

## **PhD Student in Discrete Task-Level Robot Programming and World Modelling, KU Leuven, Belgium**

### **Job Description**

You will be embedded in the Robotics Research Group at the Department of Mechanical Engineering, Division of Production engineering, Machine design and Automation (PMA). The group has pioneered robotics research in Europe since the mid-1970s and was among the first to develop active force feedback for assembly operations. Already in 1980 it developed learning insertion algorithms based on stochastic automata. It has covered virtually all aspects of sensor-based robotics, from the high-level task specification down to low-level sensor-based control, and applied the research results in a variety of industrial applications. In the last decade the group shifted its attention towards service robots (behaviour-based mobile manipulation, shared control, learning control), medical robotics (natural interfaces, haptic bilateral control), industrial robot assistants, and active sensing. PMA has created several spin-off companies that are active in robotics-related activities, has initiated several free and open-source software projects in robotics (Orocos, KDL, iTaSC, eTaSL, ...), and has participated in a large number of EU projects in robotics, mostly oriented towards control and software development, with a focus on model-driven engineering techniques. More information is available through the link below.

### **Project**

The selected candidates will be involved in the MULTIROB project, a four-year strategic research project. The project focuses on developing a rigorous framework for programming of multi-robot systems such as mobile manipulators, bimanual robots, spanning three large work packages: 1) continuous motion planning for multi-robot systems, 2) discrete coordination, planning and scheduling of complex tasks, and 3) building a world (meta-)model that can serve the algorithms from WPs 1 and 2.

For this vacancy, the candidates will focus on WPs 2 and/or 3.

### **Profile**

We are looking for highly motivated, enthusiastic and communicative researchers with a background in Robotics, Computer Science, Mechatronics or a related field. The candidates should have a strong interest in (at least) one of the following two research profiles:

PROFILE 1: discrete robot task programming:

- motion planning, discrete optimization, constrained optimization, ...
- task-level robot control, task scheduling and allocation.

PROFILE 2: estimation and world modelling:

- sensor data processing for robotics applications, such as kinematics and dynamics, numerical optimization, SLAM-applications or computer vision,...
- world model representations, visualization,...

For both profiles, software development will be part of your core research. The following elements will be appreciated and considered in the evaluation:

- proficiency, in (or willing to learn) multiple programming paradigms (object-oriented, procedural, functional, declarative), possibly with different general purposes languages ( C/C++, Lua, Python, Julia, LISP, etc.)
- experience with existing robotics middleware (Orocos, ROS,...)
- experience with writing domain-specific languages
- experience with existing database frameworks (with preference to NO SQL and graph-based databases)
- experience with implementing planning, control or estimation algorithms
- experiences with model-driven engineering approach.

For all your experiences, list clearly what you did.

Other contributions to free and open source software projects are a plus. Please list them clearly in your application or send us your portfolio.

The candidate is furthermore expected to:

- have a very good knowledge of English (spoken and written)
- be able to work independently, accurately and methodically
- be a team player
- present research findings at national and international conferences
- publish research findings in international journals
- hands-on experience with robot platforms and sensor systems (vision, force, ...) are a plus.

## **Offer**

The successful candidates will receive:

- a doctoral scholarship for one year, renewable up to four years
- multiple benefits (health insurance, access to university infrastructure and sportsfacilities, etc.)
- the opportunity to participate in research collaborations and international conferences

A start date in the course of 2018 is to be agreed upon.

## **Interested?**

Please use the online application tool to submit your application and include: (i) an academic CV with photo, (ii) a pdf of your diplomas and transcript of course work and grades, (iii) statement of research interests and career goals (max. 2 pages), (iv) sample of technical writing (publication or thesis), (v) contact details of at least two referees. Note that the positions might be filled in earlier if excellent candidates are found. For more information please contact or Dr. ir. Wilm Decré, tel.: +32 16 37 26 86, mail: [wilm.decre@kuleuven.be](mailto:wilm.decre@kuleuven.be), or Prof. dr. ir. Joris De Schutter, tel.: +32 16 32 24 79, mail: [joris.deschutter@kuleuven.be](mailto:joris.deschutter@kuleuven.be).

You can apply for this job no later than August 31, 2018 via the online application tool

KU Leuven seeks to foster an environment where all talents can flourish, regardless of gender, age, cultural background, nationality or impairments. If you have any questions relating to accessibility or support, please contact us at [diversiteit.HR@kuleuven.be](mailto:diversiteit.HR@kuleuven.be).