Articles

An Applied Mathematician in Focus: Dr. F. Mary Williams Director General, NRC Institute for Ocean Technology

by Serpil Kocabiyik

Mary Williams is a national authority on ice engineering focusing her research on the forces of ice on ships and offshore structures as well as the engineering properties of ice. In September 2002, she was appointed director general of the National Research Council's Institute for Ocean Technology, which is an international leader in ocean engineering research.

Mary Williams' appointment as director general of the NRC's Institute for Ocean Technology was a return to Canada's national laboratory for ocean engineering research after five years at Memorial University of Newfoundland. Prior to joining Memorial, Mary was a Senior Research Officer at NRC. As Research Officer, she carried out fundamental research and also advised public and private sector clients. Her work has involved many field trips on the ice as well as icebreaker expeditions to the Arctic, the Antarctic, and around Newfoundland.

Mary was a full professor at Memorial (1997-2002), with joint appointments in the Faculty of Engineering and Applied Science, and the Department of Physics and Physical Oceanography. She currently holds an honorary professorship in Engineering, lectures occasionally, and supervises graduate students.

While at Memorial, Mary held the NSERC/Petro-Canada Chair for Women in Science and Engineering, Atlantic Region. The Chair is one of five across Canada dedicated to increasing the participation of women at all levels in Science and Engineering. The work of the Chair included research in organizational dynamics, teaching, advising, and outreach. The results of this work continue to be delivered through a book and a series of workshops for scientists and managers. The parallel paths of engineering research and organizational behaviour converge in her present position as director general at NRC.

Mary has served on numerous Boards, selection committees and review panels. She is a frequent spokesperson on ocean technology developments. In spring 2000, she was chosen to officially launch the TerraNova FPSO (Floating Production, Storage and Offloading platform), currently producing oil on the Grand Banks.

This rather offbeat career began with a Ph.D. (1975) in Applied Mathematics from Simon Fraser University. Mary's thesis topic was The Deformation of Viscoelastic Materials with Environment-Dependent Properties. Her knowledgeable and patient supervisor was Dr. Cecil Graham.

Mary is one of the invited speakers for the 2004 joint CAIMS/CSFD/CMS meeting in Halifax.

Articles

Canada School Mathematics Forum

by Christiane Rousseau

On May 16-18 2003, 148 delegates attended the Canada School Mathematics Forum, including school teachers, university faculty in mathematics and education, school board administrators, people working in provincial ministries, delegates from provincial associations of math teachers and mathematical societies, a few delegates from industry, research councils and media. Pierre Reid, Minister of Education from Quebec was honorary president of the Forum and met the participants before the public lecture. The Forum has been an opportunity to compare issues and best practices across the country and to make links across the different levels of education and across the traditional provincial boundaries. Working groups have identified issues on which subgroups will prepare more detailed findings to be presented at the second Forum to be held in Toronto in 2005 and some directions of actions. Proceedings will be published electronically on the website of CMS and will be distributed widely.

The five themes of the Forum were the following:

- Comparison of Experiences
- Critical thinking or Mathematical education as a tool to function and innovate in the modern world
- Goals and challenges in the modern school
- Teacher education and development
- Summing up with a vision of the future

Each theme started with plenary activities and continued with panel discussion and or working groups. Sixteen working groups met for 3 sessions during the forum. All together a very large spectrum of subjects of mathematical education have been discussed during the forum, covering enrichment for the best students, basic mathematical education for everyone, adequate preparation to enter science and engineering university programs, teacher education and development. The program can be seen at www.cms.math.ca/Events/CSMF2003

Some directions for action have come out of the Forum and actions will start already as preparation for the next Forum. Efforts will be made to attract more teachers at the next Forum.

Mathematical education for aboriginal communities

At the Forum the major issue of mathematical education for aboriginal communities was discussed while it becomes evident from the demographics that this dossier will become a national issue in the next years. In contrast to our community the aboriginal communities have a lot of young members. They realize that education is crucial if they want to be able to create jobs in the communities. On the other hand the step is too high for aboriginal students in our schools if no effort is made to adapt to their culture and make school interesting to them. There will be a follow-up on this item at the level of the education activities of CMS in collaboration with people working in the aboriginal communities.

Linking provincial associations of teachers

In the past provincial associations met at NCTM annual meetings in the USA. The format

of this meeting is not good for discussions about issues and for real joint discussions on mathematics education matters in Canada. The Forum has been particularly appreciated on this aspect and a meeting of provincial associations will be organized during the next Forum. A long term goal for maintaining steady links could be for instance the formation of a "Canadian Mathematics Teachers Society". The first step will be the creation of a Web site on the Camel server.

Elementary school teacher education and development

Too many elementary school teachers have little or no background in mathematics and in science. It is necessary to bring the message that preservice students must have math content courses and math methods courses. The CMS will consider creating a task force with guidelines on what a good course should be. One issue is to have more specialists.

The pressure of the curriculum

There is an enormous pressure of the curriculum. The schools have the impression that the mathematics in university control the curriculum. There is no time available in schools for special activities: developing intuition, use of software to develop geometric visualization, introduction to the concept of proof, discussion of modern applications of mathematics, activities to make students love mathematics, etc. CMS will consider playing a leadership role in giving guidelines on what is important in high schools.

The issue of inservice teacher education

This issue is common to all regions of the country. There is a need for serious discussions on inservice teachers, for developing new models of inservice teacher education and for looking at the good practices.

The need for networking good material

A lot of working groups have come with conclusions that there is a need for networking resources and making depositories of good material. There is a need to create a task force to work on this. The task force will need to identify the resources, put together some proposal and do some fund raising for the project, make sure that there is a mechanism to control quality, make sure that the group is sufficiently representative, build a viable structure.

Maintain the momentum of the Forum

The Forum has helped attract the attention on mathematical education and raised enthusiasm in the country. We will work collectively to maintain the momentum: in particular keep contacts with ministries, with provincial associations, etc.

Changing attitudes

This old issue remains a central one in mathematical education. We should unite our energies to change attitudes by all means: show the applications of mathematics, explain its power and some of the problems it can solve, make visible its universality in science and technology, show that it is beautiful and that it can be fun.

Should we have Canadian subcommission for ICMI?

ICMI is the International Commission of Mathematical Instruction. It is a commission of the International Mathematical Union (IMU). This is a long term goal on which we will work in the next years.

First Mathematics Electronic Journal Turns Ten

by Daniel B. Szyld

The Electronic Transactions on Numerical Analysis (ETNA) turns ten years old this year. ETNA was the first mathematics electronic journal, and it is devoted to Numerical Analysis and Scientific Computing. ETNA has been a trail-blazer from the very beginning, a decade ago, showing what was possible to do with the new technology. This set the stage for many independent mathematics electronic journals and for electronic versions of established print journals. To celebrate this milestone, a conference called “Following the Flow of Numerical Analysis” was organized in late May at Kent State University, where ETNA has been housed since its inception in 1993.

This was the first conference organized around ETNA. Ten years is truly a long time in the electronic world, and this prompted the organizers to mark the occasion. The event took place over three days at the end of May, attracting over sixty scientists from all over the United States and several European countries. The fifty half-hour talks ranged from numerical solution of PDEs to numerical linear algebra, with control theory and orthogonal polynomials peppered in between. There were also presentations on aspects of the world of scientific journals and the effect that electronic journals such as ETNA have had in the last decade.

The atmosphere was very friendly and celebratory. The talks were of high quality, with ample discussion after them, as well as during coffee breaks and the communal meals. One participant remarked to me that this type of conference was ”really great” because you have several aspects of numerical analysis and scientific computing together in a relatively small meeting. In particular, the PDE people and linear algebra people were listening to each other’s talks, and exchanging challenges and ideas. The ETNA board must have heard this colleague, since they announced their intention to hold similar meetings every few years. ETNA editors from Madrid and Rome quickly volunteered to organize such a conference. Participants were heard soon after taking bets on where it would be held first.

ETNA, which is rejecting about half of the papers submitted, has published 16 volumes with over 170 articles. From its beginning it has been reviewed in *Mathematical Reviews* and *Zentralblatt für Mathematik.* On its tenth anniversary this year, it started to be covered by the Science Citation Index. While the editorial policy has been to accept only articles of the highest quality, many deans have frowned upon ETNA and other electronic-only journals when tenure or promotion decisions were on the table. Being one of only two hundred journals indexed by the Science Citation Index will go a long way to erase these doubts in administrator’s minds.

Conference participants praised the journal’s capabilities of color publishing and interactive modules. One nice feature mentioned by an author is the list of forward references. The list has pointers to the articles which cite the original contribution. Many told me how pleased they were to have the Transactions, and to be part of its anniversary celebration. Almost everyone said they will go to the next meeting, wherever it is held. What was unanimous was the praise for the organizers, Daniela Calvetti from Case Western University, and Volodymyr Andriyevskyy, Austin Melton, Lothar Reichel, Arden Ruttan, and Richard Varga from Kent State University, for the flawless running of the meeting and wonderful social functions.