

Debate continues on joint accreditation proposal

CEAB accredits first software programs

by Sharon Van Ihinger

The Canadian Engineering Accreditation Board (CEAB) has accredited the first software engineering programs at Canadian engineering faculties, at McMaster University, the University of Ottawa and the University of Western Ontario. At the same time, an organization representing Canadian university computer science departments and faculties said it could not support a proposal to establish a Software Engineering Accreditation Board (SEAB), whose accreditation would be necessary for all undergraduate programs calling themselves "software engineering."

According to George Comrie, P.Eng., chair, Ontario Software Engineering Task Force (OSWET), the accreditation of the first software engineering programs is a significant milestone that will be the start of a wave of accreditations—and ultimately greater numbers of licensed professional engineers in the software engineering field. Graduation from the programs will now fulfill the academic requirements for licensing as a professional engineer. Prior to these accreditations, PEO licensed software practitioners by individually assessing their academic qualifications in conjunction with their experience, according to assessment criteria approved by PEO Council in 1999.

New engineering programs are evaluated for accreditation in the same year their first students graduate, because the process involves assessing student work and an evaluation of learning outcomes. Ottawa graduated seven students from its newly accredited software engineering program this year, McMaster 21, and Western eight. Enrolment in the McMaster program will likely increase to 85 next year,

while Ottawa expects more than 70 students to enter its program and Western 60. Several other Canadian universities that initiated their software engineering programs after McMaster, Ottawa and Western will also be accepting students.

Based on the courses offered through these accredited programs, Comrie believes that IT sector employers will see enormous benefits in hiring these graduates, through improved reliability and efficiency of software products. Tyseer Aboulnasr, PhD, P.Eng., dean of engineering, University of Ottawa, says the accreditation process forced a hard examination of the software engineering program Ottawa is offering "to ensure that all parts of the program fit together to produce the unique learning foundation all engineers are expected to build in their undergraduate programs—a broad well-rounded education that prepares its graduates for professional practice in their disciplines."

No guarantees?

Ironically, accreditation of the first engineering programs in software—which was initiated by the universities last fall—came shortly after endorsement by the engineering profession of draft accreditation criteria and procedures for a proposed SEAB, which would be a joint board of CEAB and the Computing Science Accreditation Council (CSAC) of the Canadian Information Processing Society (CIPS). The creation of the SEAB, accreditation by which would be necessary for any undergraduate program to be called "software engineering," is a proposal of the Software Engineering Panel established to review the use of the term "engineering" in the undergraduate university community. The panel was the result of an agreement between the Canadian Council of Professional Engineers, the Association of Universities and Colleges of Canada (AUCC) and Memorial University that settled a lawsuit over Memorial naming a non-engineering program "software engineering."

Although at press time AUCC had not yet responded to the draft SEAB accreditation criteria and procedures, it appears the SEAB proposal has not been well received by some in the computer science community. At its annual meeting on June 1-2 in Ottawa, the Canadian Association of Computer Science/Association Informatique Canadienne (CACS/AIC), which comprises the Canadian university chairs of computer science departments, passed a motion saying that "any attempt to impose a single curriculum model on all applied software programs is seen as both narrow and inappropriate." In particular, CACS/AIC said, it cannot support the current proposal to establish an SEAB to manage all software engineering programs until there are guarantees:

- ◆ that the right to practise for all information and communications technology (ICT) professionals is assured, whether or not they have graduated from SEAB-accredited programs;
- ◆ that Canadian universities maintain the freedom to create a wide variety of academic programs in areas involving ICT, with or without the involvement of engineering schools or faculties;
- ◆ that any accreditation standards for ICT (whether proposed by CSAC, CEAB, SEAB, or any other professional body) be flexible enough to match a broad and rapidly changing discipline.

AUCC had formally requested CACS/AIC reaction to the SEAB proposal. Earlier, both the Council of Ontario Deans of Engineering and the National Council of Deans of Engineering and Applied Science endorsed the SEAB proposal.

In a counter proposal to the SEAB, (endorsed by PEO Council in February) Comrie's OSWET had suggested that the Canadian Engineering Accreditation Board accredit software engineering programs as its does existing engineering dis-

ciplines with one difference: non-P.Eng. scientific experts would be allowed on the visiting teams that gather data on which CEAB makes its accreditation decisions. In fact, notes David Parnas, PhD, P.Eng., director of the software engineering program at McMaster University, accreditation of the three software engineering programs by CEAB makes clear "that a solid engineering program in software can be accredited." Parnas says that engineering-style accreditation of software engineering programs, as provided by the CEAB, demonstrates flexibility (considering that the three programs are quite different but all were accredited), and protects the public from incompetence. The accredited programs do this, he says, by delivering core components of engineering to students in first and second year, then specialized computer engineering courses for the balance of the program, much like other engineering programs in civil, industrial, mechanical, and electrical.

To license, or not

Parnas notes that while computer science programs are largely geared toward interpreting what's inside the computer, through courses in computer programming and project management, the software engineering program at McMaster is geared toward interpreting what's both inside and outside the computer, through courses on controlling the interaction between computers and the environment—by applying math logic, for example, to develop better software products or choose a programming language.

He sees the need for licensing of graduates of both computer science and software engineering, if they are developing critical software systems. Licensed software engineers, he says, would be needed for computerized control systems and other applications needing understanding of the physical world. "Professional software developers" (a possible title for licensed computer science graduates involved in software development) might be required for such applications as large databases, or customer relations management, he says.

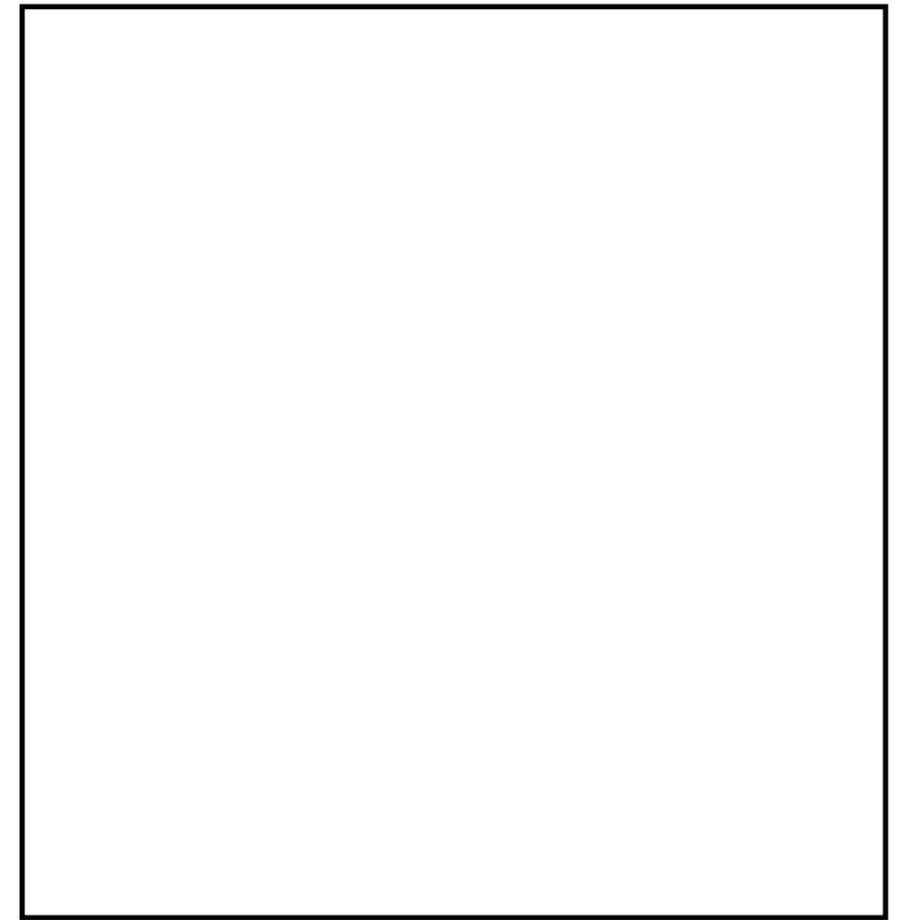
In a rationale accompanying its formal motion on the SEAB proposal, however, CACS/AIC takes a different position, rejecting the notion of professional licensure in software development, on the basis of "deep philosophical differences in pro-

fessional approach between engineering and computer science. The engineering approach is to create uniform strong standards, strictly adhered to. The computer science approach also encourages strong standards, but these must be flexible and adaptable to the incredible speed of change in ICT, and there must be recognition of the diversity and interdisciplinarity of ITC. CACS/AIC is worried that the SEAB proposal may lead to the imposition of an engineering-style model on computer science programs. ... There is concern about the conservatism of mandatory accreditation. There is also concern about forcing the ISP [the credential awarded by the Canadian Information Processing Society] on computer science faculty and de-emphasizing the PhD. There is special concern that software engineering will be rolled into provincial engineering acts across the country."

CACS/AIC also "rejects the notion that computer science has now spun off an applied side that needs to be governed by engineering paradigms 'for the public safety.' First, the public safety is not at risk. In fact, most software works remarkably well,

considering that it has been called the most complex artifact ever designed by humans. ... Second, computer science is not a natural science that is at last ready for spin-off applications. Rather, it is a science that is fundamentally about designing and implementing artifacts. In fact, computer science started out with a strong applications focus, and evolved both theoretical principles and software engineering processes in synergy with one another."

Meanwhile, following Council approval in principle on March 26, PEO is discussing with CIPS Ontario the idea of licensing of applied computer science professionals whose work requires regulation in the public interest, possibly under the *Professional Engineers Act*. The current discussions with CIPS, and also with the Association of the Chemical Profession in Ontario, are in line with the PEO Strategic Plan, which Council endorsed on June 22 (see In Council, this issue). The plan calls for PEO "to study the public interest implications of alternative models for governing allied applied science practitioners." ◆



Engage at earlier stage of development to cross law-engineering divide: telecom law professor

by Sharon Van Ihinger

Highly synergistic—that's how law professor Hudson Janisch, of the University of Toronto, sees the relationship between law and engineering. Speaking at an IEEE Communications Society Toronto section meeting in May at the University of Toronto, Janisch illustrated the inter-relationship between technology development, law and engineering.

According to Janisch, a lawyer will say, "How can I work this issue out so that we can progress and move forward?" while an engineer will say, "This is the way it would be most effectively run from an engineering point of view."

Janisch said his experience of working with a telecommunications policy steering committee that included both lawyers and engineers was enlightening. He called the collaboration between the lawyers and engineers a process in which they defined who was better at sorting out the detailed rules of implementation and who was better at sorting out the necessary interplay of technology. The engineers, he said, were a little effacing, while the lawyers a little aggressive.

Janisch explained that in many situations the law doesn't change, what changes are the interpretation, application and implementation of the statute. He observed that engineering students found it strange that a set of words, such as "just

and reasonable rates" and "non-discrimination" could mean different things depending on the circumstances.

Janisch said that what he finds intriguing as a lawyer who's worked with telecommunications companies during the transition from monopoly toward competition is the immense legal challenge. He explained that once the economic barriers to entry are removed by new technology, you have a battle between entrepreneurs and the law: "[When] you get aggressive entrepreneurs offering customers a better deal, you can bet the law's not going to stand very long in the way."

Today's shifts in long distance transmissions technology from wire (copper) to wireless (satellite, microwave) and then back to wire (optical fibre) demand reciprocal shifts in legal regimes, Janisch said. As an example, he discussed the history and eventual break-up of AT&T, illustrating that while law has often been used to defend the status quo and the privileges of incumbency, recently it has acted as a facilitator of change by opening up new market sectors to competition.

He said he is looking forward to seeing how the next contemporary issue—telecommunications privacy—will play out, and whether the words of an Australian judge who once said, "there goes law limping after technology" will hold true.

Janisch wonders whether privacy concerns shouldn't be factored in at the design stage of new development; however he's concerned, he said, that given the complexity of the problem, "all you're going to do is to end up with bad engineering and bad law." Essentially, each one does what it does best and at the end of the day the bridge still has to stand, he said. However, if societal concerns can be incorporated with economic incentives and technological development, Janisch believes there is a much greater opportunity to reinforce the desired direction of the law.

Referring to John Galbraith's vision of the complete engineer, he concluded that it might well be very desirable to get engineers and lawyers together at an earlier stage than when the technology is fully developed and starting to be applied.

Better homes & technologies



Panelists from the 2001 Engineering Innovations Forum, part of National Engineering Week, answer questions on their presentation "Home, Smart Home." The purpose of the forum was to foster educational dialogue and raise public awareness of the creative role engineering plays in linking science and technology. State of the art security systems, the latest designs for home offices, integrating distance learning with a "wired" home and some of the latest methods to address health concerns around the house were among topics covered. From left to right: Eric Nejat, PhD, P.Eng., president, E.Z.Nejat and Associates Ltd., Albert Bianco, marketing manager, Leviton Canada, Debra Wright, senior consultant, Canada Mortgage and Housing Corp., and Phil Fung, P.Eng., manager, Systems Integration & Research Services.

Committee releases 2001 fee schedule

by Dwight Hamilton

A new *Schedule of Fees for Engineering Services* for 2001 has been released by PEO's Fee Schedule Committee and includes rates up to 20 per cent higher than last year. It is a guide for all types of engineering services normally encountered and provides a framework within which fees can be negotiated between clients and engineers. Guidelines for deciding on the appropriate fee basis for fees for special services and conditions are also included.

Three bases by which fees are commonly determined are described (time-based, percentage of construction cost and fixed). Due to a changing marketplace, a section covering innovative fee bases presents new ways of compensating engineers. Included are the value-added,

profit-sharing, equity-participation and performance-based methods. The guideline states that some of these new methods may eventually replace the three traditional fee bases.

Also new this year is the calculation of minimum hourly rates using the *median* salary for each level from PEO's *2000 Engineers Salaries—Survey of Employers* as opposed to the *base* salaries. "This is more in keeping with actual professional salaries, rather than the minimum paid to engineers," says Bernard Ennis, P.Eng., PEO manager, professional practice. As a result of this change, some minimum hourly rates have risen by 20 per cent.

The guideline also recommends that engineers charge 5 per cent of the total fee value as an expense, if the costs associated with IT are not accounted for in a firm's overhead. This is also a new recommendation. "Engineering firms are

spending a lot on computers and software and we're not sure everyone is able to recoup these costs," says Catherine Karakatsanis, P.Eng., Fee Schedule Committee chair.

Next on the committee's agenda is work on the next edition of the fee schedule guideline, which will involve a survey of buyers and sellers of engineering services to try to understand their perception of price-based service delivery, says Karakatsanis. Another goal is to expand the guideline's usefulness by representing some of the non-traditional fields of engineering.

Printed copies of the schedule can be purchased for \$10 from PEO's publication desk. Phone (416) 224-1100 or complete the publication order form that appears in the *Gazette* or on PEO's website (www.peo.on.ca). The *Schedule of Fees for Engineering Services 2001* can also be downloaded free of charge from the website.

Sustainable development to be explored in seminar

by Dwight Hamilton

Dr. Stuart Smith will be the keynote speaker at a seminar on sustainable development to be hosted by PEO's Environment Committee on Oct. 18.

Smith is chair of the National Round Table on the Environment and the Economy (NRTEE), an independent advisory body that furnishes Canadian opinion leaders, decision makers and the public with advice for promoting sustainable development. His talk will give some insight into the federal government's "sustainable development indicator initiative," which promotes the science of measuring progress toward a more sustainable economy. A project case study, an expert panel discussion and an update on current national initiatives in the field will also be featured.

Various studies have rated Canada as one of the best countries to live in for quality of life. But the duty of Canadian professional engineers to consider protection of the environment as a key feature of design is increasing, due to trends in globalization and the increasing pace of economic growth and innovative technology.

Sustainable design is a result of integrating an appropriate balance between protection of the environment, a viable economy and social well-being and therefore reinforces the overriding duty of pro-

fessional engineers.

For information on registration, contact Shirley Lowery at 416-224-9528, ext. 462, or 800-339-3716 (email: slowery@peo.on.ca).

Building industry could see change in time limits for launching civil lawsuits

by Sharon Van Ihinger

The Ontario government has reintroduced legislation that would make more predictable the time limits for commencing legal proceedings in civil courts. If passed, the *Limitations Act 2001* would consolidate existing time limits in other legislation into one law and set two limitation periods for launching a civil lawsuit.

The act would allow up to two years after damage has been discovered for the initiation of civil litigation. However, an ultimate limitation period of 15 years would be allowed for those who don't find out about injury, loss or damage until well after the fact.

The 15-year allowance is aimed at the building industry where construction-related problems may remain hidden for extended periods of time. Several excep-

tions in the new legislation would permit an indefinite time period on environmental claims that haven't yet been discovered.

There is no time limit under current legislation on when building-related lawsuits can be launched. Contractors, engineers and architects can be forced to defend themselves against lawsuits originating from decades-old projects. If the new *Limitations Act* is passed, it would address these gaps.

The government has tried twice unsuccessfully to amend the *Ontario Limitations Act*, in 1991 and 1997. In 1991, PEO was a signatory to the *Report of the Limitations Act Consultation Group*, which had been convened at the government's request. In 1997, PEO was also asked to comment on reform of the act, and a Limitations Act Working Group

prepared a submission that was approved by Council on November 22, 1997.

The submission proposed an ultimate limitation period of 10 years in the full range of engineering practice, commencing from the date of substantial performance, purchase or start-up of the system, or the date on which an alleged breach of duty, act or omission occurred.

In August 2000, PEO was again asked for input on limitations reform, and resubmitted its 1997 position, after it was endorsed by the Executive Committee. The Ontario Society of Professional Engineers (OSPE) also provided input on the new legislation.

The Council of Ontario Construction Associations (COCA) sees the proposed legislation as a long overdue improvement. It has been lobbying for a limitations act since the late 1970s.

Quebec order forms service corporation

by Dwight Hamilton

The Order of Engineers of Quebec (OIQ) has restructured to focus on its core functions by forming a separate corporation to offer the member services it has been providing. It's anticipated that the new corporation will additionally offer an investment service, group insurance and similar programs to OIQ members.

"We must separate the services from the real role of the [OIQ], which is public protection. The two are not compatible," says Zaki Ghavitian, ing., formerly OIQ's vice-president of corporate affairs and now president of the new entity, the Service Corporation of Engineers of Quebec.

Ghavitian says the move now enables OIQ to devote its full attention to its priority of "promoting the skills and public image of engineers in order to eliminate unlawful practice." Participation in the new service corporation's offerings will be optional for OIQ members.

In Ontario, PEO is also refocusing on its core functions by divesting its non-regulatory functions and activities, over a three-year period, many of them to the Ontario Society of Professional Engineers (OSPE). In its agreements with OSPE, PEO has defined as non-regulatory the

programs and activities that do not relate to the principal and additional objects under the *Professional Engineers Act*. PEO will continue to provide advocacy that relates to its regulatory functions, including raising awareness of the role of the

association in licensing professional engineers and regulating engineering practice. Advocacy for the profession, including promoting the public image of engineering, will be provided by OSPE as the "voice of the profession."

Send us your stories

Engineering Dimensions welcomes submissions of articles and stories. Stories should focus on the legal, regulatory and ethical aspects of the profession. However, we will still cover a broad range of topics, and offer a diversity of opinions to ensure balance. Possible topics can cover professional development, continued competence, trends in regulation across Canada, innovation, etc.

Editorial staff will edit submissions from authors for spelling, grammar, punctuation and style. Edited articles and features will be reviewed by the author for approval prior to publication.

Send submissions to the Managing Editor, *Engineering Dimensions*, Professional Engineers Ontario, 25 Sheppard Ave. W., Suite 1000, Toronto, ON M2N 6S9. Please include your name, telephone number and email address.