

A physics education challenge for Canadian premiers



As the new English language editor of *CUPJ*, I look forward to working with the students who submit to the journal and the volunteers who make this important journal possible. There are very few venues for undergraduates in the physical sciences to publish their work. Having a journal such as this fulfills a very important academic, cultural and economic function.

The physical sciences and mathematics form the basis of some of the most sublime of human thought. For those few who work at understanding this thought, the rewards are very personal and meaningful. For many of us, we remember almost to the moment the epiphany of when we first understood Newton's calculus, or when we could begin to truly appreciate the brilliance of Einstein, Dirac, Herzberg or Landau.

We are fortunate in this edition to have a paper written by Dr. Marina Milner-Bolotin, who, as a young girl, grew up as a neighbour and family friend to Lev Landau in Moscow. The subject she writes about is physics education in Canada. The physical sciences form one of the foundations of a modern economy. While we like to think ourselves modern, Canadians are schooled in, but not educated in, the physical sciences. Most of us learn enough of the subject to pass the exams, but not enough to master the subject to any degree. It is time we change and better prepare ourselves for the 21st century.

I would like to set down a challenge by first thanking a unique Canadian, the Honourable Jean Charest, Premier of the Province of Québec, former Minister of Parliament, former Député for Sherbrooke-Fleurimont. I would like to thank Mr. Charest for believing in Canadian technology enough to see that in 1997, a Canadian-designed and built nuclear medicine cyclotron would be placed at a new research facility at a hospital in Sherbrooke.

Early in 1997, a colleague, Mr. John Maw and I had coffee with Mr. Charest in his Centre Block office at Parliament to discuss the project. As we stood to leave, Mr. Charest proudly described the hats hanging on the hat rack next to his door as a measure of his commitment to Canada. They represented the many different hats he had worn as a federal minister. Mr. Charest came through with his promise to see that a Canadian manufac-

turer be considered favourably for this project. By standing true to his belief in Canada, he helped to make it possible for a BC-based nuclear medicine equipment company to go on to win contracts at Rockefeller Hospital/Cornell Medical Centre in New York, as well as at eight other facilities around the world over the past decade. By believing in Canadian ability, Mr. Charest helped launch a Canadian success story.

In arranging the Sherbrooke and the New York contracts, the little Canadian company competed against two of the world's largest technology companies. As the person who negotiated the New York contract, I enjoyed walking past the Rockefeller Centre and look up, thinking, "If only you knew what we were doing." We were proving Canadian cyclotron technology was the best in the world. There is now a Canadian-made cyclotron at Brookhaven National Lab on Long Island and at five other cancer research and treatment centres across North America, as well as one in Korea and one in China.

As outlined in Dr. Milner-Bolotin's article, a similar vision is needed in the field of physics education. It is time to bring physics education in Canada into the 21st century.

I challenge the Council of Ministers of Education, before this decade is out, to double our investment in Physics 11 and 12 programs in Canada. I also challenge the University of British Columbia, the University of Toronto and McGill to establish physics education programs in their departments of physics by 2010. No investment would bring a higher academic, cultural and economic return than a good education in physics.

I have had the pleasure of teaching physics and the sciences as an instructor at the high school and college level, and as a teaching assistant at a university level. I look forward to teaching physics at a Canadian university. Being familiar with the strengths and shortcomings of such institutions, I can say that the only way that such a physics education initiative will be successful is if you let the physicists in our country take the lead in such an undertaking. For faculties of education to subsume such an undertaking will water it down, and such efforts will be frustrated and unsuccessful. Much of what goes on in these places lacks focus and relevance. One has only to recognize

that there are no qualified physicists to be found in faculties of education in Canada.

Such a physics education initiative would also relieve the problem of remedial teaching that is becoming such a burden to undergraduate physics instructors. At the very least, by better preparing students for the challenges of university life, you are preparing them to succeed at their studies. At the very most, you are making them better citizens.

Over the next few years, *CUPJ* will be running feature articles on physics education, which are designed to be used by instructors in their classroom. The first article in the series is about the pendulum, a subject that is taught in high school and in first year undergraduate physics.

The January edition of *CUPJ* will have the theme "Canadians in Space" and will focus on Canada's contributions to advances in space and aerospace science. A little science trivia: when the Apollo 11 astronauts landed on the moon in 1969, the first piece of hardware that touched down on the lunar surface were support legs on the lunar excursion module ... equipment made for NASA and Grumman by a Canadian manufacturer then located in St. Hubert, Québec.

We Canadians have been in space since the very beginning and have ventured to far places with our neighbours and friends to the south. Now we are doing the same with our Russian, European and Japanese partners on the International Space Station. This serves to remind us that we can keep up with the best of them ... if we try.

To the Honourable Jean Charest, for his past and ongoing commitment to Canada, I say "merci bien," and to the other Premiers of Canada and their Ministers of Education I ask: are you up to the challenge?

A handwritten signature in cursive script that reads "Patrick".

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