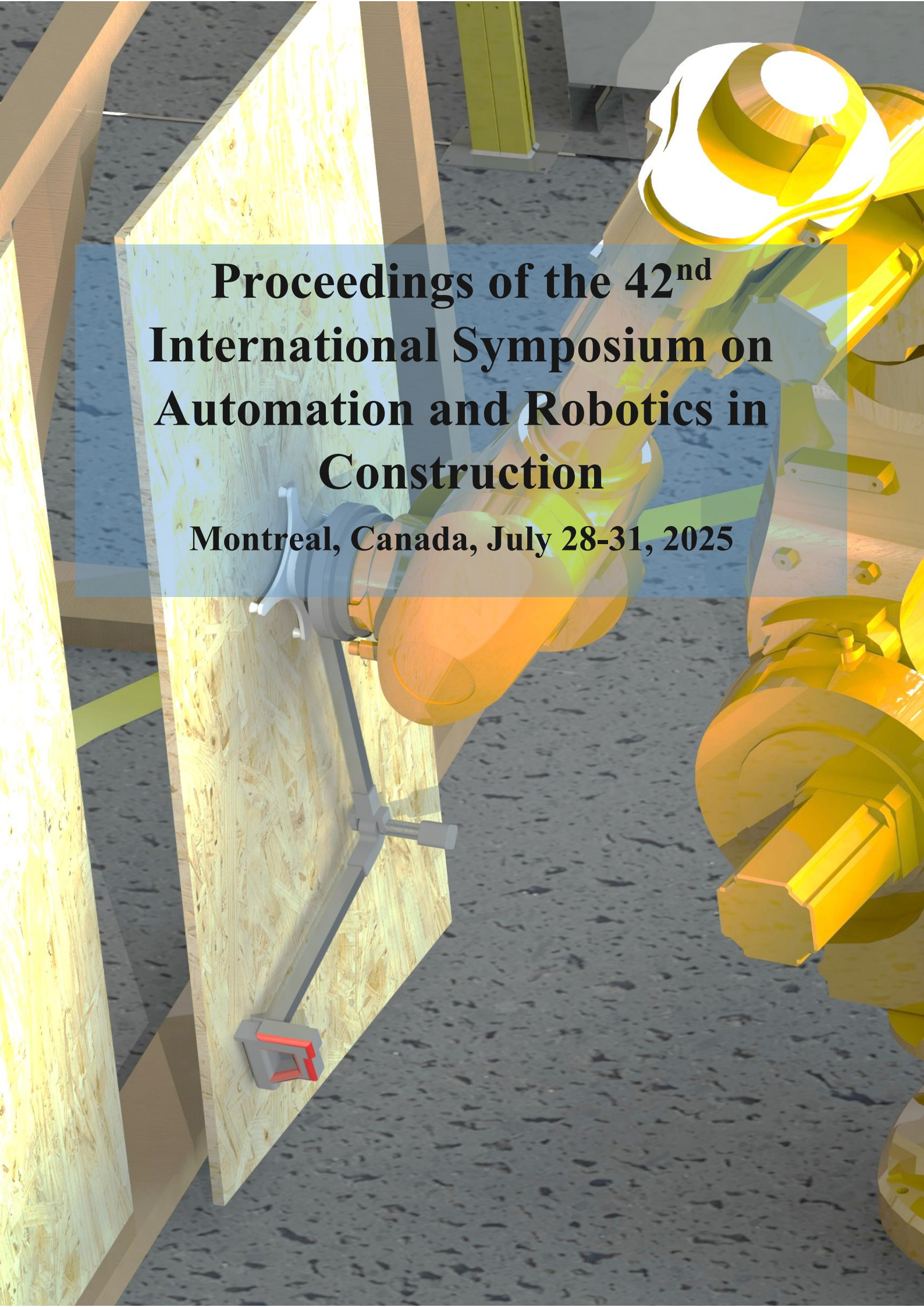

Proceedings of the 42nd International Symposium on Automation and Robotics in Construction

Montreal, Canada, July 28-31, 2025

Proceedings of the 42th International Symposium on Automation and Robotics in Construction

ISSN (for the proceedings series): 2413-5844

ISBN (for this issue of the proceeding series): 978-0-6458322-2-8.

The proceeding series is Scopus indexed.

Scopus®

All papers are available in the IAARC Website and presentations in the IAARC YouTube Channel

Cover design: Dax Pimentel, Mario Cervantes, Jiansong Zhang, Luis C Félix-Herrán; Image: Patented Robotic End-Effector for Placing and Fastening Paneling Material for Building Construction Operations Developed by the Automation and Intelligent Construction (AutoIC) Lab at Purdue University

Editorial Board

Local Organizing Committee

Amin Hammad, Concordia University (Chair)
Osama Moselhi, Concordia University (Honorary Chair)
Mohamed Al-Hussein, University of Alberta (Chair of MOC)
Mazdak Nik-Bakht, Concordia University (Chair of CSCE/CRC)
Ashutosh Bagchi, Concordia University
Po-Han Chen, Concordia University
Rebecca Dziedzic, Concordia University
Khaled Galal, Concordia University
Michel Guevremont, Hydro-Quebec
Sang Hyeok Han, Concordia University
Shahin Karimidorabati, Concordia University
Zhen Lei, University of New Brunswick
Jong Won Ma, Concordia University
Mohammed Mawlana, Thomas Jefferson University
Ali Motamedi, École de technologie supérieure
Fuzhan Nasiri, Concordia University
Sara Rankohi, Université du Québec à Montréal
Ahmed Soliman, Concordia University
Farid Vahdatikhaki, University of Twente
Cheng Zhang, Xi'an Jiaotong-Liverpool University
Sungkon Moon, Ajou University
Qian Chen, University of British Columbia
Gursans Guven Isin, University of Manitoba
Tadesse Zelele, University of Alberta
Fardin Bahreini, Concordia University
Golnaz Mirzaei, Concordia University
Shrouk Gharib, Concordia University
Azadeh Soofypour, Concordia University
Stéphanie Croteau, Hospitality Concordia
Joanie Boivin, Hospitality Concordia

Sponsors

PLATINUM SPONSOR

Hydro Québec

DIAMOND SPONSORS

HATCH

POMERLEAU

GOLD SPONSORS

CANAM Better Building Solutions

Volt-Age CONCORDIA

SILVER SPONSOR

Concordia 50

BRONZE SPONSORS

AECON

Fayolle

HORIZON LEGACY

BROCCOLINI

MONTRÉAL

GRIDD

APPLIED AI INSTITUTE CONCORDIA

Civil Engineering Sciences A SCIENCE PARTNER JOURNAL

Reviewers

Abdelmegid, Mohammed
Adil, Muhammad
Agrawal, Ashwin
Agrawal, Ajay Kumar
Akerele, Daniel Damilare
Al Farsi, Ghassan Ibrahim
AlBalkhy, Wassim
Albeaino, Gilles
Alduais, Mohammed
Alotaibi, Emran
Alwisy, Aladdin
Amburi, Sathwik
Anandh, K.S
Ang, Yu Qian
Arana, Maider
Ariyachandra, Mahendrini
Atencio Castillo, Edison
bae, juhyeon
Baek, Francis
Barkokebas, Beda
Bartels, Niels
Bhadaniya, Parth Kamalbhai
Bielski, Jessica (Julia)
Blankenbach, Jörg
Borjigin, Ori
Borrmann, Andre
Bosché, Frédéric
BouHatoum, Makram
Bruttini, Alessandro
Bugalia, Nikhil
Buswell, Richard
Cai, Hongjie
Cai, Jiannan
Cai, Weijia
Carbonari, Alessandro
Chang, Yuntsui
Chen, Po-Han
Chen, Shiqi
Chen, Jingdao
Chen, Zhengxing
Chen, Weiwei
Cheng, Chih-Shen
Cheng, Jiun-Yao
Chern, Wei-Chih
Cheung, Clara
Collins, Fiona
Cooperman, Alissa
Correa, Fabiano
Dan, Minghao
Devkota, Ajit
Ding, Shiqi
Ding, Yujie
Dong, Beixuan
Duan, Kangkang
DUCOULOMBIER, LAURE
Durmus, Dilan
Eiris, Ricardo
Elkabalawy, Moaaz
ElMenshawy, Mohamed Ezzat
Eskudero, Ibon
Esser, Sebastian
Fan, Chao
Fawad, Muhammad
Fleckenstein, Julia
Follini, Camilla
Forcael, Eric
Gao, Yuezhen
GAO, Maggie Y
García de Soto, Borja
Garcia-Lopez, Nelly
Gautam, Yogesh
Gholizadeh Lonbar, Ahmad
Gloser, Franz-Ferdinand
Görsch, Christopher
Graser, Konrad
Grzeszczyk, Grzegorz
Gu, Yueyan
Guo, Jingjing
Habibnezhad, Mahmoud
Hackl, Jürgen
Halder, Srijeet
Ham, Youngjib
Hammad, Amin
Han, Luxuan
Han, Wei
Hartmann, Timo
Hosny, Fatma
Hu, Rongbo
Hu, Yuqing
HU, Difeng
Huang, Lei
Huang, Yaojing
Hwang, Jeongbin
Iqbal, Imtiaz
Jäkel, Jan-Iwo
Jeelani, Idris
Jeon, Jungho
Jeong, Insoo
Jiang, Yishuo
Jipa, Andrei
Jung, Jaehoon
Jung, Wooyoung
Kalasapudi, Vamsi Sai
Kang, Kyubyung
Kastner, Fabian
Katooziani, Ali
Kentroti, Niki
Khoshkenar, Amin
Khoury, Hiam Mayez
Kim, Michael Young
Kim, Namgyun
Kim, Hayoung
Kim, Jeehoon
Kim, Jinwoo
Kim, Junghoon
Kim, Siyeon
Kim, Hongjo
Kim, Hyoungkwan
Kim, Juhyeon
Kim, Yeseul
König, Markus
Kravchenko, Ekaterina
Le, Thai-Hoa
Lee, Kyeongsuk
Lee, Meesung
Lee, Bogyeong
Lee, Dongmin
Lee, Gyueun
Lee, Jisang

Reviewers

Lee, Yongcheol
Li, Hang
Li, Kexin
Li, Shaobo
LI, Zirui
LI, Mingkai
Liang, Ci-Jyun
Liang, Houhao
lin, peng
Lin, Alexander
Lin, Jacob
Lin, Zhiyang
Liu, Canlong
Liu, Kexin
Liu, Liu
Liu, Yan
Liu, Danya
Liu, Yizhi
Liu, Meiyin
Louis, Joseph
Lozano Galant, José Antonio
Ma, Jong Won
Mao, Jiazhen
Mao, Zeyu
Martinez, Jhonattan
Mengiste, Eyob
Messi, Leonardo
Miller, Seirgei Rosario
Moon, Seonghyeon
Mostafa, Kareem
Mourgues, Claudio
Muñoz La Rivera, Felipe
Napps, Daniel
Nassereddine, Hala
Nguyen, Dac Hoang
Núñez Varillas, Christopher Joseph
Obaid, Lubna
Oh, Heung Jin
Ojha, Amit
Orlando, Vincenzo
Osorio Gómez, Cristian Camilo
Pal, Aritra
Pal, Aritra
Pan, Mi
Park, Sangyoon
Park, Somin
Park, Somin
Pauwels, Pieter
Pooladvand, Shiva
Prieto, Samuel A.
Proboste-Martinez, Mathias
Quan, Guan
Raphael, Benny
Raza, Muhammad Huzaifa
Reja, Varun Kumar
Ren, Tianyu
Reynoso, Hamlet
Sabek, Mohamed
Saffert, Anne-Sophie
Saleh, Amira
Sánchez Rivera, Omar Giovanny
Sati, Ala Saif Eldin
Senthilnathan, Shanmugaraj
Shamsollahi, Dena
Shayesteh, Shayan
Shi, Zhuoya
Shirazi, Amirpooya
Siegele, Dietmar
Sohn, John
Soman, Ranjith
Sonkor, Muammer Semih
Soonwook, Kwon
Stumm, Sven
Subrin, Kevin
Suen, Christine
Suh, Seungah
Sun, Yuan
Tan, Tan
Tariq, Muhammad Abu Bakar
tian, fenghua
Vielma, Juan
Walzer, Alexander N.
Wang, Qian
Wang, Xi
Wang, Mingzhu
Wang, Xin
Wei, Chialing
Wen, Jing
Wen, Leyang
Williams-Riquer, Francisco
Xiao, Jinwu
Xiao, Bo
Xu, Jiuyi
Xu, Ping
Xu, Xiaoxiao
Xu, Yifan
Xu, Liqun
Yang, Tao
Yang, Cheng-Hsuan
Yang, Xiaofei
Yantao, YU
YAO, DONGCHI
YE, Yang
Ye, Xuling
Yeum, Chul Min
Yeung, Timson
Yi, Wen
Yong, Gunwoo
Yu, Hongrui
Yu, Jingshuo
Zhang, Yuming
Zhang, Cheng
Zhang, Hao Xuan
Zhang, Haonan
Zhang, Haonan
Zhang, Zhen
Zhao, Shuxuan
Zhao, Xianxiang
Zhao, Xiayu
Zhou, Xiaoshan
Zhou, Shenghua
Zhou, Yuhan
Zhu, Jin
Zhu, Lei
Zhu, Aimin
Zhu, Aiyu
Zhu, Zixian
Zhuang, Dian
Zuo, Hui

Foreword

The International Association for Automation and Robotics in Construction (IAARC) and the Local Organizing Committee are pleased to present the Proceedings of the 42nd International Symposium on Automation and Robotics in Construction (ISARC 2025). This year's symposium draws inspiration from the vibrant spirit and cultural diversity of its host city—Montreal, an international hub of innovation and creativity. ISARC 2025 was held from July 28–31, 2025, proudly hosted by Concordia University.

The 42nd edition of ISARC demonstrated continued growth, with remarkable participation: a total of 272 papers were submitted, marking a 24% increase from the previous year. After a rigorous multi-step peer-review process, including a rebuttal phase, 211 papers (78% acceptance rate) were ultimately selected and included in the proceedings. In total, 1038 authors and co-authors representing 123 universities, research labs, departments, and companies from 27 countries/regions across Asia, Eurasia, the Middle East, North America, Oceania, South America, and Western Europe submitted their work.

The review process was strongly supported by an expanded and diverse group of 32 Area Chairs, representing institutions across various continents, including previously underrepresented regions such as South America and Oceania. Area Chairs actively coordinated the review efforts, providing critical insights across the eight technical areas of interest within IAARC, including "Decarbonizing the Construction Industry," a theme proposed by the Local Organizers. A total of 258 reviewers participated, providing 590 comprehensive reviews. Each submission received at least two reviews, with 77% of papers receiving two reviews, 22% receiving three reviews, and 1% undergoing four reviews.

Building upon the successful innovations introduced by the Technical Committees of previous years, this year’s Technical Committee solidified and integrated these advancements into ISARC’s curation process. The review procedure included pre-screening, two rounds of formal reviews, and a rebuttal phase, which have become fundamental elements within the ISARC review framework. This rigorous process was further structured and rubricated this year by enhanced guidance provided to Area Chairs and reviewers, including streamlined guideline documents, step-by-step cue cards, short instructional videos, systemized regular communication among editorial board members, and a tailored submission system.

The ISARC 2025 symposium featured three keynote presentations, eight plenary sessions, and 200 parallel and poster sessions. We hope you find this year's proceedings engaging and the included papers insightful and inspiring. Enjoy your reading!

Jiansong Zhang
Qian Chen
Gaang Lee
Vicente A. Gonzalez
Vineet R. Kamat

Table of Contents

K - Keynote talks

P - Plenary talks

A - Automated/robotic machines, devices, and end-effectors

C - Construction management techniques

D - Decarbonizing the Construction Industry

H - Human factors & human-system collaboration

I - Information modeling techniques

S - Sensing systems & data infrastructures

SB - Services and business applications / Industry & Short Papers

T - Technology management and innovation