



11-13th March 2015, Vienna, Austria

Workshop on:

**Flexibility and Dexterity in industrial robots:
demonstrators of new frontiers in industrial applications**

Dr Ferdinando CANNELLA, Dr Sotiris MAKRIS, Dr Matteo ZOPPI

12th March, 08:30 – 10:00 (KUKA room)



Workshop on:

Flexibility and Dexterity in industrial robots: demonstrators of new frontiers in industrial applications

Organisers:

Dr. Ferdinando CANNELLA

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Agenda:

08:30-08:35

Introduction

08:35-09:45

Project Presentations

09:45-10:00

Round Table Discussion on Industrial robots needs on Dexterity and Flexibility

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Content:

The increasing need for **High Mix and Low Volume** production pushes the industry to investigate **new solutions for increasing flexibility.**

Radical changes can be achieved by **introducing autonomous production/handling units** which can change **task** (from joining to handling and vice versa) and **position** (around the shop floor), eventually cooperating among themselves, reacting quickly to stoppages and reducing losses as much as possible.

Technologies in this direction involve:

- **Reconfigurable tools** to enable autonomous and flexible assembly equipment to adapt production process to process/market variations,
- **Intelligent, Control & Monitoring systems** enabling enhanced performance and high level re-configurability of production processes
- **Open integration & communication architectures** to allow easier integration and networking of the control systems utilizing agent-based, web-services and ontology technologies.

This **workshop** will focus on presenting the **latest advances in these topics**, ranging from flexible grippers, dexterous robots and intelligent decision making software, aiming at concluding to challenges for the future.



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Presentations:

- Cooperating robots in manufacturing environment,

Dr. George Michalos and Aldo Bottero, LMS-University of Patras, Greece,

- Multi-agent and swarm fixturing and manufacturing in aeronautics,

Prof. Rezia MOLFINO, UNIGE, Italy

- Robotics for flexible manufacturing system,

Dr. Damien SALLE, TECNALIA, Spain

- Force/impedance based dexterous manipulation for assembly applications,

Dr. Dragoljub SURDILOVIC, Fraunhofer IPK, Germany, Control

- Development of a Metamorphic Robotic Hand and Its Applications,

Dr. Guowu Wei, KCL, Research associate

- Dexterous Manipulators: from Consumer Goods to Automotive Applications,

Dr. Fei CHEN, Italian Institute of Technology, Italy

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Discussion:

Flexibility:

- ✓ system level complexity and integration
- ✓ openness of software/architecture
- ✓ autonomy; perception of the environment
- ✓ compliance
- ✓ regular/non regular shapes; rigid/soft materials
- ✓ bottlenecks

Dexterity:

- ✓ control level complexity and integration
- ✓ speed/efficiency/accuracy/robustness
- ✓ compliance
- ✓ regular/non regular shapes; rigid/soft materials
- ✓ bottlenecks