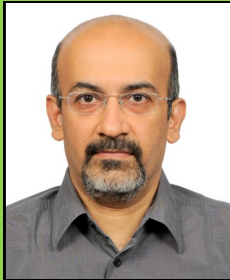




# IAARC NEWSLETTER

International Association for Automation and Robotics in Construction

Newsletter 2015



**Koshy Varghese**  
IAARC President

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## A Word from the IAARC President

Dear IAARC Members, Friends, and Colleagues,

The IAARC newsletter is released on an annual basis to capture some of our past events, achievements and also to provide a look ahead to our upcoming ISARC 2015.

About 150 participants and 136 presentations made the 2014 ISARC in Sydney, Australia, a huge success! More details on the Sydney ISARC can be found on Page 2.

In a few weeks the ISARC community will meet in Oulu, Finland, for our 32nd International Symposium on Automation and Robotics in Construction. Final reviews comments have been mailed to the authors. Final paper upload and early bird registration is now open. The organizers have done a great job in planning this event and we look forward to another successful ISARC in Oulu. More details about ISARC 2015 are on pages 3 and 4 of this newsletter.

Due to retirement and realignment of priorities, Dr. Ronie Navon requested to resign from the BOD after being an active member of IAARC for more than 25 years. During his term as IAARC President Ronie initiated significant changes which have resulted in a rapidly growing vibrant organization. For his sustained contributions to IAARC the BOD unanimously decided to invite him to become a honorary life member of the IAARC BOD. Ronie has accepted the invitation.

Pages 5 through 7 contain articles from Dr. Frédéric Bosché on comparing potential conference review systems and from Dr. Thomas Bock on activities at TUM including his recent publications on construction robotics.

Pages 8 to 10 present information on last year's paper award winners: the LIVE group at University of Michigan, Herriot Watt University and the BIM Lab at National Chiao Tung University, Taiwan.

More information about how you can connect with IAARC or participate at future ISARCs can be found on pages 11-13. Please take a look at page 14 if you need to contact key IAARC personnel. On behalf of the IAARC & ISARC community I would like to thank Dr. Jochen Teizer and Dr. Frédéric Bosché for compiling this newsletter.

Dr. Koshy Varghese  
President of IAARC

**ISARC2015**  
15-18 June 2015, Oulu, Finland

32nd International Symposium on  
Automation and Robotics in Construction and Mining

**Connected to the Future**

**REGISTER NOW for the 2015 ISARC @ <http://www.isarc2015.org>**

# Review of Last Year's ISARC 2014

Reported by Quang Ha, July 18, 2014

The 31st International Symposium on Automation and Robotics in Construction and Mining (ISARC 2014) in Sydney, Australia has been held from July 9th to 11th, at the Aerial Function Centre, the University of Technology, Sydney (UTS).

The theme the symposium covered was: Automation, Construction and Environment. Apart from addressing latest advances in automation and robotic technologies for construction, building and mining, ISARC 2014 had a specific focus on efficiency, productivity, quality, and reliability attributes of the construction/mining automation process and its interactions with the environment.



### SPONSORS:

The event was sponsored by:

- The New South Wales Government under its Research Attraction and Acceleration Program,
- The Australasian Joint Research Centre on Building Information Modelling at Curtin University,
- The Institute for Infrastructure Engineering at The University of Western Sydney, and
- The Faculty of Design Architecture & Building, Faculty of Engineering & IT at UTS, and IAARC.

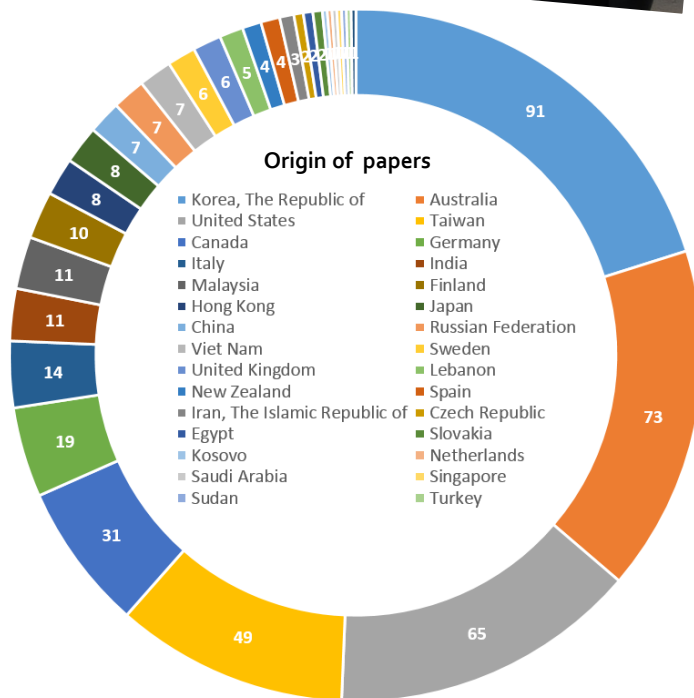
### TECHNICAL AND SOCIAL PROGRAM

The organizers of ISARC 2014 received a total of 230 abstract submissions from 33 countries, all of which have been peer-reviewed by international experts, track chairs and the program committee. These papers can be downloaded for free at <http://www.iaarc.org>.

With 136 papers being included for presentations, the ISARC2014 had an acceptance rate of approximately 60%. The Technical Program featured five keynotes, including the Tucker-Hasegawa speech, 5 invited papers, 30 parallel sessions, a workshop, and 2 research laboratory tours.

In addition to the Technical Program, ISARC2014 has a number of social programs, including Welcome Reception, Farewell Lunch, and Gala Dinner accompanied by a special concert, led by Guest Performers from The Australian National University and Bridgewater State University, USA, on the interrelation of science and technology with nature to illustrate the symposium theme via music.

The list of conference attendees showed 73 full registrations and 70 other participants (student registrations/day registrations/workshop registrations/partner attendees). The banquet attendance had around 150 people including delegates' partners and volunteers.





# Welcome to ISARC 2015 Oulu, Finland!

The International Symposium on Automation and Robotics in Construction and Mining (ISARC 2015) will be the 32nd Symposium, and will be held in Oulu, Finland, on June 15-18, 2015

Now it is the time to register to the Symposium via website [www.isarc2015.org](http://www.isarc2015.org)

## Program

### Confirmed keynote speakers



**Thomas Bock**  
Prof. Dr.-Ing./Univ.Tokio



**Stephen J Fraser**  
Senior Principal Research Scientist (Exploration & Mining Spatial Data Analyst)  
Mineral Resources Flagship  
Queensland Centre for Advanced Technologies



**Benefits of BIM and Automation Technologies in Construction Sites - Case Skanska**

**Ilkka Romo**  
MSc, Construction Tech.  
Vice President, R&D  
Skanska Finland



**Automation for Rapid Delivery for Metro Rail Projects**

**Koshy Vargese**  
Dr. Professor  
Building Technology & Construction Management  
Department of Civil Engineering  
Indian Institute of Technology Madras Chennai India

### Symposium presentations

Total number of 180 abstracts from 26 different countries were received. Full paper reviewing is now on its way and we expect to get a great number of quality papers to be presented at the Symposium. Detailed technical program will be updated to the website.

Symposium will include also Special ICT & Robotic Construction Industrial Workshop.

### Technical excursions

We will have four different technical excursions:

1. Yara Siilinjärvi Phosphate Mine
2. Outokumpu Chrome Kemi Mine
3. The best pieces of BIM based Building Construction of Skanska
4. The Most Advanced BIM based Automation in a major Railway Construction Project by Destia

Visit the website for more information about the excursions.

## Exhibition and Sponsorship Opportunities

There will be an exhibition during the symposium. We can also offer a lot of different opportunities for sponsorship. For more information contact the secretariat or visit the website. This is a unique opportunity to position your company and align your brand with an international convention.

## Social program

Symposium will held a great number of social events:

15th of June Get-together event at Oulu University  
16th of June City reception at Oulu City Hall  
16th of June Symposium dinner Uusi Seurahuone

Touristical excursion to Lapland to experience the midnight sun will also be organized.

## Finland, Oulu and Lapland

Finland is a land of interesting contrasts, such as the four seasons, the Midnight sun and the winter darkness, urban and rural, East and West.

Lively Oulu is a gateway to urban culture as well as the unique nature of the North. The city of Oulu, located on the shores of the Bay of Bothnia, in the Oulunjoki river delta, is the largest city in Northern Finland. This is where a modern business and tourism city meets northern peace and exoticism

Lapland's Dark Arctic winters have their counterpart in one of the most iconic of Finnish natural phenomena, the Midnight Sun. In the northernmost Finnish Lapland, the sun stays above the horizon for over 70 consecutive days.

## Contact

ISARC 2015 Scientific committee  
Prof. Rauno Heikkilä  
University of Oulu  
tel. +358 40 538 5840  
E-mail: rauno.heikkila@oulu.fi

ISARC 2015 Symposium Secretariat  
Ms. Kirsti Tikkanen  
Finnish Association of Civil Engineers RIL  
Tel. +358 40 7433474  
E-mail: kirsti.tikkanen@ril.fi







## Updates and News to IAARC Organization

### A Farewell Letter from Prof. Ronie Navon

Dear Mr. President, Professor Varghese,

After close to 25 years of serving as a member of the Board of Directors (BOD) and being the President of the International Association for Automation & Robotics in Construction (IAARC), I would like to resign for the following reasons:

- I am close to retirement.
- The forthcoming conference in Sydney will be the second consecutive meeting that I will not attend and I will attend less meetings in the future.
- I think that being a BOD member is not merely a status symbol, it is a commitment - as mentioned above, I'll be contributing less in the future.
- I was very successful in bringing young talented BOD members (one of whom is you) - I would like to give them the chance to build on our past achievements and push the organization forward.
- For the benefit of the young members I'll briefly mention that IAARC was conceived in 1989 and formed in 1991. It has become a brand name that many organizations want to be associated with.
- I promise to continue to support and help.

Best regards,

Ronie





## Updates and News to IAARC Organization

### Comparison of Conference Editorial Systems

provided by Frédéric Bosché

With a mandate from the IAARC Board of Directors, Frédéric Bosché has investigated several editorial systems for managing conference paper submissions. The objective of this BOD task was to provide an overview and then select one editorial system that is to be systematically used for all future ISARCs. This would save time to the organizers and enable authors and reviewers to get used to one system.

This assessment includes a review of the conference paper editorial systems used by past ISARC organizers and other popular conferences in our community.

- OpenConf (<http://www.openconf.com/>) is a conference submission and reviewing system that runs on a Apache/PHP/MySQL server (all free and uses very common technology). The system can be run on anyone's server.
- EasyChair (<http://www.easychair.org/>) is similar but is entirely run on the provider's server.
- Open Conference Systems (OCS) (<https://pkp.sfu.ca/ocs/>) is similar but is entirely run on anyone's server.

In brief, the table provided below shares some of the advantages and limitations of each system.

Functionality	Description	Importance	OpenConf	OpenConf	OCS	EasyChair	EasyChair								
Hosting + Price	Custom Submission Types	e.g. poster or paper			✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cost	Multiple File Upload Types	e.g. review file, copyright waiver, final paper. Access can also be controlled (who can view what)	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
Your Server	Assign Reviews		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Our Servers (SaaS)	Reviewer Bidding	Reviewers bid on submission types	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
Technical Support	Advocates (Champions)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Branding	Advocate Assign Reviews	Advocates can make review assignments	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
Submission	Conflict Detection (Auto & Manual)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
File Format	Reviewer File Uploads	In addition to web-based textboxes	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
Custom Topics	Review Scoring		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Submission Reports	Custom Review Forms	Selection of fields to be displayed	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Committee Discussion	Online discussions on papers	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Custom Acceptance	e.g. change "Accept" to "Accept as paper"	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓



At the past ISARC 2014, the investigation was presented, identifying 6 possible options (including letting each organizer decide). The table shown below summarizes the results of the anonymous vote by the Board members, from which the EasyChair system was selected. Furthermore, due to its attractive price and inclusion of technical support, the particular Executive Edition has been selected.

EasyChair will be first employed for ISARC 2016 (taking place at Auburn University, USA). As part of the newsletter, website, and editorial team, Frédéric Bosché will be the contact person for the IAARC Submission System, enabling the knowledge of ISARC organizers to be captured and transferred to future organizers. Finally, following each conference, feedback on the use of system by ISARC organizers and paper authors will be considered by the IAARC Board of Directors to inform further discussions on the suitability and value of the system.

OpenConf		Open Conference Systems (OCS) -- [Free]	EasyChair		None of the above (let each organizer decide)	No opinion
Community Edition	Professional Edition		Free Edition	Executive Edition		
2	3	5	4	4	3	1
5			8			





## Updates and News to IAARC Organization

### Prof. Dr.-Ing./Univ.Tokio Thomas Bock Publishes Cambridge Handbooks on Construction Robotics

*provided by Thomas Bock*

The Cambridge Handbooks on Construction Robotics series focuses on the implementation of automation and robot technology to renew the construction industry. Volumes 1 and 4 will be published by December 2014, with the other volumes soon to follow.

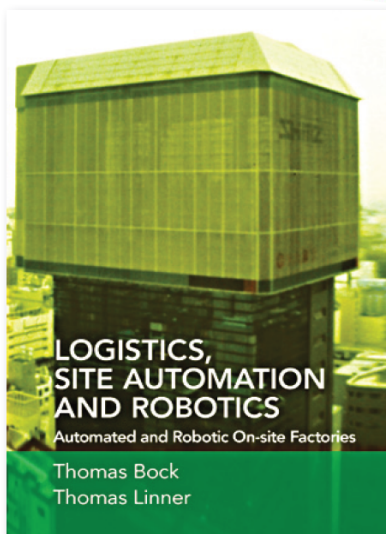
Volume 1: Robot-Oriented Design and Management introduces the design, innovation, and management methodologies that are key to the realization and implementation of the advanced concepts and technologies presented in the subsequent volumes.

Volume 2: Industrialized Customization in Architecture and Construction outlines technologies in building component manufacturing based on building materials and large-scale prefabrication holding the potential to deliver complex components and products which are introduced and discussed.

Volume 3: Single Task Construction Robots shows that single task construction robots can be used for a variety of tasks ranging from digging, facade painting, interior finishing to inspection, maintenance and deconstruction.

Volume 4: Logistics, Site Automation and Robotics extends the new technology of robotics in building-component manufacturing and construction introduced in earlier volumes to on-site structured environments and on-site automated factories. Click hereto learn more about this volume.

*TEDx Talk by Prof. Bock in Stuttgart, Germany in 2014*



Visit  
[www.cambridge.org/bock](http://www.cambridge.org/bock)  
for more information



## Updates and News to IAARC Organization

### 1984-2014: All ISARC Proceedings Now Online For Free!

Thanks to the efforts of Profs. Carl Haas and Koshy Varghese, the 1986 ISARC proceedings were found in a bookshop in Paris, scanned, and made available on the IAARC website. You can find access to all proceedings here: <http://www.iaarc.org/publications/search.php>



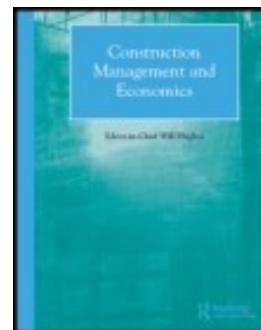
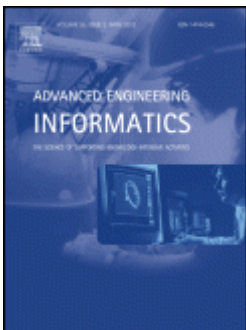
### Connect with IAARC via LinkedIn



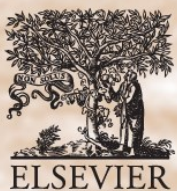
<https://www.linkedin.com/groups/IAARC-International-Association-Automation-Robotics-2794315/about>

### Contribute to the Next Newsletter!

Please submit your contribution to the next IAARC Newsletter to Dr. Jochen Teizer or Dr. Frederic Bosche, Editors of the ISARC Newsletter, E-Mail: [jochen@teizer.com](mailto:jochen@teizer.com) or [f.n.bosche@hw.ac.uk](mailto:f.n.bosche@hw.ac.uk)



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# Paper Award Winners at ISARC 2014

**Towards Autonomous Robotic In-Situ Assembly on Unstructured Construction Sites Using Monocular Vision**  
 Chen Feng, Yong Xiao, Aaron Willette, Wesley McGee and Vineet Kamat, University of Michigan, USA

**Controlling Slab Flatness Automatically using Laser Scanning and BIM**  
 Frederic Bosche and Emeline Guenet, Heriot-Watt University, UK

**Application of Building Information Modeling in Designing Fire Evacuation - A Case Study**  
 Kun-Chi Wang, Shih-Yu Shih, Wen-Shuo Chan, Wei-Chih Wang, Shih-Hsu Wang, Abdoul-Aziz Gansonre, Jang-Jeng Liu, Ming-Tsung Lee, Yuan-Yuan Cheng and Ming-Feng Yeh, National Chiao Tung University, Taiwan

## Highlights from Award Winners of ISARC 2014 (Part 1)



### LIVE Robotics Group, University of Michigan

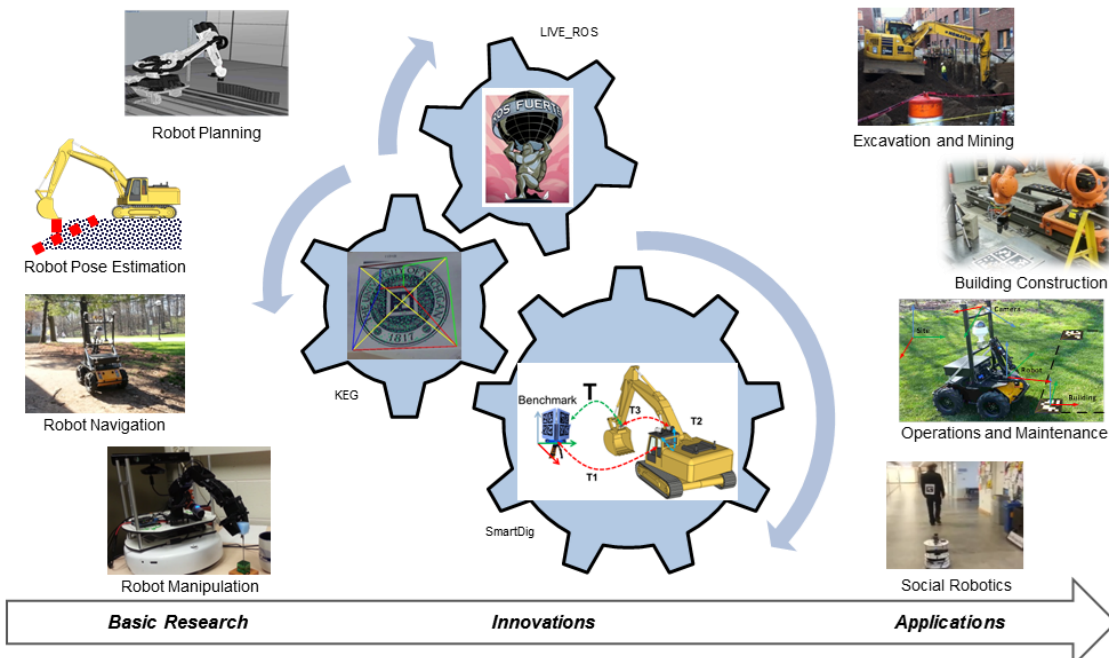
Director: Vineet R. Kamat, Ph.D., Associate Professor  
 Department of Civil and Environmental Engineering  
 Phone: (734) 764-4325 Email: vkamat@umich.edu

Research at the **LIVE Robotics Group** is focused on Automation and Robotics, and its applications in the construction, operation, and maintenance of civil infrastructure systems. LIVE is also conducting research in Real-Time Visualization and its applications in construction process monitoring and control.

LIVE research is supported by the US National Science Foundation (NSF), US National Institute of Standards and Technology (NIST), and the US Department of Transportation.

Please visit <http://pathfinder.engin.umich.edu>

LIVE is primarily interested in creating collaborative autonomous robots for construction, assembly, and maintenance in unstructured and evolving environments. Our research specifically focuses on finding solutions to the robot localization, pose estimation, and semantic object recognition problems. LIVE is part of the [Michigan Robotics Initiative](#) and also collaborates with the [Digital Fabrication Laboratory](#) at the University of Michigan.



# Highlights from Award Winners of ISARC 2014 (Part 2)



## Immersive and Controlled Environment (ICE) for construction training

R&D team: Dr Mohamed Abdel-Wahab (Co-PI), Dr Frédéric Bosché (Co-PI),  
Dr Ludovico Carozza (RA), and Dr Aparajithan Sivanathan (RA)



www.ice.hw.ac.uk

*"With construction strongly influencing the quality of the environment in which we all live and work, it is essential that developments taking shape on projects around the country are connected to the academic capability and innovation in our higher education sector as this will ensure that an innovative culture pervades our industry."*

Ed Monaghan, Chair of Construction Scotland

ICE applies and develops **cutting-edge technologies** for **enhancing construction manual trade training**. ICE will:

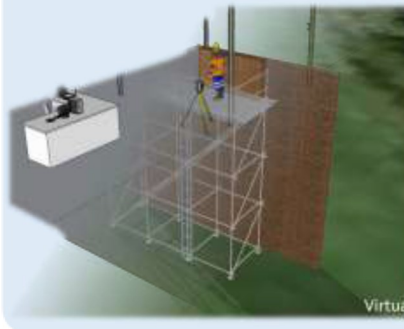
- Enable FE college students to **train in realistic site conditions without being exposed to health and safety risks**.
- Deliver **comprehensive, objective and quantitative feedback** to trainees with a view of benchmarking their performance against **health and safety, and productivity standards**.

### Immersive Environment – Augmented Reality

The Immersive Environment provides a **training system that combines features of an actual construction site and virtual serious gaming environments**.



The team is developing a state-of-the-art **Augmented Reality (AR)** technology enabling trainees to **conduct real tasks** (e.g. bricklaying) while feeling immersed in **realistic and challenging construction site environment**.



A demonstration of the initial system prototype took place at **Edinburgh College** where students were able to **experience sitting on a beam 100m above Philadelphia city centre!**



### Controlled Environment – Activity Tracking

The Controlled Environment aims to **track motion and other construction-related activities** (e.g. climbing a ladder) to deliver **continuous performance monitoring**, thereby supporting **life-long training for maintaining H&S and productivity performance**.

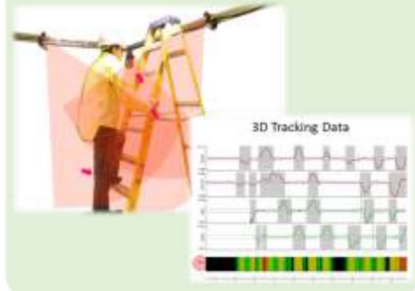


We are developing a state-of-the-art **wearable sensor network** system using **motion sensors** for automatically measuring performance and providing a **real-time feedback** to trainees.

- Sensors (inertial motion, etc.)
- Data storage
- Computing unit



As a proof of our concept, a **proxy system** employing infrared cameras demonstrated the **feasibility to identify unsafe ladder climbing** by tracking ankle and wrist motions.





## Highlights from Award Winners of ISARC 2014 (Part 3)

# BIM LAB

Department of Civil Engineering,  
National Chiao Tung University,  
Taiwan



**Professor of the  
Program of  
Construction  
Engineering and  
Management**

**Ph.D. of the University  
of California at  
Berkeley, USA**

The Building Information Model (BIM) lab of the Civil Engineering Department at National Chiao Tung University is located in Hsinchu, Taiwan. The lab includes Ph.D. and Master's students from a wide range of nations, including Taiwan (majority), Malaysia, Thailand, Burkina Faso and China. The lab is supervised by Professor Wei-Chih WANG whose expertise is in the construction management of high-tech facilities. Currently, the lab is focused on BIM-oriented topics and consulting projects concerned with cost control.

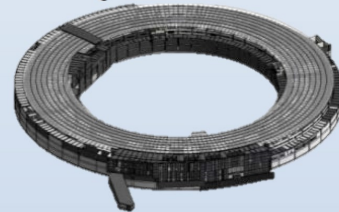


The lab's BIM-oriented studies include applying BIM to support fire prevention management and using BIM's quantity takeoffs to support construction management. In the fire prevention management research, a BIM model is used with FDS simulation software to evaluate whether building personnel can escape with sufficient time in case of a fire. Additionally, BIM's quantity takeoffs are extracted and used in cost estimation software to generate construction project budgets automatically, and to facilitate change order management and plot construction progress curves.



We are currently developing maintenance systems to support the management of operations at building facilities. One direction of research involves using mobile devices and a BIM model with cloud and augmented reality technology.

With respect to the cost control of consulting projects, the lab has been cooperating with consulting companies to assess reasonable engineering fees and develop coding systems for recording the man-hours of engineers.



Our lab actively cooperates with companies by regularly inviting outside speakers to give seminars, supporting students in summer internships at these companies, and collaborating in research projects. This practical training helps students to adapt quickly to their future careers.

The lab frequently participates in national contests in Taiwan. For instance, in 2013, we participated in a national competition to operate a cost estimating system. Of the 137 competing teams, we won the third place award. We also took part in the 2014 BIM applications contest in Taiwan and received an Honorable Mention.

Finally, we are delighted to have this opportunity to share our lab with the global readership of the IAARC Newsletter. National Chiao Tung University invites students from all over the world to join us.

## New Courses Offered at the IAARC Academy

Beginning in October 2011, the IAARC Academy has offered new courses focusing on automation and robotics in construction and building technologies for professionals of the construction and building industry, architects, civil engineers, mechanical engineers, electrical engineers, computer scientists, managers and health professionals.

### These courses may benefit if:

- You work as an onsite construction or precast concrete factory manager
- You want to modernize your construction company
- You want to develop new market niches
- You are interested in the development and application of frontier engineering and emerging technologies

### What you will learn:

These courses will show you how to rationalize and modernize your construction factories, your onsite processes and adjust existing buildings to new customer needs such as caused by demographic change.

The design philosophy will show you how to design for rationalization by automation and robotics, how to design the concepts in these courses are suitable for continuous customization and, therefore, are capable of providing solutions for the rapidly changing needs in the market. You can increase your competitiveness not only by improving efficiency, but by also developing new market opportunities.

For more information, visit the  
IAARC Academy website:

<http://www.iaarc-academy.com>



IAARC Academy 2014 Participants at the  
CIB W119 Conference  
(Proceedings are online at <http://www.iaarc.org>)

### IAARC courses:

- AIR—Ambient Innovation Robotics
- iCAR—Industrialized Customization in Architecture
- L/SAR—Logistics/Site Automation & Robotics
- SSR—Service Science & Robotics
- DCD—Demographic Change Design
- ROD—Robot Oriented Design
- iP1—Integrated Project 1
- IDS—Innovation Deployment Strategies
- iP2—Integrated Project 2
- Inc—Incubator







## International Association for Automation and Robotics in Construction



**IAARC is the only global organisation dedicated to the advancement of Automation and Robotics in Construction.**

### IAARC's objectives are:

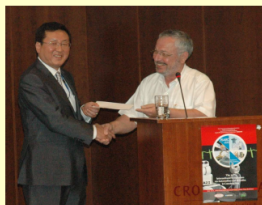
- To encourage, facilitate and promote the coordination of scientific and technical development in Automation and Robotics in Construction (ARC).
- To facilitate the collection, compilation, publication, exchange and dissemination of scientific ARC data and information.
- To encourage the execution of fundamental ARC studies, to advance research, laboratory investigations and field tests and to accelerate the use of ARC.
- To assist the end-user application of Automation and Robotics in the construction industry.



*Meeting of the Board of Directors*

### Some of the IAARC activities are:

- Organising the annual ISARC's
- Participation in the CIB IAARC W199 committee: Customised Industrial Construction
- A website [www.iaarc.org](http://www.iaarc.org) (with free access to all ISARC proceedings) and newsletter
- Conducting the IAARC-Academy



*Award ceremony*



*Innovation in Construction*

### IAARC members are from the following countries:

Spain, Sweden, Japan, USA, Republic of Korea, Poland, Canada, The Netherlands, Germany, Israel, Finland, India, Taiwan, Australia, Italy, Slovenia, Lithuania, Luxembourg, Nigeria, Kuwait, United Kingdom, Saudi Arabia, Egypt, China, Switzerland, Ecuador, Slovakia, Czech Republic, Greece, Portugal, Iran, Sri Lanka



*General session during the annual International Symposium on Automation and Robotics in Construction (ISARC)*

### Member benefits are:

- Participation in a network of world class construction technology innovators
- Participation in a community of scholars, researchers and industrialists
- Opportunities to meet and interact with fellow members
- Exchange of state of the art knowledge and ideas
- Benchmarks for research progress and quality
- Opportunities to initiate international research projects
- Opportunities to coach young people in an international environment
- Opportunities to publish in IAARC's international journal, AUTCON (Elsevier)
- Participation in the annual meetings (ISARC conferences)
- Active membership in community committees
- Influence on IAARC's objectives and its future direction
- Web links from the IAARC site to your own web site
- Discounts for IAARC-supported activities such as ISARC conferences
- Exhibition rights at the annual ISARC conferences

### The next ISARC will be in 2015:

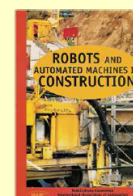
Oulu, Finland: <http://www.ril.fi/en/events/isarc2015/home.html>

### Membership:

Please see the IAARC website for more information to the membership: [http://www.iaarc.org/pe\\_membership.htm](http://www.iaarc.org/pe_membership.htm).



**AUTCON is encouraged by IAARC**



**Publication by IAARC**

**Corporation members:** Royal BAM Group, Swedish Construction Federation, National Institute of Standards and Technology NIST USA, Hyundai Engineering & Construction Group Korea, Hangil IT Korea

Cooperation with





## About IAARC and Contact Information

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- To assist the end-user application of automation and robotics in the construction industry.

### IAARC Contact Information:



#### IAARC President

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Chennai, India  
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#### IAARC Vice-President

Carl T. Haas  
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