

# Working With Us

## 2 Ph.D. Student Positions in Open-Ended Robot Learning at U. Innsbruck, Austria

The [Intelligent and Interactive Systems](#) group (Prof. Justus Piater and Dr. Matteo Saveriano) is looking for two talented Ph.D. candidates.

### Scientific Context

We would like to be able to equip our robots with almost arbitrary skills in unconstrained environments. However, programming robot skills by hand is time consuming, and supervised and exploratory learning do not easily scale to complex and diverse tasks. Open-ended learning requires a combination of exploratory learning, explicit teaching, and the ability to reuse knowledge.

### Position 1: Learning Large-Scale Robotic Knowledge Bases By Observing Humans

The goal of this project is to enable robotic devices to acquire knowledge about the task execution from human observation and to build a large scale database of robotic tasks. Modern computing technologies, like noSQL, graph databases and cloud computing, are leveraged to populate and query the knowledge base and plan tasks on-line. A large knowledge base will allow the robot to execute a multitude of tasks and, more importantly, can potentially allow the robot to reuse its knowledge in different scenarios in order to learn novel behaviors by self-practice. The Ph.D. candidate will also try to overcome the current imitation learning paradigm where the human is the only source of knowledge by adopting a bidirectional paradigm where the robot uses already acquired knowledge to assist the human during the teaching.

This is a university assistant position that includes minor teaching requirements.

### Position 2: Teaching Robots the Essence of Tasks

Most current work in robot learning focuses on learning trajectories or on mapping perception to action. However, tasks are characterized by the achievement of specific post-conditions; it is these the robot should understand, along with means to achieve and verify them. The objective of this research is to leverage explicit human teaching and other means to focus the attention of the robot to the crucial aspects of its perception/action space that define the task, allowing it to acquire complex skills in open-ended scenarios.

This position is part of the new EGTC Euregio IPN *OLIVER - Open-Ended Learning for Interactive Robots*, with Prof. Angelika Peer (U. Bolzano) and Prof. Nicu Sebe (U. Trento).

## Your Profile

Applicants must have

- earned, or be about to earn, an M.Sc. degree or equivalent in computer science or other relevant area,
- an excellent academic record,
- a strong background in machine learning, AI, and robotics,
- excellent mathematical and coding skills (C/C++, Matlab, ROS, Python),
- excellent written and oral communication skills in English, and
- enthusiasm for leading-edge research, a team spirit and independent problem-solving skills.

## How to Apply

Applications must state the position(s) of interest (1, 2 or both), and must include

- a letter of motivation,
- a curriculum vitae including URLs of English-language theses and dissertations,
- scanned transcripts (including grades) and diplomas,
- a list of projects you have worked on with brief descriptions of your contributions, and
- contact information of at least two references.

They should be sent as PDF attachments by e-mail to both [Justus.Piater@uibk.ac.at](mailto:Justus.Piater@uibk.ac.at) and [Matteo.Saveriano@uibk.ac.at](mailto:Matteo.Saveriano@uibk.ac.at).

Applications must be received by **July 15, 2019**. The ideal starting date is September 1st, 2019.

## The University of Innsbruck, Austria

The University of Innsbruck dates back to 1669 and celebrates its 350th anniversary this year. It offers a complete set of academic curricula and currently counts 28000 students. Founded in 2001, our young Department of Computer Science is highly productive in diverse research domains, and is internationally very well connected.

Innsbruck is home to 35000 students who imprint a distinctive, international student atmosphere upon this lively city of 130000. Beautifully located in the Tyrolean Alps, on the Inn river and surrounded by summits of up to 2718m, Innsbruck offers outstanding opportunities and quality of life all around the year.

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Last update: **2019/06/11 12:14**

