

CEMC **SUMMER CONFERENCE** **FOR COMPUTER STUDIES AND** **MATHEMATICS EDUCATORS**

August 18 to 20, 2026



UNIVERSITY OF
WATERLOO



The CENTRE for EDUCATION in
MATHEMATICS and COMPUTING

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Schedule

Time	Activity	Location
Monday, August 17		
3:00 p.m. - 8:00 p.m.	Early registration	St. Jerome's Parking Lot
5:00 p.m. - 6:00 p.m.	Dinner	St. Jerome's Cafeteria
8:00 p.m. - 10:30 p.m.	Games, pizza and refreshments	SJ2 Atrium
Tuesday, August 18		
7:30 a.m. - 8:30 a.m.	Registration Breakfast	SJ2 Atrium St. Jerome's Cafeteria
9:00 a.m. - 10:30 a.m.	Welcome address	SJ2 1004
10:45 a.m. - 12:15 p.m.	Session 1	MC
12:15 p.m. - 1:15 p.m.	Lunch	MC
1:15 p.m. - 2:45 p.m.	Session 2	MC
3:00 p.m. - 4:30 p.m.	Session 3	MC
5:30 p.m. - 9:00 p.m.	Dinner (served at 6:00 p.m.) and social time	Fed Hall
Wednesday, August 19		
7:30 a.m. - 8:30 a.m.	Breakfast	St. Jerome's Cafeteria
9:00 a.m. - 10:30 a.m.	Session 4	MC
10:45 a.m. - 12:15 p.m.	Session 5	MC
12:15 p.m. - 1:15 p.m.	Lunch	MC
1:15 p.m. - 2:45 p.m.	Session 6	MC
3:00 p.m. - 4:30 p.m.	Session 7	MC
5:15 p.m. - 6:30 pm	Dinner	St. Jerome's Cafeteria
6:30 p.m. - 7:30 p.m.	Campus tour	SJ2 Atrium
7:30 p.m. - 10:00 p.m.	Social time	SJ2 Atrium
9:00 p.m. - 10:00 p.m.	Observatory tour (weather permitting)	Walk from SJ2 Atrium
Thursday, August 20		
7:30 a.m. - 8:30 a.m.	Breakfast	St. Jerome's Cafeteria
9:00 a.m. - 10:30 a.m.	Session 8	MC
10:45 a.m. - 12:15 p.m.	Session 9	MC
12:15 p.m. - 1:15 p.m.	Lunch	MC

Icons and Abbreviations



Timing



Presenter



Venue



Session title



Audience



Computer Studies



Grade 7 & 8 Mathematics

7 & 8



Grade 9 to 12 Mathematics

9 to 12



All Mathematics

All

******This session includes the use of software. Read the session description for more information. You may find it useful to access the software on your own device with an operating system with which you are most comfortable. If the session is scheduled in one of the labs (MC 3003, MC 2063 or MC 2062), then you can use one of the lab computers. Participants are encouraged, as always, to follow best cybersecurity practices when deciding whether to download or use the software, among other things paying attention to the permissions that the app needs (e.g. access to GPS location, access to information about networks, open network sockets, etc.).

Please note that some sessions are 90-minute sessions and others are 3-hour sessions with a 15 minute break. We have labelled parts of these sessions as *part 1* and *part 2* in this document.

You are welcome to attend any of the sessions offered during a given timeslot, regardless of the area of interest you selected during registration. For example, even if you indicated Grades 9-12 Mathematics as your primary interest, you are still welcome to attend sessions designated for Computer Studies educators.

MC: Mathematics and Computing Building

SJ2: St. Jerome's University

Welcome address

Social Implications of Math

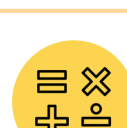


Judith Koeller



SJ2 1004

Many math students struggle with the question “When will we use this in the real world?”. Explore some social implications of math and computer science related to the environment (carbon tax), wealth (predatory lending), health (Body Mass Index), ethics (self-driving cars). Examine some specific implications when different identity groups are under-represented in math/CS initiatives.

			
Creative Coding	Craig Kaplan	MC 4042	
History of CS and Visit to the Computer Museum	Scott Campbell	SJ2 Atrium	
10 Activities for the first 10 minutes of class	Kevin Shonk	MC 2034	 7 & 8
Problem Solving in a Secondary Math Class	Ian VanderBurgh	MC 2035	 9 to 12
Starting a Math Club in your school	Shawn Godin	MC 2038	 All

Creative Coding

Creative coding involves, among other things, using code to produce artistically interesting images and animations. There is a large and vibrant online community of creative coders. I will talk about P5.js as a platform for exploring creative coding, show some of the work that inspires me in this medium, demonstrate a few past projects of mine, and walk through a couple of live examples of creating abstract looping animations using code.

History of CS and Visit to the Computer Museum

In this session, we'll complete a walking tour of the UW Computer Museum and its distributed display cases, exploring the history of computing in and around UW. The tour guide will be Prof. Scott Campbell (B.Math/CS), co-founder of the museum and an historian of computing. The tour will feature a stop at the main museum office, where visitors will learn about the Red Room, UW's original computing centre from the 1960s, and can enjoy playing with some of our working historical computer systems. We'll also stop at our slide rule exhibit, and discuss how obsolete slide rules can be included in modern courses about numeracy and critical thinking. The tour will conclude with a visit to Nibi, UW's supercluster computer. Registration is limited, and if the weather isn't cooperating, we'll do the tour entirely indoors.

NOTE: Participants in this session will gather in the SJ2 Atrium following the "Welcome Address" in SJ2 1004. There is a limit of 20 people for this session.

10 Activities for the first 10 minutes of class

Explore a variety of activities that will start your math class with engagement and creative thinking. I have used these activities for many years in grade 7 and 8 classes to draw in all learners, increase math communication and help to spiral curriculum concepts. Hear about the activities I have found to be the most impactful and how I organize them for ease of implementation and student engagement.

Problem Solving in a Secondary Math Class

In this session, we will solve a variety of problems and engage in discussions about problem solving, examining it both as an essential component of the curriculum and as a valuable tool for enrichment and extension activities. We will explore different approaches, strategies, and techniques for solving problems, while also encouraging teachers to consider how problem solving can be integrated effectively into their classroom instruction to enhance critical thinking, creativity, and deeper understanding among students.

Starting a Math Club in Your School

Interested in running a math club but don't know where to start? We will discuss ideas around setting one up, activities, and issues you are bound to face. Samples of ideas to be used with the students will be shared. There are ample resources on the CEMC website to help get your math club going, and we will also explore other resources that will be valuable. Fortunately, there are no guidelines for creating a math club, so you are free to move in directions that are of interest to you and your students. Come out to this session and get started!

			
Combatting Academic Misconduct in the Era of AI - <i>part 1</i>	Sarah Strong	MC 3003	
Block Coding in Delightex - <i>part 1</i>	Sandy Graham	MC 2063	
Inclusive Inquiry: Empowering Neurodivergent Learners Through Knowledge Building and Micro:bit, Enhanced STEM Experiences - <i>part 1</i>	Elizabeth Gateman	MC 2062	
Making Math Come to Life with Coding - <i>part 1</i>**	Sheri Hill and Nathan Rowbottom	MC 2034	 7 & 8
Building a Thinking (Calculus) Classroom	Jamie Mitchell	MC 2035	 9 to 12
Introduction to Generative AI	Pavol Chvala	MC 2038	 All

Combatting Academic Misconduct in the Era of AI - part 1

Generative AI tools such as ChatGPT have gained popularity among everyone, including students, in the past few years. Most high school students have been using it without being taught how to use it responsibly and what happens when you over-rely on it. Let's teach our students how to use AI to help with their learning and thinking, not replace it. Here are the topics covered in this session:

1. How to promote academic integrity in computer science courses;
2. How to design AI-resistant assignments;
3. How to address academic misconduct with students and stakeholders.

Block Coding in Delightex - part 1

Delightex (formerly CoSpaces) is a platform for creating interactive 3-D scenes. The elements of the scenes can be controlled through block coding, Python code, or JavaScript. In this session we will explore the basics of the block coding elements. The CEMC uses Delightex in its CS Escape Workshop that introduces coding concepts to Grade 8 students. You need a licence to access the full set of features available: this includes classroom management tools. Participants in the session will have a chance to see how these tools can be used and get a chance to see if the licence cost would be worth paying for their own classroom needs.

**** Session is accessible for teachers with little or no coding experience looking for ways to integrate coding in their Math or CS classes.*

Inclusive Inquiry: Empowering Neurodivergent Learners Through Knowledge Building and Micro:bit, Enhanced STEM Experiences - part 1

The purpose and overall goal of this session is to provide insights from science, technology, engineering and math (STEM) programming and learning environments which aim to create inclusive, high-engagement STEM experiences for learners with diverse strengths and support needs. This session will explore the role of Inquiry, e-Based Learning, Knowledge Building pedagogy, and Universal Design for Learning (UDL) to cultivate curiosity and increase autonomy in younger learners in technology-based learning settings.

Making Math Come to Life with Coding - part 1

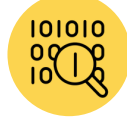
In this session, participants will explore a variety of strategies, manipulative tools, and digital resources that can support student engagement, enhance understanding, and facilitate meaningful expression of their learning. Opportunity will be given to engage with hands-on activities, experiment with innovative technologies, and discuss practical applications that can be integrated into diverse learning environments. Additionally, participants will reflect on how to adapt to meet the needs of all learners, fostering a more inclusive and dynamic educational experience.

Building a Thinking (Calculus) Classroom

Are you building your own thinking classroom? Do you struggle with designing tasks or creating assessments? Participants at this session will experience first hand some of the tasks used in MCV4U to engage student thinking. Additional scripts and tasks will be shared, as well as suggestions and strategies to assess student learning in a way that aligns with the spirit of Thinking Classrooms. A major focus of this session will be on practices that centre the student as a learner, equitable classroom norms and how the Thinking Classroom can be used to disrupt traditional practices. You don't need to be a Calculus teacher to take something away from this session!

Introduction to Generative AI

Dive into the world of Generative AI with this introductory session designed to provide hands-on experience in effective AI use. Develop a solid understanding of the technologies that drive GenAI tools, explore the common risks and challenges associated with their use, and acquire the essential skills to confidently navigate and utilize today's GenAI tools.

			
Combatting Academic Misconduct in the Era of AI - <i>part 2</i>	Sarah Strong	MC 3003	
Block Coding in Delightex - <i>part 2</i>	Sandy Graham	MC 2063	
Inclusive Inquiry: Empowering Neurodivergent Learners Through Knowledge Building and Micro:bit, Enhanced STEM Experiences - <i>part 2</i>	Elizabeth Gateman	MC 2062	
Making Math Come to Life with Coding - <i>part 2</i>**	Sheri Hill and Nathan Rowbottom	MC 2034	 7 & 8
Modelling Math Concepts with Polypad	Angela Kurmey	MC 2035	 9 to 12
Solving for X with AI: Transforming Your Math Classroom with Google's Gemini Suite	Robin Grondin	MC 2038	 All

Combatting Academic Misconduct in the Era of AI - part 2

This is a continuation of the Combatting Academic Misconduct in the Era of AI - part 1 and the session description can be found on page 9.

Block Coding in Delightex - part 2

This is a continuation of the Block Coding in Delightex - part 1 and the session description can be found on page 9.

Inclusive Inquiry: Empowering Neurodivergent Learners Through Knowledge Building and Micro:bit, Enhanced STEM Experiences - part 2

This is a continuation of the Inclusive Inquiry: Empowering Neurodivergent Learners Through Knowledge Building and Micro:bit, Enhanced STEM Experiences - part 1 and the session description can be found on page 9.

Making Math Come to Life with Coding - part 2

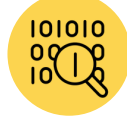
This is a continuation of the Making Math Come to Life with Coding - part 1 and the session description can be found on page 10.

Modelling Math Concepts with Polypad

Polypad is a suite of virtual math manipulatives connected to geometry, numbers, fractions, algebra, and probability and data. In this hands-on session, participants will be introduced to these tools and how they can be used to build models to represent abstract mathematical concepts from MTH1W, MFM2P, MPM2D, and MDM4U.

Solving for X with AI: Transforming Your Math Classroom with Google's Gemini Suite

This presentation offers a practical guide for math educators on leveraging Google's powerful suite of AI tools—Gemini, NotebookLM, Gems, and Gemini in Google Classroom—to create more dynamic, differentiated, and engaging learning experiences. We'll move beyond the theoretical and dive into concrete strategies that you can implement immediately to save time, spark student curiosity, and deepen conceptual understanding. Join this session to walk away with a toolkit of AI-powered strategies that will not only enhance your math instruction but also re-energize your passion for teaching.

			
Vibe Coding: When the Rubber Hits the Road	Paul King	MC 3003	
A Point and Click Workflow for Independently Publishing Teaching Materials (Lab) - part 1**	Russell Gordon	MC 2063	
Beginner Introduction to MicroPython (Lab) - part 1**	John Rampelt	MC 2062	
Building Students' Mental Math Skills with Strings	Sarah Whitehead	MC 2034	 7 & 8
Naming the Problem: Teaching how to solve open problems in high school math	Michael Szarka	MC 2035	 9 to 12
Error-Correcting Codes: Nostalgia? Museum Relics? The GOAT?	Judith Koeller	MC 2038	 All

Vibe Coding: When the Rubber Hits the Road

The results of an attempt to use AI (Copilot), problems encountered in a Grade 11 high school setting, and how they were addressed. Since students hadn't yet learned arrays, a teacher could also consider using this in grade 10 (ICD2O). What problems is vibe coding meant to solve? How were we using vibe coding? How uneven was the "playing ground" when AI is determining what code a student receives? This and more are discussed.

A Point and Click Workflow for Independently Publishing Teaching Materials (Lab) - part 1

Who owns the valuable content that you author and publish for your students through third-party platforms? How is your content used by those platforms? Can you easily export your content if you change employers, or if your employer decides to change the content management system used by your school?

Text files are the one universal file format, and by learning Markdown and organizing files using Obsidian, you can author and publish a deeply linked, searchable website, with pages that can include “pretty-print” mathematical formulae and equations, code snippets, diagrams, animations, images, videos, PDF files, or any other type of document.

In this session, the presenter will share a point-and-click app that runs on Windows or macOS that makes it easy to publish modern class websites from a set of Markdown-formatted text files. No manual configuration required, no command-line work, just an app that you can install on your own computer and begin using right away. The software supports deploying your website to a variety of online hosting services.

So, who would own the content you write and publish through this system?

Unambiguously – it is you. As it should be.

This is the third and final version of an idea first presented in the 2023 session titled "A Rapid Workflow for Publishing CS Teaching Materials" and updated in the 2025 session titled "An Even Faster Workflow for Publishing Teaching Materials". Everyone knows version 3.0 is the best version of a given piece of software, so, don't miss out!

Session is accessible for teachers with no experience in publishing online materials.

Beginner Introduction to MicroPython (Lab) - part 1

Is it time to leave Arduino C code behind? The introduction of powerful and inexpensive new microcontrollers in both the Raspberry Pi Pico and ESP32 families have enabled the use of MicroPython as an easier-to-learn-programming alternative to traditional Arduino C/C++ code. In this session we'll compare Arduino and MicroPython programs, learn the structure, syntax, and features of MicroPython programs, and build and program a range circuit examples using MicroPython, including analog sensing, driving motors, controlling NeoPixels, and even using WiFi.

Building Students' Mental Math Skills with Strings

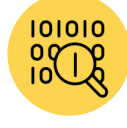
Mental math doesn't have to be a guessing game. In this workshop, we'll explore strings as a powerful way to help students build number sense, think flexibly, and make sense of numbers—without reaching for a pencil. Through examples and discussion, educators will learn how to facilitate meaningful math conversations that encourage reasoning, justification, and multiple approaches to problem-solving that turn “I just knew it” into “Here's how I figured it out.”

Naming the Problem: Teaching how to solve open problems in high school math

As high school teachers we often ask students to explore and solve open problems to help them learn new concepts, but has anyone ever helped them learn the concept of problem solving itself? Students, especially those that don't see themselves as good math students, struggle to solve open problems and will often end the problem by giving up before any meaningful learning can take place. This presentation aims to arm you with strategies that help students learn how to problem solve WHILE they problem solve, leading to meaningful improvement in both areas. By being explicit about their process students will improve dramatically with resilience and perseverance, leading to much better learning in math class!

Error-Correcting Codes: Nostalgia? Museum Relics? The GOAT?

Error-Correcting codes use discrete mathematics to improve the quality of photos from space, playing recorded music, scanning groceries at the check-out, and watching a live sports event on TV. We'll explore the mathematics and its connection to decimals, fractions, exponents, polynomials, probability and binary numbers.

			
How can we train a machine learning model to recognize images and sound?	Jared Stryker	MC 3003	
A Point and Click Workflow for Independently Publishing Teaching Materials (Lab) - part 2**	Russell Gordon	MC 2063	
Beginner Introduction to MicroPython (Lab) - part 2**	John Rampelt	MC 2062	
Building Fraction Sense: Scaffolded Thinking Through Problem Solving	Tali Amar	MC 2034	 7 & 8
Data Management: Small Steps for Big Results	Paul Alves	MC 2035	 9 to 12
Supporting Struggling Learners: Universal Design for Learning Principals (UDL) in Math	Erica Mark	MC 2038	 All

How can we train a machine learning model to recognize images and sound?

How can we train a machine learning model to recognize images and sound? Using Teachable Machine, a free resource from Google, educators will learn how students can quickly and easily train a machine learning model to recognize different inputs in a safe environment - even from a school computer! Knowing that incorporating AI education into classroom policy comes with its own hurdles, we will also introduce a suite of smaller activities that teach the underlying concepts shaping modern AI in an offline and unplugged environment.

A Point and Click Workflow for Independently Publishing Teaching Materials - part 2

This is a continuation of the A Point and Click Workflow for Independently Publishing Teaching Materials - part 1 and the session description can be found on page 14.

Beginner Introduction to MicroPython - part 2

This is a continuation of the Beginner Introduction to MicroPython - part 1 and the session description can be found on page 14.

Building Fraction Sense: Scaffolded Thinking Through Problem Solving

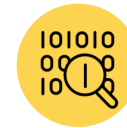
Understanding fractions deeply is essential for mathematical flexibility, but many students struggle beyond basic procedures. This session focuses on scaffolding fractional thinking through problem-solving to build conceptual understanding. Participants will explore rich tasks, strategies to support students, and ways to connect fractions to broader concepts. Through activities and discussions, educators will gain practical approaches to help students understand fractions meaningfully.

Data Management: Small Steps for Big Results

Data management is my favourite course to teach in the high school math curriculum. My wish is that more students would enroll in the course and see the utility of the content for their post-secondary life, and to make them critical consumers of information. In this workshop, I will share activities, resources and tips that I have collected over the years teaching data management. Whether you are a data rookie or a veteran, you will walk away with content that can be integrated into your own program. Participants are also encouraged to share their best practices that make this course one of the most unique courses in high school math.

Supporting Struggling Learners: Universal Design for Learning Principals (UDL) in Math

In this session, participants will explore a variety of strategies, manipulative tools, and digital resources that can support student engagement, enhance understanding, and facilitate meaningful expression of their learning. Opportunity will be given to engage with hands-on activities, experiment with innovative technologies, and discuss practical applications that can be integrated into diverse learning environments. Additionally, participants will reflect on how to adapt to meet the needs of all learners, fostering a more inclusive and dynamic educational experience.

			
Computer bot Programs to Teach Abstract Classes and Interfaces (Java) - <i>part 1</i> **	Nathan Rowbottom	MC 3003	
Movement and Meditation in the Classroom	Roma Uniat	MC 4042	
RTC Shield Workshop - <i>part 1</i> **	Raj Nachimuthu	MC 2062	
Beyond the Screen: Make the Coding Curriculum Come to Life in a Middle School Classroom - <i>part 1</i>	L. Andrea Izzo	MC 2034	 7 & 8
A Sprinkling of Algebra and Interleaving Homework	Lindsay Parchimowicz	MC 2035	 9 to 12
Moving Beyond Marks to Create a Culture of Meaningful Learning	Avinash Ghosh	MC 2038	 All

Computer bot Programs to Teach Abstract Classes and Interfaces (Java)

- part 1

Looking for a relatable context for your students to use interfaces in Java? Your students (alone or in groups) will program Java-based arenabots to dodge, track, attack, and loot other bot programs for some friendly competition.

In the past, it was a little difficult for some students to get nicely functioning bot programs in a smaller window of time. This is where the value of interfaces comes into play.

Join former Prime Minister's Award for Teaching Excellence in STEM, Nathan Rowbottom for a double session, where you will make a bot program starting from an abstract class.

Continue adding functionality using either videos or working together, implementing the basic functions for moving, sensing, dodging and attacking.

Suggested that you can bring your own technology and preferred Java IDE.

The session will supply code base using github or usb sticks and demonstrate using VSCode with AI turned off.

Movement and Meditation in the Classroom

This talk is to show how movement can support learning. Research from brain gym on activating neurons and improving thinking will be used. Participants will engage in cross body movements and participate in different meditations that can be used in class. We will also connect movement to curricular concepts in math and CS.

RTC Shield Workshop - part 1

This presentation focuses on building a summative, hands-on project using the familiar Arduino UNO platform. Participants will construct an Arduino RTC Shield capable of displaying the time, date, and month on a seven-segment display. As the shield is custom designed, no external wiring is required, simplifying assembly and improving classroom reliability. Participants will solder the shield components and then proceed to program and test the completed circuit.

Beyond the Screen: Make the Coding Curriculum Come to Life in a Middle School Classroom - part 1

Stop teaching coding in a vacuum. Transform abstract concepts into real-world results by bridging the gap between the screen and the physical world. Using tools like LEGO Spike Prime, Vex-VR, Micro:bits, and Google Sheets, you'll learn to weave Geometry and Data Management into your coding curriculum to skyrocket student engagement and deepen pedagogical impact.

A Sprinkling of Algebra and Interleaving Homework

The topics that often hold back students in mathematics are the algebra-heavy ones. I have worked with my colleagues to redesign the grade 9 destreamed math to try and spread out the algebra topics to allow students more time to absorb the sometimes very nuanced details of algebra, while continuously reviewing everything in the course weekly. This course redesign incorporates standards based grading, levelling questions, interleaving homework and has been carefully thought out to aid students in the destreamed math course at all levels.

Moving Beyond Marks to Create a Culture of Meaningful Learning

How can Outcomes-Based Assessment change the way we evaluate and support student learning? In this interactive session, we will walk through the implementation process - from identifying learning outcomes to designing assessment tools that align with curriculum expectations. We will learn how these practices improve consistency and support student growth. The goal is to rethink our current assessment practices and leave with the knowledge and resources needed to adapt these for your own classroom or school.

			
Computer bot Programs to Teach Abstract Classes and Interfaces (Java) - <i>part 2</i> **	Nathan Rowbottom	MC 3003	
Exploring Quantum Algorithms with Games (<i>Hands-on</i>)	John Donahue	MC 4042	
RTC Shield Workshop - <i>part 2</i> **	Raj Nachimuthu	MC 2062	
Beyond the Screen: Make the Coding Curriculum Come to Life in a Middle School Classroom - <i>part 2</i>	L. Andrea Izzo	MC 2034	 7 & 8
Engaging Students with Paradox	Rich Dlin	MC 2035	 9 to 12
UW Math Trail	Rob Gleeson	MC 2038	 All

Computer bot Programs to Teach Abstract Classes and Interfaces (Java) - part 2

This is a continuation of the Computer bot Programs to Teach Abstract Classes and Interfaces (Java) - part 1 and the session description can be found on page 20.

Exploring Quantum Algorithms with Games

Quantum computing allows us to process information in ways beyond what's possible with today's computers. By encoding bits into objects like electrons and photons that obey the rules of quantum physics, we can manipulate information to reach solutions in novel ways. In this workshop, we'll explore what makes quantum bits different than classical bits and the toolbox to manipulate them. We'll discover some algorithms that can be run more efficiently on a quantum device, including unsorted search. We will finally introduce a hands-on game to show students how quantum advantages may start small but become incredibly powerful as the system size increases.

RTC Shield Workshop - part 2

This is a continuation of the RTC Shield Workshop - part 1 and the session description can be found on page 20.

Beyond the Screen: Make the Coding Curriculum Come to Life in a Middle School Classroom - part 2

This is a continuation of the Beyond the Screen: Make the Coding Curriculum Come to Life in a Middle School Classroom - part 1 and the session description can be found on page 21.

Engaging Students with Paradox

From Ancient Greece to Lewis Carroll, intellectuals have been testing the faults in mathematics and logic for centuries, if not millenia. The very nature of paradox promotes deeper inspection, making it a valuable tool for learning. In this session, Rich will present some of the more intriguing - yet accessible - paradoxes that are embedded in the high school curriculum, and how one can use these to engage students, promote deeper understanding, and ultimately to either resolve the paradox, or else revel in the sweet logic of its existence.

UW Math Trail

A Math trail invites students to view the world while thinking mathematically and getting a little fresh air. Students follow a planned route and answer a set of questions, create mathematical questions related to what they encounter, or capture images of mathematical concepts that could be explored later in class. Through experiences like these, students are given a chance to connect the mathematics curriculum to many subjects including art, design, architecture, science, geography and history.

			
Teaching Debugging (Lab) - part 1	Carmen Bruni	MC 3003	
Data Visualization in p5.js - part 1	Andrew Seidel	MC 2063	
Final Project Idea for TEJ or TAS Classes - part 1**	Rob Ceccato	MC 2062	
Problem Solving in Grades 7 and 8	Shawn Godin	MC 2034	 7 & 8
What to Expect in the First Year at the University of Waterloo	Shane Bauman and Fiona Dunbar	MC 2035	 9 to 12
Introducing CEMC's Grade 4 to 6 Courseware	Michaela Crowson and Ashley Sorensen	MC 2038	 All

Teaching Debugging (Lab) - part 1

Debugging is one of the most important and overlooked skills when learning how to program. In this session, we will explore common errors that programmers encounter in code using what has arguably become the lingua franca of programming namely Python. While examples presented will be in Python, much of what will be discussed can be used in a course that teaches any programming language. We will discuss systematic approaches to diagnosing and resolving issues in code, practice the skills with examples that can be use in the classroom and leave with some resources that can be implemented in the classroom to help students develop confidence, resilience and better problem-solving skills that can be applied to debugging code.

Data Visualization in p5.js - part 1

This hands-on workshop uses p5.js as a computational art / visualization tool for teaching ICS4U (Grade 12 Computer Science) programming topics. During the workshop where examples will be provided, you will have opportunities to work through visualizing data in a non-standard way by generating artful data representations (e.g., no pie charts, bar charts, scatter plots, etc.). For this session, you should have a basic understanding of how p5.js works and an understanding of the ICS4U programming topics (e.g., classes, objects, inheritance, file i/o, etc.).

Final Project Idea for TEJ or TAS Classes - part 1

Creating engaging, hands-on, and budget-friendly projects that reinforce semester-long learning can be challenging for high school computer science, engineering, and technology teachers—especially when teaching multiple sections or working with returning students year after year.

In this interactive workshop, participants will actively build, wire, and program (using an Arduino) a plastic or paper-based car while working through the same process students experience in class. Teachers will leave with ready-to-use handouts, lesson materials, and practical strategies to implement the project immediately.

The project integrates electronics and programming concepts through functional features such as headlights, turn signals, reverse lights, brake lights, and an optional buzzer to simulate a burglar alarm. It has been successfully used in a Grade 9 engineering course and can be adapted for a wide range of high school computer science, engineering, and technology classes.

This culminating project emphasizes hands-on design, electronics, coding, time management, and critical thinking, while remaining engaging, flexible, and affordable for the classroom.

Problem Solving in Grades 7 and 8

Problem solving is central in the mathematics curriculum. In this session, we will explore the problem-solving process through the solutions of a variety of problems. We will investigate ways that problem-solving can be used in the classroom from introducing a topic, to deepening understanding and making connections, to extending ideas beyond the curriculum. We will also take some time discussing resources - from the CEMC website and beyond - and ways to create good problem-solving activities.

What to Expect in the First Year at the University of Waterloo

In this interactive workshop, teachers engage with pre-calculus problems that emphasize reasoning, structure, and precision. Topics include function composition and inverses, logarithms and exponentials, trigonometry, domain analysis, and introductory proof. We also discuss study strategies, perseverance, and resources that support student success in first year mathematics courses at the University of Waterloo.

Introducing CEMC's Grade 4 to 6 Courseware

The University of Waterloo is excited to announce the launch of new mathematics courseware specifically designed for students in Grades 4, 5, and 6. Building on the success and quality of resources found on the CEMC website, this courseware adapts content and presentation to suit younger learners. This initiative complements the existing CEMC offerings for Grades 7–12, which participants will explore as well. With engaging activities and clear instruction, the new materials aim to strengthen foundational math skills and inspire curiosity in elementary students.

			
Teaching Debugging (Lab) - part 2	Carmen Bruni	MC 3003	
Data Visualization in p5.js - part 2	Andrew Seidel	MC 2063	
Final Project Idea for TEJ or TAS Classes - part 2**	Rob Ceccato	MC 2062	
Math Games and Math Talk Opportunities: How to Build Reasoning and Thinking in Learners	Nisha Patmanathan	MC 2034	 7 & 8
Probability, Vectors, Logic, and Cryptography in Quantum Technology	John Donohue	MC 2035	 9 to 12
Made in Canada, when Math comes Home	Carly Ziniuk	MC 2038	 All

Teaching Debugging (Lab) - part 2

This is a continuation of the Teaching Debugging (Lab) - part 1 and the session description can be found on page 25.

Data Visualization in p5.js - part 2

This is a continuation of the Data Visualization in p5.js - part 1 and the session description can be found on page 25

Final Project Idea for TEJ or TAS Classes - part 2

This is a continuation of the Final Project Idea for TEJ or TAS Classes - part 1 and the session description can be found on page 25.

Math Games and Math Talk Opportunities: How to Build Reasoning and Thinking in Learners

In this session, you will explore how games can be used to promote math talk in the classroom. You will engage in math games in randomized groups and reflect on their effectiveness. We will discuss how the games can be modified to meet the needs of learners in your class and division. Participants will receive a collection of games and ideas for gathering assessment data for classroom use. Drawing on experience in cross-divisional split classes, we have seen how math games build community, support meaningful practice, and deepen students' reasoning by providing multiple entry points and appropriate challenge.

Probability, Vectors, Logic, and Cryptography in Quantum Technology

Quantum science describes the behaviour of atoms, electrons, and photons. It is applied in many ubiquitous technologies like lasers and GPS, and is driving emerging technologies like quantum computing. The rules of quantum mechanics rely primarily on two mathematical principles: probability and linear algebra. In this workshop, we'll explore how we can model quantum bits (qubits) as two-dimensional vectors, with a physical example allowing hands-on exploration. We'll use a card game to demonstrate how probability arises in quantum systems and how binary logic can be different in these systems, and finally introduce applications of these ideas to cryptographic security protocols.

Made in Canada, when Math comes Home

Discover Canadian math resources and make students "feel at home" in their math classes right here in Canada. Explore engaging activities, including zero-waste geometric quilt patterns based on textiles from the ROM and indigenous creators, "Made in Canada" percentage questions, and Canadian Space Agency (CSA) STEM learning opportunities. Experience integrated cross-curricular Canadian resources from the Fields Institute, Let's Talk Science, Discover the Universe, and Ingenium (along with Canada Museums of Science & Technology and Canada Museum of Space and Aviation). Made right here in Canada. Math Comes Home.

General Information

Where to find coffee around the conference venue:

Tim Hortons - SLC

Student Life Centre (ground floor)

Open August 17 - 20 from 7:30 a.m. to 8:00 p.m.

Tim Hortons - DC

Davis Centre (ground floor)

Open August 17 - 20 from 7:30 a.m. to 8:00 p.m.

Starbucks - STC

Science Teaching Complex (ground floor)

Open August 17 - 20 from 8:00 a.m. to 5:00 p.m.

You are also welcome to bring a travel mug to fill up coffee/tea at breakfast and lunch.

How to contact us:

Email us at cemc.events@uwaterloo.ca or you can contact us by calling the CEMC cell phone number - (519) 581-8196 - in case you are getting delayed or need any support while coming to the registration venue.

Please note that this number will be active only during up to 2:00 p.m. on Tuesday, August 18.

How to find your way around campus:

University of Waterloo Campus Map - [click here](#) to access the campus map to find your way around campus during the conference.

Master of Mathematics for Teachers



Fully online

study anywhere



Part time

learn asynchronously



Advance your knowledge

explore real-world applications



Tailored for teachers

of secondary-school classrooms



World-class instruction

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Grow your confidence

to amplify impact

Quick facts about the Master of Mathematics for Teachers (MMT)

- Focus on mathematics rather than pedagogy
- Theoretical courses include number theory and probability
- Applied courses include cryptography and music
- General interest courses include problem solving and history
- Almost all work is asynchronous
- Students can expect to pay under \$1200.00 CAD per course, which includes fees and the cost of textbooks and other materials
- Begins every September
- Straightforward admissions criteria

Contact us at [**mmt-info@uwaterloo.ca**](mailto:mmt-info@uwaterloo.ca) to know more.

Quick links to the CEMC website

Contests

- [Canadian Senior and Intermediate Mathematics Contests](#)
- [Beaver Computing Challenge](#)
- [Canadian Computing Competition](#)
- [Pascal, Cayley and Fermat Contests](#)
- [Euclid Contest](#)
- [Fryer, Galois and Hypatia Contests](#)
- [Canadian Team Mathematics Contest](#)
- [Gauss Contests](#)
- [Team Up Challenge](#)

Tools and Resources

- [Canadian Senior Mathematics Contest and Euclid Contest Preparation Material](#)
- [Courseware](#)
- [CS and Society](#)
- [Past Contests, Solutions and Results](#)
- [Problem of the Month](#)
- [Problem of the Week](#)
- [Problem Set Generator](#)
- [Problems with Purpose](#)
- [The Mathematician Mosaic](#)

Student Workshops

CEMC Visits Schools

Master of Mathematics for Teachers

Notes



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