



# Rapport de Camps mathématiques 2015 Math Camps Report





# One year, twenty-four camps:

3 national camps,  
4 specialty camps,  
17 regional camps...

...nearly 800 participants!

"Overall, my camp experience was fantastic. It was fun and educating at the same time, and the environment was one of striving for excellence. I really loved it!"  
- Participant at York University Math Camp

\*The information contained in this report appears in the language of submission.  
\*L'information inclus en ce rapport paraît dans la langue soumise.



# About CMS Math Camps

Since their launch at the beginning of the new millennium, the Canadian Mathematical Society's (CMS) Math Camps have grown into a major enrichment activity in the field of mathematics for young Canadian students from coast to coast.

Math Camps offer students the chance to sharpen their mathematical skills and to explore new horizons usually inaccessible in a classical classroom setting. Many studies show that one of the major difficulties encountered by students at various levels is that they do not see the relevance of the material they are studying. This can seriously affect their motivation in their courses and their ultimately, their success. This effect seems to be most pronounced in the field of mathematics, whereas other science courses are more readily seen to be practical in real life.

Camps are designed to address this problem, to engage students in a challenging and fun atmosphere. All efforts are made in each camp to show students the crucial role played by mathematics in the advancement of science and technologies from GPS operation to a simple text message sent by a phone.

The CMS collaborates with universities and colleges across Canada to organize and host a series of Math Camps each year. In 2015, a total of 24 camps were held across the country with about 800 students participating. Camps ranged from day camps to week-long overnight camps and included specialty camps such as the UBC Math Camp for Aboriginals and the Dalhousie Math Camp for Black Students.

Year after year, student and organizer comments show that participants leave the camp with a fresh view of mathematics and a new approach to problem solving. Feedback also reveals that a high percentage of students indicated an increase of interest in math, science and engineering as a result of active participation. It is expected that all camps will continue for the 2016 season with potential for new ones in 2017.



The CMS wishes to thank all sponsors, universities, teachers, camp organizers, volunteers, parents and students that made the 2015 CMS Math Camps a success!

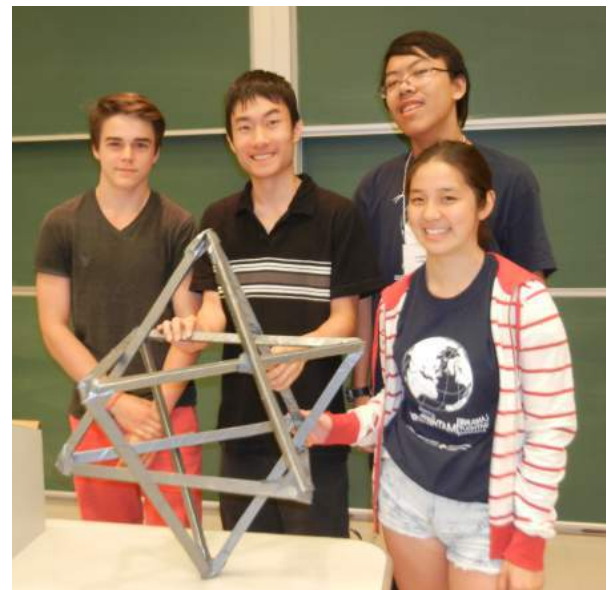
**D**epuis leur lancement au début du nouveau millénaire, les camps mathématiques de la Société mathématique du Canada (SMC) ont grandi pour devenir une activité d'enrichissement majeure dans le domaine des mathématiques pour les jeunes étudiants canadiens partout dans le pays.

Les camps mathématiques offrent aux étudiants la chance d'améliorer leurs compétences en mathématiques et d'explorer de nouveaux horizons normalement inaccessibles dans l'environnement d'une salle de classe classique. De nombreuses études montrent que l'une des principales difficultés rencontrées par les étudiants à différents niveaux est qu'ils ne voient pas la pertinence du matériel qu'ils étudient. Ceci peut sérieusement affecter leur motivation dans leurs cours et par la suite, leur succès. Cet effet semble être plus prononcé dans l'apprentissage des mathématiques alors que d'autres cours de sciences sont aisément vus comme plus appliqués dans la vie réelle.

Les camps mathématiques sont conçus pour adresser ce problème, pour engager les étudiants dans une atmosphère stimulante et amusante en même temps. Dans chacun des camps, les organisateurs mettent de l'effort pour montrer aux participants le rôle central que jouent les mathématiques dans le progrès des sciences et de la technologie : de l'opération du GPS à un simple message envoyé par un téléphone.

Chaque année, la SMC collabore avec les universités et collèges canadiens pour mettre en place une série de camps mathématiques. En 2015, un total de 24 camps ont eu lieu partout le pays avec environ 800 étudiants participants. Ces camps varient d'un camp de jour à un camp résidentiel durant une semaine. Il y avait aussi des camps spécialisés tels que le camp UBC pour les étudiants autochtones et le camp Dalhousie pour les étudiants noirs.

À chaque année, les commentaires des étudiants et organisateurs montrent que les participants quittent les camps avec une fraîche aperçue des mathématiques et une nouvelle approche pour la résolution de problèmes. Les commentaires révèlent également qu'une bonne partie des participants indiquent une augmentation d'intérêt pour les mathématiques, les sciences et l'ingénierie suite à une participation aux activités du camp. On prévoit que tous les camps de 2015 se poursuivront en 2016 avec deux nouveaux camps prévus pour 2017.



La SMC tient à remercier tous les commanditaires, les universités, les enseignants, les organisateurs des camps, les bénévoles, les parents et les étudiants qui ont contribué à faire des camps mathématiques un grand succès en 2015 !



# REGIONAL MATH CAMPS

## ALBERTA

### University of Calgary

The mathematics enrichment camp was hosted at the University of Calgary from June 28-July 5, 2015. The overnight camp included 30 students from grades 7 through 10 and was organized by professor Michael Cavers of the University of Calgary.

Participation was by invitation based on students' performance in regional math competitions. The Alberta camp takes place in Edmonton and Calgary in alternate years. Most students indicated interests in finding work in the areas of mathematics, science and engineering - we also had students who wanted to apply mathematics to other disciplines such as economics.



UNIVERSITY OF  
CALGARY

## BRITISH COLUMBIA

### Simon Fraser University - Burnaby Campus

The CMS/PIMS Math Camp was hosted at Simon Fraser University's Burnaby Campus from June 22-26, 2015. The week-long day camp included 34 students from grades 8 to 10 and was organized by professor Malgorzata Dubiel of Simon Fraser University.

The camp was designed to give participants the opportunity to gain a great mathematical experience in a friendly and fun environment. Presentations offered students the chance to explore hands-on topics in mathematics that are relevant to everyday activities. Presenters and helpers were from faculty, visiting faculty, postdoctoral students, graduate students and undergraduate students of the Department of Mathematics and affiliated organizations.







## Simon Fraser University - Surrey Campus

The CMS/PIMS Math Camp was hosted at Simon Fraser University's Surrey Campus from June 24-25, 2015. The day camp included 37 students from grades 7 to 10 and was organized by senior lecturer Natalia Kouzniak of Simon Fraser University.

Presentations at this camp were designed to offer insights into higher level mathematics and to make it relevant to the participants. The hands-on component offered opportunities to have fun while trying out their problem solving and critical thinking skills. Students gained a better understanding of mathematical structures and became intrigued by the beauty of mathematics. Presenters and helpers were from faculty, visiting faculty, postdoctoral students, graduate students and undergraduate students of the Department of Mathematics and affiliated organizations.

## University of Victoria



University  
of Victoria

The camp was hosted at the University of Victoria from June 29-July 3, 2015. The day camp included 25 students from grades 9 through 11 who had demonstrated a talent and interest in mathematics. The camp was organized by Kseniya Garaschuk and Amanda Malloch of the University of Victoria.

The program's goal was to show the participants the exciting side of math that enables us to see surprising deep patterns and to creatively discover new ideas. Participants were shown that mathematical concepts are both interesting for their own sake and applicable to real life situations. The camp featured presentations on numbers of different topics: linear transformations and matrices, combinatorial counting, cryptography and much more, including students' favorite Puzzle Hunt.

# MANITOBA

## University of Manitoba



The Math Camp was hosted at St. John's College (University of Manitoba) from August 29-September 2, 2015. The day camp included 20 students from grades 9 and 10 and was organized by Dr. Donald Trim of the University of Manitoba.

The purpose of the camp was to enable mathematically gifted students to pursue knowledge in a subject they enjoy, in an environment that encourages and fosters such pursuits. Participants gained math knowledge and skills, with particular emphasis on problem-solving. The camp offered students a chance to meet and make friends with fellow Math Camp students and enjoy and value the pursuit of higher learning.

## University of Winnipeg



The Archimedes Math School "Math Readiness Camp" was hosted at Wii Chiiwaakanak Learning Centre (University of Winnipeg) from August 17-28, 2015. The day camp included 21 students and was organized by Anna Stokke of the University of Winnipeg and Archimedes Math Schools.

This 10-day summer math program provided students from ages 9-14 with the opportunity to sharpen their math skills while participating in fun activities with university students and outings within the University of Winnipeg perimeters. The program enabled students to return to school with an enhanced confidence in their math skills. All students were rewarded with a certificate and back-to-school supplies.



# NEW BRUNSWICK

## University of New Brunswick

The camp was hosted at the University of New Brunswick from May 8-10, 2015. The overnight camp included 28 students and was organized by Patrick Reynolds of the University of New Brunswick.

This Math Camp was designed for grade 10 and 11 students and attendance was by invitation only based, primarily, on performance in the NB Math Competition. Students worked on math problems (some fun, some quite challenging) and attended interesting presentations about the world of mathematics and their applications. Students got the chance to meet some UNB professors and they lived in residence for the weekend.

# NEWFOUNDLAND AND LABRADOR

## Memorial University of Newfoundland

The "Blundon Seminar" Math Camp was hosted at Memorial University of Newfoundland from May 20-22, 2015. The overnight camp included 31 students and was organized by Dr. Margo Kondratieva.

The three-day camp was for senior high school students who were interested in mathematics and demonstrated consistently good performance in mathematics competitions. During the seminar the students attended two one-hour talks given by professors from MUN on various mathematical topics and applications in science and engineering. There were several problem-solving sessions as well as other activities such as Athletics and Papers Chase.



# NOVA SCOTIA

## Dalhousie University

The Math Camp was hosted at Dalhousie University from July 5-10, 2015. The overnight camp included 20 students and was organized by Roman Smirnov, Marie-Andrée Langlois and Caroline Cochrane.

The goals of this camp were to identify, stimulate and encourage mathematical talent among Nova Scotia high school students. The camp consisted of lectures and problem-solving sessions conducted by faculty members from Dalhousie and Saint Mary's Universities. Students also enjoyed extracurricular activities and learned about the university and life on campus.



## St. Francis Xavier University

The camp was hosted at St. Francis Xavier University from May 8-10, 2015. The overnight camp included 24 students and was organized by professor Joe Apaloo.

Grade 10 and 11 students attended this math camp. The goal was to provide students in Nova Scotia with opportunities for personal growth in the mathematical sciences within a supportive environment. The camp consisted of lectures delivered by experienced instructors from StFX, and fun filled activities including: math relays, math trivia, problem solving and games.



# ONTARIO

## Brock University

This camp was hosted at Brock University from July 20-24, 2015. The five-day overnight was organized by Dr. Thomas Wolf and included 28 students.

The mathematics enrichment camp was designed primarily for Canadian students in grades 9 through 10 and invitations were based on the results of the Cayley and Pascal math contests (top scoring students from the geographic area between Toronto, Windsor, and Owen Sound to the north). Students engaged in a variety of academic and social activities: labs, contests, field trips, swimming, dancing, etc.

## University of Ottawa - Université d'Ottawa

Two Math Camps were hosted at the University of Ottawa from June 25-30, 2015. The camps included a total of 48 students and were organized by Joseph Khoury and Graham Wright.

The University of Ottawa Department of Mathematics and Statistics organized two camps, one in English and one in French. The two overnight camps took place at the same time with many joint activities. The camps were by invitation only for grade 10 students in Ontario or Secondary IV students in Quebec on the basis of exceptional results in either the Cayley or Opti-Math competitions.

Every morning, participants were introduced to a new topic in mathematics, its history, recent developments and its applications. In the afternoon, students were grouped into teams to complete various competitions in mathematics in a fun environment. Other activities included some individual challenges. Teams were also required to build projects using given material. The camps ended with a cultural visit to a museum in the nation's capital.

Deux camps de mathématiques ont eu lieu à l'Université d'Ottawa de 25 au 30 juin, 2015. Un total de 48 étudiants ont participé aux camps, organisés par Joseph Khoury et Graham Wright.

Le département de mathématiques et de statistique à l'Université d'Ottawa a organisé deux camps en 2015, un en anglais et un autre en français. Les deux camps résidentiels ont déroulé en parallèle avec de nombreuses activités conjointes. Participation aux camps est par invitation seulement pour les élèves de 10<sup>e</sup> année en Ontario ou du secondaire IV au Québec sur la base des résultats exceptionnels dans les compétitions de Cayley ou Opti-Math. Chaque matin, les participants sont introduits à un nouveau sujet en mathématiques, son histoire, les développements récents et ses applications. Dans l'après-midi, les élèves sont regroupés en équipes pour des concours en mathématiques dans un environnement stimulant et amusant. Des défis individuels étaient aussi sur l'horaire des camps. Des matériaux sont aussi fournis pour les équipes afin de construire des projets basés sur des concepts mathématiques. Les camps se terminent par une visite culturelle à un musée de la capitale nationale.

## Western University

The Western/CMS Math Camp was held at Western University from July 28-30, 2015. The day camp included 32 students and was organized by professor Gord Sinnamon.

Grade nine students participated in this day camp. The camp was run by high school mathematics teachers who were heavily involved in mathematics competitions and other student enrichment in mathematics, as well as faculty from the Department of Mathematics at Western University.



uOttawa







## York University

This "Math Experience" camp was held at York University from July 6-10, 2015. The day camp was organized by Chris Wu of the Toronto District School Board and included 34 student participants.

The camp was held for grade 9 students who earned the highest provincial score on the CMS competition. Students learned advanced problem-solving techniques and participated in hands-on math enrichment activities, which included presentations from individuals who work, research and teach in different fields of mathematics.

# PRINCE EDWARD ISLAND

## University of Prince Edward Island



The Math Camp was held at the University of Prince Edward Island from May 1-3, 2015. The overnight camp was organized by professor Ken Sulston and included 17 student participants.

From basic statistical methods and their applications to Math Trivia, these students were offered math enrichment activities to encourage them to study math at the post-secondary level. Other math camp topics included, team problem-solving, mathematical card tricks, games, puzzles, graphs and more. Students made friends and participated in social activities in the evenings.

# QUÉBEC

## Université de Montréal



Ce Camp mathématique a eu lieu à l'Université de Montréal du 31 mai au 6 juin 2015. Il s'agit d'un camp résidentiel pour 23 participants de toutes les régions de Québec, organisé par Dr Christiane Rousseau.

Au cours du camp, les participants ont eu la chance de s'interagir avec des mathématiciens, des scientifiques, les étudiants des collèges et cégeps à travers la province qui partagent le même intérêt et la même passion pour les mathématiques. Les participants au camp étaient choisis selon leurs résultats dans la compétition AMQ (niveau collégiale). Les activités du camp étaient animées par des chercheurs en mathématiques pures ou appliquées.

## Collège Montmorency



Le Camp mathématique a eu lieu au Collège Montmorency du 28 juin au 3 juillet 2015. Ce camp résidentiel était organisé par Ivan Constanineau et comprenait 35 participants.

Les élèves du secondaire qui se sont distingués dans des compétitions mathématiques et des concours de sciences à Montmorency ont profité de cette semaine d'activités stimulantes de contact avec des mathématiciens professionnels. Le camp a été organisé par le collège d'enseignement en mathématiques à Montmorency, en collaboration avec l'équipe d'animation scientifique du département de la vie étudiante. Des ateliers tels que l'échec simultanée avec l'expert Alain Regnier, une visite au Cosmodôme, au parc Rivière-des-Mille-Îles et au centre d'interprétation de l'eau étaient inclus dans le programme du camp.

# SPECIALTY MATH CAMPS



## University of British Columbia

### SPECIALTY CAMP FOR ABORIGINAL STUDENTS

The UBC/CMS/PIMS Math Camp for Aboriginal students from grades 8 to 10 provided a unique and unforgettable experience within the beautiful world of mathematics. The weeklong camp was organized by Kseniya Garaschuk and Shawn Desaulniers and hosted at the University of British Columbia from July 20-24, 2015.

The atmosphere was friendly and non-competitive. Participants enhanced their mathematical understanding through hands on activities and advanced problem solving while learning about career possibilities within science and engineering. As well as participate in social and cultural activities, and a guided tour of UBC.



## Dalhousie University

### SPECIALTY CAMP FOR BLACK STUDENTS

Dalhousie University and the Black Educators Association teamed up for this six-day math and science camp at Dalhousie University with the support of the CMS and the AARMS organization. The camp was held from July 6-11, 2015 and was organized by R.P. Gupta of Dalhousie University.

Thirty girls and boys, ages 13 to 15, who showed talent in math were invited to attend. The program emphasized problem-solving skills and applications of mathematics to common everyday living. Instructors were from the public school system, the universities, and the professional community. Students took part in field trips and engaged in other recreational activities in the evenings.



# St. Francis Xavier University

## SPECIALTY CAMP FOR ABORIGINAL STUDENTS

Show Me Your Math is a program where Aboriginal Students in Atlantic Canada explore the mathematics that are evident in their own community and cultural practices. The 2015 camp organized by Lisa Borden included 200 students and was held on May 8. Through exploring aspects of counting, measuring, locating, designing, playing and explaining, students discover that mathematics are all around them. Students gathered for the annual math fair and celebrated the work they have done.



# Queen's University

## SPECIALTY CAMP FOR GIRLS

Organized by Siobhain Broekhoven, "Math Quest" was a four-day camp aimed at introducing high-school aged girls to the full breadth of mathematics through activities that are fun. The camp was held from August 10-13, 2015 and included 29 participants. Activities included origami to discuss geometry, and the mathematics of nature. Activities were designed to engage the girls using hands-on, project based, real life applications. Organizers included opportunities for students to work together cooperatively. The presence of female role models was designed to attract girls to mathematical science professions.





# NATIONAL MATH CAMPS

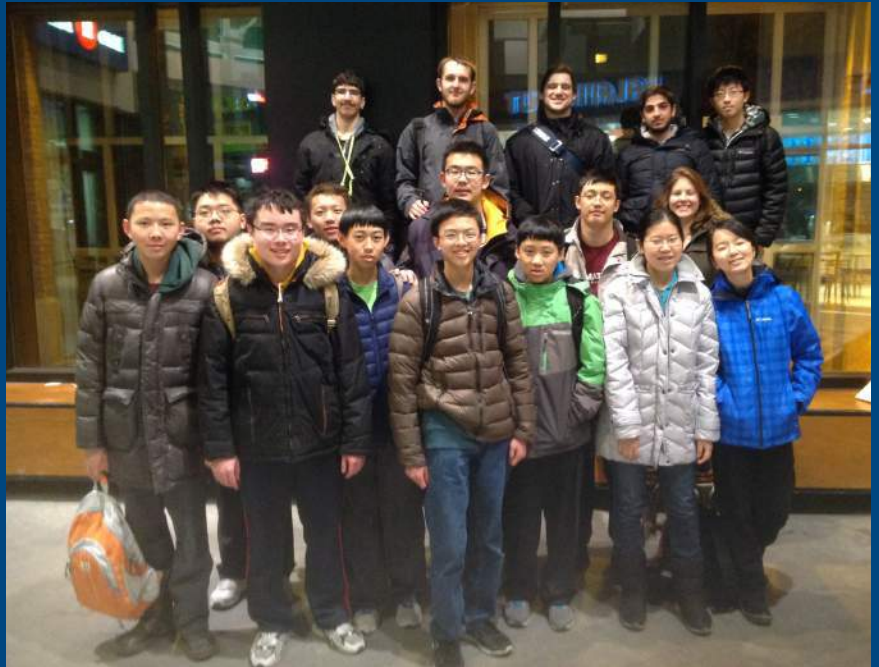
## Winter IMO Training Camp



YORK UNIVERSITY

Every winter, potential candidates for Math Team Canada start advanced training for the IMO at York University. This camp is organized by Neal Madras, the chair of the Canadian Mathematical Olympiad Committee.

In 2015, 14 students were invited to the camp that ran from January 2-7, 2015. Invitees to the camp are top performers in CMS and provincial math competitions. The camp program consists of lectures, workshops, practice contests, and students' solution presentations, along with social and recreational activities.



## Summer IMO Training Camp



BANFF INTERNATIONAL RESEARCH STATION (BIRS)

Each summer, Math Team Canada undergoes two weeks of intensive competition training at BIRS.

In 2015, the six team members of Math Team Canada trained at BIRS from June 26-July 9 prior to traveling to Chiang Mai, Thailand for the 56th International Mathematical Olympiad in Thailand. Math Team Canada placed 9th out of 104 countries and one team member, Alex Song, was ranked number one in the world.



## National CMS Summer Camp



UNIVERSITY OF TORONTO

The National CMS Math Camp is organized by Pamela Brittain at the University of Toronto. Twenty-five students from across Canada attended the overnight camp from July 25-August 1, 2015. This camp is by invitation only for top scorers from the COMC and those recommended by teachers and mathematical community.

Campers took part in academic activities on the St. George campus for six days, they learned advanced problem-solving techniques and, on the seventh day, they competed in a Mock Olympiad where teams solve as many challenging problems as possible in a few hours.



# 2015 Student Feedback

**"I really enjoyed the camp! I liked building the bridges and funky shapes with ZomeTool Creator. The fractal presentation was also very cool and the card games were intriguing. It was a great experience. Thank you to all of those involved in making this camp possible!"**

-Simon Fraser University, Surrey

"I liked that I got think outside the box and away from the stress of school. It was fun to learn stuff outside of the curriculum and to learn for the sake of learning, not marks."

-Western University

*« J'ai fait des nouveaux amis qui ont le même intérêt en math que moi. Les échanges que j'ai eu avec eux ont vraiment enrichi ma connaissance. »*

*-University of Ottawa – l'Université d'Ottawa*

"I have been to other math camps, but this one has been my favorite. I loved the StFX campus and am very excited to hopefully come here in the near future!"

-St. Francis Xavier

*"Math camp not only helps the individual students, but also contributes to the NB community by fostering its future mathematicians, engineers and scientists. It also develops with the students an increased interest and appreciation for mathematics in general and for many of them, math camp is one of the only places that they can truly explore challenging and interesting mathematical concepts."*

*-University of New Brunswick*





**« C'est de très loin unes des meilleures expériences de ma vie. J'ai pu rencontrer des personnes fantastiques et je me suis sentie acceptée parmi ces « aliens de la planète Maths », mes semblables. »**  
 -Université de Montréal

"I really liked the variety of topics covered by the sessions. There were many new types of math problems that I had not seen before and it was nice to trying to solve them with different methods. I enjoyed the competitions at the end of the day, and even when I lost, it was still fun. I also liked the topology puzzles (with the string and scissors) and the brainteasers. I worked with many new people and made new friends. The camp taught me new concepts and skills, and overall, it was a great experience!"

-York University

"The academic part was a great experience. Although some lectures were complex, it was an honour to experience them. And the chaperones were great, very helpful, friendly and very easy to get along with."

-Dalhousie University

"I really enjoyed the encouraging atmosphere and the great group of campers that I spent this week with. It has been a wonderful experience."

-University of Calgary

**"Great seminar! Well organized and well run. A lot of work must have went into this. Thank you!"**  
 -Memorial University of Newfoundland





# Partners and Sponsors of CMS Math Camps



**The Canadian Mathematical Society is proud to have partnered with provincial governments, universities and organizations in staging the 2015 Math Camps. The success of CMS Math Camps is built on the organization and volunteer contributions from the following program partners:**

## UNIVERSITY PARTNERS

Brock University  
Collège Montmorency  
Dalhousie University  
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Queen's University  
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