Tom Ginsberg

EDUCATION

2023   **MSc Computer Science**
UNIVERSITY OF TORONTO
Machine Learning and
Computational Healthcare Group

2021   **BASc Engineering Physics**
UNIVERSITY OF BRITISH COLUMBIA

WORK EXPERIENCE

Medical AI Researcher
UBC Robotics and Control Lab — 2020/21

In one year while completing my undergrad I successfully published three papers on novel deep learning methods for computer-aided diagnosis in cardiac ultrasound. Worked in collaboration with clinicians at Vancouver General Hospital to identify impactful problems and ethically gather data. Built and distributed various tools for data and model management including several video data processing that are widely used by the lab today.

Quantum Algorithms R&D
beit.tech — 2019

Developed company IP in quantum algorithms for NISQ systems. My focus was on methods beyond unstructured search for quantum computers to solve classically hard problems. I worked on theorizing, developing and testing quantum algorithms as well as building high-performance in-house tools for simulation of gate-model, adiabatic and continuous variable systems.

Junior Mechatronics and Embedded Systems Engineer
OTI Lumionics — 2018

Completed a large independent project to improve the sample transfer system used to fabricate organic light-emitting diodes (OLED). Focused on design and implementations of mechanical, electrical, and software systems particularly PLC-based automation and control.

NOTABLE COURSES

UofT: Probabilistic Learning, Visual Computing, Machine Learning for Healthcare, Collective Decision Making
ETH: Deep Learning, Reliable and Interpretable AI, Signals Models and Machine Learning, Physical Simulation
UBC: Software Design, Data Structures and Algorithms, Quantum, Electrodynamics, Physics Laboratory Techniques, Optics, Stat Mech, Fluid Mechanics, Thermodynamics, Solid Mechanics, Mechanical Design, Microcomputers, Control, Vector Calculus, PDEs, Mathematical Proof, Probability, Complex Analysis, CMOS Design

NOTABLE COURSE AND PROJECT WORK

Masters Thesis (*In Progress*)

Identifying and Characterizing Distributional Shift and Resulting Consequences for Neural Network Classifiers
I'm working on developing methods that can automatically detect when neural networks are deployed in domains outside their area of generalization. Methods to solve this problem will be crucial for the safe deployment of neural networks in high-risk domains (e.g medical).

Software Projects

- Echolib: A capstone project for the UBC Robotics and Control Labratory to systematize machine learning research for applications to point of care echo.

- DeepZAdapt: A learable Zonotope relaxation for L_∞ robustness certification of deep neural networks.

- Drone Tree ID: An industry sponsored deep Learning solution for automated segmentation and characterization of multi-modal forest data.

Physics & Simulation Projects

- Gravitational Trajectory Optimization: An engine to simulate and optimize rocket trajectories using gravity assists.

- FEALite: A library for non linear finite element analysis.

- NMR: A set of data analysis and simulation tools to explore concepts of free induction decay and the spin echo effect in probabilistic NMR models.

Mechatronics Projects

- Scooter: A full mechatronics design project through the construction of a functional autonomous robot. Design challenges included: autonomous sensing and navigation, crossing various gaps, locating and picking up objects and detecting and processing infrared signals using analog circuitry.

AWARDS & ACHIEVEMENTS

- Received Gordon Merritt Shrum Memorial Scholarship valued at $6k. Given to two outstanding students in Physics upon recommendation of faculty.

- Completed one semester abroad at ETH Zurich, undertook various masters level courses in machine learning. Achieved a semester average of 96%.

- Received the Trek Excellence Scholarship every year for students ranked in the top 5% of their Faculty.

- Received the Charles and Jane Banks Scholarship for worthy and deserving students awarded on the recommendation of Faculty.

- Awarded for obtaining the highest overall and academic average in my high school graduating class.

Skills

Languages, Frameworks & Applications

EXPERIENCED   Python, Mathematica, Java, PyTorch, TensorFlow, LaTeX

PROFICIENT   C/C++, Bash, Matlab, ROS, Go, VHDL, 8051 Assembly, Intel Quartus, LTSpice, Solidworks, OnShape, HTML/CSS, Structured Text

Prototyping

3D Printer, Laser Cutter, Water Jet Cutter, Mill, Lathe, Various hand and power tools

Communication

An interdisciplinary degree and diverse set of work experiences have given me the ability to communicate effectively with technical experts from various engineering and science backgrounds.

I have experience giving public presentations, including physics lectures for 100+ students and presenting work on artificial intelligence to a team of cardiologists. I also have experience conducting technical interviews.

Publications

- **Deep Video Networks for Automatic Assessment of Aortic Stenosis in Echocardiography**
  Tom Ginsberg*, Ro-ee Tal*, Michael Tsang, Calum Macdonald and others
  International Workshop on Advances in Simplifying Medical Ultrasound

- **Echo-Rhythm Net: Semi-Supervised Learning For Automatic Detection of Atrial Fibrillation in Echocardiography**
  Fatemeh Taheri Dezaki*, Tom Ginsberg* and others
  2021 IEEE 18th International Symposium on Biomedical Imaging (ISBI)

- **Echo-SyncNet: Self-supervised Cardiac View Synchronization in Echocardiography**
  Fatemeh Taheri Dezaki*, Christina Luong*, Tom Ginsberg* and others
  IEEE Transactions on Medical Imaging

* indicates equal contribution

Hobbies and Interests

I try to spend my time off hiking in the mountains, skiing, rock climbing and going on canoe trips. I also enjoy playing chess, board games, reading, road biking, eating spicy foods and generally seeking out new experiences. I have visited various places in Europe, Japan, China, Africa the Middle East and South America and I have lived briefly in Poland and Switzerland.

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This document was last updated January 29, 2022   □