



IC-IMPACTS

A Canadian Network of Centres of Excellence

Social Innovation *through Canada-India* University-Industry Partnerships



NEMY BANTHIA

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IC-IMPACTS

- › An International **Network of Centres of Excellence** funded equally by Governments of **Canada** and **India**
- › The UBC-hosted **pan-Canadian, pan-Indian** Centre serves as a new model for international collaboration
- › Total current **funding: \$60 million**



Partners & Collaborators

78 Academic Partners 99 Industry Partners 42 Government Partners 24 Community Partners



THE UNIVERSITY
OF BRITISH COLUMBIA



UNIVERSITY OF
ALBERTA



UNIVERSITY OF
TORONTO



McGill



UNIVERSITÉ
LAVAL



STEWOLS



Department
of Science
& Technology



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



Golder
Associates



NCE RCE



Creating tomorrow today



Stanter



GE Power & Water
Water & Process Technologies



Reliance
Industries Limited



Wells
for India



Environment Technology Corporations - Canada

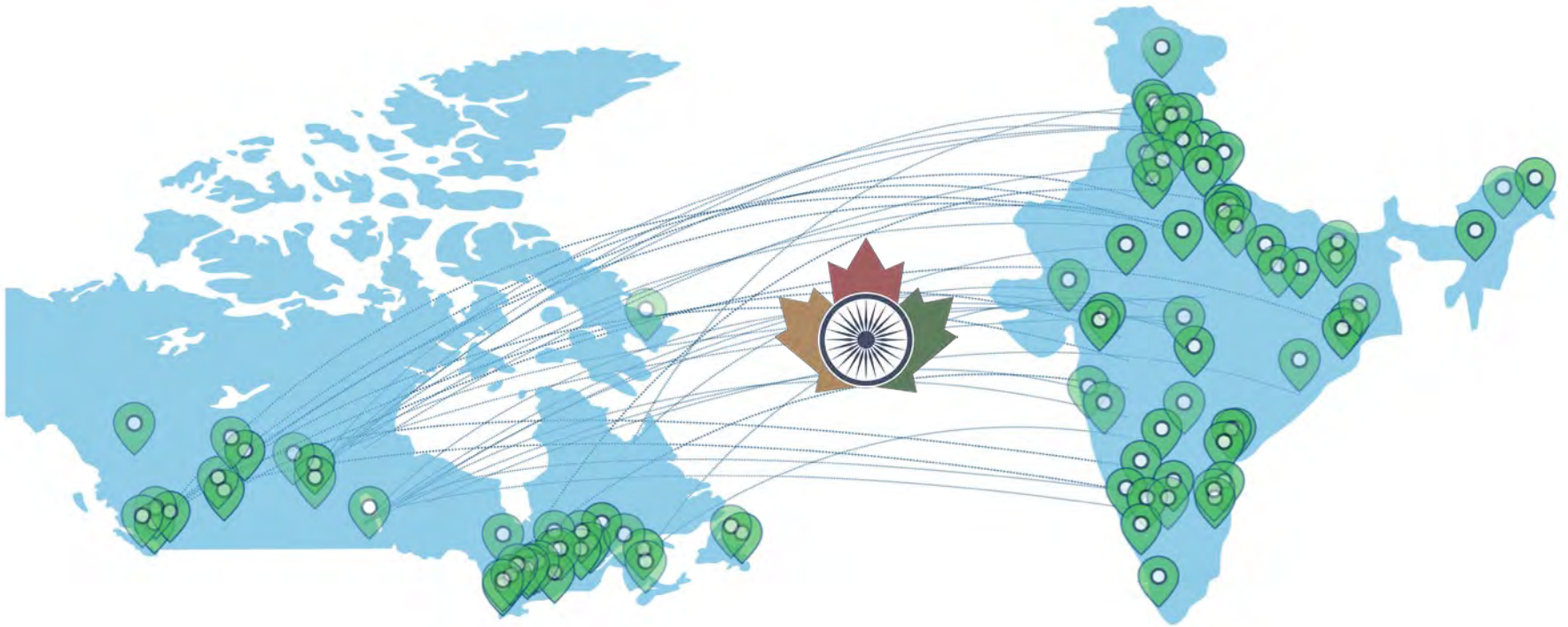


TATA CONSULTANCY SERVICES



IC-IMPACTS
Building Healthy Communities in Canada & India

Our Network



FACULTY

STUDENTS

INDUSTRY

COMMUNITY





Core Research Areas



Safe & Sustainable Infrastructure

- Low-Carbon Materials
- Sensors
- Strengthening



Integrated Water Management

- Sensors
- Alternative Power Supplies
- Water Treatment Systems



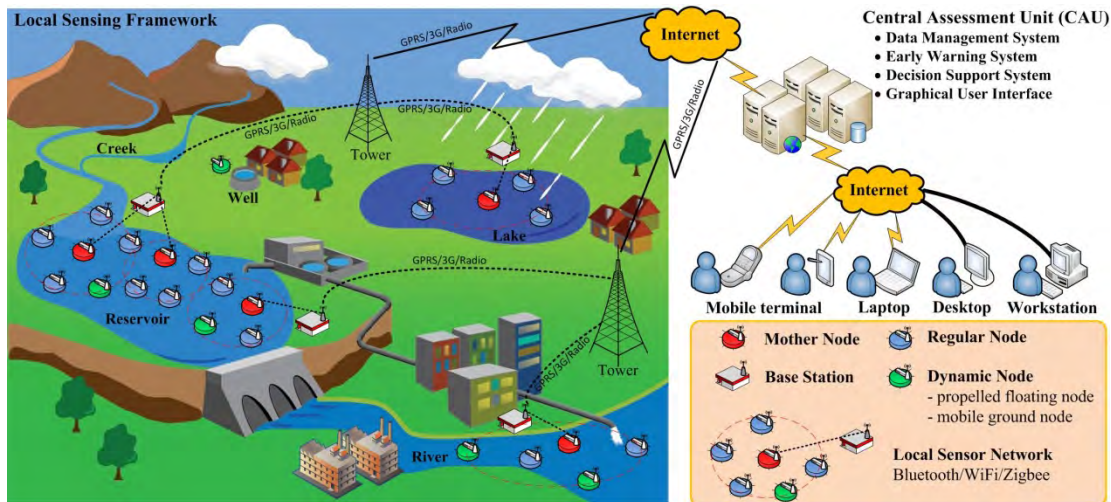
Public Health

- Rapid Diagnostic Devices and Lab-on-chip Sensors
- Infectious and Water-borne Diseases
- Mobile Health Technologies



Integrated Water Management

- 3D printed pH and chlorine sensors for water
- Off-grid water treatment with zero energy
- ICT platform for water quality monitoring
- Optical sensors for E. coli in water





Public Health

- **Diagnostics** for emerging viral diseases such as **Dengue and West Nile virus**
- Engaging pharmacists to enhance **early detection of tuberculosis**
- Improving **child immunisation** services in India
- Developing **portable diagnostic** tools for detection of infectious diseases such as **HIV and malaria**





Examples of Translating Research into Communities (Safe & Sustainable Infrastructure)

 Self Healing Road, Thondebhavi



 KRS Dam, Mysore



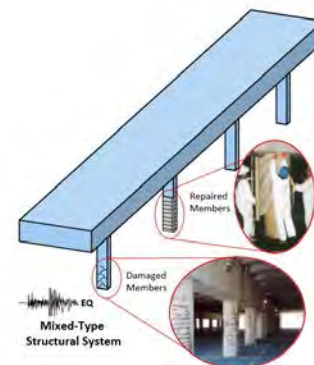
 STF (Scrap Tire Fiber) Repair, UBC



 Seismic Retrofit



 GFRP Wraps on Bridge Columns, Toronto





Thondebhavi Self-Healing Concrete Rural Pavement Project

- India needs **2.4 million km of rural pavement**, this project saw the successful installment of **self-healing** road in Thondebhavi, India
- Reduce road thickness by 50% using high strength concrete with advanced **nano-modified hydrophilic fiber** system.
- Reduce **carbon footprint** by incorporating 50% flyash in concrete





Restoring KRS Dam, Mysore, India



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

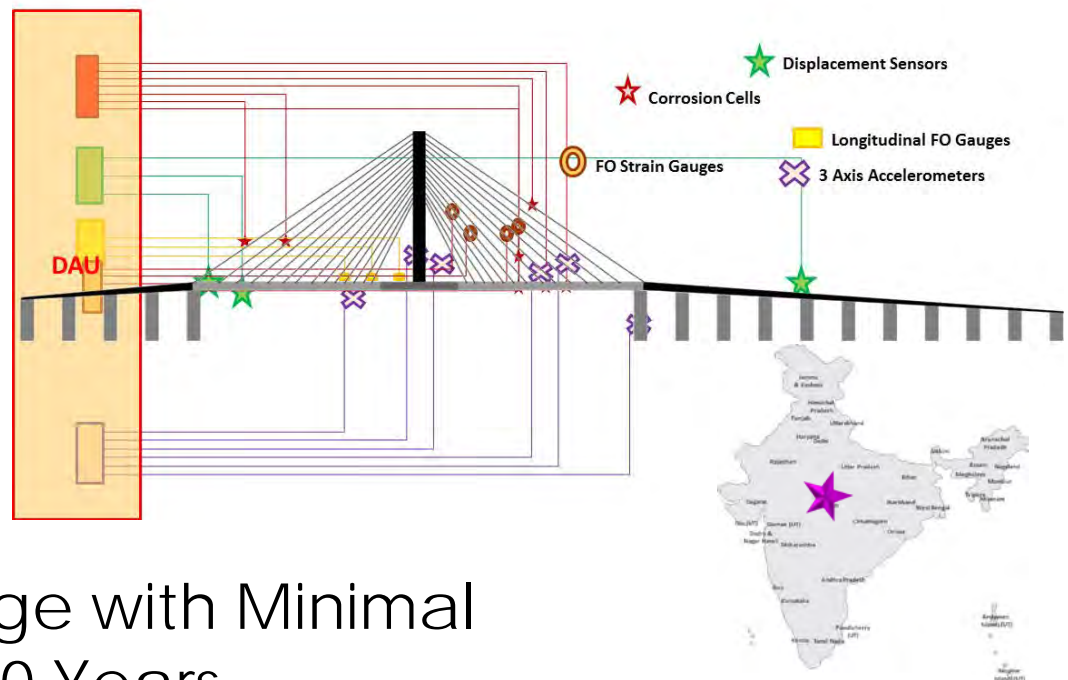


- › Collaborative project between U of Alberta, Archaeological Society of India and National Institute of Engineering, Mysore
- › Novel Nanolime Material for Repair



Bridge Monitoring in Nagpur, India

Internet Based SHM of
Ram Jhoola Bridge in Nagpur

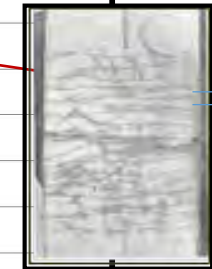
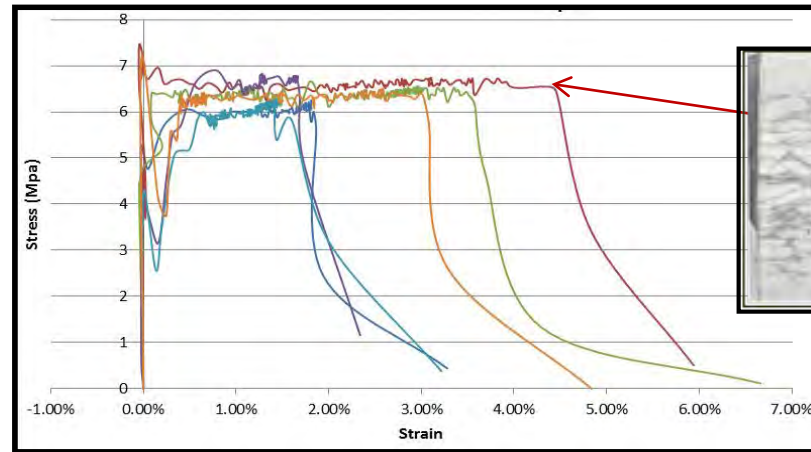
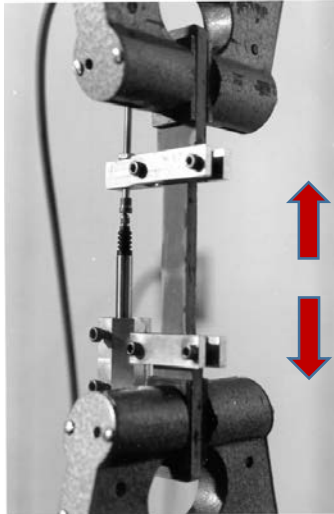


Ensuring a Safe Bridge with Minimal
Maintenance for 100 Years



Fiber Reinforced Concrete: Eco-friendly Ductile Cementitious Composite (EDCC)

Quasi-Static ϵ Response



$$x = 2 \left(\frac{V_m}{V_f} \right) \left(\frac{\sigma_{mu}}{\tau_{fu}} \right) \left(\frac{d_f}{4} \right)$$



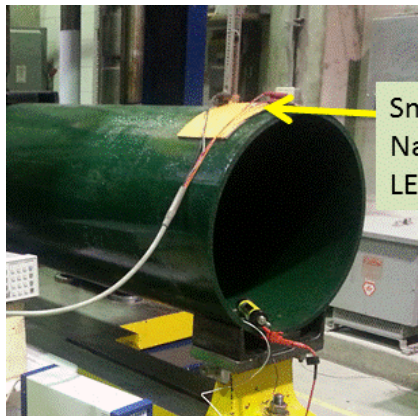
Jamieson Elementary School, Vancouver
Retrofitted in 2017



Girls School, Roorkee,
India , 2018



Monitoring 2.1 Million Kilometers of Oil and Gas Pipelines for Leak Detection



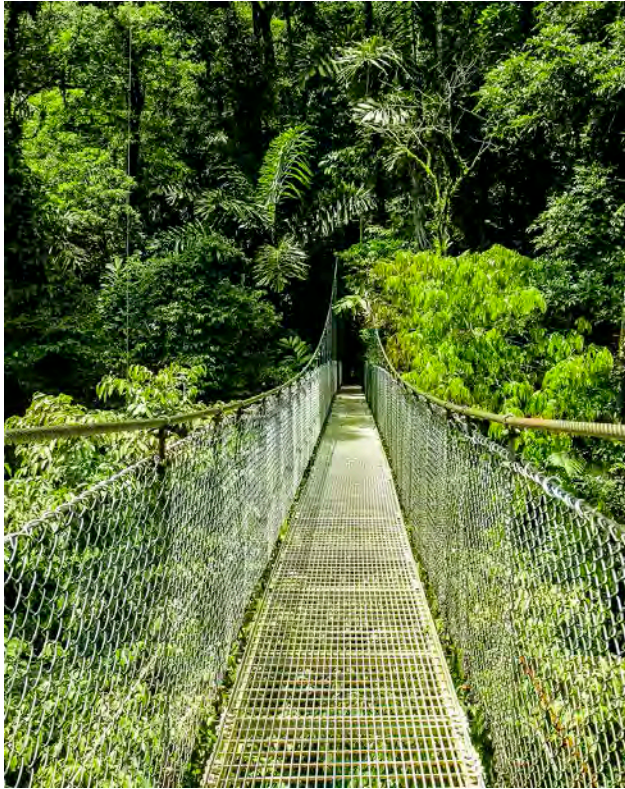
Smart Patch with Carbon Nanotubes for CRACK and LEAK Detection

Smart Cement-Based Patches





IC-IMPACTS Future and An Invitation



Continued Research and Innovation
for Community Transformation

Creation of Global Entrepreneurs and
Companies

Expansion to other countries: US,
Mexico and China





Thank you!

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