT AI Ethics Hackathon, attracting students of various disciplines, including non-technical backgrounds.
- Taught Introduction to CS & AI programs and pioneered the first high school AI Ethics Competition in North America.
- Over $3000 in funding from AI4ALL, University of Toronto, NCWIT, SAP, and Perplexity AI.

Course Instructor, *Wave Learning Festival*   **June 2021 – Jul 2021**
- Taught Introduction to Artificial Intelligence to 74 students, focusing on the fundamentals of neural networks and ethics.

AI Scholar, Curriculum Developer, *AI4ALL*   **Jul 2020 – Apr 2021**
- Selected as one of 32 students across Canada for AI4ALL Summer Program.
- Programmed face detection and classification of human facial expressions training convolutional neural networks.
- Developed introductory AI curriculum crash course for middle and high school students, implemented by the Bronx School of Sciences, featured by National Center for Women & Information Technology (NCWIT)