CEMC
SUMMER CONFERENCE
FOR COMPUTER STUDIES AND MATHEMATICS EDUCATORS

August 12 to 14, 2025

UNIVERSITY OF WATERLOO

The CENTRE for EDUCATION in MATHEMATICS and COMPUTING

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Schedule

Time	Activity	Location
Monday, August 11		
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
9:00 p.m. - 10:30 p.m.	Pizza and refreshments	SJ2 Atrium
Tuesday, August 12		
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	CS: MC 4040; Math: MC 2035
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 13		
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	CS: MC 4040; Math: MC 2035
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	Barbecue Dinner	St. Jerome's Courtyard
6:30 p.m. - 7:30 p.m.	Campus tour	SJ2 Atrium
7:30 p.m. - 10:00 p.m.	Social time	SJ2 Atrium
Thursday, August 14		
7:30 a.m. - 8:30 a.m.	Breakfast	St. Jerome's Cafeteria
9:00 a.m. - 10:30 a.m.	Session 8	MC
10:30 a.m. - 10:45 a.m.	Coffee available	MC 2035
10:45 a.m. - 12:15 p.m.	Session 9	MC
12:15 p.m. - 1:15 p.m.	Lunch	CS: MC 4040; Math: MC 2035

Icons and Abbreviations

 Timing

 Presenter

 Venue

 Session title

 Audience

 Computer Studies

 Grade 7 & 8 Mathematics

7 & 8

 Grade 7, 8 & 9 Mathematics

7,8,9

 Grade 9 to 12 Mathematics

9 to 12

**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.

MC: Mathematics and Computing Building
SJ2: St. Jerome's University

Welcome address

Think Think think!

 Mark Modolo

 SJ2 1004

At the heart of math and computer science is the joy of solving tough problems and discovering new insights. Problem-solving isn't just about the answer, but the process: understanding the problem, making connections, and rethinking approaches when needed. This requires creativity, fresh perspectives, and sometimes patience. The greater the struggle, the sweeter the breakthrough. In this session, we'll shift the focus to our teaching: How can we apply these problem-solving habits to overcome classroom challenges—both delightfully intellectual and undeniably practical? We'll explore how to approach teaching with curiosity, rethink strategies when things don't go as planned, and create joyful learning experiences, with some time for percolation, too.

CS and Society Resources	Sarah Chan	MC 3003	
Teaching TAS 1O/2O	Rob Ceccato	MC 2062	
Model It! Prevent Coding Disasters with State Charts	Dennis Cecic	MC 4042	
Computational Thinking in the Math Class	J.P. Pretti	MC 2054	 7 & 8
Problem Solving in a Secondary Class	Ian VanderBurgh	MC 2017	 9 to 12

CS and Society Resources
In this session you will be introduced to new resources created by the CEMC to support non-programming computer science curriculum. Resource topics are dedicated to social, economic, cultural, environmental, and ethical issues. You will take on the role of a student as we practice using select materials from the collection.

Teaching TAS 1O/2O
This session will give you all the necessary resources needed for teaching basic electronics to students in either grade 9 or grade 10. We will quickly go over the unit on electronics (look at the resources and how they are laid out). I will then demonstrate how to use TinkerCad (a free online electronics workbench that runs on a web browser) and to give you a resource that you can share with your students so they can learn how to use TinkerCad. Finally, we will then take what we have learned and apply it to the TAS 1O and or TAS 2O curriculum. 3 Final TAS Curriculum related assessments will be shared that are related to the unit.

Model It! Prevent Coding Disasters with State Charts
Coding without design leads to disaster! State Chart "Models" are used to facilitate a clear communication of software behavior before any coding takes place. In this workshop, we will review the basic features of state charts and show how these models can be implemented in Arduino sketches.

Computational Thinking in the Math Class
There is a push to incorporate computer science in math courses. This session will explore using computational thinking problems, with interactive examples successfully used with students. These examples are computer language-independent, focus on real-world applications, and include interactive apps to boost engagement and discovery.

Problem Solving in a Secondary 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.

Introduction to Data Science *(Lab) - part 1***	Carmen Bruni	MC 3003	
There is an Arduino for that! Arduinos for Everyone *(Lab) - part 1***	Michael Chan	MC 2062	
Introducing Desmos Classroom for Grade 7 and 8 Math Classes**	David Petro	MC 2054	7 & 8
Exploring the Intersection of Mathematics, Art, and Nature	Sheri Hill and Amanda Zammit	MC 2017	9 to 12
AI-Powered Math Classrooms: Your Ai(d) in Education	Robin Grondin	MC 2034	All

Introduction to Data Science (Lab) - part 1

In this session we'll introduce the Python package pandas as a way to analyze data. We'll practice how to visualize and manipulate data within the pandas environment and see some visualizations of data as well.

Prior experience with Python is welcome but not strictly required. Having Jupyter Notebooks installed in advance would be a benefit but also not required.

If you want to follow along with all the examples from this session on your own device, you can download materials at home. Click here to view instructions on how to be prepared.

There is an Arduino for that! Arduinos for Everyone (Lab) - part 1

Current curricula put great emphasis on practical applications and coding. Arduinos with their versatility, simplicity and low costs, serve as ideal candidates for teachers to pick and choose the right level of illustrative applications to go with their lessons. From my experience, arduinos provide solutions to all my practical endeavours. Arduino projects could be as simple as a led on/off to demonstrate gate logics, or as sophisticated as performing AI decisions.

This workshop shows how easy and inexpensive it is using Arduinos to illustrate/explore (from grade 7 to grade 12 STEAM) curricula principles. Most likely you already have a class set of Arduinos in school. Teachers with no prior coding/technical experience, CS, Mathematics or Science, are encouraged to attend this 101 introductory workshop. See for yourself if you could share the fun, motivations and challenges of coding with Arduino interfacing in your classes!

Session Topics:

- Intro to Arduino/What's an Arduino - overview of common Arduino boards (UNO, Nano) used for education, simple Arduino programs
- Applications for different disciplines (STEAM)
- Showcase of interesting projects
- Straightforward hands-on tutorials (Scratch & C++)

Introducing Desmos Classroom for Grade 7 and 8 Math Classes

Desmos Classroom is a powerful, free tool for running math activities that promotes communication, lets you monitor student work, and helps you explore their thinking with ease. This session introduces ready-made lessons for grades 7 and 8, shows how to use the teacher dashboard, and more. Bring a laptop, Chromebook, or tablet for the best experience.

Exploring the Intersection of Mathematics, Art, and Nature
Explore how Desmos Art Assignments blend math concepts with artistic expression to enhance creativity, exploration, and deeper learning. Through project-based learning, students strengthen their connection to math and the world around them, making it interactive, personal, and creative. This process-centered approach helps students build problem-solving skills, refine ideas, and appreciate math as both art and discovery.

AI-Powered Math Classrooms: Your Ai(d) in Education
Feeling overwhelmed by the demands of teaching? In this workshop, we'll explore how AI can be your new teaching assistant, providing support for everything from crafting engaging lessons to supporting assessments. Leave this workshop with a toolkit of AI resources to enhance your practice and bring new excitement to your math classroom. No prior experience with AI is required.

Introduction to Data Science *(Lab) - part 2***	Carmen Bruni	MC 3003	
There is an Arduino for that! Arduinos for Everyone *(Lab) - part 2***	Michael Chan	MC 2062	
Supporting Reasoning in Intermediate Math	Paul Alves	MC 2054	7 & 8
Creating Activities with Desmos Classroom**	David Petro	MC 2017	9 to 12
UW Math Trail	Rob Gleeson	MC 2034	All

Introduction to Data Science (Lab) - part 2
This is a continuation of Introduction to Data Science (Lab) - part 1 and the session description can be found on page 9.

There is an Arduino for that! Arduinos for Everyone (Lab) - part 2
This is a continuation of There is an Arduino for that! Arduinos for Everyone (Lab) - part 1 and the session description can be found on page 9.

Supporting Reasoning in Intermediate Math
A growing body of research indicates that students with a strong foundation in spatial reasoning benefit in their mathematical understanding as they progress through their education. In this session, we will explore a learning trajectory that supports numeracy and algebraic reasoning by building upon spatial understanding. Additionally, we will examine strategies such as puzzles and games that foster student confidence, engagement, and number sense.

Creating Activities with Desmos Classroom
Have you ever used a premade Desmos activity and thought it could be improved? This session shows you how to create custom Desmos activities from scratch, adding graphs, open responses, multiple choice, Polypads, and more to build interactive math slideshows. You'll also learn to edit existing activities and use basic coding with Computation Layer (Desmos' custom coding language). Bring a laptop or tablet, as this can't be done easily on a phone.

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.

How to Use Optical Illusions to Illustrate Mathematical and Coding Concepts *(Lab) - part 1*	Catherine Leung	MC 3003	
Technology and the Skilled Trades - A Digital Approach (Coding, Electronics, and Design) *(Lab) - part 1*	Grant Hutchison	MC 2063	
Build, Code, and Test - Arduino Made Easy with Tinkercad *(Lab) - part 1*	Raj Nachimuthu	MC 2062	
Reaching All Students: How Do Open Questions Work? - *part 1*	Marian Small	MC 2054	 7 & 8
Creating a Positive Math Environment	Angela Kurmey	MC 2017	 9 to 12
Space for All: Inspiring Learners to Practice Math Skills with 2025 Space Events using Desmos Activity Builder	Carly Ziniuk	MC 2034	 All

How to Use Optical Illusions to Illustrate Mathematical and Coding Concepts (Lab) - part 1

In this hands-on session, we will explore the creation of optical illusions that involve repeating patterns and how these concepts can be applied to the teaching of both programming and mathematics. Some optical illusions are created with repeating patterns. These repeating patterns can be used to help students learn programming concepts such as iteration and selection. It can also help students understand ideas such.
Mathematical concepts:

- Shapes and geometry
- Coordinate systems
- Creation of algebraic equations to determine positions

Programming concepts:

- Iteration for repeating patterns
- Selection for exceptions
- JavaScript

This session will also demonstrate tech options for doing this with your students and pros and cons of each option allowing you to choose the best strategy for deploying coding components based on your technological comfort and needs.

Technology and the Skilled Trades - A Digital Approach (Coding, Electronics, and Design) (Lab) - part 1

In this 3-hour workshop attendees will have the opportunity to explore classroom resources (lessons, activities, and assessments) across multiple units of study. Each unit will include a student-centered Engineering Design Process (EDP) template that can be used with students.
The Computing Systems and Electronics unit will include an exploration of the fundamental components of computers and electronic systems. You will gain knowledge of various components. During this unit you will design and test circuits using simulators, breadboards, and also have an opportunity to build a permanent circuit (soldering).
The Computational Thinking (CT) and Coding unit will involve a scaffolded exploration of powerful block-based coding environments for robotics and control systems. We will use online robotics (FTCSim) and Micro:bit coding platforms. You will connect each new coding environment to CT concepts such as: pattern recognition, decomposition, algorithms, and abstractions. Attendees will apply the Engineering Design Process to various projects including security systems, motion analysis, and robotics using a highly extensible robotics platform.

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Communication is an important element of many Technology and Skilled Trades professions. In this session we will be creating and reading: schematics (electronics), state diagrams (coding/control systems), and scaled architectural drawings (floor plans).

Build, Code, and Test - Arduino Made Easy with Tinkercad (Lab) - part 1
Introduce your students to electronics and programming through hands-on labs. Build Arduino circuits using Tinkercad Classroom without needing any physical components and tools. Tinkercad provides a virtual environment where students can design circuits, write code, and simulate their circuits. It is a browser-based tool that allows you to assign activities and monitor student progress. Ideal platform for developing critical STEAM skills.
Session Topics:

- Introduction to Tinkercad Circuits, Tinkercad Classroom.
- Beginner level Arduino circuits on Tinkercad: LEDs, Switches, Buzzers
- Interfacing with sensors: Light, Temperature, Distance
- Advanced circuits and programming: writing functions, using libraries

Reaching All Students: How Do Open Questions Work? - part 1
We will explore how Grade 7/8 teachers can use more open-ended questions not only to better meet the goals of the curriculum, but to reach a broader range of students. The right open questions can, at the same time, be accessible to those who sometimes struggle, but can better challenge those who are able to do more.

Creating a Positive Math Environment
In this session, participants will look at the facets of a positive math learning environment. We will explore how to create a space where students collaborate, feel comfortable making mistakes, and see themselves as capable problem solvers. Participants will engage in thinking tasks and math conversations.

Space for All: Inspiring Learners to Practice Math Skills with 2025 Space Events using Desmos Activity Builder
2025 is a big year for space enthusiasts! As a NASA Space Apps Navigator and teacher, I use exciting 2025 astronomical events to engage students and boost math skills. Learn to create and adapt lessons using Desmos Activity Builder, with activities linked to Artemis II, the Lunar Gateway, Canadarm, and Canada's role in the OSIRIS-REx mission. Explore how cultures organize themselves astronomically and mathematically through their calendars.

How to Use Optical Illusions to Illustrate Mathematical and Coding Concepts *(Lab) - part 2*	Catherine Leung	MC 3003	
Technology and the Skilled Trades - A Digital Approach (Coding, Electronics, and Design) *(Lab) - part 2*	Grant Hutchison	MC 2063	
Build, Code, and Test - Arduino Made Easy with Tinkercad *(Lab) - part 2*	Raj Nachimuthu	MC 2062	
Creating Open Questions *- part 2*	Marian Small	MC 2054	 7 & 8
Observations and Conversations	Carmen Sinatra	MC 2017	 9 to 12
Exploring Engagement in Math Class	Brian McBain	MC 2034	 9 to 12

How to Use Optical Illusions to Illustrate Mathematical and Coding Concepts (Lab) - part 2
This is a continuation of How to Use Optical Illusions to Illustrate Mathematical and Coding Concepts (Lab) - part 1 and the session description can be found on page 14.

Technology and the Skilled Trades - A Digital Approach (Coding, Electronics, and Design) (Lab) - part 2
This is a continuation of Technology and the Skilled Trades - A Digital Approach (Coding, Electronics, and Design) (Lab)- part 1 and the session description can be found on page 14.

Build, Code, and Test - Arduino Made Easy with Tinkercad (Lab) - part 2
This is a continuation of Build, Code, and Test - Arduino Made Easy with Tinkercad (Lab)- part 1 and the session description can be found on page 15.

Creating Open Questions - part 2
This is a continuation of Reaching All Students: How Do Open Questions Work? - part 1 and the session description can be found on page 15.
There will be opportunities for Grades 7 & 8 teachers to build their own open questions with the support of colleagues and the support of the session speaker.

Observations and Conversations
Conversations & Observations are all the rage, but how do we track them, grade them, and keep it manageable? In this session, I'll share practical strategies my department uses to effectively incorporate conversations and observations. You'll leave with tools to create your own "Conversation & Observation day" that works for you and your students.

Exploring Engagement in Math Class
Are you looking for new ways to engage your students and make math class their favorite part of the day? Imagine your students eagerly looking forward to math class, excited about what they will learn and do. In this session, you'll participate in a variety of activities designed to increase excitement and make math more engaging. You'll walk away with practical tools and ideas that you can easily implement in your classroom.

Using ChatGPT to Build Custom Chatbots for the Classroom *(Lab)*	Peter Beens	MC 3003	
New Arduino, new tricks: from breadboard prototypes to advanced projects with the new Arduino Nano ESP32 *(Lab) - part 1***	John Rampelt	MC 2062	
Building Fraction Sense: Scaffolded Thinking Through Problem Solving	Tali Amar	MC 2054	7 & 8
Making Math Come to Life with Coding - *part 1***	Sheri Hill and Nathan Rowbottom	MC 2017	7,8,9
Reaching All Students: How Do Open Questions Work? - *part 1*	Marian Small	MC 2034	9 to 12

Using ChatGPT to Build Custom Chatbots for the Classroom (Lab)

This session empowers educators to move beyond passive AI use by designing and building their own Custom GPTs—chatbots tailored to specific classroom tasks and aligned with curriculum goals. You'll explore real-world examples of Ontario-focused GPTs that support lesson planning, assessment design, student feedback, and differentiated instruction.

The session follows a structured design framework that can be adapted to any subject or grade level. You'll gain hands-on experience in creating Custom GPTs using ChatGPT, learning the essentials of prompt engineering, workflow design, and iterative testing. By the end of the session, you'll be equipped to confidently develop AI tools that serve your unique instructional needs.

You'll leave with:

- A clear understanding of what Custom GPTs are and how they support classroom practice
- A repeatable design process for creating GPTs tailored to your instructional goals
- Practical strategies to align AI tools with curriculum expectations and student needs
- Prompt engineering techniques that ensure clarity, relevance, and effectiveness

New Arduino, new tricks: from breadboard prototypes to advanced projects with the new Arduino Nano ESP32 (Lab) - part 1

This session is designed for teachers who have had some experience with Arduino and want to get more experience interfacing Arduino with different types of I/O devices. Participants will learn how to attach input circuits and connect output devices to the tiny, powerful, 3.3V Arduino Nano ESP32 circuit, explore its unique new features, and investigate more advanced Arduino programming and debugging techniques. It is recommended that participants bring their own computer with the Arduino IDE already installed.

Session Topics:

- Introducing Arduino Nano ESP32 (quick comparison w/UNO, Nano)
- Breadboard circuit review (internal connections, 5V/3.3V power, input circuits, output devices)
- The Arduino IDE (overview, setup and configuration for Arduino Nano ESP32)
- Arduino program basics (review: header, I/O configuration, setup(), loop(), other important and useful I/O functions - map(), pulseIn(), micros(), millis())

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- Developing and debugging a program (planning techniques, numeric types, creating functions, debugging techniques, code optimization)
- Break
- Advanced topics – function libraries vs. creating functions, A/D, Servo, SONAR, NeoPixels, I2C, SPI, wireless communication (ESPNow, WiFi)
- Creating your own Arduino projects for education (overview of designing circuits, interfacing to higher voltage devices, designing custom PCBs, making multi-function PCBs)
- MicroPython on Arduino Nano ESP32

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.

Making Math Come to Life with Coding - part 1
Coding is now part of Ontario's Grade 9 math curriculum, but why stop there? Integrating it throughout the course helps students explore, visualize and engage with math in exciting ways. Feeling overwhelmed? Don't worry! This double session offers ready-to-use activities that connect coding to math, even for beginners. You'll have time to experiment and build confidence, making it easy to bring coding into your classroom. Discover how coding can make math more interactive, creative, and fun—no experience required! Please bring a laptop for an optimal experience.

Reaching All Students: How Do Open Questions Work? - part 1
We will explore how Grade 9- 12 teachers can use more open-ended questions not only to better meet the goals of the curriculum, but to reach a broader range of students. The right open questions can, at the same time, be accessible to those who sometimes struggle, but can better challenge those who are able to do more.

Transforming Lab Analysis with AI *(Lab)*	Eagle Chan and Eva Chu	MC 3003	
New Arduino, new tricks: from breadboard prototypes to advanced projects with the new Arduino Nano ESP32 *(Lab) - part 2***	John Rampelt	MC 2062	
Making Math Come to Life with Coding - *part 2***	Sheri Hill and Nathan Rowbottom	MC 2017	 7,8,9
How to teach problem solving - BCC & Gauss - using CEMC resources	Gerry Lewis	MC 2054	 7 & 8
Creating Open Questions - *part 2*	Marian Small	MC 2034	 9 to 12

Transforming Lab Analysis with AI (Lab)
This lab session focuses on leveraging AI-driven video analysis to enhance students' computational thinking skills. By integrating advanced AI tools and educational methodologies, we aim to redefine lab analysis, providing students with a more interactive and precise learning experience.
Participants will learn how to use AI-driven video assessment techniques to analyze data from lab activities and enhance computational thinking. They will explore how AI assists in solving complex problems, understanding data patterns, and improving learning design. The session includes hands-on activities where participants will engage in video analysis experiments and propose innovative solutions. Upon completion, participants should be able to apply their learning in teaching or research, fostering the integration of technology and education.

New Arduino, new tricks: from breadboard prototypes to advanced projects with the new Arduino Nano ESP32 (Lab) - part 2
This is a continuation of the New Arduino, new tricks: from breadboard prototypes to advanced projects with the new Arduino Nano ESP32 (Lab) - part 1 and the session description can be found on page 19.

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 20.

How to teach problem solving - BCC & Gauss - using CEMC resources
Math problems require a variety of strategies to understand, plan, and solve them. This session will help build a teacher's toolbox of strategies to help students navigate challenging tasks. We will cover how to find problems from CEMC Problem of the Week and past Gauss contests, how to incorporate Thinking Classroom pedagogies to make these strategies visible, and how to provide meaningful feedback to students when they're approaching problems in different ways.

Creating Open Questions - part 2
This is a continuation of the Reaching All Students: How Do Open Questions Work? - part 1 and the session description can be found on page 20. There will be opportunities for Grades 9 – 12 teachers to build their own open questions with the support of colleagues and the support of the session speaker.

An Even Faster Workflow for Publishing Teaching Materials *(Lab) - part 1*	Russell Gordon	MC 3003	
Exploring Quantum Algorithms with Games	John Donahue and Fiona Thompson	MC 2063	
Arduinos with Hi-tech - Ideas and Challenges for the Advanced Level *(Lab) - part 1*	Michael Chan	MC 2062	
Making Math Tangible: Engaging Students with Manipulatives and Games	Michaela Crowson	MC 2054	 7 & 8
Financial Math Literacy Test	Carly Ziniuk and Pauline Martin	MC 2017	 All
Level Up your Thinking Classroom Routines	Jamie Mitchell	MC 2034	 All

An Even Faster Workflow for Publishing Teaching Materials (Lab) - part 1
Content management systems such as Edsby, Brightspace, Google Classroom... the list of third-party platforms we depend on as teachers to share information with our students is long. The user interfaces of these systems? Questionable, often requiring a time-consuming series of clicks and selections to publish even the simplest information. Further, it is often difficult to move your valuable content out of these systems. In this session, the presenter will share a pre-configured publishing system that you control, can take away from the conference, and then run on your own computer to build modern, standards-compliant class websites. In the session, optionally complete a series of "quests" to learn how to use this publishing workflow and get assistance from the presenter in setting up your own website on the spot. You will learn how to use Markdown-formatted text files to quickly 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.

NOTE: For those with good memories, this is an update of the 2023 session titled "A Rapid Workflow for Publishing CS Teaching Materials", with new software, much less work involved to get a site up and running, and a better end-product. This new session is suitable for and useful for both mathematics and computer science teachers.

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.

Arduinos with Hi-tech - Ideas and Challenges for the Advanced Level (Lab) - part 1
Arduinos technology has evolved since its birth in the 80s as a mere substitute for ports control. Ardunios nowadays equipped with all kinds of supporting accessories and circuitries become high processing units with Rfid, BT, Wifi, Spatial, Audio/visual (camera) communication powers.

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This workshop showcases some common arduino units and accessories available in the market and how they could be harnessed in the classroom providing inspirational adventures such as AI, VR, AR, IOT and RF/BT communications for your students. You do not have to be a rocket scientist nor a big spender to use these top-notched technologies. Don't miss out this opportunity to experiment and to keep abreast of today's innovations and development for your classes!

Session Topics:
• IOT, AI, CAM, SPATIAL, REIF.
• Examples, tutorials and hands-on activities & challenges

Making Math Tangible: Engaging Students with Manipulatives and Games
This hands-on workshop explores the power of manipulatives and games in the middle and high school math classroom. Discover practical strategies to deepen conceptual understanding, enhance problem-solving skills, and increase student engagement. Participants will have the opportunity to play games, experiment with manipulatives, and leave with ready-to-use ideas for their own classrooms.

Financial Math Literacy Test
This workshop focuses on Ontario's K-9 Math Curriculum, incorporating Financial Literacy. Participants will review curriculum outcomes, select resources for the upcoming school year, and explore materials from CEMC Courseware, OAME, TVO, and Desmos activities. You'll also review preparation materials for the Nova Scotia 10 Provincial Math Exam: Financial Math. Learn to use Desmos Teacher Mode (with Computation Layer) for student feedback, and create practical activities for students at any level. While the focus is on Grades 7-9 Mathematics curriculum content, the content can be adapted for higher-level courses and adjusted based on student self-assessment.

Level Up your Thinking Classroom Routines
This session will explore how thoughtfully crafted, hands-on math lessons can foster deeper student engagement and critical thinking. Using an inquiry-based approach, we'll delve into strategies for building a Thinking Classroom environment where students are empowered to collaborate, explore, and drive their own learning. We'll discuss practical ways to integrate problem-solving, student agency, and real-world relevance, creating an atmosphere where mathematical thinking flourishes. Participants will leave with concrete strategies and ideas for using inquiry-based approaches to make math more engaging and meaningful for every student.

An Even Faster Workflow for Publishing Teaching Materials *(Lab) - part 2*	Russell Gordon	MC 3003	
Algorithmic Thinking via “J4 and J5”	J.P. Pretti	MC 4042	
Arduinos with Hi-tech - Ideas and Challenges for the Advanced Level *(Lab) - part 2*	Michael Chan	MC 2062	
Math without Worksheets	Kelly Cullen	MC 2054	7 & 8
Stretching Problems	Katy Howell Escobar	MC 2017	9 to 12
Supporting Struggling Learners: Universal Design for Learning Principals (UDL) in Math	Erika Mark	MC 2034	All

An Even Faster Workflow for Publishing Teaching Materials (Lab) - part 2
This is a continuation of An Even Faster Workflow for Publishing Teaching Materials (Lab) - part 1 and the session description can be found on page 24.

Algorithmic Thinking via "J4 and J5"
The more difficult problems on programming contests can be daunting for students, teachers, and professors alike. However, outside the pressure of a timed competition, these problems serve as a perfect opportunity to explore fundamental computer science ideas. This session will illustrate how these problems are a rich source of examples through which to explore curriculum and enrichment topics. Participants will engage in a friendly and accessible discussion of a select few "J4 and J5" problems from the Junior Canadian Computing Competition.

Arduinos with Hi-tech - Ideas and Challenges for the Advanced Level (Lab) - part 2
This is a continuation of Arduinos with Hi-tech - Ideas and Challenges for the Advanced Level (Lab) - part 1 and the session description can be found on page 24.

Math without Worksheets
Picture walking into your classroom and the room abuzz with chatter about the lesson. Students throughout the room are using materials to make physical and meaningful connections to math concepts. During this workshop, we will explore implementing rich math tasks into the classroom without the need for a worksheet. We'll learn how to document student thinking through oral conversations and observations and discover tools to enrich mathematical understanding.

Stretching Problems
This session is designed to help teachers make the most of existing math problems by adapting them for different grade levels. We don't always want to start from scratch, instead we want to take a good idea and stretch the problem to reach the floor and ceiling we have in our classrooms. We'll explore frameworks like Magic Squares, balancing scales, and real-world problems, showing participants how to keep the core idea while changing the context to engage students from grades 9-12. Time will be given to investigate CEMC's topic generator to help find new and interesting starting points for problems.

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.

General Information

Where to find coffee around the conference venue:
Math Society – CnD
3rd Floor, MC Building
Open on August 11, 12, 13 from 8:00 a.m. to 5:30 p.m.

Tim Hortons - SLC
Student Life Centre (ground floor)
Open August 11-14 from 7:30 a.m. to 8:00 p.m.

Tim Hortons - DC
Davis Centre (ground floor)
Open August 11-14 from 7:30 a.m. to 5:00 p.m.

Starbucks - STC
Science Teaching Complex (ground floor)
Open August 11-14 from 7:30 a.m. to 5:00 p.m.

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 12.

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

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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
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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** 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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