

# 3rdHandRobot Project Partners



**Inria Bordeaux Sud-Ouest  
Flowers Lab  
France**



**Technische Universität Darmstadt  
Intelligent Autonomous Systems  
Germany**



**Universität Innsbruck  
Intelligent and Interactive Systems  
Austria**

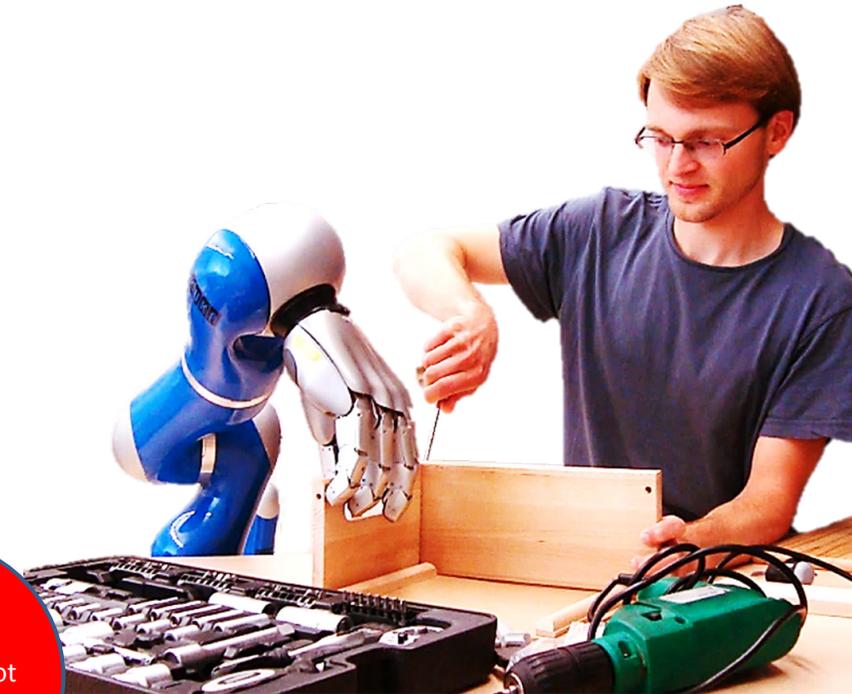
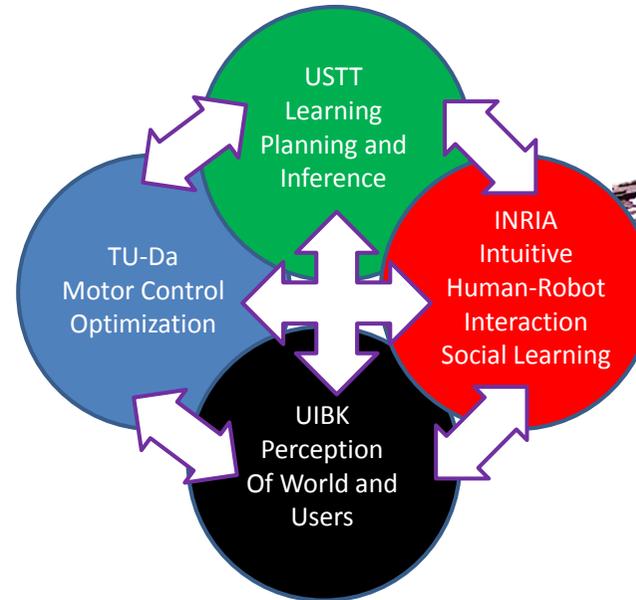


**Universität Stuttgart  
Machine Learning and Robotics Lab  
Germany**

This project brings together the strength of the following partners

- Inria
- Technische Universität Darmstadt (TU-Da)
- Universität Innsbruck (UIBK)
- Universität Stuttgart (USTT)

Integration of core research areas



**Project name**  
Semi-Autonomous 3rd Hand  
[www.3rdhandrobot.eu](http://www.3rdhandrobot.eu)

**Project acronym**  
3rd HAND 610878

**Call identifier**  
FP7-ICT-2013-10

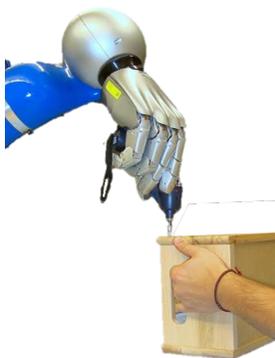
**Start**  
1st October 2013

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# 3<sup>rd</sup> Hand

Robots have been essential for keeping industrial manufacturing in Europe. Most factories have large numbers of robots in a fixed setup performing a few routines that produce the same product hundreds of thousands of times.



The only common interaction between the robot and the human worker has become the emergency stop button.

As a result, re-programming robots for new or personalized products has become a key bottleneck for keeping manufacturing jobs in Europe.

***To date, production in factories have focused on production in large numbers, causing small batches to have a high price. Robot-based small series production requires a major breakthrough in robotics: the development of a new class of semi-autonomous robots that can decrease this cost substantially.***

Such robots need to be aware of human workers, relieving them of the monotonous, repetitive tasks, while keeping them in the loop where the worker intelligence makes a substantial difference.

## Goal

This project aims at developing a semi-autonomous robot assistant that ***acts as a third hand for a human worker.***

This project will develop and study the scientific principles of semi-autonomous human-robot collaboration. This new robotics paradigm will result in a class of robotic systems that have the following principles: they are ***proactive***, able to be ***programmed and commanded by intuitive instructions***, capable of ***skill self-assessment*** and ***modeling of the team behaviour.***

Under these principles the assistant robot is expected to

- Learn hierarchical and cooperative tasks from demonstration
- Learn from natural human instruction as opposed to traditional programming methods
- Find relevant connections between different situations to transfer knowledge between tasks and environments

The robot will learn ***when*** and ***how*** to assist a human worker in his/her task. To this end, we will develop new methods that allow robots to gradually increase their repertoire of interaction skills without additional effort by the human programmer.

We will demonstrate the efficacy of the project with a case study: a collaborative assembly task where the robot acts as a semi-autonomous third hand.



## Impact

A semi-autonomous third hand has the potential to change the European manufacturing scenario from static, pre-programmed robot systems to dynamic human-robot collaboration, allowing for personalized products, smaller product series, and lower production costs.



The principles followed in this project will facilitate a revolution in the way factories operate by changing the usual way workers program and interact with robots. Instructing a robot will become straightforward even for an untrained worker. The third hand will provide effective collaboration between the robot and the human worker during the execution of a task.

## Workflow and Integration

The 3rd Hand is a four-year project with project-wide milestones. Outcomes defined for each milestone will be carefully evaluated by progressively more difficult scenarios, culminating in a proof-of-concept, cooperative assembly task.

