

Report on Canada's participation in the 45th International Physics Olympiad in Astana, Kazakhstan

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The 45th International Physics Olympiad (IPhO) was held from July 12th to 21st in Astana, Kazakhstan. Members of the Canadian Physics Olympiad team were selected based on the results of the Canadian Association of Physicists (CAP) High School Exam. 996 students from 170 Canadian schools wrote the exam (about 13% increase compared to last year), and the top 5 students were invited to form the Canadian Team. Because the Canadian Physics Olympiad Program lost all of its funding, no National Camp or team training was organized – this is in stark contrast to teams from other countries, who went through training for anything from 2 weeks to 2 years. The students and one leader (instead of the regular two) had to pay their own way to Kazakhstan (about \$2500 per person). As far as I know, we were the only country that requested students to do so, when less fortunate countries were able to support the participation of their students financially. The Canadian Physics Olympiad (CPO) Program paid the IPhO participation fee (\$2500) and CAP contributed \$200 to each student's travel expenses. The CPO contribution was made possible by the kind donations from Dr. John Madden and Triumph.

The members of the Canadian team this year were:

- Henry Wu from University of Toronto Schools, ON; student of Shawn Brooks
- Chris (Yuan Qi) Ni from A.Y. Jackson Secondary School, ON; student of Gavin Kanowitz
- Antonio Molina Lovett from Ecole Sainte-Anne, NB; student of M. Andre Martin
- Pasindu Muthukuda from Burnaby Central Secondary School, BC; student of E. Byman
- Andrew Jinwook Kim from University of Toronto Schools, ON; student of Shawn Brooks

The team leader was Dr. Andrzej Kotlicki (UBC), Director for the Canadian Physics Olympiad Program.

Nazarbayev University and the Republican Scientific and Practical Center "Daryn" hosted this year's IPhO. The opening and closing ceremonies were held at the Palace of Peace

and Reconciliation, with wonderful traditional and modern dance and music performances. It was a nice surprise for the team that both ceremonies were attended by Canadian diplomats: The Opening Ceremony was attended by the Chargé d’Affaires of the Canadian embassy, Ms. Catherine E. Ivkoff; the Closing Ceremony was attended by the new Ambassador to Kazakhstan, his Excellency Shawn Steil.

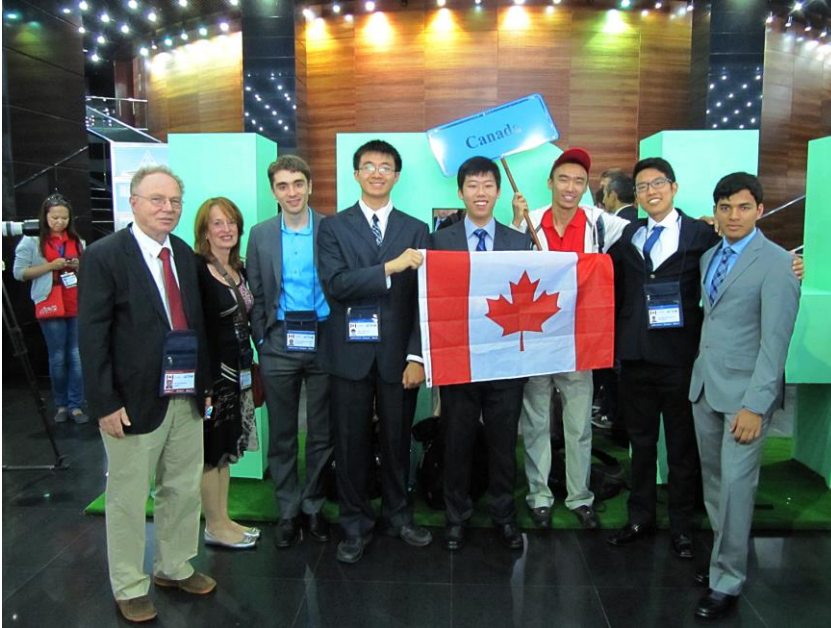


Figure 1. The Canadian Team at the Opening Ceremony. From the left: Dr Andrzej Kotlicki, Dr Chantal Haussmann (honorary team physician), Antonio Molina Lovett, Chris Ni, Henry Wu, Yerbol Akhmetov, a Kazakh guide, student of engineering at Nazarbayev University, Andrew Kim, Pasindu Muthukuda.

Eighty-five countries participated from all continents except Antarctica in this year’s Olympiad. According to the IPhO’s statistics, roughly 67% of the participants are awarded Olympic medals or honorable mentions.

As usual, the competition had both theoretical and experimental parts that are meant to challenge students at a level more advanced than typical high school exams. The competition consisted of 3 theoretical and 1 experimental problems. The first theoretical problem had 3 parts: an interesting mechanical problem with a puck sliding inside a cylinder, a thermodynamics problem with the heat capacity and oscillations of the soap bubble, and an electrical problem with LC circuits. The second theoretical problem involved van der Waals gas equation. This problem was the longest part of the 30-point theoretical exam and was worth 11 points. It needed rather straightforward but long calculations. The third theoretical problem was about the gas discharge (an electric current flowing through a gas) and similarly needed long calculations. Leaders from most countries agreed that the theoretical problems were too long.

The experimental problem was all about the birefringent effect in plastics and liquid crystals. It needed a lot of careful measurements and a good understanding of optical effects. Only one student among all participants got close to receiving all points for this problem.

To ensure the fairness and consistency of the marking, grading was done separately by organizers and team leaders and then moderated. Overall, marking was reasonable and consistent. Few disagreements, normal for the marking process, were resolved in a friendly manner.

Our team did reasonably well in the competition even though there was almost a complete lack of training due to funding reasons. Everyone on the team received a prize: Henry Wu won a silver medal, Chris Ni won a bronze medal and Lovett Antonio Molina, Pasindu Muthukuda and Andrew Jinwook Kim won honorable mentions. It's worth pointing out that both our medalists participated in the training camp last year.

Due to the length of the problems, the scores were lower than usual. The score of the top student (absolute winner of the Olympiad) was only slightly over 80% and the lowest score of the gold medalist was about 55%!



Figure 2. The team after the closing ceremony. From the left: Henry Wu, Chris Ni, Antonio Molina, Pasindu Muthukuda, Andrew Kim, Canadian Ambassador, his Excellency Shawn Steil, Andrzej Kotlicki.

When the students were not busy with exams, they spent time experiencing the rich cultural, social and scientific programs. They also took the opportunity to admire

Astana's fascinating, futuristic architecture and interacted with their peers from other countries.

Next year, India will host the next Olympiad in Mumbai. At the official closing ceremony of the Olympiad, the Indian leaders showed a movie and invited all the countries to the next International physics Olympiad. Canada looks forward to participating in 2015.



Figure 3 The team sightseeing. From left: Yerbol Akhmetov, Henry Wu, Andrew Kim, Chris Ni, Antonio Molina, Pasindu Muthukuda.