



IC-IMPACTS

A Canadian Network of Centres of Excellence



Social Innovation *through*
University-Industry-
Community Partnerships

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IC-IMPACTS

- An International **Network of Centres of Excellence** funded equally by Governments of **Canada and India**
- The Centre serves as a **new model for international collaboration**, to solve global challenges
- Total current **funding: \$60 million**



Partners & Collaborators

76 Canadian Partners

83 Indian Partners

7 Global Partners



UNIVERSITY OF
TORONTO



Department of Biotechnology
Ministry of Science & Technology,
Government of India



Department
of Science
& Technology



ROBONiK®



McGill



UNIVERSITÉ
LAVAL



Stantec



Wells
for India

Core Research Areas



Safe & Sustainable Infrastructure

- Low-Carbon Materials
- Sensors
- Strengthening



Integrated Water Management

- Sensors
- Alternative Power Supplies
- Water Treatment Systems



Public Health

- Rapid Diagnostic Devices and Lab-on-chip Sensors
- Dengue
- Mobile Health Technologies

Research Projects are Pan-Canadian & Pan-Indian

- 38 Projects, across 58 Academic Institutions, involving 66 Disciplines
- 91 Canadian Scientists, 96 Indian Scientists



CLEANER WATER

- Over **40 million** Indians are affected by water-borne diseases; **1.5 million** children die of diarrhea each year.
- In Canada over **5 million people** do not have access to reliable sources of clean drinking water
- **IC-IMPACTS:**
- Use of innovative **sensors** for more reliable water quality monitoring
- Developing **alternative power supplies** for water systems in areas with unstable and unreliable electricity
- Creating novel **water treatment systems** for safer drinking water



Public Health and Disease Prevention

- In India, **maternal deaths** are the highest, 1.4 million **infants** die from malnutrition and lack of immunization every year
- India's **Infectious disease** burden in malaria, HIV, STI, is staggering: 2 million new cases of **tuberculosis** alone each year.

- **IC-IMPACTS:**

New technologies for **rapid diagnostics** of infectious and water-related infections

Focus on **maternal and child health**

Development of **mobile, networked health technologies**



SAFE INFRASTRUCTURE

- Aging **Unsafe Structures** with **Unknown Condition** both in Canada and India
- **\$125 Billion** Canada's current infrastructure deficit; **India will spend \$1.3 Trillion** in next 5 years
- **IC-IMPACTS:**
- **Low Carbon** Building Materials
- New techniques for **repairing & strengthening** existing structures
- Use of **innovative sensors** for more accurate **structural health monitoring** and condition assessments

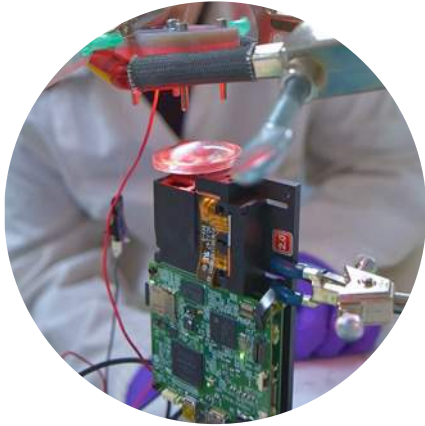


Digitization





Five (5) Goals Drive Change in Communities



DEVELOP TECHNOLOGIES



DEPLOY OUTCOMES



TRAIN INNOVATORS



PATENTS



CREATE PARTNERSHIPS

Unprecedented Success in only 3.5 Years



DEVELOP TECHNOLOGIES



DEPLOY OUTCOMES



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IP

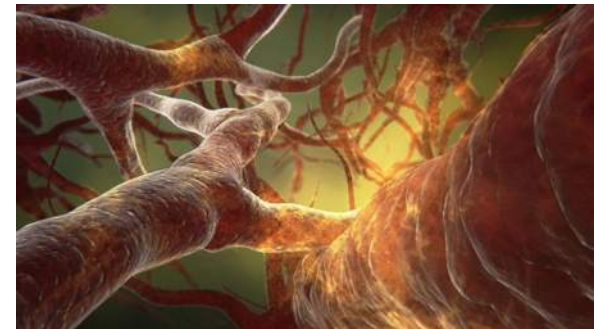
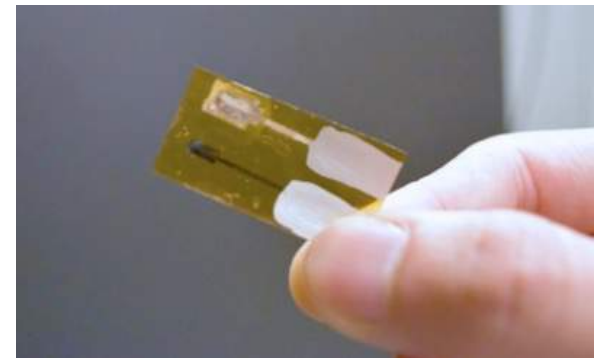


CREATE PARTNERSHIPS



Ground Breaking Innovations

- Self-Healing Fiber Reinforced Concrete
- Geopolymer cement pavers made from 100% waste **cost 50% less** than traditional cement-based pavers
- New Passive Membrane System for water treatment can be operated manually (**using zero to little electrical power**) or in fully automated fashion
- New point-of-use test can detect high levels of heavy metals (Cadmium, Zinc, Lead and Mercury) in water for **less than \$1**
- Timeline between TB diagnosis and primary treatment has been **reduced by 93%**



Research Outcomes Move Into Communities

- **10 research outcomes** deployed into communities
- **40 deployments** scheduled over the next two years

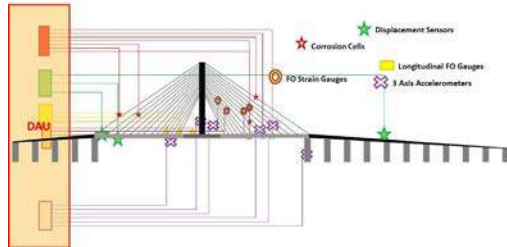


Five Examples of Translating Research into Communities

 Thondebavi, Kanataka



 Naqpur, Maharashtra



 KRS Dam Mysore



 Monitoring Pipelines



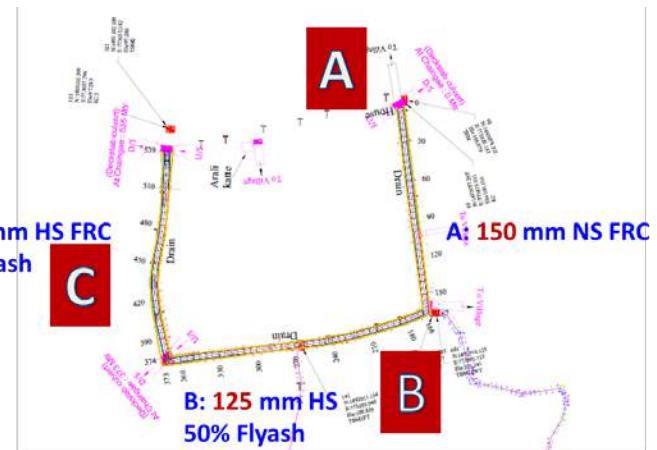
 Pavement in Lubicon First Nations Reserve

Tondebavi Self-Healing Concrete Rural Pavement Project

India needs 2.4 Mkm of rural pavement



- ❑ Self-Healing Pavement System
- ❑ Reduce thickness by 50% using high strength concrete with advanced nano-modified hydrophilic fiber system.
- ❑ Reduce carbon footprint by incorporating 50% flyash in concrete
- ❑ Fully Monitored



Restoring Krishanraj Sagara Dam, Mysore

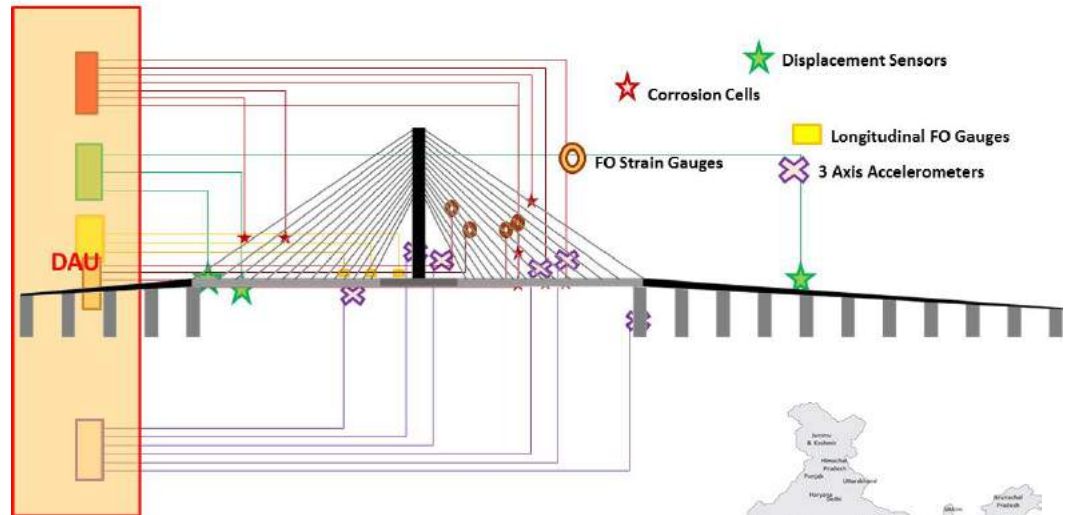


Krishanraj Sagar Dam, Mysore
Built 1924 Across River Kaveri
3.5 km long 38 m high
Total Capacity 49 Billion ft³

- › Collaborative project between U of Alberta, Archaeological Society of India and National Institute of Engineering, Mysore
- › Novel Nanolime Material for Repair

Bridge Monitoring *in* Nagpur, India

Internet Based SHM of Ram Jhoola Bridge in Nagpur



- › Ensuring a Safe Bridge with Minimal Maintenance for 100 Years



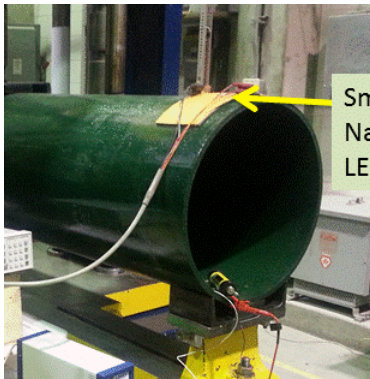
Tire Fiber Pavement in Lubicon First Nations Reserve



Use of Tire Fiber in Pavements: A billion tires produced per year!



Monitoring Pipelines for Leak Detection



Smart Patch with Carbon Nanotubes for CRACK and LEAK Detection





Thank You

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