

An E-Conversation with a Math Olympian

Robert Wong

Recently, MCATA asked me to do a write-up on Robert Barrington Leigh, a medal winner in both the 2003 International Mathematical Olympiad (IMO) and the 2003 International Physics Olympiad. Two questions came to mind: Where is Robert Barrington Leigh? and, What can I ask him that various news media haven't already asked? With Andy Liu's help, I was able to find the whereabouts of the famous Edmontonian: Robert is now in his first year of study of mathematics at the University of Toronto. A face-to-face conversation with him would have been difficult, so e-mail it was. I thought it would be best if I asked questions from a student perspective. After brainstorming with my students and collaborating with Shauna Boyce, MCATA publications director, I came up with a set of questions. What follows is my e-mail conversation with Robert Barrington Leigh.

ROBERT WONG: What math topics did you have to work with in the IMO?

ROBERT BARRINGTON LEIGH: The problems I solved during this year's competition—two out of six—concerned geometry (the usual: circles, lines and angles) and number theory (properties of whole numbers). There were also one algebra question and two more number theories. The hardest problem concerned powers of prime numbers. Significantly, the IMO considers calculus postsecondary material; thus, I didn't feel obliged to study it! The problems chosen for the Olympiad are generally more difficult when tackled with calculus than without.

RW: How competitive was the Olympiad? Was it stressful?

RBL: The Olympiads are organized to be as friendly as possible: we write the contest within a few days of our arrival and then we try to concentrate on enjoying ourselves and making friends for the rest of the event. I particularly recall playing a card game with members of the Chinese team, who seemed just as relaxed as the Canadians. Understandably, though, some of us were anxious while the questions were

being marked and right before the results were posted. In addition to the opportunity to meet other students, the International Olympiads provide the opportunity to explore a new country and culture. I was fortunate this year to visit Tokyo, because I do not often travel outside Canada and certainly had never left the Western Hemisphere. I think it's essential to have a sense of the scale and diversity of our planet, and, although the abstract field of mathematics might not seem the best field in which to develop such an understanding, the IMO lets students engage in both mathematics and cultural exploration.

In general, the Olympiad was not stressful—even the 270-minute exams were more relaxed than one might expect. If I had panicked, I would have made more mistakes than usual, and I would certainly have had no room in my thought processes to discover solutions. Thus, the exam is a mixed bag of exploration, insight and occasionally frantic writing.

RW: What kind of recognition have you received as a result of the competition?

RBL: Articles about the Olympiads were published in Edmonton, Calgary and Banff newspapers, and I was heard on an Edmonton radio show last spring.

RW: Did you spend much time outside of school working on or studying math topics?

RBL: Certainly. I have never been content with learning only what I am being taught officially—and there are always contests to study for. One useful tool has been a correspondence program for high school students organized by Ed Barbeau of the University of Toronto: every month he sends out a problem set and marks everyone's solutions. Moreover, over the past few years I have been invited to many math camps, which are, perhaps surprisingly, almost as much fun as they are instructive. These camps include the Alberta summer camp held alternately in Edmonton and Calgary, a corresponding national camp at the University of Western Ontario, a spring camp at

the University of Waterloo, a January camp for IMO contenders at York University and a July training camp for the IMO itself that was held this year in Calgary and Banff. I am deeply grateful to the professors and university departments involved and to the sponsors of these camps: ESSO, the Canadian Mathematical Society and the Pacific Institute for the Mathematical Sciences.

RW: What are your career plans? Is math a part of those plans?

RBL: Most likely math will be my principal focus for decades to come. I am not yet certain how I will manage to incorporate this focus in a career.

RW: What are you studying now?

RBL: I am enrolled in a math–physics double major (with greater emphasis on math), but I think I’ll also pursue the odd computer science course. Right now, I’m taking second-year math and physics, a first-year computer science course and a sociology seminar for first-year students.

RW: What have been your accomplishments in the last three years?

RBL:

- Placed first for Alberta in the 2001 Canadian Open Math Challenge
- Placed first for Alberta in the 2003 Alberta High School Math Competition
- Received an honourable mention in the 2002 Canadian Mathematical Olympiad and placed third in 2003
- Placed third in the 2002 Leonardo da Vinci Competition
- Placed eighth in the 2002 Canadian Association of Physicists High School Prize Exam and first in 2003
- Placed third for Alberta in the 2003 Chemical Institute of Canada National High School Chemistry Examination
- Placed ninth for Alberta in the 2003 University of Toronto National Biology Competition
- Won the bronze award at the 2002 International Mathematical Olympiad in Glasgow, U.K. (22 points out of 42; tied 113th–132nd of 480 participants) and the bronze award in 2003 in Tokyo (18 points out of 42; tied 107th–123rd of 457 participants)
- Won the silver award at the 2003 International Physics Olympiad in Taipei, Taiwan (28.7 points out of 50; 38th place out of 239)
- Participated, as a member of the three-person University of Toronto team, in the 2003 William Lowell Putnam Mathematical Competition

(a North American math competition for university students) on December 6, 2003

RW: How many articles or books have you written and published?

RBL: A few years ago, I published two articles with Richard Ng, with help from Andy Liu of the University of Alberta—“Zigzag” and “Minimizing Aroma Loss” (which was reprinted in *delta-K*, Volume 38, Number 1, December 2000). I am in the process of helping Professor Liu with a book of translated problems and solutions from a Hungarian math competition (*Hungarian Problem Book IV*).

RW: Were your parents good at math?

RBL: Yes, I would say that interest in math runs in the family. My father was my first math teacher and the one who could teach me best for many years.

RW: When did you start working on math problems?

RBL: Sadly, I don’t remember that far back, but in Grade 1 I was asking my teacher for enrichment to the math curriculum. In Grade 5, I wrote my first multiple-choice math contest, and in Grade 6 I joined a math club organized by Professor Liu. There I discovered a long-answer math contest called the International Tournament of the Towns, which I enjoyed immensely despite its being slightly above my level.

RW: How many hours of math did you do in a week in elementary, junior high and senior high?

RBL: About three—I certainly don’t remember in elementary. Also, sometimes I’m not expressly working on math but am just thinking about a problem—in the shower or what have you. But, naturally, I wished I had more time for math than was available.

RW: What do you enjoy doing when you have free time? Hobbies?

RBL: Apart from math and chatting with friends, I enjoy music, in particular playing the piano, as well as cross-country skiing and running. Edmonton has a supportive Nordic ski club that I’ve belonged to since elementary school. Also, I have a casual interest in computer programming—my brother-in-law is a software developer.

RW: What kinds of books do you read?

RBL: Like many people, I must confess that I ought to be reading a much greater variety and volume of books than I do. Currently my reading agenda consists of math books—recreational and otherwise—and other science-related nonfiction, fiction and biography.

RW: Who's your mentor in math?

RBL: Without a doubt my mentor is Professor Andy Liu, an award-winning mathematics educator at the University of Alberta, who even tutored me privately in Grade 11. I have been in contact with him since Grade 6 through his math club, and most recently he was the leader for the 2003 IMO team. Professor Liu not only has been a dedicated mathematics tutor and friend but also has introduced me to many other young mathematicians and, crucially, shown me how rewarding a career in math can be.

RW: How do you prepare for math tests and contests?

RBL: The same way as anyone else does: I familiarize myself with the standard problem-solving techniques and then I attempt to solve sample problems. If I get stuck on a problem, I either move on to the next or look up the solution in case the same approach can be applied elsewhere. In a contest, the range of insights needed for different problems is much broader; therefore, knowing the solution to a particular problem is less valuable than it might be on a school test. Seeing the solutions to many sample problems is still helpful, but solving them myself is key.

RW: What are your educational and career goals?

RBL: Learn a great deal of math and physics. I have no idea—save the world

RW: Do you have any advice for others who want to excel in math?

RBL: Find others with the same goal; it's more exciting when you challenge each other to excel. There are so many good math problems on the Internet and in the library that I'll never run out of them. The Canadian Mathematical Society also has some great resources, such as Dr. Barbeau's Mathematical Olympiads Correspondence Program (www.cms.math.ca/Competitions/MOCP/info.html), especially if you need someone to mark your solutions—an important part of training.

I must stress that, without practice, speed and creativity in math diminish over time.

RW: What would you say to people who do not like or who struggle with math?

RBL: Well, I certainly don't hold it against them: though I pick up mathematical ideas faster than average, I find other skills difficult and, therefore, unpleasant. On the other hand, mathematics is diverse enough that someone may abhor one branch but appreciate the charm of another. Puzzles created by Binary Arts Inc.—for example, Rush Hour—tend to be friendly tools for exercising the mathematical parts of one's brain without even noticing.

Robert Wong, MCATA webmaster, teaches at Vernon Barford Junior High School in Edmonton, Alberta.

This interview was previously posted on the MCATA website (www.mathteachers.ab.ca). Minor editorial changes have been made in this version.