

2012 MATH CAMP REPORT





2012 REPORT

Each year, the Canadian Mathematical Society (CMS) collaborates with universities across Canada to organize and host a series of Math Camps. These camps are designed to help students develop their mathematical knowledge in an engaging, challenging, and - most importantly - fun atmosphere.

CMS Math Camps are a great way for students to hone their mathematical skills, meet new friends and to experience math in a way they never have in a classroom setting. Students who participate in CMS Math Camps often leave the camp with a new outlook of mathematics and new approaches to problem solving.

In 2012, a total of 21 camps were held in provinces across Canada with a total of 614 students in attendance. These camps ranged from day camps to week-long overnight camps.

This year, the CMS offered specialty camps which included the Queen's Math Camp for Girls and the Dalhousie Math Camp for Black Students. In addition, in partnership with the University of Toronto, the CMS staged the national Canada Math Camp.

As with previous years, both parent and student feedback was very positive. Many students noted their surprise that Math Camp was much more fun than expected and that they plan to attend future camps.

The 2012 CMS Math Camp Report contains information collected from each of the camp organizers at various host universities.

DOING THE MATH!

625 Student participants

15 Regional Camps

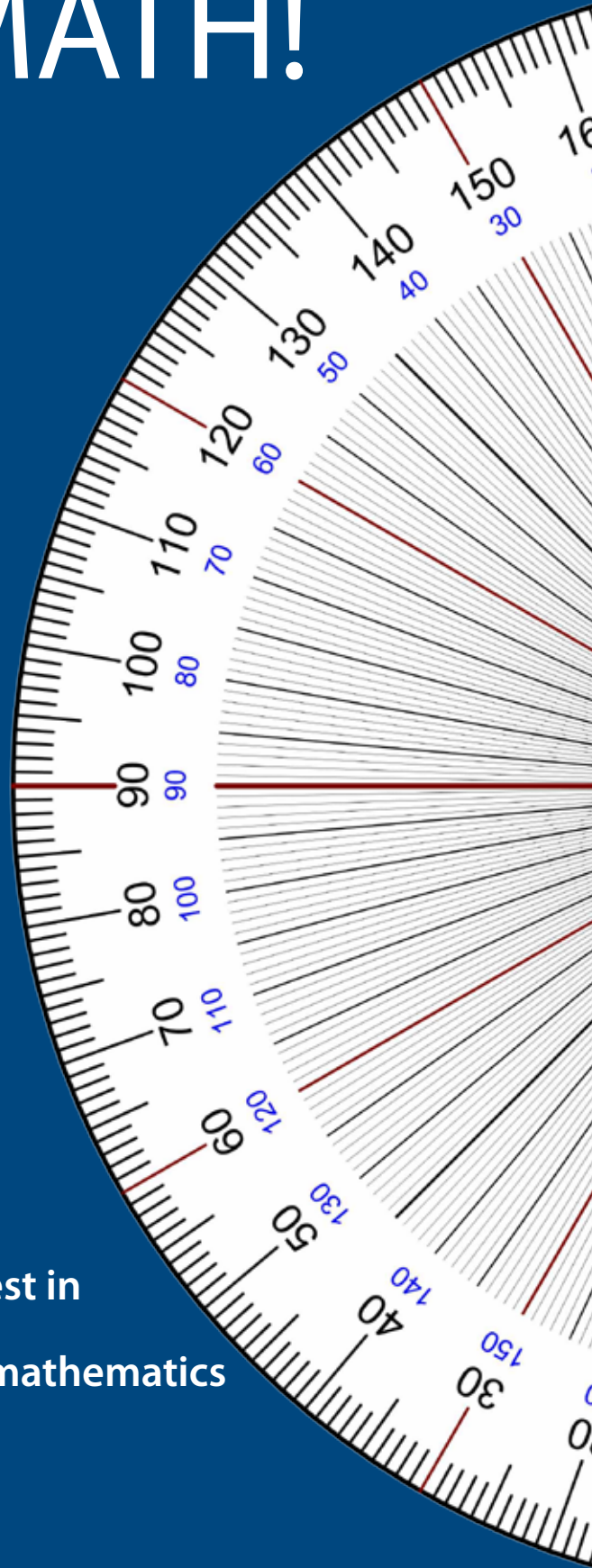
3 Specialty Camps

3 National Camps

23 % Specialty camp students

30 % Female participants

91 % Expressed increased interest in
science, engineering and mathematics





STUDENT FEEDBACK

"I established friendships with all my fellow campers, and am relieved to know that most of them are heading to the same high school as I am." 2012 Student

"The camp was truly an amazing experience as we covered aspects of math that I didn't even know existed." - Junho Lee

"Going to the camp was one of the most memorable experiences this summer, and I will definitely remember the fun and learning I had in those two weeks."

- Kevin Wang

"I had a great time at the math camp, thank you and the team so much for organizing it!" - Jerry Wu



REGIONAL CAMPS

ALBERTA



UNIVERSITY OF ALBERTA

The CMS/Alberta Math Camp was hosted on the University of Alberta campus at St. Joseph's College and was held from August 18 -22. This overnight camp was attended by a total of 30 students in grades 6-10 and was organized by University of Alberta professor, Andy Liu.

Students who participated in the Alberta regional camp attended lectures from university professors, completed various problem solving exercises, took nature walks, and had several excursions – one of which was to the Whitemud Drive Amusement Park.

Of the students who attended the Alberta regional camp, surveys showed that 24 out of the 30 students are considering a future career in mathematics, science or engineering. Additionally, 28 students indicated that they had an increased interest in mathematics, science and engineering upon completion of the camp.

BRITISH COLUMBIA

SIMON FRASER UNIVERSITY - BURNABY

The CMS/PIMS SFU camp was hosted by Simon Fraser University on the Burnaby campus. This day camp was held from July 3-6 and was attended by 36 grade 8-10 students. The camp was organized by Malgorzata Dubiel, a senior lecturer at Simon Fraser University.

Students who participated in the camp participated in hands-on mathematics presentations

such as “Computer Science Unplugged” by Diana Cukierman and Piper Jackson and “Pythagoras and other Greeks” by Cameron Morland.

Overall, surveys showed a high level of student satisfaction with the camp. Of the 36 students in attendance, 36 expressed an increased interest in math, science and engineering. Additionally, 32 students reported that they were interested in pursuing a career in mathematics, science or engineering. This camp will be held again in the summer of 2013.

SIMON FRASER UNIVERSITY - SURREY

The CMS/PIMS SFU camp hosted at the Simon Fraser University Surrey campus was held from June 27-28. The camp was organized by Natalia Kouzniak, a senior lecturer at Simon Fraser University. A total of 52 grade 9-10 students attended the camp.

Students attending this camp participated in 8 presentations from local members of the mathematical community. Some of these presentations included “Using Mathematics to Solve Real World Problems” by R. Pyke, “From Tiles to Proofs in Mathematics” by E.Halmaghi and “Card Tricks and Other Fonzies” by M.Sterelyukhin.

At the end of the camp, student surveys indicated the satisfaction level was high. Of the attendees, 42 are considering pursuing a career in mathematics, science or engineering and 40 indicated the camp increased their interest in these subjects. This camp will be held again in the summer of 2013.



**University
of Victoria**

UNIVERSITY OF VICTORIA

The CMS/University of Victoria Math Camp ran from July 3-7 and was attended by a total of 18 students in grades 9-10. This invitation-only day camp was organized by Kseniya Garaschuk, a mathematics PhD graduate from the University of Victoria.

Students in attendance of this camp participated in 15 sessions, a campus tour and a puzzle hunt. Presentations covered topics such as finite geometries, infinite numbers, cryptography, fractals, introduction to algebra, Polya Theory and others. Every day started with a handout containing POTD - Problem Of The Day, which related to the material discussed in one of the day's session.

Following the camp, students surveys showed that all participating students had an increased interest in mathematics, science and engineering and that 14 students intended pursuing careers in this subject area. This camp will be held again in the summer of 2013.



MANITOBA

UNIVERSITY OF MANITOBA

The Department of Mathematics at the University of Manitoba conducted its eleventh Mathematics Camp, August 26–29. Nineteen students from grades 9 and 10, who stayed in residence at St. Andrew's College, were immersed in an intensive program of mathematics and its applications. Don Trim, a mathematics professor at the University of Winnipeg, organized this invitation-only, residential camp.

On Monday through Wednesday, there were two and one-half hours of class time, one and one-half in the morning and one in the afternoon, after which students applied their understanding to extensive problems sets on the theme of the day. Topics covered were arithmetic in different bases, sequences and series (finite and infinite), and Diophantine equations.

Following the camp, surveys indicated a very high level of student satisfaction. Of the 18 students, 15 are considering pursuing a career in mathematics, science or engineering. This camp will be held again in the summer of 2013.

NEW BRUNSWICK

UNIVERSITY OF NEW BRUNSWICK

The CMS/University of New Brunswick camp was held from May 11-13 and was attended by 25 students. This invitation-only, residential camp was coordinated by Daryl Tingley, a mathematics professor at the University of New Brunswick. This camp was available to students in grades 10 and 11 and selection was largely based on student performance in the Maritime Math Contest.

Students at this camp participated in presentations such as "The Math of Computer Animation" by Johann Crombach and "Numerical Curiosities" by John Grant McLaughlin. Students also got the chance to play games such as basketball math and participated in math relays.

Student surveys completed at the end of the camp indicated that all participants had an increased interest in mathematics, science and engineering. Of the 25 attendees, 23 said they wanted to pursue a career in these areas of study. This camp will be held again in the summer of 2013.



NEWFOUNDLAND AND LABRADOR

MEMORIAL UNIVERSITY

The CMS/Memorial University Math Camp was held from May 23-25 and was attended by 35 students in grades 11 and 12. This year's camp was organized by Margo Kondratieva, a mathematics professor at Memorial University.

Students in attendance of this camp heard talks such as "Mathematical Infinity" by Dr. Tom Baird and "Short Introduction to Problem Sessions" by Dr. Danny Dyer. Students also participated in daily problem solving activities and free-time sessions.

Following the camp, student satisfaction levels were high. Of the 35 students in attendance, 30 indicated they had an increased interest in science, mathematics and engineering following the completion of the camp. This camp will be held again in 2013.

NOVA SCOTIA

DALHOUSIE UNIVERSITY

The CMS/Dalhousie University Math Camp was held from May 23-25 and was attended by 19 students in grades 11 and 12. This year's camp was organized by Margo Kondratieva, a mathematics professor at Memorial University.

On Monday through Wednesday, there were two and one-half hours of class time, one and one-half in the morning and one in the afternoon, after which students applied their understanding to extensive problems sets on the theme of the day. Topics covered were arithmetic in different bases, sequences and series (finite and infinite), and Diophantine equations.

Following the camp, surveys indicated a very high level of student satisfaction. Of the 18 students, 15 are considering pursuing a career in mathematics, science or engineering. This camp will be held again in the summer of 2013.



ONTARIO



UNIVERSITY OF OTTAWA

The CMS/University of Ottawa Math Camp was held for a 13th consecutive year from June 24-29. A total of 48 students in grade 10 attended this bilingual, overnight camp. The camp was coordinated by Joseph Khoury and Graham Wright.

Students attended presentations such as "Math in Real Life" by Steve Desjardins and were given problems to work on every night. Students also worked together all week to construct mathematical structures and prepare presentations. This year's camp was well supported by publishers and software companies who provided prizes for various activity winners.

Student satisfaction for the camp was high overall. Of the 48 students who attended, 45 indicated that they had an increased interest in mathematics, science and engineering. Additionally, 35 students said they plan to pursue a career in this field. This camp will be held again in the summer of 2013.



UNIVERSITY OF WESTERN ONTARIO

The CMS/University of Western Ontario Math Camp ran from July 24-26. This invitation-only, day camp was attended by 28 grade nine students. This camp was organized by Gord Sinnamon, a mathematics professor and Undergraduate Chair at the University of Western Ontario.

Students attending this camp participated in team competitions, math relays and attended presentations from members of the local mathematical community. One such presentation was titled "DNA Computing" and was presented by Professor Lila Kari, Canada Research Chair in Biocomputing.

As a result of positive student response, this camp will be held again in summer of 2013. Of the 28 students who attended the camp, 28 students plan to pursue careers in mathematics, science or engineering. This camp will be held again in the summer of 2013.



YORK UNIVERSITY

York University's 2012 Math Camp ran from July 9-13 and was attended by 32 grade nine students. This invitation-only camp was coordinated by Chris Wu. Students were selected for the camp based on their performance on the Pascal, Cayley, Fermat, Euclid, CIMC or CSMC (University of Waterloo) competitions.

Students who attended the camp participated in daily lectures, puzzles and brain teasers and problem solving and competition preparation. Some of the lectures included "An Introduc-

tion to Mathematical Modelling” by Professor Jane Heffernan and “Diophantine Equations” by Mike Yang.

Student surveys showed an extremely high level of satisfaction. Of the 32 students surveyed, all of them indicated that they are considering a career in science, math or engineering. This camp will be held again in the summer of 2013.

PRINCE EDWARD ISLAND

UNIVERSITY OF PRINCE EDWARD ISLAND

The CMS/UPEI Math Camp ran from May 4-6 and was attended by 17 students in grades 10 and 11. Students were invited to this residential camp based on teacher recommendations from local area high schools. This camp was organized by Ken Sulston, an applied mathematics professor at the University of Prince Edward Island.

Students attending the camp completed problem sets for group problem solving and competed in mathematical relays. Students also attended presentations from local members of the mathematical community such as “Mathematical Card Tricks” by Dr. David Horrocks and “Counting the Elements in an Infinite Set” by Dr. Max Burke.

Student surveys showed that following the camp 14 out of 16 students surveyed were considering careers in mathematics, science and engineering. This camp will be held again in the summer of 2013.

QUEBEC

UNIVERSITÉ LAVAL

The Camp mathématique - AMQ/SMC ran from June 10-16 and was attended by 26 students. This year’s camp was coordinated by Frédérick Gourdeau, a professor in the mathematics and statistics department at Laval. Students were selected to participate in the camp based on their scores from Quebec Mathematical Association run competitions.

Students who attended this camp participated in activities such as Geocaching, group presentations and talks from local members of the mathematics community, such as André Fortin and Bernard Hodgson.

Following the camp, students’ satisfaction was very high. Student feedback indicated that the campers enjoyed the balance between mathematical learning and organized activities. This camp will be held again in summer 2013.





COLLÈGE DE-BOIS-DE-BOULOGNE

The Camp mathématique -- Collège de Bois-de-Boulogne ran from July 1-6 and was attended by a total of 21 high school students. This camp was a residential, invitation-only camp and was organized by Emmanuel Montini.

Students attending this camp participated in a variety of talks such as "Résolution de crime" by J. Picard, "Les réseaux neurones" by S. Beauregard and "Les mathématiques du poker" by F. Tremblay. Students attending this camp also participated in various math related games and activities.

Student surveys were not completed for this camp.

SASKATCHEWAN

UNIVERSITY OF REGINA

The CMS/University of Regina camp was a one-day camp held on September 22. This camp was attended by 33 students in grades 7-12 and was coordinated by Sadia Mwangangi.

Students who attended were given problems to work on for the amazing Math Race activity, as well as a gift bag containing some math-related games and activities. Links to the activities that were done during the math camp, problem-solving workshop for grades 7-12, as well as the Math Central were forwarded to the students following the camp.

E-mails from parents indicated that the level of student satisfaction was high. This camp will be held again in the summer of 2013.





SPECIALTY CAMPS



DALHOUSIE UNIVERSITY - MATH CAMP FOR BLACK STUDENTS

The CMS/Dalhousie University Math camp for Black Students took place from July 15-29. A total of 31 students in grades 6-8 attended this week-long, overnight camp. This year's camp was coordinated by Rajendra Gupta, an adjunct professor at Dalhousie.

Students attending this camp stayed in Howe Hall under the supervision of four chaperons-D'Arcy Higgins, Nakie Davies, Jasmine Hudson and Kabu Davies. Mornings and two afternoons were devoted to the academic teaching. The instructors were: Mr. Gerry Clarke, Dr. Chelluri Sastri, Mr. Preman Edward and Mr. Leigh Herman. Students also visited the Black Cultural center, and the Department of National Defence.

Of the students who attended the camp, 28 said they wanted to pursue a career in mathematics, science or engineering and 28 also said the camp helped peak their interest in these subjects. This camp will be held again in the summer of 2013.

QUEEN'S UNIVERSITY - MATH CAMP FOR GIRLS

The CMS/Queens' University Math Camp for Girls was held from August 27-30. This day camp was open-registration for all girls in grades 9 and 10 and was organized by Maja-Lisa Thomson. A total of 15 girls attended this year's camp.

Students attending the Math Camp for Girls participated in sets of relay problems and were presented with types of problems they would not normally be exposed to in high school. Many of the lectures were taught by undergraduate students; these lectures included topics such as fractals and population survival.





Upon completion of the camp, student satisfaction was quite high. Of eight students surveyed, 7 indicated that they had an increased interest in math, science and engineering and 7 also indicated they were interested in pursuing a career in these fields. This camp will be held again in the summer of 2013.

MATH IN MOTION... GIRLS IN GEAR!

This one-day speciality camp is staged by the University of Toronto Scarborough and was held on November 3 with about 100 grade 9 female students, generally aged 13-14. The objective of the event is to motivate and encourage female students to develop interests in mathematics and continue studies in high school and consider studying mathematics related fields in university. The mastermind of this conference is Judy Shanks (Pickering High School, Durham District School Board). The organizers of the event were Sophie Chrysostomou (Toronto Scarborough), Lise Groen (Father Leo J. Austin, Durham Catholic District School Board), Carol Miron (Albert Campbell Collegiate Institute, Toronto District School Board) and Judy Shanks.

The event features hands-on sessions facilitated by academic and corporate female leaders. The program is built with the aims (1) to illustrate that mathematics can be fun, as well as applicable and helpful in life and (2) to provide great role models of women with successful math based careers both from the academic as well as corporate world.

Feedback from the students was very positive. The students commented that they enjoyed the whole day, that it was amazing and fun, they mostly liked the egg drop design and the sessions Programming by Picture (computer lab), Cracking the Code (cryptography) and the keynote speaker. Feedback from the volunteers was also positive. They commented that they enjoyed the experience, that they enjoyed the sessions and speakers as well as the interaction with the student participants.



NATIONAL CAMPS



UNIVERSITY OF
TORONTO

CMS CANADA MATH CAMP

University of Toronto - National Math Camp

The CMS Canada Math Camp was hosted by the University of Toronto and ran from July 28-August 5. A total of 21 grade 9 and 10 students attended this residential camp. Invitations to participants were sent out based on their scores on the Canadian Open Mathematics Competition with a focus on Part C questions. The aim was to have 25 participants with at least 5 female participants.

Students attending the CMS Canada Math Camp were treated to lectures and activities put together by some of the top mathematicians in the country in their field. Each day, students participated in new and exciting activities, from lectures and talks from faculty to field trips around the city.

Following the camp, student surveys indicated an extremely high level of satisfaction. Of the 15 students who completed surveys, the majority indicated that they plan to pursue a career in science, mathematics or engineering. The CMS Canada Math Camp will continue to be hosted by the University of Toronto in 2013.





OLYMPIAD WINTER CAMP

York University- 2012 OLYMPIAD WINTER CAMP

The 2012 Olympiad Winter Camp was held at York University from January 3 to 8. The objective of this national camp is to provide top high school students with exposure to an enriched high level engagement with Olympiad type of mathematics, and for the leaders of Canada's International Math Olympiad (IMO) team to get better acquainted with students who have a strong chance of becoming members of the team. A total of 13 students from across Canada participated of which 11 were male and 2 were female. Except for one grade 9 student, all were from grades 11 and 12. The local organizer was Neal Madras, who was assisted by Alfred Pietrowski, Kate Singh, Ana Iorgulescu, Mike Pawliuk, and the staff of Norman Bethune College at York. The program was organized by team leaders Jacob Tsimmerman and Lindsey Shorser, with assistance from Dorette Pronk, Alex Remorov, and Adrian Tang.

The camp was developed around a solid program of lectures throughout the day that emphasized problem solving. Each lecture was around 3 hours long, and devoted roughly half an hour to presenting some new technique or mathematical topic for the students. The remaining time was spent with the students working on a problem set that accompanied the lecture. The idea was to have the students develop their own ability, and also learn from each other by discussing the problem sets. If someone became stuck or had additional questions the organizers were around to help. In addition, two 'mock' Olympiads were staged during the camp. One of these was named the buffet contest, during which the students would receive one problem in each of number theory, algebra, geometry and combinatorics. If a student solved one of these problems correctly during the contest they would receive another problem in the same subject but more difficult. This way the students can choose to either climb up the ladder in their best subject, or spend the time practicing one of the subjects they were less comfortable with as they saw fit. The other mock Olympiad followed a traditional style similar to the IMO, and was designed to give us and the students a better sense of their abilities thus far.

This camp was particularly memorable due to the large number of strong students and the high level of collaboration. Students mostly worked together with others of a similar level. However, between sessions, there was a great feeling of camaraderie that extended beyond this stratification, in which newer learners gained much from talking to more experienced members of the group. In this sense the camp benefited, as in previous year, from having sessions that encourage student interaction. The buffet contest was very well received, as being both challenging and fun for the students. Overall, both the students and the organizers were very pleased with the camp and with the facilities that York university provided, and were happy to know that the camp will be held at York again next year, for at least the 14th consecutive year.



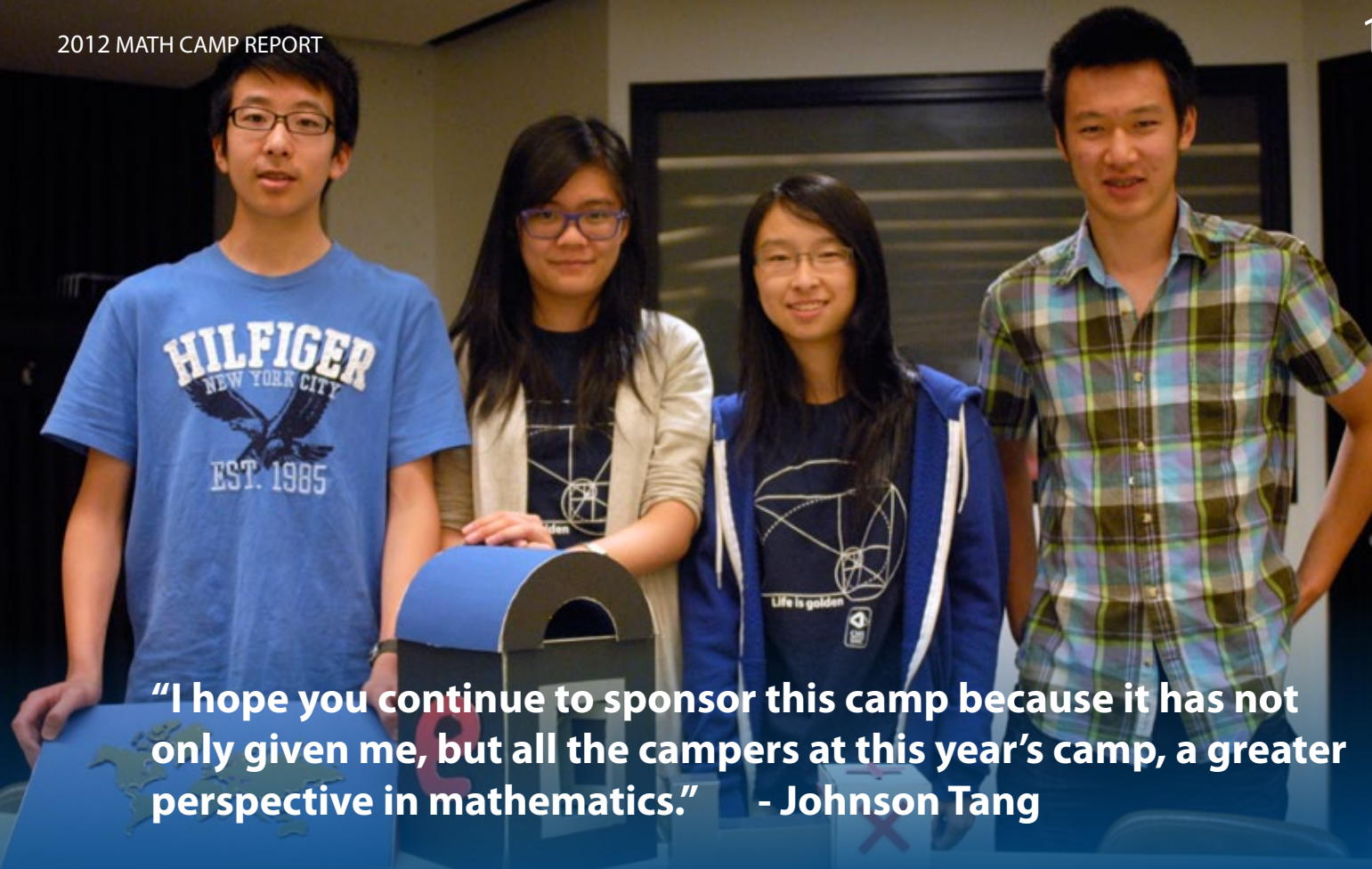
2012 TEAM CANADA TRAINING CAMP

Banff International Research Station- 2012 Team Canada Training Camp

The 14 day 2012 Team Canada training camp at the Banff International Research Station (BIRS) for Mathematical Innovation and Discovery in Banff, Alberta, was staged directly in advance of the 53rd International Math Olympiad (IMO) held in Mar del Plata, Argentina, which took place from July 8th to July 16th. The objective of the camp is to intensely prepare the six Math Team Canada students chosen by the CMS to represent Canada at the IMO. The team was selected based on the Canadian results in the Asian Pacific, USA and Canadian Math Olympiads. The 2012 student members of the team were: Calvin Deng (Cary NC), James Rickards (Ottawa ON), Alex Song (Waterloo ON), Kevin Zhou (Toronto ON), Daniel Spivak (Toronto ON), and Matthew Brennan (Toronto ON) and the three leaders were Team Leader Jacob Tsimmerman (Harvard University), Deputy Leader Lindsey Shorser (University of Toronto) and Deputy Leader Observer Ralph Furmaniak (Stanford University). In staging the camp and coaching the students, the leaders were assisted by several past Canadian team members, Hunter Spink, David Arthur, and Alex Fink.

Based on the experience with previous IMO camps, the camp program was structured around a combination of 'mock' Olympiads and daily lectures about mathematical topics that bear on the Olympiad itself, accompanied by a substantial amount of problem solving. The students had a chance to learn new mathematical tools and apply those tools in tackling the problem sets, as well as practice and refine what they've learned up to this point. Feedback from the students and the organizers indicated that the camp was successful in preparing the kids for the Olympiad, both in developing their mathematical toolkit and in getting them mentally ready to write a challenging, nine hour contest. Additionally, for the first week of the camp we invited three Canadian students, Leo Lai, Weilian Chu and Kevin Sun, who were not selected for the IMO team but nevertheless show great promise for the future to join us. Everyone was pleased with this arrangement and we hope to be able to continue this trend of training prospective team members during the camp.





“I hope you continue to sponsor this camp because it has not only given me, but all the campers at this year’s camp, a greater perspective in mathematics.” - Johnson Tang

UNIVERSITY PARTNERS

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The CMS promotes the advancement, discovery, learning and application of mathematics in Canada.

To support or partner with the CMS Math Camps program, please contact:

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