



IEEE ICPS 2020 - <http://icps2020.fi>

3rd IEEE International Conference on Industrial Cyber-Physical Systems (ICPS)

Special Session on

“Cyber-Physical Systems for Deformable Object Manipulation”

organized by

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Call for Papers

Scope of the Special Session

Manipulation of flexible objects such as clothes, cables and food is relevant to both industrial and household environments. In particular, the factory of the future will witness the increase of robotic manipulation skills allowing robots to carry autonomous tasks, independently of materials, sizes, shapes and other product properties thanks to enhanced perception and interaction capabilities provided by devoted sensors, processing and control algorithms as well as purposely designed handling tools. This will bring new opportunities to human-intensive labor manufacturing processes like the ones dealing with fabrics, ropes, cables and wires where the routing and fitting tasks are calling for advanced manipulation techniques. This new robotic ability will impact several production scenarios in which human work is widely adopted due to the complexity in the



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objects, materials and manipulation tasks, characterized unpredictable initial configuration as well as large deformability and plasticity.

These objectives fall in the area of smart manufacturing and robotics, and they are particularly related to the field of interest of the IEEE TEMS from the point of view of manufacturing operations and of the IEEE System Council from the point of view of systems Modeling, simulation, integration, resilience and product transition, design, production, testing, deployment, disposal.

Topics of interest for this special session include

To foster the scientific and technological development in this field, this special session focus on topics in the area of, but not restricted to, integrated approach to the modeling and simulation, perception, embedded control, digital components, sensors, actuator, manipulation tools and programming-by-demonstration of deformable object manipulation tasks for industrial applications.

Submissions Procedure: All the instructions for paper submission are included in the conference website <https://events.tuni.fi/icps2020/authors/>

Deadlines: The same as the general [conference deadlines](#)

CVs of the proposers

Prof. Gianluca Palli (<https://www.unibo.it/sitoweb/gianluca.palli/en>) received the M.Sc. and Ph.D. degrees in automation engineering from the University of Bologna, Bologna, Italy, in 2003 and 2007, respectively. He is currently an Associate Professor at the University of Bologna. His research interests include many aspects related to the development of robots able to interact with unstructured environments, deformable objects and to cooperate with humans. He coordinated the WIRES projects (<http://echord.eu/wires.html>), which aim was to automatize the switchgears wiring process, and he is now the coordinator of the REMODEL H2020 project (<https://www.remodel-project.eu/content/home>), aiming at the development of robotic technologies for the manipulation of complex deformable linear objects. He is particularly active in the field of design and control of manipulation systems for deformable objects, of anthropomorphic hands for service robotics and grippers for both industrial and service applications, on the design, modeling and control of robots with variable stiffness joints, the design of compliant structures for robotics applications, on the development of innovative actuation systems, on the development of novel sensors for robotic applications.

Prof. Jose Luis Martinez Lastra currently works as Professor (Full) at Tampere University (Finland). Jose serves as Director for the Industrial Technologies and Energy Research Center, CINTECX, located in Vigo (Spain). The Center is built with the target of becoming the point of excellence where the industrial society can benefit from the Fourth Industrial Revolution. Jose does research in Automation, Industrial Informatics, Industrial Cyber-Physical Systems, Robotics and Artificial Intelligence. The main application domains for Jose's research are: Factory Automation, Healthcare Automation and Smart Mobility. Jose's ultimate goal is the seamless knowledge integration of humans and machines/robots creating smart environments by capitalizing the advances on Information and Communication Technologies.

Krzysztof Walas, is Assistant Professor at the Institute of Control, Robotics and Information Engineering, Poznan University of Technology since 01.10.2012. From 08.2014 till 09.2015 he was on sabbatical leave (research fellow) at The University of Birmingham, Intelligent Robotics Laboratory (FP7 project PaCMan). His

primary research interest is on perception for robotics. He was a project leader in research on multi-modal perception for compliant ground negotiation and currently he is a leader of the project on manipulation of elastic objects. He is the principal investigator in H2020 project on the subterranean haptic investigation with a walking robot. During his stay at the University of Birmingham, his main research focus was on compositional representations of objects in 3D. Krzysztof Walas has been taking part as an investigator in 3 EU and 4 national projects. He was also a chair of the organising committee of the 1st International Workshop on Perception for Mobile Robots Autonomy - PEMRA 2012, and currently he is National Coordinator for euRobotics Week, and he has been co-organizing several International Workshops on Recovering 6D Object Pose in conjunction with ICCV and ECCV. His implementation skills were proven in the successful completion of 3 six-legged robotic platforms.

Pawel Lembicz received the M.Sc. of production engineering at Poznan University of Technology in Poznan, Poland, in 2018. He is currently assembly specialist at Volkswagen Poznan Sp. z o.o. He took part in many projects, relating to automation of assembly processes in his company. Right now he is one of the participants of project REMODEL in H2020 in role of industrial partner. This project is focused on manipulation of linear, flexible objects by the robot. It has to reflect as well, real industrial environment, namely assembling line, where the cockpit wiring harness is assembled. In his daily work, he still look for new possibilities to automate hand processes.

Žiga Gosar, received his diploma degree in mechanical engineering in 2010 and his Ph.D. in nonlinear mechanics from the University of Ljubljana, Slovenia, in 2014. During his Ph.D. study he applied high vacuum metallization process in the company. Currently he is employed as head of research and development department and also dealing with optimization of production processes with lean methods (5S, SMED, TPM, VSM, ABC...). In 2016 a project Machine vision for defect detection on high gloss surfaces (MV4HGS) was performed, and in 2017 he got a Rector's Award for Innovation. He is studying for his 2nd PhD in plasma polymerization on Jožef Stefan International Postgraduate School on Jožef Stefan Institute. With the study of plasma polymerization a lot of knowledge was got, so 30% of reduction of high vacuum metallization process cycle time was made. He was involved in H2020 project, Reconfigurable robot workCell for fast set-up of automated assembly processes in SMEs (ReconCell - <http://www.reconcell.eu/>). Currently he is involved in project Robotic tEchnologies for the Manipulation of cOmplex Deformable Linear objects (REMODEL - <https://remodel-project.eu/>) and is also a member of the advisory board for project Co-production CeLL performing Human-Robot Collaborative AssEmbly (CoLLaboratE - <https://collaborate-project.eu/>). On a national level he is a member of SRIP ToP, coordinator for robotics (Strategic Partnership for Innovation and Development, Factories of the Future - <http://ctop.ijs.si/sl/domov/>) and is involved in research and development projects like Innovative sensors for real-time monitoring of deposition rates in plasma-enhanced chemical vapour deposition (PECVD) systems and project Initial stages in surface functionalization of polymers by plasma radicals.

Aitor Iburguren received the MSc in computer science in 2004 and the Ph.D. in computational science and artificial intelligence in 2008 from the UPV/EHU, Basque Country, Spain. He joined Tecnalia Research and Innovation in 2017 after working as a researcher in Basque research institutions. His research interests are focused on control, artificial vision and calibration applied to robotics. He actually participates in H2020 projects such as SHERLOCK or REMODEL, projects focused on the bimanual manipulation of flexible objects in industrial environments. He is currently active in the implementation of sensor driven algorithms and control strategies for manipulators in industrial applications, especially in assembly tasks.