![University of Toronto logo](UNIVERSITY OF TORONTO)

U of T's CONTRIBUTION

Bench Strength in Related Research & Innovation

Research funding attracted in last 5 years:
$244M

Canada Research Chairs:
7

CIFAR AI Chairs:
8

Faculty members:
111

Graduate students supervised:
544

Startups created in last 10 years:
108

ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is a transformative business platform and area of significant investment in the world economy. The global market for smart machines (neurocomputers, autonomous robots and vehicles, smart embedded systems, intelligent assistance systems) is anticipated to grow to $15 billion annually by 2021. By 2030, the global economic impact of AI is expected to be approximately $15.7 trillion. **AI, especially in the areas of machine and deep learning, is expected to become embedded in virtually every industry.** The Toronto ecosystem is a hotbed for AI, powered by world-class research, the greatest presence of tech jobs in Canada across all sectors of the economy, and a growing number of tech startups. In 2017, Thomson Reuters' Toronto Technology Centre established a new long-term facility, with a commitment totaling more than USD$100 million. In 2018, Fujitsu, NVIDIA, Samsung Research America (SRA), Etsy, and LG Electronics announced state-of-the-art AI centres in Toronto, joining other multinational companies like Google and Uber.

HOW U of T ENHANCES THE CLUSTER

For more than 30 years, U of T researchers have been at the forefront of advancing AI in such areas as computer vision, computational linguistics and natural language processing, knowledge representation and reasoning, cognitive robotics, and machine learning. Geoffrey Hinton, a father of artificial neural networks and deep learning, founded the U of T Machine Learning Group in 1985, which is now home to many international leaders in the field. **In 2018, the Canadian Institute for Advanced Research (CIFAR) named eight U of T researchers as AI chairs as part of its $125 million Pan-Canadian AI strategy.** And U of T scholars are leading important industry initiatives. Raquel Urtasun, an expert in machine learning and self-driving cars, leads Uber's Advanced Technologies Group in Toronto. Sven Dickinson is leading Samsung's Toronto-based AI centre, which is taking an interdisciplinary approach to solving AI problems, from computer vision to computational linguistics and cognitive science. U of T is also a major partner in the Vector Institute, an independent, non-profit research institution that is helping to make the city a world-leading centre for AI research and commercialization. U of T is also a leader in research into the ethical and societal effects of AI. Philosopher Brian Cantwell-Smith is the Reid Hoffman Chair in Artificial Intelligence and the Human at U of T's iSchool, and Gillian Hadfield is the Schwartz Reisman Chair in Technology and Society—and the director of the **Schwartz Reisman Institute for Technology and Society—**whose mandate is to look at how technological innovation is implemented fairly and equitably in societies around the world.

KEY EDUCATIONAL & RESEARCH PROGRAMS	KEY FACILITIES, INITIATIVES & PARTNERSHIPS	
• Applied Computing • Applied Genomics • Computer Science • Data Sciences • Electrical & Computer Engineering • Engineering Science: Machine Intelligence • Linguistics • Management Analytics • Mathematics • Philosophy • Physics • Psychology • Statistical Sciences & Applied Statistics	• Centre for Aerial Robotics Research and Education • Centre for Analytics and Artificial Intelligence in Engineering (CARTE) • Centre for Applied Genomics • Compute Ontario • Computer Science Innovation Lab • Computer Hardware for Emerging Sensory Applications • Creative Destruction Lab (CDL) • Donnelly Centre for Cellular and Biomolecular Research • Engineering Entrepreneurship Hatchery • Fields Institute for Research in Mathematical Sciences • Health Innovation Hub	• Institute for Clinical Evaluative Sciences (ICES) • Intelligent Transportation Systems (ITS) Centre and Testbed • NanoMechanics and Materials Laboratory • RBC Research in Machine Learning • SciNet • Southern Ontario Smart Computing Innovation Platform (SOSCIP) • Schwartz Reisman Institute for Technology and Society • Smart Applications on Virtual Infrastructure • Toronto Institute of Advanced Manufacturing • U of T Institute for Robotics • Vector Institute for Artificial Intelligence

U OF T & HOSPITAL INNOVATION IMPACT

ROSS INTELLIGENCE

San Francisco-based ROSS Intelligence opened ROSS North in 2017, their research and development headquarters in Toronto. Originally a U of T startup co-founded by alumni Andrew Arruda, Jimoh Ovbiagele and Pargles Dall'Oglio, ROSS uses AI to make the tedious process of combing legal databases faster and more efficient. Lawyers can ask ROSS questions as though they were talking to a colleague, dispensing with the usual keyword searches and Boolean queries. Named one of its 10 AI "companies to watch" in 2019, ROSS has always wanted a presence in Toronto because of the need to be close to the cutting-edge artificial intelligence research being done at U of T and institutions such as Vector, which are making Toronto a global leader in AI.

PHENOMIC AI

Founded by U of T PhD graduate Oren Kraus, Phenomic AI develops computer vision tools for a faster and more accurate analysis of microscopy data. The tools developed will help researchers spot subtle differences between cells that could be early signs of disease and identify promising drugs. Kraus's research was supervised by University Professor Brenda Andrews, director of the Donnelly Centre for Cellular and Biomolecular Research, and Professor Brendan Frey of the department of electrical and computer engineering, and a founder of Deep Genomics, a U of T startup that uses AI to interpret genome data.

SYSOMOS

Founded by Professor Nick Koudas and Nilesh Bansal, Sysomos is a spinoff of the University of Toronto research project BlogScope. Sysomos equips the world's best digital marketers with the technology they need to demonstrate and optimize the value of their work to their business, clients or partners. Through the use of contextual text analytics and sophisticated data-mining technology, the Sysomos social intelligence engine collects data from blogs, Twitter, social networks, message boards, wikis and major news sources, and integrates all of that data into one, intuitive user interface.

WINTERLIGHT LABS

Winterlight Labs was founded in 2015 by Professor Frank Rudzicz and students Katie Fraser, Liam Kaufman, and Maria Yancheva. Winterlight specializes in computational linguistics, cognitive neuroscience, and machine learning. The company has developed a proprietary, tablet-based technology that assesses cognitive health (including memory, thinking, and reasoning) by analysing hundreds of language markers from short snippets of speech.

UNIVERSITY OF TORONTO