

◆ Message from ICRoM 2017 Chairs



Prof. Hassan Zohoor



Prof. S. Ali A. Moosavian

The 5th International Conference on Robotics and Mechatronics (ICRoM 2017) organized by the Robotics Society of Iran (RSI) is a unique opportunity to bring the relevant communities together, to exchange ideas and to create fruitful connections between active researchers and industrial professionals in these fields. Some internationally recognized experts have been invited to deliver keynote speeches in this conference in order to consolidate the state of the art advancement in key areas of robotics and mechatronics.

ICRoM 2017 covers a vast spectrum of themes in the Robotics and Mechatronics fields, including Actuators, Automation, Bio-Inspired Robots, Calibration, Cognitive Robotics, Cooperation and Coordination, Design and Optimization, Drivers, Embedded Systems, Field Instruments, Field Robotics, Flying Robots, Haptics, Humanoids, Identification, Industrial Robots, Intelligent Robots, Kinematics and Dynamics, Learning Robots, Machine Vision, Measurement Systems, Mechatronics Systems, MEMS/NEMS, Micro- and Nano-Robots, Mobile and Legged Robots, Motion and Force Control, Motion Planning, Object Manipulation, Opto-Mechatronics, Parallel Manipulators, Probabilistic Robotics, Reconfigurable Robots, Rehabilitation, Sensors, Serial Manipulators, Service Robotics, Speech Recognition, Tele-robotics, Tele-surgery, Trajectory Generation, Underwater Robots, Visual Servoing, Workspace Analysis, and new and emerging frontier fields of advanced intelligent robotics and mechatronics. ICRoM 2017 received 182 paper submissions. The reviews were carried out by the Conference Program Committee, which involved 12 associate editors and about 500 reviewers coordinated by the Steering Committee. Each paper underwent at least two quality reviews, and based on the associate editors recommendations, finally 55 papers were selected for oral presentation organized in 13 sessions in five parallel tracks, and 66 papers for poster presentation. Moreover, there are special tracks at the ICRoM 2017, including creativity exhibition and robotic contest roundtable and an industrial panel, which are aimed to further boost up dissemination of robotic solutions into the industry and service sectors of the country. Moreover, two technical workshop is organized to be presented by the leading international researchers in the field of robotics.

We are glad to announce that all accepted papers of ICRoM 2017 will be submitted for indexing into IEEE Xplore, and some selected and high quality papers will be submitted to the International Journal of Robotics, and Scientia Iranica journal for fast track review and publication. We would like to take this opportunity to express our thanks and appreciations to all the members of the steering, executive, and scientific committees for the effort they devoted to the program and organization of this conference. Our special thanks go to the volunteers and secretarial staffs for the long hours and hard work they have generously given to the conference. Above all, ICRoM 2017 is the result of its technical contributions, and we would like to thank all the authors, reviewers, speakers, and participants for taking part in and contributing to this conference. We warmly welcome you to ICRoM 2017 and look forward to having a vibrant scientific event!

Prof. Hassan Zohoor
Chair of Robotics Society of Iran

Prof. S. Ali A. Moosavian
General Chair, ICRoM 2017

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◆ Keynote Speakers



Prof. Mahdi Tavakoli

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Biography:

Mahdi Tavakoli is a Professor in the Department of Electrical and Computer Engineering, University of Alberta, Canada. He received his BSc and MSc degrees in Electrical Engineering from Ferdowsi University and K.N. Toosi University, Iran, in 1996 and 1999, respectively. He received his PhD degree in Electrical and Computer Engineering from the University of Western Ontario, Canada, in 2005. In 2006, he was a post-doctoral researcher at Canadian Surgical Technologies and Advanced Robotics (CSTAR), Canada. In 2007-2008, he was an NSERC Post-Doctoral Fellow at Harvard University, USA. Dr. Tavakoli's research interests broadly involve the areas of robotics and systems control. Specifically, his research focuses on haptics and teleoperation control, medical robotics, and image-guided surgery. Dr. Tavakoli is the lead author of Haptics for Teleoperated Surgical Robotic Systems (World Scientific, 2008).

Speech : Closed-loop Control for Improving Needle Steering in Soft Tissue

This presentation will demonstrate the potentials of robotics technologies for improving healthcare by enhancing needle-based surgeries and therapies. In permanent implant brachytherapy, needles loaded with radioactive seeds are used to reach planned locations in the prostate, where the seeds are deployed. Accurate seed placement is a key factor that influences the effectiveness of the procedure. However, current manual techniques can place seeds with an accuracy of only about 5 mm, which is a substantial error given the average prostate size. We will discuss mechatronic technologies for precisely steering a needle towards its intended location using feedback control. Closed-loop control of needle in tissue is challenging due to measurement errors, unmodelled dynamics created by tissue heterogeneity and motion of targets within the tissue, only to name a few. We will review recent progress made in this area including modelling needle-tissue interaction, sensing needle deflection, and controlling the needle trajectory.

◆ Workshops

Workshop 1:

Deep Learning for Self-Driving Cars

Tuesday October 24, 8:00 – 17:00



Prof. Hamid Taghirad[†]



Dr. Alireza Norouzzadeh Ravari[‡]

[†]Professor of Electrical Engineering, Director of the Advanced Robotics and Automated System (ARAS), K. N. Toosi University of Technology, Tehran, Iran.

[‡]Director of ARAS Autonomous Robotics Group, K. N. Toosi University of Technology, Tehran, Iran.

Workshop 2:

Cooperative Control in Aerospace Systems

Tuesday October 24, 14:00 – 18:00



Dr. Farzaneh Abdollahi



Dr. Hamed Rezaee

Department of Electrical Engineering , Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran.

◆ Industrial and Creativity Roundtables

Industrial Roundtable 1

IOT in Mechatronics, Robotics and other Industries: Outcomes and Future Horizons

Wednesday October 25, 17:00 – 19:00

Participants:

Dr. Mohammad Mohammadi Moghaddam, Prof. Aryia Alasti, Mr. Asghar Barezi

Presenters:

Dr. Pedram Ataee, University of British Columbia, and specialist in IOT Industrial Technology
Mr. Sadegh Salahshoor, Specialist Presidency Center for Innovation and Technology Cooperation (CITC)
Dr. Seyed Farhang Fasihi: Vice President of Presidency Center for Innovation and Development Fund
Mr. Rasool Raeisi Ardali, Founder and Technical manager of Rizsasegan Takin Co.
Ms. Maryam Rastegar, Mechatronics and Robotics expert Qeshm Voltage Electrical and Electronic Engineering Co.

Creativity Roundtable 2

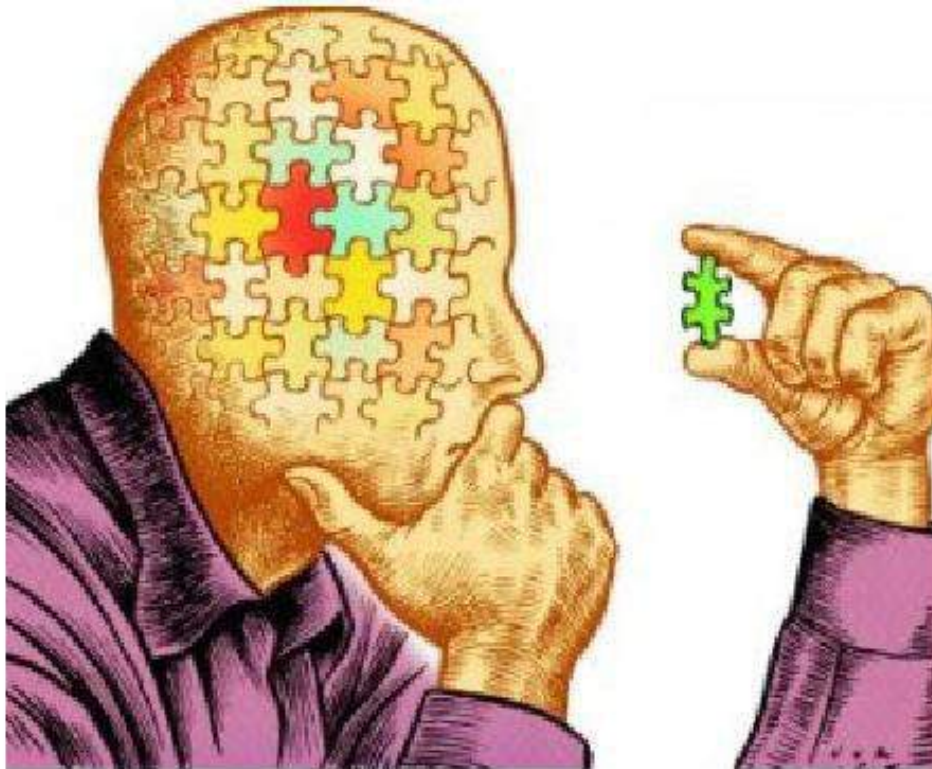
Robotic Ideas and Foresights: Today and Future

Thursday October 26, 10:15 – 12:15

Participants:

Dr. P. Zarafshan, Dr. Dehghani, Dr. Shahri, Prof. Hamid Taghirad, Prof. Aghil Yousefi-Koma
Idea and Creativity contest finalist team leaders

◆ Idea and Creativity Exhibition



Since launching the first robotics contest in 1980's the world has witnessed great advancements in robotics education and research. In addition, the edutainment themes of diverse robotics competitions have attracted the interest and attention of a large portion of the population ranging from preschool to senior citizens to the robotics technologies and their futuristic applications. As a result, we are witnessing a broad and intensive participation of students, experts and ordinary people in the robotics competitions. This spectacular phenomenon has proved to be fruitful in terms of developing practical mechatronics capabilities, improving the interdisciplinary expertise, teamwork capabilities and self-learning, regarding applicable robotic systems. On the other hand, a limited number of competitions, like the DARPA Grand Challenge, have proved that a well-designed and good motivating competition can be a good platform to energize the robotics community to gather the forces and create technologies that are useful in daily life. Therefore, the Robotic Society of Iran (RSI), has designed a Robotics Creativity Exhibition to partially fill in the gap between the entertainment-like competitions and real industrial needs through innovative robotic technologies.

In the Creativity Exhibition of ICRoM 2017, the participants present their robotics and mechatronics design ideas. The teams justify the impact of applying robotic systems to some selected tasks in terms of technological, financial, safety and environmental aspects and propose a conceptual design of their robotic systems. A team of juries, composed of experts and researchers in related industrial, robotic and mechatronic fields, reviews the proposals and select a set of teams to participate in the final stage of the Creativity Exhibition. In the final phase, the participants demonstrate their robotic ideas by simulations mockups, or proof of concept prototypes. The greatest award for the finalist teams will be granted by related industries to further implement their idea into more robust prototypes of their invented robotic systems.

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