

A Forum on: **Mechatronics Education in Canada: Past Experience and Future Directions**¹

May 18th 2001 at University of Waterloo, <http://mecforum.uwaterloo.ca>

Organizers:

Professor Farid Golnaraghi
Chair, CSME Mechatronics & MEMS Division
Department of Mechanical Engineering
University of Waterloo
Waterloo, Ontario N2L 3G1
mfgolnar@uwaterloo.ca

Professor Robert Gorbet
Department of E&CE
rbgorbet@uwaterloo.ca

In the past decade, we have witnessed a technological revolution in the development of both products and processes, from consumer goods to factory automation systems. The pace of this change has been staggering, and is increasing. Virtual prototyping and computer simulation eliminate the need for traditional prototyping and testing, drastically shortening development cycles. In addition, the increasing power and reduced size and cost of microprocessors means they are finding their way into more and more products. The automotive industry, already a massive consumer of microprocessors, is seriously geared towards the implementation of the drive-by-wire concept by 2010. In a drive-by-wire vehicle, operation of components like suspension, steering, engine, and brakes is fully controlled by an on-board computer, processing signals from various sensors and commanding pneumatic, hydraulic and servo actuators.

The term, which has emerged, for this tight integration of sensors, actuators, computers, and mechanical structures is "Mechatronics." Going beyond the team-based systems approach to design, the Mechatronics engineer must be individually competent in multiple cross-disciplinary areas: physical and mathematical modeling, analysis, control design and implementation, and experimentation and hardware implementation. Industrial demand for Mechatronics engineers, who understand computer and mechanical systems as well as their interactions, is high and continues to grow.

Traditionally, because of the diversity in their training, mechanical engineers have been in a unique position of bridging the gap among various engineering areas. However, engineering education has failed to keep pace with the incredible rate of change in industrial practices, and the resulting change in expectations. There is more than ever a need for mechanical engineers to understand analog and digital control systems, sensors and actuators, and computer architecture and interfacing, in addition to the conventional mechanical engineering subjects. Our engineering education system must recognize the balance between traditional mechanical design, engineering and mathematical analysis,

¹ Sponsored by Faculty of Engineering at University of Waterloo and CSME

software, and hardware, that makes up this key skill set. To effectively teach these skills requires a cross-disciplinary approach, which differs by its nature from traditional teaching methods. Its successful implementation depends on a well-planned, collaborative effort within the university engineering faculties.

In response partly to the increased importance of Mechatronics skills, the Canadian Society for Mechanical Engineering has set up the Mechatronics and MEMS Technical Division. A part of its mandate is to promote Mechatronics education among practicing mechanical engineers and in the undergraduate curriculum. The Division's first effort in this regard is to organize a forum on Mechatronics education in Canada.

Over the past five years, universities in Canada have begun to contemplate the teaching of Mechatronics. Some schools currently have Mechatronics courses, options, or programmes in place. The CSME Forum on Mechatronics Education in Canada proposes to bring together, from across the country, experts in the teaching of Mechatronics principles and design. In addition, we have invited one of the pioneers of Mechatronics education in the US to give a keynote presentation. The goal of the Forum is to share some of the growing pains individual programmes have experienced, determine what has worked and what hasn't towards developing a curriculum which is distinctly 'Mechatronics'. In recognition of the very applied nature of Mechatronics, the forum will include representatives from industry, and provide an opportunity for their comment on industry needs and programme/curriculum development.

Program

- 8:30 Registration
- 9:00 Welcoming Remarks by Professor Sujeet Chaudhuri, Dean of Engineering,
University of Waterloo
- 9:15 Professor Kevin Craig, Keynote Speaker, Rensselaer Polytechnic Institute, USA
- 10:00 Break
- 10:15 Professor Mo A. Elbestawi, MacMaster University, Vice President CSME
- 10:45 Professor Ridha Ben Mrad, University of Toronto
- 11:15 Sponsoring Industrial Speaker 1 (TBA)
- 11:45 Lunch (University Club)
- 13:45 Sponsoring Industrial Speaker 2 (TBA)
- 14:15 Professor Patrice Masson, Université de Sherbrooke
- 14:45 Professor Elizabeth Croft, University of British Columbia
- 15:15 Break
- 15:30 Panel discussion Moderator: Professor Jan Huissoon University of Waterloo
Panel: Professors Professors Craig, Elbestawi, Masson and Croft
- 16:30 Closing

REGISTRATION FORM

Forum on: **Mechatronics Education in Canada: Past Experience and Future**

Directions

Friday, May 18th, 2001

William G. Davis Centre, Room 1302

University of Waterloo

Waterloo, Ontario N2L 3G1

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Registration Fee: (Canadian Funds, Includes GST)

Forum:	CSME Members:	\$25.00 (on or before May 1, 2001)
	CSME Members:	\$35.00 (after May 1, 2001)
	Non-members:	\$40.00 (on or before May 1, 2001)
	Non-members:	\$50.00 (after May 1, 2001)
	Students:	Free
Forum + Lunch:	CSME Members:	\$40.00 (on or before May 1, 2001)
	CSME Members:	\$65.00 (after May 1, 2001)
	Non-members:	\$55.00 (on or before May 1, 2001)
	Non-members:	\$80.00 (after May 1, 2001)

Registration Payment

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Please **fax or mail** your registration to:

Mrs. Kathy Roenspiess
Department of Mechanical Engineering
University of Waterloo
Waterloo, Ontario, Canada N2L 3G1
Tel. (519) 888-4567, ext. 2802 - Fax: (519) 888-6197
E-mail: kathy@engmail.uwaterloo.ca