IC-IMPACTS

Canadian Ministry of Innovation, Science, and Economic Development (ISED), Department of Science and Technology of India (DST), and IC-IMPACTS announce joint funding of ten new projects.

2016-2017 ANNUAL REPORT

"Since its humble beginnings in 2013, IC-IMPACTS is now recognized as a very successful model for international research collaborations, innovative HQP training, respectful community engagement and creation of technologies that promote international trade."

- Dr. Nemy Banthia
CEO and Scientific Director, IC-IMPACTS

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TECHNOLOGY DEPLOYMENTS

PUBLICATIONS

584

SCIENTIFIC PUBLICATIONS

22

PATENTS & LICENSES

JOBS

630

INNOVATORS TRAINED

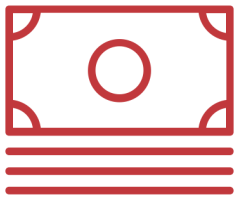
98%

STUDENTS EMPLOYED

PARTNERSHIPS

250

MULTI-SECTOR PARTNERSHIPS



$11M

FUNDING LEVERAGED*

**** $ to $ match:** Every Canadian research funding $ matched by equal Indian contribution in joint projects*

SAFE & SUSTAINABLE INFRASTRUCTURE

PROJECTS

Sustainable Infrastructure Using Smart FRPs
Canadian Lead: Dr. Shamim Sheikh, University of Toronto
Indian Lead: Dr. Umesh Sharma, IIT Roorkee

Characterization And Use Of Industrial Fly Ash
Canadian Lead: Dr. Daman Panesar, University of Toronto
Indian Lead: Dr. Bhupinder Singh, IIT Roorkee

Modelling And Assessment Of Deficient And Repaired Structures
Canadian Lead: Dr. Frank Vecchio, University of Toronto
Indian Lead: Dr. Umesh Sharma, IIT Roorkee

Conservation Of Heritage Masonry Structures Within Cauvery Basin Waterworks
Canadian Lead: Dr. Vivek Bindiganavile, University of Alberta
Indian Lead: Dr. Narayana Suresh, National Institute of Engineering

Full Field Non-Contact SHM Protocols For Long Span Railway Bridges And Heritage Structures
Canadian Lead: Dr. Rishi Gupta, University of Victoria
Indian Lead: Dr. Esakki Balasubramanian, Vel Tech

Evaluating The Integrity Of Railway Infrastructure In India And Canada With An Emphasis On Bridges And Tracks
Canadian Lead: Dr. Mustafa Gul, University of Alberta
Indian Lead: Dr. Pradipta Banerji, IIT, Roorkee

Application Of Precast Products Made Using Bottom Ash & Fly Ash For Rural Pavements & Other Infrastructure In India
Canadian Lead: Dr. Rishi Gupta, University of Victoria
Indian Lead: Dr. Urmil Dave, IIT, Nirma University

Solar Energy Powered Net-Zero Energy Smart Buildings
Canadian Lead: Dr. Bruno Lee, Concordia University
Indian Lead: Dr. Srinivas Reddy, IIT, Madras

India Canada Initiative for Resilient Global Urban Shelter
Canadian Lead: Dr. Constantin Christopoulos, University of Toronto
Indian Lead: Dr. Ravi Sinha, IIT Bombay

Strengthening And Sustaining Civil Infrastructure In India And Canada
Canadian Lead: Dr. Nemy Banthia, The University of British Columbia
Indian Academic Institutions: IIT-Hyderabad, IIT-Delhi, IIT-Mumbai, National Institute of Engineering (Mysore), VNIT (Nagpur)

Structural Health Monitoring Of Tall Buildings Using Vibration-Based Techniques
Canadian Lead: Dr. Lucia Tirca, Concordia University
Indian Lead: Dr. Soraj Panigrahi, CSIR – Central Building Research Institute, Roorkee, India

Energy and Water Disaggregation for Non-Intrusive Load Monitoring in Buildings
Canadian Lead: Dr. Ivan Bajic, Simon Fraser University
Indian Lead: Dr. Angshul Majumdar, IIT Delhi

Smart Sensor Deployment in Buildings: Evacuation Planning and Energy Management
Canadian Lead: Dr. Mark Fox, University of Toronto
Indian Lead: Dr. Krithi Ramamritham, Indian Institute of Technology, Bombay

Urban Heat Island Effect and Building Energy Demand: Linkages Explained Using a Dense, Low Cost Sensor Network
Canadian Lead: Dr. Raja Sengupta, McGill University
Indian Lead: Dr. Prasad Pathak, Shiv Nadar University

RECYCLING TIRE FIBRES INTO PAVEMENTS

Dr. Nemy Banthia and Dr. Obinna Onuaguluchi (University of British Columbia) have developed a more resilient type of concrete using recycled tires that could be used for concrete structures like buildings, roads, dams and bridges while reducing landfill waste.

The team experimented with different proportions of recycled tire fibres and other materials used in concrete—cement, sand and water—before finding the ideal mix, which includes 0.35 per cent tire fibres.

"Most scrap tires are destined for landfill. Adding the fibre to concrete could shrink the tire industry's carbon footprint and also reduce the construction industry's emissions, since cement is a major source of greenhouse gases," said Dr. Banthia. "We use almost six billion cubic metres of concrete every year," he added. "This fibre can be in every cubic metre of that concrete."

The new concrete was used to resurface the steps in front of the McMillan building on UBC's campus in May. Dr. Banthia's team is tracking its performance using sensors embedded in the concrete, looking at development of strain, cracking and other factors. So far, the results support laboratory testing that showed it can significantly reduce cracking.

> ***Most scrap tires are destined for landfill. Adding the fibre to concrete could shrink the tire industry's carbon footprint and also reduce the construction industry's emissions.***
>
> ***- Dr. Nemy Banthia***

FEATURED INNOVATIONS

TRANSFORMING WASTE INTO PAVER STONES

Dr. Rishi Gupta (University of Victoria) and his team have developed a new "super sustainable" building material entirely made from waste.

The innovative material uses fly ash waste produced from coal-based power plants. Although fly ash captured from the chimneys in these plants has been utilized before, Dr. Rishi's IC-IMPACTS project is unique in that it incorporates bottom ash as well. Bottom ash is also found at coal-based power plants but is usually made into a slurry before being disposed of into ponds for storage (sometimes called "pond ash").

"In traditional materials, cement is generally the most expensive component. By eliminating cement entirely, the cost savings would be significant," said Dr. Gupta. He estimates that this new material could cost 50% less to produce than conventional materials, depending on the availability and source of the fly ash and bottom ash.

The research team used the ash to create a new geopolymer material. Indian researchers at Nirma University are analyzing different proportions of fly ash and bottom ash and have started working on optimizing the final mix. On the other side of the world, Canadian researchers are analyzing the material at a microscopic level.

The team have deployed pavements in both Canada and India and are currently measuring the performance of these new paver stones.

> ***This new material could cost 50% less to produce than conventional materials.***
>
> ***- Dr. Rishi Gupta***

INTEGRATED WATER MANAGEMENT

PROJECTS

An Innovative Sustainable Biotechnology For Resource Recovery From Wastewater Streams Using Microwave Enhanced Advanced Oxidation With Algae
Canadian Lead: Dr. Victor Lo, The University of British Columbia
Indian Lead: Dr. Pradeep Kumar, IIT, Roorkee

Development Of Capacitive Deionization Technology For Point-Of-Use Water Purification
Canadian Lead: Dr. Madjid Mohseni, The University of British Columbia
Indian Lead: Dr. Sathish Kumar, Eureka Forbes Ltd.

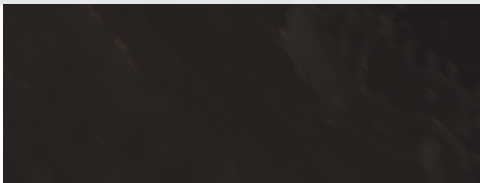
Biomonitoring Of Water Quality In Relation To Human Health Using Biosensors And Improvements Through Nanoparticle Based Purification Systems
Canadian Lead: Dr. Damase P. Khasa, Laval University
Indian Lead: Dr. Manzoor Shah, University of Kashmir

Microfabricated, Low-Cost, High-Sensitivity Chlorine And Ph Sensor Systems For Water Quality Monitoring
Canadian Lead: Dr. Jamal Deen, McMaster University
Indian Lead: Dr. Soumyo Mukherji, IIT Bombay

A Study Of Technology & Financial Appropriateness Of Water & Wastewater Infrastructure In Selected Cities Of India
Canadian Lead: Dr. Govind Gopakumar, Concordia University
Indian Lead: Dr. N.C. Narayanan, IIT Bombay

Development Of A Low-Cost Water Monitoring Kit For Multiplex Heavy Metal Detection Based On Aptamer Sensors
Canadian Lead: Dr. David Juncker, McGill University
Indian Lead: Dr. Rohit Srivastava, IIT Bombay

An Innovative Green Technology For Treating Municipal And Industrial Wastewater Entering Rivers And Streams
Canadian Lead: Dr. Shiv Prasher, McGill University
Indian Lead: Prof. Rameshwar Kanwar, Lovely Professional University



Handheld P-Laps Pathogen Detector
Canadian Lead: Dr. Thomas Thundat, University of Alberta
Indian Lead: Dr. Bhaskaran Muralidharan, IIT Bombay

Development Of An ICT Platform For Water Quality Monitoring
Canadian Lead: Dr. Clarence de Silva, The University of British Columbia
Indian Lead: Dr. Sandhya Shrivastava, Bhavan's Research Centre, Mumbai University

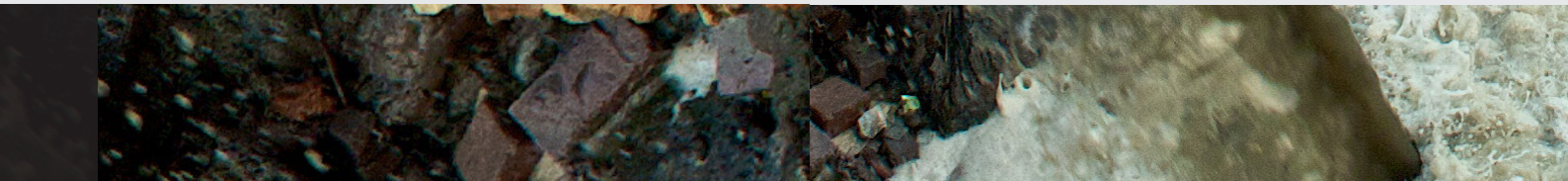
Quantum Dot Solar Panels For Water Treatment In Remote Settings
Canadian Lead: Dr. Edward Sargent, University of Toronto
Indian Lead: Mr. Prashant Kamat, Brick and Byte Innovative Products Pvt. Ltd

Compact High-Rate Water Treatment Systems For Small Communities
Canadian Lead: Dr. Ramin Farnood, University of Toronto
Indian Lead: Dr. Vivek Kumar, IIT Roorkee

Direct Cryptosporidium Detection For Developed And Developing Nations
Canadian Lead: Dr. Mina Hoorfar, The University of British Columbia
Indian Lead: Dr. Krishna Khairnar, CSIR

High Quality Potable Water For Small/Remote Communities In Canada And India
Canadian Lead: Dr. Pierre Bérubé, The University of British Columbia
Indian Lead: Dr. Anand Krishnamurthy, GE India

A Nanotechnology Enabled Device For The Detection Of Harmful Bacteria In Drinking Water
Canadian Lead: Dr. Michael Serpe, University of Alberta
Indian Lead: Dr. Soumyo Mukherji, IIT Bombay



FEATURED INNOVATIONS

REMOVING WASTEWATER CONTAMINATION

Dr. Prasher and his team at McGill University have developed a unique method to remove heavy metals from wastewater using agricultural waste. The researchers use biochar, a carbon rich material produced by burning leftover rice husks and plantain peels. The end result is a material that is highly absorptive that can be used as a passive wastewater treatment solution.

Before being released into open water bodies, municipal wastewater is often treated to remove harmful suspended solids to lower the biological oxygen demand. However, many wastewater treatment plants were not designed to remove emerging contaminants and small amounts of these sources can lead to significant concerns.

Researchers in Canada are developing and refining the biochar mix and testing its application. Partner researchers in India are studying the microbial properties of the material. Their findings will providing insight into a second application of biochar – applying biochar filters to slow sand filters. Slow sand filters can be used by rural communities to remove water contaminants, the addition of biochar and the bacterial colonies present in these filters can help make the removal process more effective.

By using waste as a resource, Dr. Prasher and his research team are helping introduce a sustainable technology that is very effective and can be easily implemented in communities across Canada, India, and beyond.

Researchers are using agricultural waste to create biochar - a highly absorptive material that can be used to remove heavy metals in wastewater.

Membrane treatment can remove over 99.99% of contaminants, making it ideal for creating drinking water.

USING BACTERIA TO PURIFY WATER

Dr. Bérubé (University of British Columbia) has developed a membrane treatment system that can remove over 99.99% of contaminants, making it ideal for creating clean drinking water.

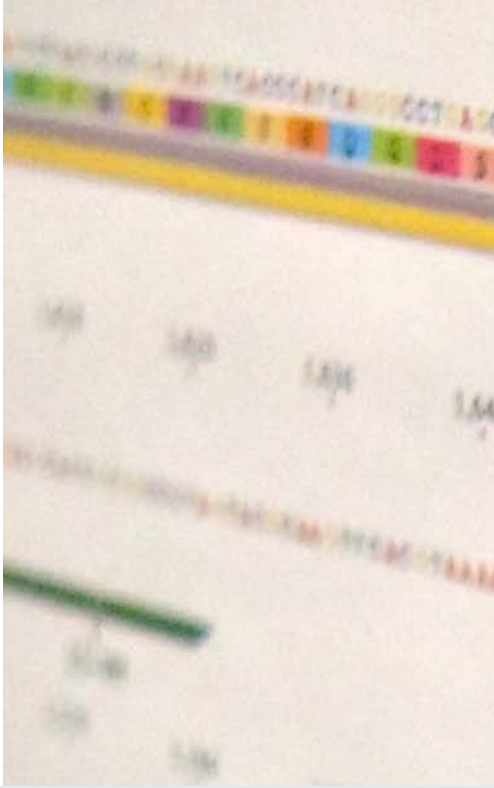
Dr. Bérubé's system uses bacteria to turn non-potable water into drinking water. Tanks of fibre membranes catch and hold contaminants—dirt, organic particles, bacteria and viruses—while letting water filter through. A community of beneficial bacteria, or biofilm, functions as the second line of defence, working in concert to break down pollutants.

The newly developed system, has been designed to rely on gravity and hungry bacteria to get the job done.

"Our system is the first to use gravity to scour and remove captured contaminants, which otherwise accumulate and clog the membrane. It's low-maintenance and as efficient as conventional approaches that need chemicals and complex mechanical systems to keep the membranes clean," said Dr. Bérubé. "The biofilm also helps by essentially eating away at the captured contaminants. You just open and close a few valves every 24 hours in order to 'lift' the water and let gravity and biology do their thing. This means significant savings in time and money over the lifetime of the system."

Unlike most municipal systems, this innovative system is very easy to maintain. The new technology has been tested in West Vancouver and has potential to be installed in remote communities in Canada and India.

PUBLIC HEALTH



PROJECTS

Next Generation Molecular Diagnostics For Emerging Viral Diseases
Canadian Lead: Dr. Francois Jean, The University of British Columbia
Indian Lead: Dr. Santanu Chattopadhyay, Nationwide the Family Doctors

Dialled In: Tapping Community Voice To Improve Child Immunization Services In India
Canadian Lead: Dr. Mira Johri, University of Montreal
Indian Lead: Dr. Alok Kumar Mathur, Indian Institute of Health Management Research (IIHMR) University

Engaging Community Pharmacists In India To Enhance Early Detection Of Tuberculosis
Canadian Lead: Dr. Madhukar Pai, McGill University
Indian Lead: Dr. Nita Jha, World Health Partners

A High Quality Serotype Discriminating Dengue Virus Diagnostic Test Adapted For Field Investigation
Canadian Lead: Dr. Sachdev Sidhu, University of Toronto
Indian Lead: Dr. Amitabha Chaudhuri, SciGenom Labs

Identification Of High Affinity Ligands Against Dengue Virus NS1 For The Development Of An Affordable Point-Of-Care Diagnostic Kit
Canadian Lead: Dr. Tom Hobman, University of Alberta
Indian Lead: Dr. Easwaran Sreekumar, Rajiv Gandhi Centre for Biotechnology

A Portable Fever Kit For Dengue And Chikungunya
Canadian Lead: Dr. Stewart Aitchision, University of Toronto
Indian Lead: Dr. Manoj Varma, Indian Institute of Science

A Point-Of-Care Device For Malaria Diagnosis And Drug Resistance Genotyping
Canadian Lead: Dr. Stephanie Yanow, University of Alberta
Indian Lead: Dr. Aparup Das, National Institute of Malaria Research

Development Of A Hand Held Molecular Point-Of-Care Test Device For Infectious Diseases
Canadian Lead: Dr. James Mahony, McMaster University
Indian Lead: Professor Daman Saluja, University of Delhi

Development Of A Portable Device For Early Detection Of Eye Infection And Dry Eye Disease
Canadian Lead: Dr. James Feng, The University of British Columbia
Indian Lead: Dr. Ashutosh Richhariya, L.V. Prasad Eye Institute

Surface Modulation Of CUS Quantam Dots Using Biginelli Compounds For Construction of a Portable Fluorescence Sensor For Bacteria
Canadian Lead: Dr. Jan J. Dubowski, Université de Sherbrooke
Indian Lead: Dr. Narinder Singh, Indian Institute of Technology Ropar

FEATURED INNOVATIONS

IMPROVING IMMUNIZATION COVERAGE

Preventing the occurrence of critical infectious diseases through vaccination is one of the most significant and cost-effective ways to improve child health and survival.

Dr. Mira Johri (University of Montreal) and her research team are working to improve vaccination and immunization in rural Indian communities where vaccination rates are extremely low.

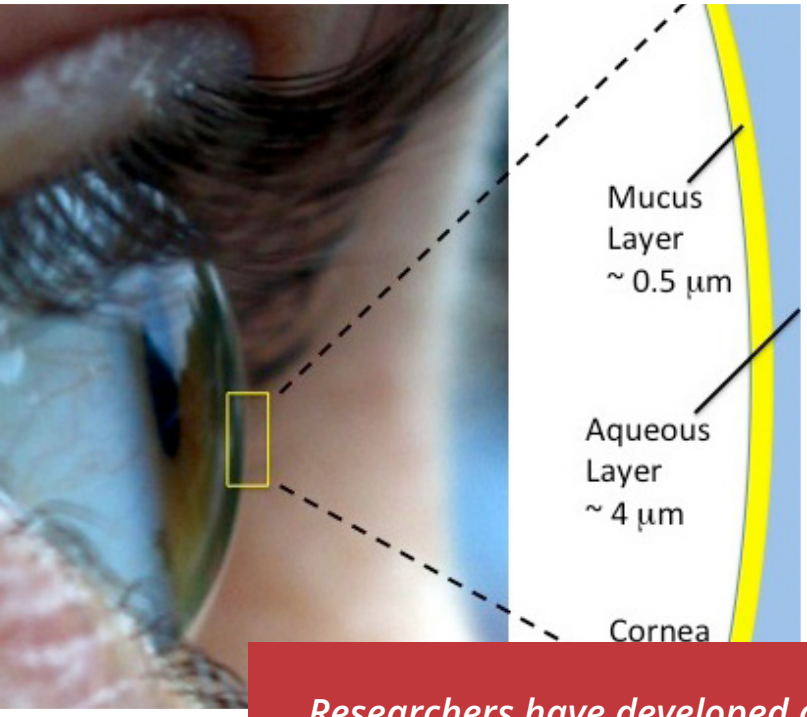
Multiple factors contribute to incomplete child vaccination. Some relate to the knowledge and beliefs of parents and families, who may not understand the purpose of immunization or the vaccine schedule, or may succumb to rumours or misinformation about vaccination being harmful. Others relate to shortcomings in vaccine provision by the government, which require that high-quality vaccines be supplied and delivered on time by qualified health workers.

Dr. Johri and her team have developed a novel mobile and social media platform called "Tika Vaani" to better inform communities and receive feedback about critical health issues in rural communities.

The platform offers an anonymous mechanism to provide the general public information on immunization and establishes a channel to enable community voice to contribute to improvements in governance and delivery of immunization services.

The novel platform has been well received by community members and is growing very successfully. Over 4,500 people in 30 different villages have attended live demonstrations of the technology and service.

By using simple mobile phones and interactive voice response systems, Dr. Johri and her team have developed a new approach to reach and inform communities. This approach can also be applied to rural and First Nation communities in Canada and can help build healthier communities across both countries.



Researchers have developed a portable, inexpensive tool for early detection of dry eye and potential eye infection.

PORTABLE DETECTION OF EYE INFECTIONS

Dr. James Feng (University of British Columbia) and his research team have developed a portable diagnostic tool that detects the premature breakup of the tear film and the loss of the mucous layer on the cornea as indicators of dry eye and impending eye infection.

Ocular surface infections such as microbial and fungal keratitis and the dry eye syndrome are among the leading causes of blindness in the world.

Traditional diagnostic methods require culturing tear samples up to 7 days in microbiology labs and early detection of infection is vital to the efficacy of clinical interventions.

Dr. Feng and his team first created theoretical models of tear film dynamics and studied various film rupture scenarios relevant to eye infection and dry eye disease. These studies helped form the foundation on which a diagnostic device is developed.

The team then engaged hospital nurses and health care end-users to better understand their user interface requirements to develop a physical diagnostic device.

Strong research collaborations are occurring between both Canadian and Indian research teams. Researchers in Canada are currently developing the designs for the final lenses while researchers in India are actively developing the handheld light system needed for the portable unit.

The efforts of this project will culminate into a robust, portable and inexpensive diagnostic tool that will benefit the health of underprivileged communities in India and Canada.

DEVELOPING FUTURE WATER LEADERS

In partnership with Waterlution, IC-IMPACTS hosted Water Innovation Lab India (WIL India) - a 12-day program that took 40 students and professionals in the water sector on a journey from Mumbai to Udaipur.

While learning about pressing issues such as water scarcity, industrial impact, accessible technology, the program encouraged collaboration between young leaders, mentors, and facilitators to develop real-world solutions that could positively affect the communities visited.

WIL India spawned seven unique group projects that are actively working on unique and innovative water solutions that can be implemented into communities.

Students and professionals also left the program knowing how to adapt research to respond to emergent needs, how to look with an interdisciplinary lens at water issues, and how to creatively inspire action. These skills will help these future water leaders further accelerate knowledge in this sector and communicate effectively across different cultures.

Without global knowledge sharing and awareness building, we will not meet our goals for safe water. WIL India and IC-IMPACTS is making this happen and their work is critical to everyone's future.

- Jerry Hanna

CEO and Founder of Clearflow Group Inc.

TRAINING PROGRAMS

NANOTECHNOLOGY & ENTREPRENEURSHIP

IC-IMPACTS hosted its annual Summer Institute at the University of Alberta. The week-long program brought 50 graduate students from across Canada and India to learn about nanotechnology innovations in the infrastructure, water, and health sectors.

Over the course of the week-long program, students learned cutting-edge research techniques from leading experts in the nanotechnology field, viewed demonstrations to show how these research techniques are applied in community contexts, and presented their own scientific research. In addition, students were challenged to think about how their own research could directly benefit communities and society.

Through a rapid-fire presentation approach, students were each given 5 minutes to make oral presentations about their own research and present it through 3 powerpoint slides. The students themselves evaluated the presentations of their peers, judging based on the complexity and value of the science, the clarity and visual communication, and overall innovation.

The Summer Institute also challenged students to think beyond research and to acquire the mind-set and skills to become successful entrepreneurs. In partnership with the Impact Centre at the University of Toronto, students explored how their technologies could grow beyond laboratory science and truly benefit society.

After an intense week, the participants came away with new research and communication skills, as well as an expanded network of students and professors across two nations.

LOOKING FORWARD

"History has a way of intruding upon the present..."

- Bury My Heart at Wounded Knee: An Indian History of the American West

Book by author **Dee Brown**

Safer Roads, Bridges, and Buildings in Canada and India

Access to Clean Drinking Water in Canada and India

Building Healthy Communities in Canada and India

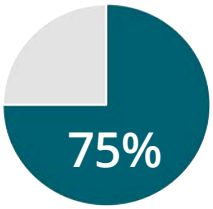
"Canada and India have a lot in common. We are bound by family ties and personal friendships. And both countries have globally competitive strengths in sectors such as technology, manufacturing and agri-food. Together, we can create companies and business opportunities while equipping our people with the skills they need for the jobs of the future."

- The Honourable Navdeep Bains
Minister of Innovation, Science and Economic Development

FOCUS: GROWING PARTNERSHIPS WITH COMMUNITIES & INDUSTRIES

CANADA 150

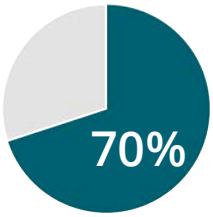
IC-IMPACTS is transferring research from Universities to remote communities, and First Nations by working in partnership, developing cultural understanding and delivering demonstration projects led by students and local residents.



75% of First Nations drinking water systems are at high risk of contamination. Over 110 communities are on boil-water advisories.

Fire incidence rates for First Nations are 2.4 times higher than for the rest of Canada. First Nations residents are 10 times more likely to die in a house fire.
(Canadian Broadcast Corporation)

In First Nation reserves, over 70% of schools need repairs.



"Through cutting-edge research IC-IMPACTS strives to develop meaningful solutions to community problems in both Canada and India and purports to scale it up with industrial involvement."

- Dr. Nemy Banthia
CEO and Scientific Director, IC-IMPACTS

IC-IMPACTS students with youth from the ?Aq'am community in Cranbrook, BC.

Canadian Innovation and Technology Demonstration - IC-IMPACTS is building partnerships between Canadian and Indian Universities, as well as industries.

INDIA

IC-IMPACTS Joint research proposal calls with Department of Science and Technology, and Department of Biotechnology have leveraged $4 million (50:50 Canada:India) in critical research areas of infrastructure, water, and health.

In the next few years, IC-IMPACTS will promote more research innovations and technology demonstrations in India and Canada. Working in collaboration with local communities and industry, we will create a path for the commercialization of research to better the lives of people in both nations and promote India-Canada trade.

More than one million Canadians trace their roots back to India

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CANADIAN GOVERNMENT PARTNERS

BC Ministry of Forest-Lands and Natural Resource Operations (FLNRO)
Black Mountain Irrigation District
Canadian Institutes of Health Research
City of Rouyn-Noranda, Quebec
Clean Air Partnership
District of Lake Country
Environment Canada
Glenmore Ellison Irrigation District
I.S.E.D, Federal Government of Canada (through NCE)
INAC British Columbia
Industry Canada, Federal Government of Canada (through NCE)
Manitoba Infrastructure and Transportation
Ministere des Transports Direction des Quebec
Ministries of Transportation (Ontario)
Ministry of Transportation and Infrastructure (British Columbia)
Ministry of Transportation and Infrastructure of BC
Natural Sciences and Engineering Research Council
North Okanagan Regional District
Ontario Ministry of Environment
Public Health Agency of Canada
Public Health Ontario
Social Sciences and Humanities Research Council
Southern Ontario Water Consortium (SOWC)
Van Anda Improvement District (Texada Island)
Village of Thorsby

INDIAN GOVERNMENT PARTNERS

Archaeological Survey of India
Department of Biotechnology, Government of India
Department of Science & Technology, Government of India
Energy and Petrochemical Department, State of Gujarat
Government of Karnataka, State Highways Development Project
Grama Panchayathi Thondebavi, Government of Karnataka
Indian Railways
Ministry of Health and Family Welfare
Mumbai Municipal Corp.
Nagpur Municipal Corporation
National Health System Resource Center
National Instruments Corporation
National Mission for Clean Ganga (NMCG)
NHSRC Ministry of Health and Family
Punjab Pollution Control Board
Regional Medical Research Centre for Tribals (India Council of Medical Research)

GLOBAL GOVERNMENT PARTNERS

Water Magic

CANADIAN COMMUNITY PARTNERS

AFN Housing
Alberta Urban Municipalities Association
Asia Pacific Foundation of Canada
Canada India Business Council
Canada India Education Society
Canada India Foundation
Canada India Network Society
Canadian Construction Association
City of Kelowna
Fort McKay First Nation Community
Lytton First Nation
MaRS Innovation
Tl'azt'en Nation
University of Manitoba

INDIAN COMMUNITY PARTNERS

Bureau of Indian Standards
Butibori Manufacturers' Association
Indian Association of Structural Engineers
Indian Concrete Institute
Public Health Foundation of India
Rotary Club Nagpur
Sengupta Consultancy
Vidarbha Industries Association
Village of Poshnia
World Health Partners

GLOBAL COMMUNITY PARTNERS

Wells for India

CANADIAN INDUSTRIAL PARTNERS

Delta Remediation
Alberta Innovates Bio Solutions
Alberta Pacific Forest Industries
Alberta Research Chemicals
Aquila Diagnostic Systems Inc.
Atlantis Holdings
Ballard Power
BASF
BI Pure Water
Brxton LLP
Canfor Innovations
CAWST
Centennial Global Solar
ChroMedX Ltd
Clearflow
CRH
Deeproot
Delcan
Droycon Bioconcepts Inc.
Ducks Unlimited
Dufferin Concrete, Canada
Euclid Admixture
Fiberline Composites Canada Inc.
Fyfe Co.
GE Power Water and Process Technologies
GE Water, North America
Globvision Inc
Holcim Cement
Hyperion Inc.
IBM Canada Research & Development Centre
InnoTech Alberta
INO (Quebec)
JPT Peptide Technologies
Kerr Wood Leidal (KWL)
Keystone Labs
Kryton International Inc.
Lafarge
Lehigh Cement
PQ Corporation
ProMinent Fluid Controls Ltd
Pultrall Inc.
Quake Tek Inc.
Reed Jones Christoffersen Ltd
RES'EAU Water Network
S-Frame Software Inc.
Schoeck Canada
Sensequake Inc
Sensor Technology Ltd.
SISCAPA Assay Technologies
Stantec Inc.
Stream Technologies Inc.
TEC Edmonton
Tricon Concrete Finishing Company
Trojan Technologies
Vector Corrosion Technologies
Viridis Terra Innovations, Sainte-Marie, Quebec
Waterlution
Xerox Research Centre of Canada (XRCC)

INDIAN INDUSTRIAL PARTNERS

ACC Cement
Ambuja Cements
Ashtech Private Limited
Basawa Technologies Ltd.
Bathinda Thermal Power Plant
Bekaert Industries Pvt. Ltd.
Brick and Byte Innovative Products Pvt. Ltd
Bruker Daltonics Inc
Cauvery Basin Waterworks
Cauvery Neeravari Nagama Limited
Eureka Forbes Ltd.
FOSROC Chemicals India
GE Water, India
GHCL
GMR Highways
Golder Associates Consulting (India) Pvt. Ltd.
Hiranandani Group
Industrial Solid Waste Application Centre
IT Innovations for Masses
J+W Consultants LLP
Jagriti Foundation
Kheti Virasat
Lars Enviro Pvt. Ltd.
Lifecare Innovations Pvt. Ltd.
M/s Machine Telecon Pvt. Bangalore
Mahimtura Consultants
Nationwide the Family Doctors
OnionDev
Rashtriya Ispat Nigam Ltd. (RINL) [Vizag Steel]
Reliance Industries Ltd.
Robonik India Pvt. Ltd.
SciGenom Labs
SkillNet Solutions India Pvt Ltd.
Starmass Environmental Technology
Stewols India Ltd
Tandon Consultancy Services
Tata Consultancy Services
Universal Enterprise
University of Kashmir
Ushta Infinity
Yash Industries
Zenatix
Zonal Lab

GLOBAL INDUSTRIAL PARTNERS

Fiberline Composites A/S Denmark
KIK Custom Productions Inc
Pultron, New Zealand and UAE
Voltek Energy Inc

HAY & WATSON | Chartered Professional Accountants

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INDEPENDENT AUDITOR'S REPORT

To the Directors of IC-IMPACTS Centres of Excellence

We have audited the accompanying financial statements of IC-IMPACTS Centres of Excellence (the "Network"), which comprise the statements of financial position as at March 31, 2017 and the statements of operations and changes in net assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility
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 comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion
In our opinion, the financial statements present fairly, in all material respects, the financial position of the Network as at March 31, 2017 and the results of its operations and its cash flows for the year then ended, in accordance with Canadian accounting standards for not-for-profit organizations.

Hay + Watson

Chartered Professional Accountants
Vancouver, British Columbia
June 8, 2017

IC-IMPACTS Centres of Excellence

Statements of Financial Position
As at March 31, 2017 and 2016

		2017		2016
Assets				
Current				
Restricted cash				
Uncommitted	**$**	**4,292,190**	$	5,005,787
Cash held at other institutions (Note 5)		**240,238**		283,045
Accounts receivable		**18,833**		44,166
Unspent research grants receivable (Note 4)		**92,235**		-
Contributions receivable		**-**		25,000
Prepaid expenses		**31,399**		23,178
Unspent research advances (Note 4)		**2,324,466**		1,918,391
		6,999,361		7,299,567
Liabilities				
Current				
Accounts payable and accrued liabilities		**28,735**		62,409
Deferred contributions (Note 7)		**6,970,626**		7,237,158
		6,999,361		7,299,567
Net assets	**$**	**-**	$	-

IC-IMPACTS Centres of Excellence

Statements of Operations and Changes in Net Assets
Years ended March 31, 2017 and 2016

		2017		2016
Receipts				
Contribution from Networks of Centres of Excellence (Note 5)	**$**	**2,986,635**	$	2,321,701
Contributions from co-hosting universities		**744,447**		484,074
Contributions from other partners		**-**		8,706
Total Receipts		**3,731,082**		2,814,481
Disbursements				
Research and training programs				
Highly qualified personnel support		**292,796**		268,105
Research networking		**282,023**		325,617
Research grants (Note 4)		**2,309,242**		1,526,120
Technology transfer		**135,509**		70,908
		3,019,570		2,190,750
Administrative operations				
Communications and promotion		**10,600**		19,988
Operating costs		**176,923**		146,312
Professional and consulting fees		**30,169**		16,705
Staff salaries		**493,820**		440,726
		711,512		623,731
Total Disbursements		**3,731,082**		2,814,481
Net assets, beginning and end of year	**$**	**-**	$	-

IC-IMPACTS Centres of Excellence

Statements of Cash Flows
Years ended March 31, 2017 and 2016

		2017		2016
Cash provided by (used in)				
Operating activities				
Cash received from Networks of Centres of Excellence	**$**	**2,830,050**	$	2,830,050
Cash received from Canadian universities		**659,500**		637,000
Cash received from other contributions		**-**		8,706
Cash returned for unspent research grants		**22,488**		-
Cash disbursed for research grants		**(2,844,170)**		(2,350,310)
Cash disbursed for operations and networking		**(1,424,272)**		(1,405,228)
Decrease in cash		**(756,404)**		(279,782)
Cash, beginning of year		**5,288,832**		5,568,614
Cash, end of year	**$**	**4,532,428**	$	5,288,832
Cash composed of				
Uncommitted restricted cash	**$**	**4,292,190**	$	5,005,787
Cash held at other institutions		**240,238**		283,045
	$	**4,532,428**	$	5,288,832

For the latest news and information, please visit:

WWW.IC-IMPACTS.COM

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