

## POLICY BRIEFING - INNOVATION

# Ten years of research infrastructure: building knowledge advantage for Canada

Budget 2007 provides \$510-million to the CFI to enable it to undertake another major funding competition before 2010. The CFI welcomes the Government of Canada's commitment to cutting-edge research and innovation, as well as its tremendous vote of confidence in the ability and quality of Canada's world-class research community.

By ELIOT A. PHILLIPSON



Knowledge-intensive economies and societies of the 21<sup>st</sup> century will be characterized by a cutting-edge research enterprise, a highly-educated and skilled workforce, as well as a business, regulatory, and social environment that encourages entrepreneurship and creative thinking.

Government plays a critical role in promoting each of these elements. In Canada, the federal government has assumed increasing responsibility for supporting the key components of the public-sector research and development enterprise—people, ideas, and infrastructure—through the specialized research funding agencies:

- the Canada Research Chairs (CRC) program is directed predominantly to enhancing Canada's pool of internationally-competitive research scholars through its support of people;

- the funding agencies (Social Sciences and Humanities Research Council, Natural Sciences and Engineering Research Council, and Canadian Institutes of Health Research) focus their resources largely on the discovery of new knowledge and ideas through the support of the direct and indi-

rect costs of research;

- the Canada Foundation for Innovation (CFI) provides state-of-the-art equipment and infrastructure to institutions and researchers, without which world-class research could not be conducted.

Since its creation in 1997, the CFI has invested \$3.69-billion in approximately 5,000 research projects at Canadian universities, colleges, research hospitals, and other non-profit research institutions. The CFI's support spans the full spectrum of research—natural sciences, engineering, health sciences, social sciences, and humanities. And in many cases, CFI funding has brought these disciplines together in exciting and highly innovative new initiatives.

Increasingly, the CFI is working with the CRC program and the three research funding agencies to coordinate support of R&D, thereby ensuring the most effective investment of resources. For example, from the inception of the CRC program, the CFI has provided support for the equipment and infrastructure required by chair recipients to establish and sustain their research programs. This joint CRC-CFI approach has helped attract the best and brightest research minds to Canadian institutions, and reversed the "brain drain" of the 1980s and early 1990s.

More recently, the CFI has led a col-

laborative initiative with the three funding agencies and several other partners to create a national high-performance computing (HPC) network across Canada. This network builds upon seven regional HPC consortia in which the CFI has invested previously, and takes advantage of the exceptional capabilities provided by CANARIE, the world's first national optical internet research and education network. This system will link all of Canada's research-intensive institutions, and will do for Canada's knowledge-intensive economy what the building of a transcontinental railway did for the natural resource and industrial economies of the 19<sup>th</sup> and 20<sup>th</sup> centuries.

Much like investing in childhood education, the full economic and social benefits of investments in R&D may take years to fully materialize. Nevertheless, the impact of Canada's investments is beginning to emerge, and points to an impressive return on investment in the years ahead, if the course is maintained.

In the case of the CFI, one of the most visible benefits to date has been the success of Canadian institutions in recruiting and retaining outstanding researchers, despite intense worldwide competition. Closely related is the enhanced capacity of Canadian institutions to train the knowledge workers and highly skilled technical staff that will be critical to Canada's future R&D-based economy—whether in the private, public, non-profit, or academic sectors.

Several of the CFI's investments in multi-million dollar facilities have given Canada a competitive edge internationally and led to worldwide admiration for Canada's S&T strategy. These

include, for example, the Canadian Light Source Synchrotron at the University of Saskatchewan; the Sudbury Neutrino Observatory (SNO) Laboratory, led by Carleton and Queen's universities; the Amundsen research icebreaker, a floating Arctic environmental and oceanographic research laboratory headed by Laval University; the VENUS and NEPTUNE sea-bed research observatories, coordinated by the University of Victoria; the Diabetes Research Centre at the University of Alberta; and the National Site Licensing Project at the University of Ottawa.

Budget 2007 provides \$510-million to the CFI to enable it to undertake another major funding competition before 2010. The CFI welcomes the Government of Canada's commitment to cutting-edge research and innovation, as well as its tremendous vote of confidence in the ability and quality of Canada's world-class research community. These new funds will allow the CFI to continue its vital role—providing infrastructure to support excellence in research and innovation. As Prime Minister Stephen Harper noted recently, CFI investments over the last 10 years have "given Canadian researchers the possibility to leave their mark through discoveries that have a positive impact on the lives of thousands of Canadians, while also contributing to the economic development of this country."

Canada's research and development enterprise has clearly made impressive advances in recent years. With this renewed commitment by the Government of Canada, and by working together, we can maintain this momentum in the future. The challenges faced by Canada in the 21<sup>st</sup> century will be great, but the opportunity is even greater—that of building a nation of innovation.

*Dr. Eliot A. Phillipson is president & CEO of the Canada Foundation for Innovation.*  
news@hilltimes.com  
The Hill Times

# Forging a new kind of literacy

By CHAD GAFFIELD

In 1982, Northrop Frye, one of Canada's great literary critics and university professors, published *The Great Code: The Bible and Literature*. It was a monumental work, exploring translations and interpretations of words, letters and books written many hundreds of years ago, and it has gone on to be published in more than 22 languages.

Frye was an early adopter of technology and wrote his tome on one of the early personal computers. What few know, though, is that shortly before the book was to go to press, something happened to the large floppy discs on which it was stored and his almost-completed work was lost. Nor had he backed up his discs or printed out his manuscript. Fortunately for the rest of us, Frye's typing skills were legendary, his memory exceptional. He pulled out his old IBM Selectric typewriter and re-wrote the book in just a few short months. It didn't have as many footnotes as either he or his critics would have liked, but it was completed and remains with us today.

We have all witnessed a rapid evolution of our communication technologies, and this has driven new industries, patterns of dissemination, and mass consumption of increasingly diverse, personal production. The digital age has changed the value and meaning of literacy. References Frye assumed would have resonance for his readers—and which had resonance for the literate populations of past eras—would puzzle many a graduate student today.

New research in the social sciences and humanities is contributing to our under-

standing of this complex interplay of culture, technology and social change in a variety of ways. This research helps us understand the challenges, it guides our legislative and policy deliberations, and it informs future innovation. Three recent Canadian success stories underline the point.

The Social Sciences and Humanities Research Council funded the just-completed

History of the Book in Canada initiative, which provides critical historical context for present-day questions: What is the future of the book as a central means of communication? Even more basic, what is a book? How can books be preserved? How and by what means should they be made accessible? What are the alternatives?

The project explored topics that ranged from Aboriginal communication systems to multinational publishing companies. The results can be found in three spectacular books (published in English by University of Toronto Press and in French by Les Presses de l'Université de Montréal); they also live in five databases that are available for future research, spatial analyses and, perhaps, applications we have not thought of yet.

Even though computerization of com-

munication raises many questions about the meaning of literacy, a number of old questions persist. Early books did not have page numbers or indexes. Copies were difficult to make. They were not systematically preserved in archives. How many of our communications—our data collections, our emails, our research, our correspondence and our photos—are inaccessible because they are not indexed, or because they reside on some superceded or out-moded media?

The second research example addresses those very questions. Under the leadership of Professor Luciana Duranti at University of British Columbia, and through the SSHRC-funded InterPARES project, Canadian scholars are leading interdisciplinary international efforts to create guidelines and standards for digital records that are being implemented by governments, industry and the makers of technology around the world.

The goal is to ensure the preservation and accessibility of our records. The name InterPARES comes from the Latin phrase, "among peers," highlighting the enormous collaborative effort required to achieve this goal. Today, it also stands for International Research on Permanent Authentic

'Our public investment in research in the social sciences, the humanities and in infrastructure has the potential to return great dividends for Canada, enabling us to pursue a new form of social literacy, as we strive to understand, guide and respond to new developments.'

Records in Electronic Systems—and it is getting attention from the medical community, judicial institutions, agencies such as NASA and businesses such as the film company DreamWorks. Professor Duranti's achievements were recently recognized by the British Columbia Innovation Council when they presented her with the 2006 Frontiers in Research Award.

As a final example, the Canada Foundation for Innovation has invested \$25-million to produce, store, and provide access to digital content, archival material, publications, audio files and other records. These records are critical for our students, professors and other researchers. Through these joint infrastructure initiatives with the Canadian Research Knowledge Network and the Synergies project, researchers pursuing complex global, social, cultural, political and economic questions will have unprecedented multi-institutional and interdisciplinary opportunities for collaboration and innovation.

We develop new technologies in response to our needs and desires. Those needs and desires, along with our behaviour, often shift in response to the new technologies—inspiring more innovation, which in turn drives more change. Many of these complex cycles are in constant motion in the world, and our new communication capabilities enable them to intersect and interact in unpredictable, non-linear and fascinating ways.

Our public investment in research in the social sciences, the humanities and in infrastructure has the potential to return great dividends for Canada, enabling us to pursue a new form of social literacy, as we strive to understand, guide and respond to new developments.

*Chad Gaffield is president of the Social Sciences and Humanities Research Council of Canada.*

news@hilltimes.com  
The Hill Times