



UNIVERSITY OF WATERLOO

The University of Waterloo is Canada's top innovation university. With more than 36,000 students we are home to the world's largest co-operative education system of its kind. Our unmatched entrepreneurial culture, combined with an intensive focus on research, powers one of the top innovation hubs in the world. Best known as an IT and engineering research hub, Waterloo is the top comprehensive research university in Canada, has 41 research centres and has 10 subjects ranked in the top 100 in the 2015 QS World University Rankings.

Priority Research Areas:

- Mathematical, Sciences and computer Science
- Quantum information and Nanotechnology
- Manufacturing and devices
- Discovery and design of materials and systems
- Environment and Energy
- Health and well-being
- Society, Culture and Governance

Established 1957

6 Faculties

190+ Master and PhD
Programs

152 Position in the 2015
QS World University
Ranking

\$181 Million External
Research Funding

65 Canada Research
Chairs* in 2015

2 Canada Excellence
Research Chairs in 2015

* Canadian Government program to attract and retain some of the world's most accomplished and promising minds.



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University of Waterloo Highlights

In the heart of Waterloo Region, at the forefront of innovation, the University of Waterloo is home to world-changing research and inspired teaching.

You create it, you own it. As a national leader in the transfer of ideas and technology to the private sector, our International Property (IP) Rights Policy grants ownership to the inventor.

Entrepreneurship is in our DNA. UWaterloo is the #1 Canadian university for venture-backed capital enterprises.

UWaterloo is ranked #1 for career preparation (Globe and Mail University Report). Experiential learning, co-operative education, and our GRADventure program prepare students for career success.

One of 10 global universities invited to lead the UN Women's HeForShe IMPACT 10x10x10 initiative. HeForShe is a global effort to engage men and boys in removing the social and cultural barriers that prevent women and girls from achieving their potential, and together positively reshaping society.

Our internationally acclaimed Mike and Ophelia Lazaridis Quantum-Nano Centre houses ground-breaking research through the Institute for Quantum Computing (IQC) and the Waterloo Institute for Nanotechnology (WIN).

UWaterloo Established Canada's first graduate programs in Kinesiology, Gerontology, and Recreation and Leisure Studies.

Our Cheriton School of Computer Science is the largest academic computer science research centre in Canada.

UWaterloo is home to:

- The first LEED Platinum certified building on an Ontario university campus
- A new, state-of-the-art digital arts and media campus in Stratford, Ontario.
- The Water Institute, one of the top ten water research institutes in the world
- The largest Actuarial Science program in North America.
- World-class schools of Optometry and Vision Science, and Pharmacy.

Priority Research Areas

- **Society, Culture and Governance**

- Analyzing complex systems and decision-making techniques
- Advancing understanding of governance at levels ranging from regional to global
- Understanding how health and wellbeing are enhanced through the effective use of leisure, including its social, psychological, economic and environmental aspects
- Improving financial management and economic forecasting related to social security, pension plan and the needs of an aging population
- Guiding strategic policy planning on public health and developing practices and policies that shape how individuals and communities receive care
- Transforming urban landscapes and architectural design



- **Mathematical, Sciences and computer Science**

- Applying mathematical theories to human-machine interaction, cyber-physical systems and artificial intelligence
- Designing fast algorithms and memory efficient data structure to improve software performance
- Modelling complex systems from the smallest units of light and matter to the behaviour of black holes, galaxies and large-scale structure in the universe
- Analysing processes underpinning technological innovation including implementation, diffusion, adaptation and the socio-economic ramifications of technology
- Mathematical and statistical problems ranging from conceptual foundations of mathematical logic and probability to applies issues in econometrics, finance and health
- Statistical models and methods for analysis in finance and insurance
- Innovative methods for studies for clinical and population health research

- **Quantum information and Nanotechnology**
 - Connecting quantum theory with gravity
 - Investigating quantum aspects of photonics, optical information processing, superconducting devices, circuit cavity electrodynamics, and fault-tolerant computation
 - Exploring nanomaterials critical to novel nanometre-sized devices such as field-effect transistors, self-assembled drug delivery systems, energy storage/generation materials, and molecular recognition elements
 - Creating nano-sized sensors to monitor and regulate engine combustion temperature
 - Using nanotechnology to address issues such as watershed management, climate change, emerging contaminants and water treatment

- **Manufacturing and devices**
 - Improve efficiencies and reducing costs in the automotive sector
 - Research in Radio frequency technologies including RF Micro-Electro-mechanical systems (MEMS), miniature RFID, wireless intelligent systems, filters and multiplexers, superconductivity, novel materials, computer-aided circuit diagnosis, simulations and modelling;
 - Developing intelligent transportation systems
 - Corrective devices to treat diseases and illness
 - Assistive technologies to promote independence and work related health, reduce the risk of injury, assess mobility of older adults and guide decision making
 - Telescope and satellite technology
 - Decision making, reduce transportation time, lower costs and boost productivity

- **Discovery and design of materials and systems**
 - Studying the mechanical behaviour of metals, composites and intermetallic
 - Enhancing microsystem functionality through materials and process integration
 - Investigating the interaction between living systems and “soft matter” which has applications in biotechnology, biophysics and materials biocompatibility
 - Creating self-driving autonomous vehicles

- Conducting research in nanophotonics, quantum materials, nanoelectronic materials, modelling and fabrication
- Participating in the design, planning and construction of civil infrastructures and the analysis of their reliability
- **Environment and Energy**
 - Creating new battery technologies
 - Studying renewable energy and energy harvesting
 - Ecotourism urban recreation geography
 - Decreasing emissions and improving vehicle weight reduction
 - Investigating environment fluid dynamics and developing mathematical and computational models in the management of natural environments
 - Analysing earth surface processes
 - Using nanotechnology to create high-performance and high-function products
 - Developing sustainable systems for providing high quality drinking water
 - Research in air quality assessment, weather analysis, atmospheric chemistry and modelling and greenhouse gas-source analysis
- **Health and well-being**
 - Geriatric, rehabilitation and management of age related conditions in primary and long term care;
 - Developing new modelling approaches to characterize the morphology and mechanics of both diseased and healthy tissue;
 - Identify both natural and synthesized compounds that serve as therapeutics for conditions such as cancer, Alzheimer, heart disease, diabetes and infectious diseases caused by bacteria and viruses
 - Mathematical, statistical and computational research into brain activity
 - Improving performance of diagnostic equipment used in healthcare settings
- **Information and communication technology**
 - Optimization models for the management of a variety of organizations
 - Machine intelligent systems to learn behaviour and anticipate responses
 - Human side of game related technologies and interactions in order to understand the compelling user engagement of games

- Explore health bioinformatics to research how chronic diseases can be monitored by wearable sensors
- Developing complex algorithms, intelligent antennas and embedded software
- Enhancing the development of practical quantum computing