

# COMPUTER SCIENCE AT UWATERLOO FROM ADMISSIONS TO GRADUATION!

MARCH OPEN HOUSE  
MARCH 22, 2025

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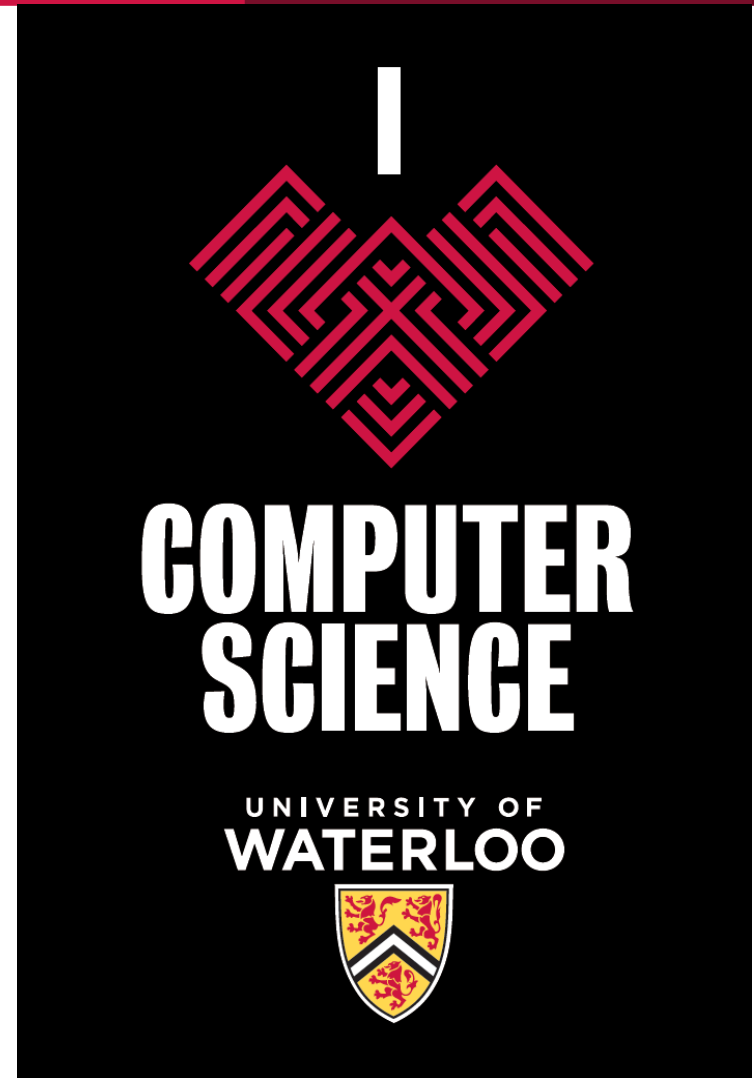
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# AGENDA

- Why Waterloo?
- Why CS?
- Our Degrees
- Co-op vs Regular
- Specializations
- Difference between BSE and BCS
- Courses (by year with survival tips)



# WHY WATERLOO?

- One of the top-ranked CS programs in the country!
- One of the few Faculties of Mathematics in the world
- Can combine different majors in different mathematical disciplines
- Generous Intellectual Property policies – You own your IP!
- World Class co-op program



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# Impact of AI on CS?

- Recruitment officers have heard many concerns about artificial intelligence taking jobs away. Will there be jobs available upon graduation?
- According to: <http://www.aimaps.ai/> overall job postings in America have declined by 17% since the end of 2022.
- However, job postings in AI fields have spiked a total of 68% over that same timeframe!
- According to the Vector Institute, the Canadian situation is similar:  
“Skills related to running AI systems and managing machine learning projects experienced the largest growth with job postings in Canada increasing by 48% and 60% respectively since the lifting of pandemic restrictions.”
- Above is for AI; other fields are also experiencing growth such as in Cyber Security - Demand for CS scholars is still very high!

# OUR DEGREES

- Most of you are interested in one of the most competitive programs in the province and have applied to one or more of the following:
  - BCS – Bachelor of Computer Science (co-op or regular and/or including data science)
  - BMATHCS – Bachelor of Mathematics; Computer Science (co-op or regular)
  - BSE – Bachelor of Software Engineering (co-op)
  - BCFM – Bachelor of Computing and Financial Management (co-op)
  - BBA/BCS Bachelor of Business Administration (co-op, with WLU)
  
- What's life like, inside the classroom and out?

# BCS: CO-OP OR NOT?

## Co-op (Mandatory for BSE, BCFM, BBA/BCS DD)

- 5-year program (8 school terms and 6 work terms)
- 2 years of work experience before you graduate
- Earn between \$55,000 and \$120,000

## Regular (non-co-op)

- 4-year program: 8 school terms, 3 spring/summer
- Summers off to travel, work
- Get started in grad school or industry sooner

# Specializations

- BCS (and DD) has specializations for
  - Artificial Intelligence
  - Bioinformatics
  - Business
  - Computational Fine Arts
  - Digital Hardware
  - Game Design Specialization
  - Human-Computer Interaction
  - Software Engineering
- Many of these are available to BSE students (but not BCFM).

# BCS VS. BSE

- **BCS** is aimed at students who want a degree in CS (I know, it's a tautology)
  - Most BCS grads become software developers, just like most BSE grads
  - BCS has more flexibility to allow you to concentrate on subareas of particular interest to you
    - Complexity theory, numerical computation, AI, graphics, ...
    - Flexibility in what terms you are on campus and/or off campus
    - You can do these in BSE also, but there's less room for electives



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# BCS VS. BSE

- **BSE** is aimed at students who wish to become professional software developers
  - *Much* of the content overlaps with the BCS degree
  - BSE is more constrained (*e.g.*, more "systems" courses required); BCS is more flexible
  - BSE is cohort based, co-op only
    - This is a very big deal for most SE students, according to our exit surveys
  - BSE is a CEAB-accredited engineering program, iron ring, path to PEng
  - **BSE –assumes some prior CS experience.** CS does not.
  - BSE and BCS grads compete for mostly the same set of jobs (co-op and permanent)
- Computer engineering (BASc in ECE) is mostly concerned with computer hardware, and software that is "close to the metal"



# YOUR FIRST YEAR (BCS)

1A	1B
Computer Science I (Language: Racket)	Computer Science II (Language: C) Computer Science Lab
Algebra I	Algebra II
Calculus I	Calculus II
Two Electives (One communication course)	Two Electives (Likely another comm course)

- CFM and BBA/BCS programs are similar but have more constraints and required courses in first year
- There are regular and advanced versions of all first-year Math and CS courses



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# RACKET: YOUR FIRST LANGUAGE (IN BCS)

```
> (define (f L)
  (cond
    [(empty? L) 0]
    [else (+ (first L)
              (f (rest L)))]))
```

```
> (f (list 2 4 5 -3 8 -10))
```

6

# YOUR FIRST YEAR (BSE)

1A	1B
Computer Science I (Lang: C)	Computer Science II (Lang: C++)
Calculus I	Calculus II
Algebra I	Digital Circuits
Linear Algebra I	Linear Circuits
Chemistry for Engineers	Seminar
<i>Methods of SE</i>	One elective



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# SURVIVING AND THRIVING IN YOUR FIRST YEAR!

What is one of the best indicators of university success (measured by GPA)?

Answer: Actually showing up to class!

- **Time management!** ... in case you've never had to do it before
  - University is harder than high school, you need to develop real study habits
  - Keep on top of your workload; seek help when you need it
  - Don't panic!
  - Don't forget to have some fun too
- Health (eating properly, exercise, sleep)
- Socializing (clubs, sports, studying with friends)



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# SURVIVING AND THRIVING IN YOUR FIRST YEAR!

- Asking for help is a sign of maturity and self-awareness, not weakness
  - Talk to your instructors, TAs, classmates outside of lecture
- Many resources are available!
  - Undergraduate advisors
  - CS/Math consulting centres
  - Tutoring in residence
  - Math undergrad office
  - UW counselling services



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# COURSE TUTOR

- Each 1<sup>st</sup> and 2<sup>nd</sup> year course has an *Instructional Support Assistant* (aka *course tutor*) who is an undergrad who has taken the course before
  - They give tutorials and hold regular office hours
  - They are the first point of contact for students in the course who want help; make use of them!
- If you enjoy helping and teaching, consider applying to become a tutor when you are in 2<sup>nd</sup>, 3<sup>rd</sup>, or 4<sup>th</sup> year (as a full-time co-op job)

# SECOND YEAR (BCS)

- Object-Oriented Programming and Software Dev (CS 246)
- Digital Hardware (CS 251)
- Logic and Discrete Math (CS 245)
- Data Structures (CS 240)
- Foundations of Sequential Programming (CS 241)
- STAT 230, STAT 231, MATH 239 (Combinatorics)
- Two electives
  
- BSE is very similar



# THIRD YEAR (BCS)

- **Required:**
  - Operating systems (CS350)
  - Algorithms (CS341)
  
- **CS electives examples:**
  - Application Development (CS346)
  - Concurrent and parallel programming (CS343)
  - Intro to databases (CS348)
  - Intro to user interfaces (CS349)
  - Intro to theory of computing (CS360)
  - Numerical computation (CS370)



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# THIRD YEAR (BSE)

- **Required:**
  - Operating systems (SE350)
  - Algorithms (CS341)
  - Concurrent and parallel programming (CS343)
  - Intro to databases (CS348 – now done in 2B)
  - Intro to user interfaces (CS349)
  - Intro to feedback control (SE380)
  - Software testing & QA (SE465)
  - Software architecture & design (SE464)



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# FOURTH YEAR COURSE OPTIONS (BCS,BSE)

- Programming languages
- Compiler construction
- Security
- Networking
- Software Engineering
- Databases
- HCI
- Architecture
- Real-time OS
- Distributed systems
- Networking
- Performance
- Neural Networks
- Algorithm Analysis
- Quantum Computing
- Image Processing
- Computational Algebra
- Financial Modelling
- Biological Analysis
- Computational Vision
- Machine Learning
- Artificial Intelligence
- Symbolic Computation
- Graphics
- Information Systems
- Social Implications



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# HOW DOES CO-OP WORK?

1. Employers post jobs online
  2. Students apply online
  3. Interviews take place on campus
  4. Students and employers rank each other
    - UW pairs up the “best matches”
- Your first co-op term will be Spring or Fall, depending on your sequence

# WORKING/STUDYING ABROAD

- Some co-op jobs are overseas!
- UW has exchange programs with several international universities
  - You can spend 4, 8, or 12 months on an exchange
  - Happens in 3<sup>rd</sup> year; plan ahead!



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# STUDENT LIFE

- Clubs (Math specific)
  - Computer Science Club
  - Data Science Club
  - Double Degree Club (BBA/BCS)
  - MathNews
  - Women in Computer Science (WICS) Undergrad Committee



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# STUDENT LIFE

- Sports!
  - Varsity sports teams
  - Intramural teams
  - Athletic clubs
- Explore creating a start-up!
  - Check out *Velocity*
  - Use a co-op term to grow your business ideas & get credit through Enterprise Co-op Program (E-Co-op)



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# COMPETITIONS

- **ACM Intl. Programming Competition East Central NA finishes:**
  - 2021: 3, 4, 10 / 99
  - 2022: 2, 3, 6, 15 / 92
  - 2023: 1, 3, 4, 20 / 84
  - 2024: 3, 7, 10, 14 / 88
  - Since 1993, 25 top-20 finished at World Finals
- **Putnam Competition (Math)**
  - UW Team finished between 6-10 in 2024! Highest Canadian ranked team finish.
- **Various hack-a-thons, code jams**



# RESEARCH AND GRAD SCHOOL!

- Consider doing a URA term; ask your profs!
  - Part-time while taking classes, or
  - Full-time during a co-op term
- Some profs allow strong undergrads to enroll in their grad courses
- If you totally dig the research thing, you may want to stay on and do a MMath or PhD
  - Waterloo is a top grad school in CS!

# ADMISSIONS UPDATE FOR APPLICANTS

# HAVE YOU APPLIED? SOME HELPFUL NOTES...

- The majority of admission decisions for the Faculty of Mathematics are made in **mid-May**
- Decisions are based on admission average and AIF score
- If you have applied to multiple programs in Mathematics (e.g., Math and Computer Science):
  - You will likely receive a decision for each program at different times
  - You will get a decision for all the programs you applied to



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# ADMISSIONS UPDATE FOR APPLICANTS

## IMPORTANT NOTES:

The Faculty of Mathematics is a very competitive faculty

- Participating in contests (CSMC and/or Euclid) can only help, never hurt.
- We receive a very large number of applications (16,000+) for around 1,280 seats.
- Be prepared for any scenario so that when you get our decision, you're ready to act.



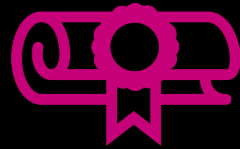
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# NEXT STEPS FOR APPLICANTS



Write Euclid



Work hard to  
finish grade 12  
with strong  
grades



Expect admissions  
decisions by  
**mid-May**



Accept your offer by  
**June 2, 2025!**

## HAVE QUESTIONS?

Visit the scholarship and admissions booth at the Mathematics info fair in M3 today.

# FOR MORE INFORMATION



[mathinfo@uwaterloo.ca](mailto:mathinfo@uwaterloo.ca)



[uwaterloo.ca/math/  
book-one-to-one](https://uwaterloo.ca/math/book-one-to-one)



[uwaterloo.ca/math/  
future-undergraduates/connect](https://uwaterloo.ca/math/future-undergraduates/connect)



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# THANK YOU AND EXPLORE UWATERLOO!

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# PLAN THE REST OF YOUR DAY

TIME	SESSION	LOCATION
11:30 – 12:15	Computer Science info session	M3 1006
	Student panel: Co-op and student life in Math and Computer Science	DC 1350
	Statistics and Actuarial Science info session	DC 1351
	Applied Mathematics info session	MC 2065
12:30 – 1:15	Game Theory sample lecture	M3 1006
	Grade 9-11 students: The road to Math and Computer Science	DC 1350
	Women in Computer Science: Networking, Mentorship, and Community	DC 1351
1:30 – 2:15	Computer Science info session	M3 1006
	Student panel: Co-op and student life in Math and Computer Science	DC 1350
	Computing and Financial Management info session	DC 1351
	Pure Mathematics info session	MC 2065
2:30 – 3:30	Preparing for the Euclid Contest workshop	M3 1006
10:00 – 4:00	Faculty of Mathematics tours (M3 Atrium) – last tour at 3:30pm	M3 Atrium
	Mathematics info fair	M3 Atrium
	Computer Science info fair	DC Great Hall