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Education Notes bring mathematical and educational ideas forth to the CMS readership in a manner that promotes discussion of relevant topics including research, activities, issues, and noteworthy news items. Comments, suggestions, and submissions are welcome.

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Introduction

The Canadian Undergraduate Mathematics Conference (CUMC) is an annual conference intended for undergraduate students of mathematics in universities across Canada. It is held each summer at a Canadian university and is organized by a local committee of undergraduate students at the host institution, with the support of the CMS Student Committee (Studc).

Any student attending the CUMC can choose to give a short talk, usually 25 minutes long, or present a poster at a poster session. These talks typically make up the greater part of the event.

In this article, we discuss what we consider to be the main benefits to students of participating in the CUMC. We also list actions that instructors can take to encourage their students to participate.

We hope that university instructors who read this note will encourage their students to attend. At the same time, we hope that high school instructors will see the value in an academic conference just for students, and find inspiration to plan similar activities.

Why have student conferences?

A mathematics undergraduate's playground.

We love it when students play with their math. We hope they will take the tools we give them and tinker around with them for fun, finding new little discoveries suiting their own tastes. One of the rare things about the CUMC is that it provides a perfect framework for students to show off the little discoveries they make when they play – be they weird facts about Pascal's Triangle, neat ways to draw tessellations, obscure proofs of classical theorems, or unexpected connections with their heritage. The most important thing about a CUMC presentation is that it be something the student thinks is cool. The stunning lack of *other* restrictions means that any of their fun math quirks is given time to shine.

At the same time, giving a presentation is more than tinkering around. It is a chance to take an idea and craft it into your own finished piece. The academic conference setting furnishes an implicit set of norms and goals towards which to work. Starting from this baseline, the student can pick and choose which conventions to adopt and which to flout. (Would it be more instructive to abandon a correct argument in favor of a flawed one? Would a particular idea make more sense if the audience were made to interact with it? Would sharing a craft project with the audience help them better appreciate a beautiful object?) Through this decision-making process, they build up something creative, and uniquely theirs: a work of art in their personal style.

Total ownership of a project.

As the presentations are not evaluated in any way, students are free of the usual constraint of having to guess an authority figure's expectations. This can give a real sense of power and control over one's engagement with the subject.

In addition, this freedom can help a student figure out *what* they like in the first place. As students decide what they might enjoy working on later in life, they may want to draw inspiration from work they've been intensely interested in. A CUMC presentation is a good opportunity to feel out potential research or professional interests in a low-stakes setting.

Moreover, other students' presentations are windows into what excites *them*. An attendee gets introduced to new problems and applications they might not encounter in their classes. It's wonderful to see people present on something that they really enjoy, and this can remind jaded students of the many reasons to love and be excited by math.

Undergraduate students are the target community.

Although the CUMC is a busy event complete with keynote lectures, a poster session, and workshops, it fundamentally remains a student event. Thus, whatever the level of an undergraduate student, they belong to the target audience: they are meant to understand what's going on, it's easier to feel like their questions are legitimate, and there is less pressure to fit in with some far more experienced group. In this way, the student gets to have a taste of what conferences are like while engaging with an environment designed to support them.

The event also gives students the chance to network with other junior mathematicians from across Canada. They spend a few days immersed in the conference, getting to know other math students and finding a broader community than just their own university. They also might connect with someone sharing more of their interests than anyone in their own department.

This sense of belonging to a community can also come from the nature of the conference as recurring every year. One can consult with older students who have attended the conference before, and after attending, one can advise younger students who are thinking of going. This can provide a cross-generational connection between math students.

Finally, having something tangible that they've created can help a student feel more connected to the mathematical community as a whole.

Encouraging students to participate

Tell students about the CUMC as early as possible.

It is easier to prepare a presentation when you have plenty of time and no need to rush. A longer period of time leading up to the conference also gives students the chance to talk about it with their peers and coordinate: groups of friends can travel together, and students who intend on giving talks can rehearse them together.

Help students find presentation topics.

Selecting a suitable presentation topic can be difficult. This is perhaps especially true for first-time presenters, who may not know what a typical student talk is like. (Some titles and abstracts from previous years' conferences are available on the CUMC website, which might help students get a sense of the range of possibility.)

Last summer, the second author helped organize a set of workshops to assist students in preparing talks for the CUMC. In a casual survey during the workshops, 18 students indicated that they might be interested in preparing a talk. In the end, 8 of them ended up speaking at the conference. Of the 10 students who did not give a presentation, 5 remarked in conversation that they were not presenting because they had not been able to settle on a presentation topic with which they were satisfied.

If a student brings up a question or an idea to you and you think that it could be turned into a good presentation – encourage them to do so! It is also well-worth reminding students that almost anything mathematics-related can make for a great CUMC talk. This includes, but is certainly not limited to:

- highlights from an undergraduate research project;
- classical problems: just as a demonstration of a famous phenomenon in physics, chemistry, or biology is always fun to watch, a good CUMC presentation can be one that reminds the audience of a famous and interesting mathematical idea;
- anything a student has read or watched, and thinks is exciting;
- intersections of mathematics with other disciplines: mathematical chemistry, mathematics education, ethnomathematics, and mathematical linguistics are all examples of more applied or interdisciplinary topics from recent CUMC presentations.

Provide funding if possible.

Participating in the CUMC typically requires paying for travel, housing, and food, as well as a conference registration fee. Let your students know if your department can sponsor them.

Note: This year's conference will likely be online, so the cost of attending will be lower than usual.

Avoid scheduling problem sets or tests during the week of the conference.

Students can only attend the conference if they have the time to go. If you are teaching summer courses, try to keep the week of the conference free from problem sets and exams if possible.

Encourage students to attend even if they won't be presenting.

It's not mandatory to give a talk to attend the CUMC. Listening to other students' talks is a lot of fun, as is immersing oneself in a conference environment for a few days. There are also keynote lectures, panels, workshops, and social events. Many students will get a lot out of attending the conference even if they do not present any work. They may even be inspired to present at a future CUMC. So, if students can spare the time and money, encourage them to attend the conference anyway.

Recruit help from experienced students.

Invite students who have given presentations before to advise current students. This could be done, for example, through small-group feedback sessions, where presenters can practice their talks in front of a smaller audience. Graduate students, postdocs, and professors who are good at giving and critiquing talks might also want to chime in.

Conclusion

There are many ways by which instructors can help students find the confidence and the resources to attend a student conference. We hope that by implementing some of the above suggestions, the reader will be able to motivate more of their students to participate in this rewarding endeavour.

The 2021 CUMC is organized by Western University. More information is available at the [official conference website](#) and on the poster below.

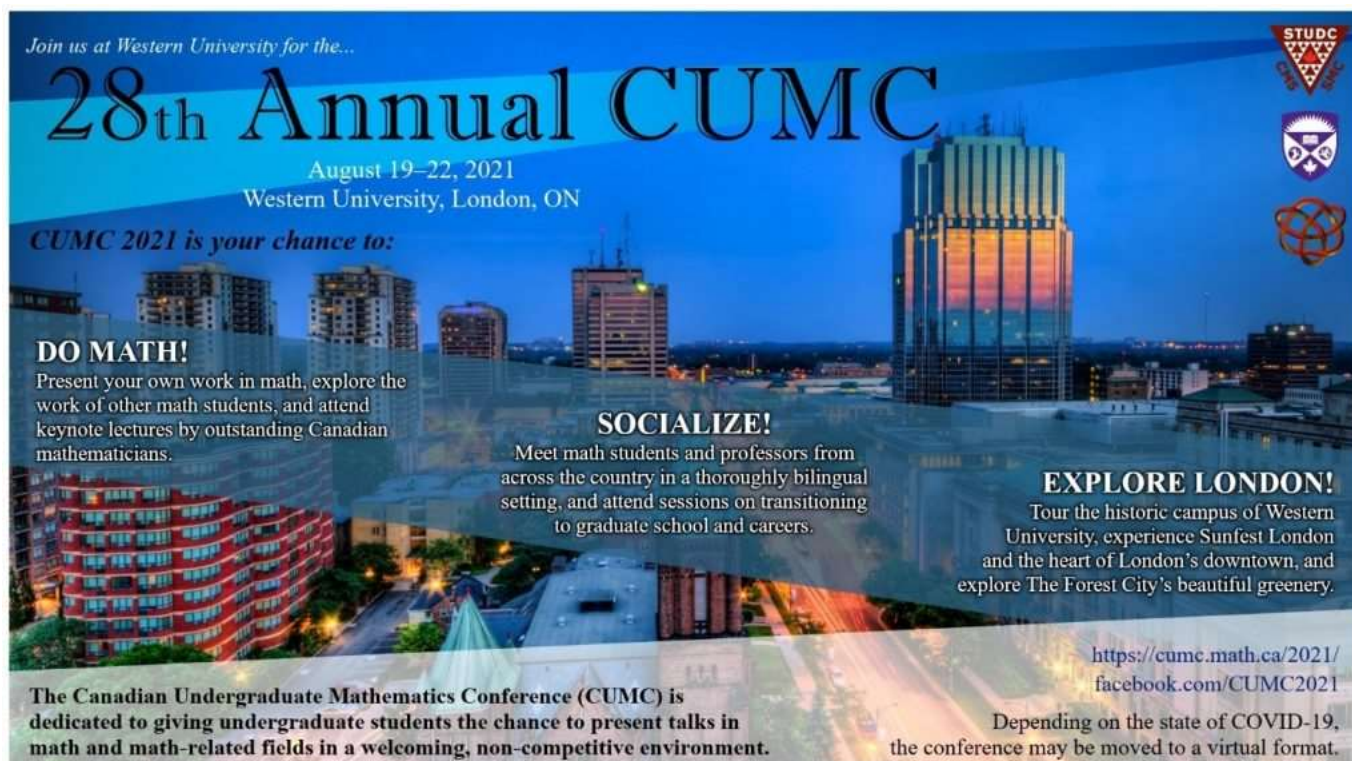


Figure 2: A poster for the 2021 CUMC, to be held at Western University. [1]

Yuveshen (Yuve) Moorooogen recently completed his undergraduate degree at the University of Toronto, and will begin his master's studies in mathematics at the University of British Columbia this fall. He is interested in functional analysis and math education. Yuve was a student presenter at the CUMC in 2019 and 2020.

Laurestine (Lola) Bradford is a master's student in the Department of Linguistics at the University of Toronto, where she also completed a bachelor's degree in Mathematics and Philosophy. Lola has long been involved in math outreach and education, and she hopes to study what language and math can say about each other. Lola was a student presenter at the CUMC in 2020.

References

- [1] Drazilov, Julian. (2021). 28th Annual CUMC. [Poster]. Retrieved from <https://cumc.math.ca/2021/> May 5th, 2021.
- [2] Munroe, Randall. 'Math Paper.' (2008). xkcd. 14 April. Retrieved from <https://xkcd.com/410/> May 5th, 2021.