



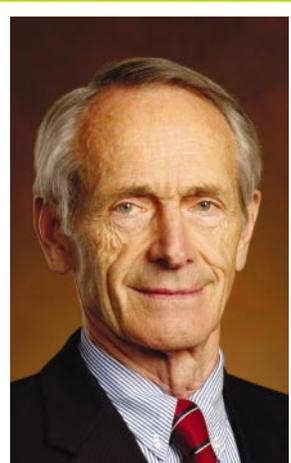
ANNUAL REPORT
2002 · 2003



Canada Foundation for Innovation
Fondation canadienne pour l'innovation

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Message from the Chair

In the six years since the CFI was established, extraordinary federal and provincial initiatives have created a dynamic research environment enabling new and established researchers to undertake world-class projects. Unprecedented levels of research support have transformed the research landscape at our country's universities and hospital research institutes. The national granting agencies have been strengthened. New programs, the Canada Research Chairs Program, and Genome Canada have been added, and the provinces have responded with complementary major investments.

The success of these investments depends on the research planned and executed at the institutional level. Research institutions across the country are identifying key areas of significance to Canada by setting priorities through the development of their strategic research plans. They are integrating ideas and knowledge from many disciplines, establishing their own priorities, anticipating the future, and creating a vision for research in Canada.

This Annual Report describes examples of how researchers supported by the CFI and the other granting agencies are training high-quality personnel for research careers, bringing about breakthroughs in some of the most exciting areas of research today, and beginning to move discoveries from the lab to the marketplace. In this dynamic environment, the CFI must continue to innovate to ensure that we have the means to attract and retain the very best people, to sustain their ongoing contributions and personal development, and to translate the results of their research to improve the quality of life and prosperity of Canadians.

To continue to play a leadership role, the CFI must plan for the future. We need to re-examine our strategy and processes to ensure that the research infrastructure that we support keeps pace with the rapidly changing nature of state-of-the-art research.

Without a doubt, knowledge is one of the most important keys to unlock future economic prosperity and improved social policy. Focussing on excellence and innovation by supporting the research that will lead to groundbreaking discoveries is essential for success in today's knowledge-based economy. It also enables us to address current and future health, environmental, and social challenges. So far, our research investments are achieving this and paying off in the calibre of talent that Canada is able to attract to its communities. As a result, Canada is developing a reputation as one of the leading innovative countries in the world.

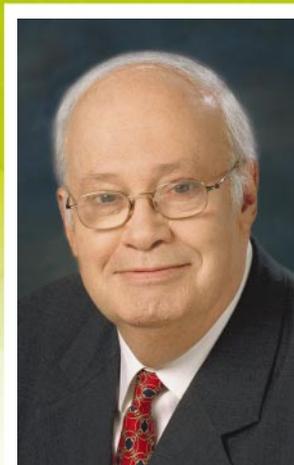
The exciting transformation that has occurred in Canada's research landscape would not have been possible without the support of the Government of Canada—in particular, Prime Minister Jean Chrétien, Finance Ministers Paul Martin and John Manley, as well as Industry Minister Allan Rock. I thank them for their vision and continued commitment to the CFI. We are also grateful for the substantial contributions from the provinces, which have made it possible for the grantees to mobilize matching funds. Finally, I would like to express my appreciation to the Board of Directors, the Members, and the volunteers who have served on assessment committees and reviewed infrastructure proposals, and who have worked so diligently to ensure that the CFI adheres to the highest standards of excellence. Together, these dedicated individuals are ensuring that our country's researchers can continue to make a difference in the lives of countless Canadians for generations to come.

John R. Evans

“CANADA’S INNOVATION STRATEGY REQUIRES A NATIONAL EFFORT—THE SHARED COMMITMENT OF BUSINESSES, ACADEMIA, AND COMMUNITIES WILL POWER CANADA’S RISE TO BECOME ONE OF THE WORLD’S MOST INNOVATIVE NATIONS.”

— Allan Rock, Minister of Industry

Message from the President & CEO



For anyone scouring the research landscape searching for evidence that Canada's Innovation Strategy is working and that innovation is more than a vague concept, the events that took place as our reporting year drew to a close must have been reassuring.

That's when Canadian researchers made a remarkable advancement in the fight against the mysterious global virus known as Severe Acute Respiratory Syndrome (SARS). Working together in a unique trans-Canada collaboration, researchers from the B.C. Cancer Agency, the B.C. Centre for Disease Control, the Health Canada National Laboratories in Winnipeg, and Mount Sinai Hospital in Toronto, became the first in the world to sequence the "coronavirus," suspected of causing SARS. By determining the virus' make-up, the team provided critically important knowledge that's being used to better understand the virus and stop its spread. The development is considered an invaluable first step in creating a diagnostic test and perhaps a vaccine.

But just as importantly, the SARS breakthrough shows what can be achieved through partnerships. It provides vivid proof of the value of Canada's Innovation Strategy and the institutions and agencies that implement it, as well as the kind of results that are transforming our research landscape. The mapping of the SARS virus is a prime example of brilliant minds at work—demonstrating that investments in leading-edge research are paying off with significant benefits to society. It also provides indisputable evidence of the progress we're making in reversing our country's brain drain. Many researchers are being attracted back to Canada, and others are making a critical choice to stay here in the first place, because of the renewed vitality and transformation of the country's research climate.

By most accounts, the Innovation Strategy is working and the full range of benefits of CFI investments is becoming apparent. We can now see Canada's research agenda emerging. Researchers and institutions are broadening their investigation into new and innovative areas that they themselves have identified. They provide a useful roadmap of Canada's research priorities that can be categorized into a number of themes, including: life sciences, genomics, and biotechnology for health; information science technologies; nanotechnology and nanosciences; aeronautics and

space; food quality and safety; sustainable development and global change; and citizenship and governance. Increasingly, the institutions themselves are taking the initiative to form consortia among institutions and with the private sector to meet research objectives.

It is precisely this desire to reach common objectives that is creating valuable new research alliances. Experience has demonstrated that successful knowledge economy clusters develop and are centred around universities that have the ability to provide outstanding opportunities for their researchers to perform at internationally competitive standards. Levels of productivity and innovation improve because of the benefits from pooled knowledge, face-to-face interaction and, most importantly, collaboration. Research collaboration is strongly influenced by geographical proximity—as distance decreases, collaboration increases. As a result, highly qualified personnel are attracted to poles and networks of excellence.

In the middle of all the activity, as innovation swirls around us, there is clear evidence that research and innovation are undergoing major transformations and that we are experiencing one of the most unique times in human history. If the 20th Century was one of increasing differentiation and specialization, then the 21st Century is where these specializations are being integrated. How will it all come together? What will be the ultimate benefits for our society? We are enabling researchers to reach new and exciting research frontiers to improve our quality of life, and in so doing, they will help answer these questions.

In closing, I would like to take this opportunity to extend my most sincere thanks and appreciation to CFI staff, committee members, and reviewers for their contributions over the past year. Their professionalism and dedication have been essential in carrying out the CFI's mandate to advance our country's research and innovation agenda.


David W. Strangway



Agent of Transformation

Canada is developing a global reputation as a place where outstanding research and training is being conducted. Although this new reputation is well deserved, it's no coincidence. In fact, it's the result of a planned transformation that has taken place across Canada and that has empowered our country's researchers and research institutions to reach for the highest levels of excellence, participate in the new knowledge-based economy, and compete with the best from around the world.

The Canada Foundation for Innovation (CFI) has played a significant role in this transformation. The opportunities created by the CFI's programs have helped to reinvigorate the R&D climate, and have changed the atmosphere at Canada's research institutions to one of optimism. Armed with the knowledge that there is support for new initiatives and state-of-the-art infrastructure, institutions have been able to enhance their commitment to long-term research planning and develop research plans—many for the first time—and set priorities for establishing new facilities, recruiting new talent, training, and fundraising. As a result, institutions are now in a better position to pursue new ideas, plan faculty renewal, and attract and retain faculty members and researchers.

Another valuable outcome of the CFI investment is the strengthening of local “knowledge clusters.” Infrastructure-based research platforms are key to international competitiveness and to attracting and retaining outstanding researchers. Building on these platforms, institutional strengths, and the researchers recruited, institutions have been able to compete more effectively for research funds from many sources. Research is more cutting-edge and is conducted faster—with more multidisciplinary and collaboration. The overall result? Canada's research agenda is emerging as institutions identify priority areas of research for the future and invest in projects that are producing long-term benefits for countless Canadians. This means a better quality of life due to improved drug treatments and therapies; technology that's faster and better; agriculture techniques that produce safer, more nutritious food; cleaner water, air, and soil; and cleaner forms of energy.

This transformation of the research landscape, however, would not be possible without one vital and essential element: partnerships. No single institution or organization, acting alone, can make such a positive impact on Canada's research community. The CFI infrastructure support complements the investment provided to Canadian research institutions through the Canada Research Chairs Program and indirect costs. With institutions in a position to attract the best researchers and graduate students, and acquire state-of-the-art tools, researchers can compete more effectively for support from the federal granting agencies—the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council, and the Social Sciences and Humanities Research Council—as well as Genome Canada. In cooperation with provincial and municipal governments, as well as the private and volunteer sectors, we are all working to implement Canada's Innovation Strategy. Along the way, we are creating a more innovative society, achieving a reputation for excellence and opportunity, and ensuring a brighter future for generations of Canadians.

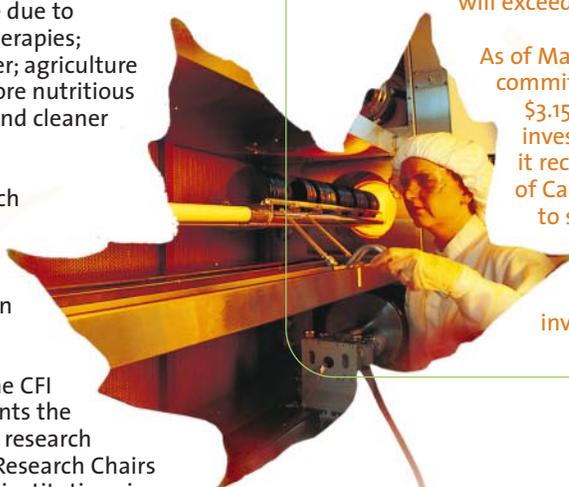
CFI Overview

The CFI is an independent corporation created in 1997 with an initial federal investment of \$800 million that has since grown to \$3.65 billion following renewed funding commitments from the Government of Canada.

The CFI's mandate is very specific: to strengthen the capacity of Canadian universities, colleges, research hospitals, and other non-profit research institutions, to carry out world-class research and technology development. It does this through investment in infrastructure, ensuring that researchers are equipped with the very best equipment and facilities. In turn, this helps them to attract and retain highly skilled research personnel in Canada; strengthen research training of young Canadians for the knowledge society; promote multidisciplinary, as well as networking and collaboration among researchers; ensure the optimal use of research infrastructure within and among Canadian institutions; and to be competitive in the international research environment.

The CFI funds 40 percent of these infrastructure costs, with an additional 60 percent coming from research institutions and their provincial, private-sector, and non-profit partners. This unique funding partnership is generating a critical mass of research investment that will exceed \$10 billion by 2010.

As of March 31, 2003, the CFI had committed over \$2 billion of the \$3.15 billion (plus interest) investment in infrastructure funding it received from the Government of Canada. The funds have gone to support 2,552 projects at 112 institutions in 10 provinces and 55 municipalities, and are triggering a total research investment of close to \$5 billion.



“THIS COUNTRY KNOWS WHERE THE FUTURE OF RESEARCH IS HEADED—MULTIDISCIPLINARY IN NATURE, INVOLVING COMPLEX PROBLEM-SOLVING TECHNIQUES, AND INVESTING IN HUMAN CAPITAL AND INFRASTRUCTURE.”

— Professor Michael Gibbons, Secretary General, Association of Commonwealth Universities

Transforming

Solving the Mysteries of the Brain

UBC researchers are probing deep inside the brain to ease suffering and improve quality of life

The Project

At the University of British Columbia's Brain Research Centre, researchers are dedicated to finding cures for the degenerative diseases that threaten our brains and impose a huge burden on society. From Parkinson's to Alzheimer's, Multiple Sclerosis to Creutzfeldt-Jacob disease, schizophrenia to dyslexia, the Centre's researchers are exploring them all.

The \$28-million Brain Research Centre is a joint venture with the Vancouver General Hospital and Health Sciences Centre. It brings the combined expertise of 140 of North America's leading neuroscientists to bear on a wide range of neurodegenerative disorders that affect the quality of life of thousands of Canadians, and that challenge the capacities of the Canadian health care system.

Headed by Director Max Cynader, the Centre operates a comprehensive "bench-to-bedside" model of patient care. From its Clinical Trials Facility, to the Gene Expression and Analysis Facility, to the Molecular Imaging Facility, the Brain Research Centre is offering researchers, patients, and pharmaceutical companies the latest state-of-the-art facilities and equipment. With support from the CFI, the Centre is helping investigators solve the mysteries of the brain—one of this century's greatest remaining challenges.



Benefits for Canadians

Diseases of the brain inflict long-term suffering on patients, their families, and caregivers. The advances that researchers are generating through their work at the Brain Research Centre promise to alleviate the suffering and improve the quality of life for hundreds of thousands of Canadians. There is also widespread potential for new drugs and economic benefits from the spin-off companies the Centre has spawned.

Researchers have already pioneered novel therapeutic, diagnostic, and genetic approaches to Parkinson's disease. They have also spearheaded clinical trials in the use of interferon-based therapies for patients with Multiple Sclerosis. Another group is leading the way on new drug treatments for Alzheimer's disease.

Brain
Research
Centre



People



Max Cynader
Director, Brain Research Centre

Max Cynader originally believed that his middle name—Sigmund—would guide his career choice. At the tender age of 16, he entered McGill University to study psychology. It wasn't long, though, before he decided he wasn't interested in analysis. Instead, he was captivated by the inner workings of the brain. That led Cynader to further studies at the Massachusetts Institute of Technology, where he earned his Ph.D. in neuroscience, and then to Cambridge University. He is now considered a world leader in understanding the mechanisms of the brain.

“THE STRENGTH OF RESEARCH AND DEVELOPMENT AT B.C.’S INSTITUTIONS PLACES THEM AMONG THE MOST SUCCESSFUL IN THE COUNTRY. SCIENTISTS FROM AROUND THE WORLD WILL FIND NEW REASONS TO COME AND WORK HERE.”

— Graeme Bowbrick, Former Advanced Education Minister, Government of British Columbia

Commercialization

Discoveries by members of the Brain Research Centre have resulted in 14 spin-off companies. Cynader co-founded two of them:

- Wavemakers is a software company that evolved from research Cynader and colleague Pierre Zakaruskas conducted into how the brain listens for particular sounds. They built computer models to filter out background noise and isolate particular types of sound. The software has applications for the sound recording industry, voice-recognition systems, hands-free cell phones, and a new generation of speakerphones. Next year's Chryslers will contain this technology, enabling drivers to “talk” to their dashboards.
- A second gene-therapy company, co-founded with colleagues Michael Hayden and Frank Tufaro, is called Neurovir Therapeutics Inc. In their work, the researchers genetically modified the herpes virus that most people have living inside their brains and programmed the virus to tell cells to produce therapeutic proteins that protect against brain tumours. The investigators sold Neurovir, and the research is now being taken through clinical trials.

Partnerships

In addition to the Vancouver General Hospital and Health Sciences Centre, members of Simon Fraser University and the University of Victoria are involved in research projects through the Brain Research Centre, as are faculty members with each of the six teaching hospitals in the Vancouver area. Nine members of the Brain Research Centre hold Canada Research Chairs.

Other funding partners include:

- University of British Columbia
- UBC Hospital Foundation
- Vancouver General Hospital and Health Sciences Centre
- British Columbia Knowledge Development Fund
- Canada Research Chairs Program
- WestCoast Energy Inc.
- Government of British Columbia
- Heart and Stroke Foundation of B.C. and the Yukon
- Multiple Sclerosis Society of Canada
- Canadian Institutes for Health Research
- Natural Sciences and Engineering Research Council
- Great-West Life
- Bank of Montreal
- Jack Brown and Family Alzheimer Research Foundation
- Peter and Joanne Brown Foundation
- Rossanna Estates Ltd.
- Milan and Maureen Ilich Foundation
- Kevin and Patricia Huscroft

Funding Programs

International Funds

Each of the two International Funds received a one-time investment of \$100 million, with the CFI contributing up to 100 percent of the eligible project costs.

The **International Joint Ventures Fund** supports the establishment of a small number of high-profile research infrastructure projects in Canada to take advantage of extraordinary research opportunities with leading facilities in other countries.

The **International Access Fund** provides Canadian institutions and their best researchers with access to facilities in other countries and major international collaborative programs. The Fund enables them to participate in unique collaborative research opportunities that will lead to significant benefits for Canada.

After reviewing 72 submissions proposing projects worth a total of \$1 billion, and selecting 18 for further evaluation, the CFI is proceeding with the funding of nine international projects: three International Joint Ventures projects and six International Access Fund projects.

Innovation Fund

This fund enables institutions to strengthen their research infrastructure in priority areas identified in their strategic research plan. The fund promotes multidisciplinary and inter-institutional approaches and enables Canadian researchers to tackle groundbreaking projects.

Since its inception, the CFI has awarded over \$1.3 billion in support for 586 projects at 81 institutions under the Innovation Fund.

In October 2002, the CFI launched a Call for Proposals for the Fourth Innovation Fund competition with a budget of up to \$450 million. The response to the Call for Proposals was overwhelming—clear evidence that this country's research institutions are committed to making Canada one of the most innovative societies in the world. The CFI received 921 Notices of Intent (NOI) to apply, requesting about \$2.6 billion in project funding—a 70 percent increase in the number of NOIs submitted since the last Innovation Fund competition in January 2002, and a 95 percent increase in the total amount requested from the CFI.

Committed and Projected Amounts (\$M) 1998-2010

	1998-99	1999-00	2000-01	2001-02	2002-03
New Opportunities Fund	37.9	23.5	36.7	37.6	54.1
University Research Development Fund	19.2	10.3	2.7	2.4	0.5
Innovation Fund	143.3	224.8	358.6	592.6	—
College Research Development Fund		7.3	8.5		—
Canada Research Chairs Infrastructure Fund			5.3	54.2	35.8
International Funds					163.6
Career Awards					1.9
Research Hospital Fund					—
Infrastructure Operating Fund				184.1	16.2
Unallocated Amounts					—
Total (\$M)	200.4	265.9	411.8	870.9	272.1

New Opportunities Fund

This fund is key to keeping the best researchers here in Canada and to attracting some of the very best from around the world. It enables eligible universities and affiliated institutions to provide state-of-the-art infrastructure for newly recruited faculty members in their first full-time academic appointment.

Since the fund was created in 1998, the CFI has awarded almost \$190 million in support for 1,144 projects and 1,608 researchers at 68 institutions (and their affiliates) under the New Opportunities Fund. In October, the CFI's Board of Directors allocated an additional \$306 million for the 2003 to 2010 period.

In 2002-2003, the CFI approved funding for 316 projects for a total CFI contribution of over \$54 million, supporting 408 researchers.

Infrastructure Operating Fund

This fund contributes to the incremental operating and maintenance costs of infrastructure projects funded by the CFI. Each eligible institution receives an IOF allocation representing 30 percent of the finalized CFI contribution for projects approved between July 2001 and December 2005 under the Innovation Fund and New Opportunities Fund.

Since the \$400-million fund was created in 2001, the CFI has approved over \$200 million in response to requests from 83 institutions and facilities across Canada.

In 2002-2003, over \$16 million was committed under this fund.

Canada Research Chairs Infrastructure Fund

The Canada Research Chairs Program offers research and salary support for outstanding researchers, identified by the institutions themselves. Chairs are selected based on excellence in research, and in priority areas identified in university strategic research plans.

To date, the CFI has committed over \$95 million to 648 Chairholders at 61 institutions. By the end of 2005, it's expected that 2000 Chairs will have been created, and that the CFI will have provided up to \$250 million in research infrastructure needed by the Chair holders to carry out world-class research.

In 2002-2003, almost \$36 million was approved for infrastructure for 242 Chairholders.

Career Awards

These awards recognize and support outstanding researchers. Each year, up to \$1 million is available for infrastructure for the Career Award recipients of the Natural Sciences and Engineering Research Council (NSERC). An equivalent amount is available for Canadian Institutes of Health Research (CIHR) Career Award recipients.

In partnership with NSERC, each year the CFI provides infrastructure support on a competitive basis for a maximum of six Steacie Fellowship recipients. In a similar agreement with the CIHR, the CFI infrastructure contribution is associated with its Distinguished Investigator awards, for which there are usually a maximum of five recipients per year.

In 2002-2003, almost \$2 million was approved for seven recipients.

University Research Development Fund

This fund operated from 1994 to 1996 and was designed for those institutions that received less than 1 percent of the total sponsored research funding in Canadian universities. Under this fund, the CFI has allocated a total of \$35.1 million to 38 universities. Eligible institutions now submit proposals through the Innovation Fund.

In 2002-2003, the CFI approved one final award for a maximum contribution of \$500,000.

	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	Total Per Fund (\$M)
		218			156			563.8
								35.1
	450							1,769.3
								15.8
		155		No additional funds				250.3
	36.4 to be allocated		No additional funds					200
	2	2						5.9
	100			400				500
	199.7			No additional funds				400
					760			760
				2,479.1				4,500.2

Research Hospital Fund

As part of the 2003 Accord on Health Care Renewal with the provinces, the federal government has allocated \$500 million to the CFI to help address the need for further investment in research hospital infrastructure. This will make it possible to take full advantage of state-of-the-art equipment, innovative ways of doing research, and the hospitals' increased research capacity as a result of hiring additional highly qualified personnel.

The Research Hospital Fund is designed to contribute to research-hospital-based projects that support innovative research and training. Of particular interest are those large-scale infrastructure projects that take a more integrated and multidisciplinary approach among the four pillars of health research—biomedical, clinical, health services, and population health research.

These projects will have significant research infrastructure needs, especially research-related space requirements beyond what is normally supported under the Innovation Fund.

Enabling

Finding Treasure in Trees

Quebec CEGEP inoculates cattle against bacteria using natural antibiotics

The Project

If there's one thing Canada has in abundance, it's boreal forests. In a research laboratory in Northern Quebec, Johanne Morasse and her colleagues are turning coniferous trees—or more specifically, their needles—into a valuable resource that could ultimately neutralize the common bacteria that plagues the Canadian beef industry.

Morasse and her team at the CEGEP de l'Abitibi-Témiscamingue are investigating the antibiotic properties of oil contained in the needles from fir, spruce, and pine trees. The trees have already been logged and de-limbed by Tembec Inc. and other forest companies in the resource-dependent region of Abitibi-Témiscamingue. Using a water-vapour process, the researchers are extracting these essential oils. In a unique partnership, Morasse and her team are working with researchers at Tembec and at the Université du Québec en Abitibi-Témiscamingue to examine the impact of the essential oils on *E. coli*, *listeria*, and other common bacteria in the beef industry that can jeopardize herd health and food safety.

"The results are positive, and we are now determining the dosage (for inoculating cattle)," says Morasse, a forest engineer. "Now that we know that it works with certain bacteria, we will need to find the best application method."

Thanks to a contribution from the Canada Foundation for Innovation, the team at the CEGEP was able to establish the lab and pursue the distillation of the essential oils. They are also investigating the nutritional properties of the muka—the needles left over from the distillation process.



Benefits for Canadians

If veterinarians could routinely inoculate cattle against common bacteria, without using synthetic antibiotics, Canadians could be assured of a safer food chain, and farmers of healthier herds. A natural antibiotic produced from spruce, fir, and pine needles would reduce the farmers' reliance on current antibiotics, a reliance that is already resulting in dangerous levels of antibiotic resistance.

Additionally, a new source of cattle feed developed from the muka, or distilled needles, could supplement the costly hay that is increasingly difficult to come by for farmers in drought-stricken areas of Canada. The research Morasse and her colleagues are conducting at the CEGEP de l'Abitibi-Témiscamingue could result in millions of tonnes of feed—and save millions of dollars for an industry that is currently under assault from trade bans.

Harvesting the needles from de-limbed trees also benefits the Canadian forest industry. The industry currently bears the high cost of transporting and disposing of the mountains of branches that are the residue of their logging operations across Canada.

People



Johanne Morasse
Agro-Forestry Professor,
CEGEP de l'Abitibi-Témiscamingue

It was during her Ph.D. studies in agro-forestry at the University of Helsinki in Finland that Johanne Morasse read studies published by Russian researchers concerning the use of the needles from coniferous trees to feed cattle. That led her to wonder if Canada could use a similar kind of feed to supplement or replace hay.

“I had the chance to see a lot of Nordic agro-forestry and to learn methods that could be well applied here in Canada,” says Morasse.

The daughter of a logger, Morasse obtained her undergraduate degree at Laval University, her Masters in forest engineering at the University of British Columbia, and her Ph.D. at Helsinki University.

“TEMBEC IS VERY INTERESTED IN SUPPORTING RESEARCH THAT WILL OPEN UP NEW MARKETS FOR UNDER-USED NATURAL RESOURCES. WE’RE VERY PLEASED TO BE ASSOCIATED WITH THE RESEARCHERS AT THE CEGEP AND THE UNIVERSITY.”

— David Cameron, Assistant Director of
Research and Development, Tembec Inc.

Partnerships

Other funding partners include:

- Tembec Inc.
- The Province of Quebec (Ministry of Agriculture)
- CEGEP de l'Abitibi-Témiscamingue
- L'Université du Québec en Abitibi-Témiscamingue
- Regional Council for the Development of Abitibi-Témiscamingue
- Agriculture Canada

“THE FUTURE BELONGS TO REGIONS THAT ARE UNIQUE AND CAN DEVELOP HIGH-QUALITY PRODUCTS. ONE OF OUR MAIN AGRICULTURAL PRODUCTS IS BEEF, AND THIS PROJECT WILL HELP US FIND NEW WAYS TO RAISE HEALTHIER CATTLE AND TO BE MORE PRODUCTIVE.”

— Guy Lemire, General Manager, Regional Council for
the Development of Abitibi-Témiscamingue

Evaluations of Funding Programs

Innovation Fund (IF), University Research Development Fund (URDF), and College Research Development Fund (CRDF)

As part of its reporting procedures and commitment to public accountability, the CFI routinely conducts third-party evaluations of its funding programs—so that Canadians can be confident that their investment in innovation is being put to good use.

In 2002, the consulting firm BearingPoint (formerly KPMG Consulting LP) began an evaluation of the IF, URDF, and CRDF. In early 2003, the firm submitted a preliminary report to the CFI's Board of Directors.

The preliminary report found that the programs have had a major impact in transforming Canada's research capacity and environment by significantly improving the quality of infrastructure. There is every indication that these programs are meeting their ultimate objective: helping to build Canada's capacity for innovation, which in turn will contribute to improving Canada's economic and social well-being.

The full evaluation is available on the CFI's corporate website at www.innovation.ca.

Canada Research Chairs Program

A November 2002 independent third-party review of the Canada Research Chairs Program reported on the program's impact on the research community. The firm Hickling Arthurs Low reported that this program is seen as a successful initiative that helps universities to reach their research goals, and provides an incentive to develop further research capacity following a planned and co-ordinated approach. It's also helping to create and develop centres of research excellence that are leading to a strengthened and more internationally competitive research environment in Canadian universities and research institutions.

Communicating Results

InnovationCanada.ca

2002-2003 was the inaugural year for Innovation Canada, the CFI's web-based electronic magazine that showcases some of the most exciting CFI-supported research taking place across Canada. With eight published issues to date, the magazine has developed a substantial core audience and generated significant readership statistics. The first five issues alone generated more than 20,000 visits. The e-zine is available online at www.InnovationCanada.ca.

inno'va-tion and inno'va-tion²

In December 2002, the CFI launched a collection of essays that showcases the innovative and exciting work being done across the country.

The book, *inno'va-tion: Essays by Leading Canadian Researchers*, is a collection of personal stories by 25 of Canada's leading researchers published by Key Porter Books.

The web-based publication, *inno'va-tion²*, is a collection of stories from eight more of Canada's best researchers. It takes advantage of the electronic medium to showcase the researchers' work in a vibrant and modern format. It's available on the CFI's corporate website at www.innovation.ca.

Discover how innovation powers our lives!

inno'va-tion: Essays by Leading Canadian Researchers
A collection of personal stories from 25 of Canada's brightest researchers

To buy the book, call the CFI at (613) 996-3176. You can also view an online sample at www.innovation.ca.

Canada Foundation for Innovation
Fondation canadienne pour l'innovation

Check out *Innovation Canada*, the CFI's electronic magazine featuring more leading-edge research from across the country at www.InnovationCanada.ca.



A Look Ahead: Planning Objectives 2003-2004

Throughout this Annual Report, we see concrete examples of how Canada's commitment to R&D and training of highly qualified personnel is transforming the research landscape at universities, colleges, research hospitals, and other non-profit research institutions across the country.

For the coming year, the CFI has set the following objectives to further enhance the ability of the research institutions and their researchers to compete at the forefront—to undertake research that is increasingly multidisciplinary, collaborative, and sophisticated, and to translate this research into tangible benefits for Canada.

Reaching for New Heights of Excellence and Innovation

Through a rigorous merit review process, the CFI will select a limited number of exceptional infrastructure projects. It will invest up to \$450 million in projects that will enable institutions to address their research priorities and those of their partners, and to be international leaders in areas of strategic importance to Canada.

Attracting and Retaining the Very Best

Through the provision of infrastructure to first-time faculty at universities and to Canada Research Chairs, the CFI will provide the means for institutions to attract and retain the very best researchers. Expenditures are expected to be in the range of \$120 million and will support up to 800 researchers.

Strengthening Infrastructure in Research Hospitals

The CFI will design and launch a fund for \$500 million provided by the Government of Canada in the context of the 2003 Accord on Health Care Renewal, to be committed by 2008. The purpose is to help address the need for further investment in research hospital infrastructure, especially for new and different research space.

Maximizing the Impact of Infrastructure Investments

The CFI will continue to ensure the best use of, and gain the most impact from, investments in infrastructure by approving a contribution of up to \$156 million for the incremental operating and maintenance costs of new projects. This will virtually exhaust the CFI's resources for that purpose.

Institutions and their researchers must have access to adequate research funding, in particular for operations and maintenance support over the long term. The CFI will continue to interact with key stakeholders, including granting agencies and provincial programs, to find efficient ways to support all aspects of the research enterprise.

Sharing Results with Canadians

The CFI will continue to evaluate the impacts of investments in infrastructure. We will work with institutions to develop strategies to communicate the results and impacts of CFI investments in research infrastructure. The CFI will engage the community in discussion on issues related to benefits to Canada, in part through reports on commercialization and cluster development, sponsorships of conferences and workshops, and public announcements.

Fostering Excellence in Management and Operations

The CFI is committed to transparency, integrity, and fairness. As a service organization, we will continue to improve our policies, processes, and products—including information systems, merit review methods, and the corporate website—in consultation with and in response to our clientele. We will conduct audits and maintain proper financial controls for sound financial management.

The CFI will continue to identify new ways to practice excellence in governance and corporate responsibility. As an innovative workplace, we will continue to build strong human-resource practices and policies and provide a stimulating training environment for our employees.

Planning the Future

As part of our ongoing strategic planning, the CFI will continue to monitor global research trends and set directions accordingly. In consultation with institutions and other stakeholders, the CFI will anticipate the most effective ways of exercising its mandate for the future, with a particular focus on the period beyond 2005.



Benefits to Canadians

Reconstructing the Lives of Ancient Hunters

University of Manitoba bioanthropologists are pushing the envelope on age-estimation techniques

The Project

Archaeologists and anthropologists have long struggled with the problem of how to accurately estimate the age of people whose skeletal remains are discovered at sites around the world.

Now, a new Bioanthropology Digital Image Analysis Laboratory at the University of Manitoba is allowing researchers to more accurately determine the life span of early populations.

In one research project, a team headed by biological anthropologist Robert Hoppa is reconstructing the lives of two people whose skeletons were discovered in a gravel pit in Eriksdale, Manitoba. Hoppa and Greg Monks, a research colleague, are using digital imaging analysis, X-rays, isotopic scans, and ancient DNA analyses to determine the lifestyle and diet of the two people dubbed “the bison-hunters.” What kind of information have the researchers been able to pinpoint about the remains? One skeleton is 3,570 years old and belonged to a woman in her mid-40s. The second skeleton is about 3,470 years old and belonged to a man in his early to mid-30s.

The new CFI-supported lab gives the researchers the tools they need to “push the envelope” on age-estimation techniques. The ability to better estimate how long people lived in the past will help researchers understand the long-term evolution of aging.



Benefits for Canadians

Archaeology and anthropology provide Canadians with an opportunity to learn more about their history and culture. They provide insight into the way ancient societies coped and interacted with their environment, which could help us as we experience climate change in 21st Century North America.

Since the Bioanthropology Digital Image Analysis Laboratory opened in summer 2002, it has enabled researchers to make substantial progress on their projects. A prime example? Hoppa and Masters student Barbara Hewitt are re-examining the Fidler Mound burial site in Lockport, Manitoba, first discovered 40 years ago. With new equipment and changes in methodology over the last 30 years, the researchers are making new conclusions about how the people who are buried there once lived.

In addition, the lab equipment acquired with support from the CFI—which includes an X-ray machine, digital microscopy camera, image analysis workstation, imaging camera, and specialized microscopes—is enabling world-class training for a number of graduate students from across Canada. It's allowing them to acquire valuable, transferable skills that can also be applied in clinical settings such as hospitals and research institutions.



People

Robert Hoppa

Associate Professor, Department of Anthropology,
University of Manitoba

Robert Hoppa (*right*) first got hooked on anthropology at the University of Toronto. Although he was majoring in mathematics and computer science, he fell in love with anthropology during his first year in an elective course. It wasn't long before he switched his focus, even though he says he recognized it was not going to be a corporate career. Today, Hoppa is considered an expert in the survival and longevity of past populations.

Hoppa received his Masters degree at the Universities of Bradford and Sheffield in the United Kingdom, followed by a Ph.D. and a post-doctorate at McMaster University in Hamilton. He also spent a year at the Max Planck Institute for Demographic Research in Germany before joining the staff at the University of Manitoba's Department of Anthropology. He currently holds a Canada Research Chair in Skeletal Biology.



“DR. HOPPA HAS UNCOVERED VALUABLE INFORMATION THAT WILL INCREASE PUBLIC AWARENESS OF CANADA’S CULTURAL DIVERSITY, AND PROVIDE VALUABLE DATA FOR CURRENT AND FUTURE PUBLIC HEALTH POLICY AND HEALTH SCIENCE PROGRAMS.”

— Joanne Keselman, Vice-president (Research),
University of Manitoba

Partnerships

Researchers at the Bioanthropology laboratory are working closely with the Historical Resources Branch of the Province of Manitoba. Much of the work involves liaisons with First Nations, such as the Lake Manitoba First Nation, on whose traditional territory the bison hunters' remains were found. At the Historical Resources Branch, aboriginal archaeologist Kevin Brownlee is a liaison between the Lake Manitoba members and the University of Manitoba researchers. They collaborate during the delicate process of analyzing remains while respecting the traditions and culture of the First Nations people.

Other funding partners include:

- The Manitoba Innovation Fund
- The University of Manitoba
- The Winnipeg Foundation
- The Thomas Sill Foundation
- Manitoba Heritage
- Social Sciences and Humanities Research Council
- Canada Research Chairs Program

“ACCESS TO LAB EQUIPMENT THAT FACILITATES THE COMMUNICATION OF RESEARCH IDEAS HAS PROVEN TO BE VITAL TO MY RESEARCH.”

— Linda Larcombe, Ph.D. Candidate



Accountability and Governance

Accountability

The CFI is committed to the principle of public accountability. As a result, it places great importance on evaluating the impact of its investments in research infrastructure. It also recognizes its responsibility to deliver programs that focus on Canada's needs and that enable its researchers to compete in the global, knowledge-based economy.

The CFI has a signed funding agreement with the Government of Canada on investments and disbursements, and must operate within this framework. As an arm's length, independent corporation, the CFI reports to a Board of Directors.

The CFI has many forms of accountability and operates in a highly transparent manner. The CFI has undertaken formal evaluations of its programs to assess their impact and to help determine the benefits they are producing for Canadians. This year, the CFI engaged BearingPoint (formerly KPMG Consulting LP), to conduct an independent evaluation of the Innovation Fund, the University Research Development Fund, and the College Research Development Fund. These evaluations—part of our annual reporting commitment to the Minister of Industry—have been widely disseminated and are available to the public on the CFI's corporate website, along with program and financial information.

To ensure that the institutions that receive infrastructure support are providing the best possible results for the benefit of Canadians, the CFI requires that they be accountable in a number of ways. Institutions are requested to develop and periodically update strategic research plans and priorities—which are made public—to reflect the changing environment. Institutions are also required to submit annual reports describing progress against these plans. These are published and submitted to the Minister of Industry. Institutions must also report on the results for each project for a period of at least five years. And as part of an overall commitment to highlight CFI investment in their region, institutions are asked to submit communications plans.

All approved projects over \$4 million are subject to a contribution audit at the institution. Further, a sampling

of all other projects are also subject to audit. The CFI also conducts regular monitoring visits to confirm sound fiscal accounting practices at the institutions.

The Minister of Industry tables the Annual Report in Parliament and it is widely distributed by the CFI each year. The CFI also makes regular appearances and submissions to the Standing Committees on National Finance and on Industry, Science and Technology, and has a process in place to provide briefings to Members of Parliament, Senators, and senior Government officials.

Multidisciplinary Assessment Committees (MACs) and Reviewers

The CFI assessment process is widely accepted and respected by the research community for its fairness and integrity—due in large part to the impartial and independent status of its reviewers. In all, almost 4,000 research infrastructure proposals have been submitted to and reviewed by over 3,000 reviewers. At the base of this distinctive, two-step assessment process lies the evaluation of each project's strengths and weaknesses. This task is accomplished by experts in the relevant fields—either alone or by committee, depending on the size and complexity of the project.

The results of this review are forwarded to the MACs. Their mandate is to recommend to the Board of Directors which projects represent the most effective investments of public funds in research infrastructure.

The quality and innovativeness of all proposals are reviewed using the three CFI assessment criteria:

- Quality of research and suitability of the infrastructure;
- Contribution to strengthening the capacity for innovation;
- Potential benefits of the research to Canada.

MAC members come from every region of Canada and from around the world. They are selected for their broad experience and expertise in research, research management, and the use of research results. When selecting these volunteer members, the CFI strives to achieve a reasonable balance between language, gender, region, sector of the economy, discipline, and type of institution. To date, more than 275 individuals have served on MACs—with about 30 percent of them coming from other countries. Together, they have assessed almost 1,800 research infrastructure proposals submitted by universities and research institutions from across Canada.

Expert reviewers and MAC members are expected to maintain the highest standard of ethics in fulfilling their role, and sign a statement to that effect. The expertise and knowledge of these volunteers have played a significant role in ensuring that the CFI funds projects that will benefit countless Canadians, and will contribute to strengthening Canada's research capacity and reputation.

Governance: Members, Board of Directors, Committees

The CFI was established as an independent, non-governmental organization with a Board of Directors. The Board meets three to four times a year and each meeting ends with an *in-camera* session. An annual public meeting is held each year and is widely publicized in several of Canada's leading newspapers.

Members' Roles and Responsibilities

The Board of Directors reports to Members—a higher governing body similar to a company's shareholders, but representing the Canadian public. Members are responsible for the appointment of 8 of the 15 Board Directors. They receive audited financial statements, appoint auditors, and approve the Annual Report at their annual meeting.

Directors' Roles and Responsibilities

The Board of Directors is made up of 15 individuals—7 of whom are appointed by the Government of Canada—from a variety of backgrounds, each with a unique perspective and an understanding of the research world. The Directors are appointed for a three-year renewable term and bring with them expertise in the private, institutional, academic, research, and government sectors. One Director on the Board is a representative from one of the federal granting agencies.

The Board of Directors makes final decisions on projects to be funded and sets strategic objectives in the context of the funding agreement. It approves annual plans and objectives, and reviews the outcomes of these objectives each year. It regularly reviews issues from a risk-assessment perspective—determining what risks are acceptable and ensuring that appropriate mitigation steps are in place. As well, the Board sets the CFI's overall compensation policy, and specifically sets compensation for management.

Audit and Finance Committee

The Board of Directors oversees management's responsibilities for financial reporting through its Audit and Finance Committee. The Audit and Finance Committee reviews the financial statements and recommends them to the Board of Directors for approval and submission to the Members for their approval. The Board of Directors is accountable to the Members who approve the CFI's financial controls and audits. The Audit and Finance Committee's other key responsibilities include reviewing the budgets, internal control procedures, investments, and advising the Directors on auditing matters and financial reporting issues.

In a constant attempt to make the best use of public funds, the CFI through its Audit and Finance Committee, issued a Request for Proposals for its auditing services: internal, external, and contribution audits. The major national accounting firms responded to the request and, after careful evaluation of each proposal, the Audit and Finance Committee recommended to the Board that Deloitte & Touche LLP perform the internal audit function, while Ernst & Young LLP remain the external auditors and conduct contribution audits for CFI-funded projects that receive in excess of \$4 million. The Board of Directors approved the recommendation.

Governance and Nominating Committee

This Committee ensures that the proper framework is in place for the CFI to operate in the most efficient and accountable manner. Among other things, the Governance and Nominating Committee is responsible for amendments to by-laws, human resources policies, succession planning, the annual performance evaluation of the President, and the code of conduct that governs the Board of Directors, CFI employees, and reviewers.

The Committee regularly reviews Board effectiveness and conducted a survey to that effect this year. The results helped to identify areas for the Board to focus on, as well as opportunities for improvement. The Committee also establishes procedures to follow when filling vacancies on the Board and for Members.

Directors and Members are nominated, and then appointed for a three-year term for Directors, and for a five-year term for Members. The Board has chosen to use the guidelines established by the Government of Canada entitled, "Remuneration Guidelines for Part-Time Governor in Council Appointees in Crown Corporations." Directors who opt to receive remuneration from the CFI are entitled to an annual retainer of \$5,000, while committee chairs receive \$7,500. They are also entitled to receive a per-meeting fee of \$750 for attending Board or committee meetings, and a \$500 fee for attending a committee meeting associated with a Board meeting. Members are not entitled to any remuneration. However, they may be reimbursed for any reasonable out-of-pocket expenses they incur while performing their duties or attending CFI Member meetings.



Hooked on Photonics

U of T researchers are breaking new ground with “light” ideas

The Project

At the University of Toronto, Ted Sargent is turning science fiction into reality. Sargent, an electrical and computer engineer, is combining innovation in electronics with communications to go where no one has gone before in the field of photonics—the science of engineering with light. As part of his work, Sargent is manipulating light to facilitate its use as an agile carrier of vast amounts of information.

In the four years since he received support from the Canada Foundation for Innovation to equip a state-of-the-art laboratory at U of T, Sargent has already broken new ground. He has invented an entirely new material—a kind of hybrid plastic—that can produce light at the correct wavelength for fibre-optic communication.

To create that plastic, Sargent and a team of chemists and engineers grew tiny crystals of lead sulphide known as “quantum dots,” which are a billionth of a metre in size. When the dots are embedded in the semi-conducting plastic, they convert electrons’ energy into photons. That dot-embedded plastic could ultimately provide the basis for an optical computer chip that will link light and electricity.

Essentially, Sargent and his colleagues have provided the link to integrate many fibre-optic communication devices on one chip—that could then be used to communicate information and to perform computations.



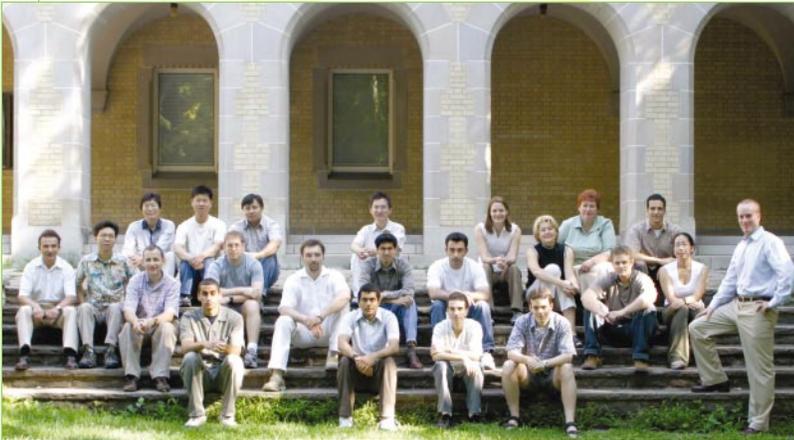
Benefits for Canadians

If Canada is to remain a leader in the field of international telecommunications, it needs to advance in the field of photonics—an area where it is already an established world leader. Sargent and his team are creating the new materials and technology needed to forge optical chips, and the next breakthrough that will revolutionize information technology.

There are many potential applications, including in the health care field. In telemedicine, for example, doctors in major urban centres require dependable networks to send large amounts of information quickly, with no breakdown in the quality of the transmission. Intelligent optical chips are needed to guarantee dependable, high-capacity, flexible communication, similar in style to the way the Internet operates.

Although the capacity to use light to transmit information already exists on a large scale, Sargent is researching ways to adapt the technology to smaller-scale applications and devices. In the not-too-distant future, Sargent’s work could enable all of us to have video teleconferencing in our homes. Or we could directly link the computers in our homes with high-speed networks that use light to transmit information in the blink of an eye.

People



Edward (Ted) Sargent
Professor, Edward S. Rogers
Department of Electrical and
Computer Engineering,
University of Toronto

Ted Sargent's (*right*) interest in lasers, semiconductors, and communications began with his first summer job at Bell Northern Research in Ottawa. He has always enjoyed solving problems, particularly in the field of physics, engineering, and design. After earning his undergraduate degree in engineering physics at Queen's

University, Sargent went on to get a Ph.D. in electrical and computer engineering at the University of Toronto, before joining their faculty.

At 30, Sargent now holds the Nortel Networks-Canada Research Chair in Emerging Technologies. He says the environment created by the CFI investment has helped his research team—just a few short years after it was formed—to compete and succeed on the world research stage.

“DR. SARGENT IS AT THE FOREFRONT OF THIS RESEARCH AND HAS HAD A NUMBER OF SUCCESSES THAT WILL MAKE A TREMENDOUS DIFFERENCE IN OUR ABILITY TO PROCESS INFORMATION OPTICALLY.”

— Safwat Zaky, Chair, Department of Electrical and Computer Engineering, University of Toronto

Partnerships

Other funding and research partners include:

- Natural Sciences and Engineering Research Council
- Canada Research Chairs Program
- Ontario Research and Development Challenge Fund
- Ontario Innovation Trust
- Nortel Networks
- Materials and Manufacturing Ontario

“NORTEL NETWORKS LEVERAGES OUR EXTERNAL INVESTMENTS, LIKE THOSE WITH DR. SARGENT, TO STAY AHEAD OF THE TECHNOLOGY CURVE. IT'S ALL LINKED DIRECTLY TO THE GO-FORWARD STRATEGY OF OUR COMPANY.”

— Ryan Stark, Vice-president of Advanced Technology, Nortel Networks

CFI Members and Board of Directors

Members

Angus A. Bruneau**

Chairman of the Board, Fortis Inc.; Chairman, Air Nova

Jim Friesen**

Professor, Banting and Best Chair, Department of Medical Research, University of Toronto

Gail Gabel*

President and CEO, E.S.I. Environmental Sensors Inc.

Robert J. Giroux**

President and CEO, Association of Universities and Colleges of Canada

Arthur Hanson**

Distinguished Fellow and Senior Scientist, International Institute for Sustainable Development

Monique Lefebvre**

President, Montreal Transition Committee

Judith Maxwell**

President, Canadian Policy Research Networks

Edythe A. Parkinson-Marcoux**

President and CEO, Ensyn Energy

Peter J. Nicholson**

Special Advisor to the Secretary-General of the Organization for Economic Cooperation and Development; Director of the Atlantic Institute for Market Studies

Martha Piper**

President and Vice-Chancellor, University of British Columbia

Guy Saint-Pierre**

(Until Fall of 2002)

Chairman of the Board, Royal Bank of Canada

Donald Savoie*

Clément-Cormier Chair in Economic Development, Université de Moncton

Matt Spence**

President and CEO, Alberta Heritage Foundation for Medical Research

Ron Steer**

Professor, Department of Chemistry, University of Saskatchewan

William Tholl*

Secretary General and CEO, Canadian Medical Association

* Serving first five-year term.

** Serving second five-year term.

Board of Directors



John R. Evans

of Toronto has been the Chair of the CFI's Board of Directors since 1997. He was re-appointed for a second term in 2000. He has worked closely with the Directors, Members, and management to help create a

dynamic Canadian innovation environment—where researchers have the equipment and facilities they need to undertake leading-edge research. He was the President of the University of Toronto from 1972 to 1978, and served as founding director of the Population, Health and Nutrition Department at the World Bank in Washington, D.C., from 1979 until 1983. He is an Officer of the Order of Ontario, and a Companion of the Order of Canada.



Michel Gervais**

of Quebec City, is the Vice-Chair of the CFI's Board of Directors and the Director General of the Centre hospitalier psychiatrique Robert-Giffard. His academic career includes a position as Rector of Université Laval from

1987 to 1997. He has been the Chairman of the Association of Universities and Colleges of Canada, and is an Officer of the Ordre du Québec, an Officer of the Order of Canada, and an Officer of the Ordre national du Mérite (France).



Lorne A. Babiuk**

is the Director of the Veterinary Infectious Disease Organization at the University of Saskatchewan in Saskatoon. He has received numerous awards for his research accomplishments, including the 1993

Xerox Canada-Forum Award recognizing his active involvement in transferring technology from the research laboratory to industry. He is an author of over 390 refereed manuscripts and 75 review articles or book chapters, and is a holder of 20 issued and 14 pending patents. He is a Fellow of the Royal Society of Canada and a Member of the European Academy of Science.



Alan Bernstein*

is the inaugural President of the Canadian Institutes of Health Research in Ottawa. He is known internationally both as a researcher and scientific leader in the areas of cancer, hematopoiesis, cardiovascular

development, and functional genomics. He has received numerous honours for his work including the McLaughlin Medal from the Royal Society of Canada, and the 2000 Australian Society for Medical Research Medal. He is an Officer of the Order of Canada.



Aldée Cabana**

was the Executive Vice-President, Corporate Affairs, for Les Industries C-MAC Inc., a Montreal-based microelectronics company. He was the Chairman of the Board of Memotec Communications Inc.,

a corporation specializing in the fabrication of telecommunication equipment, and was the Rector at the Université de Sherbrooke, where he filled the positions of professor and Dean of the Faculty of Science. He is a Member of the Order of Canada.



Dian Cohen**

of Hatley, Quebec, is a broadcaster and author, and is President of DC Productions Limited. She is the former national business editor at CTV Television, and is frequently a featured speaker at events for

business, government, and NGOs on the global economy and its implications. She is a Member of the Order of Canada.



Bernard Coupal**

of Montreal is President of two companies—Gestion T2C2/Bio Inc. and Gestion T2C2/Info Inc. (Transfer Technologies Commercialisation Capital)—that analyze, assess, and market technologies developed in Quebec

universities, private and government research centres, and industry. He was previously President of Société Innovatech du Grand Montréal, a venture capital fund established by the Quebec Government with an investment of \$300 million.



David Dolphin*

of Vancouver is Vice-President of Technology Development, QLT PhotoTherapeutics Inc. He is a Professor of Chemistry at the University of British Columbia and is a world-renowned expert in porphyrin

chemistry and biochemistry. His work has been instrumental in the discovery of the family of photosensitive compounds that led to the development of Visudyne—a drug therapy used in the treatment of Age-Related Macular Degeneration. He is the author and editor of 18 books on spectroscopy, chemistry, and biochemistry and has published over 390 research papers and holds numerous patents. In 2002, he was elected a Fellow of the Royal Society of Canada.

Audit and Finance Committee

Lorne A. Babiuk, chair

Aldée Cabana

Bernard Coupal

John R. Evans

Robert A. Phillips

Governance and Nominating Committee

Stella Thompson, chair

Dian Cohen

John R. Evans

Michel Gervais

David Pink

Gerri Sinclair

Compensation of Management

Compensation of the CFI management for the fiscal year ending March 31, 2003, was within the annual salary ranges listed below. These ranges were approved following a 2001 benchmarking exercise by external

consultants to ensure comparability with equivalent positions in similar organizations and in the federal public service. They have since been adjusted for cost-of-living increases.

David W. Strangway, President & CEO

Annual Salary Range

\$172,000 to \$202,400

Denis Gagnon†, Senior Advisor to the President

\$122,700 to \$159,000

Carmen Charette, Senior Vice-President

\$122,700 to \$159,000

Manon Harvey, Vice-President, Corporate Services

\$106,700 to \$133,000

Suzanne Corbeil, Vice-President, External Relations

\$106,700 to \$133,000

† Until October 2002.



Kevin O'Brien Fehr*

is a pharmacologist and Director of Basic Research and Genetics at GlaxoSmithKline Inc. in Mississauga. Since 1992, she has managed contract scientific research conducted in

Canadian companies and universities on behalf of GlaxoSmithKline Inc. and its precursor companies. She has extensive contacts in the academic and biotechnology communities throughout the country, and is actively working to attract funding from GlaxoSmithKline's international sources to support Canadian researchers.



Monique Frize**

is a professor in the Department of Systems and Computer Engineering at Carleton University, and a professor in the School of Information Technology and Engineering at the University of Ottawa.

She was the holder of the Nortel/NSERC Women in Engineering Chair at the University of New Brunswick (1989 to 1997) and the Ontario Chair (1997 to 2002). She has served on many prominent boards including the National Advisory Board on Science and Technology.



Robert A. Phillips**

of Toronto is the Chief Executive Officer of the Ontario Cancer Research Network, which supports translational research leading to new cancer therapies. Previously, he was Executive Director of the

National Cancer Institute of Canada, the organization responsible for distributing the research funds raised by the Canadian Cancer Society and the Terry Fox Foundation. He holds a teaching position in the Department of Medical Biophysics at the University of Toronto.



David Pink**

is a physics professor at St. Francis Xavier University in Antigonish, Nova Scotia, where he conducts research in the physics of soft condensed matter. His current work involves modeling bacterial surfaces

and biofilms and carrying out spectroscopic studies of biofilms. The work has been funded by NSERC, the AIF, a number of Agencies, and private industry. He is also involved with developing and teaching multimedia science presentations to educate young people and non-scientists.



Gerri Sinclair**

of Vancouver is the General Manager of Microsoft Canada's MSN.ca. Before joining Microsoft, she was President of the B.C. Premier's Technology Council. She is also the founder and former CEO of NCompass

Labs, and was the founding director of Simon Fraser University's ExCITE, the first multimedia research and development centre in Canada. She has received a number of awards including the 1999 Canadian Women in Communications Woman of the Year award, the Influential Woman in Business Award in 2000, and the Sarah Kirke Award for the Leading Canadian Woman High Tech Entrepreneur for 2003.



Stella Thompson**

is a principal of Governance West Inc., a Calgary-based firm that helps organizations improve their governance practices. Previously, she served as President of Stellar Energy Ltd. and held

several positions with major oil companies in Australia and Canada, and was the Vice-President of Petro-Canada's Products Division. She is a past member of the Prime Minister's National Advisory Board on Science and Technology and the Alberta Research Council.



Ronald Whelan*

is a Diagnostic Radiologist at St. Clare's Mercy Hospital in St. John's, Newfoundland. He was President of the Newfoundland Medical Association in 1979, and served as Chairman of the

Medical Board from 1983 to 1987. He is Chairman of the Archive Committee of the Canadian Medical Association, has served on the CMA's Board of Directors, and was elected President of the CMA in 1992.

* Serving first three-year term.

** Serving second three-year term.

Expertise

Supercomputing Power

A computer network in Western Canada is helping researchers work at unprecedented speeds

The Project

In the early 1990s, researcher Jonathan Schaeffer needed access to high-performance computing for his work on artificial intelligence. But he was out of luck. There were no such facilities available in Canada.

Almost a decade later, the supercomputing landscape in Canada has changed dramatically. Schaeffer is part of a team of researchers and principal investigators spearheading WestGrid—a new supercomputing infrastructure project that's linking a series of computers in Western Canada.

WestGrid uses high-speed networking to combine the computing facilities at four Alberta and four British Columbia universities and research institutions—the University of British Columbia, Simon Fraser University, TRIUMF, New MIC (Media Innovation Centre), the University of Alberta, the University of Calgary, the University of Lethbridge, and The Banff Centre.

How does it work? The computing facilities are essentially shared research laboratories. They'll enable researchers from all disciplines to undertake projects that require massive computing power. Among the exciting projects on the researchers' collective "to do" list: analyzing the human genome project, modelling the Big Bang, simulating a catalytic converter, examining the human heart, and devising better routing patterns for network traffic on the Internet.

Benefits for Canadians

WestGrid is poised to become one of the world's top 100 computing facilities, attracting researchers from around the world and retaining many of Canada's best. The network provides researchers with the resources they need to experiment and model previously unimaginable phenomena in a number of fields including physics, nanotechnology, artificial intelligence, medicine, and meteorology.

Schaeffer and his colleague Paul Lu recently launched the Canadian Internetworked Scientific Supercomputer—a virtual supercomputer that linked more than 1,000 individual computers across Canada for a day. The researchers involved benefited tremendously because they were able to access data and perform many years' worth of calculations in a single day. It's a perfect example of the kind of research and results that Schaeffer expects WestGrid to generate in the years to come.



People



Standing (from left to right): **Paul Tsaparis**, President of HP Canada; **Dave Williams**, Business Development Executive, IBM Canada; **Martin Pinard**, President of SGI Canada; **John Fryer**, Coordinator, Canada Foundation for Innovation. Seated (from left to right), three WestGrid project leaders: **Brian Unger**, University of Calgary; **Michel Vetterli**, Simon Fraser University/TRIUMF; **Jonathan Schaeffer**, University of Alberta.

Jonathan Schaeffer

Computing Science Professor,
University of Alberta;
Co-Principal Investigator, WestGrid

Jonathan Schaeffer hated the first computing course he took as a high school student. In fact, when he began his undergraduate studies at the University of Toronto, he intended to become a mathematician. But by his second year, his aptitude in computing science drove him back into that field. He's never looked back.

After earning his B.Sc. from the University of Toronto, Schaeffer went on to get a Masters and a Ph.D. from the University of Waterloo. He joined the University of Alberta faculty as a lecturer in 1984.

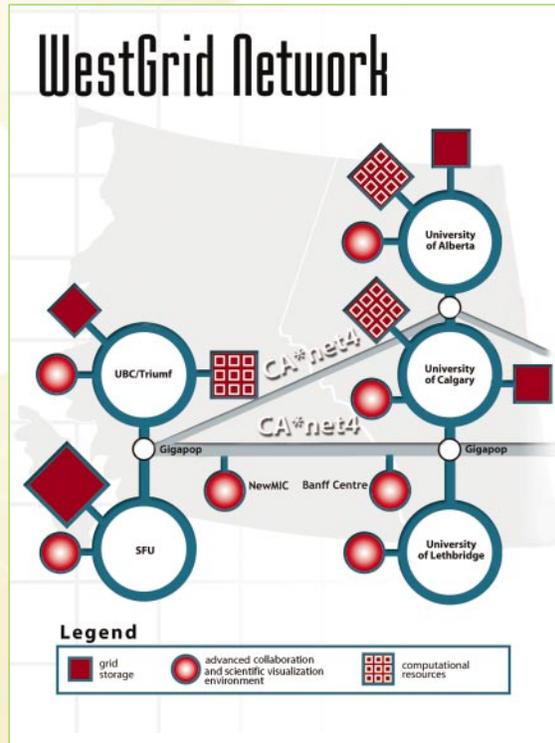
“WESTGRID IS ALL ABOUT MAKING WESTERN CANADA A DESTINATION OF CHOICE FOR THE BEST RESEARCHERS, WHO CAN THEN BUILD UPON THE REGION’S REPUTATION FOR WORLD-CLASS SCIENCE.”

— Paul Tsaparis, President and CEO,
HP Canada

Partnerships

Other funding partners:

- Alberta Innovation and Science
- British Columbia Knowledge Development Fund
- IBM Canada
- Hewlett Packard (HP Canada)
- SGI Canada
- YottaYotta Inc.
- BigBangwidth
- Netera Alliance



“BY INVESTING IN INITIATIVES SUCH AS WESTGRID, WE ARE HELPING TO MAKE B.C. AND ALBERTA GLOBAL MAGNETS FOR R&D ACTIVITY AND INVESTMENT.”

— Shirley Bond, Advanced Education Minister,
British Columbia



Financial Year in Review

In the 2002-2003 fiscal year, the CFI continued to maintain proper financial controls and to apply sound financial management principles to ensure the best use of public funds. As well, the external auditors issued an unqualified audit opinion on the financial statements.

As of March 31, 2003, the CFI had received a total of \$3.15 billion in funding from the Government of Canada. The following are highlights of the Financial Statements, which detail how the funds have been used, disbursed, and invested to date.

- The total amount that the CFI had invested as of March 31, 2003, was **\$2.737 billion**.
- The CFI's investments are subject to strict guidelines. To ensure diversification, the funds have been placed in a variety of secure investment vehicles:

- Money market funds	\$75.6 million
- Mortgage-backed securities	\$255.2 million
- Bonds	\$2.4 billion
- The net change in the amount invested from the previous year is a decrease of **\$159 million**. This is explained by the fact that total disbursements to eligible recipients during the fiscal year were **\$325.3 million**, while interest earned in 2002-2003 amounted to **\$169 million**. Operating expenses and the change in the interest receivable explain the remainder.
- Since 1997, the rate of return on the invested amounts has averaged **5.69 percent** per annum.
- As of March 31, 2003, a total of **\$881 million** had been disbursed for infrastructure funding.
- To date, the CFI has awarded grants in excess of **\$2 billion**. There remains approximately **\$2.5 billion** to be committed between now and 2010 (with projected interest income factored in).



Responsibility for Financial Reporting

The financial statements of the Canada Foundation for Innovation (CFI) were prepared by CFI management, which is responsible for the integrity and fairness of the data presented. In certain cases, the data may include amounts that are based on best estimates and judgment. The financial statements were prepared in accordance with generally accepted accounting principles, including the accounting recommendations for non-profit organizations in Canada. Financial information appearing throughout this Annual Report is consistent with the financial statements.

In discharging its responsibility for the integrity and fairness of the financial statements, and for the accounting systems from which they are derived, management maintains the necessary system of internal controls. This system is designed to provide assurance that transactions are authorized, assets are safeguarded, and proper records are maintained. The CFI's external auditors, who periodically review and evaluate the accounting records and related internal controls, and who report any findings to management, further validate the system. The external auditors' findings and recommendations are reported to the CFI's Audit and Finance Committee and to the Board of Directors.

The Board of Directors oversees management's responsibilities for financial reporting through the Audit and Finance Committee. The Committee reviews the financial statements and recommends them to the Board for approval and submission to the Members. The Committee's other key responsibilities include reviewing the budgets, internal control procedures, investments, and advising the Directors on auditing matters and financial reporting issues.

Ernst & Young LLP, independent auditors appointed by CFI Members on the recommendation of the Audit and Finance Committee, have examined the financial statements and their report follows. The independent auditors have full and unrestricted access to both the Audit and Finance Committee and the Board of Directors—to discuss their audit and the related findings about the integrity of the financial reporting, and the adequacy of the system of internal controls.

Lorne A. Babiuk
Chair,
Audit and Finance Committee

Manon Harvey, CA
Vice-President,
Corporate Services

Responsibility

Re-Discovering Canada with Geomatics

A unique Nova Scotia facility is providing a fresh perspective on our country

The Project

After SwissAir Flight 111 smashed into the Atlantic Ocean near Peggy's Cove, Nova Scotia, crash investigators faced a daunting task. They needed to plot the trajectory of the pieces of the aircraft, as well as the remains of the 229 passengers and crew.

Investigators didn't have far to go for the help they needed. They turned to David Woolnough and his colleagues at the Centre of Geographic Sciences, in the heart of Nova Scotia's Annapolis Valley. The Centre is a leader in geomatics, and is one of only two places in the entire world that has the equipment and expertise crash investigators required.

Geomatics involves the science and methodology of interpreting geospatial data—the positioning of objects in time and space. With specialized technology, including software and high-powered computers, Woolnough and his fellow researchers at the Centre can produce 3-D, digital modelling and mapping of everything from the ocean floor to sparsely populated wilderness. They get their data from aerial photographs, satellite images, multi-beam sonar, special computer software, and an instrument called a “lidar”—a laser radar.



Benefits for Canadians

Geomatics is one of the fastest-growing industries in the world. In Canada, the industry employs at least 21,000 people and exports \$260 million worth of products and services, which includes surveying, map-making, and computer modeling. There are many applications for this niche-market technology including:

- predicting floods
- plotting coastal erosion
- oil and gas exploration
- charting the relationship between water quality and health
- finding the optimum location for new businesses
- habitat analysis for aquaculture operations

The computer model that Woolnough and his colleagues created after the SwissAir crash was so critical in identifying the passengers and crew, and in pinpointing what happened to the plane, that it will likely become a standard method of crash analysis around the world.

Since it received its first CFI funding in 1999, the Centre of Geographic Sciences has created a post-graduate advanced diploma program in research processes. The program attracts up to a dozen post-graduate students from Canada and the United States in any year.

People



David Woolnough
Principal, Nova Scotia Community College;
Director of Applied Research,
Centre of Geographic Sciences

David Woolnough says he came to Nova Scotia Community College in 1980 to retire. Or to put it another way, to get paid to do work he loves in one of the most beautiful spots on earth: Nova Scotia's Annapolis Valley.

Woolnough grew up in Uddingston, Scotland, and did his post-graduate work in surveying engineering at the University of New Brunswick on a NATO scholarship. His Ph.D. involved mapping Canada from space. Although his background is in geography, Woolnough marries that experience to his interest in environmental research. When he goes on holiday, he travels around the world surveying glaciers.

“THE TRAINING RECEIVED BY GRADUATES OF GEOGRAPHIC INFORMATION SYSTEMS AT THE CENTRE OF GEOGRAPHIC SCIENCES IS THE BEST IN THE WORLD.”

— Jack Dangermond, President and CEO of Environmental Systems Research Incorporated, Redlands, California

Partnerships

Other funding and research partners include:

- The Atlantic Innovation Fund
- The Nova Scotia Research and Innovation Trust Fund
- Charlottetown-based GeoNet Technologies Inc.
- Fredericton-based CARIS Systems
- University of New Brunswick
- Acadia University
- Dalhousie University

“WITHIN A MONTH OR TWO OF GRADUATING, EVERYONE IN THE PROGRAM HAD EMPLOYMENT.”

— Carl Brydon, Senior GIS Analyst,
GeoNet Technologies Inc; 1997 Graduate,
Centre of Geographic Sciences

Private-Sector and International Involvement

- The Environmental Systems Research Institute in Redlands, California, is one of the many private-sector firms that rely on the Centre of Geographic Sciences for geomatics trainees. The institute hires up to five graduates from the Centre each year.
- GeoNet Technologies conducts digital topographic mapping. It works with the Centre of Geographic Sciences on a research project that involves mapping potential flood zones along the eastern coast of North America.
- Atlantic-based environmental engineering firms, such as ADI Ltd. and Jacques Whitford, look to program graduates first when hiring technical staff. Houston-based Western Geophysical and Calgary-based Veritas Land Systems also depend on graduates.
- Peru has sent technical personnel to receive training in hardware and software applications.
- The Philippines is participating in an exchange of researchers to learn these technologies to monitor its coastal habitat.



Financial Statements

Auditors' Report

To the Members of the
Canada Foundation for Innovation

We have audited the balance sheet of the **Canada Foundation for Innovation** as at March 31, 2003 and the statements of operations and cash flows for the year then ended. These financial statements are the responsibility of the Foundation's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of the Foundation as at March 31, 2003 and the results of its operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.

Ottawa, Canada
May 7, 2003

Ernst & Young LLP

Chartered Accountants

Balance Sheet

As at March 31

	2003 \$	2002 \$
ASSETS		
Cash	16,119,306	12,740,774
Interest and other receivables	45,982,410	53,361,864
Investments [note 3]	2,737,241,446	2,896,421,310
Prepaid expenses	47,352	150,010
Capital assets [note 4]	1,730,701	1,766,002
	2,801,121,215	2,964,439,960
LIABILITIES AND NET ASSETS		
Accounts payable and accrued charges	406,772	497,625
Deferred contributions [note 5]:		
Expenses of future periods	2,798,983,742	2,962,176,333
Capital assets	1,730,701	1,766,002
	2,800,714,443	2,963,942,335
Commitments [note 7]		
Net assets [note 6]	-	-
	2,801,121,215	2,964,439,960

See accompanying notes

Statement of Operations

Year ended March 31

	2003 \$	2002 \$
REVENUES		
Recognition of deferred contributions relating to amounts granted to eligible recipients	325,266,304	231,350,443
Recognition of deferred contributions relating to current year operations	6,828,256	7,510,395
Amortization of deferred contributions relating to capital assets	293,969	262,974
	332,388,529	239,123,812
EXPENSES		
Grants to eligible recipients	325,266,304	231,350,443
General and administration	6,828,256	7,510,395
Amortization of capital assets	293,969	262,974
	332,388,529	239,123,812
Excess of revenues over expenses	-	-

See accompanying notes

Statement of Cash Flows

Year ended March 31

	2003 \$	2002 \$
OPERATING ACTIVITIES		
Excess of revenues over expenses	-	-
Items not involving cash:		
Amortization of capital assets	293,969	262,974
Amortization of deferred contributions related to capital assets	(293,969)	(262,974)
Net increase (decrease) in deferred contributions related to expenses of future periods	(163,192,591)	1,170,299,233
Change in non-cash operating working capital	7,391,259	(16,983,176)
Cash provided by (used in) operating activities	(155,801,332)	1,153,316,057
FINANCING AND INVESTING ACTIVITIES		
Purchase of capital assets	(258,668)	(1,769,887)
Increase in deferred contributions related to capital assets	258,668	1,769,887
Net sale (purchase) of investments	159,179,864	(1,156,585,123)
Cash provided by (used in) financing and investing activities	159,179,864	(1,156,585,123)
Net increase (decrease) in cash	3,378,532	(3,269,066)
Cash, beginning of year	12,740,774	16,009,840
Cash, end of year	16,119,306	12,740,774

See accompanying notes

Notes to Financial Statements

1. GENERAL

The Canada Foundation for Innovation ["the Foundation"] was incorporated under Part 1 of the Budget Implementation Act, 1997 on April 25, 1997 for the purpose of making research infrastructure grants to Canadian universities, colleges, hospitals, and other not-for-profit research institutions to increase the capability of carrying on high quality research.

2. SIGNIFICANT ACCOUNTING POLICIES

The financial statements have been prepared by management in accordance with Canadian generally accepted accounting principles.

[a] Revenue recognition

The Foundation follows the deferral method of accounting for contributions which include government grants and, potentially, donations from other sources.

Under the Budget Implementation Act, 1997 ["the Act"], the Foundation has, since inception, received grants from the Government of Canada totaling \$3.15 billion plus accrued interest of \$964,384 on the initial contribution to be held, invested, administered and disbursed in accordance with the Act and the related Funding Agreement between the Foundation and the Government of Canada. These grants were received and recorded in prior fiscal years.

In February 2003, it was announced under the 2003 First Ministers' Accord on Health Care Renewal, that the Government of Canada will provide the Foundation with an additional \$500 million to enhance the support it provides to research hospital-based projects. These funds are expected to be received in the fiscal year ending in March 31, 2004. Due to the pending approval of specific legislative changes, the Foundation has not recorded the corresponding receivable amount as at March 31, 2003.

Grants received, together with future investment revenue, are directed to the granting of amounts to eligible recipients and the payment of the Foundation's operating expenses and acquisition of capital assets in accordance with the requirements of the Act and the terms of the Funding Agreement. Grants received and future restricted interest earned on the invested amounts will be deferred and recognized as income as expenditures are incurred by the Foundation.

Contributions applied toward the purchase of capital assets are deferred and amortized to revenue on a straight-line basis, at a rate corresponding with the amortization rate for the related capital assets.

[b] Grants to eligible recipients

Grants to eligible recipients are recognized as expenses as the awarded funds are disbursed.

[c] Investments

Investments are recorded at cost. Premiums or discounts are amortized over the remaining term of the investments. If the market value of investments becomes lower than cost and this decline in value is considered to be other than temporary, the investments are written down to market value.

[d] Capital assets

Purchased capital assets are recorded at cost. Contributed capital assets, if any, are recorded at fair value at the date of contribution. Repairs and maintenance costs are charged to expense. When a capital asset no longer contributes to the Foundation's ability to provide services, its carrying amount is written down to its residual value.

Capital assets are amortized on a straight-line basis using the following annual rates:

Leasehold improvements	Over the term of the lease
Furniture and other equipment	20%

3. INVESTMENTS

Investments comprise of the following financial instruments:

	March 31, 2003		March 31, 2002	
	Cost \$	Market Value \$	Cost \$	Market Value \$
Money-market funds	75,604,707	75,601,785	138,936,132	138,893,578
Bonds	2,406,479,658	2,487,972,361	2,436,171,510	2,456,901,830
NHA Mortgage backed securities	255,157,081	263,325,350	321,313,668	327,012,274
	2,737,241,446	2,826,899,496	2,896,421,310	2,922,807,682

4. CAPITAL ASSETS

Capital assets consist of the following:

	March 31, 2003		March 31, 2002	
	Cost \$	Accumulated Amortization \$	Cost \$	Accumulated Amortization \$
Leasehold improvements	1,373,845	194,464	1,254,621	60,146
Furniture and other equipment	1,090,090	538,770	950,646	379,119
	2,463,935	733,234	2,205,267	439,265
Accumulated amortization	(733,234)		(439,265)	
Net book value	1,730,701		1,766,002	

5. DEFERRED CONTRIBUTIONS

[a] Expenses of future periods

Deferred contributions related to expenses of future periods represent unspent externally restricted grants, together with investment revenue earned, for the purpose of providing grants to eligible recipients and the payment of operating and capital expenditures in future periods.

	2003 \$	2002 \$
Balance, beginning of year	2,962,176,333	1,791,877,100
Add grants received [note 2a]	–	1,250,000,000
Add restricted investment revenue earned	169,160,637	160,929,958
Less amount recognized as revenue	(332,094,560)	(238,860,838)
Less amount applied toward capital assets acquired	(258,668)	(1,769,887)
Balance, end of year	2,798,983,742	2,962,176,333

[b] Capital assets

Deferred contributions related to capital assets represent the unamortized amount of restricted grants received and applied toward the purchase of capital assets. The amortization of capital contributions is recorded as revenue in the statement of operations on the same basis as the amortization of the related capital assets.

	2003 \$	2002 \$
Balance, beginning of year	1,766,002	259,089
Restricted grants applied toward the purchase of capital assets	258,668	1,769,887
Less amount amortized to revenue	(293,969)	(262,974)
Balance, end of year	1,730,701	1,766,002

6. RESTRICTED CONTRIBUTIONS AND NET ASSETS

All of the net assets of the Foundation are subject to externally imposed restrictions as per the requirements of the Budget Implementation Act, 1997 which governs the Foundation and the terms of the related Funding Agreement between the Foundation and the Government of Canada. Investment revenue to be earned on the grants received from the Government of Canada is also restricted. Accordingly, the entire net assets of the Foundation are deferred and taken into revenue as expenditures are made with no net asset balance outstanding at any time. A statement of changes in net assets has therefore not been prepared since it would not provide additional useful information.

7. COMMITMENTS

During the year, the Foundation awarded grants for a maximum amount of \$272.1 million [2002 - \$874.7 million]. Total disbursements to eligible recipients during the fiscal year were \$325.3 million [2002 - \$231.4 million]. To date, the Foundation has awarded grants for a maximum amount of \$2,021.1 million, of which \$881 million has been disbursed as of the end of the fiscal year. The balance of the awarded grants will be recorded as expenses in subsequent years as funds are disbursed.

The Foundation entered into a lease agreement in 2001 for its premises at 230 Queen Street (Ottawa, Ontario) for a ten-year period starting August 2001. The minimum annual lease payments related to these premises are approximately \$1,044,000. The Foundation sublets part of its current premises for an annual amount of approximately \$228,000.

8. PENSION PLAN

The employees of the Foundation may elect to become members of the Association of Universities and Colleges of Canada [AUCC] Pension Plan, a defined contribution plan managed by Clarica Life Insurance Company. The employer contributions made to the Plan during the year ended March 31, 2003 amounted to \$66,559 [2002 - \$38,076].

9. FAIR VALUE OF FINANCIAL INSTRUMENTS

The carrying value of amounts receivable and payable approximate their fair value given the relatively short period to maturity of the instruments. The fair values of the investments, which are based on the year-end quoted market prices, are disclosed in note 3.

10. TAX STATUS

The Foundation is a non-taxable entity under paragraph 149(1)(1) of the Income Tax Act.

Harnessing Wind Power

Atlantic Canada researchers are turning to the wind for a cleaner and cheaper energy source

The Project

In remote aboriginal communities across Canada, diesel generators are often the only source of power. The generator fuel costs up to \$1.25 a litre, including the cost of shipping it to communities without road access—an expensive alternative that can have a negative impact on the environment.

Operating out of a state-of-the-art laboratory at the University of New Brunswick—financed in part through the CFI—Liuchen Chang and his colleagues have a plan to replace or supplement this costly, polluting power source with a cleaner, less expensive alternative: wind.

Chang and the group of UNB researchers are working with other Atlantic institutions to harness the power of the wind through wind turbines. The overall goal? To create a clean, environmentally friendly, and cost-effective source of electricity. Their research involves harnessing the unpredictable gusts and lulls in the wind to produce a steady power supply, through the use of a device known as a “wind power electronic inverter.” Inverters act as an energy conversion system, becoming the interface between a wind turbine and a standard electrical grid to connect the technologies. The research group intends to develop and deploy the technology into the rapidly growing distribution power-generation market.

Although the lab is located in New Brunswick, to take advantage of the best possible wind conditions the group is testing their work at the Atlantic Wind Test Site—a national wind farm in North Cape, P.E.I.



Benefits for Canadians

There are two billion people around the world without access to electricity. As a result, it's not surprising that the renewable energy industry has been expanding at an annual growth rate of more than 20 percent over the past decade, providing a rapid expansion in job creation and business opportunities.

The University of New Brunswick's research into wind power and other renewable energies opens up an important market for Canadian technology in developing countries, and in remote and Northern communities in Canada and the United States.

From an environmental perspective, wind and solar energy can help to alleviate global warming and reduce the environmental and economic costs of Canada's high per-capita electricity consumption. In fact, the research at UNB will help Canada meet its Kyoto commitments to cut greenhouse gas emissions.

Since receiving CFI support in 1999, UNB has also expanded the scope of its research. The university has developed a multidisciplinary Masters of Engineering in Environmental Studies, and is developing a multidisciplinary undergraduate curriculum.

People



Liuchen Chang

Professor, Electrical and Computer Engineering,
Energy Research Laboratory,
University of New Brunswick

In China, Liuchen Chang designed innovative power electronics converters that helped speed the development of his native country's electric railways. He earned his Bachelor of Science in Transportation and Communication at Beijing's Northern Jiotong University in 1982, and completed his Masters at the China Academy of Railway Sciences. In 1987, Chang immigrated to Canada and began his Ph.D. studies at Queen's University in Kingston, Ontario. He was awarded his Ph.D. in 1991 and joined the faculty at the University of New Brunswick in 1992.

Chang holds several patents related to power engineering technology, and is the recipient of the NSERC Chair in Environmental Design Engineering. As a

result of the research, he has two patents pending, both of which have attracted private-sector interest and could soon generate commercial spin-off activity.

Although he has had job offers from outside the country, Chang says he is committed to working in Canada and enjoys the quality of life he and his family have in Fredericton.

“THIS PARTNERSHIP BRINGS NEW IDEAS FORWARD FASTER SO THEY CAN BENEFIT EVERYONE.”

— Andy Scott, Member of Parliament, Fredericton

Partnerships

Chang and the UNB researchers are working with the Government of the Northwest Territories, Northwest Power Corp., and the Aurora Research Institute to assess comprehensive energy solutions (including wind-diesel systems) in remote communities.

The UNB researchers have also established the Atlantic Sustainable Power R&D Initiative, a partnership consisting of the University of New Brunswick, the University of Moncton, Dalhousie University, Memorial University, and a number of private-sector partners including:

- Atlantic Wind Test Site Inc.
- Florida-based Elliott Energy Systems Inc.
- Turbowinds Canada
- Custom Research Ltd.
- Pivotal Power
- Eletek Technologies Ltd.

Other funding and research partners include:

- Natural Sciences and Engineering Research Council
- Natural Resources Canada
- Atlantic Wind Test Site Inc. (a subsidiary of Energy Corp.)
- University of New Brunswick
- University of Moncton
- Memorial University

“DR. CHANG'S RESEARCH IS FOCUSED ON PRE-COMMERCIAL PROTOTYPES THAT CAN BE MOVED INTO A COMMERCIAL MARKET QUICKLY. OUR COLLABORATIONS ARE NOW BUILDING MOMENTUM WITH ADDITIONAL INDUSTRY AND ACADEMIC RESEARCH GROUPS.”

— Carl Brothers, Site Manager,
Atlantic Wind Test Site Inc.



Canada Foundation for Innovation
Fondation canadienne pour l'innovation
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