

Message from the Chairpersons

On behalf of the organizing, technical and local committees, it is our pleasure to welcome you to the 2014 IEEE International Symposium on Robotic and Sensors Environments, ROSE 2014, being held at the Politehnica University of Timisoara, Romania, on October 16-17, 2014.

The IEEE ROSE Symposium is sponsored by the Institute of Electrical and Electronic Engineers (IEEE) Instrumentation and Measurement Society (IMS). It is organized in collaboration with the IMS' TC-15 Virtual Systems in Measurements, TC-22 Intelligent Measurement Systems, TC-27 Human-Computer Interface and Interaction, TC-28 Instrumentation for Robotics and Automation, and TC-30 Security and Contraband Detection technical committees.

ROSE focuses on sensing systems and technologies for robotics and industrial automation, as well as their impact on autonomous robotics and intelligent systems development and applications. Over the two days of the symposium, the authors have the opportunity to present their work orally, exchange valuable ideas and initiate productive collaborations with colleagues and experts attending this event from all around the world.

Timișoara is the largest city in western Romania and has a long and rich history as an important commercial, industrial and multi-cultural center. It was the first city in Europe and the second in the world to use electrical street lighting in 1884, and the city which started the Revolution of December 1989, to restore the democratic values in Romania. In the last decades, Timișoara has grown to become one of the nation's main poles of high-tech industry, including IT and software development, automotive, telecommunications and multimedia. As a local focus, ROSE 2014 will feature a set of invited talks on current topics in manufacturing robotic and sensor components, integrated circuits design, and related end to end specialized services.

Since its introduction in 2003, ROSE took place in Canada, USA and in several European countries, as a truly international event. Celebrating its 12th edition this year, ROSE 2014 is hosted by Politehnica University of Timisoara, Romania, and its Department of Computer and Software Engineering. Politehnica University of Timisoara has been established in 1920 by Royal Decree of King Ferdinand I. It currently has ten faculties, four independent departments and over 1700 teaching and administrative staff, to provide top level support for more than 15000 students. The Department of Computer and Software Engineering is the first department in the field in Romania, being set up in 1964. We appreciate all the efforts and support provided by the local organizers and their institution in hosting this event.

The organizing committee wants to acknowledge and emphasize the efforts of numerous contributors to the success of the IEEE ROSE series, especially to the technical program committee members who volunteered their time to carefully review the manuscripts and provide constructive comments to authors. Special thanks also go to the IEEE Instrumentation and Measurement Society who constantly provides its support and sponsorship to the ROSE conference series, and to Cynda Covert and Chris Dyer from Conference Catalysts for their consistent and thorough assistance to the organization. Finally, thank you also to all the authors and participants who submitted manuscripts of an excellent quality to ROSE and directly contribute to the success of this conference. Welcome to ROSE 2014! Enjoy the conference and enjoy your stay in the cosmopolitan, progressive and multi-cultural city of Timișoara, Romania. Thank you for attending.

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Dr. Vladimir I. Crețu (Politehnica University of Timișoara, Romania)

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Invited Speakers

Dr. Ing. Nicolae Joni

Robcon™ SRL, Timisoara

Title: *Sensors for Robotic Arc Welding Processes*

Abstract – GMAW (Gas Metal Arc Welding) is one of the most important fields of industrial robot applications. In order to successfully implement robotic welding systems, the integrator usually faces difficult challenges that result from the tolerances of the work pieces. This presentation makes a short summary of existing sensor systems, along with example use cases of successful implementations. The sensors used are described both from the functional and from the application point of view.

Biography – Dr. Nicolae Joni is one of Robcon's top engineers and senior researchers. He founded the company in 1990 and is since then its Manager. Specialized in arc and spot welding, he graduated the Politehnica University Timisoara. He obtained his PhD. degree from the Transilvania University in Brasov in the field of robotic arc welding systems. His research interest includes arc welding processes, robotic systems, offline programming systems. He is an author of more than 150 technical papers, 5 books and 2 patents. Dr. Joni is the President of the Romanian Welding Society since 2012 and former Vice-President, during 2006-2012. He is a founding member of the Romanian Society of Robotics (1990) and since 2000 is acting as Vice President. Since 1993 he is a member of the German Association for Welding (DVS). Dr. Joni is an IEEE member since 2010 and a member of the IEEE Robotics and Automation Society since 2011.

Dr. Ing. Valentin Mureşan

Movidius SRL, Timisoara

Title: *Superior Vision: Always on Human-like Vision for Smarter Devices*

Abstract – We live in a world of smart robots, drones and mobile phones/assistants. The technologies behind these products are heralded by low-profile research projects by big name players in the technology sector. The robotic and vision technologies behind these products will shift the applications of electronic devices to a more superior level of intelligence that will change our world. From a hardware point of view, these devices will become a hub of sensors that will be able to capture information about their environment and their context. Probably the most important sense for these devices will be their vision capabilities. To make this sense as close as possible to human vision, will require advanced technology to capture, process, and provide analytics in real time to enable their applications make critical decisions. "Always on" vision capabilities are envisaged as the paradigm for the next generation of mobile applications and in order to make it as close as possible to the human vision, depth perception and estimation are also key along with the image resolution. This Keynote will cover in this context the state of the art in the domain of vision with the latest image processing, computer vision and computational photography algorithms implemented on various low-power processing architectures.

Biography – Dr. Valentin (Val) Mureşan (EEng, MBA, PhD, MIEE, MIEEE), Co-Founder and General Manager, Timisoara at Movidius, is an experienced embedded R&D leader and entrepreneur who built a 50+ Silicon and Software Development Centre and innovation team from scratch in Timisoara, Romania. In that process, dr. Mureşan holds key roles in building and managing a team which develops leading edge products on a tight budget including multi-core silicon and software solutions for real time HD audio, video codecs and processing, computational photography, computer vision, 2D&3D camcorder and camera modules, 2D-3D conversion modules, 3D technology for 2D HDMI TV's and establishing the infrastructure to work with global partners to deliver products on several continents. Dr. Mureşan has also been a director of an EU funded R&D project at Movidius (2010-2012), a Guest Lecturer at West University of Timisoara (2011-2012), Guest Lecturer at Universitatea Politehnica Timisoara (2009-2010), Co-Founder and Design Centre Manager at Movidia (2005-2009), Lecturer at Dublin City University (2002-2005), Research Programme Manager at the Centre for Digital Video Processing - Dublin City University (2001-2005) and Teaching Assistant at Dublin City University (1997-2001).

Thursday, October 16, 2014

08:30 - 09:00

Registration

Room: Big Hall of the Politehnica University of Timișoara (UPT) Senate [2, Victoriei Sq.]

09:00 - 09:15

Opening & Welcome Word

Viorel Serban, UPT Rector

Room: Big Hall of the UPT Senate [2, Victoriei Sq.]

09:15 - 10:00

Invited Speaker

Dr. Nicolae Joni, Robcon SRL

Title: *Sensors for Robotic Arc Welding Processes*

Room: Big Hall of the UPT Senate [2, Victoriei Sq.]

10:00 - 10:45

Invited Speaker

Dr. Valentin Mureșan, Movidius SRL

Title: *Superior Vision: Always on Human-like Vision for Smarter Devices*

Room: Big Hall of the UPT Senate [2, Victoriei Sq.]

10:45 - 11:00

Coffee Break

11:00 - 12:15

Robot Control

Chair: *P. Payeur, University of Ottawa, Canada*

Room: Big Hall of the UPT Senate [2, Victoriei Sq.]

11:00 **Method for Estimating Combined Controller, Joint and Link Stiffnesses of an Industrial Robot**

Ilya Tyapin (University of Agder, Norway)

Geir Hovland (University of Agder, Norway)

Torgny Brogårdh (ABB Robotics, Sweden)

11:25 **Development and Control of a Bowden-Cable Actuated Exoskeleton for Upper-Limb Rehabilitation**

Qingcong Wu (Southeast University, China)

Xingsong Wang (Southeast University, China)

Fengpo Du (Southeast University, China)

Jigang Xu (Southeast University, China)

11:50 **Fuzzy Sliding Mode Control of a Riderless Bicycle with a Gyroscopic Balancer**

Ming-Hung Hsieh (National Taiwan University, Taiwan)

Yen-Ting Chen (National Taiwan University, Taiwan)

Cheng-Hung Chi (National Taiwan University, Taiwan)

Jui-Jen Chou (National Taiwan University, Taiwan)

12:15 - 13:30

Lunch

Room: Politehnica House 1 [2, Politehnicii St.]

13:30 - 15:35

Path Planning & Robot Navigation

Chair: *M. Roveri, Politecnico di Milano, Italy*

Room: A109, Electro Building [2, Vasile Parvan Bv.]

13:30 A time-optimal isotropic Cartesian Trajectory Generator with limited Acceleration Magnitude

Mirko Kunze (Karlsruhe Institute of Technology, Germany)

Jörg Raczkowski (Karlsruhe Institute of Technology, Germany)

Heinz Wörn (Karlsruhe Institute of Technology, Germany)

13:55 Knowledge-based Direction Prediction to Optimize the Null-space Parameter of a Redundant Robot in a Telemanipulation Scenario

Jessica Hutzl (Karlsruhe Institute of Technology, Germany)

David Oertel (Karlsruhe Institute of Technology, Germany)

Heinz Wörn (Karlsruhe Institute of Technology, Germany)

14:20 Human Arm Motion Imitation by a Humanoid Robot

Sylvain Filiatrault (Université du Québec en Outaouais, Canada)

Ana-Maria Cretu (Université du Québec en Outaouais, Canada)

14:45 Safer Hybrid Workspace Using Human-Robot Interaction While Sharing Production Activities

Ramy Meziane (University of Quebec at Chicoutimi, Canada)

Ping Li (University of Quebec at Chicoutimi, Canada)

Martin J.-D. Otis (University of Quebec at Chicoutimi, Canada)

Hassan Ezzaidi (University of Quebec at Chicoutimi, Canada)

Philippe Cardou (Laval University, Canada)

15:10 Remote-sensing based adaptive path planning for an aquatic platform to monitor water quality

Fadi Halal (Université du Québec en Outaouais, Canada)

Pablo Pedrocca (Université du Québec en Outaouais, Canada)

Thomas Hirose (Noetix Research, Canada)

Ana-Maria Cretu (Université du Québec en Outaouais, Canada)

Marek Zaremba (Université du Québec en Outaouais, Canada)

15:35 - 15:50

Coffee Break

15:50 - 17:30

Intelligent Sensing

Chair: *V. Cretu, Politehnica University of Timisoara, Romania*

Room: A109, Electro Building [2, Vasile Parvan Bv.]

15:50 **Joint Localization and Fingerprinting of Sound Sources for Auditory Scene Analysis**

Scott B Kaghaz-Garan (Stony Brook University, USA)

Anurag Umbarkar (Stony Brook University, USA)

Alex Doboli (Stony Brook University, USA)

16:15 **A Smart Safety Helmet using IMU and EEG sensors for worker fatigue detection**

Ping Li (University of Quebec at Chicoutimi, Canada)

Ramy Meziane (University of Quebec at Chicoutimi, Canada)

Martin J.-D. Otis (University of Quebec at Chicoutimi, Canada)

Hassan Ezzaidi (University of Quebec at Chicoutimi, Canada)

Philippe Cardou (Laval University, Canada)

16:40 **Risk Evaluation of Ground Surface Using Multichannel Foot Sensors for Biped Robots**

Futoshi Asano (Kogakuin University, Japan)

Hideki Asoh (National Institute of Advanced Industrial Science and Technology, Japan)

Mitsuharu Morisawa (National Institute of Advanced Industrial Science and Technology, Japan)

Shuuji Kajita (National Institute of Advanced Industrial Science and Technology, Japan)

Kazuhiro Yokoi (National Institute of Advanced Industrial Science and Technology, Japan)

17:05 **Instrumented Compliant Wrist for Dexterous Robotic Interaction**

Pascal Laferrière (University of Ottawa, Canada)

Pierre Payeur (University of Ottawa, Canada)

Rafael Toledo (University of Ottawa, Canada)

17:30 - 20:30

ROSE 2014 Dinner

Recas Winery

Friday, October 17, 2014

08:30 - 09:00

Registration

Room: A109, Electro Building [2, Vasile Parvan Bv.]

09:00 - 10:40

Robot Vision & Distributed Sensing

Chair: *S. Zug, Otto-von-Guericke Universitat Magdeburg, Germany*

Room: A109, Electro Building [2, Vasile Parvan Bv.]

09:00 **Robotic Intelligent Vision and Control for Tunnel Inspection and Evaluation - The ROBINSPECT EC Project**

Konstantinos Loupos (Institute of Communication and Computer Systems, Greece)

Angelos Amditis (Institute of Communication and Computer Systems, Greece)

Christos Stentoumis (Institute of Communications and Computer Systems, Greece)

Philippe Chrobocinski (CASSIDIAN SAS, France)

Juan Victores (Universidad Carlos III De Madrid, Spain)

Max Wietek (VSH Hagerbach Test Gallery Ltd, Switzerland)

Panagiotis Panetsos (EGNATIA Odos AE, Greece)

Alberto Roncaglia (Institute of Microelectronics and Microsystems, Italy)

Stephanos Camarinopoulos (RISA Sicherheitsanalysen GmbH, Greece)

Vassilis Kallidromitis (TECNIC Tecniche E Consulenze Nell' Ingegneria Civile, Italy)

Dimitris Bairaktaris (D. Mpairaktaris Kai Synergates-Grafeion Technikon, Greece)

Nikos Komodakis (Ecole Nationale Des Ponts Et Chaussees, France)

Rafa Lopez (Robotnik Automation Sll, Spain)

09:25 **Integration of vision/force robot control for transporting different shaped/colored objects from moving circular conveyer**

Michael Jokesch (Chemnitz University of Technology, Germany)

Mohamad Bdiwi (Fraunhofer Institute for Machine Tools and Forming Technology IWU, Germany)

Jozef Suchý (Chemnitz University of Technology, Germany)

09:50 **Low-Level Communication Time Analysis in Real-Time Wireless Sensor Networks**

Valentin Stangaciu (Politehnica University of Timisoara, Romania)

Mihai V. Micea (Politehnica University of Timisoara, Romania)

Vladimir I. Cretu (Politehnica University of Timisoara, Romania)

10:15 **GINGER: a minimizing-effects reprogramming paradigm for distributed sensor networks**

A. Antola (Politecnico di Milano, Italy)

A. L. Mezzalana (Politecnico di Milano, Italy)

M. Roveri (Politecnico di Milano, Italy)

10:40 - 11:00

Coffee Break

11:00 - 11:50

Mobile Robots

Chair: *M. Micea, Politehnica University of Timisoara, Romania*

Room: A109, Electro Building [2, Vasile Parvan Bv.]

11:00 Mobile Manipulator Is Coming To Aerospace Manufacturing Industry

Kai Zhou (Profactor GmbH, Austria)

Gerhard Ebenhofer (PROFACTOR GmbH, Austria)

Christian Eitzinger (Profactor GmbH, Austria)

Uwe Zimmermann (KUKA Laboratories GmbH, Germany)

Christoph Walter (Fraunhofer IFF, Germany)

José Saenz (Fraunhofer IFF, Germany)

Luis Pérez Castaño (Prodintec, Parque Científico Tecnológico de Gijón, Spain)

Manuel Alejandro Fernández Hernández (Prodintec, Parque Científico Tecnológico de Gijón, Spain)

José Navarro Oriol (IDPSA, Spain)

11:25 Technical Evaluation of the Carolo-Cup 2014 - A Competition for Self-Driving Miniature Cars

Sebastian Zug (Otto-von-Guericke Universität Magdeburg, Germany)

Christoph Steup (Otto-von-Guericke Universität Magdeburg, Germany)

Julian-B. Scholle (Otto-von-Guericke Universität Magdeburg, Germany)

Christian Berger (University of Gothenburg, Sweden)

Olaf Landsiedel (University of Gothenburg, Sweden)

Fabian Schuldt (Technische Universität Braunschweig, Germany)

Jens Rieken (Technische Universität Braunschweig, Germany)

Richard Matthaei (Technische Universität Braunschweig, Germany)

Thomas Form (Technische Universität Braunschweig, Germany)

11:50 - 13:10

Lunch

Room: Politehnica House 1 [2, Politehnicii St.]

13:10 - 14:50

Robot Programming & Optimization

Chair: *A.-M. Cretu, Université du Québec en Outaouais, Canada*

Room: A109, Electro Building [2, Vasile Parvan Bv.]

13:10 Experimental Study on the Influence of Controller Firmware on Multirotor Actuator Dynamics

Øyvind Magnussen (University of Agder, Norway)

Geir Hovland (University of Agder, Norway)

Morten Ottestad (University of Agder, Norway)

Simon Kirby (Hostway Canada, Inc., Canada)

13:35 Robotized Task Time Scheduling and Optimization Based on Genetic Algorithms for non Redundant Industrial Manipulators

Khelifa Baizid (University of Cassino and Southern Lazio, Italy)

Amal Meddahi (University of Cassino and Southern Lazio, Italy)

Ali Yousnadj (Polytechnics Military School, Algeria)

Ryad Chellali (Istituto Italiano di Tecnologia, Italy)

Hamza Khan (Istituto Italiano di Tecnologia, Italy)

Jamshed Iqbal (COMSATS Institute of Information Technology, Pakistan)

14:00 Energy Profiling of FPGA Designs

Cosmin Cernazanu-Glavan (Politehnica University of Timisoara, Romania)

Stefan Fedeac (Politehnica University of Timisoara, Romania)

Alexandru Amaricai-Boncalo (Politehnica University of Timisoara, Romania)

Marius Marcu (Politehnica University of Timisoara, Romania)

14:25 Hard Real-Time Execution Environment Extension for FreeRTOS

Cristina S. Stangaciu ("Politehnica" University of Timisoara, Romania)

Mihai V. Micea ("Politehnica" University of Timisoara, Romania)

Vladimir I. Cretu ("Politehnica" University of Timisoara, Romania)

14:50 - 15:10

Best Paper Awards & Closing Remarks

Room: A109, Electro Building [2, Vasile Parvan Bv.]

IEEE ROSE 2014 Conference Locations

-  Room: Big Hall UPT Senate
[2, Victoria Sq.]
-  - Oct. 16: ROSE Registration,
Opening, Invited Speakers and
Session 1
-  Room: A109, Electro Building;
[2, Vasile Parvan Bv.]
-  - ROSE Sessions 2, 3 (Oct. 16)
-  - ROSE Sessions 4-6 (Oct. 17)
-  Room: Politehnica House 1
[2, Politehnicii St.]
-  - Lunch (Oct. 16, 17)
-  Conference dinner rally point
(Oct. 16, 5:30 P.M.)
[2, Vasile Parvan Bv.]

