

ISARC 2018 Berlin, Germany July 20-25, 2018

35th International
Hackathon and
Symposium on
Automation
and Robotics
in Construction



The Future of Building Things



<http://www.isarc2018.org>

Dear colleagues and friends,

We cordially invite you to attend the 2018 International Hackathon and Symposium on Construction and Robotics (ISARC). The Hackathon and ISARC 2018 will conjointly take place in Berlin, Germany, 20-25 July 2018. ISARC offers a unique program, comprising of state-of-the-art research and practices in construction including civil and building construction engineering and management, 3D reality capture (laser scanning, drones), augmented/virtual reality (AR/VR), building information modeling (BIM), machine automation, robotic applications to construction, internet-of-things (IoT), supply chain management, modularization, wearable and connected devices and many more fields.

Hackathon: July 20-22, 2018 at the TU Berlin
ISARC: July 22-25, 2018 at a Berlin conference center

We welcome quality submissions from academia and from industry on all areas of automation, robotics, sensing, computing, lean in the broader Architecture, Engineering, Construction, and Facilities Management (AEC/FM) industry. ISARC 2018 uses a simple submission system and peer-review stage. Attendance without contributing a paper to the proceedings is possible.

Aside cutting-edge demonstrations of technology and technical tours, ISARC 2018 is host of valuable workshops and an Industry Day which focuses on strategic themes of interest to our industry:

- **Automation and robotics applications to construction (e.g., 3D printing)**
- **Building Information Modeling (BIM)**
- **Lean Construction Management (LCM)**
- **Internet-of-Things (IoT, incl. sensors, cloud platform, apps),**

The ISARC 2018 brings together leaders from construction companies and software vendors, from design firms and academia, both experts and those just beginning their automation and robotic, BIM, Lean, IoT journeys. It provides exceptional learning and exchange values for a diverse audience including leaders in academic research, industry practice or start-ups, and to those individuals with novel ideas.

The ISARC 2018 value proposition for researchers and industry stems from the topics it presents. ISARC 2018 provides the following additional benefits:

- **Network among peers in academia and industry.**
- **Listen to invited keynotes and plenary sessions (per invitation only and based on scientific merit),**
- **Invited panel discussion on the future of automation and robotics construction “Today, in 2025, and beyond”,**
- **Best paper prizes in several award categories (academic and industry),**
- **Rigorous review process and fast track recommendations of selected and highly ranked papers for publication in special issues of related and highly ranked international journals,**
- **Open access proceedings, and**
- **DOI numbers for every paper.**

With your support and participation, we will make ISARC 2018 successful and remarkable! More importantly, you cannot miss the chance to explore and discover the capital of Germany, Berlin and its cultural as well as touristic highlights it is known of in the world.

We look forward to seeing you in Berlin!

Jochen Teizer, Markus König, and Timo Hartmann (ISARC 2018 General Chairs)



International Association for
Automation and Robotics in Construction

About the IAARC Community and Annual ISARC

IAARC is the world's leading network of professionals and researchers in architecture, engineering, construction, and facility management (AEC/FM) who feel that the practice, education, and research of automation and robotics in construction have to transform in order to respond to the world's existing and future challenges. What historically has been organized by leading academics around the world has turned in 1990 to the world's leading International Organization for Automation and Robotics in Construction (IAARC).

By then a number of international symposia had already been convened and since 1984 the International Symposium on Automation and Robotics in Construction (ISARC) is IAARC's annual flagship event where both practitioners and researchers, industry and academic leaders meet. While ISARC has steadily grown over the past years it has always been presaging most of the innovations that have prominently emerged in the construction and infrastructure industries. Topics including 3D reality capture (i.e., laser scanning, drones), augmented/mixed/virtual reality (AR/MR/VR), artificial intelligence (AI), information modeling, 3D printed, automated heavy equipment, lean construction, supply chain management, prefabrication, and modularization have all been researched under the IAARC umbrella.

While the IAARC members come from all over the world, most are from the various industry and academic sectors in construction. Their common tie is to work together to drive innovation in safety, productivity, efficiency, and quality performances in an industry often pointed to lag behind others. The proclaimed goal of IAARC is to improve processes and people in the construction industry by advancing research and education on technology and innovative practices.

Even IAARC's open source intellectual property (IP) approach is innovative. Over 4,500 ISARC proceedings are all freely available on the IAARC website (<http://www.iaarc.org>), with a new set added every year. Numerous innovations first researched within the IAARC community eventually emerged as commercial technologies, processes, and products, though in some cases it has taken decades. The recent uptake in interest of the AEC/FM community in transforming an entire industry through information and communication technologies (ICT) has considerably shortened the path of commercializing scientific research. Research-to-product (R2P) as well as rigorous prototype testing of integrated, practical, or operative solutions result in novel intellectual property (IP).

Other IAARC success stories involved innovative and forward thinking principles and methods like real-time automated material tracking, digital site layout planning, robotic platforms for automated assembly, human-machine interfaces, laser scanning for point cloud data acquisition and as-built modeling, internet-of-things (IoT), wearable sensing and actuation devices for safety and health monitoring, and many more. These are just a few of the topics that are presented at the annual ISARCs. Contributions of the most recent ISARC have proven that research and development on automation, robotic and digital technologies go hand-in-hand. They are about transforming the way we design, construct, or operate the built environment. It is therefore worth attending an ISARC where academic and industry leaders meet to bring much needed change to our industry! For more information, please visit <http://www.iaarc.org>.

Topics

Information Modeling

- Building information modeling
- 4D/nD modeling
- Ontologies for modeling and visualization
- Energy modelling & monitoring
- Data, information and knowledge management
- Model Based Management Tools & Systems
- IT supported architectural and engineering design
- Design and decision support systems
- 3D geographic information systems
- Modeling the physics of buildings and infrastructure

Data Sensing, Computing, and Visualization

- Data acquisition (handhelds, laser scanning, photo-/videogrammetry, unmanned aerial vehicles, drones)
- Data analysis (algorithms)
- Connectivity and storage (internet-of-things, cloud platform)
- Simulation in construction
- Situation awareness and sensing technologies
- Augmented/Mixed/Virtual Reality (AR,MR,VR)
- Autonomous agents in virtual and augmented environments
- Collaborative visual and augmented environments
- Interactive media environments
- Human-computer interaction in virtual environments
- Game engines and serious game applications
- Visualization and simulation techniques
- Visual pattern recognition technologies
- Mobile and wearable computing
- Communication and collaboration technologies
- Machine Learning
- Computer vision
- Artificial/computational intelligence

Education

- Education in construction automation and informatics
- Knowledge transfer, technology dissemination, and standardization
- Research methods in construction informatics

Automation and Robotics

- 3D printing (contour crafting)
- Material properties and characteristics
- Smart structures & data resilience
- Automated approaches in construction
- Automation and control

Human Resources and Environment

- People, culture, and change
- Risk management
- Human-machine interaction
- Safety, quality, and the environment
- Powered exoskeleton

Lean, Logistics, Prefabrication, and Modularization

- Systems engineering
- Product lifecycle management
- Product development & design management
- Product/process modeling and control
- Knowledge modeling and linked data
- Integrated process and product design
- Production system design
- Supply chain management
- Prefabrication and assembly / Modularization
- Enabling lean with IT / Lean theory
- Teaching lean
- Contract and cost management
- Sustainability and lean
- Constructability

Other related topics

- Managing IT strategies
- Intelligent transportation systems
- Smart structures & data resilience
- Energy modelling & monitoring
- Integrated IT throughout the life-cycle of the design, construction and occupancy of buildings and related facilities
- Collaborative learning platforms
- Information and communication technologies