



Department of Science & Technology
Government of India



IC-IMPACTS
Centres of Excellence
Canada

COLLABORATIVE RESEARCH PROJECT PROPOSAL

Joint Call for Proposals

Improving Occupant Survivability in Buildings During Fires Using Innovations in Structural Engineering, Materials Science and Cyber-Physical Interfaces

DST and IC-IMPACTS

Fire represents one of the most severe hazards encountered by built environments and thus providing appropriate fire safety measures is a major requirement in building design. Fire in a building can result from an accidental event (short circuit etc.) or as a secondary event following other hazards (such as earthquake, explosion, and impact). Fires, if not contained or controlled in early stages, can create severe life-threatening conditions leading to loss of life, injuries and property damage. Hence, appropriate fire safety measures in buildings are critical for ensuring the safety of occupants, fire-fighters, emergency responders, as well as for minimizing fire-induced damage and collapse of structural systems.

Recent fire statistics clearly show that India has the highest fire-related deaths of any country in the world. For instance, in 2014, there were more than 300,000 fires in India that resulted in about 25,000 deaths and fire losses in the order of thousands of crores (rupees). According to the statistics released by the National Crime Records Bureau (India), fire accounts for about 5.9% (23,281) of the total deaths reported due to natural and unnatural causes during the year 2012. Further, recent statistics also show that fire losses in India are increasing at a faster pace due to rapid urbanization and growing economy. Much of this increased fire-related deaths and losses are due to the rapid rise in high-rise buildings, increased fuel load in buildings and slower response time to fight fires.

In Canada, First Nations Communities are ten times more susceptible to die in house fires than the population at large. (2015, December 21.)

(Retrieved from <http://www.cbc.ca/news/indigenous/first-nations-10-times-more-likely-to-die-in-house-fires-1.3374631>)

To address growing fire problem in India and Canada, IC-IMPACTS and the Department of Science and Technology (DST) are soliciting research proposals aimed at developing strategies for mitigating fire hazard in built infrastructure. Especially, this call is for proposals focused on the development and evaluation of novel ideas, methodologies, materials, and cyber-physical strategies that can enhance fire safety in buildings. Proposals under the following broad themes are invited:



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- **Structural fire safety**
 - Development of techniques and design methodologies for enhancing structural performance
 - Development of new materials with improved fire resistance properties (including cladding/insulation materials)
 - Guidance for improved architectural and structural features aimed at enhancing fire safety in buildings
- **Active protection systems**
 - Enhancing reliability of heat and smoke detection systems
 - Developing cost-effective sprinklers and self-extinguishing systems
- **Evacuation strategies**
 - Evaluation of human behaviour under fire conditions
 - Development of improved evacuation procedures and efficient design of egress paths
 - Development of guidelines for efficient evacuation strategies
- **Cyber-Physical interfaces and sensing technologies for mitigating fire hazard in buildings**
 - Improving reliability of fire detection systems through better sensors.
 - Sensors for faster response (times) from fire department.
 - Sensors for monitoring structural performance under fire conditions.
 - Post-fire capacity assessment of fire damaged structures through new sensor technologies.

Implementing Agencies for This Call for Proposals

- **The Department of Science and Technology (DST)**, Ministry of Science and Technology, Government of India, was established with the objective of promoting new areas of science and technology and to play the role of a nodal department for organizing, coordinating and promoting these activities in India. The department is mandated to formulate policy statements and guidelines and to support basic and applied research in national institutions.
- **IC-IMPACTS** Centres of Excellence is a not-for-profit organization, established by the Federal Government of Canada through the Networks of Centres of Excellence Program to serve as a pan-Canadian agency responsible for the delivery of research programs in the areas of safe and sustainable infrastructure, integrated water management, and public



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health, disease prevention, and treatment between Canada and India. It is the only Networks of Centres of Excellence (NCE) with a mandate focused on research collaborations between Canada and India.

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Timeline

- Launch of the Call for Proposals on IC-IMPACTS and DST websites: **Wednesday, March 28, 2018**
- Deadline for Project Proposal Submissions: **Monday, June 18, 2018 (4:30 pm DST)**
- Projects approved: **September 2018**
- Projects need to be launched as soon as approved, and no later than **December 2018**

Eligibility

- All Indian researchers normally eligible to apply for DST funding opportunities are eligible to apply as Principal Investigators from India with a Canadian Principal Investigator.
- All Canadian researchers eligible to receive funding from IC-IMPACTS and tri-council agencies in Canada are eligible to apply as Principal Investigators from Canada with an Indian Principal Investigator.

Intellectual Property

DST and IC-IMPACTS funded participants to the projects shall agree upon the ownership, access rights and exploitation of the intellectual property generated during the cooperation. The agreements shall be made in writing. The guidelines of the funding organizations should be followed when making the agreements. At a minimum, a letter of intent between the collaborators should be included in the application stating the desire for cooperation and acknowledging that each participant has understood the general terms and conditions of the other project parties.

Application Instructions



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Please note following important application instructions:

- Research projects of one (1) or two (2) years in duration are eligible for funding.
- Funding beyond the first year of the project will be contingent upon successful progress being made in the previous year as determined by the review processes in place by each funding organization.
- Each project application must consist of a Indian and Canadian applicant (Principal Investigators) who together have developed a joint project proposal and project budget. The joint project proposal along with all supporting documentation required by each funding organization must be submitted online via <https://onlinedst.gov.in/Projectproposalformat.aspx>. All documents and forms required for a project application are accessible online.
- The online application will be automatically sent to both DST and IC-IMPACTS together with all funding organization specific documents submitted as part of the online application process.
- The budget documentation must clearly delineate funding being requested from DST in support of Indian researcher participation and funding being requested from IC-IMPACTS for Canadian research participation. Cash and In-kind contributions from other collaborating partners, if any, must be clearly identified in the budget documentation.
- Applicants are encouraged to contact their national funding organization before submitting their applications if they have any questions regarding the Call for Proposal or budget eligibility.

Evaluation Criteria

The research projects funded in this call are expected to be of a high international standard that will lead to a technology or solution directly impacting the lives of Indian and Canadian citizens.

Indian-Canada joint projects must be based on meaningful engagement, include a common project plan, and involve at least one researcher from Canada and one researcher from India. Student and HQP (High Quality Professional) training is a mandatory component of all funded projects.

Research proposals submitted to DST and IC-IMPACTS for funding through this call will be evaluated against the following selection criteria:

- Relevance to Indian and Canadian national and community health challenges;



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- Potential for research outcome to be deployed in remote and low-resource settings in India and Canada;
- Quality and originality of research program;
- Qualification and excellence of research team and proven record of successfully delivering prior research project objectives (Note: there must be a lead Indian and lead Canadian researcher for each research project submitted);
- Expected results and outcomes and appropriateness of budget strategy to achieve them;
- A local partner organization (e.g., industry, public health agency, hospital, education or a not-for-profit institute) willing to participate and share cost and benefits-
- Applicants should submit a Letter of Support from the partner organization with details of potential funding commitment;
- Potential for successful commercialization and/or community adoption of research outcomes;
- Potential to scale up the application rapidly and apply to other water bodies;
- Training of Highly Qualified Professionals;
- Inclusion of multidisciplinary aspects of the research program; and,
- Engagement of partners from academic, industrial, government, community sectors (Note: it is not a requirement to have non-academic partners on the research project, however, multi-sector partnerships will be evaluated more favourably. All partners participating in a research project must demonstrate meaningful engagement and commitment to the project).

Review Process for Evaluation of Applications

- All applications will be handled in the strictest of confidence.
- A Joint Evaluation Committee comprised of representatives and independent external reviewers from Canada and India will thoroughly examine the proposals and reach consensus within the overall budget framework of the two contributing organizations about which projects should be funded.
- Once a consensual decision has been reached on projects to be jointly funded by DST and IC-IMPACTS, DST and IC-IMPACTS will follow their organization's normal processes and norms to notify applicants about their funding decisions.



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PROPOSAL SUMMARY:

Project Number:

Title:

Keywords:

Proposed Duration of Project: _____ year(s)

Indian Principal Investigator (PI):

Indian PI Institution:

Indian Co-Principal Investigator:

Indian Co-PI Institution:

Canadian Principal Investigator (PI) :

Canadian PI University:

Canadian Co-Principal Investigator (if any):

Canadian Co-PI University:

Total Requested Budget from DST (Indian Rs.):

Total Requested Budget from IC-IMPACTS (CAD):

Number of Students To Be Trained in India: __Ph.D. __Postdoc.

Number of Students To Be Trained in Canada: __M.Sc. __Ph.D. __Postdoc.

Expected Cash Contribution by Partners: _____ /per year



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Expected In-kind Contribution by Partners:

/per year

Project Abstract (for public purposes – maximum 250 words). If application is successful, this section will appear on IC-IMPACTS website and in other print IC-IMPACTS materials.

1. Research Team

1.1. Principal Investigators

Indian Principal Investigator Information:

Last Name:		First Name:	
Title:			
Department:			
Institution:			
Telephone:		Mobile:	
Email:		Fax:	
Street Address:			
City:		State:	
Date of Birth:			

Canadian Principal Investigator Information:

Last Name:		First Name:	
Title:			
Department:			
Institution:			
Telephone:		Mobile:	
Email:		Fax:	
Street Address:			



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City:		Province:	
Postal Code			

1.2. Co-Principal Investigators

Indian Co - Principal Investigator Information:			
Last Name:		First Name:	
Designation:			
Department:			
Institution:			
Telephone:		Mobile:	
Email:		Fax:	
Street Address:			
City:		State:	
Canadian Co - Principal Investigator Information:			
Last Name:		First Name:	
Designation:			
Department:			
Institution:			
Telephone:		Mobile:	
Email:		Fax:	
Street Address:			
City:		State:	

1.3. Other Project Team Members:

List the core members of the research team, their role and expertise.

Distinguish between core project members for whom you would seek funding through this process and those who would be providing input, but would be supported through “leveraged” or “in-kind” support funded from other sources (if available). Indicate each team member’s anticipated overall role in the project.



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1.3.a Proposed Core Research Team Members

Name	Academic Institution or Organization	Project Role	Area of Expertise / Qualifications

1.3.b. Other Researchers and Partners (supported by other “leveraged” funding if available)

Name	Academic Institution or Organization	Project Role	Area of Expertise / Qualifications

1.4. Excellence of the Research Team:

Briefly describe how the scientific qualifications, breadth of experience and roles of each of the Principal Investigators, Co-Principal Investigators and other Project team members are best suited to achieve the outcomes of this project. Be sure to highlight their expertise in the proposed field of work.



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1.5. Relevant Publications of Project Leaders:

Identify Three (3) Key Publications by **each** of the Canadian and Indian Principal Investigators and Co-Principal Investigators Relevant to the Proposed Project:

1.6. Ongoing / Completed Projects by Indian Principal Investigator:

List National and International Ongoing and Completed projects by the Indian Principal Investigator (DST information requirements)

National Projects: (add rows as necessary)

S. No.	Project Title	Sponsoring Agency	Budget	Status

International Projects: (add rows as necessary)

S. No.	Project Title	Name of the Collaborating Scientist and Institute	Sponsoring Agency	Budget	Status



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2. Collaboration Opportunity:

(maximum 500 words)

Is this a new opportunity for Canada-India Collaboration or is there a past record of collaboration in this project area? If so, describe past collaboration and results.

Describe necessity and significant of proposed research exchange between Canada and India (whether project could be done without the collaboration and if not complementary aspects the demonstrate benefit and impact of collaboration)

PROJET TECHNICAL INFORMATION

3. Research Project Overview

(maximum 1000 words)

Include a discussion of the following:

- discussion of origin of the proposal
- rational of the subject supported by cited literature,
- hypothesis and key questions
- current status of research and development in the subject
- relevance and expected outcome of the proposed study
- preliminary work done to date
- relevance to national needs in India and Canada



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6. Expected Results of the Collaboration:

(maximum 1000 words)

Describe expected outcomes (for example: joint publications, patents, etc.)

Describe if any of the expected results are likely to have commercial value?

7. Research Outcomes Deployment:

(maximum 1000 words)

Discuss the following issues:

- (1) Specify the strategy for deployment or knowledge transfer of the research outcomes into a community context.
- (2) Identify any anticipated challenges in the deployment or knowledge transfer or research outcomes into a community context and how you plan to mitigate these challenges if they arise.
- (3) Address how you will identify opportunities for knowledge translation and end-user utilization in the development and application of the proposed innovations and technologies?



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8. Unique and Innovative Aspects of the Proposed Research Project:

(maximum 1000 words)

9. Partner Involvement and Technology Utilization:

(maximum 1000 words)

Discuss the following issues:

- Describe the specific role of partners involved in the project and how they will contribute.
- Describe any opportunities for networking within, as well as external to, your proposed project to inform and increase the value and potential of your project and network to benefit other research projects of your institution, within your field, and within the IC-IMPACTS Network.

10. Project Relevance:

Describe the relevance of the project to Communities in India and Canada and explain how findings of the project will be applied towards improving the lives of habitants in these partner communities. Identify any potential road-blocks to successful translation of findings from your project into these communities. (maximum 500 words)



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11. Highly Qualified Personnel Training Summary:

Summarize the quantity and identify the role of graduate students, other highly qualified personnel (HQP) or professional practitioner training in the proposed project and summarize the anticipated nature of their role in the research project.

HQP Training Summary					
Level of HQP	Number participating from India		Number participating from Canada		How involved in project
	Year 1	Year 2	Year 1	Year 2	
Masters Students					
Doctorate Students					
Post-Doctoral Fellows					
Professional Practitioners					
Other HQP					
Total # HQP					

12. Highly Qualified Personnel Training – Unique Training Opportunity:

(maximum 1000 words)

Describe the unique potential training opportunities, opportunities for training within communities, and other opportunities to interact with end-user communities.



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13. Experts in the Field:

List names, institutions and addresses of 5 experts in the field who would be in a position to evaluate your research proposal. Note: DST and IC-IMPACTS may solicit independent external reviews from individuals not identified on this list.

Surname	First name	Position	Institution	Area of Expertise	Email Address

14. Project Management:

Indicate how you will ensure effective project management, including: (maximum 500 words)

- (1) A clear plan and demonstrated capacity to manage the various elements of the project,
- (2) Ensuring that the project proceeds on time and on budget, and addresses key milestones;
- (3) Ensuring appropriate integration of project elements and avoiding silos among project participants;
- (4) Overseeing effective HQP development and maximization of training potential; and
- (5) Ensuring effective collaboration among international project team members and partners

15. Rationale for Requested Budget from DST and IC-IMPACTS and Funding from Other Sources

- (1) Use the budget application forms to specifically outline the project budget requested from DST and IC-IMPACTS and as provided from other funding sources.
- (2) **In writing below** address each of the following issues: (maximum 500 words)



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- a) Describe how any leveraged sources, funding or programs available to you will contribute to the budget and enhance the outcomes of this project or make it more achievable.
- b) Describe budget provisions for knowledge translation and commercialization activities, including face-to-face meetings with end users and within partner communities during the life of the project.
- c) Describe budget provisions for knowledge dissemination and technology commercialization at end-of-project.

16. Additional Critical Considerations:

(maximum 500 words)

Identify any additional critical considerations you would like to bring to the attention of the review committees.



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FINANCIAL AND ADMINISTRATIVE INFORMATION

TOTAL COST OF THE PROJECT :

Generally limited to the extent of expenditure on approved exchange visits viz. international airfare for Indian scientists and local hospitality to the Canadian scientists as per approved norms. Major items of expenditure should be met from internal resources of the Implementing Institution or any other sources.

1. List of equipment and other facilities available in the participating Institutes for implementation of the project :
(In case facilities of other institutes are utilised, a consent letter from the these institute(s) may be neclosed)

2.. Exchange visits and estimated expenditure:

S.No.	Items of Expenditure	1 st yr	2 nd yr	Total (in Rs)
i.	Manpower			
ii.	Minor equipment			
iii.	Consumables			
iv.	Visit by Indian scientists to Canada - Number of visits & duration for each visit - International air-fare by lowest economy class including airport taxes and airport transfers in India - Medical Insurance (silver class) - Visa fee			
v.	Visits by Canadian scientists to India - Number of visits & duration for each visit - Accommodation in Guest House - Per diem @ 1000 per day - local travel in India between the host institute and the nearest International Air Port			
	Total			
	Overhead (excluding travel)			
	Grand Total			



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Note :i) The PI is required to submit periodic reports and its continuation in the second year would depend upon its progress assessed by DST. At the end of each financial year .the PI is also required to submit the Utilisation Certificates and Statement of Expenditure in prescribed format.

ii) Visit of one person is to be counted as one visit.

3. Designation and address of the Authorised official in Institute/ University to receive the grant
4. A letter from the Canadian Principal Investigator agreeing with the objectives, work plan including projected visits from both sides may be enclosed.

We hereby certify the statements above to be true and correct.

Signature with Date
Indian Principal Investigator

Signature with Date
Indian Co-Principal Investigator



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CERTIFICATE OF HEAD OF THE INDIAN INSTITUTION

It is certified that

- 1) The institution agrees to participate in this joint research project;
- 2) In the event of the Indian Principal Investigator (PI) leaving the Institute due to retirement or otherwise, the Co-PI would become the PI and be responsible for completing the project and submitting the periodic progress report and financial statements;
- 3) The institution shall provide infrastructure & available facilities as mentioned above, for implementing the joint project;
- 4) The institution assumes to undertake financial & other management responsibilities for part of the project work to be carried out in this institution;
- 5) The breakup funding for manpower, consumables etc. is available to this project;
- 6) All necessary formalities as per our institution have been completed.

(Signature and seal of the Head of the institution)



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CHECKLIST

1. Title of the Project :
2. Initiating Institute of project :
3. Sponsoring Agency/Ministry :
4. Total cost of the project :
- Nature and Quantum of foreign
Collaboration sought
- (i) Financial support: :
- (ii) Equipment support :
- (iii) Technical support :
- (iv) Manpower training :
- (v) Miscellaneous :
5. Is there any possibility, however :
remote of use of data, information
of result of the work which may
impinge on India's national security?
If yes, the nature of such a use may
be indicated. (In case the concerned
scrutinizing Ministry do not have clear
answer, the matter should be referred
to the DRDO and MHA for examination).

II. ORIGIN OF THE PROJECT AND ITS SPONSORS:

6. If the proposal is foreign-originated,
what is the background of the foreign
agency or organization which is sponsoring
the project? Information available, if any on
past collaboration by foreign agency with
Indian Institution.
7. Are the foreign agency, organization, scientists
concerned, known to have taken up any project of



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military significance in the past or are known to be associated with any military organization or project?

(if the above information is not known or if there is definite information that there is no such association, these should be clearly indicated).

8. Is the proposer (Indian) known to the foreign collaborator and his group for some time and has this emerged naturally from the research work done by the two sides?

FUNDING OF THE PROJECT

9. Is the foreign source known to have funded research into sensitive and national security areas in its own country or in other countries?
10. Are there reasons to believe that the foreign source is a cover name for some other sponsor?

ADMINISTRATION AND CONTROL OF THE PROJECT

11. Give a list of the likely places of visit :
within the country planned by the foreign collaborator. Also give a list of the institutions which the collaborator is likely to visit.
12. Will any sensitive source material be referred to during the course of the research?
13. Does the collaboration involve
- a) Transfer of biological material(s) :
 - b) Use of radioactive materials :
 - c) Use of environmentally or otherwise :
hazardous material(s)
 - d) Use of Genetically Modified Organisms :
 - e) Field trials or testing :



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- f) Ethical issues :
- g) Issues related to Intellectual Property Rights (IPR) :
14. If answer to any section of question 13 is yes, are the investigators/ proposers aware of the relevant regulations and have they agreed to abide by them?
15. Will the research be conducted in accordance not only with the country's own ethical and environmental standards, but with international standards as well?

Signature with date of the Principal Investigator

Signature with date and seal of Head of Department/ Institute



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PROJECT SUMMARY

1. Project Title:
2. Total cost of the project (Indian side) (in Rs.):
3. Duration of the Project.
4. Project Investigators (PIs) and Co-Investigators:
 - 4.1 Indian PIs
 - 4.2 Foreign
5. Other Project participants:
 - 5.3 Indian
 - 5.2 Foreign
6. Implementing Agencies / Institutions:
 - 6.1 Indian
 - 6.2 Foreign
7. Sponsoring Agency / Department / Ministry
 - 7.3 Indian
 - 7.2 Foreign
8. Administrative Ministry in Government of India:
9. Has the Project been cleared by Secretary of the Administrative/
Sponsoring Ministry/Department from security/sensitivity angle?: Yes/No
10. If answer to (9) above is 'No', then does the Administrative/
sponsoring Ministry/Department recommend the Project to
be considered by High Level Committee of Secretaries?
Yes/No

Signature of the concerned Officer
in the Administrative/Sponsoring
Ministry/Department



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**International Cooperation Division
Department of Science & Technology
Bank details for transfer of DST fund electronically**

Agency name as registered with DST CPMS	
Agency Code as per CPMS	
Account Holders name/ designation	
Name of Bank and address	
Saving Bank Account Number	
IFSC Code	
MICR Code	
e-mail of the PI	

I do hereby certify that the above mentioned account is an **interest bearing account** and I take all responsibility for **declaring the interest** so accrued on the released grant from DST in the SE/UC to be furnished to DST.

Signature of Finance Authority with seal

(Please note that Agency name and Account holders name should be identical.)