

## Workshop on AUTONOMOUS GRASPING

**From Multi-Sensing to Symbolic Representations for  
Robotic Manipulation Tasks**



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## CALL FOR PAPERS

The Workshop on Autonomous Grasping will take place at the 2011 IEEE International Conference on Robotics and Automation (ICRA 2011) in **May 9th, 2011** at the **Shanghai International Conference Center** and the **Shangri-La Hotel Shanghai Pudong in Shanghai, China**.

The main objective of the workshop is to discuss different approaches on autonomous grasping for robotic hands that are capable of performing grasping and manipulation tasks in uncertain and unforeseen scenarios.

In this workshop we shall cover representations underlying the human strategies that define the appropriate characteristics of the grasp and manipulation movements in specific contexts or objects and how these strategies can be extended and replicated by robots.

The focus will be on techniques to extract relevant information from human data recording in scenarios of grasping and manipulation tasks, including data on tactile sensing, visual gaze and saccade movements of the subject.

As an outcome, we expect the speakers to contribute for a more complete overview on the current state-of-art on robotic systems that explore different strategies of grasping and manipulation, and explore physical properties of objects to provide more intelligent artificial hands. The models for multi-sensor data integration will be discussed as well as the representations and control strategies that provide autonomous manipulation.

ICRA 2011

2011 IEEE International Conference on  
Robotics and Automation

May 9-13, 2011  
Shanghai International Convention Center  
Shanghai, China

## PRESENTERS WITH AFFILIATIONS AND STATUS OF CONFIRMATION

- Veronique Perdereau, Université Pierre et Marie Curie-Paris 6 (UPMC)- Confirmed
- Jorge Lobo, University of Coimbra (FCTUC) - Confirmed
- Kaspar Althoefer, King's College London (KCL) - Confirmed
- Boyko Iliev, Örebro University, (ORU) - Confirmed
- Jianwei Zhang, University of Hamburg (UHAM) - Confirmed
- Alexandre Bernardino, Instituto Superior Tecnico (IST)- Confirmed

The workshop organization intends also to do a general call for contributions that will be distributed among the robotics community. We expect to enlarge this list of speakers with researchers from other institutions and projects around the world.

The articles will be reviewed and selected by a Scientific Committee that will be composed by remarkable researchers in the topic of robot manipulation and grasping. These reviewers will be selected on the RAS community and depending on the topics addressed by the different contributions.

## LIST OF TOPICS

The workshop will address the following topics (non-exhaustive list):

- Dexterous manipulation
- Grasp synthesis
- Grasping by Imitation learning
- Grasp gesture recognition
- Grasp and skill learning
- Motor control and learning
- Sensor features extraction for manipulation
- Characterization of object affordances
- Object representations and uncertainty
- Learning and imitation of human strategies



## MOTIVATION AND OBJECTIVES

One important goal on robotics is to increase the autonomy on grasp, exploration and manipulation of objects that are partially known. To achieve these objectives there is a tendency to develop robotic hands where their mechanical structures are inspired by the human hand.

By using sensing devices such as tactile, temperature, force/torque sensors attached to the robotic hand it will be possible to develop more sophisticated techniques for grasping and manipulation. The development of this new generation of robotic hands places new challenges concerning its motion (fingers, palm, coordination fingers/fingers, fingers-palm) based on the data provided by sensors (tactile, temperature, artificial skin, vision). Some of the recent systems rely only on visual feedback and others integrate visual and haptic feedback. The goal of this workshop is to join researchers with different research backgrounds (control, robot vision, machine learning) to discuss autonomous manipulation based on different perspectives, from multi-sensing to symbolic representations.

A strategy to develop robotic hands with human-like capabilities for handling objects is to encode and learn manipulation strategies from human demonstrations. The workshop provides a forum where this approach can be analysed and discussed from different perspectives. The methodologies to extract essential components (constraints, regularities) across multiple demonstrations of manipulation tasks by humans, are also interesting topics to be discussed and analysed during the workshop.

The goal of the workshop is to increase discussion among researchers working in the domain and identify synergies that could be the leverage to new approaches for autonomous grasping and increase the autonomy of robotic hands.

This workshop will also be an opportunity to present and discuss recent developments by research teams of the following European projects:

- **HANDLE**: Developmental pathway towards autonomy and dexterity in robot in-hand manipulation. - HANDLE is a large-scale integrated project which is funded under the European Community's 7th Framework Programme. The HANDLE project is coordinated by Véronique Perdereau.
- **DEXMART** - "DEXterous and autonomous dual-arm/hand robotic manipulation with SMART sensorymotor skills: A bridge from natural to artificial cognition". - DEXMART is a large-scale integrated project which is funded under the European Community's 7th Framework Programme. The DEXMART project is coordinated by Bruno Siciliano.
- **GRASP** Emergence of Cognitive Grasping through Introspection, Emulation and Surprise. - GRASP is a large-scale integrated project which is funded under the European Community's 7th Framework Programme. The GRASP project is coordinated by Danica Kragic.

## IMPORTANT DATES

**March 1th, 2011** Submission deadline

**April 1th, 2011** Notification of acceptance

**May 9th** Workshop

## MORE INFORMATION

<http://media.isr.uc.pt/autonomousgrasping/>

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