IC-IMPACTS

2021-2022 ANNUAL REPORT

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YEAR IN REVIEW

The past year was marked by significant challenges arising from unprecedented events and the impacts of the COVID-19 pandemic. These impacts were felt both personally and professionally across communities worldwide. Millions of people lost family members, friends, and colleagues, leading to heightened stress and anxiety. We remain deeply grateful to frontline healthcare professionals who continue to care for others while putting their own lives at risk each day.

Despite these challenges, 2021 was also a year of opportunity, discovery, and growth. I am pleased to report that IC-IMPACTS continued to strengthen research collaboration and knowledge exchange between Canada and India, while advancing the application of new technologies in communities across both countries—particularly through partnerships with First Nation communities in Canada. Together, our researchers are breaking new ground through innovative demonstration projects in safe and sustainable infrastructure, integrated water management, and public health.

IC-IMPACTS' unique bilateral model stands as a tangible example of the critical role collaboration plays in science and technology.

We particularly value the continued and expanding support of India's Department of Science and Technology (DST) and Department of Biotechnology (DBT), whose commitment has grown steadily over the years. We remain committed to equipping graduate students and postdoctoral researchers in both countries with the skills, perspectives, and mindsets needed to pursue research for social good. The success of our entrepreneurship training is reflected in the strong employment outcomes of our graduates.

Through a growing network of passionate and talented young researchers, distinguished academics, innovative industries, and the shared vision and commitment of governments and communities, IC-IMPACTS has established itself as an effective and inspiring model for bilateral engagement between Canada and India.

We are deeply grateful to our entire IC-IMPACTS community—including the Research Management Committee, CEO and Scientific Director, staff, partners, researchers, and students across Canada and India—for their dedication and continued commitment. We also acknowledge the outstanding support we receive from the Networks of Centres of Excellence (NCE) and the Natural Sciences and Engineering Research Council of Canada (NSERC).

Mr. Barj S. Dhahan
Chairman of the Board of Directors

Despite the challenges of 2021, the Centre made steady progress in advancing its mission. IC-IMPACTS continues to facilitate strong collaborations between Canada and India, reaffirming its commitment to expanding a highly successful applied research model through industry partnerships and meaningful engagement with local communities. Through this approach, we contribute to the well-being of communities in both countries. We remain firmly committed to science-based research and social innovation that accelerate trade and deliver tangible benefits to citizens.

This report highlights key achievements from 2021–2022, including IC-IMPACTS' response to the COVID-19 pandemic. Our work has consistently been shaped by community-identified needs, and in response to the global crisis, two projects were funded to support efforts to combat COVID-19.

IC-IMPACTS' long-standing relationships with the Government of India's Department of Science and Technology and Department of Biotechnology have continued to strengthen over the years. These partnerships have enabled exciting new research initiatives in public health, integrated water management, and safe and sustainable infrastructure.

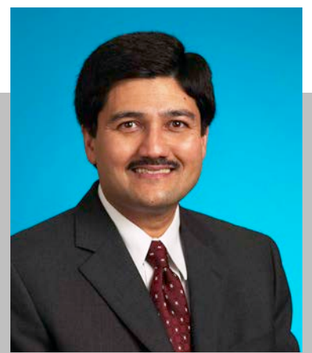
In Canada, collaborations with First Nation communities have led to meaningful and transformative social outcomes, with IC-IMPACTS technologies now being scaled up and implemented in additional communities across both Canada and India.

The training of Highly Qualified Personnel (HQPs), including graduate students and postdoctoral fellows, remains a core mandate of IC-IMPACTS. Our researchers have produced world-class peer-reviewed publications and launched start-ups, underscoring the Centre's strong research excellence and entrepreneurial impact. IC-IMPACTS continues to play a vital role in fostering partnerships between researchers and industry, having established bi-lateral collaborations and supported the development of patents, thereby accelerating knowledge-based trade between Canada and India.

IC-IMPACTS also continues to expand its network through collaborations with universities, non-governmental organizations, industry leaders, and communities across both countries, as we advance toward our long-term vision of building a financially sustainable Centre.

Finally, I extend my sincere gratitude to frontline workers for their tireless efforts to keep our communities safe. Their resilience, dedication, and unwavering commitment during these unprecedented times continue to inspire us all.

Dr. Nemy Banthia
Chief Executive Officer and Scientific Director



OVERALL ACHIEVEMENTS

Translating Research Into Communities

NEW CALLS FOR DEMONSTRATION PROJECTS
IC-IMPACTS announced two Calls for Proposals in the 2020-21 fiscal.

- Call for proposals in Innovative Technology Demonstration Projects
- Call for Proposals in Food Security

IC-IMPACTS BY THE NUMBERS

74
RESEARCH PROJECTS

1,331
HQP TRAINED

383
PARTNERSHIPS CREATED

1,431
SCIENTIFIC PUBLICATIONS

33
PATENTS FILED

8
START-UPS LAUNCHED

DEVELOPMENT OF INNOVATIVE TECHNOLOGY

Public Health

Biovalorization of Lignin
Canadian Lead: Dr. Vikramaditya G. Yadav, University of British Columbia
Indian Lead: Dr. Syed S. Yazdani, International Centre for Genetic Engineering & Biotechnology (ICGEB)

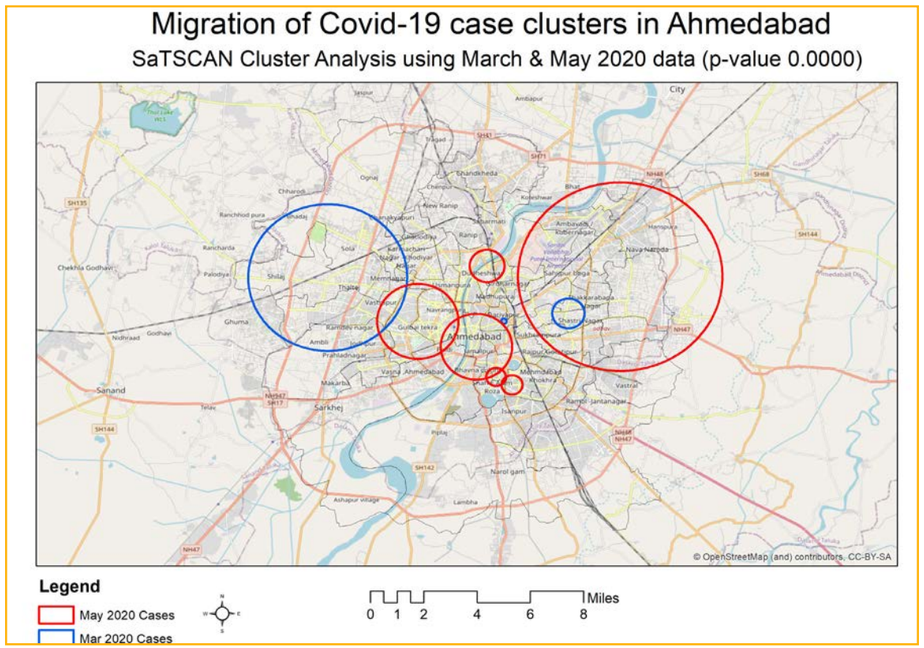
This project seeks to develop a bioprocess for manufacture of capsaicinoids and capsinoids from lignin. The project is a key piece in the development of innovative biotechnologies to reduce the environmental footprint of current manufacturing operations. Researchers employed bioinformatics and synthetic biology to replace the rate-limiting biocatalyst with a more active heterologous enzyme and observed enhanced production of the fatty acyl-CoAs.

The team also identified other enzymatic targets in the pathway for re-engineering and these modifications to the pathway resulted in further enhancement of the pathway flux. Researchers successfully validated production of vanillylamine and vanillyl alcohol by E. coli. The success in producing fatty acyl-CoAs and vanillylamine/vanillyl alcohol attracted industry partners who have shown interest on developing sustainable manufacturing processes for production of novel flavours and functional foods. Discussions are currently underway with Unilever for a potential collaboration.

Individuals Getting Vaccinated through the Network

Agent-Based Simulation of COVID-19:
Estimating the Spread and Disease Burden Using Advanced Epidemiological Modelling
Indian Lead: Dr. Deepak Saxena, Indian Institute of Public Health-Gandhinagar
Canadian Lead: Dr. Raja Sengupta, McGill University

This project aims to assist the unfolding crisis in India following a second COVID-19 wave. Currently, project personnel from three institutions (McGill, BITS Pilani Goa Campus, and IIPHG) are working closely with Dr. Saxena and IIPHG to provide Geospatial data support for the location of reported COVID-19 cases and identification of hospital resources, which in turn is to be used by Ahmadabad Municipal Corporation (AMC). The team is creating maps to show the location of the reported cases and the medical resources for specific regions of Ahmadabad. These maps aid in decision Making and resource management.



Map Screenshot Indicating the Migration of COVID-19 in Ahmedabad

Smart App-Based Rapid Multiplex Screening of HIV Associated Co-Infections of At-Risk Populations at the Point-of-Care: A Demonstration Study in India
Indian Lead: Dr. Suma Nair, Manipal Academy of Higher Education (MAHE)
Canadian Lead: Dr. Nitika Pai, Research Institute of McGill University Health Centre (RI-MUHC)

This research project aims to provide deployment of an app-based multiplex testing strategy for many viral and bacterial infections. In this age of the pandemic, where conventional testing/screening proves to be difficult, digital solutions to improve the quality and efficiency of primary care are essential. The project team redeveloped the AideSmart application; in the past year, the new the AideSmart app has been adapted from its previous version to the context of the current project. The testing kits and platform devices provided by Cepheid were shipped and received at MAHE in September 2020 and the fully executed inter-institutional agreement between RI-MUHC and MAHE was completed in February 2021 and IRB approvals were duly obtained. Three systematic reviews have stemmed from the multiplexing project and have been submitted to open access journals.

The research team also published a related review in *The Lancet HIV* on Modern Diagnostic Technologies for HIV, with a focus on the role of multiplexed technologies.

Integrated Water Management

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

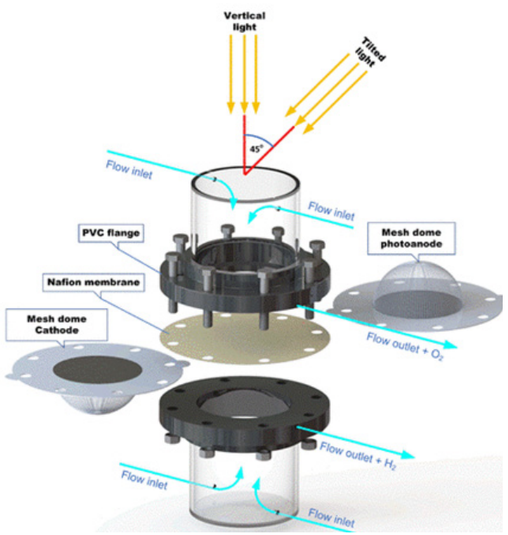
Carbon corrosion is a persistent challenge in electrochemical systems. This project aims to further understand carbon corrosion under a variety of experimental conditions. Amongst these, special attention was given to the effect of applied potential, cycling time, presence of dissolved oxygen in addition to organic and inorganic constituents. Moreover, an electrochemical approach to mitigate the effect of carbon corrosion was explored.

Fundamental work was carried out using an electrochemical cell that allowed fine tuning and exceptional potential control. This helped overcome issues with potential allocation that occur in classic, more practical, two-electrode cells. Once the fundamental studies were finished, a few selected cases were replicated using a two-electrode cell; hence, it was possible to contrast rigorous fundamental work with what is seen in the field, under typical cycling conditions. The research team identified the importance of conducting long-term assessment experiments using a three-electrode cell. This setup enables a careful control over the thermodynamic state of the electrode being studied (i.e., constant driving force). Researchers also revealed the unsuccessful outcome of electrochemical regeneration approaches and demonstrated the need for adequate pre-treatment for iron containing brackish waters to avoid increased decay and loss of performance.

Carbon Neutrality through Combined CO_2 Capture and Novel H_2 Technology with Production of Non-Conventional Fuels for Smart Cities
Indian Lead: Dr. Subrata Borgohain Gogoi, Dibrugarh University
Canadian Lead: Dr. Ibrahim Dincer, Ontario Tech University

CO2 is recognized as the main pollutant responsible of the super green-house effect, causing global warming and climate change. This project aims to convert CO2 into valuable synthetic, non-conventional and non-renewable fuels for reducing CO2 emissions and boosting the deficient energy sector. Two novel photoelectrochemical (PEC) reactors have been designed, developed and tested experimentally in Clean Energy Research Laboratory (CERL), at Ontario Tech University. The two hydrogen reactors bring a new prospective to PEC process via novel photoelectrodes' geometries improving the effectiveness of the process considerably. Moreover, a significant study has been conducted on developing ammonia-based carbon capturing systems that produce useful chemical outputs (primarily ammonium bicarbonate) to offset the energy penalty typically imposed by implementing a carbon capture retrofitting to a power plant.

Researchers working on this project have published 15 peer-reviewed research articles in highly prestigious energy journals and have presented a number of papers at reputable international conferences.

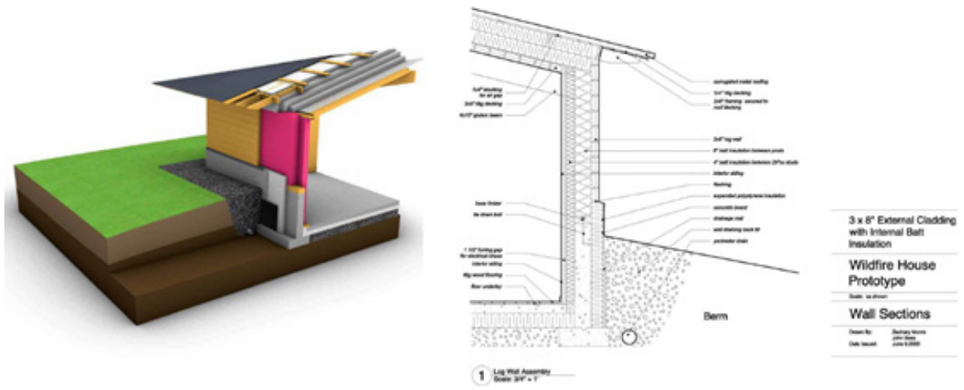


View of the developed PEC hydrogen apparatus

Safe and Sustainable Infrastructure

Wildfire House Prototype
Lead: Dr. John Bass, University of British Columbia

Researchers have produced a set of technical design and construction documents that lead to the realization of a house prototype in Yunesit'in. This prototype will set a standard of house construction for remote Indigenous communities with chronic indoor air quality (IAQ) problems in their existing housing stock and effectively address the threat of fire, both of which are exacerbated by climate change related processes. Researchers working with the Indigenous community are raising the bar of a growing body of knowledge about how that research should be carried out.



Wall and Roof Assemblies with Locally Sourced and Milled Lumber

Development of Cost-Effective, Energy Efficient, and Resilient Housing Technologies for First Nations Communities
Lead: Dr. Ashutosh Bagchi, Concordia University

The housing shortage and the lack of long-term durability of housing structures in northern and First Nations Communities are well recognized. In this project, a holistic and integrated approach is adopted to incorporate renewable energy technologies into conventional heating and cooling systems for buildings in order to support development of resilient First Nations Communities.

The components of which include: (a) development and fine tuning of low-cost sensors for measuring vibration and thermal comfort in buildings; (b) integration of solar power, which is intermittent with the traditional power source to provide resilient and sustainable energy supply for indigenous housing; (c) innovation in prefabricated and modular housing to achieve lower cost, faster construction and higher durability, necessary for the studied community.

Prototype Building Model

Smart Infrastructure with High Fracture Toughness, Durable Concrete Employing Large Amounts of Industrial Wastes
Canadian Lead: Dr. Nemkumar Banthia, The University of British Columbia

Repairing aged and deteriorated sewer infrastructure is an ongoing challenge for municipalities and is often complicated by the fact that sewer pipes are located in crowded and developed areas that have changed significantly since the original design and installation. To tackle this issue, the research team at UBC is collaborating with Metro Vancouver to develop a carbon-neutral, geopolymer coating with biocides (called multi-phase composite coating, MCC) that when applied on sewer infrastructure, will resist bacterial attack, prevent further corrosion and extend the infrastructure's existing service life. This coating was recently applied at the Tilbury Junction Chamber near Annacis Island, in Delta, BC. During the initial trials, a better than expected performance of the MCC coating was observed.

An additional field study is currently in progress and the first stages of performance evaluation are being carried out. The rheological study is in full swing and researchers are progressing towards improving the sprayability and preparing for the final mix design. With various HQP (including undergraduate and graduate students) involved, the project is a good example of industry-academia partnership leading to significant long-term benefits for essential public infrastructure.

Testing the Sprayability of the Material

PARTNERSHIPS AND SOCIAL IMPACT

Continuing the Dialogue with Academic Institutions

During the year, IC-IMPACTS continued to work with a network of innovative researchers, industry leaders, community members and government officials to develop unique solutions for the challenges faced by communities in Canada and India. IC-IMPACTS continues to expand its network by collaborating with universities, NGOs, industry leaders and communities across Canada and India. We are fortunate to have the University of British Columbia, University of Toronto, University of Victoria, Laval University and Queen's University as network members. We are happy to report that discussions are underway with a number of other universities who have expressed interest to joined IC-IMPACTS as an Affiliated Partner University.

IC-IMPACTS' collaborations with the Department of Science and Technology (DST) and the Department of Biotechnology (DBT) continue to grow with a renewed focus on demonstrating technologies in communities. With 11 Indian Institutes of Technology (IITs) collaborating with IC-IMPACTS, we are recognized as the Canadian Center for S and T collaborations with India.

IC-IMPACTS is a key participant of the 7th Canada-India Joint Science Technology Cooperation Committee (JSTCC) Meeting which is to take place in Ottawa on May 19, 2022. We are pleased to inform that a Memorandum of Understanding between NSERC, DST and DBT would be signed shortly before the commencement of the 7th JSTCC meeting. Once the MoU is signed, IC-IMPACTS will be launching joint Calls for Proposals in the areas of:

(i) Agritech and Food Security (IC-IMPACTS and DBT)

(ii) Carbon Reduction in Our Built Environment (IC-IMPACTS and DST)

(iii) Water (IC-IMPACTS and DST)

(iv) Health, Post COVID Health Issues and Long COVID (IC-IMPACTS and DBT)

FUTURE LEADERS

Bringing Canadian and Indian Skills Together

To increase HQP mobility, IC-IMPACTS continues to work synergistically with other institutions. Our aim is to have young talents work and study abroad where they can bring back new experiences, skills, connections and knowledge, to give their careers a boost, and to ultimately enrich Canada's economic prosperity. IC-IMPACTS signed an MoU with Mitacs in July 2021, to support research collaborations in sectors of mutual interest. In addition, IC-IMPACTS met multiple times with Mitacs to explore new avenues of collaboration and to create scholarships for HQP working on IC-IMPACTS projects.

In collaborative efforts to support an entrepreneurial ecosystem, IC-IMPACTS continued to actively participate in cohorts organized by Startup Bridge Canada. Four cohorts were held in the last year, providing recent graduates and entrepreneurs clarity on their next steps, with critical feedback on their decisions to support their growth in the Canada-India space. Other participants included regional businesses, institutions, incubators, universities and investors who work towards developing a gap-free entrepreneurship pipeline to support the sustained growth of our HQP.

BOARD OF DIRECTORS

Mr. Barj S. Dhahan (Chair)
CEO, Sandhurst Group

Dr. Nemy Banthia (CEO & Scientific Director)
Professor, The University of British Columbia

Ms. Krista Connell
CEO, Fertiloam Inc.

Ms. Meeru Dhalwala
Author and Entrepreneur

Dr. Matthew Evenden
Associate Vice President, Research & Innovation,
The University of British Columbia

Dr. Arvind Gupta
Professor, Computer Science,
The University of Toronto

Ms. Anita Huberman
President & CEO, Surrey Board of Trade

Mr. David Isaac
Acting Executive Director, Centre for
Native Policy & Research

Dr. V.I. Lakshmanan
Vice Chairman and CEO, Process Research Ortech Inc.

Ms. Alexandra Otis
Professor, Mathematics,

Dr. Sujatha Ramdorai
Professor, Mathematics,
The University of British Columbia

Dr. Christopher Yip
Dean, Faculty of Applied Science &
Engineering, The University of Toronto

NCE LIAISON AND OBSERVER ON THE IC-IMPACTS BOARD OF DIRECTORS AND RMC

Dr. Chris Kelly
Deputy Director, Networks
of Centres of Excellence (NCE)

NOMINATIONS & GOVERNANCE COMMITTEE

Dr. Arvind Gupta (Chair)
Professor, The University of Toronto

Dr. Sujatha Ramdorai
Professor, The University of British Columbia

Dr. Christopher Yip
Dean, Faculty of Applied Science &
Engineering, The University of Toronto

EXECUTIVE COMMITTEE

Mr. Barj S. Dhahan (Chair)
CEO, Sandhurst Group

Dr. Nemy Banthia
Professor, The University of British Columbia

Dr. Arvind Gupta
Professor, The University of Toronto

SCIENTIFIC TEAM

Dr. Nemy Banthia
Scientific Director and Theme Lead, Safe and Sustainable
Infrastructure, The University of British Columbia

Dr. Stewart Aitchison
Theme Lead, Public Health: Disease Prevention
and Treatment, Professor, Electrical & Computer
Engineering, The University of Toronto

Dr. Damase Khasa
Theme Lead, Integrated Water Management, Professor,
Department of Wood and Forest Sciences, Université Laval

Dr. Pratap Pati
Theme Lead, Food Security and Agritech, Professor,
Department of Biotechnology, Guru Nanak Dev University

RESEARCH MANAGEMENT COMMITTEE (RMC)

Dr. Nemy Banthia (Chair)
Professor, The University of British Columbia

Dr. Stewart Aitchison
Professor, The University of Toronto

Dr. Rishi Gupta
Associate Professor, The University of Victoria

Dr. Kevin Kane
Professor, The University of Alberta

Dr. Damase Khasa
Professor, Université Laval

Dr. Madjid Mohseni
Professor, The University of British Columbia

Dr. Daman Panesar
Professor, The University of Toronto

Dr. Stephanie Yanow
Professor, The University of Alberta

STUDENT ENGAGEMENT COMMITTEE

Ms. Alexandra Otis (Chair)
PhD Candidate, Université de Montréal

Mr. Anurag Krishna (Co-Chair)
PhD Student, The University of British Columbia

Ms. Afreen Anwar
Country Representative – India
Women Scientist B, Indian Institute of Technology, Roorkee

Ms. Archita Borah
Outreach and Social Media Coordinator
Masters of Applied Science Student, The University of British Columbia

Mr. Shashank Chandra
Event Coordinator – India
PhD Student, Indian Institute of Technology, Roorkee

Mr. Jaskaran Dhiman
Outreach and Alumni Coordinator
Postdoctoral fellow, McGill University

Mr. Fuhar Dixit
Co-Chair & Graduate Seminar Coordinator
PhD Candidate, The University of British Columbia

Mr. Abhishek Dutta
Graduate Seminar Coordinator
PhD Student, The University of British Columbia

Mr. Karl Zimmermann
Webinar Coordinator
PhD Student, The University of British Columbia

LIST OF PROJECTS | 2021-2022 ANNUAL REPORT

FUNDED RESEARCH PROJECTS

PUBLIC HEALTH

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

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

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

Agent-Based Simulation of COVID-19: Estimating the Spread and Disease Burden using Advanced Epidemiological Modelling
Canadian Lead: Dr. Raja Sengupta, McGill University
Indian Lead: Dr. Deepak Saxena, Indian Institute of Public Health, Gandhinaga

Citizen-lead Evaluation of the Public Health Response to COVID-19 in India: Harnessing Information and Communications Technology (ICT) to Promote Real-Time learning, Human Rights and Good Governance
Canadian Lead: Dr. Mira Johri, Université de Montréal
Indian Lead: Dr. Aaditeshwar Seth, Indian Institute of Technology, Delhi

COPE: Community Health Outcomes and Personalized Education/Exercises for Spinal Injured Individuals
Canadian Lead: Dr. Andrei Krassioukov, The University of British Columbia
Indian Lead: Dr. Nishu Tyagi, Indian Spinal Injuries Centre

Design2Impact: Uniting Researchers, Makers and Spinal Injury Survivors Through Open-Source Technology
Canadian Leads: Dr. Aaron Yurkewich, The University of Toronto, and Stewart Russell, Makers Making Change at Neil Squire Society

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, The 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

Development of Portable Spine MEG Scanner for Real-Time Spinal Functional Evaluation and Data Acquisition
Canadian Lead: Dr. Teresa Cheung, Simon Fraser University,
Indian Lead: Dr. Rohit Sharma, Indian Institute of Technology, Ropar

Development of Wearable Artificial Muscle for a Tetraplegic Hand
Indian Leads: Dr. Harvinder Chhabra, Indian Spinal Injuries Centre, India and Dr. Sitikantha Roy, Indian Institute of Technology, Delhi

Dialled In: Tapping Community Voice to Improve Child Immunization Services in India
Canadian Lead: Dr. Mira Johri, Université de Montréal
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

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, The University of Alberta
Indian Lead: Dr. Easwaran Sreekumar, Rajiv Gandhi Centre for Biotechnology

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

Smart App-Based Rapid Multiplex Screening of HIV Associated Co-Infections of at Risk Populations at the Point-of-Care: A Demonstration Study in India
Canadian Lead: Dr. Nitika Pant Pai, McGill University
Indian Lead: Dr. Suma Nair, Manipal Academy of Higher Education

Surface Modulation of CuS Quantum 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

Wearable Technology to Monitor Sitting Posture and Reduce the Pressure Injury Risk
Canadian Lead: Dr. Hossein Rouhani, The University of Alberta

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FUNDED RESEARCH PROJECTS

INTEGRATED WATER MANAGEMENT

A Floating Treatment Wetland System for Removing Contaminants from Rivers and Streams using a Biomimicry Approach
Canadian Lead: Dr. Shiv Prasher, McGill University
Indian Lead: Dr. Ramesh Kanwar, Lovely Professional University

A High-Performance Advanced Septic (HPAS) System for Villages and Roadside Restaurants
Canadian Lead: Dr. Edward McBean, The University of Guelph
Indian Lead: Dr. Y. R. Satyaji Rao, National Institute of Hydrology

A Nanotechnology Enabled Device for the Detection of Harmful Bacteria in Drinking Water
Canadian Lead: Dr. Michael Serpe, The University of Alberta
Indian Lead: Dr. Soumyo Mukherji, Indian Institute of Technology, Bombay

A Study of Technology and Financial Appropriateness of Water and Wastewater Infrastructure in Selected Cities of India
Canadian Lead: Dr. Govind Gopakumar, Concordia University
Indian Lead: Dr. N.C. Narayanan, Indian Institute of Technology, 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

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, Indian Institute of Technology, Roorkee

Application of Emerging Biotechnology for Non-point Source Pollution Control of River Ganga, India
Canadian Lead: Dr. Onita Basu, Carleton University
Indian Lead: Dr. Anirban Gupta, IIEST Shibpur

Biovalorization of Lignin
Canadian Lead: Dr. Vikramaditya G. Yadav, The University of British Columbia
Indian Lead: Dr. Syed S. Yazdani, International Centre for Genetic Engineering and Biotechnology

Biomonitoring of Water Quality in Relation to Human Health Using Biosensors and Improvements through Nanoparticle-Based Purification Systems
Canadian Lead: Dr. Damase P. Khasa, Université Laval
Indian Lead: Dr. Manzoor Shah, The University of Kashmir

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

Contaminated Land Reclamation Using Hybrid Absorbable Landscape and Native Plant Species
Canadian Lead: Dr. Rishi Gupta, The University of Victoria
Indian Lead: Dr. Neeta Raj Sharma, Lovely Professional University

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, Indian Institute of Technology, 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

Development and Scale-Up of Technology for Microbial Extraction of Xylose from Agro-Waste Materials and Subsequent Conversion into Xylitol
Canadian Lead: Dr. Tatjana Stevanovic, Université Laval
Indian Lead: Dr. Baljinder Kuar, Punjabi University

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.

Direct Cryptosporidium Detection for Developed and Developing Nations
Canadian Lead: Dr. Mina Hoorfar, The University of British Columbia
Indian Lead: Dr. Krishna Khairnar, CSIR – National Environmental Engineering Research Institute

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

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

Microfabricated, Low-Cost, High-Sensitivity Chlorine and PH Sensor Systems for Water Quality Monitoring
Canadian Lead: Dr. Jamal Deen, McMaster University

Passive UF Membrane Demonstration
Canadian Lead: Dr. Pierre Bérubé, The University of British Columbia

Quantum Dot Solar Panels for Water Treatment In Remote Settings
Canadian Lead: Dr. Edward Sargent The University of Toronto

Sensors 4 People / 3 Drops
Canadian Lead: Dr. Michael Serpe, The University of Alberta

Sewage Contaminated Lake Water Quality Restoration through Aeration and Floating Wetland Plants
Canadian Lead: Dr. Rajesh Seth, The University of Windsor
Indian Lead: Dr. Rakesh Kumar, CSIR-NEERI

Testing and Upscaling Phytoremediation Technology in Real-World Conditions
Canadian Lead: Dr. Damase Khasa, Université Laval
Indian Lead: Dr. Manzoor Shah, The University of Kashmir

Thondebhavi Water Quality Assessment
Canadian Lead: Dr. Pierre Bérubé, The University of British Columbia

Thorsby Water Quality Assessment
Canadian Lead: Dr. Michael J. Serpe, The University of Alberta

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FUNDED RESEARCH PROJECTS

SAFE AND SUSTAINABLE INFRASTRUCTURE

Application of Precast Products Made Using Bottom Ash and Fly Ash for Rural Pavements and other Infrastructure in India
Canadian Lead: Dr. Rishi Gupta, The University of Victoria
Indian Lead: Dr. Urmil Dave, Institute of Technology, Nirma University

Assessment of Fire Performance of Structural Elements and Structural Systems through Conventional Fire Tests and Hybrid Fire Simulation
Canadian Lead: Dr. Oh-Sung Kwon, The University of Toronto
Indian Lead: Dr. Dipti Ranjan Sahoo, Indian Institute of Technology, Delhi

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