



**Networks of Centres
of Excellence of Canada**

**Réseaux de centres
d'excellence du Canada**

The Networks of Centres of Excellence of Canada 2000–2001 Annual Report

Forging Innovation Networks

Canada

The Networks—Acronyms

AquaNet	Network in Aquaculture
AUTO21	Automobile of the 21 st Century
CAN	Canadian Arthritis Network
CBDN	Canadian Bacterial Diseases Network
CGDN	Canadian Genetic Diseases Network
CANVAC	Canadian Network for Vaccines and Immunotherapeutics
CSN	Canadian Stroke Network
CIPI	Canadian Institute for Photonic Innovations
CITR	Canadian Institute for Telecommunications Research
CLLRNet	Canadian Language and Literacy Research Network
CWN	Canadian Water Network
GEOIDE	Geomatics for Informed Decisions Network
HEALNet	Health Evidence Application and Linkage Network
IRIS	Institute for Robotics and Intelligent Systems
ISIS	Intelligent Sensing for Innovative Structures
MITACS	Mathematics of Information Technology and Complex Systems
Micronet	Microelectronic Devices, Circuits and Systems
PENCE	Protein Engineering Network
SFM	Sustainable Forest Management Network
SCN	Stem Cell Network
TL-NCE	TeleLearning Network of Centres of Excellence
Wood-Pulps	Mechanical Wood-Pulps Network

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Contents

The Networks—Acronyms	ii
Message from the Chair	
Message from the Chair.....	1
Excerpt from the Fifth Report of the Standing Committee on Industry, Science and Technology.....	2
NCE Program at a Glance	
A Vital Component of Canada’s Innovation System.....	5
Program Administration.....	8
Program Highlights for 2000–2001	
Building on an Impressive Track Record.....	11
Success Highlights.....	13
Four New Networks.....	19
Canadian Water Network.....	19
Canadian Language and Literacy Research Network.....	19
AUTO21 – The Automobile of the 21 st Century	19
Stem Cell Network.....	20
NCE Selection Committees.....	21
Stage 1: Letters of Intent.....	21
Stage 2: Full Proposals.....	22
Twenty-Two Networks of Centres of Excellence.....	23
Health, Human Development and Biotechnology.....	23
Information and Communications Technology.....	24
Natural Resources.....	25
Engineering and Manufacturing.....	26
List of Tables and Illustrations	
Post-Network Employment by Sector.....	5
NCE Participating Organizations.....	6
The NCE Program Funding.....	7
Contributions to the NCE Program.....	7
Governance Structure.....	8
A Typical NCE Organization Chart.....	9
Regional Distribution of NCE Researchers, Highly Qualified Personnel and Expenditures.....	12
Participating Organizations (bilingual format)	29





Message from the Chair

Message from the Chair

The Networks of Centres of Excellence (NCE) are an integral part of Canada's Innovation Strategy. NCEs play an important role in mobilizing some of the best research talent found in Canadian universities, and engaging their partners in the private, public and non-profit sectors.

As Chair of the NCE Steering Committee, I take great pride in acknowledging the contributions and vision of the Scientific Directors and Chairs of the Boards of Directors who are guiding the NCEs. They have put in place well-defined strategies to transfer knowledge to users—ensuring that discoveries and technological advances are turned into social and economic benefits for all Canadians.

As a result of their efforts, the NCEs have steadily helped to create the right environment for business and government to invest in. In an average year, the researchers in the 22 NCEs produce 2,653 publications*, and their research support from the NCE program leverages additional cash and in-kind contributions of almost \$85 million from partners. They create 19 spin-off companies; file more than 150 patents; and obtain close to 100 licenses. In addition, they contribute to the development of more than 5,000 highly qualified professionals, including researchers, research associates, postdoctoral fellows, graduate and summer students, as well as technicians.

The NCE program builds on the sustained investment in research excellence made by Industry Canada and the granting agencies—the Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research, and the Social Sciences and Humanities Research Council.



Photography by Tony Scullion

Their support has been central to building the base of research excellence and supporting high-quality training in Canadian universities and research hospitals. The program depends on the infrastructure support and R&D personnel provided by these institutions.

NCEs and their partners have developed multi-disciplinary and multi-sectoral research programs that contribute to advancing knowledge in areas as diverse as engineering and manufacturing; health, human development and biotechnology; information and communications technologies; and natural resources, the environment and water quality. Their impacts range from new Canadian products to better public policies.

I believe that the strategies and partnerships put in place by the 22 Networks of Centres of Excellence are key to helping Canada reach its innovation objectives.

Thomas A. Brzustowski, P. Eng., Ph.D.
Chair
NCE Steering Committee

*Publications include refereed articles and other refereed contributions that were published, accepted for publications, or in press in 2000-2001



Excerpt from the Fifth Report of the Standing Committee on Industry, Science and Technology

“The Networks of Centres of Excellence (NCE) program is administered jointly by the three federal granting councils and Industry Canada. In a somewhat similar vein as the cluster strategy of the NRC, the program provides a mechanism for bringing together researchers from universities, the private sector and government—often across a number of disciplines—to address research issues of common concern that have economic potential. As it was put to the Committee:

The program was created in 1989...The idea is to foster synergies between what we call the creators of the knowledge and the users of that knowledge. That's where the link of the private sector comes in as an extremely powerful element to it. We focus on areas of critical importance and large problems that will obviously have benefits for Canadians. [Jean-Claude Gavrel, 20, 9:45]¹

This type of cluster or partnership was described as a virtual organization with the following typical structure:

An NCE is managed by a board of directors, a board that has representation from the sector but not from the people who actually receive the money... The responsibility of that board is to manage... the funds, to

determine where the research should be carried out and to basically ensure the accountability of those research dollars. An NCE can be broken down usually into about four to six research themes, for a total of maybe 15–20 projects. [Jean-Claude Gavrel; 20, 9:50]

Currently, there are 22 NCEs linking more than 900 Canadian organizations that employ more than 5,000 people. The NCEs have investigated questions in the fields as diverse as the automobile sector, language and literacy, water resources, arthritis, bacterial and genetic diseases, strokes, vaccines, stem cells, protein engineering, telecommunications, microelectronics, photonics, geomatics, robotics, mathematics, aquaculture, sustainable forestry, mechanical wood-pulps and engineering.

The Committee believes that the NCE program constitutes a vital component of Canada's innovation system. However, before making a recommendation on the appropriate level of financial support the NCE program should receive from the federal government, the Committee would like to review the NCE's funding requirement in detail.”

¹Jean-Claude Gavrel is the Director of the NCE program.



NCE Program at a Glance





NCE Program at a Glance

A Vital Component of Canada's Innovation System

As recognized during the June 2001 Standing Committee on Industry, Science and Technology, the NCEs “focus on areas of critical importance and large problems that will obviously have benefits for Canadians.”

The NCEs are innovative organizations that pursue research that is likely to create new opportunities for: commercialization; improving Canadians' quality of life; attracting, training and retaining the best and brightest minds; encouraging the development of industrial and scientific clusters that will become magnets for investment in local communities; and leading to the commercialization of Canadian innovations.

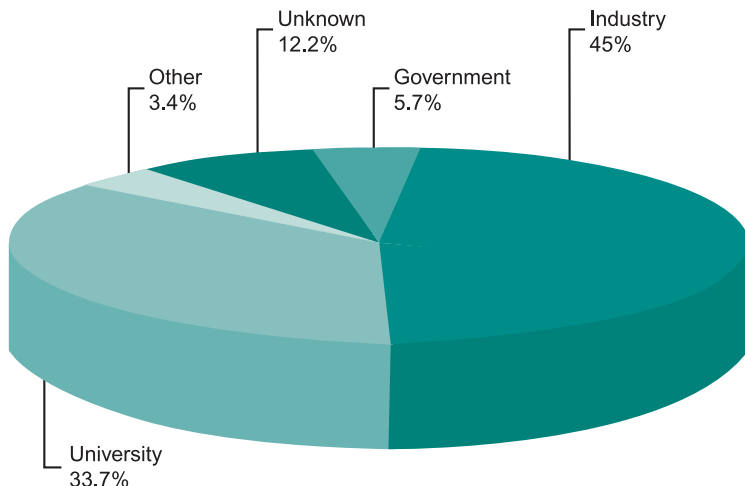
Conceived twelve years ago, the NCEs began as a federal experiment to encourage interdisciplinary, collaborative

research among researchers based in universities, industry and government institutions. Its goal? To solve major problems that require new knowledge and move potential innovations from the laboratory to the marketplace more quickly by piquing industrial interest and support soon after the innovation potential has been recognized.

It was an idea whose time had come: one that has greatly narrowed the traditional gulf between researchers and the industrial sector. Today, the NCEs have indeed become “magnets for investment and opportunity.” Many an S&T cluster across Canada includes at least one NCE, and often several. Individually and collectively, they are making significant contributions to Canadians' quality of life and to the economy.

Post-Network Employment by Sector for 2000–2001

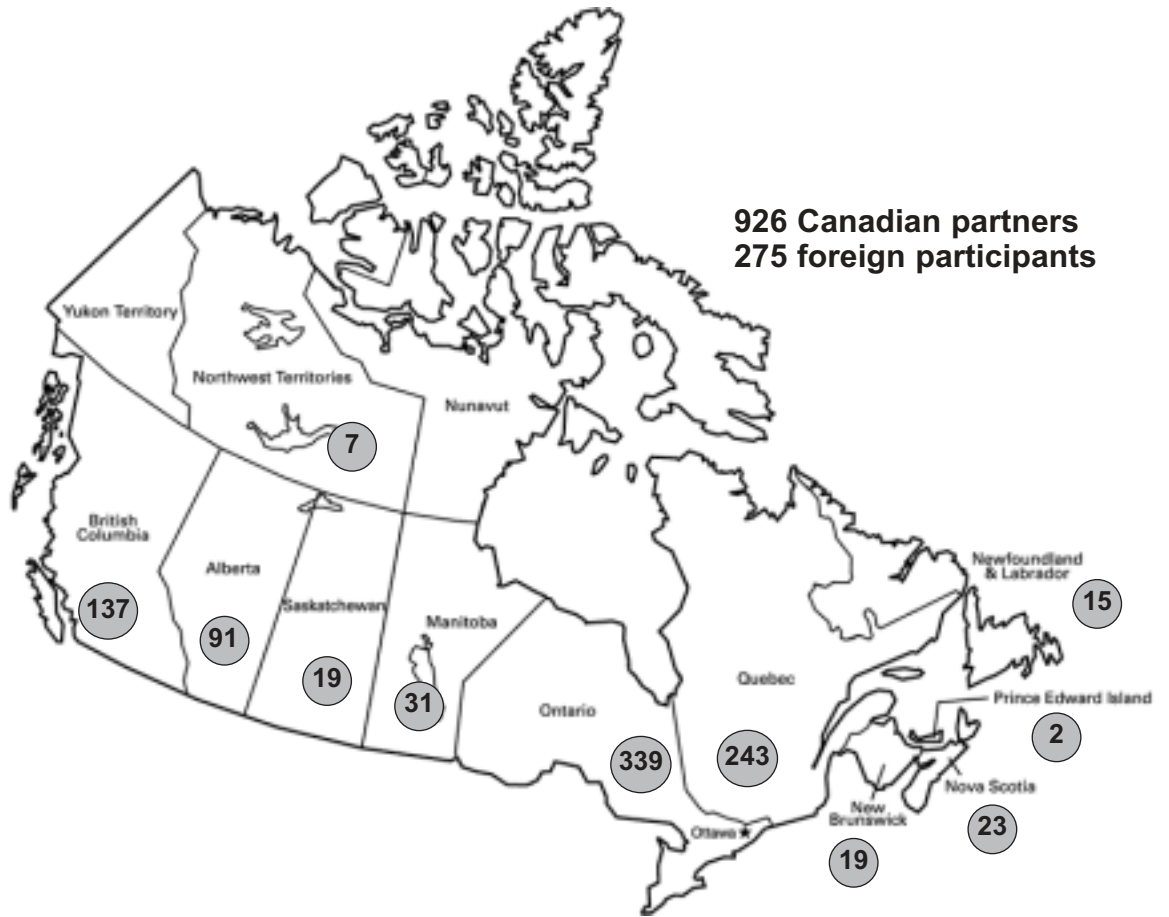
About 88 percent of network graduates are successful at finding jobs upon graduation.



NCE Participating Organizations

The Networks reported partnerships with 926 Canadian partners and 275 foreign organizations from the

university, industry, hospital, government and other sectors.



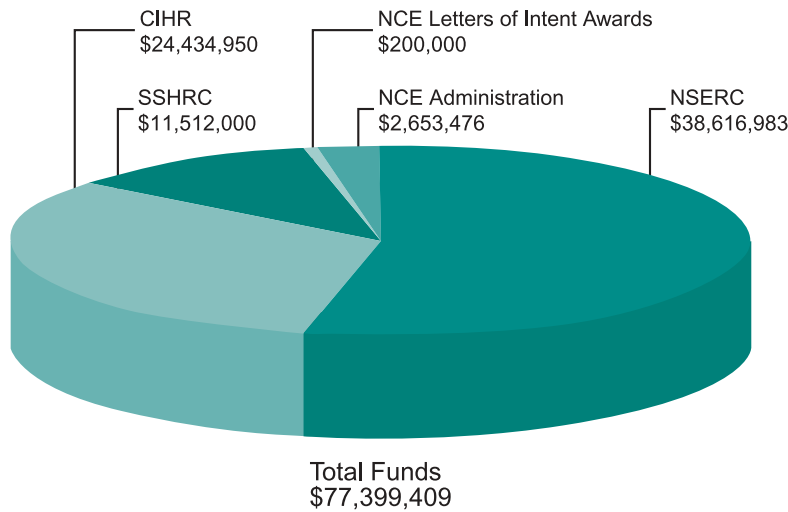
Participating Organizations 2000–2001

	Federal	Hospital	Industry	Other	Provincial	University	Total
Northwest Territories	0	0	1	4	2	0	7
British Columbia	4	5	82	24	15	7	137
Alberta	2	1	58	18	8	4	91
Saskatchewan	0	0	7	3	7	2	19
Manitoba	2	0	17	5	5	2	31
Ontario	32	13	184	84	12	14	339
Quebec	13	15	126	48	24	17	243
New Brunswick	2	0	8	4	2	3	19
Nova Scotia	3	0	10	5	2	3	23
Prince Edward Island	0	0	0	1	0	1	2
Newfoundland and Labrador	1	0	7	5	1	1	15
Total Canadian	59	34	500	201	78	54	926
Total Foreign	6	10	96	68	0	95	275
Grand Total	65	44	596	269	78	149	1,201

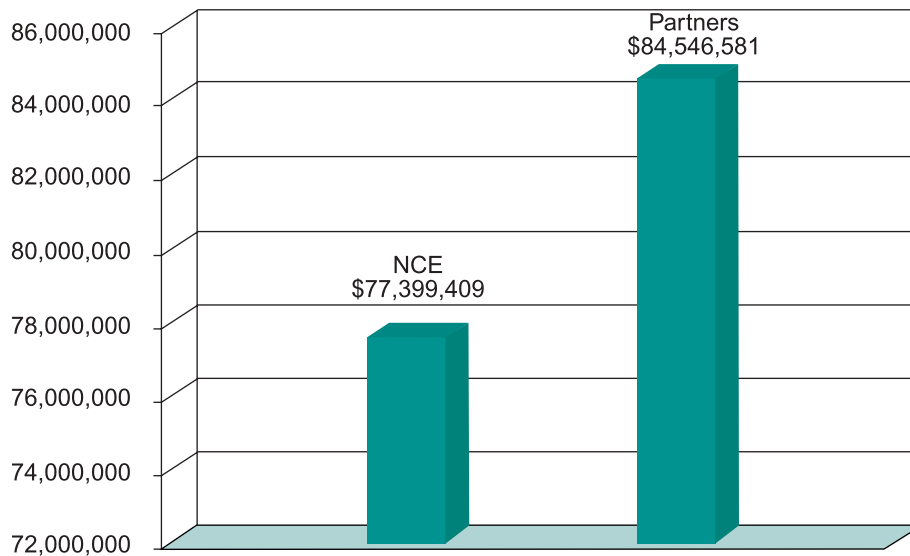
The NCE Program Funding

The Networks continue to stimulate outside investments: they leveraged more than \$84 million this year, of which

industry partners made critical cash and in-kind contributions totalling more than \$48 million.



Contributions to the NCE Program



	NCE	University	Industry	Federal	Provincial	Other	Totals
Cash	\$77,399,409	\$1,111,753	\$16,590,645	\$4,814,780	\$5,388,551	\$10,481,162	\$115,786,300
In-Kind	—	\$4,573,922	\$31,969,114	\$1,725,548	\$1,725,548	\$3,565,278	\$46,159,690
Total	\$77,399,409	\$5,685,675	\$48,559,759	\$9,140,608	\$7,114,099	\$14,046,440	\$161,945,990

Partner Contributions	
Cash	\$38,386,891
In-Kind	\$46,159,690
Total	\$84,546,581

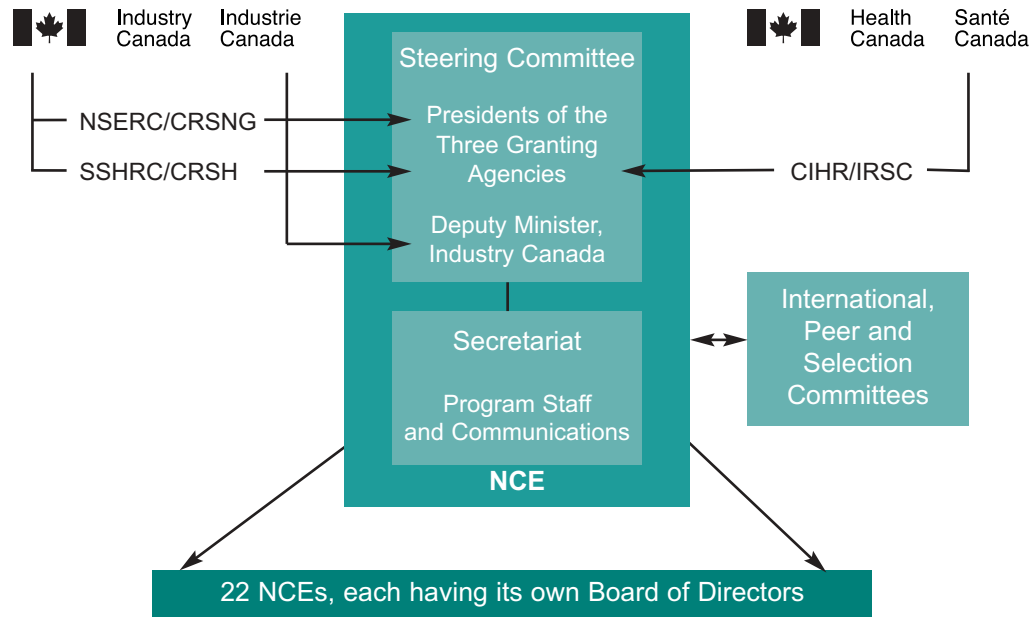


Program Administration

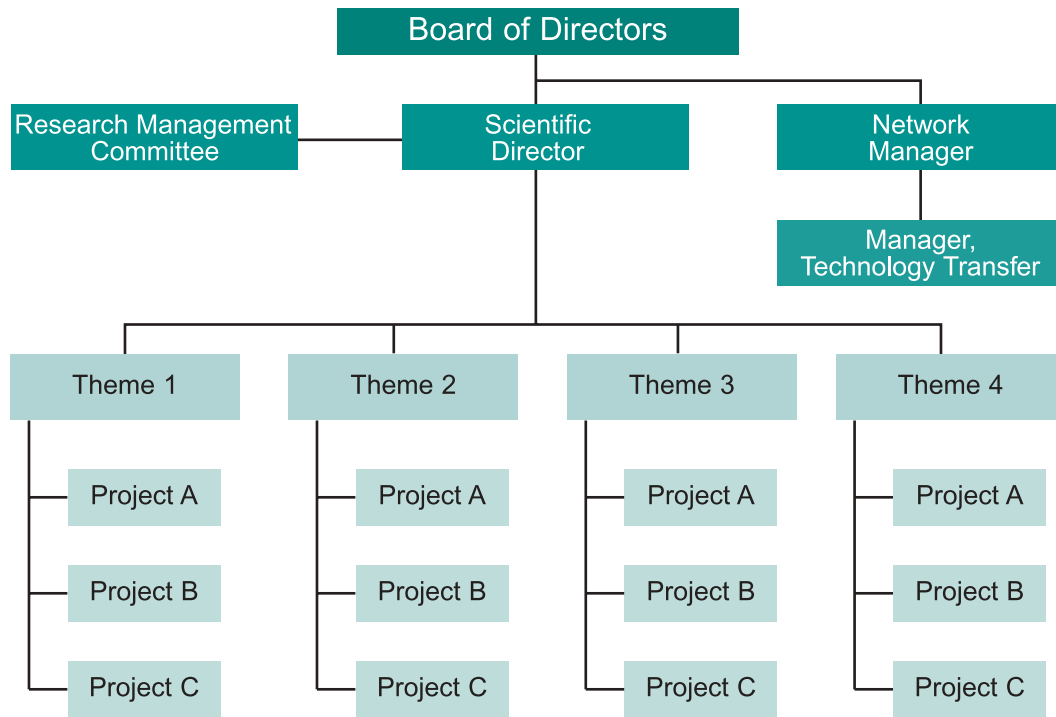
The NCE program is jointly administered by Canada's three granting agencies, the Canadian Institutes for Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC), in partnership with Industry Canada. The unique relationship with the three granting agencies and Industry Canada helps ensure both the requisite collaborative and responsive features of the NCEs.

The program is managed by a Steering Committee made up of the three agency presidents and the Deputy Minister of Industry (or their delegates). The NCE Directorate, the majority of whose staff is provided by the three agencies, undertakes day-to-day program management and communications.

Governance Structure



A Typical NCE Organization Chart





Program Highlights for
2000–2001

Building on an Impressive Track Record

Boasting an already impressive track record in research discovery and innovation, the NCE program's success continued to soar in 2000–2001. Year after year, the statistics prove that the program is meeting its goal of mobilizing Canada's research talent to develop the economy and improve the lives of Canadians.

In this fiscal year, 56 patents were awarded, 74 licenses were granted and 19 spin-off companies were created.

Network Accomplishments 2000–2001

Patents filed:	179
Patents awarded:	56
Licences under negotiation:	34
Licenses granted:	74
Spin-off companies created:	19



Regional Distribution of NCE Researchers, Highly Qualified Personnel and Expenditures

NCEs create nation-wide multidisciplinary research partnerships, connecting 1,700 researchers. Close to 6,000 personnel are involved in the NCE

program, 3,800 of whom are research associates, postdoctoral fellows, graduate and summer students.

Regional Distribution of NCE Researchers and Highly Qualified Personnel for 2000–2001

Region	NCE Researchers		HQP supported by NCE funds	HQP supported by non-NCE funds	Total Personnel
	University	Non-University			
Alberta	179	31	276	234	720
British Columbia	247	30	344	349	970
Manitoba	32	18	53	52	155
New Brunswick	22	2	28	14	66
Newfoundland & Labrador	19	4	22	13	58
Northwest Territories	0	0	0	7	7
Nova Scotia	38	11	48	28	125
Nunavut	0	0	0	4	4
Ontario	480	129	709	717	2,035
Prince Edward Island	2	0	3	1	6
Quebec	348	76	645	623	1,692
Saskatchewan	29	3	51	50	113
TOTAL	1,396	304	2,159	2,092	5,951

Regional Distribution of NCE Personnel and NCE Funds for 2000–2001

Region	NCE Researchers		HQP		NCE Expenditures	
	Total	Percentage	Total	Percentage	Total	Percentage
Alberta	210	12.4	510	11.9	\$7,955,523	13.0
British Columbia	277	16.3	693	16.3	\$10,944,717	17.9
Manitoba	50	2.9	105	2.5	\$1,464,003	2.4
New Brunswick	24	1.4	42	1.0	\$635,176	1.0
Newfoundland & Labrador	23	1.4	35	0.8	\$173,028	1.3
Northwest Territories	0	0	7	0.2	\$0	0
Nova Scotia	49	2.9	76	1.8	\$862,719	1.4
Nunavut	0	0	4	0.1	\$0	0
Ontario	609	35.8	1,426	33.5	\$23,434,687	38.2
Prince Edward Island	2	0.1	4	0.1	\$67,317	0.1
Quebec	424	24.9	1,268	29.8	\$14,376,278	23.5
Saskatchewan	32	1.9	81	2.0	\$759,705	1.3
TOTAL	1,700	100	4,251	100	\$61,273,15	100

An NCE researcher is a researcher from the academic, public or private sector responsible for certain aspects of a network-funded research project.

Highly Qualified Personnel includes research associates, postdoctoral fellows, graduate students and summer students.

The Regional Distribution of NCE Funds shows only reported expenditures by each participating institution for 2000–2001.

Success Highlights

Health, Human Development and Biotechnology

Piecing together a painful puzzle

Researchers are shedding new light on one of the world's oldest diseases, thanks to a national research consortium that is bringing together scientists, clinical specialists and organizations devoted to arthritis. Established in 1998, the **Canadian Arthritis Network (CAN)** links experts across the country who are devoted to changing the way in which this ailment is investigated, diagnosed and treated.

Through integrated, multi-disciplinary research and development, the Canadian Arthritis Network will become a world leader in developing new diagnostic and therapeutic technologies for arthritis, providing innovative, knowledge-based services in partnership with industry and government, and enhancing the quality of life for people with arthritis.

Bringing an *E. coli* vaccine closer to market

The deadly *E. coli* O157:H7 is making headlines again, but this time the news is good. After the Walkerton tragedy, there is hope that Canadian farmers will soon be able to inoculate their cattle against the bacteria with a new Canadian-developed vaccine that will save millions of dollars and, potentially, human lives.

Made possible by the work of a University of British Columbia researcher and funded by the **Canadian Bacterial Diseases Network (CBDN)**, this vaccine will become an important management tool in the cattle industry's crusade against the *E. coli* bacteria. CBDN's mission is to advance scientific knowledge and enhance Canada's

economic competitiveness through networking, excellence in fundamental research on bacterial diseases, and collaboration with industry.

Searching the world for hope—and finding it! It's all in the genes

What do certain families in the Netherlands, Quebec and British Columbia have in common? Well, other than living in a couple of the best countries in the world, they share a link that could lead to a breakthrough in the treatment of cardiovascular disease, saving countless lives around the world.

Xenon Genetics Inc., a spin-off company from the **Canadian Genetic Diseases Network (CGDN)**, is a leading-edge drug discovery company created to develop pharmaceutical therapies based on genetically derived targets. CGDN is a not-for-profit corporation that conducts collaborative research in human disease; trains scientists; establishes frameworks and partnerships for the commercialization of research; and ensures that the benefits and risks of research in human genetic disease are publicly recognized.

In this particular case, the families had a significant history of heart disease and low levels of HDL or "good" cholesterol. Xenon's researchers, as part of a group of international collaborators, made an important discovery through this study. They found that mutations in a single human gene—the ABC1 gene—impair a person's ability to regulate levels of HDL cholesterol, thereby increasing the risk of heart disease. If a drug therapy can be developed to remove or reduce that impairment, it would lead to a



reduced risk of heart disease. That would be welcome news for all who suffer from cardiovascular disease.

New hope in the search for an AIDS vaccine

Since HIV (the virus that leads to AIDS) first appeared in Kenya in the early 1980s, the sexually transmitted disease has infected 95 percent of the prostitutes who work in the grim shantytown outside Nairobi. Five percent, however, have remained HIV-free, despite contracting other STDs and despite showing no behavioural differences from those who were infected. How is this possible? A University of Manitoba Professor of Medical Microbiology who is also a member of the **Canadian Network for Vaccines and Immunotherapeutics** (CANVAC) thinks that these women are resistant to the AIDS virus; that something in their immune systems is able to recognize and kill the virus.

The likely candidate for that “something” is an abundance of killer T-cells specific to HIV. The researchers believe that immunity has built up in the prostitutes like a callus: Their first exposure to the virus provoked enough T-cell production to beat it back, and the second and subsequent exposures provoked even more T-cells, which heightened immunity again and again.

The team is trying to develop a vaccine to promote a T-cell response to HIV like the one seen in these prostitutes. This vaccine, which is based on T-cell response, is one of a handful of candidate vaccines picked for rapid development by the International AIDS Vaccine Initiative.

National database a valuable tool for treating strokes

Each year, approximately 50,000 Canadians suffer a “brain attack” that can lead to death or serious disability. Many survivors face physical and mental challenges that greatly affect their quality of life, as well as that of their families. The costs, both financial and social, are high.

Thanks to the **Canadian Stroke Network** (CSN), healthcare professionals and policy makers have a new tool to better prevent stroke and treat stroke patients. The Stroke Registry—a first-ever national stroke database—will allow them to monitor and evaluate all stages of stroke treatment by drawing a clearer picture of the quality of healthcare services across Canada.

Making e-health interactive leads to better health for Canadians

A **HealNet**-sponsored researcher is helping Canadian women to understand breast cancer information on the Internet. This allows them to make more informed decisions and gives them greater control over their lives.

The University of Western Ontario researcher is creating Web sites that blend facts, storytelling, cultural factors and multimedia to create interactive consumer health Web sites that emphasize the “care” in healthcare. The sites are interactive in that they enable the user to “jump” from one place in the presentation to another, allowing each user to customize the way information is presented.

The HealNet research found that using interactive sites that include audio and video components dramatically increases patients' understanding of the content. It also facilitates their retention of information.

Converzyme Inc. right on target

Converzyme Inc. is an innovative drug-discovery company that has some significant disease targets in its sights. And that is giving hope to millions of Canadians who suffer from Alzheimer's disease, coronary restenosis, cancer metastasis, type II diabetes, and other diseases. The development of real therapeutic treatments could have tremendous and lasting benefits for all Canadians, including longer and better quality of life and reduced healthcare costs.

Converzyme was established in 2000 to build ground-breaking work on pro-protein convertases (PCs) by researchers at the Institut de recherches cliniques de Montréal (IRCM) and the Ottawa Health Research Institute (OHRI). The researchers and the institutions are members of the **Protein Engineering Network** (PENGE Inc.)

PENGE Inc. is a dynamic network of top researchers specializing in the study of protein technologies. It boasts globally innovative research ideas for new protein products, pharmaceutical therapeutics and biotechnological research tools.

Information and Communications Technology

Nobel Laureate John Polanyi's molecular printing press

When it comes to microchips, you can't be too small or too powerful.

Canada may well be one of the first countries to meet that need, thanks to research being conducted in the laboratory of Nobel Laureate Dr. John Polanyi. His work on molecular imprinting (printing electronic circuits molecule by molecule) is being hailed in the international scientific press as a milestone in the worldwide race to establish the next miniaturization threshold.

The goal of the **Canadian Institute for Photonics Innovations** (CIPI) is to place Canada at the forefront of photonics research in the 21st century by supporting world-class experiments in Canada's private industries, universities and government institutions.

Cyberspace moves into outer space

The earth's orbit will soon become the next frontier for high-speed Internet communications, as Canadian researchers take a leading role in developing satellite systems that could revolutionize the way users gain access to the network. Rather than plugging their computers into a ground-based network of wires and fiber-optic cables, logging on might become a matter of turning to the sky for a signal as satellite television viewers do now.

The **Canadian Institute for Telecommunications Research** (CITR) is devoted to increasing the flow of people and ideas to the Canadian telecommunications R&D community by sponsoring industrially relevant research.



Watching the earth move, one millimetre at a time

Saving lives and reducing damage due to earthquakes are the ultimate goals of the Natural Hazards and Disaster Monitoring Project, part of the **Geomatics for Informed Decisions (GEOIDE)** NCE.

The benefits of this GEOIDE project are improved probability estimates for earthquake hazards, in terms of both size and location. The new knowledge and understanding can be incorporated into seismic capabilities of buildings, dams, bridges and highways. It will also help target funds and preparation efforts to areas where they would be most effective, saving lives and reducing damage.

GEOIDE's mission is to act as a catalyst within the Canadian geomatics community and thereby bolster the strategic alliances necessary to consolidate and strengthen the domestic geomatics industry while delivering optimum benefit from Canada's R&D capabilities.

Make no bones about it, computer-assisted surgery sets things straight

Canadians suffering from debilitating arthritis, poorly healed broken bones or painful bone tumors now have a better chance of getting back on their feet sooner. Researchers with the **Institute for Robotics and Intelligent Systems (IRIS)** are using computer science, math and mechanical engineering to help surgeons better visualize, plan and perform complex orthopedic procedures.

IRIS promotes high-quality collaborative research in intelligent systems that is of strategic importance to Canadian industry.

Mathematical researchers on the front lines of non-linearity

The plume of a pollution spill in water may be visible at the surface, yet it is all but impossible to measure properly, especially in underground or underwater regions. This limitation can hamper monitoring and cleanup efforts.

In much the same way, airplanes circling an airport can be tracked on a radar screen, yet their individual movements remain hard to anticipate, placing stress on traffic controllers responsible for avoiding collisions.

The key to solving these problems is "filtering," a mathematical process for estimating the current state of a random dynamic system by fusing corrupted information collected from a limited number of sources over a limited time period of time.

A research team in the **Mathematics of Information Technology and Complex Systems (MITACS)** Network is creating and analyzing non-linear filtering algorithms. These algorithms provide the best estimates of a system's current and future state, which is the essence of reliable tracking and prediction.

MITACS supports 21 projects developed around five main themes—biomedical, industrial, information technology, finance and manufacturing—all vital factors for Canada's success in the 21st century.

Smashing barriers to speed and reliability on the Internet

An Ottawa-based high-tech company with roots in the **Micronet** NCE is making it possible for Canadians to enjoy faster, cheaper access to the

world through optical switching technology for the Internet. The technology is not only reliable and innovative, but also capable of meeting the Internet future demands. In the process, AcceLight Networks is making the Canadian microelectronics industry that much more competitive.

Micronet is continuing its efforts to support industrially relevant pre-competitive research for communications, information and instrumentation systems. It also seeks to further the training of highly qualified personnel.

Developing software with universal learning appeal

Here's a tall order: develop a computer program that works effectively in

schools, businesses and policy-driven organizations. Oh yes, it should also be useful for people with learning disabilities and students who use English as a second language.

Sounds impossible? Researchers at the **TeleLearning Network of Centres of Excellence** (TL-NCE) have done just this in the form of Knowledge Forum, a problem-centred collaborative database operated over a computer network. Participants in the network's Knowledge-building Communities project create text and graphic notes, read and build on each others' notes, and create views to represent different aspects of their collaborative work. Using the computer as an organization and support tool, users carry on discussions and debates to develop a working, knowledge-building community.

Natural Resources

Research helps the rise of Canadian aquaculture

The first visitors to Atlantic Canada valued its wealth of fish, which later became the region's economic mainstay. Today, despite a devastating drop in ocean stocks, fish promise to play a major part in the region's future success.

The key to that success will be aquaculture—the “farming” of fish in shore-based facilities and net pens. This industry has been growing steadily for the past 20 years, drawing young, enthusiastic entrepreneurs into a global marketplace that has become highly competitive. Canadian researchers are helping this industry stay ahead of its competition by providing biological insights and technological innovations that can enhance the volume and quality of aquaculture production.

AquaNet's mission is to position the Canadian aquaculture industry for the future by increasing the efficiency of aquaculture production through species diversification, biotechnology, environmental sustainability and training of highly qualified personnel, while simultaneously addressing the legal, political and social issues that have historically affected the industry.

Mechanical wood-pulps: Building better refiners, one fibre at a time

Just how much can a single fibre of wood pulp be expected to take?

Researchers at Queen's University and the University of Victoria are trying to determine exactly how wood chips are transformed in mechanical refining.



Mechanical refining is the process of separating wood chips into fibres and then modifying the fibre properties so they can be made into high-quality paper. The researchers have designed a unique tabletop instrument that simulates this refining process. A fibre is placed in the device under a microscope. Then, under computer control, it's put through its paces. The idea is to duplicate, and then study and understand the effects of the process on individual fibres.

The mission of the **Mechanical Wood-Pulps** is to develop technology that will enable Canadian-based manufacturers to globally market high-value products from mechanical pulp, or processes, or the equipment used for their manufacture.

Mercury contamination in lakes—finding a cause and possible solution

Researchers at the **Sustainable Forest Management (SFM)** Network have developed simple models to predict the amount of mercury that makes its way into lakes (and ultimately fish) following forest harvesting. Forest companies now have a tool that will allow them to minimize the negative impacts on Canada's fresh water resources.

The SFM Network provides research support for the development of total management protocol for Canada's boreal forest. This includes creating environmental technologies and management strategies to sustain all values inherent in the boreal forests and maintain them in all their physical, biological, ecological and economic dimensions for future generations.

Engineering and Manufacturing

New life for an old wharf

The collapse of the Hall's Harbour wharf during a 1998 winter storm might have spelled the end for one of the most venerable landmarks on the Bay of Fundy. But thanks to the efforts of an innovative Canadian research network, the disaster marked the beginning of a high-tech renaissance for the 97-year-old structure.

While steel has long been used to reinforce large concrete structures, corrosion can lead to deterioration just

like that which left the Hall's Harbour wharf vulnerable to the effects of wind and waves. The **Intelligent Sensing for Innovative Structures (ISIS) NCE** was created to investigate and develop the substitution for fiber-reinforced polymers in concrete, which could dramatically extend its durability. Researchers have transferred this technology from the laboratory to actual building sites, where sensors placed within the concrete regularly relay measurements of the stresses and strains on the material.

Four New Networks

A call for applications for a targeted competition was issued on January 12, 2000, to establish new Networks of Centres of Excellence in the following areas:

- The Automobile of the 21st Century
- Genomics Technologies and Society

- Meeting Environmental Challenges for Clean Water
- Early Child Development and its Impact on Society

Eight groups were invited to submit full applications, and in February 2001 the NCE Selection Committee announced four new networks.

Canadian Water Network

Canada has maintained an enviable international reputation as a leader in water resource management, but our research and management capacity have not kept pace with rapidly changing social, economic and technical needs. The Canadian Water Network

(CWN) seeks to ensure Canada's pre-eminent place in the management and sustainable use of water resources; preserve access to clean water; protect the health of Canada's people and ecosystems; and support the Canadian economy.

Canadian Language and Literacy Research Network

Communication and literacy skills provide the foundation for effective social functioning and for academic, occupational/economic and life success. The Canadian Language and Literacy Research Network (CLLRNet) will combine the expertise

of researchers at universities in most Canadian provinces to improve language and literacy skills. The focus will be on children, so that improvements occur early in life and allow academic, social, economic and personal benefits to accrue over a lifetime.

AUTO21 – The Automobile of the 21st Century

The automotive industry is Canada's largest single business sector, producing more than 13 percent of the manufacturing GNP and providing high-quality employment to more than half a million Canadians. Without advanced R&D, Canada's auto industry will not be able to compete internationally, and the

hundreds of thousands of automotive industry jobs will be less secure. AUTO21 will tackle the challenges confronting the automotive industry, which includes the people who work in it; the communities where the industry is situated; and, the interaction between the industry and Canadian society as a whole.



Stem Cell Network

Stem cells play a critical and essential role in the human body, providing the starting material for every organ and tissue. Those cells in one compartment of the body can be used for tissue repair or regeneration in another part of the body. Diseases that may be amenable to stem cell repair and regeneration include muscular dystrophy, retinal degeneration leading to blindness,

Alzheimer's, Parkinson's, arthritis, osteoporosis, and serious disorders of the blood-forming system. While in line with social and ethical considerations, the Stem Cell Network will help to bring stem cell therapeutics to the marketplace through a number of industrial partnerships with biotechnology and pharmaceutical companies and health charities.

NCE Selection Committees

Stage 1: Letters of Intent: May 25 and 26, 2000

Chair

Richard Fuchs
President, Futureworks Inc.
Torbay, NF

Members

Bill Cheliak
President
Progressive Genetics Systems Ltd.
Ottawa, ON

Hani Henein
Director
Advanced Materials and Processing
Laboratory
University of Alberta
Edmonton, AB

David Owen
Director
Industrial Collaboration and Licensing
Technology Transfer Group
London, United Kingdom

Sylvie Marcoux
Vice-doyenne à la recherche et
aux études avancées
Université Laval
Montréal, QC

Mark W. Rosenberg
Professor
Department of Geography
Queen's University
Kingston, ON

Francine Mayer
Professeure
Département des sciences biologiques
Université de Québec à Montréal
Montréal, QC

David B. Shindler
President and CEO
Milestone Medica Corporation
Toronto, ON

Lisa Serbin
Director
Centre for Research in Human
Development
Concordia University
Montréal, QC

Bruce Smith
Chairman
Smith Institute
Surrey, United Kingdom

Dr. Shoo Lee
Director
Centre for Community Health and
Health Evaluation Research
Vancouver, BC



Stage 2: Full Proposals: January 15 and 16, 2001

Chair

Richard Fuchs
Director
Information and Communications
Technology for Development
International Development Research Centre
Ottawa, ON

Members

Bill Cheliak
Vice President
Business Development and Alliances
Supratek Pharma Inc.
Montreal, QC

E. Paul Hart
Professor
Faculty of Education
University of Regina
Regina, SK

Hani Henein
Director
Advanced Materials and Processing
Laboratory
University of Alberta
Edmonton, AB

Shoo Lee
Co-Director
Centre for Community Health and
Health Evaluation Research
Children's and Women's Health Centre
of British Columbia
Vancouver, BC

Sylvie Marcoux
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Francine Mayer
Professeure
Département des sciences biologiques
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Montréal, QC

David Owen
CEO
Medical Research Council Technology
Medical Research Council
London, United Kingdom

Mark W. Rosenberg
Professor
Department of Geography
Queen's University
Kingston, ON

David B. Shindler
President and CEO
Milestone Medica Corporation
Toronto, ON

Bruce Smith
Chairman
Smith Institute
Surrey, United Kingdom

James Bruce
Senior Associate
Global Change Strategies
International, Inc.
Ottawa, ON

Twenty-Two Networks of Centres of Excellence

Health, Human Development and Biotechnology

Canadian Arthritis Network (CAN) **www.arthritisnetwork.ca**

Funding Cycle: 1998–2002
NCE Award in 2000–01: \$3.9 M
Network Researchers¹: 111
Highly Qualified Personnel: 91
Universities²: 18
Industries²: 44
Government departments, agencies
and others²: 35

Canadian Bacterial Diseases Network (CBDN) **www.cbdn.ca**

Funding Cycle: 1989–2002
NCE Award in 2000–01: \$3.8 M
Network Researchers¹: 193
Highly Qualified Personnel: 185
Universities²: 58
Industries²: 61
Government departments, agencies
and others²: 55

Canadian Genetic Diseases Network (CGDN) **www.cgdn.generes.ca**

Funding Cycle: 1989–2002
NCE Award in 2000–01: \$4.5 M
Network Researchers¹: 45
Highly Qualified Personnel: 369
Universities²: 12
Industries²: 56
Government departments, agencies
and others²: 56

Canadian Language and Literacy Research Network (CLLRNet) **www.cllrnet.ca**

Funding Cycle: 2001–2005
NCE Award in 2000–01: \$2.4 M
Network Researchers¹: 96

Highly Qualified Personnel: N/A ³
Universities²: 21
Industries²: 8
Government departments, agencies
and others²: 71

Canadian Network for Vaccines and Immunotherapeutics (CANVAC) **www.canvacc.org**

Funding Cycle: 1999–2003
NCE Award in 2000–01: \$4.7 M
Network Researchers¹: 53
Highly Qualified Personnel: 250
Universities²: 21
Industries²: 30
Government departments, agencies
and others²: 38

Canadian Stroke Network (CSN) **www.canadianstrokenetwork.ca**

Funding Cycle: 1999–2003
NCE Award in 2000–01: \$4.7 M
Network Researchers¹: 137
Highly Qualified Personnel: 29
Universities²: 23
Industries²: 10
Government departments, agencies
and others²: 20

Health Evidence Application and Linkage Network (HEALNet) **healnet.mcmaster.ca/nce**

Funding Cycle: 1995–2002
NCE Award in 2000–01: \$2.4 M
Network Researchers¹: 94
Highly Qualified Personnel: 158
Universities²: 28
Industries²: 45
Government departments, agencies
and others²: 89



**Protein Engineering Network of
Centres of Excellence (PENCE)**
www.pence.ca

Funding Cycle: 1989–2002
NCE Award in 2000–01: \$4.5 M
Network Researchers¹: 53
Highly Qualified Personnel: 172
Universities²: 12
Industries²: 60
Government departments, agencies
and others²: 27

Stem Cell Network
www.stemcellnetwork.ca

Funding Cycle: 2001–2005
NCE Award in 2000–01: \$3.6 M
Network Researchers¹: 55
Highly Qualified Personnel: N/A³
Universities²: 13
Industries²: 9
Government departments, agencies
and others²: 11

Information and Communications Technology

**Canadian Institute for Photonic
Innovations (CIPI)**
www.cipi.ulaval.ca

Funding Cycle: 1999–2002
NCE Award in 2000–01: \$3.5 M
Network Researchers¹: 61
Highly Qualified Personnel: 227
Universities²: 22
Industries²: 24
Government departments, agencies
and others²: 14

**Canadian Institute for
Telecommunications Research (CITR)**
www.citr.ece.mcgill.ca

Funding Cycle: 1989–2002
NCE Award in 2000–01: \$1.5 M
Network Researchers¹: 60
Highly Qualified Personnel: 239
Universities²: 18
Industries²: 17
Government departments, agencies
and others²: 2

**Geomatics for Informed Decisions
Network (GEOIDE)**
www.geoide.ulaval.ca

Funding Cycle: 1998–2002
NCE Award in 2000–01: \$3.2 M
Network Researchers¹: 161

Highly Qualified Personnel: 175
Universities²: 33
Industries²: 47
Government departments, agencies
and others²: 45

**Institute for Robotics and Intelligent
Systems (IRIS)**
www.precarn.ca

Funding Cycle: 1989–2002
NCE Award in 2000–01: \$4.3 M
Network Researchers¹: 108
Highly Qualified Personnel: 356
Universities²: 23
Industries²: 54
Government departments, agencies
and others²: 22

**Mathematics of Information
Technology and Complex Systems
(MITACS)**
www.mitacs.math.ca

Funding Cycle: 1998–2002
NCE Award in 2000–01: \$3.8 M
Network Researchers¹: 238
Highly Qualified Personnel: 408
Universities²: 43
Industries²: 66
Government departments, agencies
and others²: 29

**Micronet – Microelectronic Devices,
Circuits and Systems**
www.micronetrd.ca

Funding Cycle: 1989–2002
NCE Award in 2000–01: \$2.3 M
Network Researchers¹: 81
Highly Qualified Personnel: 370
Universities²: 20
Industries²: 42
Government departments, agencies
and others²: 3

TeleLearning NCE
www.telelearn.ca

Funding Cycle: 1995–2002
NCE Award in 2000–01: \$3.7 M
Network Researchers¹: 77
Highly Qualified Personnel: 364
Universities²: 47
Industries²: 43
Government departments, agencies
and others²: 88

Natural Resources

AquaNet
www.aquanet.ca

Funding Cycle: 1999–2003
NCE Award in 2000–2001: \$3.6 M
Network Researchers¹: 68
Highly Qualified Personnel: 103
Universities²: 20
Industries²: 22
Government departments, agencies
and others²: 14

Canadian Water Network (CWN)
www.cwn-rce.net

Funding Cycle: 2001–2005
NCE Award in 2000–01: \$2.5 M
Network Researchers¹: 173
Highly Qualified Personnel: N/A³
Universities²: 38
Industries²: 29
Government departments, agencies
and others²: 40

Mechanical Wood-Pulps Network
www.ppc.ubs.ca/wood-pulps

Funding Cycle: 1989–2002
NCE Award in 2000–01: \$2 M
Network Researchers¹: 39
Highly Qualified Personnel: 104
Universities²: 16
Industries²: 17
Government departments, agencies
and others²: 7

**Sustainable Forest Management
Network (SFM)**
www.ualberta.ca/sfm

Funding Cycle: 1995–2002
NCE Award in 2000–01: \$3 M
Network Researchers¹: 154
Highly Qualified Personnel: 523
Universities²: 31
Industries²: 16
Government departments, agencies
and others²: 8



Engineering and Manufacturing

Automobile of the 21st Century (Auto 21)

www.auto21.ca

Funding Cycle: 2001–2005

NCE Award in 2000–01: \$3.9 M

Network Researchers¹: 207

Highly Qualified Personnel: N/A³

Universities²: 26

Industries²: 70

Government departments, agencies

and others²: 17

Intelligent Sensing for Innovative Structures (ISIS)

www.isiscanada.com

Funding Cycle: 1995–2002

NCE Award in 2000–01: \$2.7 M

Network Researchers¹: 82

Highly Qualified Personnel: 180

Universities²: 14

Industries²: 54

Government departments, agencies

and others²: 24

¹ Includes Canadian and foreign researchers from all sectors

² Includes Canadian and foreign organizations

³ N/A; Not applicable: Network has started its operation at the end of the fiscal year