



Harnessing Industry - Academic Collaboration for Innovation

Qipei (Gavin) Mei, Assistant Professor, University of Alberta

Vicente Gonzalez-Moret, Professor, University of Alberta

#IHT Lab



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Innovation Begins from the University

#IHT Lab



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Department of Civil and Environmental Engineering

- The department was founded in 1909, one year after the University of Alberta was founded
- ~70 professors
- 8 Subdisciplines • (Construction, Structures, Geotechnical, Environmental, Water Resources, Transportation, Mining, Petroleum)
- 500+ grad students
- 1000+ undergrad students
- Ready to collaborate with industry!

Construction Innovation Centre

The University of Alberta's Faculty of Engineering established the Construction Innovation Centre (CIC) in May of 2019 to provide breakthrough research, education and training that directly benefit Canada's construction industry .



More than **40 professors** including **nine research programs** supported by more than **50 partners** in industry, professional associations, government, and funding bodies are involved in the CIC.

Annual Forum & Focus Group



Newsletter



Open House



Construction Innovation Centre

OPEN HOUSE



JOIN US

Attend the CIC Open House to explore our cutting-edge facilities and meet world-class researchers who are driving the latest breakthroughs in construction innovation and technology!

Wednesday, Nov 12, 2025

1:00-4:00 PM

UofA North Campus

BE INSPIRED AND DISCOVER HOW YOU CAN HELP SHAPE THE NEXT WAVE OF CONSTRUCTION RESEARCH AND INNOVATION!

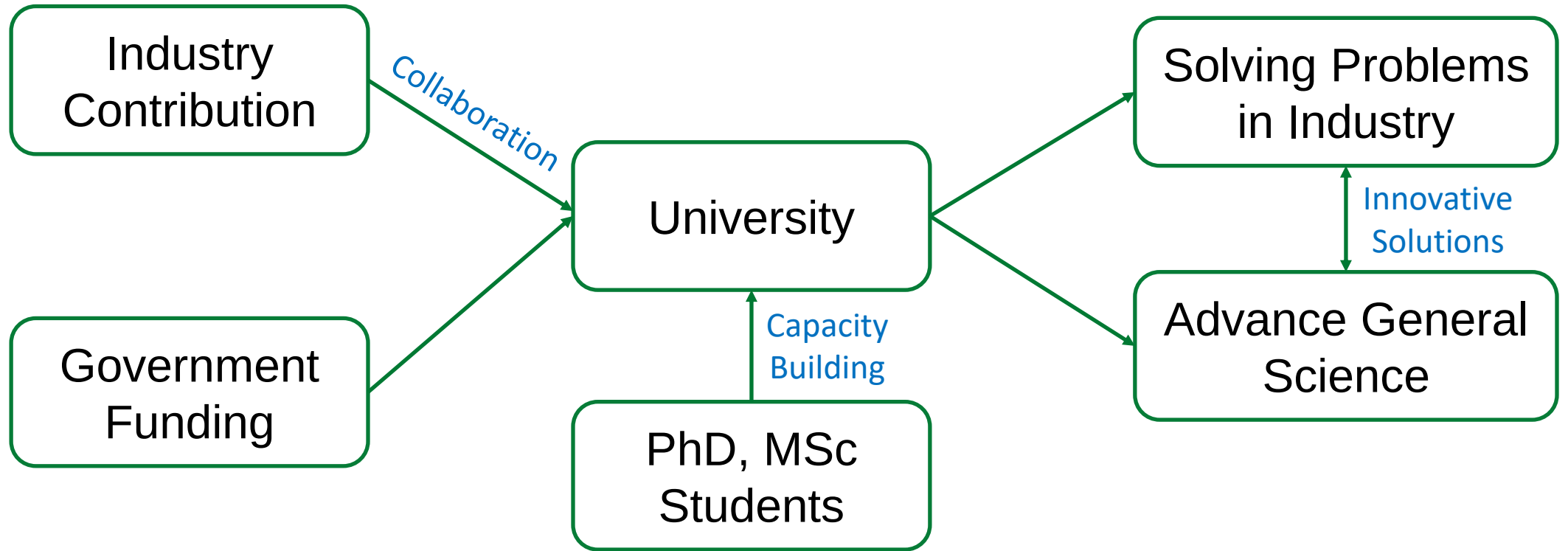
Industry-Academic Collaboration

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Industry Collaboration Projects

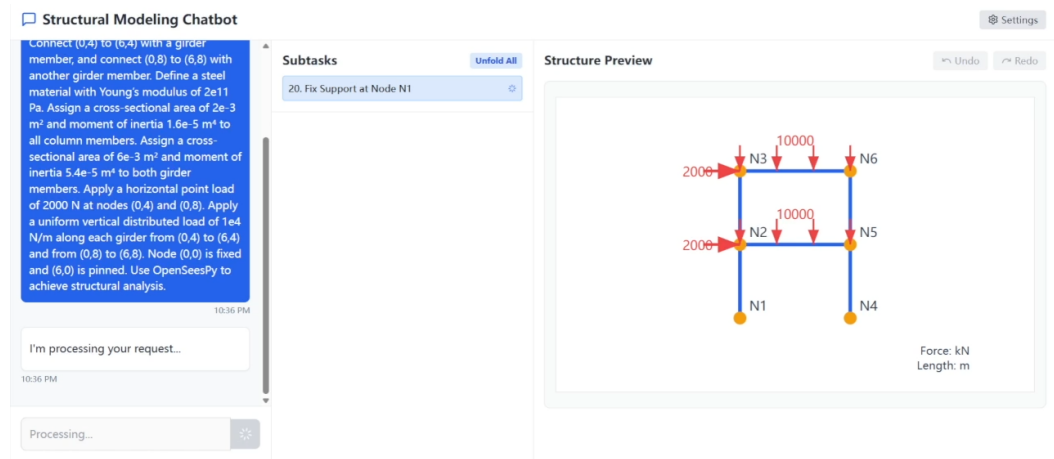


Benefits to the Partners

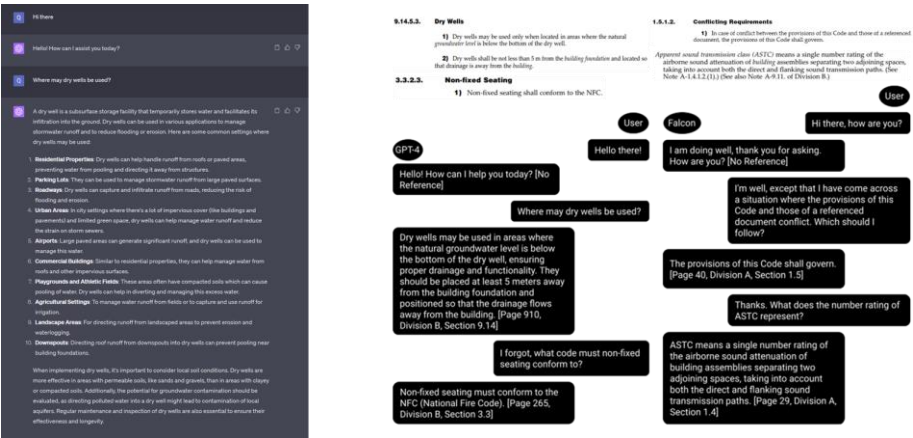
- **Access to cutting-edge research & expertise** from universities and leading researchers
- **De-risked innovation** through shared cost and technical support
- **Talent pipeline development** — early access to highly skilled students, interns, and postdocs
- **Accelerated R&D** and faster commercialization of technology
- **Custom solutions** to company-specific technical or operational challenges
- **Enhanced competitiveness** through new technologies, processes, and knowledge
- **Improved productivity & efficiency**, often reducing costs or cycle time
- **Reduced recruitment cost** and improved workforce retention by training talent early

What We Have Achieved Through Collaboration with Industry

AI-Agent Based Automated Structural Analysis



Large Language Model for Information Extraction from Building Codes



AI-Based Pavement Assessment



The video is generated using a high-speed camera and our AI algorithms

Smart Helmet Prototype for Real-time Safety Monitoring



Funding Structure

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Funding Programs that Support Industry-Academic Collaboration

NSERC Alliance

- Funds collaborative research between universities and industry, government, or non-profits.
- Aims to create new knowledge, technology, and innovation with real-world impact.
- Leverage ratio of 1:2
- Supports projects from 1–5 years, up to \$1 M/year in funding.



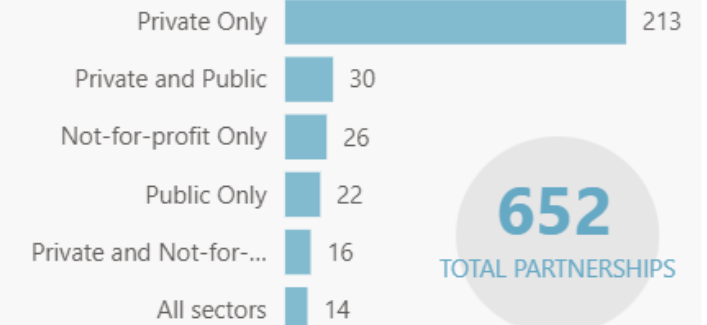
CASH CONTRIBUTIONS COMMITTED:

\$443.1M

recognized for
cost-sharing

Partnership Types

Public and Not-for-p...



652
TOTAL PARTNERSHIPS

Funding Programs that Support Industry-Academic Collaboration

Mitacs Accelerate

- Connects academia, industry, government & non-profits to drive research-based innovation.
- Offers internships and fellowships where students/post-docs work directly on real-world challenges with partner organizations.
- Leverage ratio of 1:2
- Up to ~5 years



Funding Programs that Support Industry-Academic Collaboration

Alberta Innovates

- Support research projects with SME
- Additional leverage ratio of 1:2 on top of NSERC
- Up to 2 years



Home > Funding Programs > Campus Alberta Small Business Engagement (CASBE) Program

Campus Alberta Small Business Engagement (CASBE) Program

We offer funding for Alberta-based companies to adopt emerging technologies with the support of researchers from Alberta Post-Secondary Institutions.

On This Page
[Overview](#) [Open Intakes](#) [Funding History](#)

Program Status: Active [Intake Status: Open](#) [Apply Now](#)

Program at a Glance		Eligibility	
Business Area:	Post-Secondary Investments & Emerging Technology	Alberta-based:	Yes
Priority Area(s):	Connect Albertan academics and small businesses to work together and take advantage of grants with expanded budgets and timelines.	Organization Type:	Academic Institutions & Researchers Small to Medium Enterprise
Program Guide:	Campus Alberta Small Business Engagement (CASBE) Program - Program Guide		

IHT Lab in a Nutshell: Motto and Organisation

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IHT Lab in a Nutshell: Motto and Organisation

“Pioneering scientific ingenuity to make tangible impacts for a better world”. IHT Lab Motto

“We aim to be the preferred partner for those seeking science-driven solutions to complex challenges, so that science and technology can be transformed into practical and impactful solutions that benefit society”. IHT Lab Goal



Dr Vicente Gonzalez
Co-Director
Lean Construction 4.0 Area



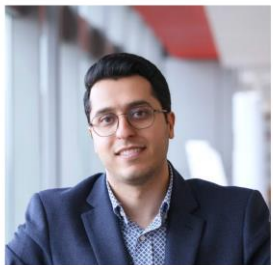
Dr Gaang Lee
Co-Director
Computer-Driven Behavioural
Area



Dr Qiwei (Gavin) Mei
Co-Director
Sensing and AI Area



Smart Infrastructure TEchnologies (SITE) Research Group



Dr Ali Golabchi
Co-Director
Entrepreneurship and Industry Engagement



Neil J. McFarlane, P. Eng., B.Sc. (CivEng)
Industry Advisor

IHT Lab in a Nutshell: Motto and Organisation

Graduate Researchers

Meet our student researchers supervised by Dr. Vicente Gonzalez, Dr. Gaang Lee and Dr. Olpei (Gavin) Mei



PhD in Civil Engineering, University of Alberta
Zhong Wang

I am currently working on the project of developing and validating an integrated smart project management tool for Real Time Decision Making in project monitoring and control.

Supervised by Dr. Vicente Gonzalez



PhD in Civil Engineering, University of Alberta
Yulun Wu

I am exploring the integrated solutions of applying generative AI in construction training content generation, visualization and collaboration.

Supervised by Dr. Vicente Gonzalez



PhD in Civil Engineering, University of Alberta
Kexin Liu

I am working on using digital twin based Extended Reality (VR, AR, and MR) to enhance fire safety management on construction sites, reducing construction workers' injuries and death and property loss.

Supervised by Dr. Vicente Gonzalez



PhD in Civil Engineering, University of Alberta
Amira Saleh

I am developing a Predictive Analytics Model that can be used to support on-site safety, production planning, and control decisions holistically.

Supervised by Dr. Vicente Gonzalez



PhD in Civil Engineering, University of Alberta
Zeyu Mao

I am currently engaged in research aimed at exploring how to use digital twin technology to improve the efficient management of construction constraints within the Lean Construction background.

Supervised by Dr. Vicente Gonzalez



PhD in Civil Engineering, University of Alberta
Mohammed Sabek

I am building an AI-based model to recognize different construction activities and machinery.

Supervised by Dr. Vicente Gonzalez



MSc in Civil Engineering, University of Alberta
Andrea Sanchez Aguirre

My research centers on elucidating the efficient application of production models for goods within the realm of construction.

Supervised by Dr. Vicente Gonzalez



PhD in Civil Engineering, University of Alberta
Ghanim Saqib

I am currently engaged in the development of an ergonomic coaching framework for field workers, which utilizes augmented reality and reinforcement learning.

Supervised by Dr. Gaang Lee



PhD in Civil Engineering, University of Alberta
Eren Shahrokhishahraki

I am interested in managing heavy equipment operators' cognitive function to reduce equipment-related accidents by applying a head-cap type sensor and eye tracking sensor.

Supervised by Dr. Gaang Lee



MSc in Civil Engineering, University of Alberta
Nahom Abraham

I am focusing on advancing urban inclusion and equity by understanding marginalized people's lives, older adults and the disabled experience via affordable wearable biosensors and applying technical and social interventions.

Supervised by Dr. Gaang Lee



MSc in Civil Engineering, University of Alberta
Parth Maheshkumar Jain

I am working on understanding construction field-specific team/organization dynamics and developing psychological and socio-cognitive interventions to advance construction workers' safety and productivity.

Supervised by Dr. Gaang Lee



PhD in Structural Engineering, University of Alberta
Hao Xie

I am working on the application of computer vision and machine learning to extract information from engineering drawings and to automate structural design.

Supervised by Dr. Olpei (Gavin) Mei



PhD in Structural Engineering, University of Alberta
Mohammad Talebi Kalaleh

I am currently engaged in the research that use smartphones as sensors for indirect bridge health monitoring.

Supervised by Dr. Olpei (Gavin) Mei



PhD in Structural Engineering, University of Alberta
Jiangyu Zeng

My research is about the application of smartphones for crowdsensing based bridge condition monitoring.

Supervised by Dr. Olpei (Gavin) Mei



PhD in Structural Engineering, University of Alberta
Hui (Pololo) Zuo

My research focuses on using point cloud data and digital twin for infrastructure defect detection and management.

Supervised by Dr. Olpei (Gavin) Mei



PhD in Structural Engineering, University of Alberta
Sida Ai

My research focuses on using computer vision to measure the dynamic response of structures and assess the health condition of them.

Supervised by Dr. Olpei (Gavin) Mei



PhD in Structural Engineering, University of Alberta
Beilei Ji

My research focuses on developing machine learning based surrogate models for pipelines subjected to permanent ground movement.

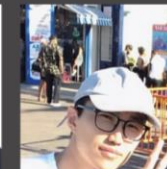
Supervised by Dr. Olpei (Gavin) Mei



PhD in Engineering Management, University of Alberta
Xiang Yuan

My research focuses on the use of Augmented Reality to improve the training of construction workers.

Supervised by Dr. Olpei (Gavin) Mei



PhD in Engineering Management, University of Alberta
Chao Fan

My research focuses on ergonomics and occupational safety of construction workers using computer vision/machine learning.

Supervised by Dr. Olpei (Gavin) Mei



PhD in Building Engineering, University of Alberta
Qibin Hu

My research is about the application of AI technology for automatic wood floor design.

Supervised by Dr. Olpei (Gavin) Mei



MSc in Structural Engineering, University of Alberta
Zahra Hassani

I am working on the application of smartphones for serviceability condition assessment for buildings.

Supervised by Dr. Olpei (Gavin) Mei



MSc in Structural Engineering, University of Alberta
Yuchen Qian

I am working on using smartphones to evaluate serviceability condition of buildings.

Supervised by Dr. Olpei (Gavin) Mei

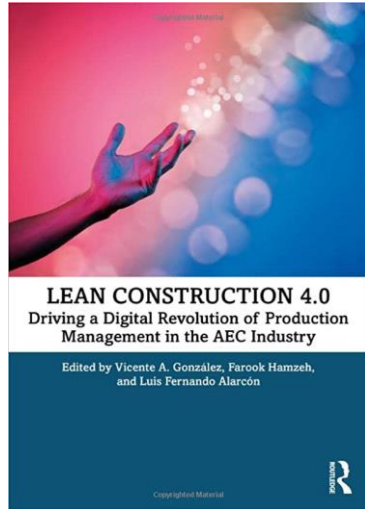


MSc in Structural Engineering, University of Alberta
Farshid Heshmati

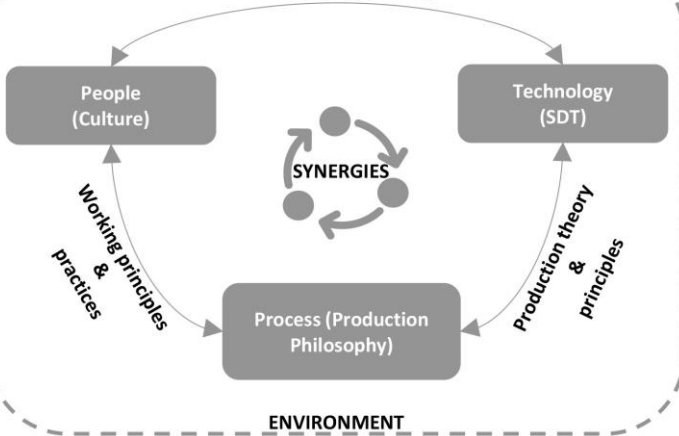
My research focuses on developing machine learning based surrogate models for pipelines subjected to permanent ground movement.

IHT Lab in a Nutshell: Motto and Organisation

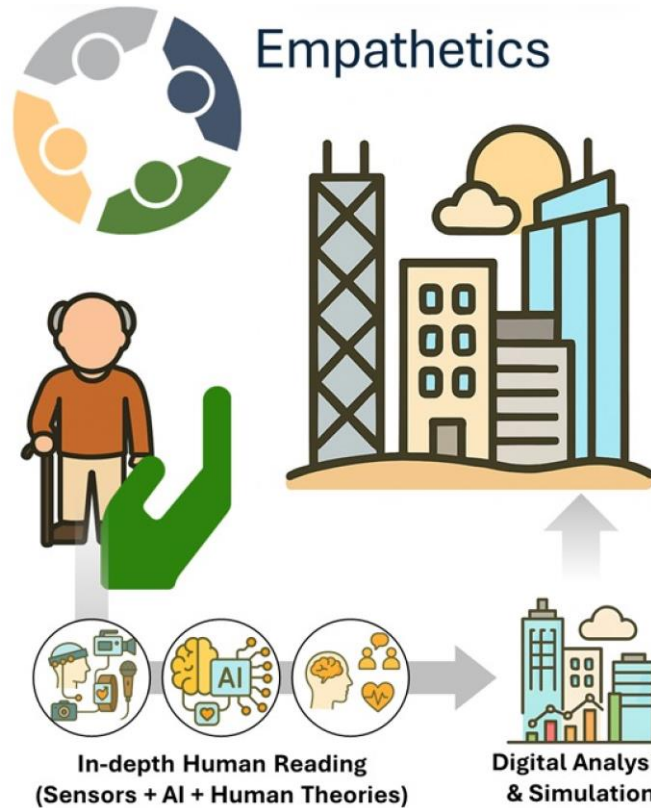
Research Pillars



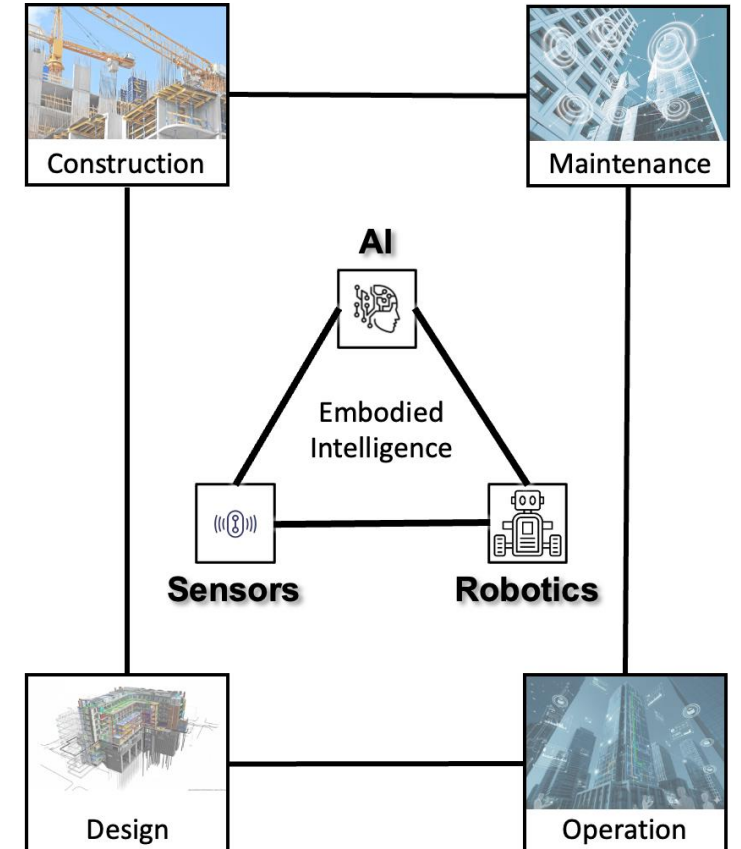
Human-centered design



Dr Vicente Gonzalez
Co-Director
Lean Construction 4.0 Area



Dr Gaang Lee
Co-Director
Computer-Driven Behavioural Area



Dr Qipei (Gavin) Mei
Co-Director
Sensing and AI Area

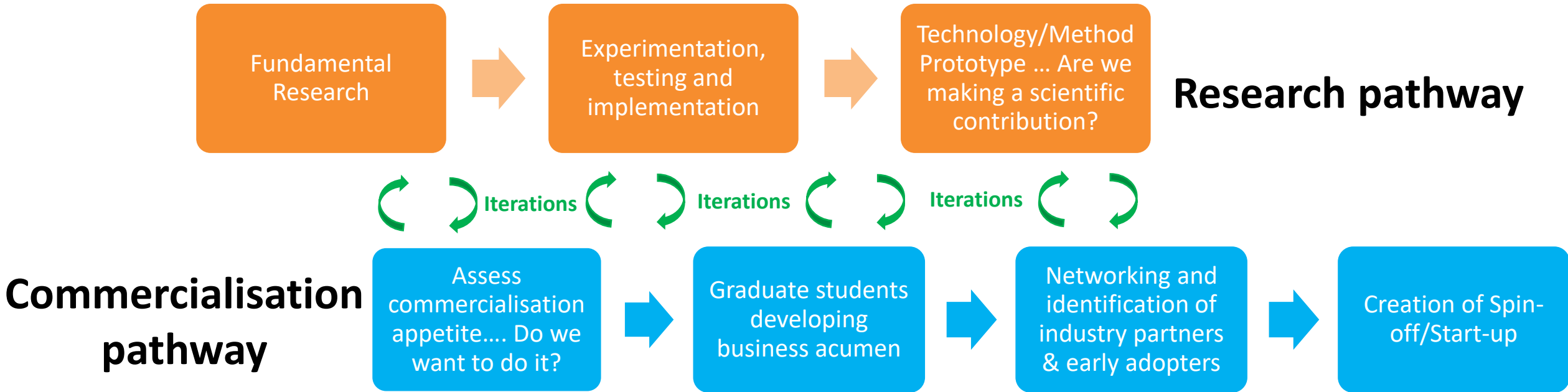
From Research to Commercialisation within the IHT Lab

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From Research to Commercialisation within the IHT Lab



From Research to Commercialisation within the IHT Lab

- An IHT Lab success story:



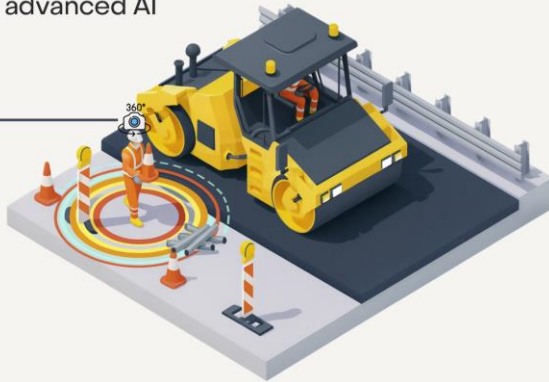
REINVENTING THE HARD HAT FOR THE MODERN JOBSITE

Smart Helmet detects proximity to any **hazards** around and in blind zone of worker using advanced AI and provide **haptic alerts**.



Proximity to **'Tripping Hazard'** due to scatter pipes.

Moving Machinery Nearby. Roller is at safe operating distance.



TURNING RESEARCH INTO REAL-WORLD IMPACT

Smart Helmet technology has been validated through **research at the University of Alberta**, achieving over **85% accuracy** in hazard identification.

The system performs real-time **AI processing** entirely **on-board without internet**.

A new **ergonomic and regulatory-compliant** design is under development for commercial deployment.



HOW THE SMART HELMET WORKS



Camera sensors continuously capture the full surroundings of the worker.



Our state-of-the-art computer vision models, are trained to identify any hazardous conditions.



Haptic and auditory alerts warn the worker based on hazard severity.

- Partners:



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Thank you!

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Vicente Gonzalez-Moret

Email: vagonzal@ualberta.ca

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