

TORONTO'S LIFE SCIENCES SECTOR

People employed
38,000

Number of firms
1,600

U of T'S CONTRIBUTION

Bench Strength in Related Research & Innovation

Research funding attracted by U of T and partner hospitals in last 5 years:

\$3.8B

Canada Research Chairs:
148

Faculty members:
996

Graduate students supervised:
1,347

Startups created in last 10 years:
232

LIFE SCIENCES

The Toronto Region is home to one of the most vibrant life sciences, human health sciences, and biotechnology ecosystems in the world, in which leading-edge basic and clinical trial research converge with international business expertise and advanced manufacturing capabilities. **Over 50% of Canada's life sciences companies are located here, as are over 50 of the world's top 100 life sciences multinationals, and more than half of Canada's medical device companies, collectively contributing more than \$2 billion to the local economy.** The Toronto Region is home to 55% of Canada's pharmaceutical companies and 65% of its pharmaceutical jobs. Toronto's Discovery District, a world-class downtown urban research and innovation hub, represents **Canada's largest concentration of hospitals, research institutes, business incubators and venture capital organizations.** JLABS@Toronto, the first Johnson & Johnson Innovation lab to open outside the U.S, and Evotec are part of an extensive ecosystem that supports companies that are advancing pharmaceutical, medical device, consumer, and digital health products and programs. The Toronto Academic Health Science Network (TAHSN) comprises the University of Toronto and nine research hospitals that work collaboratively to advance high-quality patient care, innovative research, and active knowledge translation to industry partners, which include over 1,000 institutes and local companies.



HOW U of T ENHANCES THE CLUSTER

U of T researchers are global leaders in addressing some of the most important health and life sciences questions facing our society. Since Banting and Best discovered insulin here almost a hundred years ago, U of T has led in the development of new technologies and the translation of research into new treatments, health care system improvements, and companies. **Medicine by Design (MbD)** reflects U of T's position as one of the world's leading centres for the design and manufacture of cells, tissues and organs that can be used to treat degenerative disease. Its commercialization partners, the Centre for Commercialization of Regenerative Medicine (CCRM) and the Centre for the Commercialization of Antibodies and Biologics (CCAB) are helping MbD take regenerative medicine to the next level. The Ted Rogers Centre for Heart Research, a partnership between The Hospital for Sick Children, University Health Network, and U of T, and born from a \$130 million gift from the Rogers family, is addressing heart failure across the lifespan. And U of T recently launched the **Precision Medicine Initiative (PRIME)**, a new cross-institutional, multi-faculty effort that will leverage the university's excellence in pharmaceutical sciences, medicine, physical sciences and engineering that will establish Toronto as a leading centre for precision medicine. The tight integration of clinical practitioners, clinician scientists, and clinical sites with U of T's research and innovation partners is what makes the U of T life sciences ecosystem exceptional.

KEY EDUCATIONAL AND RESEARCH PROGRAMS

- Anatomy
- Animal Physiology
- Biochemistry, Biotechnology
- Bioinformatics & Computational Biology
- Biological Sciences
- Biomedical Toxicology
- Cell and Systems Biology
- Chemistry
- Chemical Engineering & Applied Chemistry
- Developmental Biology
- Dentistry
- Ecology & Evolutionary Biology
- Environment and Health, Biology
- Environment and Toxicology
- Environmental Chemistry
- Forestry
- Genome Biology
- Health Science in Medical Genomics
- Human Biology

- Immunology
- Kinesiology and Physical Education
- Medicine
- MitoNet
- Molecular Genetics & Microbiology
- Medical Imaging
- Neuroscience
- Nursing
- Nutritional Sciences
- Occupational Therapy
- Pathobiology
- Pediatrics
- Pharmaceutical Chemistry
- Pharmacology
- Pharmacology & Biomedical Toxicology
- Physical Therapy
- Physiology
- Psychology
- Rehabilitation Science
- Speech-Language Pathology

KEY FACILITIES & INITIATIVES

- BioZone
- Donnelly Centre for Cellular and Biomolecular
- Institute of Biomaterials & Biomedical Engineering
- Centre for Cellular and Biomolecular Research
- Centre for Child Nutrition and Healthy Development
- Centre for Health Promotion
- Centre for Neurobiology of Stress
- Centre for Research in Women's Health
- Centre for Study of Pain
- Banting & Best Diabetes Centre
- Centre for Collaborative Drug Research
- Fraser Mustard Inst. for Human Development
- Gage Occupational and Environmental Health Unit
- Ontario Institute for Cancer Research
- Ontario Tobacco Research Unit
- Heart & Stroke/Richard Lewar Centre of Excellence in Cardiovascular Research
- McLaughlin Centre
- Tanz Centre Research in Neurodegenerative Diseases
- Ted Rogers Centre for Heart Research

U of T & HOSPITAL INNOVATION IMPACT



Braze Mobility

Founded by Pooja Viswanathan, who did her post-doc in U of T's computer science department, and Professor Alex Mihailidis, a senior scientist at the Toronto Rehabilitation Institute, Braze Mobility sells obstacle detection systems that can be attached to wheelchairs, which are often bulky and difficult to manoeuvre. Braze's devices provide users with more freedom to move about without fear of crashing into people or objects. Braze received support from U of T's Impact Centre incubator.

Deep Genomics

Founded by U of T Professor Brendan Frey and his students Babak Alipanahi and Andrew Delong, Deep Genomics combines artificial intelligence and genomic medicine in the first-ever deep learning application for determining the specificities of DNA- and RNA-binding proteins. Deep Genomics's technology is able to handle millions of sequences per experiment to create a "mutation map" that reveals how genetic variations cause disease such as cancer and illnesses linked to aging. Genomics medicine holds the promise to significantly reduce health-care costs and improve the lives of millions.

ExCellThera

Co-founded by U of T Professor Peter Zandstra, ExCellThera is a clinical stage biotechnology company that is focused on developing robust and cost-effective ways of growing blood stem cells for therapeutic use. It has developed a unique way of producing high-quality blood stem cells in large quantities. ExCellThera's technology will also improve the outcome of stem cell transplants in patients by allowing for better-matched donors.

Forcen

Founded by Robert Brooks, who did his PhD in Mechanical Engineering at U of T, and Justin Wee, a PhD candidate at the Institute of Biomaterials & Biomedical Engineering working with Professor Ted Gerstle in the Department of Surgery, Forcen aims to help surgeons gain greater control over tools that are remotely or robotically operated. The company has developed a robust, paper-thin force-sensing film technology to provide a digital sense of touch for high reliability robotics in surgery, manufacturing, and aerospace/defense.



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