

SPRING 2003

DEPARTMENT OF CHEMICAL ENGINEERING AND APPLIED CHEMISTRY



FACULTY OF APPLIED SCIENCE AND ENGINEERING UNIVERSITY OF TORONTO

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**“It was my luck to have a few
good teachers in my youth, men
and women who came into my
dark head and lit a match”**

Life of Pi by Yann Martel
2002 Man Booker Prize Winner

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and Applied Chemistry
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Message from the Chair

"Interfaces" is a new venture which seeks to engage the wider Chemical Engineering Department community: alumni, students, faculty, staff, and friends. "Interfaces" celebrates all the people whose vitality makes our Department a success. Welcome to Volume 1, Number 1.

In 2002, our emphasis was on building teams. The whole team was out in force at the Annual Dinner, with many alumni and former staff in attendance. You are invited to the next Annual Dinner, to be held March 28, 2003. Please join us.

Last May 27, we organized a highly successful (first Annual) Spring Cleaning Day. Lab and office teams cleared out a formidable pile of "precious objects" that we had been carefully saving all these years. The Wallberg Building was lightened by several tonnes, and some sensed it rise perceptibly; certainly, spirits rose. From February to September, teams of professors laboured to meet the challenges of the future, creating the "Strategic Plan 2002-2006" and forging a shared vision: "We will be among the top ten chemical engineering departments in the world, educating leaders of tomorrow". To act on our commitment to nurture leadership in our students, we initiated a Summer Leadership Program, in which nineteen students spent sixteen Friday afternoons engaged in special programs, including team building. Pursuing another strategic direction, on October 17, we held the first meeting of our new Board of Advisors, an outstanding team of community leaders.

"Interfaces" is also about removing boundaries between university and industry, between students and alumni, and between the Wallberg communities of today and yesterday. "Interfaces" brings you news and an invitation to share your good stories. We welcome your participation.

All the best,
Doug Reeve

Frank Dottori Professor of Pulp and Paper Engineering
Professor and Chair, Department of Chemical Engineering
and Applied Chemistry

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P.S. Don't forget to mark your calendar for the Annual Dinner on March 28, 2003 and to send in the enclosed RSVP letter.

Board of Advisors



Board of Advisors for the Department: Back row (l to r): Claire Kennedy, John Voss, and Sonia De Buglio (Director of External Relations); Middle row (l to r): Ted Cross, David Colcleugh, Michael May, and Larry Seeley; Front row (l to r): Robin Korthals, Rocky Simmons, Nadine Riley, and Doug Reeve. Not present: Michael Charles, Frank Dottori, Raminder Gill, Paul Godfrey, and Bob Steele.

The first meeting of the Department's dynamic new Board of Advisors was held on October 17, 2002. The members engaged faculty and students to gather information and encourage discussion of pertinent issues. The student response was highly enthusiastic:

"I just wanted to thank you for the invitation to mingle with the Board of Directors. It was a very enjoyable experience and I appreciate the opportunity to meet such successful Chemical Engineers."

Sonya van Vliet, Third Year

"They really impressed me. I have a renewed enthusiasm for chemical engineering, and for that I thank you."

Mark Pingal, Second Year

"It was very inspiring to be among such people!"

Katie Higgins, Second Year

The purpose of the Board is to provide guidance and counsel to the Department's leadership, to act as ambassadors, to undertake mentoring for students and faculty, and to assist in reaching out to our alumni.

We are fortunate to have so many successful and committed alumni and are especially grateful to those who have agreed to serve on the Board. (*See page 12*)

We have a vision. We have a plan. And now we have a campaign.

Our Mission:

- We will be leaders in the development of modern chemical engineering, a central discipline integrating chemistry, biology, mathematics and engineering.
- Our students will graduate with a high level of scholarship, strong professional capability, and sophisticated skills in learning, planning, problem solving, communication and leadership.
- Our research will be recognized as excellent, innovative, multidisciplinary, and of significant social and economic benefit.
- Our Department will be renowned for its ethical standards and its friendly, supportive and spirited atmosphere.

We are campaigning to raise funds for student scholarships, new teaching laboratories, special professorships, and world-class facilities and programs. It's all about students realizing their dreams and becoming leaders of tomorrow.

We need your help. For more information about getting involved, please contact Sonia De Buglio,
Director of External Relations
Telephone: 416 978 8770 Fax: 416 978 8605
email: campaign@chem-eng.utoronto.ca

The Department has identified **information engineering** as a high priority for the future. Building on the expertise of present faculty in information engineering, computational methods, and applied mathematics, we have formed a key research cluster, "Informatics". Chemical Engineering Professor Joseph C. Paradi, leader of the Informatics Cluster and Director of the Centre for Management of Technology and Entrepreneurship, has won support for an endowed Chair in Information Engineering. The Chair's sponsors have committed \$2 million.



2003 Formula SAE Racing Team

The University of Toronto **Formula SAE** team challenges students to exercise their knowledge, creativity and skill by designing and building a single-seater race car for annual international competitions held in Pontiac, Michigan and Birmingham, England. The project requires technical knowledge, business acumen, and good communication within the team and with industry. Our students have a superb track record, last year placing second overall out of a field of 30 teams in the British competition.

For 2003, two second-year Chemical Engineering students, Nadia Boin and Jennifer Aiello, are Business Manager and Public Relations Director, respectively. They are responsible for managing public events and preparing cost reports, as well as fundraising and networking with sponsors.

The Formula SAE team welcomes the Department of Chemical Engineering and Applied Chemistry and the Faculty of Applied Science and Engineering as new sponsors. Thanks to their financial and technical support, the team is well on the way to building another winning car.

For more information about this exciting student project, please visit the team's web site:

www.fsae.utoronto.ca

The Department is moving through a significant review of the **undergraduate program** to continue to meet the needs of graduating chemical engineering students. We have begun with a revision of the first-year curriculum and the introduction of two new first-year courses.

Concepts in Chemical Engineering

The motivation for this course is to ensure that first-year students are exposed to the core chemical engineering competencies and the diversity of the discipline. The Department has been organized into research clusters, and every year, four of them will be responsible for the course, each presenting a research overview based on a "case study".

Engineering Strategies and Practice:

A New First-Year Course

Engineering Strategies and Practice (ESP) is an innovative Faculty-wide course designed to foster excitement for engineering through projects that combine creativity and logical methodology and that explore the role of engineering in society. Students will be introduced to professional communication skills, team work, and the social impact of technology. In ESP I, short hands-on projects give students a chance to grapple with the challenges of engineering design. In the second half of the term, students will participate in a technology related topical seminar. In ESP II, students will work in teams on a design project to develop a viable solution that meets a client's needs.

In 2003/04, a pilot program will be run with one hundred students drawn from all programs in the Faculty, except Engineering Science.

Reaching New Heights

In June 2002, partially funded by the Department of Chemical Engineering and the Birmingham Medical Research Expeditionary Society, a team of five researchers, including **David Preiss**, Chem 0T0, set out for the Bolivian Andes. Under the supervision of Dr. Joseph Fisher of the Toronto General Hospital, the team had designed a breathing device that increases the efficiency of oxygen delivery at high altitudes. The objective of the expedition was to field test a prototype.

The challenges that awaited were severe, including water shortages, having to mix calibration gases at -15°C , a snowstorm that left backpacks soaked, and most alarming, a colleague who developed high altitude sickness at an elevation of 4750m. To ensure that the gas cylinders would last the night, the team was forced to treat him with the new oxygen conserving device. It was equal to the task: he was brought down to safety in the morning.

The expedition led to many exciting opportunities, among them a contract the team is currently negotiating with the US Marine Corps to mass-produce the new device.

Phillip Tan, PhD 2002, won the Governor General's Gold Medal award upon graduation in recognition of his work on an aerosol Laser Ablation Mass Spectrometer (LAMs), the first of its kind in Canada and one of only a handful around the world. The analysis, which instantly assesses individual particles of air pollution, takes place in real time, and the results are linked to a Web site.

Tan is now working in Maryland as an Instrumentation R&D Engineer for MassTech Inc., a small start-up company which is a subsidiary of Science & Engineering Services, Inc. (SESI). Phillip conducts experiments on MassTech's newly developed commercial MALDI (Matrix-Assisted Laser Desorption Ionization) mass spectrometry source, targeting the rapidly expanding proteomics field which has evolved from the Human Genome Project. He also works for SESI on the design of novel aerosol systems for bioaerosol detection and identification.

The latter project, part of a multi-year contract with the US Army's Edgewood Chemical Biological Center, involves designing an automated method for identifying biowarfare agents.

Tan, reflecting on the breadth of his graduate training, says: "Ultimately, what I've noticed is that although my expertise from U of T was in aerosol analysis, I'm certainly capable of learning and doing a lot more."

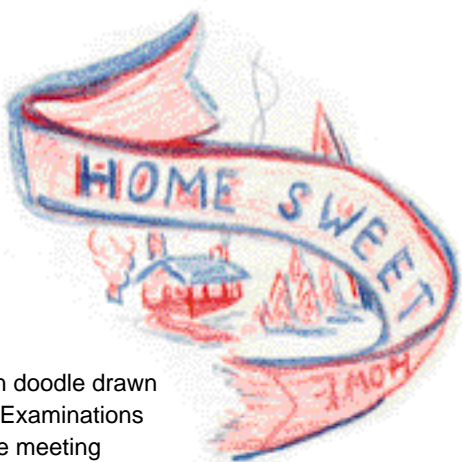


David Preiss (R) Chem 0T0 on his expedition to the Bolivian Andes.



Professors Bill Graydon and Bill Burgess

“I believe nobody teaches anybody anything. All you do is provoke people to learn, and humour is the best way.”



A Graydon doodle drawn at a 1967 Examinations Committee meeting

The “two Bills”, Bill Graydon and Bill Burgess, first met in 1954 in the basement of Wallberg. They felt an instant affinity. Burgess still fondly recalls the dehydrated orange on Graydon’s desk, the subject of an experiment about water evaporation.

When asked to describe a memorable day, each Bill recounted a similar incident. Graydon came to a lecture in which all the students sported white cotton batting on their chins in imitation of his beard. Burgess, who routinely wore a red cardigan and bow tie, walked into class and found all his students similarly attired. Both Bills were touched by what they regarded as an affectionate gesture.

Discussing his love of teaching, Prof. Burgess said: “There’s nothing so wonderful as when the light bulb goes on....as I look out and see all the students, I see myself. The wonderful feeling when you finally understand something, and you want to share your insight with others to help them understand too.” Graydon, whose father was the manager of Shea’s Theatre on Bay Street where Red Skelton began his career, says that students remember him for his humour: “When they’re laughing, they trust you.” He summed up with the following remark: “I believe nobody teaches anybody anything. All you do is provoke people to learn, and humour is the best way”.

Prof. Graydon, who still owns the dehydrated orange, retired in 1984; Prof. Burgess retired in 1989 but continues to teach chemistry to Engineering Science students.

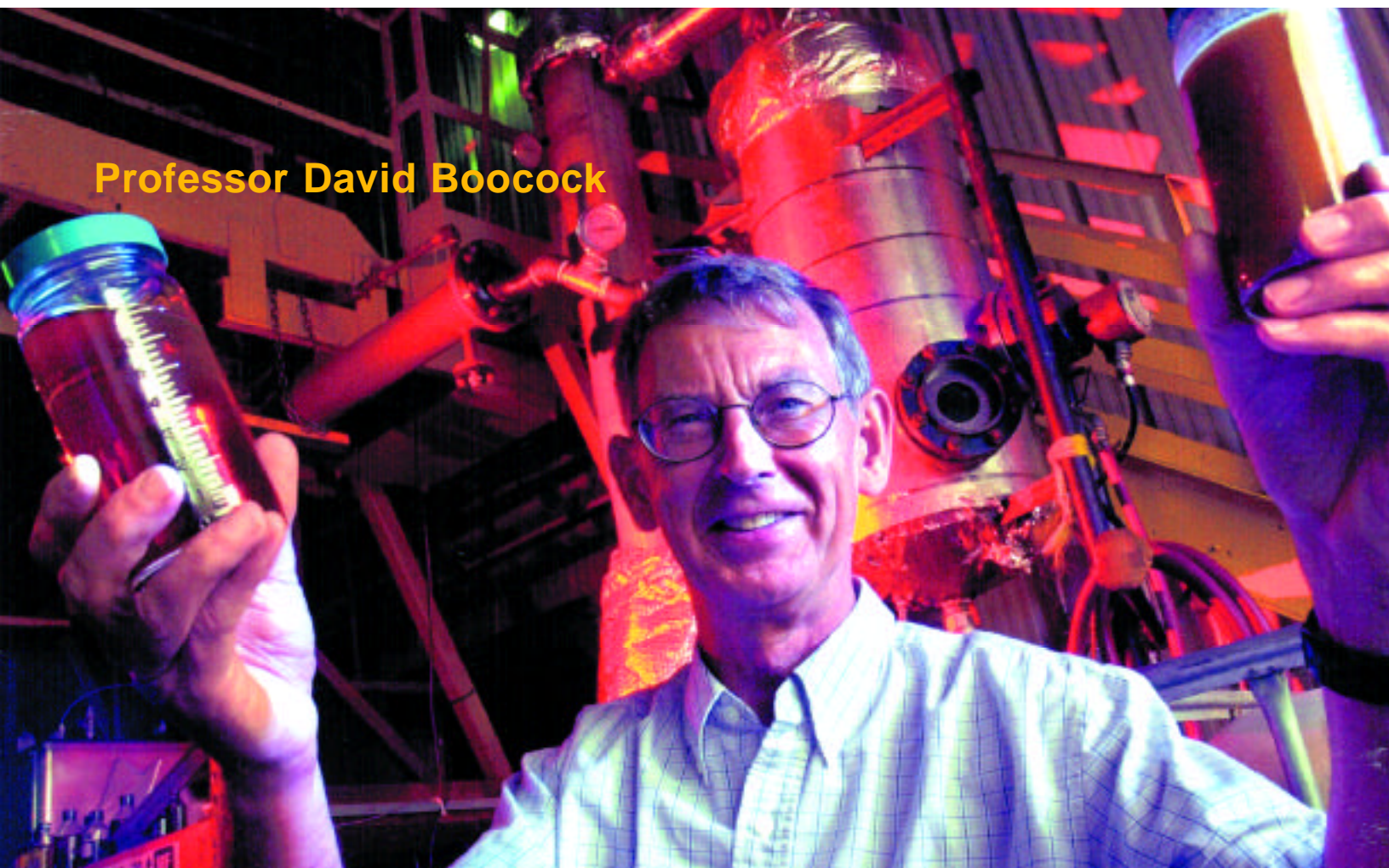
Almost nine years ago, Professor **David Boocock**, former Chair of the Department, discovered a process that eliminates one of the chemical steps needed to create biodiesel from soybean oil and waste animal fat. The process, which takes about 40 minutes per batch, is expected to cut production costs considerably.

The University of Toronto's Innovation Foundation (UTIF), which brings together professors and entrepreneurs, helped to transform Dr. Boocock's idea into a business venture. Monteco Holdings, together with Tim Haig, an engineer with substantial experience in environmental projects, set up Biox Corp. in a joint venture with UTIF. The company

currently operates on a pilot scale but expects to become fully operational early in 2003, producing 60 million litres of biodiesel annually. Biox won the Canadian AgriFood Award of Excellence for innovation, presented on November 11, 2002 at the Awards of Excellence ceremony at the Royal Agricultural Winter Fair.

This past summer, Toronto Hydro's fleet of trucks was powered by biodiesel imported from the United States, and more than 100 Montreal buses ran on a diesel mixture made from waste animal fat and old restaurant grease. Significant reductions in harmful exhaust emissions were reported.

Professor David Boocock



Faculty News

Each year, the executive-search firm The Caldwell Partners International recognizes outstanding achievement with the Canada's Top 40 Under 40 award. In 2002, one of the winners was the dynamic **Molly Shoichet**, Associate Professor of Chemical Engineering and Applied Chemistry. Shoichet received a similar honour from the Canadian Institute for Advanced Research (CIAR), earning a Young Explorers' Award, granted to leading Canadian scientists under the age of 40.

Professor Shoichet's research interests include the regeneration of damaged bone and nerve tissues. She has developed techniques for producing microscopic tubes that can be inserted into an injured spinal column to provide a scaffolding for the regrowth of nerve tissue. Although much work remains before clinical applications can be attempted, the initial results were sufficiently promising that, in 2001, Professor Shoichet was awarded a Canada Research Chair in Tissue Engineering. Last year, her lab of fifteen researchers attracted grants worth \$5.3 million. She has also started spin-off companies, matRegen and BoneTec Corp., with the goal of developing practical technologies based on her research.

In October 2002, **Masahiro Kawaji** was awarded the CSCChE Jules Stachiewicz Medal which recognizes contributions in the field of heat transfer, including design, research, manufacturing and teaching. He graduated from Engineering Science (chemical option) in 1978 and received his PhD from the University of California, Berkeley, in 1984.

In 1986, he was made an Assistant Professor in the Department. He was promoted to full Professor in 1993 and served as an Associate Chair from 1995-97. Kawaji conducts both fundamental and applied research in the field of heat transfer and multi-phase flow, addressing various problems in the chemical, nuclear, and process industries.

Professor **Michael Charles** officially retired on June 30, 2002 but will continue scholarly work, focussing on climate change, the Kyoto Protocol, and sustainable energy.

Beginning his career in 1964 as Assistant Professor, he has served the University long and exceptionally well, as Chair of the Department for ten years, as Vice Dean of the Faculty for seven, and as Dean of the Faculty for eight.

His exceptional service has been recognized by the endowment of a chair, the "Michael E. Charles Chair in Chemical Engineering", which he is the first to hold. The "Michael E. Charles Council Chamber" has been named in his honour.

Frank Dottori, a native of Timmins, began his career at the Canadian International Paper Company's Kipawa Mill in Temiscaming.

In 1973, after it was announced that the mill would be closed, he formed a new company, Tembec, creating a partnership with the workers to purchase the plant. Tembec's operations support local communities and are environmentally responsible. In 2001, Tembec became the first forestry company to have an independent environmental group monitor its practices.

In recognition of his leadership in the forest industry and his impact on local communities and the economy, Frank Dottori was inducted into the Order of Canada in 1989 and received the Highest Achievement Award from l'Ordre des ingénieurs du Québec in 1999.

In 2001, Tembec donated \$1 million, which was matched by the University, to establish the Frank A. Dottori Chair in Pulp and Paper Engineering. The first holder of this Chair is **Doug Reeve**, who is also Chair of the Department and a U of T graduate, MSc 1969 and PhD 1971.

On November 15, 2002, at the Professional Engineers Ontario gala ceremony, Dottori was awarded the Engineering Medal for Entrepreneurship, and Reeve was awarded the Engineering Medal for Research and Development.

Phillip J. (Rocky) Simmons, was the October 2002 winner of the CSE Award in Industrial Practice, which recognizes a distinguished contribution in the practical application of chemical engineering or industrial chemistry. Rocky is a U of T Chemical Engineering graduate and the President and CEO of Eco-Tec Limited, a Canadian company supplying water treatment and chemical recovery systems to the international industrial sector. In his 32 years with Eco-Tec, Simmons has been actively involved in innovation, engineering, manufacturing, sales, and marketing around the world. A member of the Chemical Engineering Board of Advisors, he continues to be active in advising various institutions of higher learning.

Clarence Osborne, who recently turned 100, could not be present at his 1933 graduation because he was serving as a wireless operator in Sault Ste. Marie. He finally attended convocation for his BSc in Chemical Engineering sixty-nine years after completing the requirements: "It took me five years to graduate. It should have taken me four, but one year I could not attend because I didn't have any money ... I didn't have any free time. I had to study and work to pay for my tuition. I was hired to chauffeur a lady around Toronto to pay for my lunch money. I cooked my pork and beans on a tin plate over a Bunsen burner in my rented room near the University. After 69 years I have the honour of receiving my Bachelor of Applied Science in person."



Doug Reeve and Frank Dottori receiving medals at the PEO awards night on November 15th, 2002



Bill Troost, Chem 6T7

Bill Troost, Chem 6T7, is the President of Peel Plastic Products Limited, a successful producer of plastic bags and cellophane products. The company, established by Troost in 1978 and located in Brampton, operates at the leading edge of printing and manufacturing technologies. Peel Plastic Products has over 170 employees, with sales topping \$60 million annually in Canada and the U.S. Bill recently made a generous donation to the Department to help advance our goal of ranking among the top ten chemical engineering departments in the world. We take great pride in the entrepreneurial spirit and accomplishments of Bill and many of our other alumni.

Ronald Brenneman, BAsC 6T8, was recently named to the Engineering Alumni Hall of Distinction. After graduating from the Department in 1968, he went to work for Imperial Oil, eventually becoming President. After a stint with the parent company Exxon, during which he turned around Esso Benelux in the Netherlands, their largest foreign subsidiary, he became CEO of Petro Canada.

A recipient of many awards, Brenneman exemplifies the interface between engineering and business. His deep commitment to Canada and its future underlies his creative approach to management in an era of rapid technological advances.



Alex Dvornyak



Joan Chen

Alex Dvornyak obtained his BSc in biology and chemistry from Kiev State University, Ukraine, while working part-time in IT support. In 1998, he moved to Canada, where he earned an honours diploma in computer programming from Humber College. Prior to joining the Department in July 2002 as its Information Technologist, Alex worked in web development and IT support, specializing in engineering and graphics.

Joan Chen, a graduate of St. Michael's College with an honours BA in sociology and environmental studies, comes to Chemical Engineering from Inria HP CIBC, where she was a system administrator. She had previously worked for the Admissions and Awards Department at U of T. She joined the Department in September 2002 as Administrative Graduate Assistant, providing support to the Administrative Assistant in the Graduate Office.

† **Henry Joseph Ostrowski**, member of the Class of 3T5, which is renowned for its Skule spirit and camaraderie, passed away peacefully on November 5, 2002. During his long and distinguished career as a chemical engineer, he occupied various technical and engineering positions in the pulp and paper industry. He was the holder of three Canadian patents and the author of twenty-one papers, published in both Canadian and American journals. In 1998, he was awarded the Engineering Excellence Medal by Professional Engineers Ontario for his significant contributions to the pulp and paper industry.

Upcoming Events

2002-2003 Distinguished Lecturer Series

All of the seminars will be held at 12:30 pm in room 116 of the Wallberg Building, 200 College Street, Toronto, Ontario

Jan. 15 James Tiedje, Michigan State University, USA: "Environmental Genomics"

Jan. 29 Michael Charles, University of Toronto, Canada: "The Carbon Cycle, Kyoto and Canada's Energy Future"

Feb. 12 Tom McKone, University of California, Berkeley, USA: "The Future of Multimedia Fate Models: Complexity and Credibility vs. Reliability and Transparency"

Feb. 26 Levente Diosady, University of Toronto, Canada: "The Role of Chemical Engineering in Eliminating Third World Nutrition Deficiency Diseases"

Mar. 12 Per Claesson, YKI, Stockholm, Sweden: "Interactions between Cellulose Surfaces"

Mar. 19 David Briggs, University of Nottingham, England: "Time-of-Flight Secondary Ion Mass Spectrometry (ToF-SIMS): An Increasingly Versatile Tool in Surface Chemistry Research"

Apr. 9 Clark Colton, Massachusetts Institute of Technology, USA: "An Engineer Looks at Transplantation of Islets of Langerhans for Diabetes"

For further information, contact the Chair's office at 416-978-3069 or chair@chem-eng.utoronto.ca

This lecture series is supported by the friends of the Department.

Mark your calendars for the 18th Annual Chemical Engineering Dinner on Friday, March 28th, 2003.

Reception 6:30-7:30pm
East Common Room, Hart House

Dinner: 7:30pm Great Hall, Hart House

Post Dinner Reception: 9:30pm
East Common Room, Hart House

Please mail/fax the enclosed reply postcard to RSVP for the dinner.

Board of Advisors

Name	Degrees	Affiliation
Michael Charles	BSc, 1957 MSc, 1959 PhD, 1963	Michael E. Charles Chair in Chemical Engineering, Dean Emeritus, Faculty of Applied Science and Engineering, University of Toronto
David Colcleugh	BASc*, 1959 MASc*, 1960 PhD*, 1962	Chairman, and former CEO and President, DuPont Canada
Ted Cross	BASc*, 1957	E.B. Cross & Company, Intellectual Property Management and Licensing
Frank Dottori	BASc*, 1963	President, Tembec Inc.
Raminder Gill, MPP	BASc*, 1974 MEng*, 1978	Member of Provincial Parliament, Parliamentary Asst. to Premier and Minister of Intergovernmental Affairs
Paul Godfrey	BASc*, 1962	President and CEO, Toronto Blue Jays Baseball Club
Claire Kennedy	BASc*, 1989 LLB, 1994	Partner, Davies Ward Phillips & Vineberg LLP
Robert W. Korthals	BASc*, 1955 MBA, 1961	Former President 1981-1995, Toronto Dominion Bank
Michael May	BASc*, 1991 PhD*, 1998	President, Rimon Therapeutics Ltd.
Nadine Riley	BASc*, 1983	President, Cyradis Technology Group Inc.
Larry Seeley	BASc*, 1966 MASc*, 1968 PhD*, 1972	President and CEO, Lakefield Research Ltd.
Rocky Simmons	BASc*, 1964 MASc*, 1965 PhD*, 1968	President and CEO, Eco-Tec Inc.
Bob Steele	BSc, 1969 MASc*, 1971 PhD*, 1976	Vice President, Technology, ShawCor.
John Voss	BASc*, 1982 MBA, 1989	Managing Director, Aegent Energy Advisors Inc.

* Degrees from the Department

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We invite inquiries, comments and suggestions from readers.

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In our next issue, we look forward to recognizing the tremendous support we have received from our Alumni.