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Natural Sciences and Engineering Research Council of Canada

NSERC Contact

Investing in people, discovery and innovation

NSERC, the *Smart*Canada People

Editorial by NSERC President Tom Brzustowski

For a long time now, we at NSERC have felt burdened by the official name of our organization, "The Natural Sciences and Engineering……." The official name is long, involved, and fails to convey any sense of activity. And very often people get it wrong, even people who work closely with us.

The formal name cannot be changed easily, but we can draw attention to what we do by referring to NSERC in some different way in all our promotional materials. The label we are starting to use is the title of this piece: "NSERC, the ***Smart*Canada** People."

Smart*Canada** is not just a phrase. It is, in fact, a precisely defined vision of the future to which NSERC contributes. Here's the way I've been defining it: "Smart*Canada** is the world's best place to live and work because Canadians create and use knowledge skillfully to improve all aspects of their life and work." This vision positions research prominently in relation to a very attractive view of our country's future. We believe that such positioning is both accurate and essential.

The new label and vision are parts of a larger change in NSERC that was endorsed by NSERC's Council at its January meeting. The change involves two sets of initiatives: "**Lightening the Burden** — What NSERC might do to reduce the bureaucratic burden on researchers, and leave them more time to do their research" and "**Transformation** — How NSERC will make itself a more dynamic, flexible, and forward-looking organization to help build ***Smart*Canada** and prepare for the next new economy."

These changes are being made to address two problems. The first is that Canadian professors in the natural sciences and engineering have less time for research than do their counterparts in other developed countries. I believe that this situation is mainly caused by the relatively poor core funding of Canadian universities that produces high teaching loads and low levels of support services.

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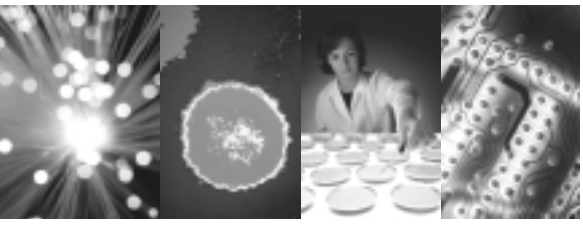

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NSERC is Canada's instrument for promoting and supporting university research in the natural sciences and engineering, other than the health sciences.

NSERC supports both basic university research through research grants and project research through partnerships among universities, governments and the private sector, as well as the advanced training of highly qualified people.

Editor-in-Chief
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Mainly, but not entirely. The research community we serve has clearly told us that NSERC also adds to the workload, through the time demands of peer review and the complexity of the application processes. "Lightening the Burden" is our response. It is a set of measures being developed to reduce the workload of NSE researchers, both as applicants and as reviewers of the applications of others. We will look at possible ways of making it easier to apply to NSERC, at reducing the workload of peer review, and also at the feasibility of reducing the number of NSERC programs by appropriate consolidation.

During the February competition just ended, I met with all the GSCs and described what we were trying to achieve. I asked all the members to send us suggestions on how the application process might be simplified and how the workload of peer review might be reduced **without sacrificing the quality of funding decisions**, something that is very important both to the research community and to us at NSERC.

I now extend the same invitation to the readers of *Contact*. You can rest assured that all the obvious suggestions have already been made, and that there are no silver bullets. For example, the Government of Canada is going on line, and NSERC is part of that. Moving into e-business offers a new range of possibilities in how NSERC and the research communities might interact. But we have to move beyond electronic document transfer; we also have to change many of our processes to reap any real benefits.

Please give these questions some thought. Discuss them with colleagues. And if you develop some constructive ideas, please send them to me at exec@nserc.ca.

Our second task is to alter the perception, admittedly more from outside the research community than from within, that NSERC is mired in the business of providing "more of the same," and unwilling to change. We now believe that this perception is one reason why some important requests for federal funding to support university research in the natural sciences and engineering are bypassing NSERC, and why some new organizations have been set up to provide such support, duplicating our work.

We can argue that such perceptions are inaccurate and unfair. We can remind that NSERC has led the way in many important innovations in research funding, we can explain that "more of the same" funding for research grants is exactly what the country needs, we can argue that the time scale of basic research is long and support for it must be stable, we can point out that NSERC is constrained by the legislation and regulations under which we operate, etc. However, we are not prepared to dismiss the unfavourable external perceptions as baseless; the best way to change them is to try to address them head-on and begin to act differently.

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Call for Nominations

University - Industry Synergy

NSERC invites your nominations for the 2001 University-Industry Synergy Awards, a nationwide competition that showcases distinguished university-industry collaborations.

Every year, the University-Industry Synergy Awards recognize outstanding examples of R&D partnerships in the natural sciences and engineering. They include a $25,000 research grant component and will be presented at a gala event in November 2001.

Please submit all nominations by June 1, 2001.

For more information, visit the NSERC Web site at www.nserc.ca/about/award_nomin_e.htm.

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Let me mention just one specific action under the "Transformation" initiative. NSERC will launch what we are now calling NSERC Innovation Platforms, NIPs for short. NIP is not a new program, and it will never be defined crisply in terms of program parameters and criteria. On the contrary, it will be specific only in example.

NIPs will be a new framework within which NSERC will collaborate as a partner with any external organization, agency, initiative, or program whose mandate includes supporting long-term university research in science and engineering, and the training of highly qualified people in that research. The overlap of such a mandate with NSERC's is a necessary condition for the creation of a NIP, and the activities in that area of overlap would constitute the NIP. NSERC would, of course, not be involved in any activities of the partner organization that fell outside of NSERC's mandate. That said, we may expect as many different organizational and administrative arrangements as there will be NIPs.

To make the NIP succeed, NSERC would contribute what we do best: working closely and continuously with the NSE research community to develop people and ideas, using peer review to make funding decisions that support excellence, monitoring the use of public funds, and measuring results and impacts. In some cases, or perhaps even in most, NSERC might contribute funding to the joint effort.

In return, NSERC would impose only one condition: that the additional benefits of any such NIP should be accessible to all members of the research community served by NSERC ***without the need for submitting additional applications***. As indicated earlier, the people NSERC supports already have too little time for their research. They must not be burdened by having to prepare new applications to a new agency with new rules, new schedules, etc.

How might this be done? One way that comes to mind is the mechanism of self-identification. Let me illustrate it with the entirely hypothetical example of an NSERC Innovation Platform in nanoscience. One could imagine that all NSERC grantees might be invited to answer three simple questions: 1) Do you believe that the research that is the subject of your current or most recent application to NSERC might contribute to the development of nanoscience in Canada as described in the goals and mandate of the NIP on nanoscience? Yes or no. If yes, then 2) Do you agree to give NSERC permission to transfer your current or most recent application for a research grant, as well as NSERC's funding decision on that application, to the NIP on nanoscience, for consideration for membership in the NIP and for possible additional funding? Yes or no. If yes, then 3) In a hundred words or less, please describe how your current research might contribute to the goals of the NIP in nanoscience. I believe that such a process would be much less of a burden than having to develop a whole new application for research support.

It is evident, of course, that a pre-condition for a NIP to succeed is that a researcher of note should agree to head the effort as research director, and that other eminent scholars should agree to serve on a research advisory committee. The director and the committee would initially have the task of deciding whom to accept into the NIP on the basis of the responses to the above three questions. In this way, the NIP would be both inclusive and selective. Interested researchers whose NSERC applications are submitted to any GSC could apply, but the NIP would include only those who were judged able to contribute to its goals. This process would not be an end-run around peer review, since all applicants would already have gone through the Research Grants competition. Likewise, the creation of a NIP would not short-circuit the Reallocations exercise, which remains hugely important as the strategic planning exercise of the existing disciplines.

A NIP would be created by NSERC whenever the need arose, and it would be done quickly, once a compelling case was heard and a potential research director identified. An example might be the need to jump-start a new field of research in Canada, say (again), nanoscience. Another example might be the need to support a much larger number of researchers in an existing field because of an urgent need for highly trained young people (e.g., the case being made by the industry-led initiative called eMPOWR, which identifies a need to support more professors and students working in the hardware portion of the ICT sector).

I intend to speak about these changes in more detail any time that an opportunity arises to address members of the NSERC community at their home universities, at scientific meetings, etc. I am sure that I shall learn a great deal in that process, just as I have already learned much from my meetings with all the GSCs last month.

NSERC's Council and staff are working hard to meet the needs of the science and engineering research community that we serve, whether they be for more time for research or for a response to some urgent new need for support, or just for "more of the same" research funding. I think that the label "NSERC, the ***Smart*Canada** People" is most appropriate.

Members of the Reallocations Committee Announced

NSERC's Council has now selected the members of the Reallocations Committee for the 2002 Exercise. Dr. Martin Godbout, President and CEO of Genome Canada and a member of Council, will chair the Committee. The list of members can be found on NSERC's Web site at www.nserc.ca/programs/real2000/com_e.htm.

2001 NSERC Prize Winners Announced

The NSERC E.W.R. Steacie Memorial Fellowships and Doctoral Prizes are two of Canada's most important research prizes.

The prestigious Steacie Fellowships are named after Dr. Edgar William Richard Steacie, a physical chemist who, as President of the National Research Council from 1952 to 1962, did much to encourage young researchers. Open to both women and men, the fellowships are awarded to enhance the career development of outstanding and highly promising scientists and engineers who are staff members of Canadian universities. Successful fellows are relieved of any teaching and administrative duties for two years.

The NSERC Doctoral Prizes are awarded in recognition of high-quality research conducted by students completing their doctoral degrees. There are two awards in the natural sciences and two in engineering; each winner receives a $5,000 cash prize and a silver medal from NSERC.

Ten Canadians have been named winners of the 2001 NSERC Steacie Fellowships and Doctoral Prizes. Industry Minister Brian Tobin and NSERC President Dr. Tom Brzustowski made the announcement in early February.

2001 NSERC Steacie Fellows

Dr. Simaan AbouRizk
University of Alberta
Computer-simulation software for construction

Dr. Simaan AbouRizk

Dr. AbouRizk has developed computer-simulation software to help construction companies improve their operating and management techniques. Through a flexible, user-friendly interface, construction engineers can design or analyze construction processes, optimize production, and find the best alternative to build a facility. Dr. AbouRizk found that in construction, coordinating the various skilled labourers is often the most important and challenging part to model in computer simulations.

As an NSERC Steacie Fellow, Dr. AbouRizk will pursue his current goal: to have most construction companies in Alberta use computer-simulation software by 2007.

Dr. Peter Grütter
McGill University
Nanotechnologies research

Dr. Grütter is setting the scientific groundwork for the development of nanotechnologies — atomic-scale technological devices. As an NSERC Steacie Fellow, he will be able to continue measuring the electron transport properties of individual molecules.

Owen Egan

Dr. Peter Grütter

In the past, researchers were not able to define the nanoscale contact wires that deliver and receive electrons to the intermediary molecule. Dr. Grütter's Montreal lab solved this problem by building a unique device to measure the individual components of a nanoscale electronic system. The device allows the researchers to atomically view, manipulate and measure the behaviour of the contact leads.

Dr. Grütter, who grew up in Switzerland, Chile and South Africa, is now also collaborating with medical researchers to study the electrical conductivity of nerves. He will use his instruments to help medical practitioners understand pain propagation.

Dr. Ben Koop
University of Victoria
The study of molecular evolution

Dr. Ben Koop's research into the complex gene mixes that influence molecular evolution — from the human immune system to deep-sea snails — has opened up potentials in many areas, including potential cancer therapies and better ways to manage British Columbia's wildlife. For example, a better understanding of the basic mechanisms of autoimmune diseases, such as rheumatoid arthritis and cancers, can be used to develop potential therapies.

Dr. Ben Koop

Dr. Koop's success in this quickly developing, information-intensive field is fuelled by his strong technical skills. In 1996, he collaborated in documenting what was then the largest human genome sequence, a segment of the human beta T-cell, a key part of the immune system.

Dr. Arokia Nathan
University of Waterloo
Electronics on flexible plastic

Dr. Nathan's cutting-edge research to develop electronics, including sensors and displays, on flexible plastic, captures the imagination in its potential to bring futuristic concepts to reality. His results could lead to anything from smart-cards that digitally display bank information, to digital X-ray images that eliminate the need for X-ray films. The researcher's long-term goal is to create the ultimate smart-plastic device — a personal digital assistant.

So far, Dr. Nathan's major technical challenge lies in creating thin-film silicon circuits on flexible plastic. But the new NSERC Steacie Fellow is confident that he will have working prototypes of flexible plastic displays within the period of the fellowship,

Dr. Arokia Nathan

Dr. Sarah Otto

and will be able to make the technology available to Canadian industry.

Dr. Sarah Otto
University of British Columbia
Applying mathematical models to evolution

Dr. Sarah Otto is tackling a broad range of questions about what sets the pace of evolution and how evolution shapes genome structure. For example, she has determined how a decline in population size, such as that caused by human activities, reduces the ability of a species to adapt to a changing environment.

By combining math and biology, Dr. Otto's research has generated answers to age-old questions, such as why do so many organisms have sex. She provided the first formal proof of the hypothesis that sex and genetic recombination would evolve because they increase the chance that beneficial genetic mutations can be brought together.

Dr. Warren Piers
University of Calgary
Creating synthetic catalysts

Dr. Warren Piers

Dr. Warren Piers' research may soon lead to plastics with more precise structures and therefore unique and useful physical properties. He has greatly improved our understanding of the polyethylene creation process by creating catalysts that knit together small, single gas molecules to form large solid ones. Reactions that previously involved a stew of catalysts now involve only one.

In the past, Dr. Piers specialized in organometallic chemistry — organic molecules bonded to large metal atoms. His postdoctoral research was part of a revolution in the understanding of the chemical behaviour of so-called early-transition metals, such as scandium and titanium.

2001 Doctoral Prize Recipients

Dr. Cameron Currie
University of Toronto
Ants, fungi and bacteria symbiosis

Dr. Cameron Currie's research on ants captured not only the scientific but also the popular imagination — leading to more than two dozen media interviews and a cover story in the New York Times science section.

Dr. Currie has discovered a fascinating four-way relationship involving an ant, a fungus that it 'cultivates' and feeds on, a second fungus that attacks the first, and an antibiotic bacterium that the ant harbours to destroy the harmful fungus. As a result of the media exposure, his ants have become entomological celebrities in their own right. One colony even appeared in a music video, while another is on display at a Chapters bookstore. He completed his doctoral thesis at the University of Toronto's Department of Botany. Dr. Currie grew up in Edmonton, Alberta.

Dr. Eldon Emberly
Simon Fraser University
Exploring the quantum universe

Albert Einstein called it "spooky action," but for Dr. Eldon Emberly it is something to be observed, measured and explained. Both physicists are talking about the quantum mechanical effects of matter. Until the last 20 years, these atomic-level effects — first identified by Einstein and others in the early 1900s — have remained in the realm of theory.

Dr. Emberly is exploring the practical dimensions of this quantum universe in the form of molecular wires and transistors, including resistors. "The amazing thing is that these 'molecular resistors' behave nothing like a conventional resistor you might buy at an electronics store," he says. Dr. Emberly spent his childhood in Winnipeg and received his doctorate from Simon Fraser University.

Dr. Yuri Leontiev
University of Alberta
Teaching computers meaning

Remarkably, Dr. Yuri Leontiev has made computers clearly understand that while books can get wet, they don't drink. In his doctoral thesis, *A type system for an object-oriented database programming language*, he explains a consistent type system he designed that would allow for thorough automatic checking of logical semantic associations.

Because Dr. Leontiev was not affiliated with any previous attempts to create a unified object-oriented database programming language, he didn't realize the enormous scope of the challenge. He was therefore able to trace a new route to scale this computer science pinnacle. Dr. Leontiev received his PhD from the Department of Computing Science at the University of Alberta. He is a native of Moscow, Russia.

Dr. Vien Van
University of Waterloo
The practical mathematics of optical effects

Dr. Vien Van is turning theory into practice when it comes to non-linear materials. The unique optical effects of non-linear materials were first noted in the early 20th century, but until recently have remained in the domain of theoretical physics.

Dr. Van's research sets the mathematical groundwork for using these theoretical concepts to increase the speed of telecommunications and logic devices. "The next step is to actually build so-called all-optical systems," he says. Born in Vietnam, Dr. Van moved to Vancouver while young and completed his doctorate at the University of Waterloo.

Four New NCEs Established

Industry Minister Brian Tobin recently announced a four-year investment of $73.3 million to establish four new Networks of Centres of Excellence (NCEs):

- The Automobile of the 21st Century (AUTO21)
- The Canadian Language and Literacy Research Network (CLLRN)
- The Canadian Water Network (CWN)
- The Stem Cell Genomics and Therapeutics Network (STEMNet)

These four NCEs will tackle important research issues and reinforce Canada's commitment to compete and lead in the knowledge-based global economy.

"The NCE program is recognized internationally for research excellence in areas of strategic importance," says Dr. Tom Brzustowski, NCE Steering Committee Chair. "The new networks will develop innovative research programs critical to our economy and quality of life, and put new knowledge to effective use."

Selected through a rigorous independent review process, NCEs are industry, university and government partnerships that connect research with industrial know-how and practical investment.

The NCE program is administered by NSERC, the Canadian Institutes of Health Research (CIHR), and the Social Sciences and Humanities Research Council (SSHRC), in conjunction with Industry Canada. Visit the NCE program Web site at www.nce.gc.ca.

(from left to right) Susan Whelan, Essex MP and Master of Ceremonies, Robert Gillham (CWN), Peter Frise (AUTO21), Donald Jamieson (CLLRN), Herb Gray, Deputy Prime Minister, Brian Tobin, Minister of Industry and Minister responsible for the NCEs, and Keith Stewart (STEMNet).

Engineering Application Guidelines Under Review

NSERC has set up an advisory group to ensure that engineering applications to the Council continue to receive the most appropriate peer review. The group, which includes experts from universities and associations, as well as representatives from SSHRC and CIHR, will have several jobs.

They will:

- examine existing guidelines and, if necessary, recommend revisions so that they reflect appropriate performance indicators;
- formulate criteria to determine whether an engineering activity lies within NSERC's mandate and, based on these criteria, comment on the extent to which areas, such as management, engineering economics, engineering education, technology transfer, architecture, and others that it may identify, lie within NSERC's mandate;
- advise NSERC on what role it could play in helping overcome cultural barriers that keep design engineering from being recognized as an essential and integral part of engineering;
- study the membership and review processes used by NSERC's Grant Selection Committees, and advise NSERC on necessary changes; and
- recommend ways to help other groups, such as university promotion and tenure committees, evaluate the contributions and impact of engineering research.

NSERC last revised its evaluation criteria for engineering applications in 1993.

The present advisory group plans to complete its work by January 2002. For input into the work of the group, contact Michèle Beaudry at michele.beaudry@nserc.ca.

Membership of the Advisory Group

Chair:	
Gilbert Drouin	Valorisation Québec
Members:	
Pascale Carayon	University of Wisconsin
Huw Davies	University of New Brunswick
Peter Flynn	University of Alberta
Peter Frise	University of Windsor
Paul Guild	University of Waterloo
Michael Isaacson	Canadian Academy of Engineering
Robert Kearney	McGill University
Marie Lemay	Canadian Council of Professional Engineers
Joe Paradi	University of Toronto
Ian Rowe	CRESTech
Martha Salcudean	University of British Columbia
Gordon Slemon	University of Toronto
Paul Stuart	Processys Inc./École polytechnique

Northern Research Gets a Boost

Council has laid the foundation for rebuilding Canadian university-based northern research with a program that will ramp up over two years to approximately $1.25 million per year.

"NSERC has launched a small program consisting of up to six Northern Research Chairs, and is making available additional support for postgraduate and postdoctoral study," said Elizabeth Boston, Director of Life and Earth Sciences, Research Grants.

President Tom Brzustowski calls it "a modest but important step for NSERC. We felt obliged to take it in light of the significance of the North to Canada. We hope, of course, that our action will catalyze a much more substantial program of northern research."

This effort is in response to the report of the Task Force on Northern Research (*Contact*, Fall 2000). The full $24 million program advocated by the Task Force — a joint initiative of NSERC and SSHRC — will require new funds from the federal government.

The report, *From Crisis to Opportunity: Rebuilding Canada's Role in Northern Research*, proposed a five-point program: establish university research chairs; create scholarships and fellowships; support strategic research projects; build new partnerships between universities and northern communities; and provide funding for equipment and infrastructure. The report is available on NSERC's Web site at www.nserc.ca/news/2000/p000921.htm.

NSERC and SSHRC will post a joint response to the report's policy recommendations on their Web sites in April. In announcing its support for the report's findings, SSHRC made a commitment to fund the proposed activities — including its innovative concept for northern Community-University Research Alliances — should additional funding become available.

Information on the new NSERC Chair and stipend program is now available at www.nserc.ca.

Taking Care of Our Research Collections

Our valuable research collections should be around for many years to come so that future researchers can benefit from them, just as researchers do today.

That's why the three federal granting agencies (CIHR, NSERC, and SSHRC) are finalizing a framework that will clarify their general expectations on the care and maintenance of collections established as part of Agency-funded research programs. The goal is to ensure that such collections are eventually transferred to appropriate repositories, where they will receive long-term curatorial care and where scientists will have reasonable access to them. Collections range from cells (animal or human), through insects to artifacts.

The *Framework for Researchers Working with University-Based Collections* was drafted with the assistance of an Advisory Group composed of researchers from various disciplines, representatives of professional societies, directors of research from provincial and federal museums, and a representative of the Canadian Association of University Research Administrators (CAURA). In March, the Agencies will ask for comments from the Vice-Presidents of Research and Research Grants Officers of all institutions who now qualify for support from at least one of the Agencies. The Agencies will also seek the views of various professional associations with an interest in collections.

We invite researchers to read the report, which will be available on NSERC's Web site in late March, and provide us with their comments.

Environmental Assessment Applications Reviewed

The Environmental Assessment (EA) Unit reviewed almost 600 applications in the recent Research Grants competition. The Unit sent out more than 100 letters to applicants requesting further information and directed eight to undergo a full screening under the *Canadian Environmental Assessment Act* (CEAA).

The EA Unit also reviewed applications from the Research Partnerships Program. The 30 proposals that it reviewed required additional information, resulting in three screenings under the Act.

NSERC created the Environmental Assessment Unit in October 2000 to ensure that proposals submitted to NSERC and that may affect the environment are identified and reviewed under the Act. The Unit is currently working with Networks of Centres of Excellence (NCE) staff to develop an environmental review process geared to the needs of the NCE program.

For EA-related information, contact Diane Fraser or Robert Roy at enviro.assess@nserc.ca.

NSERC Plays Matchmaker

NSERC is doing even more to bring together people and organizations into productive relationships.

In May 2000, we launched the NSERC Concourse — part of our Web site — to help students, researchers and companies find research partners in areas of mutual interest. Parties submit descriptive postings, via e-mail, under four headings: For Students, For Researchers, For Companies, and Job Postings. The postings normally remain on the site for 90 days.

The NSERC Concourse is a free service open to individuals and organizations involved in research areas that fall under NSERC's mandate.

For more details, see our Web site at www.nserc.ca/match/main-e.htm.

NSERC Award Winners Recognized

Dr. Howard Alper (rt), winner of the Gerhard Herzberg Canada Gold Medal for Science and Engineering, poses with Her Excellency the Right Honourable Adrienne Clarkson, Governor General of Canada, and NSERC President Dr. Tom Brzustowski at Rideau Hall during a ceremony honouring the NSERC 2000 prize winners on December 7.

NSERC Forges Closer Ties With Community Colleges

NSERC is pleased to announce that two community colleges recently qualified for NSERC support. Faculty at the **Collège communautaire du Nouveau-Brunswick à Bathurst (CCNB-Bathurst)** in Bathurst, New Brunswick, and the **Olds College** in Olds, Alberta, can now participate in several NSERC project research programs as co-applicants with university professors. These programs include:

- International Opportunity Fund
- Collaborative Research Opportunities Grants
- Genomics Projects
- Collaborative Health Research Projects
- Strategic Projects
- Research Networks
- Collaborative Research and Development Grants
- Technology Partnerships Program
- Research Partnership Agreements with Canadian Government Departments and Agencies

These are the first colleges to become eligible since Council agreed a year ago to support research in community colleges to acknowledge the encouragement that colleges give young Canadians to pursue careers in the natural sciences and engineering, and to recognize their partnerships with universities and the private sector.

For further information, contact NSERC's Corporate Secretary, Ms. Isabelle Blain, at isabelle.blain@nserc.ca.

Canada's First Chairs in Design Engineering Announced

Industry Minister Brian Tobin recently announced federal funding of $4.8 million for design engineering chairs at five Canadian universities: University of Manitoba, Université de Sherbrooke, Dalhousie University, University of Calgary, and École Polytechnique.

"These five chairs — and there are more in the pipeline — will generate the knowledge and training that will give us the home-grown base of Canadian innovators that our industries are urgently seeking," said Mr. Tobin at Dalhousie University, where he made the announcement.

Design engineers are the people who take an invention and turn it into an economical and safe commercial product or process. As such, they play a key role in bringing new goods and services to the market.

NSERC expects to announce the next phase of the program in May 2001 with a September 1, 2001, submission deadline. Contact Barbara Muir (barbara.muir@nserc.ca) for additional information.

Chairholder	University	Area
Dr. Ron Britton	University of Manitoba	Design-ready engineers
Mr. François Charron	Université de Sherbrooke	Innovations in design engineering
Dr. Peter Gregson	Dalhousie University	Total design
Dr. Peihua Gu	University of Calgary	Life cycle engineering
Dr. Paul Stuart	École Polytechnique	Process integration