HARRIS CHAN

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RESEARCH INTERESTS

Building general agents for open-ended environments using world models, multimodal foundation models, and goal-conditioned reinforcement learning.

EDUCATION

University of Toronto
Doctor of Philosophy, Computer Science — January 2019 - June 2026
Supervisor: Prof. Jimmy Ba and Prof. Sheila McIlraith — CGPA: A+

Master of Science, Computer Science — September 2017 - January 2019
Supervisor: Prof. Jimmy Ba and Prof. Sanja Fidler — CGPA: A+

Bachelor of Applied Science in Engineering Science (ECE Option) — September 2011 - June 2016
Thesis Supervisor: Prof. Deepa Kundur — CGPA: 3.92

RESEARCH EXPERIENCE

Research Scientist — December 2023 - Present
Google DeepMind, Toronto, Canada
Manager: Vlad Mnih, Luyu Wang

Research Intern — September 2022 - January 2023
DeepMind
Supervisor: Vlad Mnih

Student Researcher — February 2022 - July 2022
Google Brain Robotics
Supervisor: Ted Xiao

- Research topic: Robotic Skill Acquisition via Instruction Augmentation with Vision-Language Models

Research Intern — June 2021 - October 2021
Google Brain Robotics
Supervisor: Ted Xiao

- Research topic: Learned Reward Functions in Multi-task Deep Reinforcement Learning for Robotic Manipulation

Research Intern — June 2020 - October 2020
Google Brain
Supervisor: Delesley Hutchins

- Research topic: Deep Structured Model for Program Understanding

Research Intern — June 2019 - September 2019
Google Brain Toronto
Supervisor: William Chan

- Research topic: Multichannel Generative Language Models

Research Intern — January 2019 - May 2019
Borealis AI
Supervisor: Kevin Luk

- Research topic: Auto-regressive Graph Generation Modeling with Improved Evaluation Methods

Undergraduate Thesis Student September 2015 - April 2016
University of Toronto
Supervisor: Prof. Deepa Kundur

· Research topic: Investigating the impact of intrusion detection system performance on communication latency and power system stability

Research Student May 2012 - August 2012
Condensed Matter Physics, University of Toronto
Supervisor: Prof. Young-June Kim

· Research topic: 3-Omega method for measuring thermal conductivity for thermoelectric materials

PUBLICATIONS

Peer-reviewed conference papers

1. Anian Ruoss, Fabio Pardo, **Harris Chan**, Bonnie Li, Volodymyr Mnih, Tim Genewein. LMAct: A Benchmark for In-Context Imitation Learning with Long Multimodal Demonstrations. In *International Conference on Machine Learning* (**ICML**) 2025.
2. Shalev Lifshitz*, Keiran Paster*, **Harris Chan**†, Jimmy Ba, Sheila McIlraith. STEVE-1: A Generative Model for Text-to-Behavior in Minecraft. In *Conference on Neural Information Processing Systems* (**NeurIPS**) 2023. (**Spotlight**)
3. Ted Xiao*, **Harris Chan***, Pierre Sermanet, Ayzaan Wahid, Anthony Brohan, Karol Hausman, Sergey Levine, Jonathan Tompson. Robotic Skill Acquisition via Instruction Augmentation with Vision-Language Models. In *Robotics: Science and Systems* (**RSS**) 2023.
4. Yongchao Zhou*, Andrei Ioan Muresanu*, Ziwen Han*, Keiran Paster, Silviu Pitis, **Harris Chan**, Jimmy Ba. Large Language Models Are Human-Level Prompt Engineers. In *International Conference on Learning Representations* (**ICLR**) 2023.
5. Wenlong Huang*, Fei Xia*, Ted Xiao*, **Harris Chan**, Jacky Liang, Pete Florence, Andy Zeng, Jonathan Tompson, Igor Mordatch, Yevgen Chebotar, Pierre Sermanet, Noah Brown, Tomas Jackson, Linda Luu, Sergey Levine, Karol Hausman, Brian Ichter. Inner monologue: Embodied reasoning through planning with language models. In *Conference on Robot Learning* (**CoRL**) 2022. (To appear)
6. Beining Han, Chongyi Zheng, **Harris Chan**, Keiran Paster, Michael R. Zhang, Jimmy Ba. Learning Domain Invariant Representations in Goal-conditioned Block MDPs. In *Conference on Neural Information Processing Systems* (**NeurIPS**) 2021.
7. **Harris Chan**, Jamie Kiros, William Chan. Multichannel Generative Language Models. In *Findings of Empirical Methods in Natural Language Processing* (**EMNLP**) 2020.
8. Silviu Pitis*, **Harris Chan***, Stephen Zhao, Bradly Stadie, Jimmy Ba. Maximum Entropy Gain Exploration for Long Horizon Multi-goal Reinforcement Learning. In *International Conference on Machine Learning* (**ICML**) 2020.
9. Silviu Pitis*, **Harris Chan***, Kiarash Jamali, Jimmy Ba. An Inductive Bias for Distances: Neural Nets that Respect the Triangle Inequality. In *International Conference on Learning Representations* (**ICLR**) 2020.
10. Yeming Wen*, Kevin Luk*, Maxime Gazeau*, Guodong Zhang, **Harris Chan**, Jimmy Ba. Interplay Between Optimization and Generalization of Stochastic Gradient Descent with Covariance Noise. In *International Conference on Artificial Intelligence and Statistics* (**AISTATS**) 2020.

Preprint or Submission

1. SIMA Team (including **Harris Chan**). SIMA 2: A Generalist Embodied Agent for Virtual Worlds. *arXiv preprint arXiv:2512.04797*, 2025.
2. Google DeepMind (including **Harris Chan**). Genie 2: A large-scale foundation world model. *Google DeepMind Blog*, 2024.
3. **Harris Chan***, Yuhuai Wu*, Jamie Kiros, Jimmy Ba. ACTRCE: Augmenting Experience via Teacher's Advice For Multi-Goal Reinforcement Learning. *arXiv preprint arXiv:1902.04546*, 2019.

Workshops

1. Kate Baumli, Satinder Singh, Feryal Behbahani, **Harris Chan**, Gheorghe Comanici, Sebastian Flennerhag, Maxime Gazeau, Kristian Holsheimer, Dan Horgan, Michael Laskin, Clare Lyle, Volodymyr Mnih, Alexander Neitz, Fabio Pardo, Jack Parker-Holder, John Quan, Tim Rocktschel, Himanshu Sahni, Tom Schaul, Yannick Schroecker, Stephen Spencer, Richie Steigerwald, Luyu Wang, Lei Zhang. Vision-Language Models as a Source of Rewards. In *Agent Learning in Open-Endedness Workshop (ALOE)*. Workshop held at Neural Information Processing Systems (NeurIPS), 2023.
2. Shalev Lifshitz*, Keiran Paster*, **Harris Chan**†, Jimmy Ba, Sheila McIlraith. A Generative Model for Text Control in Minecraft (Abridged Version). In *Structured Probabilistic Inference Generative Modeling* and *Interactive Learning with Implicit Human Feedback*. Workshop held at ICML 2023.
3. Ted Xiao*, **Harris Chan***, Pierre Sermanet, Ayzaan Wahid, Anthony Brohan, Karol Hausman, Sergey Levine, Jonathan Tompson. Skill Acquisition via Instruction Augmentation with Vision-Language Models. *arXiv preprint arXiv:2211.11736*, 2022. In *Foundation Models for Decision Making (FMDM)*. Workshop held at NeurIPS 2022.
4. Yongchao Zhou*, Andrei Ioan Muresanu*, Ziwen Han*, Keiran Paster, Silviu Pitis, **Harris Chan**, Jimmy Ba. Large Language Models Are Human-Level Prompt Engineers. In *Foundation Models for Decision Making (FMDM)*. Workshop held at NeurIPS 2022. (**Oral**)
5. Silviu Pitis*, **Harris Chan***, Stephen Zhao, Bradly Stadie, Jimmy Ba. Maximum Entropy Gain Exploration for Long Horizon Multi-goal Reinforcement Learning. In *Adaptive and Learning Agents Workshop*. Workshop held at International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2020. (**Oral, Best Paper Award**)
6. **Harris Chan**, Jamie Kiros, William Chan. Multilingual KERMIT: It's Not Easy Being Generative. In *Perception as generative reasoning Workshop*. Workshop held at Neural Information Processing Systems (NeurIPS), 2019. And in *3rd Workshop on Neural Machine Translation and Generation (WNMT)*. Workshop held at EMNLP-IJCNLP, 2019.
7. Chia-Cheng Liu*, **Harris Chan***, Kevin Luk. Auto-regressive Graph Generation Modeling with Improved Evaluation Methods. In *Graph Representation Learning Workshop*. Workshop held at NeurIPS 2019.
8. Silviu Pitis*, **Harris Chan***, Jimmy Ba. ProtoGE: Prototype Goal Encodings for Multi-goal Reinforcement Learning. In *4th Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM)*, 2019.
9. Yuhuai Wu, **Harris Chan**, Sanja Fidler and Jimmy Ba. ACTRCE: Augmenting Experience via Teachers' Advice. In *1st Workshop on Goal Specifications for Reinforcement Learning*. Workshop held jointly at ICML, IJCAI, AAMAS 2018. (**Oral**)
10. **Harris Chan**, Eman Hammad, Deepa Kundur. Investigating the impact of intrusion detection system performance on communication latency and power system stability. In *Proceedings of the Workshop on Communications, Computation and Control for Resilient Smart Energy Systems,* 2016.

PROFESSIONAL EXPERIENCE

SoC Design Engineer August 2016 - September 2017
Intel Programmable Solutions Group, Toronto, Canada

· Usability Tools Team in the OpenCL Group for Intel FPGA

Co-founder and developer May 2016 - September 2017
Curovate, Entrepreneurship Hatchery, University of Toronto

· Worked with a team of a physiotherapist and three other Engineering Science students to develop an Android application for post ACL surgery/injury rehabilitation, as well as creating a business and marketing plans.

Engineering Intern, Video Processing Group May 2014 - September 2015
Qualcomm Canada, Markham, Canada

· Designed and performed image and video quality assessment for Display Stream Compression (DSC) technology

- Created a Kivy application for subjective image quality trials according to proposed standard ISO/IEC DIS 29170-2 for testing nearly lossless coding, and conducted the experiment to verify results from Samsung
- Modelled in C the pipeline of video post processing algorithms, for use with hardware design verification

Co-founder and developer May 2013 - September 2013
Nanomaps, Entrepreneurship Hatchery, University of Toronto

- Worked with a team of two other Engineering Science students to develop a proof of concept interactive indoor map of commercial areas on Android, with extension to mobile navigation system for the blind
- Searched and contacted relevant stakeholders such as retail storeowners and marketing director of the mall, and conducted surveys among venue visitors

TEACHING EXPERIENCE

Teaching Assistant September 2017 - Present
University of Toronto

- CSC413 Neural Networks and Deep Learning, Winter 2020-2022 (Head TA 2021-2022)
- CSC311 Introduction to Machine Learning, Fall 2019/2020
- ECE421 Introduction to Machine Learning, Winter 2019
- MIE324 Introduction to Machine Intelligence, Summer (created 3 assignments) & Fall 2018
- CSC321 Introduction to Neural Networks, Winter 2018
- CSC411 Introduction to Machine Learning, Fall 2017

HONOURS & AWARDS

RBC Graduate Fellowship	2021
NSERC Canada Graduate Scholarship (CGS-D), University of Toronto (Accepted)	2021 - 2024
MITACS Accelerate (in collaboration with Borealis AI)	2019
NSERC Canada Graduate Scholarship (CGS-M), University of Toronto (Accepted)	2018
NSERC Canada Graduate Scholarship (CGS-M), University of Toronto (courteously Declined)	2016
Engineering Science Award of Excellence, University of Toronto	2016
Dean's List for all semesters, University of Toronto	2011-2016
Hill & Schumacher Entrepreneur Award, University of Toronto	2013
Herbert Gladish Memorial Award, University of Toronto	2013
Walberg Memorial Award, University of Toronto	2012
Engineering Science Research Opportunities Program (ESROP) Fellowship, University of Toronto	May 2012
Engineering Entrance Scholarships, University of Toronto	2011
Queen Elizabeth II Aiming for the Top, University of Toronto	2011 - 2016

PROFESSIONAL SERVICES

Conference Reviewer

- Conference on Neural Information Processing Systems (NeurIPS) 2019-2025
- International Conference on Learning Representations (ICLR) 2020
- International Conference on Machine Learning (ICML) 2019-2020