

Vinith M. Suriyakumar

LAST UPDATED October 2020

CONTACT
INFORMATION *Phone:* (613) 612-0937
Email: vinith@cs.toronto.edu
Website: VMS-6511.github.io

RESEARCH
INTERESTS **Areas:** Machine Learning, Theoretical Computer Science
Topics: Differential Privacy, Algorithmic Fairness, Optimization
Applications: Healthcare & Social Welfare

EDUCATION **University of Toronto**, Toronto, Ontario Canada
Department of Computer Science
M.S., Computer Science (Machine Learning), Sept 2019 - Present
GPA: 3.90/4.00
Focus: Differential Privacy and Algorithmic Fairness in Machine Learning for Healthcare
Advisors: Dr. Marzyeh Ghassemi, Dr. Nicolas Papernot, Dr. Anna Goldenberg
Affiliations: Vector Institute, The Hospital for Sick Children

Queen's University, Kingston, Ontario Canada
School of Computing
B.Computing., Biomedical Computing, May, 2019
GPA: 4.14/4.30 (Overall), 4.30/4.30 (Major)
Thesis: Deep Classification and Generative Models for Prostate Cancer MRIs
Advisors: Dr. Gabor Fichtinger & Dr. Parvin Mousavi
Affiliations: Kingston Health Sciences Centre

SKILLS Data Processing Frameworks: Pandas, Numpy
Machine Learning Frameworks: Tensorflow, PyTorch
ML DevOps Frameworks: Weights and Biases, Tensorboard
Languages: Python, Java
Markup: LaTeX, Markdown

HONORS AND
AWARDS Ethics of AI Graduate Research Fellowship, University of Toronto, August 2020
Mitacs Accelerate Research Fellowship, December 2019
University of Toronto Arts and Science Fellowship, September 2019
Queen's University: Graduated Dean's Honor List with Distinction, June 2019
NSERC Industrial Undergraduate Research Award, August 2017
1st Degree Black Belt in Karate, October 2010

ACADEMIC
EXPERIENCE **University of Toronto**, Toronto, Ontario Canada
Graduate Student **September, 2019 - Present**
Includes current Masters level coursework and research projects. Courses: Machine Learning, Neural Networks and Deep Learning, Probabilistic Learning and Reasoning, Ethics of AI in Context
Teaching Assistant **September, 2019 - present**
Duties at various times have included office hours, assignment and exam marking, assignment de-

velopment, and holding tutorials. Courses: Introduction to Databases, Introduction to Artificial Intelligence, and Capstone Design Project.

Queen's University, Kingston, Ontario Canada

Research Assistant

September, 2017 - May, 2019

Worked in biomedical engineering lab developing generative models to improve MRI image quality from 1.5T to 3.0T for improving image quality in developing / rural regions. Developed classification models using neural networks to detect cancer lesions in prostate MRIs. Worked on combination of graphics and HCI research developing open source treatment planning visualization system with over 10 000 downloads worldwide.

Peer Tutor

September 2016 - May 2017

Individualized tutoring for students in introductory computer science courses such as discrete mathematics and introduction to programming.

PUBLICATIONS

Suriyakumar, V.M., N. Papernot, A. Goldenberg, and M. Ghassemi. 2020. Chasing Your Long Tails: Differentially Private Prediction in Health Care Settings, FAccT 2021 (in submission).

Cheng, V., V.M. Suriyakumar, N. Dullerud, S. Joshi, and M. Ghassemi. 2020. Impacts of Differentially Private Synthetic Data on Downstream Model Fairness, FAccT 2021 (in submission).

Suriyakumar, V.M., N. Papernot, A. Goldenberg, and M. Ghassemi. 2020. The Challenges of Differentially Private Prediction in Healthcare, NeurIPS 2020 ML4H Workshop (in submission).

Suriyakumar, V.M., N. Papernot, A. Goldenberg, and M. Ghassemi. 2020. The Challenges of Differentially Private Prediction in Healthcare, NeurIPS 2020 Privacy Preserving Machine Learning Workshop (Accepted).

Suriyakumar, V.M., N. Papernot, A. Goldenberg, and M. Ghassemi. 2020. The Pitfalls of Differentially Private Prediction in Healthcare, Theory and Practice of Differential Privacy 2020 (Accepted).

Chang. A*, V.M. Suriyakumar*, A. Moturu*, N. Tewattanarat, A. Doria, and A. Goldenberg. 2020. Using Generative Models for Pediatric wbMRI. Medical Imaging in Deep Learning 2020. * denotes equal contribution.

Suriyakumar, V.M., R. Xu, C. Pinter, G. Fichtinger. Collision detection for external breem radiation therapy applications in SlicerRT. 2017. Imaging Network Ontario Conference.

Suriyakumar, V.M., R. Xu, C. Pinter, G. Fichtinger. Open-source software for collision detection in external beam radiation therapy. 2017. SPIE: Journal of Medical Imaging 2017, 10135-51.

CONFERENCE PRESENTATIONS

Chang. A*, V.M. Suriyakumar*, A. Moturu*, N. Tewattanarat, A. Doria, and A. Goldenberg. 2020. Using Generative Models for Pediatric wbMRI. Medical Imaging in Deep Learning 2020. * denotes equal contribution. (Oral)

Chang. A*, V.M. Suriyakumar*, A. Moturu*, A. Doria, and A. Goldenberg. 2019. Early pediatric cancer detection in whole-body MRIs. Evolution of Deep Learning Symposium 2019. * denotes equal contribution. (Poster)

Suriyakumar, V.M., R. Xu, C. Pinter, G. Fichtinger. Collision detection for external breem radiation therapy applications in SlicerRT. 2017. Imaging Network Ontario Conference. (Poster)

Suriyakumar, V.M., R. Xu, C. Pinter, G. Fichtinger. Open-source software for collision detection in

	external beam radiation therapy. 2017. SPIE: Journal of Medical Imaging 2017, 10135-51. (Oral)
	Suriyakumar, V.M., R. Xu, C. Pinter, G. Fichtinger. Improving accessibility of radiation therapy software in developing countries. Canadian Undergraduate Conference on Healthcare 2017. (Oral)
INVITED TALKS	Chasing Your Long Tails: Differentially Private Prediction in Health Care Settings, Ethics of AI in Context: Emerging Scholars, Centre for Ethics, University of Toronto, October 2020
	Chasing Your Long Tails: Differentially Private Prediction in Health Care Settings, Vector Institute, University of Toronto, October 2020
CHALLENGE PARTICIPATION	NeurIPS 2020 Hide-and-Seek Challenge: Membership Inference on Clinical Time Series In collaboration with Christopher A. Choquette-Choo
PAPERS IN PREPARATION	Fair Differentially Private Learning: Drawing Fair Subsamples In collaboration with Nicolas Papernot and Marzyeh Ghassemi.
	Fair Use of Sensitive Attributes in Machine Learning for Healthcare In collaboration with Berk Ustun and Marzyeh Ghassemi.
	Privacy Amplification for Non-Uniform Subsampling In collaboration with Natalie Dullerud, Victoria Cheng, and Marzyeh Ghassemi
	Differentially Private Time Series Generation In collaboration with Shrey Jain, Victoria Cheng, and Marzyeh Ghassemi
	Anomaly Detection for Pediatric Cancer Screening: A Multi-Site Study In collaboration with Alex Chang, Abhishek Moturu, Nipaporn Tewattananarat, Andrea Doria, and Anna Goldenberg.
MENTORING AND ADVISING	Victoria Cheng, Undergraduate Researcher, Summer 2020
	Shrey Jain, Undergraduate Researcher, Summer 2020 - Present
REVIEWING	Program Committee, IJCAI 2020 AI for Social Good Workshop Program Committee, NeurIPS 2020 Machine Learning for Health Workshop External Reviewer, USENIX Security 2021
SELECTED PROFESSIONAL EXPERIENCE	The Hospital for Sick Children , Toronto, Ontario Canada <i>Research Assistant</i> May, 2019 - Present
	Cape Privacy (formerly Dropout Labs) , Remote <i>Consultant</i> June, 2019 - August, 2019
	Square , San Francisco, California USA <i>Data Science Intern</i> May, 2018 - August, 2018
	Helpful (acquired by Shopify) , Toronto, Ontario Canada <i>Machine Intelligence Intern</i> September, 2017 - April, 2018

SERVICE AND VOLUNTEERING	IBM, Toronto, Ontario Canada	
	<i>Deep Learning and Systems Research Intern</i>	May, 2017 - August, 2017
	Director of Finance & Advisor, CUSEC	January 2019 - Present
	NeurIPS 2019 Student Volunteer	December 2019
	Co-Chair, Toronto Health Data Hackathon	September 2019 - October 2019
	Chair, QHacks	April 2018 - February 2019
	Co-Chair, CUSEC	January 2018 - January 2019
	Director of Events, CUSEC	January 2017 - January 2018
	VP Operations, Queen's Computing Students' Association	March 2017 - April 2018