

Engineering enrolment up, computing gains most

2000/01 than in the previous year, an increase of 6.7 per cent, nearly double the average of the previous five years.

Electrical and mechanical engineering remained the top choices at the undergrad level, with computer engineering displacing civil engineering in third place. There are now more than 7000 students enrolled in computer engineering programs, nearly four times the number a decade ago. Most provinces saw gains in total enrollment with British Columbia and Manitoba leading the pack.

The study reports a significant increase (19 per cent) over the previous year in the number of foreign students enrolled in undergraduate engineering programs. Over 5 per cent of the total enrolled in Canadian engineering programs now come from abroad and study mostly in Ontario and Quebec.

The percentage of women among the total enrolled seems to have reached a plateau of about 20 per cent over the last five years. In 1975, women made up only

3.6 per cent of the total, increasing to nearly 11 per cent a decade later, and to almost 19 per cent in 1995.

There were 8305 undergraduate engineering degrees awarded in 2000, the lion's share in electrical and mechanical. Civil engineering reversed a steady decline with a 3 per cent increase in degrees awarded over 1999.

The trend line in postgraduate enrollment appears flat. There were 14 per cent fewer full-time doctoral students in 2000/01 than there were five years previously and masters enrollment nudged up 1 per cent over that time. There is also a growing tendency toward part-time studies with 25 per cent more students choosing this route in 2000/01 than in 1996/97. The percentage of men enrolled in doctoral studies declined 18 per cent between 1996/97 and 2000/01.

During the same time period, the number of postgraduate degrees granted dropped by more than 13 per cent. Although the overall numbers were down, women were awarded 18 per cent more doctorates in 2000 than in the previous year. As well, the number of women obtaining a master's in electrical engineering in 2000 rose by 67 per cent from the year before.

For the first time, the annual survey examined co-op and internship programs in detail, noting the large increase in participation over the previous 10 years. Three out of four Canadian engineering schools now deliver some form of practical experience in conjunction with academics. In 2000/01, at least a third of undergrads were involved in some form of work placement, not including students in summer programs.

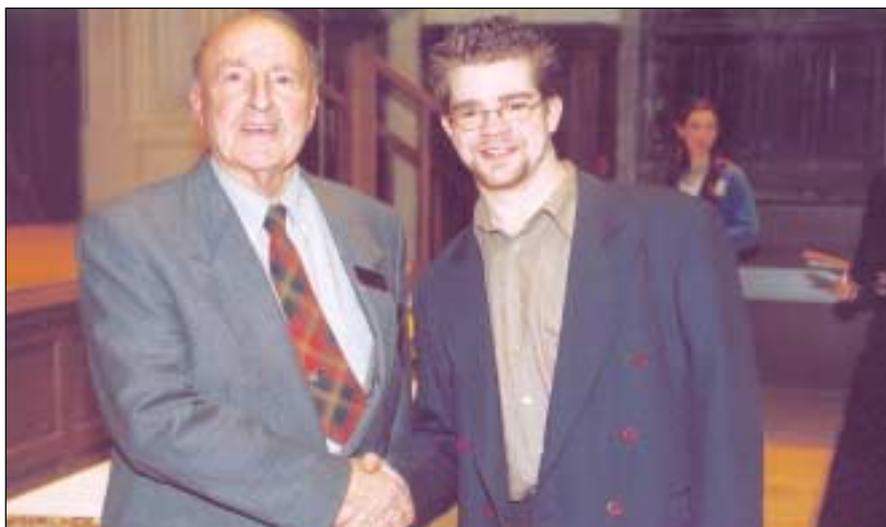
In fact, the survey report points out, some co-op or internship programs work so well, students drop out: "Indeed, in some areas students are being lured into employment with high pay and other options and may not complete their degrees. In particular, the recent boom in the high-tech sector has increased such offers, particularly in the software, computer and electrical segments."

by Dwight Hamilton

Enrolment in Canadian undergraduate engineering programs increased sharply for the 2000/01 school year, according to a survey by the Canadian Engineering Resources Board of the Canadian Council of Professional Engineers. Canadian Engineers for Tomorrow compiled enrollment and degrees awarded data from all Canadian universities that offer programs approved by the Canadian Engineering Accreditation Board.

Over 3000 more Canadian students studied engineering at university during

The future of engineering



Nick Monsour, P.Eng., board member, Ontario Professional Engineers Foundation for Education, congratulates Phil Weicker, a 2001-2002 winner of the Foundation for Education Gold Medal. The Foundation awards the prize to students who achieve the highest standing in their final examinations in their final year of undergraduate study at Ontario universities with accredited engineering programs. Monsour presented the award at McMaster University's annual engineering awards assembly last spring. A registered charity, the foundation welcomes donations from professional engineers. Contributions can be sent to Ontario Professional Engineers Foundation for Education, 25 Sheppard Avenue West, Suite 1000, Toronto ON M2N 6S9.

Public protection and professional growth prompt competence programs

by Sharon Van Ihinger

Mandated professional development programs for Ontario's self-regulated professions are becoming the standard, according to an April 2002 survey by the Ontario College of Teachers.

Focusing on professional development, the college contacted the 37 organizations the Ontario government lists as occupational regulatory bodies to obtain a description of their professional development policies and requirements. It found that the majority of the organizations require members to take part in some mandatory professional development, although several organizations, including PEO, reported having no mandated professional development and some recently established self-regulatory bodies had not yet developed policies in this area.

Of the organizations requiring professional development, many required learning in core areas, with members generally paying for their own continuing education. Professional development is often stretched over two-to-five-year cycles, the survey found. Many of the self-regulating professions also required members to maintain professional portfolios, which are résumés of professional and academic accomplishment, including areas for improvement, personal goals and future learning plans.

The survey found that under the *Regulated Health Professions Act* (RHPA) participation in a quality assurance program is mandatory. The RHPA governs the 21 colleges that regulate 23 health professions, including medicine, nursing, pharmacy, physiotherapy and dentistry. In addition to promoting continuing competence among members of the professions, the RHPA further requires that the colleges have quality assurance committees and councils that prescribe the quality assurance programs.

The Ontario Association of Architects launched its continuing education program in 1999, and is phasing in three cycles over a number of years, the College of Teachers

reports. Cycle One has been phased in. In the current Cycle Two, comprising a renewal points system, each architect must obtain 30 professional renewal points and 40 self-directed points by the end of 2003. By 2004-2005, when Cycle Three is phased in, the required number of professional renewal points and self-directed points will increase to 50 each.

The College of Teachers findings, available in full at www.oct.on.ca/english/self-freg.asp, are consistent with an independent study conducted in 1998 by Assessment Strategies Inc., which found that there is a growing recognition by government, the public and professional regulatory bodies of the need for continuing competence programs.

Entitled *Licensure, Certification and Continuing Competence Practices among*

Canadian Regulated Professions, the study found that public protection and professional growth were among the major factors leading to development of continuing competence programs. Other factors included the need for national standards and ensuring quality services. Continuing education and self-assessment were two of the most common formats for the programs, the majority of which Assessment Strategies found to be provincial in scope.

However, the Assessment Strategies report also notes that despite the priority being given to ensuring continuing competence by regulating and certifying bodies, "there are a lot of issues that need to be considered before such a venture can be undertaken," including costs and full participation from each provincial regulatory body.

Big turnout for Ontario Society of Professional Engineers annual meeting

by Dwight Hamilton

The 2002 annual general meeting of the Ontario Society of Professional Engineers was held on May 11 in Toronto with over 200 delegates in attendance. Outgoing Chair Robert Goodings, P.Eng., began by saying that the society's membership is growing steadily, with almost 4000 professional engineers joining as full-paying members in 2001. As this was before its initial membership drive, the number is "sending a clear signal" that the society's mission is valued by Ontario's engineers, he said.

According to the society's research, its most important objective should be to raise the profession's profile with governments, the media and the public. Goodings said the society was very active in responding to the Walkerton Inquiry report and that its Safe Water Task Force will comment on the inquiry's part two report. As well, during the Ontario PC leadership race, three candidates replied to the society's questionnaire on engineering issues. "If we are to be effective advocates, our voice needs to be heard in every caucus room at Queen's Park. We will speak regularly with all parties to make sure this happens," he said.

Goodings also gave delegates a primer on "EngineersFirst," a new permission-based email marketing system to provide services to society members. Computers from IBM, high-speed Internet access from Sympatico and long distance telephone plans from Sprint are some of the current offerings. Shortly, the society expects to offer insurance packages that improve upon similar programs now furnished by the Canadian Council of Professional Engineers, he said. At present, staff is examining options with insurance industry experts and counterparts from Quebec's services corporation, which split from the Order of Engineers of Quebec last year to provide services to Quebec engineers.

Goodings reported that because professional development is also high on the wish list of the society's membership, it plans to offer preferred access to continuing technical education through existing suppliers or through other associations this fall. In 2003, a series of non-technical business skills courses is slated for introduction. The society's career centre has steadily expanded its services since its transfer from PEO last August, he said, with résumé posting, career management workshops, severance and employment law counseling, and networking discussion groups available.

Randall Pearce, the society's chief executive officer, pointed out that creating a sense of community for engineers is a tough challenge given the diversity of the profession. But the society "is a force drawing together complete strangers in the common cause of engineering. We're doing more than building a voice for engineers, we're building a home for engineers," he said. "And, if there's one thing engineers are known for, it's building."

The engineers building the new society, Pearce continued, believe that if they become a partner with government in



ABOVE: Outgoing Chair Robert Goodings, P.Eng., gives his farewell address to attendees at the society's 2002 annual general meeting. **BELOW:** James O'Brien, president of the Ontario Bar Association, addresses members in a keynote luncheon speech.



public improvement today, they will have a more receptive hearing at Queen's Park tomorrow. "These are the people who believe that if we support our students through events like Engineers are Everyday Heroes and the Ontario Engineering Competition in 2002, we will have a steady supply of fresh talent in 2022. These are the people who know how important it is that business leaders read about engineers in [national newspapers] so that they will place more value in our member's skills and expertise," he added.

Responding to the perception by some that the society has made little progress in its early days, Pearce countered: "Building can be a slow process. As you can appreciate, the work below grade is the most time consuming and arduous. The structure above rises relatively quickly."

After the meeting, the society's board elected Catherine Karakatsanis, P.Eng., as its new chair, Chris Cragg, MBA, P.Eng., as treasurer, and Daniel Young, P.Eng., as vice-chair and secretary. Young introduced luncheon keynote speaker James O'Brien, president of the Ontario Bar Association,

commenting that the talk was timely as the legal profession in Ontario recently reached an agreement that integrates paralegals into the practice of law, similar to pending developments in engineering. "The society is a place for debate, not dogma," he said. "Your board hasn't taken a position on the [technologist] licensing issue yet [to access the *Report of the Technologist Licensure Task Group*, go to www.peo.on.ca, click on Publications, click on Reports] but we are interested in learning from the experience of another profession."

Engineering community recognizes expertise and community contribution

by Sharon Van Ihinger

Eight engineers will receive awards at a gala dinner and ceremony celebrating engineering and community achievement. The 2002 Ontario Professional Engineers Awards, to be held Friday, November 15, 2002, in Mississauga, recognizes excellence across a broad range of engineering endeavours, including innovation, professional leadership and entrepreneurship, as well as contributions to society in general.

Arthur B. Johns, BASc, MSc, P.Eng., principal and chair, Morrison Hershfield Group, will receive the Professional Engineers Gold Medal. Johns' entrepreneurial talents, solid management practices and his outstanding business acumen were instrumental in building Morrison Hershfield from a small Canadian consulting engineering firm into the large North American entity it is today.

In addition, Johns served as PEO Councillor; chair, NAFTA Task Force; member and then chair, Professional Practice Committee; member, Conflict of Interest Committee, Consulting Engineer Designation Committee and Discipline Committee. He was admitted to the PEO Order of Honour in 1987. Johns is active on the board of directors, Consulting Engineers of Ontario, acting as treasurer and chair of the Business Practice

Committee. He is involved in the Iron Ring Ceremony at Ryerson University and the University of Toronto, and is a strong advocate for several charities.

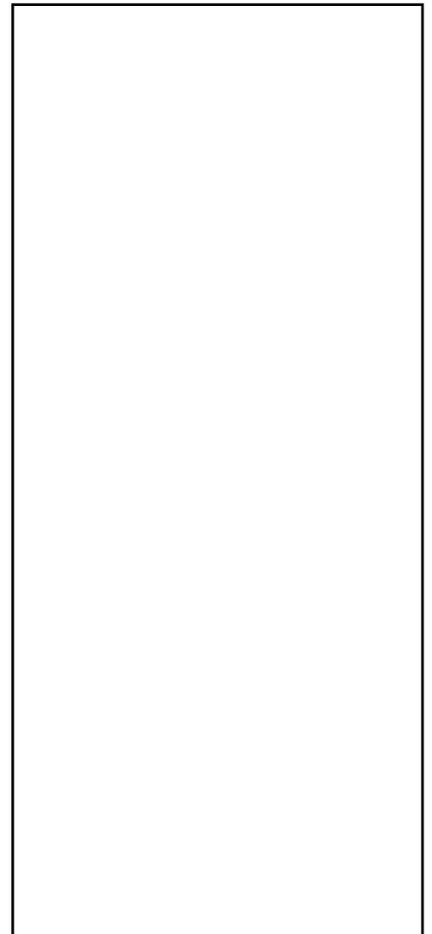
Receiving the Engineering Medal in the Research and Development category will be Douglas W. Reeve, PhD, P.Eng., chair, Department of Chemical Engineering and Applied Chemistry, University of Toronto, for outstanding contributions to pulp and paper research. Reeve pioneered a highly successful model for education and research through the founding in 1987 of the Pulp and Paper Centre at the University of Toronto, where faculty and students are linked with industry. Reeve's research record includes two textbooks, 18 patents and more than eight refereed papers, and he has received several international awards.

Ian Armitage, P.Eng., Keith Marchildon, PhD, P.Eng., and Adel Sedra, PhD, P.Eng., will each receive an Engineering Medal in the Engineering Excellence Category for overall excellence in the practice of engineering.

Throughout his career at MD Robotics, formerly Spar Aerospace Ltd., Armitage contributed to numerous space programs and was directly responsible for the design and development of highly complex precision transmissions and mechanisms, which led to several patents for new or novel mechanism design. In his expanded

role as project engineer, he is responsible for the design, development, procurement, assembly and test of space flight hardware.

(Continued on p. 14)



Marchildon is a leader in Canada's chemical engineering community and in research and development with DuPont Canada, where his research focused on polymers. Much of the technology DuPont uses in the manufacture of Nylon 66 is owed to Marchildon. He has been recognized internationally and in 2000 was promoted to DuPont Fellow, one of 15 within the DuPont Company and the first with DuPont Canada. Marchildon has promoted continuing education in the chemical engineering discipline, and helped CCPE to define the core body of knowledge in that sector, which is used by the provincial/territorial licensing bodies to assess the academic qualifications for licensing of foreign-trained engineers.

Sedra, vice-president, provost and chief academic officer, University of Toronto, is highly regarded in the microelectronics and electronic circuits field. He's won many prestigious medals and awards in recognition of his work, and has contributed significantly

to the academic community—as mentor of graduate students, co-author of three textbooks and author of over 150 published papers. Sedra served on many panels, boards and committees, and played a critical role in establishing such government-sponsored institutions as Ontario's Technology Research Centre and the federal Network of Centres of Excellence in communications.

Frank A. Dottori, P.Eng., president and CEO, Tembec Inc., an international forestry corporation, will receive the Engineering Medal in the Entrepreneurship Category. Dottori used his entrepreneurial and management skills to rejuvenate paper mills in northern Ontario and Quebec, returning their communities to progressive, prosperous places to live. Dottori has received many honours and awards throughout his career.

Peter Chadwick, P.Eng., will receive the Engineer Medal in the Management Category. Chadwick's career with MD Robotics has encompassed all major

achievements in Canadian space robotics—from the Canadarm, to the design and delivery of the new International Space Station robotics. He led the last Canadian robotic contribution to the space station, the Special Purpose Dexterous Manipulator (a small two-armed robot). He has ensured public awareness of this newest technology and helped to raise the profile of the engineering profession.

The Citizenship Award goes to Charles Olmsted, P.Eng., for significant contributions to his community. Olmsted owned and successfully managed Steds Limited, a mid-sized general contracting firm. North Bay has benefited immensely from Olmsted's generous volunteer work, leadership and engineering skills.

For further information on the 2002 Ontario Professional Engineers Awards, check the Awards pages of PEO's website at www.peo.on.ca.



Annual WEAC forum to focus on mentoring

by Gayle Aitken

The third annual PEO Women in Engineering Advisory Committee (WEAC) Claudette Mackay-Lassonde Memorial Forum, to be held at the University of Toronto on October 19, 2002, will feature speakers who have been involved in formal mentoring programs in a variety of educational and work settings.

Entitled "Experience, Support,

Success," the WEAC forum will include a presentation on PEO's new mentoring program, which matches P.Eng.s with PEO Engineering Interns (EITs). The presentation will provide information about how participating in this program can help those pursuing engineering careers and licensing.

The forum will provide an introduction to formal mentoring programs and what to look for in employer-sponsored mentoring programs. Professional engineers will also discuss their own experi-

ences with mentoring in their career development.

For more information on registration, visit the PEO website, under Women in Engineering. To receive registration information, contact Leta McCulloch at 416-224-9528, ext. 403, or 800-339-3716 ext. 403, or at lmcculloch@peo.on.ca.

Claudette MacKay-Lassonde, P.Eng., was PEO's first female president, in 1986-1987, a founder of Women in Science and Engineering, and a driving force behind the creation of WEAC.

Know the problem, P.Eng. tells project managers

by Stephanie Wei

The key elements to project management are understanding the problem you are trying to solve, listening more than you talk and understanding the risk, says Francis T. Hartman, PhD, P.Eng., professor and chair in project management at the University of Calgary.

Over 800 representatives from government, academe and industry were given an introduction to Hartman's SMART (Strategically Managed Aligned Regenerative Transitional) theory of project management at Materials and Manufacturing Ontario's "Partnerships 2002" conference held on June 20 in Toronto.

A project manager needs to look at the reasons for problems, as well as providing practical solutions, Hartman says. In many cases, he pointed out, project managers do not solve the right problems, and do not manage the relevant resources, often leading to cost overruns. SMART management techniques save time and money, he says, by cutting through projects' non-value-adding components.

"Engineers are taught to apply technology to provide practical solutions," he said. "But you need to make sure that

you are solving the right problem, and that there actually is a problem to be solved." According to Hartman, younger engineers need to understand the problem, while older engineers need to understand the solution, because younger engineers still want to change the world, and older engineers must recognize that the world has changed, and that there are new solutions.

Hartman emphasized the need for engineers to develop soft skills. By the intermediate level of an engineer's career, he said, "less than 50 per cent of the work is technical. The real skills become listening, thinking, business, people skills. You don't lose the technical skills, but you have to apply them in new ways."

In his research, Hartman has found that the common thread to SMART management is trust. Project managers need to build trust, both within the team and with clients, which partly involves not overpromising results. Project managers have to deliver on what they promise, he said, because investors make judgments based on track record, and if you deliver 50 per cent of what you promise, they will consider that you can provide only 50 per cent of the solution.

He also stressed the importance of licensure: "It is absolutely critical for peace of mind. You can't do anything in

life without having to trust a lot of people to design and build things properly. The examples are endless. We've got to build trust."

Correction

In the June/July issue of *The Link*, PEO Councillor Denis Dixon, P.Eng., was incorrectly identified as a West Central Region Councillor. Councillor Dixon is, in fact, a Councillor-at-Large, in addition to his appointment as a member of the Executive Committee. Our apologies to Councillor Dixon and to West Central Region Councillors Richard Weldon, P.Eng., and Colin Moore, P. Eng., for the error.

Send us your stories

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