

November 2021

Insight report: Innovation & R&D in construction



Canadian
Construction
Association

Innovation

in·no·va·tion | \ ,i-nə-'vā-shən \

Essential Meaning of *innovation*

1: a new idea, device, or method

She is responsible for many *innovations* in her field.
the latest *innovation* in computer technology

2: the act or process of introducing new ideas, devices, or methods

Through technology and *innovation*, they found ways to get better results with less work. The rapid pace of technological *innovation*

"Innovation." *Merriam-Webster.com Dictionary*, Merriam-Webster,
<https://www.merriam-webster.com/dictionary/innovation>.

The Canadian Construction Association (CCA) is the national advocate for the industry, ensuring fair and transparent procurement, consistent and sufficient investment in infrastructure and attracting a skilled workforce.

Our mission is to "inspire a progressive, innovative and sustainable construction industry that consistently acts with integrity". Our 20,000 members take great pride in the work they do to build strong, resilient and caring communities across Canada.





Construction research at your fingertips

CCA and Cognit.ca launched the first ever [Construction R&D Portal](#) to help you navigate through the vast amount of research on construction within our university network.



\$14 billion

of research performed
by universities annually



100,000+

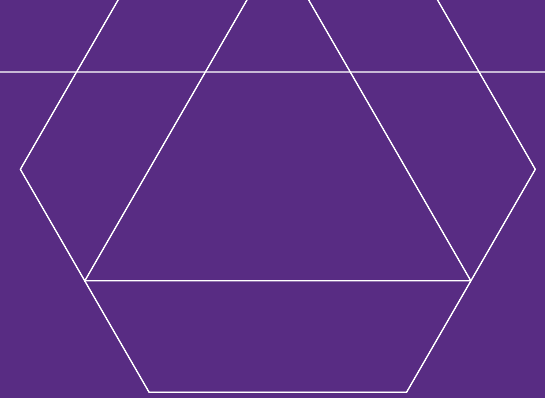
experts and research
documents



225,000

research grants

Data provided is from the cognit.ca tool, and is for illustrative purposes. The searches may yield different results depending on the key words and time the search was effected.



Infrastructure

Why it matters:

A gap exists in the level of investment allocated compared to what is needed to fix ageing infrastructure as well as position Canada for the future.

Setting national goals around building sustainability into our infrastructure and supporting the Western Canada Gateway Trade Initiative are just two significant opportunities for Canada. The economy needs reliable infrastructure to connect supply chains and efficiently move goods and services across borders. The funds must be predictable, flow quickly and be aligned with provincial, municipal, and Indigenous needs.

Infrastructure provides access to services, and connects products to the marketplace. Through ports and highways, reliable energy transmission, and sustainable practices, infrastructure lowers costs, enlarges markets and facilitates trade.

- [!\[\]\(4e333a6106fc298d0ae6dff272a736ef_img.jpg\) Read: Response to Building the Canada We Want in 2050: Engagement Paper on the National Infrastructure Assessment](#)
- [!\[\]\(97089f8e07e24e31baa67366e358a709_img.jpg\) Read: VAN BUREN: It's time to focus on the elephant in the \(economic recovery\) room](#)
- [!\[\]\(9496824b8cff3a19f59b81b37b57d8b6_img.jpg\) Watch: Building for the future Canada's infrastructure](#)
- [!\[\]\(ec8d0f7e486e2280c113cd85015a8548_img.jpg\) Watch: Automating Visual Inspection with AI - Construction R&D Showcase](#)

**Number of research
projects underway
in Canada:**

4000+

Examples of projects on:

Infrastructure (highways and transportation)

Threat assessment for northern civil infrastructure affected by climate change using an AI-based geomechanical model

Funding details

Social Sciences and Humanities Research Council

Grant type:

New Frontiers in Research Fund

Years:

2018/19

Total funding:

\$125,000

Light management for high efficiency solar roadways

Funding details

Natural Sciences and Engineering Research Council of Canada

Grant type:

Engage Grants Program

Years:

2019/20

Total funding:

\$25,000

Principle investigator(s)

Uhl, Alexander Roland

University of British Columbia

Integration of remote sensing big data into the management and design of highway infrastructure

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Discovery Grants Program - Individual

Years:

2019/20

Total funding:

\$31,000

Principle investigator(s)

ElBasyouny, Karim

University of Alberta

Advancing performance-based highway geometric design

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Discovery Grants Program - Individual

Years:

2015/16 to 2019/20

Total funding:

\$170,000

Principle investigator(s)

Easa, Said

Ryerson University

Examples of projects on:

Infrastructure (sewer and water)

Pipe liner evaluations and connection studies (PipeLEACS)

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Strategic Projects - Group

Years:

2017/18 to 2019/20

Total funding:

\$590,100

Principle investigator(s)

Moore, Ian

Queen's University

Resilience and risk management in urban water supply: assessing the potential contribution of alternative systems

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Discovery Grants Program - Individual

Years:

2018/19 to 2019/20

Total funding:

\$52,000

Principle investigator(s)

Bichai, Françoise

Polytechnique Montréal

Simulation and IT-based modeling for construction operations and infrastructure systems

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Discovery Grants Program - Individual

Years:

2014/15 to 2017/18

Total funding:

\$136,000

Principle investigator(s)

Zayed, Tarek

Concordia University

Preliminary design of robotic spray nozzle for trenchless pipe rehabilitation

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Engage Grants Program

Years:

2013/14

Total funding:

\$25,000

Principle investigator(s)

Mclsaac, Kenneth

Western University

Examples of projects on:

Infrastructure (energy)

Smart operation and control of offices to improve comfort and energy performance

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Collaborative Research and Development Grants

Years:

2016/17 to 2019/20

Total funding:

\$120,000

Principle investigator(s)

O'Brien, William

Carleton University

Advanced building envelope systems for improved energy performance of multistory buildings

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Discovery Grants Program - Individual

Years:

2015/16 to 2019/20

Total funding:

\$110,000

Principle investigator(s)

Hachem, Caroline

University of Calgary

Investigating engineering properties of cemented cohesive soils as foundation support

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Collaborative Research and Development Grants

Years:

2016/17 to 2019/20

Total funding:

\$82,800

Principle investigator(s)

Deng, Lijun

University of Alberta

Simplified and compact renewable power systems for field equipment

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Applied Research and Development Grants - Level 1

Years:

2016/17

Total funding:

\$25,000

Sustainable and efficient construction practices and products

Why it matters:

With an ever-increasing focus on the environment, and significant challenges to the economy, sustainable and efficient products and practices are growing in importance. These practices and products, often environmentally conscious, can offer businesses benefits beyond good PR, which, on its own can help build a company's reputation and lead to additional business. Upfront costs translate into long-term cost savings in energy, maintenance and productivity. With construction guidelines like NetZero, there are also multiple opportunities to take advantage of government subsidies thus further reducing costs.

- 🔗 [Read: CCA research paper - Strength, resilience, sustainability: Canada's construction sector recommendations on adapting to climate change](#)
- 🔗 [Watch: Performance of the building envelope and climate change - Construction R&D Showcase](#)
- 🔗 [Watch: 2020 CCA Environmental Achievement Award](#)
- 🔗 [Watch: 2019 CCA Environmental Achievement Award](#)

Number of research projects underway in Canada:

900+

Examples of projects on:

Sustainable and efficient construction practices and products

Exploring the potential of using crushed brick products in green infrastructures for environmental remediation

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Engage Grants Program

Years:

2015/16

Total funding:

\$24,991

Principle investigator(s)

Zheng, Youbin
University of Guelph

Guidelines development for sustainable use of reactive/marginal recycled aggregates in concrete construction

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Discovery Grants Program - Individual

Years:

2018/19 to 2019/20

Total funding:

\$72,000

Principle investigator(s)

Fournier, Benoit
Laval University

Supporting the digital delivery of sustainable building projects

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Discovery Grants Program - Individual

Years:

2019/20

Total funding:

\$52,000

Principle investigator(s)

StaubFrench, Sheryl

University of British Columbia

Developing novel processes for copper patination as a green building material

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Engage Grants Program

Years:

2018/19

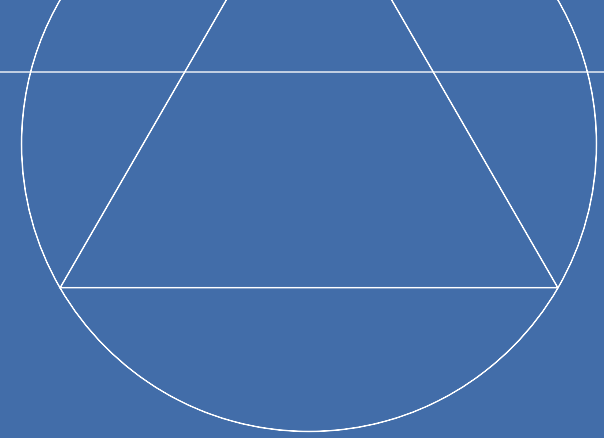
Total funding:

\$25,000

Principle investigator(s)

Kirk, Donald

University of Toronto



Construction procurement and delivery methods

Why it matters:

The federal government's procurement strategy is outdated and leaves little room for creative solutions and fair risk sharing.

In order to build the infrastructure needed across the country and recruit the workforce of the future, the federal procurement strategy needs to adapt to encourage innovation, account for long-term value and sustainability, and explore the use of alternative delivery models.

Innovative procurement and delivery methods can improve productivity, enable cost savings, and shorten the timeline for the construction project itself.

🔗 [Register: Special training session offered to members on new CCA 1](#)

🔗 [Watch: CCA CONnected webinar: Building Smarter Through Digital Transformation](#)

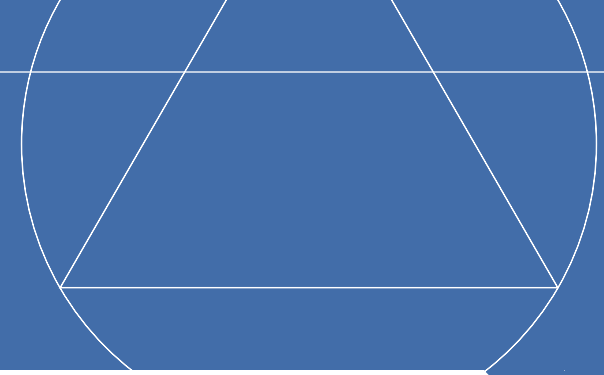
🔗 [Watch: Emerging contract models for better projects: Graham presentation to CCA:](#)

Number of research projects underway in Canada:

85+

Examples of projects on:

Procurement and project delivery



Impact of qualifications-based selection of engineering services on project outcomes

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Collaborative Research and Development Grants

Years:

2019/20

Total funding:

\$100,000

Principle investigator(s)

Abourizk, Simaan

University of Alberta

Improving upstream information exchange protocols using value-adding techniques

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Engage Grants Program

Years:

2017/18

Total funding:

\$25,000

Principle investigator(s)

AlHussein, Mohamed

University of Alberta

An integrated hybrid modeling framework for construction project delivery

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Discovery Grants Program - Individual

Years:

2012/13 to 2017/18

Total funding:

\$270,000

Principle investigator(s)

Abourizk, Simaan

University of Alberta

Optimized project delivery for a modular builder

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Engage Grants Program

Years:

2016/17

Total funding:

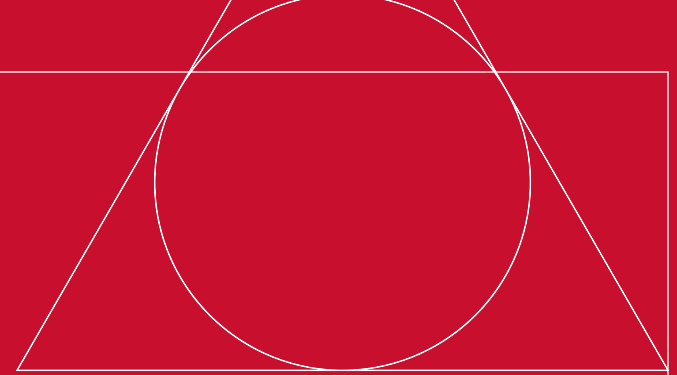
\$25,000

Principle investigator(s)

Moselhi, Osama

Concordia University

Workforce (diversity, safety and innovation culture)



Why it matters to your business:

The construction industry is facing a serious workforce shortage that will impact our progress on building for the future.

To fill this gap, the industry must be seen as a career of choice, particularly among underrepresented groups. A diverse and inclusive workforce can:

- Accelerate innovation with diverse perspectives and new ideas
- Increase employee productivity and revenue
- Reduce employee turnover
- Drive a positive safety culture; and
- Enhance your reputation, expand your customer base

[!\[\]\(e3f8612927870f2e0f9f5989e6dd3064_img.jpg\) Visit: Talent Fits Here](#)

[!\[\]\(003082e50e3009141f59bd5df831749f_img.jpg\) Read: The value of diversity and inclusion in the Canadian construction industry: A business case](#)

[!\[\]\(17413706fd4997a1a4bdf85c6864eee1_img.jpg\) Watch: CCA 2020 Workforce Excellence Award](#)

[!\[\]\(faf942dc3e59ce8eb64b4ac481eca7e0_img.jpg\) Watch: CCA CONnected webinar: Using AI to improve safety and productivity of construction projects](#)

[!\[\]\(cf531ed27e91483460120fcc057b3901_img.jpg\) Watch: CCA 2020 National Safety Award](#)

**Number of research
projects underway
in Canada:**

50+

Examples of projects on:

Workforce (diversity, safety and innovation culture)

Job talks: Innovative study and website for recruitment in the skilled trades

Funding details

Social Sciences and Humanities Research Council

Grant type:

Partnership Development Grants

Years:

2015/16 to 2017/18

Total funding:

\$239,930

Engineering students supporting heritage and sustainability (heritageengineering)

Funding details

Natural Sciences and Engineering Research Council of Canada

Grant type:

Collaborative Research and Training Experience

Years:

2015/16 to 2019/20

Total funding:

\$1,350,000

Principle investigator(s)

SantanaQuintero, Mario

Carleton University

An integrated framework for modeling construction competencies and performance using artificial intelligence and fuzzy simulation

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Discovery Grants Program - Individual

Years:

2018/19 to 2019/20

Total funding:

\$104,000

Development of a lighting vest for construction workers

Funding details

Natural Sciences and Engineering Research
Council of Canada

Grant type:

Applied Research and Development Grants - Level 2

Years:

2015/16 to 2017/18

Total funding:

\$150,000

Interested in learning more about innovation in construction?

Contact:

Kenny Leon

Vice President, Marketing Innovation and Industry Collaboration

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Or attend one of our webinars:

<https://www.cca-acc.com/events/connected-webinars>

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