IAARC NEWSLETTER

International Association for Automation and Robotics in Construction

Newsletter 2014

Koshy Varghese
IAARC President

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A Word from the IAARC President

Dear IAARC Members, Friends, and Colleagues,

Several hundreds of attendees made the 2013 ISARC in Montreal, Canada a great success. It was a quite novel ISARC since we had some contributions in topics such as mining and petroleum as well. You can read more about it in this newsletter.

I would like to invite you to register for the 31st International Symposium on Automation and Robotics in Construction (ISARC). The 31st ISARC will be held in Sydney, Australia. One of the special themes for this year's ISARC is the environment. Please find the latest information about ISARC 2014 on pages 2 to 3 of this newsletter. For more information, please visit the 2014 ISARC website at: http://www.isarc2014.org

Dr. Koshy Varghese
President of IAARC

REGISTER NOW for the 2014 ISARC !!!
July 9-11, 2014
Sydney, Australia

It's time to register for the ISARC 2014 in Sydney, Australia!

The 31st International Symposium on Automation and Robotics in Construction and Mining (ISARC 2014) will be held from July 9 to 11, 2014 in Sydney, Australia.

Prof. Quang Ha
Conference Chair

The ISARC was initiated in 1984 by a group who later founded the International Association for Automation and Robotics in Construction (IAARC) to address the needs and concerns of a global community in all fields of construction; including civil and building engineering, machine automation, robotics applications to construction, information technology innovations, planning, logistics, etc. The ISARC has been hosted in many countries and produced diverse refereed papers that have been published in proceedings worldwide.

The ISARC 2014 will be a prestigious gathering of researchers, academics and industry practitioners in all specialty areas related to the construction, mining and built infrastructure industry. Apart from addressing latest advances in automation and robotic technologies for construction, building and mining, field instrumentation and sensors, excavation and haulage, safety and protection, fleet management, and computer-aided process design and optimization, ISARC 2014 will focus on issues of efficiency, productivity, quality, and reliability in construction/mining automation and its interactions with the environment.

The organizing committee led by Prof. Quang Ha of the University of Technology, Sydney, is pleased to report some features about the 31st symposium.

- **PAPER REVIEW PROCESS:** The peer review process has been completed with notifications sent to authors.
- **STATISTICS:** The organizers have received 229 submissions from 33 countries. All papers have been reviewed by international experts, track chairs and ISARC2014 program committee. 153 papers were accepted with an acceptance rate of 67%, of which 141 submissions are for presentations and 12 for posters.
- **PROCEEDINGS:** Accepted submissions have been screened by using "turnitin" with an overlapping ratio less than 35% and will be published in the ISARC2014 Proceedings with an ISBN and in the digital format. The camera-ready paper template is available in both MS doc and LaTex.
- **PROGRAM:** The ISARC2014 technical program will be featuring six Keynotes including a Tucker-Hasegawa speech, 5 invited papers, around 30 parallel sessions on the ISARC2014 eight tracks, a workshop and two Lab tours. The workshop and lab tours are scheduled in the afternoon 11-JUL-2014.
- **GATHERINGS:** There will be a welcoming cocktail on 8-JUL (17.30-20.00). The gala dinner will be on THU 10-JUL (18.00-22.00) with a special concert on the theme "Music and the Nature". A farewell lunch is scheduled on 11-JUL (12.00-14.00) when announcements of upcoming ISARC's will be made.
- **BOARD OF DIRECTOR (BOD) MEETINGS:** There will be two BOD meetings on WED 9-JUL (17.00-19.00) and FRI 11-JUL (10.30-12.00).
- **PAPER AWARDS:** A number of nominated papers from Track Chairs are being evaluated. Awards will be announced in the Gala dinner.
- **REGISTRATION:** Please register/encourage registrations from your institutions well before the **early-bird deadline 05/23/2014**. Please register for ISARC 2014 at http://www.isarc2014.org.
- **TRAVEL:** July is a winter month in Australia but temperatures in Sydney are usually mild around that time and rarely drop below 5°C (41° F) with an average range of 8.0–16.3°C (46.4–61.3°F).

Please do not hesitate to contact us at isarc2014@gmail.com for further information or relevant matters.

The organizers hope you will find ISARC2014 a difference. Thank you for your support and looking forward to seeing you in Sydney soon!

Upcoming ISARC 2014 Keynotes

Tucker-Hasegawa Keynote: Construction Automation Needs and Challenges in Emerging Countries (Koshy Varghese)

Abstract: The need for automation has been driven by the shortage and rising costs of skilled workers. There has been a perception that in emerging countries such as India, the priority for automation is low due to the availability of skilled workers. However, the massive scale of infrastructure development planned in these nations for the next few years cannot be achieved without appropriate automation in all phases of a construction project. There are several cases where companies invest in automation technologies but don't get the benefit due to inappropriateness of the technology to local conditions. There are also cases where the automation strategy and implementation is carefully planned and results in immense benefits. This talk will present the needs, opportunities and challenges of construction automation in emerging nations requiring. Cases of implementing both process automation as well as field automation technologies will be presented and the lessons learned from these discussed.

Construction Technology Continuum: from Ancient History to Advanced Robotics (Mirosław Skibniewski)

Abstract: This presentation reviews major accomplishments in construction technologies dating back to iconic landmarks throughout the world built by ancient civilizations through the building achievements of modern ages all the way to the contemporary advanced construction robotics and allied IT solutions. The talk is richly illustrated by examples of ancient, contemporary and futuristic technical solutions related to buildings and other instances of built infrastructure.

Working towards sustainable energy production and use in Australia (Merched Azzi)

Abstract: Ensuring the availability of clean, abundant and affordable energy will play a key role in developing economic prosperity and enhanced environmental quality. Stringent environmental regulations and the proposed future limits on greenhouse gas emissions from fossil-fuelled power plants have played a key role in initiating new research opportunities to overcome these difficulties. Currently, efforts are being made by major research organisations to develop and demonstrate the availability of ultraclean, affordable fossil fuel energy technology that can be used to meet future requirements for energy production and use.

Future construction automation and robotic implementation (Thomas Bock)

Abstract: The historic development of the building industry shows that every innovation in construction technology needs at least one generation to establish itself – no matter how groundbreaking the first experiments or prototypes may have been. While early attempts by the building industry to use industrial materials and production methods have been accepted bit by bit (with all their pros and cons) and have subsequently changed the organisation of the construction site in the second half of the 20th century, it could now be assumed that the time has come for automation and robotics to establish itself in architecture at a larger scale.

The Challenges and Trends of Building Information Modelling (BIM) for Construction and Resources Sectors (Xiangyu Wang)

Abstract: Productivity is a comprehensive problem in many countries. Particularly in construction and resources sectors, continuously low productivity will potentially discourage future investments as constructing built assets is becoming more and more unaffordable and unsustainable. In recent years, Building Information Modelling (BIM) is becoming more active than ever. In order to fully realize what BIM is supposed to be, there has to be a series of mechanisms to properly adopt BIM for construction site daily use, although it has been widely used in the design and engineering phases. This keynote talk will focus on an angle of implementing BIM to enhance site productivity.

Towards Fully Robotic Tunnel Inspection and Maintenance (Carlos Balaguer)

Abstract: Tunnels environments are characterized by dust, humidity, and absence of natural light. Artificial and natural impacts, change in load criteria, or the simple effect of ageing, make tunnels require inspection and maintenance. These operations are commonly performed by human workers taking time and expertise without guarantee quality control. Robotic tunnel inspection and maintenance (RTIM) introduces high productivity, quality and repetitiveness. This paper describes the current trends in the subject, and introduces new technologies such as scenario modeling, robotic platforms, image and ultrasound sensors, control algorithms and decision making strategies. Additionally, the result of several recent and ongoing projects will be presented.

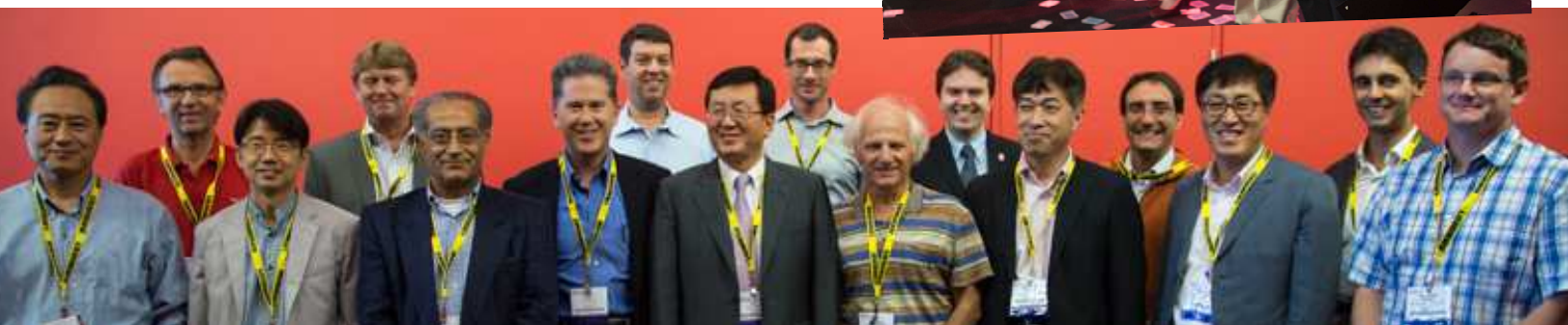
Review of ISARC 2013

The 30th International Symposium on Automation and Robotics in Construction and Mining (ISARC 2013) was held in Montreal, Canada. Please enjoy a review from Carl Haas, co-organizer of ISARC 2013 and currently vice-president of IAARC:

It was a great pleasure to welcome all 395 registered attendees to the 30th International Symposium on Automation and Robotics in Construction and Mining (ISARC 2013) to the beautiful city of Montreal, Canada. The ISARC was hosted in conjunction with the World Mining Congress. By joining the mining industry, ISARC 2013 was able to offer a combined program of mining and construction, so that we learned from each other and our respective communities. A very strong Technical Program was assembled under the expert leadership of several track chairs who are listed on the conference web site. Session chairs, together with the Technical Program Committee (from industry, academia, and government), undertook the difficult job of carefully evaluating the large number of submitted papers, considering the merits of each through detailed reviews and discussions at the Program Committee meetings, and selected a technical program of the highest caliber. We would like to thank all of the authors for submitting their work to the ISARC 2013. In addition, we were fortunate to have an outstanding slate of Keynote Speeches by leaders of the construction and mining industries, to whom we are extremely grateful.

The administration of the event and local arrangements for the Congress were handled with diligence and creativity by the staffs of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), who deserve great thanks for taking care of the incredible amount of details involved in a Congress of this size. The contributions and support of the President and secretariat of the International Association for Automation and Robotics in Construction (IAARC) were very much appreciated as well.

Of the 395 registered attendees, 120 were joint with the Mining Congress. The Mining Congress was several times larger that ISARC and had a very successful trade show with close to 300 exhibitors. Our ISARC sessions were very well attended, averaging about 40 people per session, and the quality of the presentations was excellent overall. Dr. Moon-Young Cho was given the Tucker-Hasegawa award. Dr Koshy Varghese took over as the President of IAARC, and Professor Jozef Gasperik from Slovakia is named the new Secretary of



Updates and News to IAARC Organization

1984-2013: 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**

Highlights from Award Winners of ISARC 2012 (Part 1)

Shape recognition with point clouds in rebars by K. Ishida, N. Kano and K. Kimoto

In this paper, the authors present an approach for recognizing rebar in point clouds acquired with a terrestrial laser scanner. The approach is able to recognize individual bars within a rebar cage or mesh, and divide point clouds on reinforcement bars into hoops and wall horizontal reinforcement bars. It is the first of its kind and has potential for use in rebar control.

The full paper is available on the IAARC website: http://www.iaarc.org/publications/fulltext/Shape_recognition_with_point_clouds_in_rebars.pdf

Contribute to this newsletter: Read your article here!

Please submit your contribution to the next IAARC Newsletter to Dr. Jochen Teizer or Frederic Bosche, Editors of the ISARC Newsletter, E-Mail: jteizer@web.de or f.n.bosche@hw.ac.uk

Submit your research articles to peer-reviewed academic journals !

Highlights from Award Winners of ISARC 2012 (Part 2)

Industrializing Building Construction and Building Healthier Communities

Mohamed Al-Hussein, PhD, PEng

Department of Civil & Environmental Engineering, University of Alberta, Alberta, Canada

Full paper location: http://www.iaarc.org/publications/fulltext/integrated_approach_for_older_adult_friendly_home_staircase_design.pdf

The objective of Dr. Mohamed Al-Hussein's research program at the University of Alberta is to support an industrialized (manufactured) construction process that reduces costs and construction time, while generating higher quality products, and creating healthier environments for workers and occupants. The current on-site stick-built construction process is hampered by inefficiency, material, process and energy waste, a large carbon footprint (CO2 emissions), and detrimental health outcomes for workers and building occupants. The stick-built process also limits opportunities for productivity innovations, due to the efficiency and quality of the construction practice being contingent on the ability of discipline-specific professionals to communicate information and knowledge.

Dr. Al-Hussein's research program coordinates interdisciplinary knowledge that capitalizes on a manufacturing approach in order to improve design and construction methods. A number of entities stand to benefit from this research including owners (private and public sector), institutions (schools and hospitals), general contractors, and architectural/engineering organizations. The program applies research on using prefabricated building components as an off-site alternative to the conventional on-site stick-built construction process.

Dr. Mohamed Al-Hussein capitalizes on his past record and expertise to carry out the research program's activities. The research objective is to establish novel solutions for standardized best-practices, thereby allowing industry to participate profitably in new markets without fearing the myriad of technical challenges.

In line with this research objective, Dr. Al-Hussein currently holds an NSERC Industrial Research Chair (IRC) in the Industrialization of Building Construction. The IRC program aims to improve existing technologies and manufacturing techniques through increasing the productivity and flexibility of the manufacturing system, automating design and drafting for manufacturing (DDFM), developing mathematical algorithms to optimize materials and minimize waste, quantifying and minimizing the environmental footprint of the construction process, assessing ergonomic and physical demand of construction activities on workers and building occupants, and uniting these research areas into a Building Information Model (BIM).

Due to the unique nature of this IRC program, this research has garnered the support of a diverse group of industrial partners, including manufacturers, contractors, institutions (municipal, provincial, school board), and specialized building system companies (precast and doors and windows). Through collaborating with these partners, Dr. Al-Hussein aims to contribute to the growth of Canada's construction industry by producing well-educated highly-qualified personnel (HQP), researching technical issues of strategic importance to Canada, and supporting the professional development of practicing engineers.

An innovative and advanced technology for a more efficient, productive and healthier construction process can be achieved through the success of Dr. Mohamed Al-Hussein's research program. As chair holder, Dr. Al-Hussein supports the development of innovative construction methods and acts as a hub uniting the Architecture, Engineering, and Construction (AEC) industries in their aims of industrializing building construction.

Fig.1. Modular building construction using mobile crane

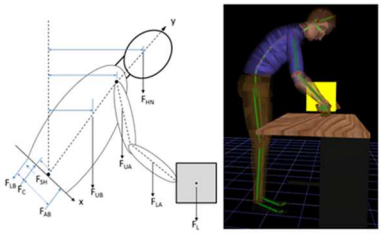


Fig.2. Human model-system geometry and forces

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.

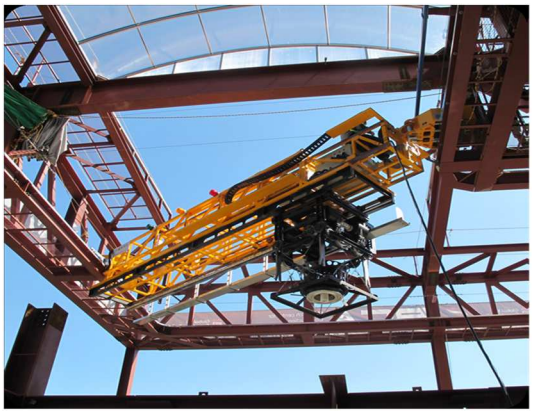
The design philosophy will show you how to design for rationalization by automation and robotics, how to design the concepts in these courses are suitable for continuous customization and, therefore, are capable of providing solutions for the rapidly changing needs in the market. You can increase your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

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

For more information, visit the IAARC Academy website:

http://www.iaarc-academy.com



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** (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)

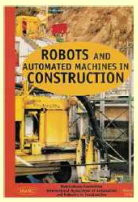
Member benefits are:

- 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.

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

General Secretary IAARC: Jozef Gasparik - Slovak University of Technology in Bratislava - Faculty of Civil Engineering - Radlinského 11 - 813 68 Bratislava - SK-Slovakia - E-Mail: secretariat@iaarc.org or jozef.gasparik@stuba.sk

About IAARC and Contact Information

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