

Dr. Devin Singh

Overview

I am a practicing Paediatric Emergency Medicine Physician at the Hospital for Sick Children (SickKids) in Toronto. I completed my undergraduate studies at the University of Western in medical sciences going on to work for the Ontario Provincial Government as a business analyst and branch project coordinator. Afterwards, I attended medical school at the University of Sydney, Australia and completed my paediatric residency and emergency medicine subspecialty training at SickKids Hospital. My research focuses on the use of machine learning to solve some of healthcare's largest problems. I am the Physician Lead for Clinical Artificial Intelligence and Data Science at SickKids for the Division of Emergency Medicine and currently completing a Master of Computer Science at the University of Toronto.

Education

Master Computer Science (Research Thesis Stream) University of Toronto Supervisor: Dr. Michael Brudno	Toronto, CAN 2018-Current <i>Completion Dec 2020</i>
Fellowship in Clinical Artificial Intelligence & Technology Paediatric Emergency Medicine University of Toronto Hospital for Sick Children	Toronto, CAN 2018-2019
Paediatric Emergency Medicine Academic Fellowship University of Toronto Hospital for Sick Children	Toronto, CAN 2016-2018
Paediatric Residency Training University of Toronto Hospital for Sick Children	Toronto, CAN 2013-2016
Bachelor of Medicine, Bachelor of Surgery University of Sydney Medical School	Sydney, AUS 2009-2013
Honours Bachelor of Medical Sciences University of Western Ontario	London, CAN 2003-2007

Examinations

The Royal College of Physicians & Surgeons of Canada Paediatric Emergency Medicine Subspecialty	Toronto, CAN Fall 2018
The Royal College of Physicians & Surgeons of Canada Paediatric Medicine	Toronto, CAN Spring 2017
Medical Council of Canada Qualifying Examination Part II	Oct 2014
Medical Council of Canada Qualifying Examination Part I	May 2014
Medical Council of Canada Evaluating Examination	Oct 2012

Certifications

Stanford University Machine Learning Online Course	Aug 2018
Paediatric Advanced Life Support	Jul 2018

SickKids PEM Point of Care Ultrasound Course	Jul 2016
Advanced Cardiac Life Support	Aug 2014
Neonatal Resuscitation Program	Oct 2014
Phlebotomy Certification Course	Sydney, AUS, 2009
Ontario Public Service Pandemic Planning Cert.	Toronto, ON, CAN, 2008
Healthy Child Development & Behaviour Management Cert.	Toronto, ON, CAN, 2006

Research & Project Initiatives

Toronto COVID-19 Action Initiative Grant Virtual Waiting Room and Care Platform for Patients Presenting to Hospitals During COVID-19 Pandemic <i>Co-Project Investigator</i>	Toronto, CAN Submitted Mar 2020
Peer Reviewed Journal Submission From Clinic to Computer and Back Again: Practical Considerations When Designing and Implementing Machine Learning Solutions for Pediatrics. Current Treatment Options in Pediatrics. <i>Principal Investigator</i>	Toronto, CAN Submitted Mar 2020
Canadian Institutes Health Research Program Grant Submission Machine Learning Based Craniosynostosis Triaging System <i>Principal Investigator</i>	Toronto, CAN Submitted Mar 2020
AI & Legal Ethics Modernization CIFAR Workshop Program University of Ottawa Centre for Health Law, Policy and Ethics <i>Collaborator with Colleen Flood</i>	Toronto, CAN Jan 2020-Current
Machine Learning Based Medical Directives for Paediatric Emergency Medicine. <i>Co-Principal Investigator</i>	Toronto, CAN April 2019-Current
PhenoPad: Voice to Clinical Text Software Study <i>Collaborator with Dr. Michael Brudno</i>	Toronto, CAN Feb 2019-Current
Emergency Department AI Sepsis Alert System for Children <i>Collaborator with Dr. Anna Goldenberg & Dr. Michael Brudno</i>	Toronto, CAN Jan 2019-Current
Emergency Department AI Return Visit Risk Calculator <i>Collaborator with Dr. Anna Goldenberg & Dr. Michael Brudno</i>	Toronto, CAN Oct 2018-Current
Proof-of-Concept Pilot Study AI Based Emergency Department MD Scheduling Software <i>Principal Investigator</i>	Toronto, CAN Aug 2018- Dec 2018
Peer Reviewed Publication Nicole Sultanum, Devin Singh, Michael Brudno, Fanny Chevalier. (2018). Doccurate: A Curation-Based Approach for Clinical Text Visualization. IEEE Transactions on Visualization and Computer Graphics. 25(1): 142 - 151.	Toronto, CAN Nov 2017-Oct 2018
Dilute Apple Juice for Oral Rehydration in the Emergency Department: Quality Improvement Project	Toronto, CAN Oct 2016-Jun 2018

National Health & Medical Research Council of Australia:
The Woolcock Institute for Medical Research
Research Assistant & Database Manager | Paid Position

Sydney, AUS
2009-2012

The Woolcock Institute for Medical Research is one of Australia's leading respiratory and sleep research organizations. In my role as a research assistant for three years, I had the opportunity to work on three large clinical research studies involving the following key activities:

Catch-up Biochemical Sleep Study

- Responsible for patient care and conducting study interventions
- Monitored patients and collected data

Diagnosis of Obstructive Sleep Apnea in Primary Care Study

- Assisted with recording observations into an online database for 1500 patients, managed data, and prepared content for statistical analysis

Australian Centre for Chronobiology, Endocrinology & Sleep Sciences Study

- Completed polysomnography (PSG) technician training
- Responsible for setting up PSG studies and monitoring patients overnight
- Collected research data in an organized fashion

Conference Presentations

AI Analytics Conference | St. Lawrence College
Keynote Speaker

Kingston, CAN
Scheduled Sep 2020

Global Determinants of Health Event | University of Guelph
Keynote Speaker

Toronto, CAN
Scheduled Jun 2020

Conference on Health, Inference, and Learning (CHIL)
Machine Learning Based Craniosynostosis Triaging System
Spotlight Paper Presentation. Principal Investigator.

Toronto, CAN
Scheduled Jun 2020

AI & ML Strategies Summit
Keynote Speaker

To be rescheduled

Engineering Society Conference
Keynote Speaker

Toronto, CAN
Feb 2020

Cancer Care Ontario Data and Analytics Forum
Presenter

Toronto, CAN
Feb 2020

AI in Medicine Royal College Task Force Round Table
Participant

Ottawa, CAN
Dec 2019

Conference on Neural Information Processing Systems (NeurIPS)
Machine Learning Based Craniosynostosis Triaging System.
Extended Abstract Presentation. Principal Investigator.

Vancouver, CAN
Dec 2019

UofT Medicine Learning in Medicine Symposium <i>Presenter</i>	Toronto, CAN Nov 2019
Bell Canada AI Conference <i>Keynote Speaker</i>	Toronto, CAN Nov 2019
UofT & Vector Health AI Deployment Symposium <i>Presenter</i>	Toronto, CAN Oct 2019
Inspirata AI Symposium <i>Keynote Speaker</i>	Toronto, CAN Oct 2019
Machine Learning Morphometrics Meeting <i>Presenter</i>	London, UK Sep 2019
Congress of International Society of Craniofacial Surgery <i>Paper Presentation</i>	Paris, FRANCE Sep 2019
TD Analytics Summit <i>Panelist</i>	Toronto, CAN Sep 2019
Machine Learning for Healthcare Conference (MLHC) Machine Learning Based Medical Directives <i>Spotlight Presentation</i>	Michigan, USA Sep 2019
Machine Learning for Healthcare Conference (MLHC) AI Based Sepsis Detection at ED Triage in Children <i>Spotlight Presentation</i>	Michigan, USA Sep 2019
Stanford Frontier of AI-Assisted Care Scientific Symposium 2019 Sepsis ED High Risk Patient Monitor <i>Abstract Poster Presentation</i>	Stanford, USA Sep 2019
Analytics by Design (ABD) Conference <i>Panelist</i>	Toronto, CAN Jul 2019
Canadian Society of Plastic Surgeons Machine Learning Based Craniosynostosis Triaging System <i>Spotlight Presentation</i>	Toronto, CAN Jun 2019
Big Data & AI Toronto 2019 <i>Presenter</i>	Toronto, CAN Jun 2019
Internet of Things (IoT) Healthcare Summit <i>Presenter</i>	Toronto, CAN Jun 2019
SickKids Paediatric Research Day 2019 Emergency Department AI Sepsis Alert System <i>Abstract Presentation</i>	Toronto, CAN May 2019
NewCO Toronto 2019 - AI at SickKids <i>Presenter</i>	Toronto, CAN May 2019

AI World Forum Conference
Panelist

Toronto, CAN
Mar 2019

Association of Physician Assistants (PA) 2018 Conference
Flipped Classroom & Virtual Approach to PA Paediatric Education | Oral Presentation

Victoria, CAN
Oct 2018

Pediatric Emergency Research Canada (PERC) 2018 Conference
Impact & Cost-Effectiveness of Physician Assistants in PEM | Oral Presentation

Banff, CAN
Oct 2018

Program Grants & Awards

Integration of Physician Assistants into SickKids ED Pilot
Supervisor: Dr. Jason Fischer | \$384,000 funding secured

Toronto, CAN
May 2016-Current

- Independently applied and obtained three separate program grants between 2016-2018 totaling **\$384,000** from Health Force Ontario & Ministry of Health
- Coordinated Physician Assistant (PA) hiring. Wrote job ads, screened resumes, chaired selection committee, hired & retained 8 PAs over the past four years.
- Developed integration & deployment strategies
- Created and published three medical directives for PAs

RESTRACOMP Award | Supervisor: Dr. Michael Brudno
- Awarded \$40,000 to support Master of Computer Science and associated lab work

Toronto, CAN
Sep 2018

Medical Education Experience

UofT Faculty of Medicine Lecture with Exam Questions
Introduction to Machine Learning in Medicine
Lecturer

Toronto, CAN
Oct 2019

PACE: Physician Assistant Clinical Education Virtual Platform
Wrote HTML code to develop website and flipped classroom platform to deliver paediatric education to PAs across Canada. Conduct virtual live streaming interactive lectures also delivered via the platform.
www.pemnetwork.ca/pace

Toronto, CAN 2017-19

Supplemental Emergency Medicine Simulation Program

Toronto, CAN 2016-17

Code Blue Boot Camp Instructor for Paediatric Residents

Toronto, CAN 2014-15

Art of Science & Clinical Medicine (ASCM) Medical Student Instructor for General Paediatric Medicine

Toronto, CAN 2014

UofT Medical Student Peer Mentor

Toronto, CAN 2013-14

Developed Medical Student Clinical Procedural Skills Training Videos

Sydney, AUS 2012

Royal Prince Alfred Student Mentorship Program	Sydney, AUS 2010-2012
Mock OSCE & Long Case Examiner	Sydney, AUS 2012
Clinical Examination Skills Tutor	Sydney, AUS 2011-2012

Professional Work Experience (Non-medical)

DocHouse Corporate Video Productions & Consulting <i>Owner & Operator</i>	Toronto, CAN 2008-2016
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DocHouse has conducted high-profile marketing campaigns for the Government of Ontario, the YMCA of greater Toronto, and the University of Ontario Institute of Technology.

- Utilized evidence based educational practices to develop nursing student simulation training videos for the University of Ontario Institute of Technology
- Responsible for hiring and managing teams of up to 27 employees during video productions
- Developed leadership, project management, and critical problem solving skills
- Created television commercials, interactive web-based advertising, and print media

The Ontario Ministry of Finance & Revenue <i>Coordinator of Branch Projects & Initiatives</i>	Oshawa, CAN 2007-2009
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- Enhanced project management experience with the ability to scope, plan, & implement projects
- Successfully developed & implemented branch wide initiatives
- Delivered public facing speeches regarding Government of Ontario initiatives
- Liaised with Deputy Ministers, executive management, and front-line employees to ensure smooth coordination and implementation of projects

The YMCA of Greater Toronto <i>Director of Camps</i>	Toronto, CAN 2005-2007
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- Developed excellent communication skills with children and their families
- Successful at integrating children with disabilities into activities by developing educational seminars for employees and creating an inclusive camp environment
- Hired 45 employees and trained 134 staff to fill entry-level and management-level positions
- Directly responsible for the health and safety of 85 children and 26 employees

Committee Memberships

Counsel for Information & Technology in Emergency Medicine	Toronto, CAN 2018-20
Emergency Medicine Research Committee	Toronto, CAN 2017-19
Emergency Department Patient Flow Committee	Toronto, CAN 2017-19
Emergency Medicine Annual Conference Committee	Toronto, CAN 2017
Emergency Medicine Fellowship Committee	Toronto, CAN 2016

Co-Chair Resident Wellness & Advocacy Committee	Toronto, CAN 2014-16
UofT Medical Student File Review Selection Committee	Toronto, CAN 2015
Internship Summit: New Zealand Working Group Committee Sydney Local Health District <i>International Student Representative</i>	Sydney, AUS 2011
Co-Chair University of Sydney Medical Society	Sydney, AUS 2009-12

Extra-Curricular & Volunteer Activities

Children's Wish Foundation Team Leader \$55,000 raised	Toronto, CAN 2015-18
Postgraduate Website Redesign	Toronto, CAN 2015
P2SK Paediatric Emergency Medicine POCUS Website	Toronto, CAN 2015
SickKids Resident Social Committee	Toronto, CAN 2014
Motivational Speaker for Undergraduate Students at Doobay Medical Centre Supervisor: Dr. Errol Bassoo	Georgetown, GUY 2014
Paediatric Medical Outreach Volunteer to Iwokrama Interior Supervisor: Dr. Errol Bassoo Traveled to remote areas of the country with local medical officers to assist with paediatric medical outreach programs	Georgetown, GUY 2014
Video Producer & Editor for Resident Run Holiday Rounds	Toronto, CAN 2013
UofT Paediatric Careers Day Discussion Panel Participant	Toronto, CAN 2013
North American Medical Student Association	Sydney, AUS 2010-2012
University of Western Freshman Student Mentor & Student Crisis Support Worker	London, CAN 2004-2008
YMCA Training Seminar Instructor: Camp Burn Out Prevention	Oshawa, CAN 2007
YMCA Peace Medallion Award Ceremony Keynote Speaker	Oshawa, CAN 2007
YMCA Youth Leadership Volunteer	Oshawa, CAN 2006
Thames Valley District School Board <i>At Risk Youth Mentor Volunteer</i>	London, CAN 2006

Software & Programming Experience

- Fluent ability to code custom programs using Python language
- Ability to automate data curation and preprocessing of large datasets in Python
- Can perform sophisticated statistical analysis using SkLearn in Python
- Experience building machine learning models using healthcare data (regression, random forest, neural networks, generative adversarial networks, natural language processing models).
- Expert knowledge using Final Cut Pro Studio for creating 4K broadcast ready commercials, web videos, and employee training videos
- Intermediate knowledge using Adobe Captivate to design interactive online training programs to be used with corporate Learning Management Systems
- Expert knowledge in Adobe CS programs including Photoshop, Indesign, Flash
- Ability to harmonize the product outputs from software listed above and package them into multimedia campaigns for various purposes
- Advanced knowledge using all Microsoft Office programs
- Ability to quickly learn new software and apply skills in a professional, fast paced environment