



STRATEGIC CONSTRUCTION MODELING AND DELIVERY

INDUSTRIAL RESEARCH CHAIR

Keynotes

Issue 10, January 2021



Message from the Chair

A Time of Transition: 2020 and 2021

I would like to begin this message by expressing gratitude, to my research team for persevering during challenging times, and to our industry partners for supporting our research during the pandemic. Last year was unique, full of novel and unexpected challenges, and 2021 will be one of transition for the IRC in SCMD. I believe we will look back on 2020 and 2021 as two eventful years that also reflect the strength of our

collaborative approach to construction innovation, research, and application.

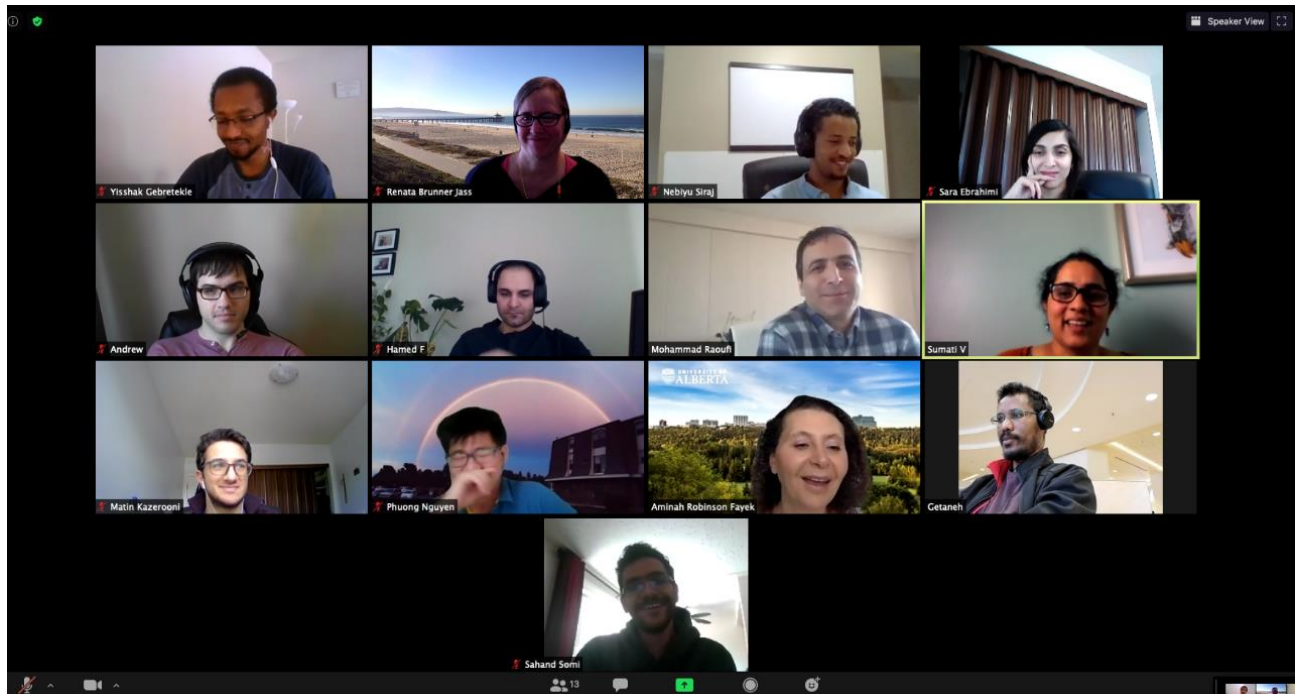
Early 2020 resembled a normal work year. The IRC in SCMD was represented at the ASCE Construction Research Congress held March 8–10 in Tempe, Arizona. By this time, of course, the full world's attention was on the COVID-19 pandemic, and we began the substantial task of adjusting and recalibrating our projects and workplaces. As so much of industry planning and communication worldwide moved to virtual spaces, the IRC in SCMD team became adept at using online platforms for regular research and management meetings. And while some conferences were postponed to 2021, the IRC in SCMD did participate in APARM 2020, which was held virtually August 20–23, by organizing and chairing a special session and presenting papers related to the Future Energy Systems project.

In 2021, the IRC in SCMD team will focus on completing some research projects and transitioning other projects and tools into the Construction Innovation Centre (CIC). (Please see the article What's Next for the IRC in SCMD in this newsletter for more.) As we make this transition, we look forward with excitement to increasing outreach,

networking, knowledge sharing, and other collaborations to make the Canadian and Albertan construction industry competitive on a global scale.

Again, I thank our research team, industry partners, and colleagues for all we have been able to accomplish with the IRC in SCMD despite the particular challenges that 2020 presented. This year will see many of our IRC in SCMD products completed and put into practice, and the CIC will further strengthen our industry and academic collaborations. Above all, we hope to be able to meet in person again soon.

– *Dr. Aminah Robinson Fayek*



Note: The IRC in SCMD originally published this article January 4, 2021, on Medium.



What's Next for the NSERC Industrial Research Chair in Strategic Construction Modeling and Delivery

The NSERC Industrial Research Chair in Strategic Construction Modeling and Delivery (IRC in SCMD) program is now in its final year of funding, as the NSERC partnerships model has changed to the Alliance Grant program (NSERC Alliance webpage). In 2021, the IRC in SCMD is focusing on wrapping up projects and developing results and recommendations. Tools, such as the Fuzzy Risk Analyzer® and Digitalization Opportunities Road Mapping Tool©, will continue to be supported.

Naturally, the research, tools, and expertise generated under the banner of the IRC in SCMD will continue to be of interest and use to industry colleagues and partners. So, what comes next?

Are you interested in pursuing problem-solving innovation and in search of the expertise and resources to make it happen?

Are you looking to improve the competitive position of your organization as well as the Alberta construction industry as a whole?

The Construction Innovation Centre might be just what you are looking for.

The industry collaboration developed over the past 15 years through the IRC in SCMD will continue under the auspices of the Construction Innovation Centre (CIC). The University of Alberta's Faculty of Engineering established the CIC in May of 2019. Its mission is "to provide breakthrough research, education, and training that directly benefit Canada's construction industry and lead to the sustainable and economic development of our built environment and a competitive advantage for the Canadian construction industry."

The University of Alberta has more than 30 years of experience in fostering university-industry collaboration, with a proven track record established by active research

programs involving most of the construction industry groups in Alberta. The CIC brings together many of these successful research programs under one umbrella, so that together they can offer much more than any one program alone. Working within the CIC are more than 30 established faculty members and nine research programs from the Hole School of Construction Engineering, Nasser School of Building Science and Engineering, the Masonry Group, and the Steel Centre, with support from more than 50 industry partners, professional associations, and funding bodies.

Members will have input into the CIC's research directions and help shape the research and projects undertaken. By bringing existing initiatives together, the CIC creates new opportunities for collaboration between various research and industry areas, opening the doors to the potential for fostering discovery and innovation across all sectors of the construction industry in Alberta and Canada at large.

The current top priorities of research applications for the CIC are:

- Productivity and Performance
- Health and Safety
- Energy and Sustainability
- Off-site Construction and Modularization

The CIC will adopt the following innovative and technology-based approaches in its research:

- Automation
- Robotics
- Artificial Intelligence
- Systems and Data Integration
- Simulation Modeling
- Visualization

The following are some of the services CIC will provide its members:

- Participation in research projects
- Exclusive access to CIC's online tools and guides
- Exclusive access to industry-wide results and products from research projects (e.g., publications, reports, and software)
- Exclusive access to industry-wide inventories and warehouses of research data and data sets
- Exclusive access to CIC for needs analysis and connecting to researchers
- Customized training, workshops, and webinars
- Member rates for participation in the Innovation in Construction Forum (ICF)
- Professional development opportunities
- Opportunity to showcase technology at CIC events
- Participation in recruitment mixers and facilitated connection to students for internship opportunities
- Opportunity to have access to CIC's collaborative research lab

The outcomes of the CIC's research and services will be: **Innovation** — state-of-the-art research solutions applicable to multiple members and to the construction industry as a whole; **Technology transfer** — access to practical tools and best practices ready for immediate application by members for process improvement; and **Highly qualified personnel (HQP)** — first-in-line access to hiring highly employable top students who are specifically trained in the members' practices as a result of the collaborative research.

The CIC provides a unique, collaborative environment that is not found anywhere else in Canada. If you are interested in pursuing problem-solving innovation, in search of the expertise and resources to make it happen, and looking to improve the competitive position of your organization as well as the provincial and national construction industries, the CIC may be a perfect fit. By joining the CIC, you can engage in cutting-edge research and development that applies directly to your work, help to better the

construction industry in Alberta and Canada, and help our nation take its place at the forefront of innovation in construction worldwide. Don't miss out!

For more information about the CIC, visit www.uab.ca/cic.

You may also contact Dr. Aminah Robinson Fayek.

Email: aminah@ualberta.ca

Phone: (780) 492-1205



Donadeo Innovation Centre for Engineering, University of Alberta

Note: The IRC in SCMD originally published this article January 4, 2021, on Medium.

The COVID-19 Pandemic and Its Impact on Our Industry

During the COVID-19 pandemic in North America, a great deal has been learned in a short amount of time, in all areas of the construction industry. Early on, provincial governments designated construction projects either essential or non-essential work, which naturally had immediate effects for contractors, owners, workers, and managers. Those people working in research and academic settings — such as the IRC in SCMD chairholder, students, and staff — have been generally working from home. All manner of meetings and conferences have been either postponed or held virtually. And in an industry like construction, particularly for people not regularly working on construction sites, we have come to appreciate more than ever the value of in-person interactions for daily work communications, sharing information, and networking.

The IRC in SCMD group has made steady progress with software tool development, student achievement, and peer-reviewed research and publications, despite being unable to visit worksites to collect data amid other pandemic-induced challenges. Several students have completed their research and have either graduated or are getting close to doing so. Regular group meetings continue to take place, only via Zoom instead of in person. And while daily communication via email was a normal part of everyday pre-COVID academic life, of course we are even more dependent on it now.



Photo by Anamul Rezwan from Pexels

In construction organizations and on jobsites, the pandemic has spurred more rapid adoption of technology as organizations grapple with the effects of the pandemic situation on workforce health, motivation, and productivity. In collaboration with the Construction Owners Association of Alberta (COAA) and the Government of Alberta's Ministry of Economic Development, Trade and Tourism, the IRC in SCMD has developed a framework to systematically evaluate the potential benefits of implementing digitalization opportunities — such as those addressing cost efficiency, project management, and an improved client experience — and factors influencing the successful implementation of such opportunities in construction organizations.

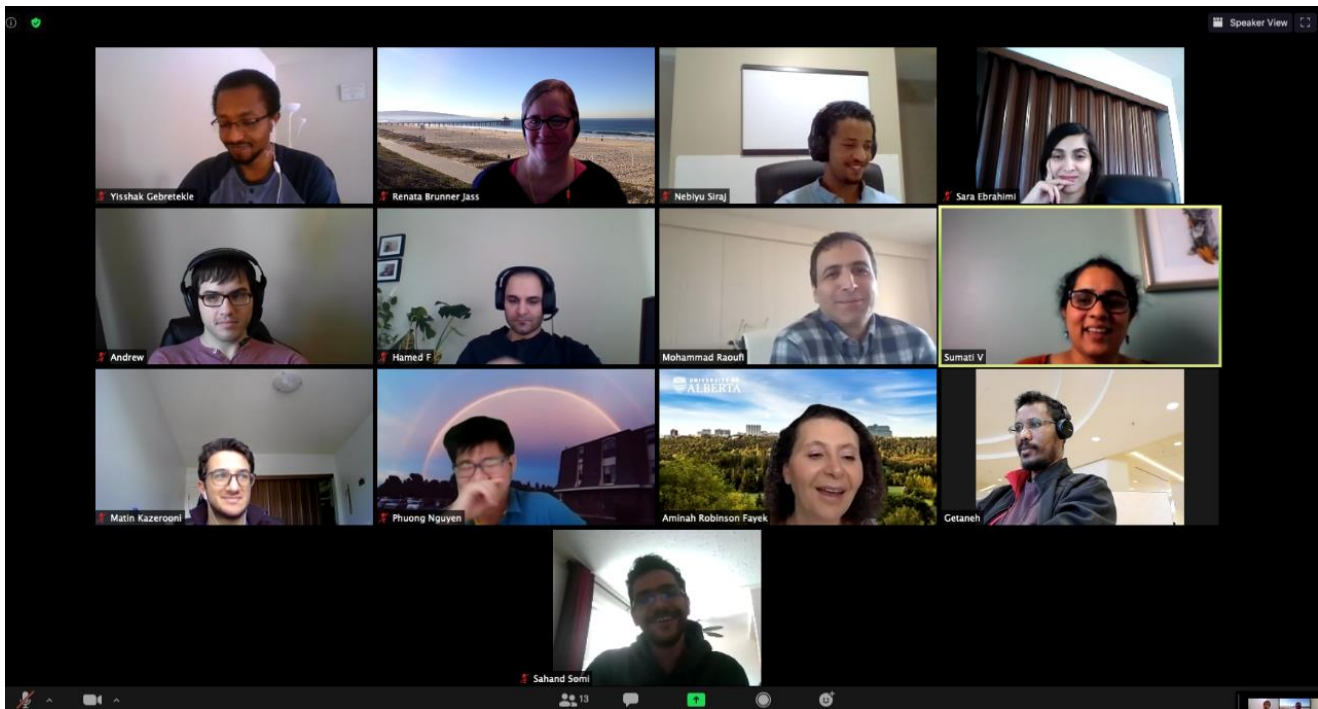
The IRC in SCMD is also investigating what construction organizations are doing now as well as planning for after the COVID-19 pandemic. This work examines the pandemic's impacts on the construction industry. In the first phase of this project, online meetings, webinars, workshops, literature, and other online sources were used to identify actions and policies that organizations have implemented or suggested, and a survey was circulated for feedback from experts about actions taken in the early pandemic stages. A second phase to this project has begun, for which the list of actions was updated and the survey was recirculated, to explore mid-pandemic actions. The actions undertaken by organizations, as identified in the surveys, will be evaluated for their effectiveness, with the goal of producing recommendations for ways that construction organizations may control and mitigate the effects of the COVID-19 pandemic.

Construction organizations, along with those in other economic and social sectors, are considering short-term as well as long-term effects of the pandemic on strategies, leadership, and economics. New operating modes may have some of the longest-term effects on the construction industry. It has been noted that in an already strongly health and safety-conscious industry, changes made for physical distancing and hygiene may result in cleaner, safer sites overall. Digitalization opportunities may increase communications within teams regarding the changing environment. In short, all that the industry is learning now will greatly increase its resilience in the event of future disruptive events such as pandemics. The IRC in SCMD continues to focus on pertinent, timely research areas and help build resources, shared knowledge, and resilience for the construction industry of Alberta and Canada.



Photo by [Jeriden Villegas](#) on Unsplash

Note: The IRC in SCMD originally published this article January 4, 2021, on Medium.



People

Goodbyes . . .

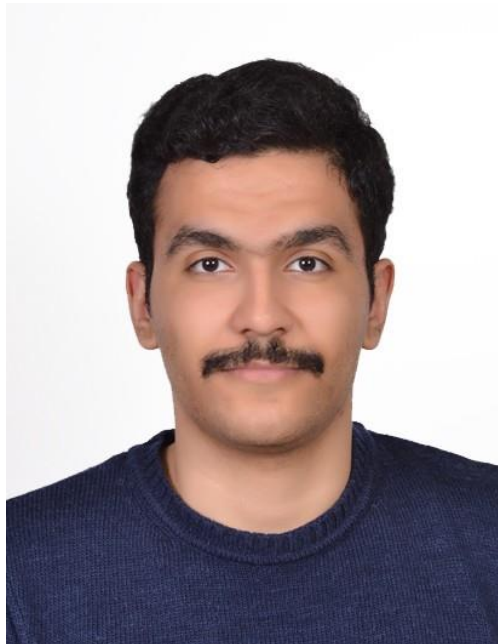
Please join the IRC in SCMD in congratulating **Dr. Nima Gerami Seresht** on his new position as Assistant Professor at Northumbria University in Newcastle upon Tyne, in the department of Mechanical and Construction Engineering. In his upcoming research projects, Dr. Gerami Seresht will focus on utilizing artificial intelligence and simulation techniques to increase the resiliency of urban infrastructure projects and to improve urban sustainability. He is looking forward to developing collaborative research projects internationally and to implementing his future developments in the real-world engineering practice.

The IRC in SCMD is pleased to congratulate **Daniel Kamau**, who completed his dual M.Eng. and MBA degrees in the spring of 2020.



Daniel Kamau

Congratulations to M.Sc. student **Sahand Somi**, who successfully defended his thesis in December 2020. We look forward to supporting him in his future endeavours.



Sahand Somi

The IRC in SCMD team has thanked **Sarah Miller**, who left the group early in 2020, for her great work and valuable contributions as Technical Writer for two and a half years.

. . . and Hellos!

Dr. Sumati Vuppuluri joined the IRC as a new Postdoctoral Fellow in January 2020. She is a computer scientist with extensive experience in applying artificial intelligence techniques. Sumati completed her Ph.D. from Dayalbagh Educational Institute, Agra, India, in 2017, for which she designed parallel interval type-2 neuro-fuzzy and evolutionary models and their applications. Dr. Sumati was awarded INSPIRE fellowship by the Department of Science & Technology (DST), Government of India. Her research interests include machine learning, deep neuro-fuzzy systems, data mining and statistical techniques, predictive analysis, and natural language processing.



Dr. Sumati Vuppuluri

Dr. Phuong Nguyen joined the IRC as a Postdoctoral Fellow in October 2020. Dr. Nguyen holds a Bachelor's in Civil Engineering from Vietnam National University, Ho Chi Minh City University of Technology, his M.Sc. in Construction Management from California State University, East Bay and his Ph.D. in Civil Engineering with a specialization in Construction Engineering and Management from Kansas University. Dr. Nguyen's research interests include project delivery and procurement methods, engineering decision-making under uncertainty, fuzzy logic, fuzzy cluster analysis, fuzzy pattern recognition, machine learning, and lean construction. Dr. Nguyen was selected as a scholar of the California State University Chancellor's Doctoral Incentive Program (CDIP).



Dr. Phuong Nguyen

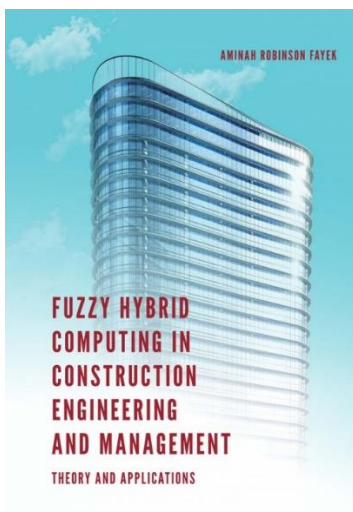
Renata Brunner Jass joined the IRC group as Technical Writer in April 2020. She brings to the group more than 20 years' experience in educational and academic publishing and communications, primarily developing STEM and English language learner content for educational, academic, and professional development publications in print and electronic media. Renata is happy to return to an academic setting and enjoys working with the IRC in SCMD team on their professional writing and communications.

Note: The IRC in SCMD originally published this article January 3, 2021, on Medium.

Recognition

In spring of this year, Dr. Aminah Robinson Fayek had the honour of being elected a Fellow of the Canadian Society for Civil Engineering (CSCE). On October 29, she also became an elected member of the U.S. National Academy of Construction (NAC). The IRC in SCMD team wishes Dr. Robinson Fayek continued success in 2021.

Dr. Mohammad Raoufi received a "Certificate of Recognition for Outstanding Contribution to ASCE Construction Research Congress 2020 in the role of Expert Peer-Reviewer" from ASCE CRC 2020 Conference Chair, Arizona State University, Tempe, Arizona, USA. Congratulations, Dr. Raoufi!



Fuzzy Hybrid Computing

In 2018, Emerald Publishing published *Fuzzy Hybrid Computing in Construction Engineering and Management: Theory and Applications*, an introduction to fuzzy logic and a survey of emerging research trends in the area of fuzzy hybrid computing techniques in the field of construction engineering and management, for which Dr Aminah Robinson Fayek served as editor. Click [here](#) to learn more.

Copyright © 2021

Industrial Research Chair in Strategic Construction Modeling and Delivery, All rights reserved.

Produced by Dr. Aminah Robinson Fayek and Renata M. Brunner Jass.

Department of Civil & Environmental Engineering

7-232 Donadeo Innovation Centre for Engineering

Edmonton, AB Canada T6G 1H9
