A Conference on the Future of Advanced Robotic Design

Wednesday June 14th
Thursday June 15th, 2017
Donald Gordon Conference Centre,
Queen’s University,
Kingston, Ontario
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Built By Bots

A Conference on the Future of Advanced Robotic Design

This conference will bring together researchers working on the foundations of robotics, robotic applications, artificial intelligence, autonomy, and analysis of robotic systems.

The conference will be single track to allow participants an opportunity to see the best research in all areas of robotics. Attendees will also have a major opportunity to reflect on our achievements in different fields and to identify challenges for the future.
Welcome

Hello to our delegates.

It is my very great pleasure to extend a warm welcome to all of you attending the 3rd Annual Name of your Conference, a conference on the future advanced robotic design.

Hosted by Queen's University and NSERC Canadian Field Robotics Network (NCFRN), this is the largest conference of its kind in Ontario, and we deeply appreciate that so many of you have found it worthwhile and important to keep coming back year after year.

We gather for an interactive, two-day session with a community of over 200 engineers, manufacturers, designers, inventors, policy-makers, and technology-minded people who are interested in supporting and learning about the rapidly advancing and innovative technologies, and ethical conversations emerging from the world of robotic design. We’ll share new research and learn how to train for, or evaluate designs, technologies, and applications for advanced robotic design.

Whether this is your first conference or you’ve attended all three, I urge you to take every opportunity to see, hear and engage with each of our amazing speakers and to connect with other delegates who make up this thriving community.

Enjoy the conference!

Gregory Dudak
Scientific Director, NCFRN
Schedule

Day 1

Wednesday | June 14

From **8:15 am** Registration Tea/Coffee

**9:00 am**
Welcome and Opening Remarks by J. Ackermann

**9:30 am**
Design of Legged Robotics, Artificial Muscles and Feet
by Dr. Morgan Smith

**10:45 am** Morning Coffee

**11:00 am**
Outdoor Obstacle Detection by Sharon Niasmith

**12:30 pm** Lunch

**3:15 pm** Afternoon Coffee

**3:30 pm**
Computer Vision and Perceptual Organization, by John Whitelegg

**5:00 pm** Questions and Review

**5:15 pm** Close

**7:00 pm** Pre-Dinner Refreshments

**8:00 pm** Conference Dinner
# Day 2

## Thursday | June 15

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Dr. Morgan Swift

His research work started in 1975, with the design and the realization of the control system of the experimental SUPER SIGMA robot, which was the first application of a multi-microprocessor system to control an industrial robot. The result of this activity was an extremely flexible and cost-effective system. He was also involved in several other researches in the field of robotics, among which vision systems, robot programming languages, etc. His research activity is now particularly oriented towards the study of systems for land mines detection.

Design of Legged Robotics, Artificial Muscles and Feet

Dr. Mogan Swift explains The Shadow Project, an independent robotics research group co-founded with Richard Greenhill in 1987. The purpose of the Shadow Project is the design of the domestic android. In the course of this research, it has developed certain interesting technologies for actuation, sensing and control. The particular piece of technology this report describes is the Air Muscle.
Sharon Nasmith received her Master's degree in Mathematics from Warsaw University in 1980, and her Ph.D. and Rehabilitation degrees in Mathematics from the School of Economics in 1978 and 1986 respectively. She is a Professor of Mathematics at the University of Kansas. Her research interests are primarily in stochastic adaptive control and Mathematics and Science education. She has held visiting appointments in Poland, Hungary, Czech Republic, France, Italy, Japan and China. Dr. Pasik-Duncan has been actively involved in the IEEE Control Systems Society (CSS) in a number of capacities.

Outdoor Obstacle Detection
Sharon Niasmith is developing prototype approaches to advance outdoor obstacle detection for robotic systems and enable higher levels of autonomous mobility needed for FCS operations. PerceptOR is designed to push the state-of-the-art in perception under real world conditions. Perception algorithms utilizing both on board and overhead sensor data are expected to yield significant improvements in obstacle avoidance, especially for off-road or complex urban conditions.
John Whitelegg helped develop one of the first remote-laboratories for control engineering education from 2004 through 2008, with support of the National Science Foundation and the GE Foundation, demonstrated at Supercomputing 1996. She has published in IEEE Transactions on Education (August 2006) and in the Frontiers in Education Conference (October 2010).

Computer Vision and Perceptual Organization
John Whitelegg outlines the importance of perceptual organization (PO) in human vision cannot be overestimated; it imparts both efficiency and robustness to the visual process. Since early demonstrations in the 1980s underscored its usefulness in object recognition, the computer vision community has seen various applications of PO in artificial vision systems such as in stereo matching, model indexing and contour completion.
Maurice Schidley

Maurice Schidley is Professor Emeritus at the University of Technology, Sydney. Maurice has a long standing research interest in the design of knowledge-based systems. During 1997 he developed an interest in multi-agent systems. He presently retains both of these interests. The focus of his research on knowledge-based systems has been on the preservation of system integrity.

**Flocking of Multi-agent Systems**

Maurice Schidley defines the exact nature of the agents is a matter of some controversy. They are sometimes claimed to be autonomous. For example a household floor cleaning robot can be autonomous in that it is dependent on a human operator only to start it up. On the other hand, in practice, all agents are under active human supervision. Furthermore, the more important the activities of the agent are to humans, the more supervision that they receive. In fact, autonomy is seldom desired.
Deirdre Walinksky received the B. S. and M. S. degrees from University of Science and Technology of China in 1982 and 1984 respectively, and the Ph. D degree from University of Southern California, Los Angeles, U. S. A. in 1989, all in Electrical Engineering. From 1989-1993, she was an assistant professor in Electrical and Computer Engineering Department, Wayne State University. In 1993, she joined Ford Research Laboratory where she is currently working in the Power train Control Systems Department as a senior technical specialist.

**Multi-modal Sensor Fusion in Man and Machine**

Derdrie Walinksky outlines that during face to face communication, it has been suggested that as much as 70% of what people communicate when talking directly with others is through para-language involving multiple modalities combined together. Research on sensory acquisition and interpretation of single modalities of human expressions have seen ongoing progress over the last decade.
Aerospace Center in Oberpfaffenhofen, Germany, where he was director of the Institute of Robotics and Mechatronics from 1984 to his retirement in 2009. He has attracted to the institute and supported such well known members of the international control and dynamics community as G. Hirzinger, W. Kortüm, G. Grübel, R. Schwertassek, K. Well (now Stuttgart) and G. Kreisselmeier (now Kassel). Together with them he has initiated and guided many applied research projects which include robust autopilots, modeling and control of trains, maglev vehicles and automobiles.

Creating Robotic Humanoids
J. Ackermann describes how robots are working all over the world almost every day to make the lives of humans easier. Since the advent of microprocessors and computers, the possibilities for Robots to improve our civilization are that much more. Simple domestic robots are finding their way onto the market to relieve us of tedious tasks. This is sure to mean more complex robots will be designed and become cheaper, to in turn, free humans from everyday chores.
Thank You Sponsors

NSERC CANADIAN FIELD ROBOTICS NETWORK
NSERC Canadian Field Robotics Network (NCFRN) brings together academic, government, and industrial researchers in the area of field robotics, to develop the science and technologies to eventually allow teams of heterogeneous robots (on land, in the air, on the surface of or under water) to work collaboratively in outdoor environments, and to communicate critical information to humans who operate them or use them.

The NCFRN provides the national framework for 11 researchers from 8 renowned Canadian universities as well as 10 industrial partners and 3 government agencies to combine their skills and expertise.

CANADIAN ARTIFICIAL INTELLIGENCE ASSOCIATION
The Canadian Artificial Intelligence Association (CAIAC) has mission to foster excellence and leadership in research, development and education in Canada’s artificial intelligence community by facilitating the exchange of knowledge through various media and venues. CAIAC is the official arm of the AAAI in Canada. CAIAC exists for the promotion of interest and activity in AI.

CAIAC conducts workshops, conferences and sponsors the journal Computational Intelligence. In the past it also published a magazine, Canadian AI/IA au Canada Magazine.

QUEEN’S UNIVERSITY
Established in 1841, Queen’s offers a trans-formative student learning experience and is one of Canada’s leading research-intensive universities.

Securing safe and successful societies in the 21st century and beyond is a defining component of our research focus. Scholars from a range of sub-disciplines at Queen’s study the methods and outcomes of efforts to secure human, financial, political, and physical assets.

Internet and communications developments also bring risks and opportunities. Our researchers frame how these events will affect both individuals and society.
Save The Date

Built By Bots

The 4th annual conference on the future of advanced robotic design will take place on WEDNESDAY, JUNE 13 and THURSDAY JUNE 14th, 2018 at the Donald Gordon Conference Centre, Queen's University, in Kingston Ontario.

Visit www.BuiltByBots.com for more details and to subscribe to the conference newsletter.