

2001 Samuel Beatty Contestant Report: Liang Hong

42nd International Mathematics Olympiad at Washington, DC, USA

The International Mathematics Olympiad (IMO) is a prestigious competition held between the young high school mathematicians of the world. With the exception of 1980, the competition has been held annually ever since the 1st IMO in 1959, at Romania. The competition has its origins in the Eastern European countries of the former Soviet Union. However, in the last 20 years it has become much more international, expanding from only 7 participating countries in 1959 to over 80 this year at Washington, DC. Countries from all around the world have hosted the competition, including Canada, in 1995. In 2001, it was at the capital of the United States, Washington DC. Last year, it was Taejon, South Korea, and next year it will be Glasgow, Scotland, followed by Tokyo, Japan in 2003. In 2004, the IMO is to be held at Greece, coinciding with the 2004 Summer Olympic Games. While the International Math Olympiad is a test of mental, not athletic capability, it is arguably as challenging. In many ways, the IMO is a mathematical marathon, a test of not only ability but also of endurance.

The rules are fairly straightforward. Each country can send up to six high school students. Most teams, Canada included, were teams of six, though smaller teams came from countries like Luxembourg, which only sent two students. The contestants are to write a two day examination consisting of a 3-question, 4.5-hour paper on each day. The solutions are then marked out of 7 points each, thus providing for a total maximum of 42 points. Few students actually attain such heights; the median score at the 42nd IMO was only 11 out of 42. This shows the high level of difficulty of the competition. Even the easiest question on the IMO can be challenging to some of the top young mathematicians of the world. This year, I was fortunate to be selected to be on Canada's team of six, the members of which were Daniel Brox, Paul Cheng, Nima Kamoosi, Roger Mong, Shu Niu, and yours truly. This year, the students came across Canada. Roger and I came from Toronto, Ontario, whereas Dan, Paul, Nima and Shu came from British Columbia, all from around the Vancouver region.

In June, we attended the annual Waterloo Math Seminar, which was followed with the CMS Summer Training Camp, held this year at the University of New Brunswick in Fredericton.

The leaders and observers that came with us to Washington DC were Richard Hoshino, Dorothea Pronk, Christopher Small, and Edward Wang. We owe a big thank you to Daryl Tingley and his wife, Maureen, as well as the University of New Brunswick, for generously hosting us and for organizing all the great events we had there. Thanks also to all the guest lecturers, CMS, and of course, to our leaders, for making the summer training camp possible.

The students endured two weeks of preparatory lectures and problem sets on a wide swath of topics ranging from inequalities, to geometry, to geometric inequalities, and so forth, as well as several mock Olympiads. Luckily, it wasn't math 24/7; we also played card games (mainly bridge and mafia, a quintessential part of every math camp). On the first day, we biked down and around Fredericton. At the University gym, we played some badminton, table tennis and basketball. We paid a visit to the Lieutenant Governor of New Brunswick, and had also had a movie night (this year, the movie was democratically selected by a very close margin to be Shrek). New Brunswick was fun, but alas, all good things must end, and at the end of June we were on our way to the airport and to Toronto. For the Toronto students this meant a brief return to home, for the Vancouver students it meant a brief stay at Richard Hoshino's house.

This year's competition was to be held at Washington DC. The last time it took place in the United States was in 1981, also at the capital. The last time the IMO was held in North America was in 1995, in the familiar surroundings of Toronto, Canada. We left in the morning of July 3, proudly donning our distinctive red and white Team Canada jackets and shirts. The plane arrived at Washington Dulles Airport only a few hours later. There, we were greeted by George Lee, the guide for Team Canada (us). George was a former participant and gold medalist of the IMO, having represented the American team. As with all the other guides, George generously volunteered two summer weeks to help the IMO run smoothly. He is now in his 2nd year at Harvard University.

Most of the student events of the 2-week IMO took place at George Mason University, located around Fairfax, Virginia and in close proximity to Washington. The student contestants, along with some of the

observers and trainers were housed on campus. The leaders were somewhat more fortunate, residing at the more luxurious confines of the Embassy Suites Hotel. As the students engaged in some last-minute review, the leaders were busy too, voting to decide the six IMO 2001 questions from the shortlist. The opening ceremony was held at an auditorium in George Mason University. There, one contestant from each of the 83 or so participant countries walked across the stage one by one, forming the parade of nations. I was selected for this role, partially because nobody else wanted to, and partially because I wanted to meet some of the other contestants from around the world. After the parade across the stage came presentations from sponsors, organizers, and notaries (including a telecast message from George W. Bush), as well as a series of performances organized by the host country.

On the Fourth of July we had a Potomac River cruise to see the fireworks over the Washington Mall. It was really nice, except for the weather, which unfortunately called for heavy rains that evening. Overall, however, the weather was agreeable in Washington, ranging mainly in the 30's and high 20's. The first few days were full of excursions for the students, but some of us were pretty stressed out in anticipation of the main two-day event. We visited the Washington Zoo and the Pandas on exhibit. We toured the Washington Mall and all the buildings and monuments there, from the Lincoln Memorial to the Washington Monument. We also went to the main Smithsonian museums, checking out the Air and Space, Natural History, and American History exhibits.

The actual competition was scheduled for July 8 and 9. During free time, some of the Canadian students could be spotted exchanging our Canada IMO 2001 pins with students from around the world. In return, we received key chains, more pins, post cards, coins, pencils, stamps, paper fans, mini plush animals, flags, etc. For me, it was two Ziploc bags full of souvenirs from around the world. Though we didn't always share the same language, we found that English worked remarkably well. In addition, with the highly multicultural Canadian IMO 2001 team (students, leaders, and observers alike), we found conversations in Farsi, Mandarin, Cantonese and Japanese, and made attempts on what French we had learned in school. Nima found former schoolmates on the Iranian team, and Paul met two former classmates on the Taiwanese IMO team. Perhaps one of the most enduring and valuable experiences at the International Math Olympiad is the people and faces

you meet, acquaintances that can become lifelong friends.

We tried not to be too stressed about it, but for five of the six members of the Canadian IMO team, this was a totally new experience, to write a 9 hour examination on the international level. The only veteran was Daniel Brox, who also participated at IMO 2000. The two days of competition, the object that we had long been training for, finally came on July 8-9th. After nine gruelling hours of math, it was finally over. In that afternoon, we visited the Canadian Embassy, receiving a warm welcome from the Canadian Ambassador.

The ordeal was over for the students, but there was still much work for our four leaders. The process of coordinating the student papers lay ahead. In the meantime, we took a day off at the Paramount's King's Dominion amusement park. Another day was spent around Baltimore, where we explored the depths of the city Aquarium. A few days later, the results came. Canada finished respectably, with a final total score of 100. We received 1 gold medal (individual top 1/12 result) and 4 bronze medals (individual top 1/2 result). We all performed admirably, with everyone completing the equivalent of at least one question. Canada finished well overall, within the top third of all countries. With respect to the final result, it was not very surprising that Team China finished first. USA did well, finishing in second place, slightly ahead of Russia in third. The award ceremony and the medals were presented the afternoon of the 13th at the Kennedy Center. It was a celebration not just of those who received medals, but of mathematics around the world, in all the 450 plus student contestants at the 42nd IMO.

The closing ceremony was held in the grand National Building Museum on the Washington Mall. There was a reception and banquet, with speakers including Andrew Wiles, the famous mathematician who proved Fermat's Last Theorem. In fact, at the end we were each presented with a DVD of Fermat's Last Tango, a musical based on the history of that elusive proof.

After two weeks of doing our best representing Canada in our distinctive maple leaf jackets and red shirts, the International Mathematics Olympiad finally drew to a close. On the morning of the 14th of July, we boarded the plane back to Canada, and to the rest of our summers. We owe a profound thank you to everyone who made IMO 2001 possible. To our four great leaders, to our guide, to the organizers of IMO 2001 USA and their sponsors, to the CMS, to the



Samuel Beatty Fund and to the other sponsors of the Canadian IMO team, and to everyone whose name I might have left out; on behalf of the Canadian IMO 2001 Team, thank you all for the great times we had this summer at Washington DC. It definitely was a wonderful experience for me.

The next IMO will be held in July 2002, at Glasgow, Scotland. Best of luck to those heading to University, (Daniel, Nima, and Shu). For those of us sticking around (Paul, Roger, myself), I sincerely hope we will once again be able to do our best of representing Canada on the international stage, at the International Math Olympiad.