

SICONG (SHELDON) HUANG

<https://www.cs.toronto.edu/~huang/>, huang@cs.toronto.edu

EDUCATION

- University of Toronto** 09/2020 -
PhD in Computer Science
Advised by Prof. Roger Grosse and Prof. Jimmy Ba
cGPA: 4.00/4.00
- University of Toronto** 09/2019 - 06/2020
Honours Bachelor of Science in Computer Science, Statistics and Mathematics. 09/2017 - 05/2018
Victoria College, Faculty of Arts & Science
Advised by Prof. Roger Grosse, Prof. Alireza Makhzani and Prof. Sageev Oore
cGPA: 3.92/4.00
- Massachusetts Institute of Technology** 06/2019- 08/2019
Visiting Student at the Department of Brain and Cognitive Sciences BCS
Advised by Prof. Josh Tenenbaum and Prof. Jiajun Wu
- University of Toronto** 09/2015 - 08/2017
Bachelor of Applied Science in Engineering Science
Faculty of Applied Science & Engineering
cGPA: 3.90/4.00
(Transferred to the Faculty of Arts & Science after Year 2)
- Tsinghua University High School (清华附中)** 09/2012 - 06/2015
Honor Science Class (理科实验班)
Merit Student. Awarded to top 5%. (三好学生)

PROFESSIONAL EXPERIENCE

- Borealis AI** 05/2021 - 08/2022
Research Scientist Intern (Part time).
- St. Michael's Hospital** 02/2021 - 09/2021
Research Student.
- Vector Institute, University of Toronto** 07/2020 - 09/2020
Research Intern.
Advisors: Prof. Frank Rudzicz and Prof. Marzyeh Ghassemi
- Computer Science and Artificial Intelligence Laboratory (CSAIL), Massachusetts Institute of Technology** 06/2019 - 09/2020
Researcher
Advisors: Prof. Josh Tenenbaum and Prof. Jiajun Wu
- Vector Institute, University of Toronto** 05/2018 - 05/2019
Research Intern (Part time).
Supervisor: Prof. Roger Grosse
- Borealis AI (RBC Institute for Research)** 01/2018 - 05/2019
Machine Learning Research Intern (Part time).
Manager: Dr. Yanshuai Cao

Vector Institute, University of Toronto Student Researcher (Part time). Supervisor: Prof. Roger Grosse	09/2017 - 04/2018
Department of Computer Science, University of Toronto Summer Research Assistant Supervisor: Prof. Roger Grosse	04/2017 - 08/2017
Ultrafast Photonics Lab, University of Toronto Summer Research Assistant Supervisor: Prof. Li Qian	04/2016 - 08/2016

PUBLICATIONS

- **Sicong Huang**, Jiawei He, and Kry Yik Chau Lui. Rethinking test-time likelihood: The likelihood path principle and its application to ood detection, 2024
- Nikita Dhawan, **Sicong Huang**, Juhan Bae, and Roger Baker Grosse. Efficient parametric approximations of neural network function space distance. In *International Conference on Machine Learning*, pages 7795–7812. PMLR, 2023
- Ian R McKenzie, Alexander Lyzhov, Michael Pieler, Alicia Parrish, Aaron Mueller, Ameya Prabhu, Euan McLean, Aaron Kirtland, Alexis Ross, Alisa Liu, et al. Inverse scaling: When bigger isn't better. *Transactions on Machine Learning Research (TMLR) 2023*, 2023
- Mingjian Jiang, Yangjun Ruan, **Sicong Huang**, Saifei Liao, Silviu Pitis, Roger Baker Grosse, and Jimmy Ba. Calibrating language models via augmented prompt ensembles. In *NeurIPS Challenges of Deploying Generative AI Workshop 2023*, 2023
- Rob Brekelmans*, **Sicong Huang***, Marzyeh Ghassemi, Greg Ver Steeg, Roger Baker Grosse, and Alireza Makhzani. Improving mutual information estimation with annealed and energy-based bounds. In *International Conference on Learning Representations*, 2022
- **Sicong Huang***, Alireza Makhzani*, Yanshuai Cao, and Roger Grosse. Evaluating lossy compression rates of deep generative models. In *International Conference on Machine Learning*. 2020
- Bryan M. Li, Alexander Cowen-Rivers, Piotr Kozakowski, David Tao, Siddhartha Rao Kamalakara, Nitarshan Rajkumar, Hariharan Sezhiyan, **Sicong Huang**, and Aidan N. Gomez. Generic reinforcement learning codebase in tensorflow. In *The Journal of Open Source Software*, 2019
- **Sicong Huang**, Qiyang Li, Cem Anil, Xuchan Bao, Sageev Oore, and Roger B. Grosse. Timbretron: A wavenet(cycleGAN(CQT(audio))) pipeline for musical timbre transfer. In *International Conference on Learning Representations*, 2019
- Aidan N. Gomez, **Sicong Huang**, Ivan Zhang, Bryan M. Li, Muhammad Osama, and Lukasz Kaiser. Unsupervised cipher cracking using discrete GANs. In *International Conference on Learning Representations*, 2018
- Yi Liu, **Sicong Huang**, and Li Qian. Stable polarization-dependent self pulsing in a brillouin amplified spun fiber. In *Specialty Optical Fibers*, pages SoW1H–6. Optical Society of America, 2016

- **Sicong Huang***, Yuancong Xu*, Xinghua Yan, Ying Shang, Pengyu Zhu, Wenying Tian, and Wentao Xu. Development and application of a quantitative loop-mediated isothermal amplification method for detecting genetically modified maize mon863. volume 95, pages 253–259. Journal of the Science of Food and Agriculture, 2015

TEACHING

Department of Computer Science, University of Toronto

Co-Instructor, Communication for Computer Scientists CSC2701	01/2023 - 05/2023
Mentor/TA, PRISM Program	01/2023 - 05/2023
Mentor/TA, PRISM Program	01/2022 - 05/2022
TA, Introduction to Machine Learning CSC311	09/2021 - 12/2021
Mentor/TA, PRISM Program	01/2021 - 05/2021
Head TA, Introduction to Machine Learning CSC2515	09/2020 - 12/2020
Prep TA, Introduction to Machine Learning CSC2515	06/2020 - 08/2020

Department of Mathematics, University of Toronto

TA, Linear Algebra II MAT224	01/2020 - 04/2020
TA, Linear Algebra I MAT223	09/2017 - 12/2017
TA, Calculus I MAT135	05/2017 - 08/2017

PROFESSIONAL SERVICE

Reviewer, Transactions on Machine Learning Research (TMLR)	2022,2023,2024
Reviewer, International Conference on Machine Learning (ICML)	2021, 2022, 2023
Reviewer, International Conference on Learning Representations (ICLR)	2021, 2022, 2023
Reviewer, Neural Information Processing Systems (NeurIPS)	2020, 2021, 2022

LEADERSHIP

FOR.ai

Co-Founder and Researcher	06/2017 - 06/2022
---------------------------	-------------------

- Co-founded an independent, international, distributed deep learning research group with Aidan Gomez, Ivan Zhang, and Byran Li.
- Helped reviewing applications (technical challenge submissions) and interviewing candidates.
- Participated in research projects, including CipherGAN and computational primitive and a research codebase for RL.
- Acquired by Cohere as Cohere For AI in 2022 June.

UTMIST(University of Toronto Machine Intelligence Student Team)

Advisor	09/2018 - Present
President	10/2016 - 08/2018
Co-Founder	10/2016 - Present

- Set up the vision, mission, name, and the executive team.
- Leading the team to organize a total of 16 events in 2017 academic year including a 10-hour minicourse (MIST101), machine learning industry & academic guest speaker series and more.
- Grown to over 700 members in the second year. Now a vibrant community with 2000+ members. See 2023 recap here.

Chestnut Residence Council, University of Toronto

VP Communications	09/2015 - 05/2016
-------------------	-------------------

*Equal Contribution

MENTORSHIP

Department of Computer Science, University of Toronto

Mentor, Graduate Application Assistance Program 2021, 2023

Mentor, The Alumni-Student Mentorship Program 2021, 2022, 2023

Division of Engineering Science, University of Toronto

Mentor, Nsight - Engineering Science Mentorship Program 2022

Department of Statistics, University of Toronto

Mentor, Statistical Sciences Mentorship program 2021, 2022, 2023 Collaborative Program in

Neuroscience, University of Toronto

Mentor and panelist, CPIN Undergraduate Mentorship Program 2021

University of Toronto Machine Intelligence Student Team, University of Toronto

Mentor, UTMIST Mentorship Program 2022, 2023

Psychology Students' Association, University of Toronto

Mentor, PSA Mentorship Program 2023

FAVORITE COURSES

Graduate-Level Courses

Advanced Topics in Social Psychology -

Motivational Theories in Social Psychology | PSY5431 by Jason Plaks Winter 2023

Philosophy of Psychology as a Social Science | PSY5432 by Romin Tafarodi Winter 2023

Behavioural Economics (PhD) | ECO3250 by Yoram Halevy Fall 2022

Algorithms for Collective Decision Making | CSC2556 by Nisarg Shah Winter 2022

Ethics of AI | ETH1000 by Markus Dubber et al. Fall-Winter 2022

Deep Learning: Theory & Data Science | MAT1510 by Vardan Papyan Winter 2020

Neural Net Training Dynamics | CSC2541 by Roger Grosse Winter 2020

Information Visualization | CSC2537 by Fanny Chevalier Fall 2020

Neuroscience Distinguished Lecture Series (Doctoral) | NEU2000 Fall-Winter 2021

Stochastic Processes | STA447/2006 by Jeffrey Rosenthal Winter 2020

Methods of Data Analysis I | STA302/1001 by Katherine Daignault Winter 2020

Mathematical Statistics I | STA452/2112 by David Brenner Fall 2019

Information Theory | ECE1502 by Wei Yu Fall 2019

Statistical Methods for ML II | STA414/2104 by David Duvenaud & Murat Erdogdu Winter 2019

Machine Learning and Data Mining | CSC411/2515 by Michael Guerzhoy Winter 2017

Cognitive Science Related

Cognitive Neuroscience | PSY493 by Meg Schlichting Winter 2020

Learning and Plasticity | PSY260 by Laura Corbit Fall 2019

Introduction to Cognitive Science | COG250 by John Vervaeke (Year Course) Fall-Winter 2018

Audited, not for credit

Social Psychology: Self and Society @ UC Berkeley by Robb Willer Winter 2024

AI Psychology | Psych 247 @ Stanford by Noah Goodman and Mike Frank Winter 2024

Positive Psychology @ Harvard University by Tal Ben-Shahar Winter 2024

Positive Psychology II @ Coursera x University of Pennsylvania by James Pawelski Fall 2023

Positive Psychology I @ Coursera x University of Pennsylvania by Martin E.P. Seligman Winter 2023

Principles of Microeconomics | 14.01 @ MIT by Jonathan Gruber Fall 2022

Psychology and Economics | 14.13 @ MIT by Frank Schilbach Summer 2022

Moral Foundations of Politics PLSC118 @ Yale by Ian Shapiro	Summer 2022
Transformers United CS25 @ Stanford Seminar	Summer 2022
Natural Language Understanding CS224U @ Stanford by Christopher Potts et al.	Summer 2022
Buddhist Psychology BPM232 @ UToronto by Anderson Todd	Summer 2022
NLP with Deep Learning CS224N @ Stanford by Chris Manning et al.	Winter 2022
Intro to Self-Determination Theory @ URochester by Richard Ryan	Winter 2022
Personality and Its Transformations PSY230 @ UToronto by Jordan Peterson	Fall 2021
Deep Reinforcement Learning CS294-112 @ UC Berkeley by Sergey Levine et al.	Summer 2019
Deep Unsupervised Learning CS294-158 @ UC Berkeley by Pieter Abbeel et al.	Summer 2019

COMPETITIONS, SCHOLARSHIPS & AWARDS

- Vector Institute Research Grant
Vector Institute for Artificial Intelligence 2020, 2021, 2022, 2023
- The Dr Lorus J Milne and Dr Margery J Milne Award
University of Toronto 05/2019
- Dean's Experience Enhancement Fund
University of Toronto 02/2019
- Konrad Group Digital Technology Scholarship
University of Toronto & Konrad Group 11/2018
- The Professor William Kingston and Dr John Kingston Scholarship
University of Toronto 10/2018
- ICLR Travel Award
International Conference on Learning Representations(ICLR) 05/2018 and 05/2019
- 1st Place in Microsoft College Code Competition
Microsoft 09/2017
- Dean's List
University of Toronto 2015-2020

TECHNICAL SKILLS

Programming	Python, Java, HTML, Matlab, C, Assembly, Verilog, Shell
Machine Learning	Pytorch, Tensorflow, Jax, Numpy, Scipy
Presentation	L ^A T _E X, PowerPoint
Software Documentation	Markdown, RST, Sphinx
Data Processing & Visualization	R, Matplotlib, Excel, Origin8, Capstone
Audio Processing	Audacity

INVITED TALKS AND POSTER PRESENTATIONS

- **ICLR2022, Online** 04/2022
Improving Mutual Information Estimation using Annealed and Energy-Based Bounds [Poster]
- **ICML2020, Online** 07/2020
Evaluating Lossy Compression Rates of Deep Generative Models [Poster]
- **NeurIPS Workshop on Bayesian Deep Learning 2019, Vancouver** 12/2019
Evaluating Lossy Compression Rates of Deep Generative Models [Oral and Poster]
- **Toronto Machine Learning Annual Conference, Toronto** 11/2019
TimbreTron [Poster]

- **Toronto Journal Club, Google Brain, Toronto.** 11/2019
Evaluating Lossy Compression Rates of Deep Generative Models [Oral]
- **Evolution of Deep Learning Symposium, Vector Institute** 11/2019
Evaluating Lossy Compression Rates of Deep Generative Models [Poster]
- **AI Squared Research Talk, University of Toronto** 09/2019
TimbreTron [Oral]
- **SIAM Talks, MIT** 06/2019
TimbreTron [Oral]
- **GANocracy Workshop, MIT** 05/2019
TimbreTron [Poster]
- **ICLR2019, New Orleans** 05/2019
TimbreTron [Poster]
- **Paper Reading Group, Borealis AI** 04/2019
Exploration Strategies in RL [Oral]
- **UTMIST Paper Reading Group, University of Toronto** 04/2019
Exploration Strategies in RL [Oral]
- **Victoria College Research Day, University of Toronto** 04/2019
TimbreTron [Poster]
- **Vector Research Symposium, University of Toronto** 02/2019
TimbreTron [Poster]
- **Paper Reading Group, Borealis AI** 12/2018
TimbreTron [Oral]
- **NeurIPS2019 ML for Creativity and Design Workshop, Montreal** 12/2018
TimbreTron [Oral]
- **Machine Intelligence Conference, MIT** 11/2018
TimbreTron [Oral]
- **ICLR2018, Vancouver** 05/2018
Unsupervised Cipher Cracking Using Discrete GANs [Poster]
- **UGSRP Talk Series, Dept. of CS, University of Toronto** 08/2017
Musical Style Transfer [Oral]
- **UNERD Talk Series, University of Toronto** 08/2016
Stable Polarization-Dependent Self Pulsing in a Brillouin Amplified Spun Fiber [Oral]

PRE-COLLEGE RESEARCH EXPERIENCE

- Shing-Tung Yau High School Mathematics Award** 11/2013 - 11/2014
Yau Mathematical Sciences Center, Tsinghua University
Advisor: Dr. Wenbing Xu, Tsinghua University High School
Researched real analysis and wrote and defended my thesis on: *Study on the Relative Periodicity and the Long-term Behavior of Hypocycloid and Quasicycloid*. The committee members: Prof. Shing-Tung Yau, Prof. Melissa Franklin, et al.
- Summer Research Student** 06/2012 - 10/2013
Advisor: Dr. Wentao Xu, Laboratory of Food Safety, China Agricultural University

Self-taught relevant molecular biology, received relevant research training and worked on: *Development and application of a quantitative loopmediated isothermal amplification method for detecting genetically modified maize MON863*