

**WATERLOO | ENGINEERING**

**GRADUATE STUDIES**

# **Biomedical Engineering**

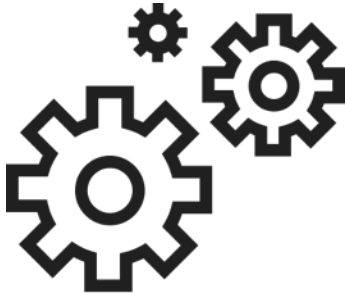


# UNIVERSITY OF WATERLOO - FACULTY OF ENGINEERING



LEADER IN INDUSTRY

CONNECTIONS



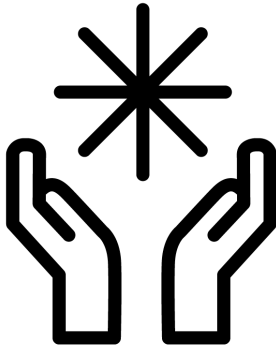
TOP LABS, INSTITUTES

AND CENTRES



TOP RANKING

SCHOOL



CLUBS

& ASSOCIATIONS



**\$87M**

in annual research funding  
within the Faculty of Engineering



**\$42M**

in engineering research equipment infrastructure

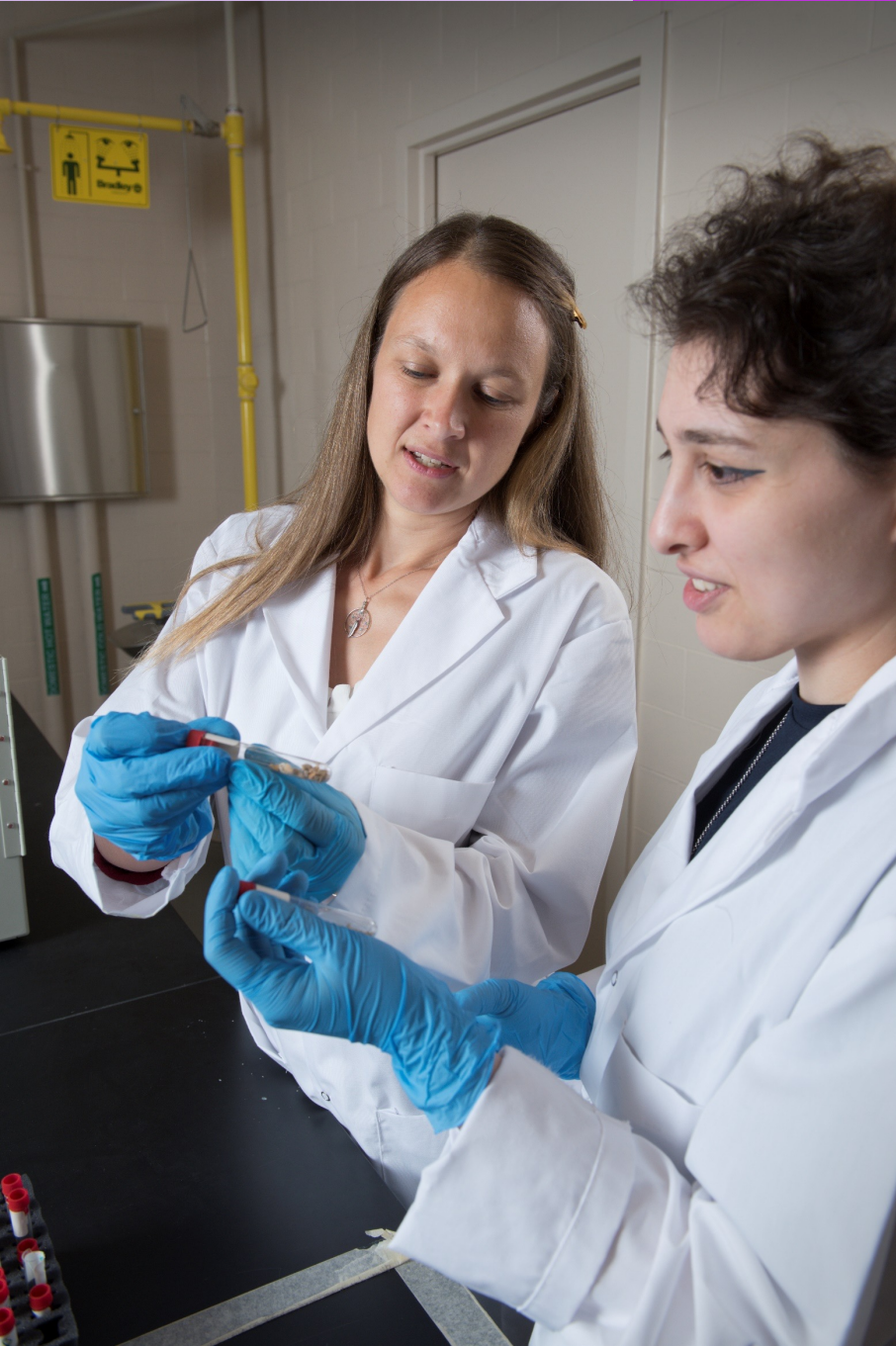
# 100%

*of the ideas developed at Waterloo are owned  
by their creators.*

ONLY AT WATERLOO

## YOUR IDEAS, YOUR INTELLECTUAL PROPERTY

Our policy on intellectual property gives both faculty and students complete ownership over their ideas and technology. That puts you in control to patent or license your idea, to commercialize it, or even start your own company



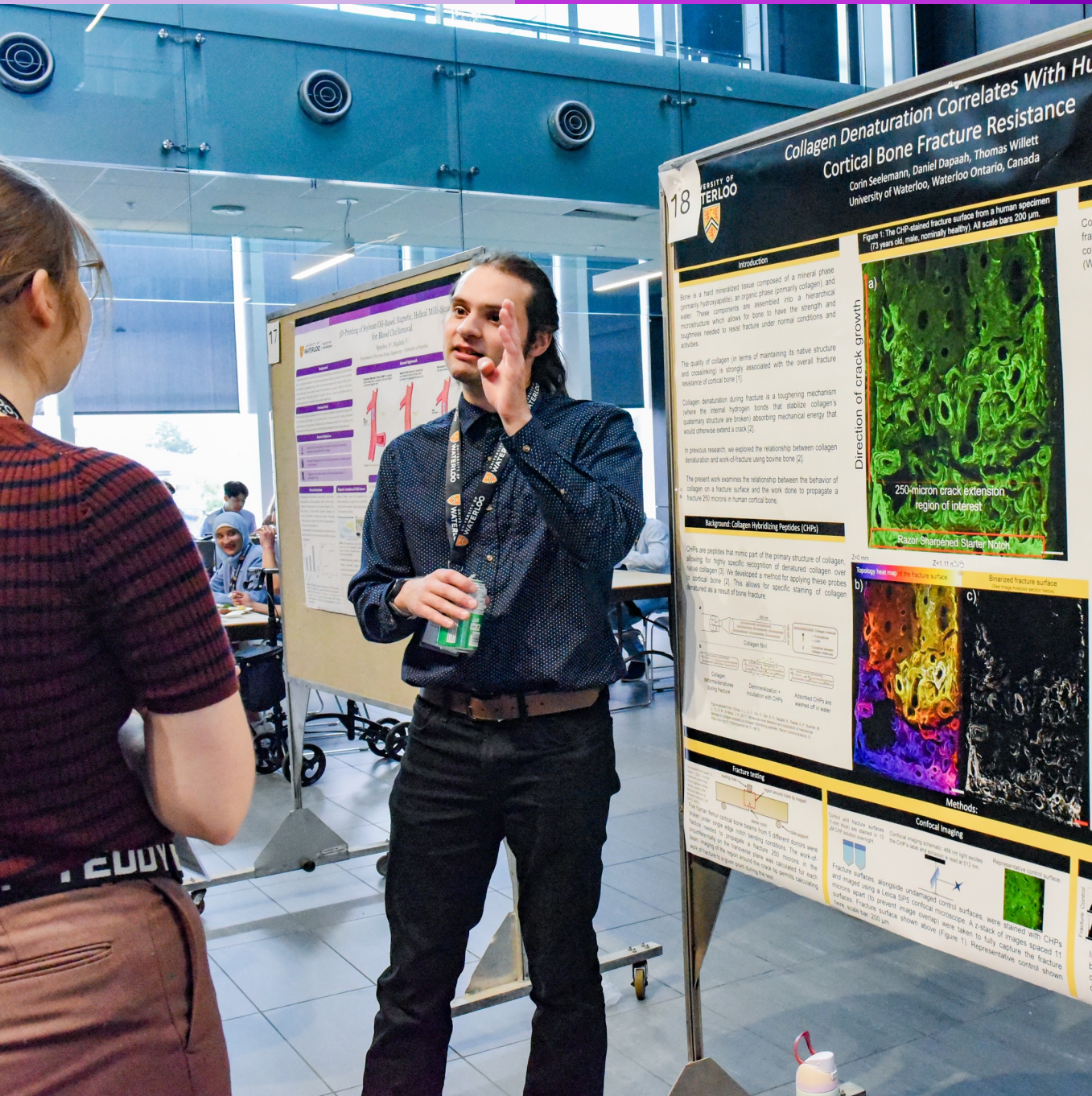
## What is the Graduate Biomedical Engineering program?

- Cutting-edge training at the intersection of biology, medicine, and engineering, preparing students to tackle today's healthcare challenges with interdisciplinary expertise
- Explore research opportunities, collaborate with world-class faculty, and pave the way towards a future in biomedical innovation

# A true collaboration

This program is a partnership between multiple engineering departments: Systems Design Engineering, Mechanical and Mechatronics Engineering, and Electrical and Computer Engineering





## What you might be interested in

- Developing advanced medical devices
- Innovating in tissue engineering
- Discovering mechanisms of disease
- Working with biomaterials
- Exploring biomechanics

Make a meaningful impact on healthcare through engineering excellence and shape the future of biomedicine



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# Programs - PhD and MASc

## Master of Applied Science

- Ideal for recent graduates or professionals seeking to expand their biomedical engineering knowledge through advanced study and research in a major field
- The full-time MASc program is completed in 6 terms
- \*Engineering undergraduate students at the University of Waterloo have the option to enrol in the Accelerated Master's program to accomplish some of the work required to earn a MASc degree while completing their undergraduate program requirements

## Doctor of Philosophy

- Ideal for students pursuing a career in fundamental or applied research in academic, government, or corporate environments
- The full-time PhD program is completed in 12 terms for entry from a master's degree

# What does each program look like?

## Master of Applied Science

- 4 graduate level courses
- Professional Attributes and Competence Enhancement (PACE) Module
- Master's Thesis Proposal
- Master's Thesis

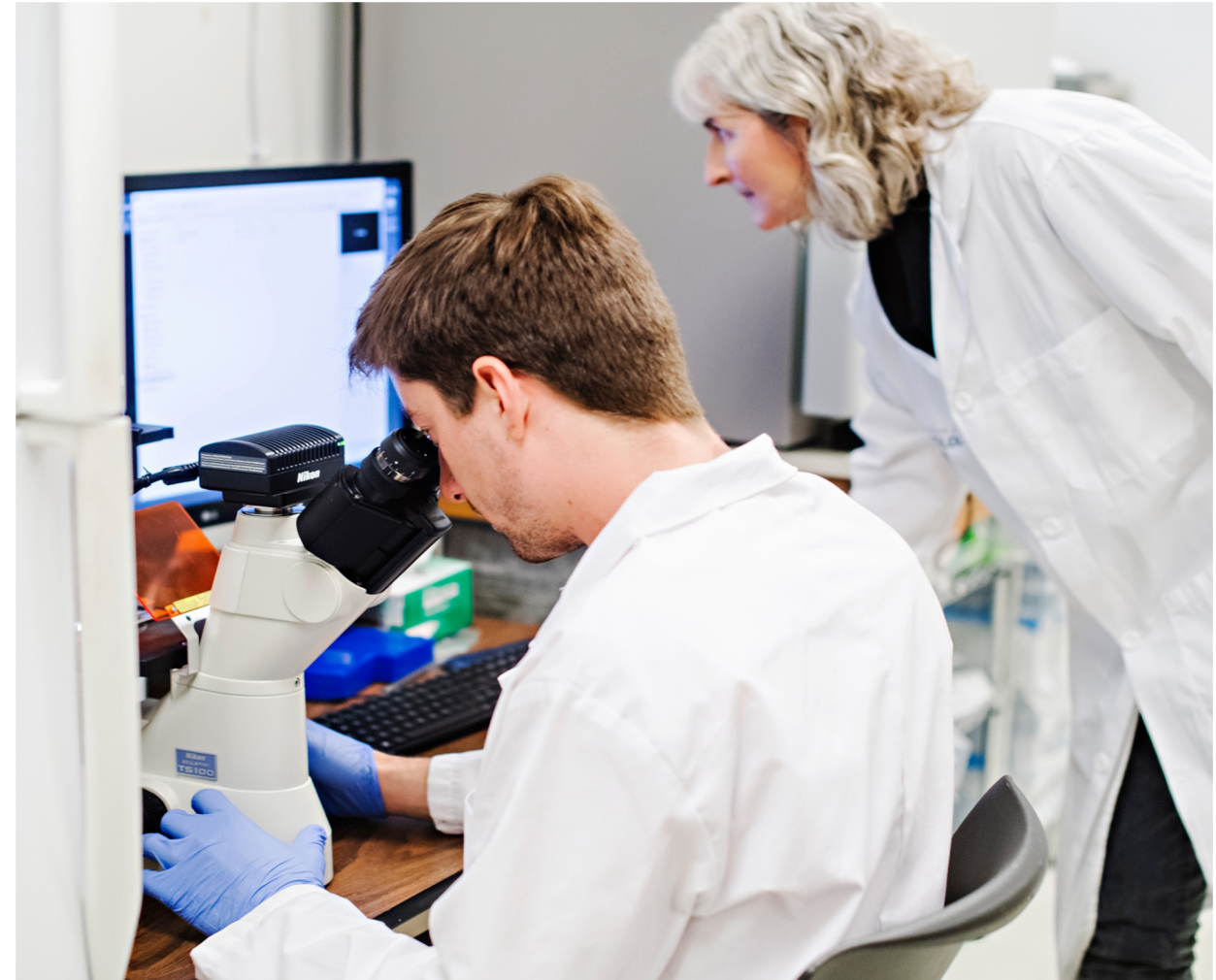
## Doctor of Philosophy

- 4 or 6 graduate level courses (depending on student's master's degree)
- Professional Attributes and Competence Enhancement (PACE) Module
- PhD Comprehensive Examination I and Comprehensive Examination II
- PhD Thesis



# Graduate Research Fields

- **Biomedical imaging technologies**
  - Enhances technology used to visualize biological structures to diagnose and monitor medical conditions
- **Biomechanics and rehabilitation**
  - Examines mechanical aspects of biological structures and movement to optimize recovery, prevent injuries, and develop assistive devices
- **Biomedical informatics**
  - Applies principles of computer and information science to transform biomedical research, the delivery of healthcare services, and public health



# Graduate Research Fields

- **Biomaterials and tissue engineering**
  - Advances medical interventions and treatment through the restoration, maintenance, improvement, and replacement of biological tissues using cells and materials engineering
- **Biomedical signals and devices**
  - Explores the acquisition and measurement of physiological signals in living systems to extract meaningful information to identify patterns and trends



# Example Research Topics

## Biomedical Imaging Technologies

- Medical Imaging
- Large area electronics
- Semiconductor Devices and Fabrication
- Machine learning
- Photoacoustic remote sensing (PARS) microscopy
- Robotics
- SLAM
- Sports Analytics

For names of supervisors, please visit our [website](#): Graduate Students  Research Areas

# Example Research Topics

## Biomechanics and rehabilitation

- Mobility and assistive devices
- Osteoarthritis, Orthopaedics
- Brain-computer interface (BCI)
- Wearable sensors and implants
- Digital human modeling
- Ergonomics
- Motion Capture
- Computational musculoskeletal modeling
- Multibody dynamic models and simulation
- Sports engineering
- Machine learning

For names of supervisors, please visit our [website](#): Graduate Students  Research Areas

# Example Research Topics

## Biomedical informatics

- Neuroscience
- Cognitive modelling and architecture
- Artificial intelligence
- Gene regulatory networks
- Hierarchical coordinate systems
- Neural networks
- Hate speech detection, sentence simplification, text mining
- Blockchain
- Real-time analytics
- Signal and image processing

For names of supervisors, please visit our [website](#): Graduate Students  Research Areas

# Example Research Topics

## Biomaterials & Tissue Engineering

- Photonic and electronic materials
- Liquid crystal elastomers
- 4D printing
- Nanotopography
- Bioprinting
- Soft robots
- STEM cells
- Nanomaterials
- Polymers and bioplastics
- Cell and gene therapy
- Biocompatibility

For names of supervisors, please visit our [website](#): Graduate Students  Research Areas



# Example Research Topics

## Biomedical & Signal Devices

- Nanotechnology and fabrication
- Hearing loss and aging
- Water management
- Fitness assessments
- Silicon devices
- Bio-MEMS and bio-NEMS
- EMC/EMI analyses
- PECOD sensors
- Field-Effect-Transistors
- Micro-devices for cancer treatment
- Microfluidic-based devices

For names of supervisors, please visit our [website](#): Graduate Students  Research Areas



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# Applying to the program

Understanding admission requirements



# ADMISSION REQUIREMENTS

## Master of Applied Science (MASc)

- MASc applicants must have completed a bachelor's degree (or equivalent) in any field of engineering or a related science discipline at a recognized institution with a minimum 80% overall average.
- Must provide program [transcripts](#).
- 2 academic letters of [reference](#)
- Proof of competency in English (if applicable). Please refer to the [English Language Proficiency website](#) for more information on required scores and [exemptions](#)
- Résumé/CV
- Supplementary information form (SIF)

## Doctor of Philosophy (PhD)

- A research thesis-based Master's degree in engineering, applied science, or science from a recognized institution with a minimum 80% overall average with demonstrated research capabilities.
- Must provide program [transcripts](#).
- 3 letters of [reference](#) with a minimum of 2 [academic references](#) (1 from your Master's supervisor)
- Proof of competency in English (if applicable). Please refer to the [English Language Proficiency website](#) for more information on required scores and [exemptions](#)
- Résumé/CV
- Supplementary information form (SIF)

# ENGLISH LANGUAGE PROFICIENCY (ELP) REQUIREMENTS

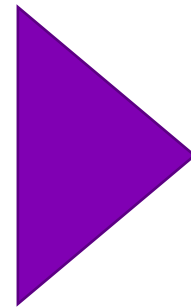
## Graduate Studies accepted examinations and required scores

<i>Internet-based TOEFL (iBT)</i>	<i>IELTS (Academic)</i>	<i>Cambridge English test (C1 Advanced or C2 Proficiency)</i>	<i>CAEL</i>	<i>PTE (Academic)</i>	<i>EFAS</i>
90; writing 25; speaking 25	7.0; writing 6.5; speaking 6.5	185; minimum 176 in each area	70; 60 per band; 70 writing; 70 speaking	63; writing 65; speaking 65	75% overall in level 400 with at least 75% in writing, oral and academic skills

- If applicable – see our list of [ELP exemptions](#)

# APPLICATION DEADLINES

- All BME programs have 3 intake terms a year (see application deadlines to the right for each intake term).
- You must submit all required documents for your application within 2 weeks of the application deadline to be considered. Incomplete applications will not be considered.
- First term available for external students or undergraduate internal UW students is **Fall 2025 with a complete application uploaded Feb 1, 2025**



Spring Term (May start) – October 1<sup>st</sup>

Fall Term (September Start) – February 1<sup>st</sup>

Winter Term (January Start) – June 1<sup>st</sup>



# MASc & PhD – FINDING A SUPERVISOR

- You don't need a supervisor to apply for a MASc or PhD program, but you do need one to be accepted into the program
  - Supervisors must be from the list of approved BME Grad Faculty
  - Supervisors provide the necessary guidance to lead you through a successful research-based program
  - Supervisors provide students with the guaranteed minimum funding to help support them in their studies
  - Students cannot receive an offer of admission if a supervisor does not accept them.

Great Resources on how to find a supervisor



# FINANCE YOUR GRADUATE STUDIES

- Minimum funding guarantee for full-time MAsc/PhD students
  - MAsc - \$18,000 per year for 2 years
  - PhD - \$30,000 per year for 4 years
- International student funding opportunities for MAsc/PhD
- TAships available to all programs
- Waterloo Awards Database

EGSO webpage on funding, scholarships and awards within Engineering



# APPLY ONLINE

**UNIVERSITY OF WATERLOO** | ADMISSIONS | ABOUT WATERLOO | FACULTIES & ACADEMICS | OFFICES & SERVICES | SUPPORT WATERLOO | COVID-19 | SEARCH

## GRADUATE STUDIES AND POSTDOCTORAL AFFAIRS

Graduate Studies and Postdoctoral Affairs home

About Graduate Studies and Postdoctoral Affairs

**Future students**

New students

Current students

Visiting and exchange students

Postdoctoral fellows

Faculty and staff

Important dates >

Forms

Graduate Studies and Postdoctoral Affairs » Future students »

### Applying to graduate school

You've explored our programs, and now you're ready to apply. Please follow the steps below as you prepare, submit, and review your application to graduate studies.

STEP 1: BEFORE <b>YOU APPLY</b>	STEP 2: <b>APPLYING</b>	STEP 3: AFTER <b>YOU'VE APPLIED</b>
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HAVE QUESTIONS?  
**ASK THE BOT**

WATCH THE RECORDING  
**PREPARING YOUR GRADUATE APPLICATION**

# CHECK OUT WHAT BME research is being done!

A new material to produce bone grafts for better surgery outcomes in development



An AI-powered digital imaging system to speed up biopsy results

Sperm-templated soft magnetic microrobots offer promise for treating cancer, infertility and more





# QUESTIONS ABOUT BME?

BME MASc/PhD Admissions  
[bme.grad@uwaterloo.ca](mailto:bme.grad@uwaterloo.ca)

OR

Visit us on our [website](#) and [request more information!](#)



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**YOU+WATERLOO**

*Our greatest impact happens together.*