



# 2001 IEEE Canadian Conference on Electrical and Computer Engineering

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## Congrès Canadien IEEE en Génie Électrique et Informatique

May 13 -16, 2001 • Downtown Delta Chelsea  
Toronto, Ontario, Canada

# Final Program

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## Programme Finale

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**CCECE**

**2001**

**CCGÉI**

**DELTA CHELSEA HOTEL**

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**33 GERRARD STREET W.,**

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**TORONTO, ONTARIO.**

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**CANADA**

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**PROGRAM**

TIME	Stevenson	Scott	Wren	Rossetti	Carlyle
	<b>Sunday, May 13, 2001</b>				
13:00 - 17:00	Tutorial 1: MPEG4 for Multimedia Streaming Tutorial 2: How to know what to build before you develop your System		Wren	Rossetti	Carlyle
19:00	Welcome Reception Churchill				
	<b>Monday, May 14, 2001</b>				
08:15 - 09:15	Plenary Session 1 - MPLEN Churchill <b>Adaptive Learning Systems: A key technology for today and ever more</b> Simon Haykin – McMaster University				
09:30 - 11:30	MM1 Motors	MM2 Software Systems	MM3 Computational Intelligence	MM4 Communications Systems I	MM5 Signal Processing
13:15 - 15:15	<b>Poster Session MP - Mountbatten</b>				
15:30 - 17:30	MA1 Computer Engineering II	MA2 Communications II	MA3 Digital Signal Processing II	MA4 Electric Machines	MA5 Electronics / VLSI
18:00	<b>Conference Reception and IEEE Awards Banquet Churchill</b> Reception at 18:00, Banquet at 19:00				

**AT A GLANCE**

<b>TIME</b>	<b>Stevenson</b>	<b>Scott</b>	<b>Wren</b>	<b>Rossetti</b>	<b>Carlyle</b>
<b>Tuesday, May 15, 2001</b>					
08:15 - 09:15	<b>Plenary Session 2 – TPLEN - Churchill</b> <b>Multi Media Systems</b> <b>A. Venetsanopoulos, University of Toronto</b>				
09:30 - 11:30	TM1 Motors II	TM2 Circuits	TM3 Special session Multimedia	TM4 Intelligent Systems I	TM5 Networks I
<b>Student Papers – Awards Luncheon – Churchill</b> <b>Guest Speaker: Dr. D. Barber, Gernum Corporation</b>					
13:15 – 15:15	<b>Poster Session TP - Mountbatten</b>				
15:30 - 17:30	TA1 Power Systems II	TA2 Systems and Devices	TA3 Image and Video Coding	TA4 Intelligent Systems II	TA5 Networks II
<b>Wednesday, May 16, 2001</b>					
08:15 - 09:15	<b>Plenary Session 3 – WPLEN – Churchill</b> <b>Device Technology Convergence</b> <b>Dr. R. Normandin, National research Council</b>				
09:30 - 12:30	WM1 Power Systems III	WM2 VLSI Design	WM3 Image Processing I	WM4 Networks III	WM5 DSP Architectures
13:00 - 15:00	WA1 Applications	WA2 Digital Design	WA3 Image Processing II	WA4 Wireless Communication	WA5 Biomedical Applications

# 1. CCECE 2001 ORGANIZATION

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CCECE 2001 Secretariat  
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## **2. REGISTRATION**

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DELTA CHELSEA HOTEL  
THIRD FLOOR, CHURCHILL COURT

<b>SUNDAY, MAY 13, 2001</b>	17:00 – 20:00
<b>MONDAY, MAY 14, 2000</b>	08:00 – 17:00
<b>TUESDAY, MAY 15, 2000</b>	08:00 – 17:00
<b>WEDNESDAY, MAY 16, 2000</b>	08:00 – 11:00



**TUTORIAL II**

**ROOM: Carlyle**

**SUNDAY, May 13, 2001, 13:00 – 17:00.**

***“How to Know What to Build Before You Develop Your System”***

**Armin Eberlein**

Dipl.-Ing. (FH), MSc, PhD.

Associate Professor, Director of the Software Engineering Program,  
Department of Electrical and Computing Engineering, University of  
Calgary, Alberta, Canada

**Abstract:** This tutorial addresses the early life cycle of system development and its effect on later stages in the life cycle. It will show the crucial importance of requirements engineering to project success. The requirements engineering process will be introduced together with activities involved, such as requirements elicitation, analysis, documentation, validation and management. The tutorial will focus on techniques that can be used to improve each one of these stages. The techniques include stakeholder identification and profiling, interviewing, traceability techniques, reviews, requirements testing, requirements management, requirements change, tools, prototyping, etc. Emphasis will also be placed on how to handle non-functional quality requirements.

**Armin Eberlein**

Armin Eberlein teaches courses in requirements engineering, software engineering, project management, and software reliability and testing. He is also a Co-Director of the Alberta Software Engineering Research Consortium (ASERC). His research focuses on the application of artificial intelligence to requirements engineering, and the development of well-defined software engineering processes. Dr. Eberlein has authored his own development methodology to support all phases of the software development life cycle based on a three-dimensional framework for requirements engineering. Dr. Eberlein has previously been employed by Siemens and has consulted for several companies in the UK and Canada.

## 4. PLENARY SESSIONS

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There will be three plenary sessions during the conference. **One** each on Monday, Tuesday, and Wednesday.

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### **Plenary Session 1 - MPLEN      ROOM: Churchill**

Monday, May 14, 08:15 - 09:15

*Adaptive and Learning Systems: A key technology for today and ever more,*

**S. Haykin,**

McMaster University.

**Abstract:** Many of the physical phenomena encountered in practice exhibit the following stochastic characteristic:

- Real-life data are non-stationary in that their statistics vary with time, and the
- statistics may be unknown.

Adaptive and learning algorithms provide the only tool for dealing with such phenomena.

Recent developments in the study of adaptive and learning systems, which have established themselves as an indispensable tool in communications, signal processing, and control, will be addressed in this lecture. Indeed, their importance will grow in years to come as we continually endeavor to improve the many facets of system performance.

## **Simon Haykin**

Simon Haykin, is a Professor in the Department of Electrical and Computer Engineering at McMaster University. He is a fellow of the IEEE, a fellow of the Royal Society of Canada, and a recipient of the honorary degree of Doctor of Technical Sciences from ETH, Zurich, Switzerland. He is the founding Technical Editor of the Wiley series of books on Adaptive and Learning Systems. His research interests include space-time communications for wireless systems, nonlinear dynamical systems for signal processing, and intelligent hearing instruments.

**Plenary Session 2 - TPLEN      ROOM: Churchill**  
Tuesday, May 15, 08:15 - 09:15

**A.N. Venetsanopoulos, University of Toronto**

***Title: Multimedia Signal Processing and Applications***

**Abstract:**

An overview of the research activities in the area of multimedia signal processing will be presented with particular emphasis on multimedia applications and services which have emerged in numerous areas including entertainment, e-commerce, medicine and education.

The address will also explore the multimedia signal processing framework, the societal, economic and technical impact of multimedia systems and technologies, and their application to image and video retrieval.

**See biography next page**

## Anastasios N. Venetsanopoulos

Anastasios N. Venetsanopoulos received the Diploma in Engineering degree from the National Technical University of Athens (NTU), Greece, in 1965, and the M.S., M.Phil., and Ph.D. degrees in Electrical Engineering from Yale University in 1966, 1968 and 1969 respectively. He joined the Department of Electrical and Computer Engineering of the University of Toronto in September 1968 as a Lecturer and he was promoted to Assistant Professor in 1970, Associate Professor in 1973, and Professor in 1981.

Since July 1997, he has been Associate Chair: Graduate Studies of the Department of Electrical and Computer Engineering and was Acting Chair during the spring term of 1998-99. In 1999 a Chair in Multimedia was established in the ECE Department, made possible by a donation of 1.25M\$ from Bell Canada, matched by an equal amount of university funds. Prof. A.N. Venetsanopoulos assumed the position as Inaugural Chairholder in July 1999 and two additional Assistant Professor positions became available in the same area.

Prof. A.N. Venetsanopoulos has served as Chair of the Communications Group and Associate Chair of the Department of Electrical Engineering and Associate Chair: Graduate Studies for the Department of Electrical and Computer Engineering. He was on research leave at Imperial College of Science and Technology, the National Technical University of Athens, the Swiss Federal Institute of Technology, the University of Florence and the Federal University of Rio de Janeiro, and has also served as Adjunct Professor at Concordia University. He has served as lecturer in 138 short courses to industry and continuing education programs and as Consultant to numerous organizations; he is a contributor to twenty nine (29) books, a co-author of Nonlinear Filters in Image Processing: Principles Applications (ISBN-0-7923-9049-0), and Artificial Neural Networks: Learning Algorithms, Performance Evaluation and Applications (ISBN-0-7923-9297-3), Fuzzy Reasoning in Information Decision and Control systems (ISBN-0-7293-2643-1) and Color Image Processing and Applications (ISBN-3-540-66953-1), and has published over 680 papers in refereed journals and conference proceedings on digital signal and image processing and digital communications.

Prof. Venetsanopoulos has served as Chair on numerous boards, councils and technical conference committees of the Institute of Electrical and Electronic Engineers (IEEE), such as the Toronto Section (1977-1979) and the IEEE Central Canada Council (1980-1982); he was President of the Canadian Society for Electrical Engineering and Vice President of the Engineering Institute of Canada (EIC) (1983-1986). He was a Guest Editor or Associate Editor for several IEEE journals and the Editor of the Canadian Electrical Engineering Journal (1981-1983). He is a member of the IEEE Communications, Circuits and Systems, Computer, and Signal Processing Societies of IEEE, as well as a member of Sigma Xi, the Technical Chamber of Greece, the European Association of Signal Processing, the Association of Professional Engineers of Ontario (APEO) and Greece.

He was elected as a Fellow of the IEEE "for contributions to digital signal and image processing", he is also a Fellow of the EIC, and was awarded an Honorary Doctorate from the National Technical University of Athens, in October 1994. In October 1996 he was awarded the "Excellence in Innovation Award" of the Information Technology Research Centre of Ontario and Royal Bank of Canada, "for innovative work in color image processing and its industrial applications", in November 2000 he became Recipient of the "Millennium Medal of IEEE", in April 2001 he became a Fellow of the Canadian Academy of Engineering. Between July 2001 and June 2006 he will be the Dean of Faculty of Applied Science and Engineering of the University of Toronto.

**Plenary Session 3 – WPLEN      ROOM: Churchill**  
Wednesday, May 16, 08:15 - 09:15

***Device Technology Convergence and the All Optical Cloud in Photonics***

**R. Normandin,**

National Research Council,  
Institute for Microstructural Sciences

**Abstract:** The emphasis, up to now, for WDM (Wavelength Division Multiplexing) applications in fiber telecommunication has been to augment the effective bandwidth by providing as many parallel channels as there were wavelengths. However, the advent of optical networks with exponential traffic growth of mixed analog and digital nature has increased interest in wavelength reuse, routing and switching in an all-optical domain. This is proving to be an interesting challenge from the point of view of the new needed optoelectronic materials, novel devices, as well as the architectural implications for the network. However, many of the required functional devices such as tuneable filters, switched amplifiers, routers, logic gates, wavelength agile lasers and low power displays are not readily available at this time. Signal regeneration, translation and display will require new device concepts to be explored and tested. All-optical or optically transparent networks are particularly challenging as few demonstrations have been done to date. Our recent efforts in novel devices and integration techniques will be described for these applications.

**See biography on next page**

## **R. Normandin**

Richard Normandin is Director General of the Institute for Microstructural Sciences with the National Research Council of Canada.

He received his B.Sc., in solid state physics, from the Université de Montréal. Subsequently he obtained his M.Sc. degree for work involving optical high-speed signal processing by surface acoustic wave interactions and his Ph.D. in the field of nonlinear integrated optics in dielectrics and semiconductors.

Dr. Normandin then joined the Division of Physics at NRC following a postdoctoral stay in Applied Physics and Engineering at Stanford University with the support of the National Sciences and Engineering Research Council and the Rutherford Memorial Scholarship of the Royal Society of Canada for work on X-ray lasers.

His current research interests are in the area of semiconductor nonlinear optoelectronic signal processing for fibre optic systems, both in all-optical and electro-optical regime, in an integrated monolithic context. In addition, several projects dealing with novel applied semiconductor geometries are being investigated for integrated electronic and optical systems. The principal semiconductors under investigation are the GaAs/AlGaAs, InGaAsP/InP systems and SiGe. Experimental and theoretical aspects are included. He is the author or co-author of approximately 175 papers and refereed conference papers in those fields, including over 25 patents awarded or pending.

Dr. Normandin is also an active member of the Optical Society of America and was elected “Fellow” for distinguished service and contributions to optoelectronics, nonlinear guided optics and its technological development. He also received the “Commemorative Medal for the 125<sup>th</sup> Anniversary of Confederation” from the Governor General of Canada in recognition of significant contribution to compatriots, community and to Canada. In 2000, the Canadian Association of Physicists (CAP) and the National Optics Institute (INO) awarded Medal for Outstanding Achievement in Applied Photonics to Dr. Normandin for his outstanding contributions and he also received the “Outstanding Achievement Award” from the National Research Council.

## **5. EXHIBITS – MOUNTBATTEN A**

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**MONDAY**      **May 14, 10:00 – 18:00**

**TUESDAY**    **May 15, 08:00 – 18:00**

**WEDNESDAY** **May 16, 08:00 – 15:00**

Exhibitor List:

- McGraw-Hill Ryerson
- IEEE Membership Development
- IEEE GOLD Program
- Niagara College

## **6. RECEPTIONS AND BANQUETS**

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### **Conference Opening Reception**

**SUNDAY, May 13, 2001 19:00 – 21:00**

**Churchill Room**

**All delegates** are welcomed to Toronto and CCECE 2001 by IEEE Canada and the Conference Organizing Committee. This is your opportunity to “network” with colleagues, renew old friendships, and forge new ones over light refreshments and cocktails.

**Student Paper Award**

**ROOM: Churchill**

TUESDAY, May 15, 2001, 11:45 - 13:15

**OPEN TO ALL DELEGATES**

There will be a buffet-style lunch on Tuesday

The winner of the  
**Student Paper Contest**  
will be announced.

**Guest speaker: Doug Barber**

B.Sc., M.Sc., DIC., Ph.D., D.Eng.(Hon), D.Sc.(Hon)  
P.Eng., FCAE

**Doug Barber**

H. Douglas Barber was born in Saskatchewan into a farming family. He obtained his B.Sc. degree with Great Distinction winning the Governor General's Gold Medal and his M.Sc. degree in Electrical Engineering at the University of Saskatchewan in 1959 and 1960 respectively. As an Athlone Fellow and a NATO Scholar, he received his DIC and Ph.D. from Imperial College, University of London in 1965.

From 1965 to 1973 he worked in the Solid State Devices Department of Canadian Westinghouse in Hamilton, Ontario, Canada, on the basic properties of silicon, the characterization of silicon and GaAs devices, device fabrication technology and integrated circuit design.

In 1973, he was one of the founders of Linear Technology Inc., a company designing, manufacturing and marketing bipolar monolithic integrated circuits. In December 1987, the company was renamed Gennum Corporation. Dr. Barber was the President and Chief Executive Officer of Gennum Corporation until April 20, 2000.

## **IEEE Awards Reception and Banquet**

**MONDAY, May 14, 2001 Time 18:00 –Churchill**

**TICKET REQUIRED** (included with full registration)

**Reception** with Cash Bar Churchill Court

**OPEN TO ALL DELEGATES**

### **IEEE Canada Awards Banquet**

The Conference Awards Banquet will honour recipients of IEEE Canada awards. It begins with a cocktail reception at 18:00 and dinner at 19:00.

Registrations include a ticket to the Awards Banquet, however others (Students, Life Members, and Day Registrants) can purchase a ticket at the Registration booth for \$60. The pre-banquet reception is open to all delegates (cash bar).

### **Speaker – Wallace S. Read:**

#### **– “*Engineers Don’t Grow on Trees*”**

The 21st century will see a vastly changed environment for the engineer. As responsible players in the struggle to ensure the survival and well being of this planet's population, engineers will be asked to play greater leadership roles than anytime in the past. Are the universities who train us, the industries that employ us and the governments who regulate us up to the task? Are we, ourselves, ready for the challenge?

The author will look at some of the challenges facing the professional engineer as we turn the corner into the 21st century. He will describe the changing environment in which the new wave of graduating engineers will find themselves, pointing out the necessity for all of us in academia, industry, governments and professional societies to accommodate changes in the way we train, use and protect this valuable human resource.

**See biography next page**

## **Wallace S. Read**

Wallace S. Read was born in Newfoundland, Canada and received his Bachelor of Engineering from Nova Scotia Technical College in 1951 before entering the pulp and paper and hydro-electric power industries in his native province. Between 1964 and 1984, he held senior positions with Newfoundland and Labrador Hydro including President of Churchill Falls (Labrador) Corporation, and President and Chief Executive Officer of the Lower Churchill Development Corporation.

Upon retirement from CEA in 1995, Dr. Read was appointed to the Board of Commissioners of Public Utilities in Newfoundland and Labrador for a three year term. From 1998 to 2000 he was a member of the Board of Directors of SaskPower, the Crown Corporation responsible for the generation, transmission and distribution of electricity in the Province of Saskatchewan. Currently he is President of REMAS Inc., which provides consulting services to electric power utilities and governments.

Dr. Read also chaired the Board of Directors of the Canadian Center for Marine Communications from 1990 to 2000 and was elected 1996 President of the Institute of Electrical and Electronics Engineers (IEEE), the world's largest engineering professional society with 365,000 members in 150 countries.

His professional affiliations include being a Life Member of the Association of Professional Engineers and Geoscientists of Newfoundland, a Fellow of the Engineering Institute of Canada and a Life Fellow of the IEEE.

Over the years, he has received numerous awards including IEEE's General A.G.L. McNaughton Gold Medal, the Engineering Institute of Canada's Julian C. Smith Medal, the CEA's Distinguished Service Award, the Canadian Standards Association's John Jenkins Award, the IEEE Power Engineering Society's Power Life Award and the IEEE Centennial and Millennium Medals.

In addition to these honours, Doctor of Engineering Degrees (Honoris Causa) were conferred upon him by the Technical University of Nova Scotia in 1992 and by Memorial University of Newfoundland in 1996.

## 7. Information

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**High-speed Internet Access**, courtesy of Bell Sympatico and Bell Nexxia will be provided for the convenience of all delegates in the Exhibit Area (Mountbatten 'A') on Monday, Tuesday and Wednesday. Note that internet access will not be provided in the presentation rooms.

## 8. Breakfast and Coffee Breaks

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**Continental Breakfast** is served to all authors and fully registered participants in the Churchill Room from 07:00 - 08:15. Session Chairs will have a chance to meet with Authors at the tables provided.

**Coffee (Networking) breaks** are scheduled for 15 minutes at 9:15 and 15:15. All breaks are held in the Mountbatten Room.

**Note that the Wednesday Afternoon Sessions begin at 13:00 (1 hour 15 minute lunch break)**

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