

# NCE

Networks of Centres of Excellence



**15** years  
1989-2004

## The Networks of Centres of Excellence Program

15 Years of Innovation  
and Leadership



Networks of Centres  
of Excellence of Canada

Réseaux de centres  
d'excellence du Canada

Canada

# NCE

## Introduction

When it was first launched 15 years ago, little did we know how the Networks of Centres of Excellence (NCE) Program would revolutionize the way Canadians conduct research and train students for the challenges of the knowledge economy, and apply discoveries and technologies to advance the prosperity and quality of life in our nation.

Established by the Government of Canada in 1989, the NCE Program was hailed as an innovative model to link research and development with wealth creation. The program was aimed at mobilizing the best talent in the academic, private, and voluntary sectors, and applying it to the task of developing the economy and improving the quality of life of Canadians. Today, the Program remains a key component of the Government Innovation Agenda. It is the only program that engages researchers, partners, and institutions in nationwide networks, and that works with users in industry and government to create commercial opportunities and develop public policy based on sound evidence.

A precursor to several other federal initiatives, the NCE Program has helped transform the research landscape and turn Canada into a global scientific powerhouse. With its focus on excellence, collaboration, and common vision, the NCE Program has provided the opportunity to bridge disciplines, sectors, and institutions. It has also helped to strengthen—in ways never seen before—our ability to advance and apply knowledge for the economic and social well-being of Canadians.

The success of the NCE Program is deeply rooted in the culture of excellence that exists at Canadian universities. It is also the result of the sustained investment by the federal granting agencies—the Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research (formerly the Medical Research Council), and the Social Sciences and Humanities Research Council. Thanks to the high standards they have nurtured over the years, the granting councils have made it possible to launch an excellence-based program that would mobilize researchers in every province.

In 2004, the NCE Program brought together 21 networks representing more than 7,000 people, 1300 Canadian organizations in academia and the public and private sectors, and almost 350 international collaborating organizations. Working in multidisciplinary teams, researchers and partners are taking up complex challenges and turning discoveries into economic and social benefits in areas of strategic importance for Canada.

The following retrospective highlights key milestones in the history of the Networks of Centres of Excellence Program. It's a story about vision, creativity, and the power of collaboration.

## The NCE Program

A key element of the Government of Canada's Innovation Agenda, the Networks of Centres of Excellence Program builds on the foundation of research support from the federal granting councils and on the long tradition of excellence that exists at Canadian universities. The NCE Program invests in university-based networks that conduct research and technology development in areas of strategic importance and apply it to the advancement of Canada's economy and society.

In its inception, the Program's aim was to significantly raise the base of research performed in Canada outside the federal government. It was also meant to provide an adequately sized pool of scientists and engineers with the breadth of experience required to meet the changing needs of science and society, and to respond to the challenges of a globally competitive economy.

## The NCE Program is designed to:

- stimulate internationally competitive, leading-edge fundamental and applied research in areas critical to Canada's economic and social development;
- develop and retain world-class researchers in areas essential to Canada's productivity and growth;
- create nationwide multidisciplinary and multisectoral research partnerships that integrate the research priorities of all participants; and
- accelerate the exchange of research results within a network, as well as the use of knowledge within Canadian organizations that can harness it for Canadian economic and social development.

### Universities— The Essential Partners

The success of the NCEs depends on Canadian universities playing a key role as partners in a multi-sector strategic research enterprise.

How do the universities contribute? By providing all the indirect costs and the intellectual environment, which underpins all research funded by the granting councils, including:

- the salaries of academic researchers;
- research facilities;
- support for network administration; and
- a pool of unique human resources, students, and postdoctoral fellows trained by the networks.

As partners in the NCE Program, the universities provide even more. University industrial liaison offices work closely with the networks across the country to make knowledge exchange and technology transfer happen.

The universities take part in the development of intellectual property agreements that strengthen the commercial potential of network-supported research. The result is more commercialization of network research, leading to the creation of new Canadian companies, products, and know-how for the global market. The Canadian economy benefits and everybody wins.

Networks are different from any other research model for their creative collaborations and innovative approaches—and their application to areas of significance for industry and government. This is done through a competitive process that calls for researchers in Canadian universities and hospitals to exchange ideas, assess the relevance and significance of research programs, and talk to potential partners. The purpose is to develop proposals that are relevant to the needs of the public, private, and not-for-profit sectors, and that have the potential to enhance Canada's economic growth and social development.

The NCE Program is managed jointly by the three federal granting councils—the Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research (formerly the Medical Research Council), and the Social Sciences and Humanities Research Council—in partnership with Industry Canada. A Steering Committee comprised of the Presidents of the three granting agencies and the Deputy Minister of Industry Canada is charged with overseeing all aspects of the Program, including communications and evaluation. The ongoing management and communications of the Program is under the responsibility of an inter-Council Secretariat.

### A Canadian innovation

The creation of the NCE Program, in 1989, was prompted and guided in large part by discussions with the National Advisory Board on Science and Technology, and the Council of Science and Technology Ministers. The Program integrated the lessons learned from earlier initiatives into a national effort to build upon excellence and research strengths throughout the country. It also built on the experience of the Canadian Institute for Advanced Research, founded in 1982, and the Ontario Centres of Excellence Program, launched in 1987.



## Changing the culture

The NCE Program has profoundly transformed the way research is done in universities and has pioneered innovative ways to translate research into economic growth and social progress. By bringing together research and collaboration, networks provide an internationally competitive environment for Canadian researchers and students to work together with industry, and accelerate the exchange of knowledge and new technology to the private sector.

The launch of the NCE Program set in motion a significant cultural shift within Canada's research community. By breaking down the barriers between people, disciplines, institutions, and sectors, the program challenged researchers and their partners to embrace collaboration, multidisciplinary, and linkages to build a critical mass of expertise in research areas of strategic importance.

Collaboration among researchers from different disciplines has helped to enhance the scope of research topics while providing fresh insight into old problems. Collaboration between researchers and partners has provided new opportunities to undertake complex research projects, and to determine—at the planning stage—how the research results could be used for the benefit of Canadians.

The researchers' recognition of the opportunities that exist by working with industry proved to be one of the earliest benefits of the Program. Researchers started thinking in new ways about the problems industry would bring to their attention. For others, the Program provided an opportunity to focus their research in terms of the needs of industry. Increasingly, researchers became aware of how Canada could benefit from their work and saw the full potential of talking and interacting with partners and potential users of the research.

From an industry perspective, the NCE Program has provided the opportunity to gain immediate access to expertise and research, and to decide on research priorities together with Canada's best scientists and engineers. In the NCE model, partners and research users take part in the management of the networks and in the selection of research projects they undertake. By fostering the efficient and timely sharing of ideas, knowledge, and technology, the Program enables partners to directly benefit from their investment in research. It also gives them a better understanding of future directions and the potential impact of cutting-edge research on their area of activity.

One of the most visible successes of the networks is the training of highly qualified personnel in areas where skilled and adaptable professionals are often in short supply. Over the years, networks have developed unique strategies and mechanisms to expose graduate students and postdoctoral researchers to multidisciplinary and multisectoral approaches. The result? A pool of highly adaptable people with broad knowledge, multidimensional thinking, and highly developed problem-solving skills.

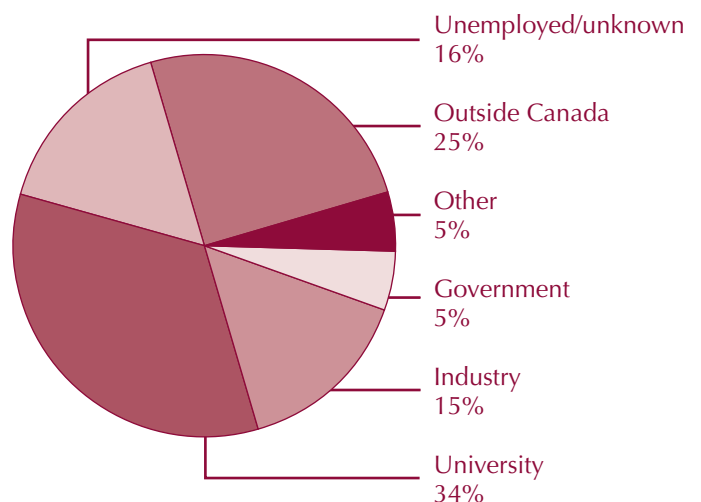
## Training for the knowledge economy

One of the most significant by-products of the NCE program is the valuable training opportunities provided to the people who will be guiding Canada into the future. The networks provide industrially relevant advanced training to a whole new generation of research students.

About 84 percent of network graduates are successful at finding employment upon graduation. Why? Because they bring with them the best research training available and a clear understanding of the challenges facing Canadian companies on the global market.

Since 1994, almost 1,700 graduate students have joined private companies and organizations in many sectors including health, environment, and telecommunications.

## Post-Network Employment by Sector



Over four years, the initial 15 networks (listed below) involved almost 800 researchers, 1,400 graduate students, 500 postdoctoral fellows, 35 universities, 30 federal and provincial departments, and 143 private sector partners.

- Canadian Aging Research Network
- Canadian Bacterial Diseases Network
- Canadian Genetic Diseases Network
- Canadian Institute for Telecommunications Research
- Canadian Network for Space Research
- Centre of Excellence in Molecular & Interfacial Dynamics
- High Performance Concrete Network
- Insect Biotech Canada
- Respiratory Health Network
- Institute for Robotics and Intelligent Systems
- Mechanical and Chemimechanical Wood-Pulps Network
- Micronet
- Neural Regeneration and Functional Recovery
- Ocean Production Enhancement Network
- Protein Engineering

By training people in a world-class research environment, and by encouraging interaction with private and public-sector partners, networks are developing the human and intellectual capital needed to bridge the research and its industrial and social applications. In addition to providing trainees with a launch pad to a variety of careers, networks help to retain the highly skilled people Canada needs to be competitive globally.

## Phase I

In January 1988, the federal government announced \$1.3 billion in new funding for science and technology, which included \$240 million over four years to launch the NCE Program. Established to enhance research excellence and improve Canadian competitiveness and prosperity, the Program is a key initiative to move forward the federal government S&T strategy to link science and technology with our competitive industrial capacity.

During Phase I of the Program, from 1989 to 1993, 15 networks in areas such as biotechnology, natural resources, telecommunications, and infectious diseases were selected following an open competition involving international peer review. These networks were selected from the 238 Letters of Intent, which were followed by 158 full applications, using four selection criteria:

- excellence of the science (50 percent);
- linkages and networking (20 percent);
- relevance to future industrial competitiveness (20 percent); and
- management capability (10 percent).

### Selecting the best

Phase I networks were selected following an in-depth assessment by an International Peer Review Committee (IPRC) made up of 23 leading scientists and engineers, including 10 members from the U.S. and Europe. The selection process involved written evaluations by independent reviewers, evaluation site visits, and ranking by the IPRC.

The funding decision was made by the Minister of State (Science and Technology) assisted by an Advisory Committee composed of 13 Canadian businesspeople and academics, and taking into account the ratings resulting from the peer-review process and the comments from the granting councils.

A similar process was in place for the Phase II competition.

When the Program became permanent in 1997, changes were introduced to the selection process to better reflect the complex, multidisciplinary nature of the research. The new process involves individual expert panels comprised of six to eight international peers that review one application each. These reviews include a site visit with the applicants. The NCE Selection Committee—with a broad multidisciplinary perspective—then reviews the expert panel reports along with the complete applications and makes a selection recommendation to the NCE Steering Committee, which, in turn, makes a funding recommendation to the Government for a final decision.

New changes were introduced in 2002 that delegated the Program's financial management to the NCE Steering Committee. These changes were the result of a review of the Program's Terms and Conditions, which takes place every five years. The NCE funds were integrated into the base budget of the granting councils, according to a formula proportionate to their own funding levels. Starting in 2002, the final decision for funding rests with the NCE Steering Committee, based on the recommendation of the Selection Committee and the reports from the expert panels

## Phase II

In 1993, following an independent interim evaluation and a review of the Program by the House of Commons Standing Committee on Industry, Science and Technology, Regional and Northern Development, the NCE Program was renewed for a second phase with a budget of \$197 million over four years.

From the Government's perspective, the first four years of operations were a success: the NCE Program produced significant research discoveries and innovations, ensured that these were transferred to potential industrial and public policy users quickly, and trained highly skilled people—often in settings outside the university. However, to maximize the generation of social and economic benefits and strengthen the networks' ability to transfer knowledge, the renewed Program was given a stronger focus on multisectoral involvement in all aspects of the networks' activities. Phase II also placed more emphasis on involving the social sciences in the networks, the importance of the business development functions of the networks, and increased support from sources other than the NCE.

To reflect the stronger focus on multisectoral collaboration and linkages to produce social and economic benefits, existing networks and proposals for new networks were assessed against five equally weighted selection criteria:

- excellence of the research program (20 percent);
- highly qualified personnel (20 percent);
- networking and partnerships (20 percent);
- knowledge exchange and technology exploitation (20 percent); and
- network management (20 percent).

The evaluation process for existing networks also included:

- a review of their strategic plan for Phase II funding;
- reports of mid-term review;
- reports of site-visit committees or other external reviewers;
- external review reports by economic reviewers; and
- presentations by network representatives to the Selection Committee.

Further to this evaluation, the following 10 networks were selected to continue during Phase II of the Program:

- Canadian Bacterial Diseases Network
- Canadian Genetic Diseases Network
- Canadian Institute of Telecommunications Research
- Concrete Canada
- Inspiraplex
- Institute for Robotics and Intelligent Systems
- Mechanical and Chemimechanical Wood-Pulps Network
- MICRONET
- NeuroScience Network
- Protein Engineering Network of Centres of Excellence

To extend the scope of the Program, \$48 million-out of the total \$197 million NCE budget-were set aside to develop new networks in five targeted areas of research:

- advanced technologies (materials, software engineering);
- environment;
- health;
- technology-based learning; and
- trade, competitiveness, and sustainability.

In addition to exceeding a threshold of excellence in the five selection criteria, the applications for networks had to demonstrate the relevance of the proposed networks to the targeted areas.

Launched in May 1994, the competition for new networks resulted in 65 Letters of Intent. After a review of the Letters of Intent, 15 groups were invited to submit a full application. The Phase II Selection Committee recommended the funding of four new networks and the competition results were announced in July 1995. The selected networks were:

- Intelligent Sensing for Innovative structures (materials)
- Sustainable Forest Management (environment)
- Health Evidence Application and Linkage Network (health)
- Telelearning Research Network (telecommunications)

None of the proposals in the fifth targeted area—trade, competitiveness, and sustainability—achieved the level of excellence required in each of the five selection criteria to be recommended for funding by the NCE Selection Committee.



## From excellence to relevance

The need to optimize the use of research results, and to more rapidly and efficiently transfer knowledge and technology to the private sector, became more acute as the program evolved. To respond to these challenges, the focus on research excellence in Phase I was broadened to include a greater emphasis on interaction with partners outside universities. In Phase II, networks needed to exceed a threshold of excellence in five equally weighted criteria, including the quality of the proposed networking and partnerships, and planned mechanisms for knowledge exchange and technology exploitation.

These changes to the selection criteria and the identification of targeted areas for the new networks were aimed at increasing private-sector participation in all network activities, including the identification of research priorities.

Another significant change in Phase II was the increased recognition of the importance of the social sciences to anticipate and understand the impact of technological advances on people and society. Networks were encouraged to involve researchers from the various disciplines of the social sciences to examine the social and economic aspects of the research, and to create new knowledge to support the development of sound public policy.

## A permanent program

In February 1997, the Government of Canada announced its decision to make the NCE Program permanent with an annual allocation of \$47.4 million.

The new permanent status of the Program, combined with a stable budget, enabled the implementation of a seven-year funding cycle. Every network became eligible to receive funding for two seven-year cycles. Funding for the second funding cycle is awarded following an in-depth assessment of the network's scientific track record, long-term vision, and strategies for training and commercialization. The peer-review process involves visits by international experts and a thorough evaluation of their reports by the NCE Selection Committee.

In addition, the progress of each network is monitored with an in-depth peer review at the mid-point of the seven-year cycle. The decision to continue or phase out the funding is made by the Program's Steering Committee, based on the review of a network's achievements, progress, and its strategic plan for the remainder of the funding period.

In October 1997, the NCE program announced the results of a competition for the renewal of 10 of the original NCEs. Five networks were given additional funding until 2005, and two others were funded until 2002. They are:

- Canadian Bacterial Diseases Network
- Canadian Genetic Diseases Network
- Micronet
- Institute for Robotics and Intelligent Systems
- Protein Engineering Network
- Canadian Institute for Telecommunications Research
- Mechanical Wood-Pulps Network

Three of the networks did not have their funding extended.

A call for proposals was also issued in 1997 to create up to four new networks to address significant issues that are important to Canada. Proposals were expected to put forward innovative research approaches that cross traditional disciplinary and sectoral boundaries, and that promote collaboration among social, human, physical, and health scientists, and engineers. The result? The following four new networks—each with a unique research niche—were selected for their potential to make major contributions to the knowledge-based society:

- Mathematics of Information Technology and Complex Systems Network
- Canadian Arthritis Network
- Geomatics for Informed Decisions Network
- Canadian Institute of Photonic Innovations

## A larger program

In February 1999, the federal government announced a one-time allocation of \$90 million over three years to increase the \$47.4 annual NCE budget. In 2002, the yearly \$30 million additional allocation was made permanent, which set the base funding of the permanent Program at \$77.4 million annually.

In 1999, the NCE Program launched an open competition for new networks, which resulted in twelve groups (from among 45 Letters of Intent) being invited to submit full applications. Following an in-depth review by the NCE Selection Committee, three new networks were announced in February 2000:

- Aquanet
- Canadian Network for Vaccines and Immunotherapeutics
- Canadian Stroke Network

In January 2000, a call for applications for a targeted competition was issued 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
- Canadian Language and Literacy Research Network
- AUTO21 – The Automobile of the 21st Century
- Stem Cell Network

In May 2001, following a competition for renewal of their funding, two networks were awarded another seven years of support:

- Intelligent Sensing for Innovative Structures
- Sustainable Forest Management

Two other networks wrapped up their activities at the end of their first seven-year funding cycle.

In January 2002, the NCE Steering Committee announced two back-to-back competitions to start new networks in 2003 and 2005. The first competition attracted 53 Letters of Intent, from which 7 proposals were invited. In July 2003, the two selected new networks for 2003 were announced:

- ArcticNet
- Advanced Foods and Materials Network

The second competition led to 31 Letters of Intent, which were narrowed down to 5 full proposals being invited. These were evaluated along with the renewal applications for four networks. In November 2004, the Program announced the results of that competition. The new network is Allergen.

The four renewed networks are:

- Canadian Arthritis Network
- Canadian Institute for Photonic Innovations
- Geomatics for Informed Decision
- Mathematics of Information Technology and Complex Systems

Most of the new networks selected since the Program was made permanent reflect the increased role of the social sciences in ensuring that researchers and partners are able to address complex issues that can have a profound impact on society. From better understanding the devastating effects of arthritis, to the social aspects of developing a vaccine against AIDS, to the impact of global warming on Northern communities, and our access to clean water, the networks wholeheartedly embrace the vision of the NCE Program.

As some networks approached the successful completion of their two seven-year cycles, a Research Management Fund (RMF) was established to help ease their transition as organizations that are no longer eligible to receive NCE support. The funds cover network administration and networking costs. Research support from other sources, such as from the granting councils programs or partner organizations is a requirement to be eligible for the RMF. The Mechanical Wood-Pulps Network was the first NCE to successfully apply to the Research Management Fund.

After 12 years as part of the Program, the Mechanical Wood-Pulps Network used its RMF funding to help itself evolve into the Canadian Pulp and Paper Network for Innovation in Education and Research (PAPIER). The mission of PAPIER is to advance the culture of collaboration between university and industry it established over the years as a member of the NCE program. Much was achieved in those years. The Mechanical Wood-Pulps Network generated valuable knowledge leading to the



commercialization of innovative products and processes. In addition, three of its projects received NSERC / Conference Board of Canada Synergy Awards for outstanding university-industry R&D partnerships.

The NCE Program is recognized for its ability to target areas of strategic importance to Canada and to mobilize the best talent in universities, industry, and government. In 2003, the Canadian cattle industry faced unprecedented challenges following the discovery of a case of bovine spongiform encephalopathy (BSE) and the resulting closure of all of the country's major beef and cattle export markets. In the Budget of February 2004, the federal government reiterated its confidence in the NCE Program and allocated funding of \$5 million per year over seven years to support the creation of a new network for

research on BSE and other transmissible spongiform encephalopathies. The Program is collaborating with Agriculture Canada, Health Canada, and the Canadian Food Inspection Agency to develop the scope of the research. A call for proposals will be issued to create this highly targeted network. The network is expected to become operational in 2005.

## Mid-term Review





As the NCE Program gained permanent status, the mid-term review became a critical tool to assess the continuing performance of the networks and their contribution to the development of Canadian economy and society.

During the fourth year of each seven-year funding cycle, networks must successfully demonstrate that they meet the Program's evaluation criteria and continue to add value to their field of activity. NCEs are assessed by experts in their own fields for their ability to:

- perform outstanding research;
- nurture and develop effective research partnerships with the public, private, and not-for-profit sectors;
- exchange knowledge and exploit technology;
- train graduate students who go on to work in industry and in other critical sectors; and
- run a national research consortium.

## Overview of Network's funding Cycles

Network Name	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
AquaNet	MT			RC				MT			RMF			
AUTO21		MT			RC				MT			RMF		
CAN			RC				MT			RMF				
CANVAC	MT			RC				MT			RMF			
CBDN			RMF											
CGDN			RMF											
CIPI			RC				MT			RMF				
CLLRNet		MT			RC				MT			RMF		
CSN	MT			RC				MT			RMF			
CWN		MT			RC				MT			RMF		
GEOIDE			RC				MT			RMF				
IRIS			RMF											
ISIS				MT			RMF							
Micronet			RMF											
MITACS			RC				MT			RMF				
MWPN														
PENCE			RMF											
SCN		MT			RC				MT			RMF		
SFM				MT			RMF							

-  1st funding cycle
-  2nd funding cycle
-  RMF Funding
-  Future funding if successful in mid-term review and/or funding completion

RC: Competition for renewal of last funding cycle

MT: Mid-term review

RMF: Research Management fund

## Keeping the Program on target

About every four or five years, the NCE Program is subject to an evaluation to make sure it continues to meet its goal of mobilizing researchers and their partners to advance and transfer knowledge for the benefit of Canada's economy and society.

In 1993, an interim Evaluation of Phase I pointed to the progress achieved by the networks and showed that the Program was on target. The report—along with another report by the Standing Committee on Industry, Science, and Technology, Regional and Northern Development regarding the future of the Program—provided the federal government with evidence to renew the NCE Program and allocate \$197 million to its budget.

In 1997, a thorough evaluation showed that the NCE Program has been successful in achieving all four of its primary objectives. Key findings of the report indicated that the Program had a marked impact on the type of research conducted, and that students and postdoctoral candidates associated with the program are exposed, far more than usual, to other researchers, to networking, and to industrial needs and concerns.

The 2002 evaluation of the Program found that the NCE is a necessary and valuable component of Canadian research and innovation. It also showed that, compared to other somewhat similar initiatives, the NCE Program provides significantly more:

- research networking and collaboration;
- partnerships with users;
- pan-Canadian networking;
- multidisciplinary;
- cross-disciplinary;
- ability to train highly qualified people in novel ways;
- support for all phases of R&D;
- ability to support risky R&D;
- critical mass and international recognition; and
- user focus.

The 2002 evaluation revealed the increasing contribution of social sciences and humanities disciplines in structuring network research programs. It also highlighted the importance of keeping an open mind when requiring social sciences participation in all networks: some networks could clearly benefit from such participation, but for others there is little or no apparent "fit."

## An Innovative Management Model

Managing large consortia of people and institutions to undertake leading-edge research and transfer knowledge to users in the private and public sector is a unique challenge that networks have embraced successfully. Each network has in place an internal agreement covering a wide range of operational matters, including the responsibilities and commitments of each participating organization, governance structure, reporting requirements, the ownership and disposition of intellectual property, the publication of research results, and conflict of interest.

Over the years, a number of management functions and committee mandates have emerged as being at the core of the NCE model, and central to its effectiveness:

The **Board of Directors** has the overall responsibility for the management, direction, and financial accountability of the network. It is accountable to the Members of the network and to the NCE Steering Committee. To ensure that stakeholders have an input in the direction of the network, at least 50 percent of the members of the Board are from outside the university community. In addition, at least one member is a researcher who does not have management responsibilities.

Appointed by the Board of Directors, the **Scientific Director** is responsible for overseeing the research program. Usually, the Scientific Director is also the Chair of the network's Research Management Committee.

The networks also appoint a **Network Manager**, responsible for the administrative staff, the ongoing operations of the network, and the management of intellectual property. The Manager also promotes the network's research expertise, develops commercialization strategies, and manages the financial and legal aspects of the network.

Depending on the different cultures within networks, the Board of Director sometimes creates a CEO position that may be filled by the Scientific Director, the Network Manager, or a separate individual.

In some networks, the **Research Management Committee** is the main planning and operations committee. Its role is to optimize the activities and resources of the network, and provide advice to the Board of Directors on the management of scientific program, including strategic directions, research themes, priorities, core facilities, and funds allocation. Committee members represent the various interests within the network.

A **Scientific Review Panel or international advisors** may assist the Research Management Committee by reviewing all projects and researchers periodically for progress against objectives, deliverables, and milestones.

The Board of Directors can also create committees such as: an **Education and Training Committee** to develop effective programs and mechanisms to support the training mandate of the network; or an **Advisory Committee on Business Development** to provide advice and guidance on research knowledge and technology transfer, commercialization strategies, and the technical feasibility and commercial significance of projects.

Finally, each network has a **Finance and Audit Committee** in place to review financial statements and recommend them to the Board for approval, to review budgets, and to ensure that all proper controls are in place.

## Measuring progress

From the beginning, the NCE Program has incorporated “outcome measurement” as part of its regular operations. Each year, the networks report on their activities and achievements in all areas, including excellence of research, the extent of their collaborations, the knowledge they have created and transferred to users, and the people they have trained. The data is collected and reported globally for the overall program in each annual report.

In 2002, the Program reviewed all its “outcome indicators” and formalized their description and their linkages to the program goals in a document entitled the *Results-based Management Accountability Framework*. This document now contains over 35 indicators organized into the following seven key performance areas:

- leading-edge research;
- the level of networking and collaboration in research;
- partnerships with industry, government, and other stakeholders;
- training of new researchers and retention of researchers;
- transfer and exploitation of knowledge and technology;
- increased productivity and economic growth; and
- improved quality of life.

In 2002, the Program also adopted a Risk-Based Audit Framework that describes the accountability and risk-management environment in order to manage transfer payments in a manner sensitive to risks, complexity, accountability for results, and economical use of resources. The goal of the Risk-based Audit Framework is to ensure that:

- due diligence is exercised in the expenditure of public funds;
- the Program is administered in accordance with Treasury Board terms and conditions of the NCE Contribution Agreement, and that recipients are selected according to, and comply with, these terms and conditions;
- relevant legislation and policies are being respected; and
- the quality of information available for use by the NCE Program management is relevant, accurate, and available for decision-making purposes.

These approaches are in line with the recommendations of the Auditor General of Canada regarding the use of public funds by granting organizations.



## The Road Ahead

In the 15 years since the NCE Program was created, much has been achieved. The Program is now established as a major Canadian institution and is an institutional innovation that has attracted international attention. As a key element of the federal government Innovation Agenda, the NCE Program is ready to take on the challenges of the years ahead. How can Canada best address emerging issues and take advantage of emerging opportunities? How can we make the best possible use of NCE funds to increase Canada's capability to produce research and putting it to use? These are some of the challenges on the horizon.

With its 21 networks in four areas of strategic importance to Canada—Advanced Technologies; Engineering and Manufacturing; Health, Human Development and Biotechnology; and Natural Resources and Environment—the Program is reaching the limit of its resources, and too few networks proposing entirely novel research can now be funded. In the coming years, the Program will need to find additional resources to support more of the cutting-edge research that enables our country to compete and lead in the global knowledge economy.

Earlier this year, the federal government turned to the NCE to create a network dedicated to BSE science. This speaks loudly of the ability of the networks to respond to pressing issues. But, by mandating the Program to create a highly targeted network, the Government is also opening the door to a potential new role for the NCEs. From open competitions to targeted and highly targeted competitions, what is the right balance?

A move towards targeted competitions in areas identified as strategic by the granting councils, government departments, and foresight exercises, would mean less work for applicants. They would no longer have to make the case for the problem. They would only have to demonstrate they are the best group to deal with it. But this would also represent a major shift from the first 15 years of the Program. Would increasing the targeting of research diminish the Program's ability to mobilize researchers in a broad spectrum of disciplines and reduce multidisciplinary research?

What was considered a major culture shift in 1989—multisectoral collaboration, and networking—today is the mainstay of the best international research. Now that a culture of partnership and collaboration has taken deep root in Canada, the time may have come to ask if there is any benefit to focusing the NCE funding on the networking aspects and the university side of the equation? Are partners ready to increase their involvement in the networks? A shift in focus could, in the long-term, help promote a stronger receptor capacity for the excellent research that is conducted at Canadian universities and research hospitals. From being mostly research driven, the Program could evolve into mostly receptor driven.

There may also be opportunities to broaden the Program and invite government laboratories to become active members in networks. Over the years, the use of international peer-review has proven to be one of the biggest assets of the NCE Program. Involving government laboratories that pass the test of excellence would enable networks to tap into a tremendous pool of expertise, particularly in critical areas such as health and the environment.

Many more questions, challenges, and issues are facing the NCE Program in the years ahead. The answers will be found in the careful consideration and widespread consultation that have marked the Program since the very first group of visionaries got together to design an innovative research model that capitalized on excellence, our country's vast landmass, and on the determination of its people to work together.

# NCE Snapshots

The following tables present the evolution of partnerships over the years.

## NCE Participating Organizations for 1996-1997

Province	Federal	Hospital	Industry	Other	Provincial	University	Total
British Columbia	1	4	75	19	10	4	113
Alberta	2	1	55	15	11	4	89
Saskatchewan	3	–	5	1	10	2	21
Manitoba	2	3	12	5	6	2	30
Ontario	27	19	139	34	7	14	241
Québec	5	12	92	17	10	14	149
New Brunswick	–	–	6	–	2	3	11
Nova Scotia	–	2	5	1	–	4	18
Newfoundland and Labrador	–	–	4	1	6	1	6
<i>Total Canadian</i>	<i>40</i>	<i>41</i>	<i>393</i>	<i>93</i>	<i>62</i>	<i>48</i>	<i>678</i>
<i>Total Foreign</i>	<i>3</i>	<i>2</i>	<i>73</i>	<i>12</i>	<i>–</i>	<i>13</i>	<i>103</i>
<b>Grand Total</b>	<b>43</b>	<b>43</b>	<b>466</b>	<b>105</b>	<b>62</b>	<b>61</b>	<b>781</b>

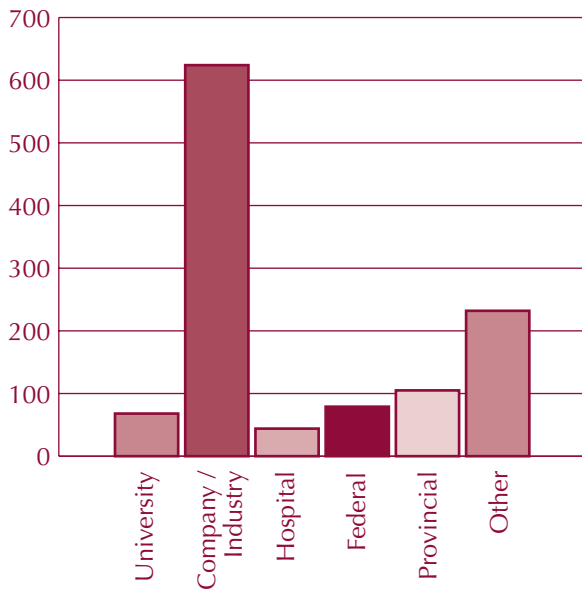
## Participating Institutions 1999-2000

Province	Federal	Hospital	Industry	Other	Provincial	University	Total
Northwest Territories	0	0	1	6	1	0	8
British Columbia	5	4	84	30	19	5	147
Alberta	3	0	52	17	12	4	88
Saskatchewan	0	0	4	4	9	2	19
Manitoba	1	0	15	3	6	2	27
Ontario	22	16	180	87	16	14	335
Québec	8	18	108	46	17	19	216
New Brunswick	1	0	12	1	0	3	17
Nova Scotia	3	1	11	1	2	4	22
Newfoundland and Labrador	2	0	8	8	4	1	23
Prince Edward Island	0	0	0	0	0	1	1
<i>Total Canadian</i>	<i>45</i>	<i>39</i>	<i>475</i>	<i>203</i>	<i>86</i>	<i>55</i>	<i>903</i>
<i>Total Foreign</i>	<i>7</i>	<i>7</i>	<i>88</i>	<i>63</i>	<i>0</i>	<i>43</i>	<i>208</i>
<b>Grand Total</b>	<b>52</b>	<b>46</b>	<b>563</b>	<b>266</b>	<b>86</b>	<b>98</b>	<b>1,111</b>

## Regional and Sectoral Distribution of NCE Partners

Province / Territory	University	Company / Industry	Hospital	Federal	Provincial	Other	Total
Northwest Territories / Nunavut / Yukon	–	1	–	1	1	1	9
British Columbia	7	87	4	5	17	27	147
Alberta	4	68	3	2	16	26	119
Saskatchewan	2	4	–	3	6	3	18
Manitoba	2	14	–	1	8	3	28
Ontario	20	270	21	43	21	103	458
Québec	21	127	15	11	20	42	236
New Brunswick	4	21	–	6	5	13	49
Nova Scotia	5	13	1	4	5	8	51
Prince Edward Island	2	4	–	1	1	2	10
Newfoundland and Labrador	1	15	–	2	5	4	27
<i>Total Canadian</i>	<i>68</i>	<i>624</i>	<i>44</i>	<i>79</i>	<i>105</i>	<i>232</i>	<i>1,152</i>
<i>Total Foreign</i>	<i>85</i>	<i>132</i>	<i>4</i>	<i>27</i>	<i>2</i>	<i>48</i>	<i>298</i>
<b>Grand Total</b>	<b>153</b>	<b>756</b>	<b>48</b>	<b>106</b>	<b>107</b>	<b>280</b>	<b>1,450</b>

### Canadian Distribution of NCE Partners



### Foreign Distribution of NCE Partners

