# RobMoSys:
# Why the future belongs to model-driven robot programming

*Prof. Herman Bruyninckx, KU Leuven;*
*Francesco Ferro, CEO of PAL Robotics*

**Location:**
automatica Forum
Halle A5, Stand 135

**Day and time:**
Friday, 22nd June 2018
11:00 – 11:30 a.m.

Model-driven software development (MDSD) is well established in many engineering domains, for example in automotive (AUTOSAR) and embedded systems. It offers uncountable benefits like modularity, scalability, transferability and reusability of tools and software.

This leads to tremendous reductions in development times, translating to reduced costs and shorter times to market, to easier to use systems, better benchmarking and predictable system safety. Up to now, there was no consistent approach available for the robotics community.

RobMoSys is a four-year EU-funded project that drives the application of model-driven methods and tools on top of the current code-centric robotic platforms and promises the managing of the interfaces between different robotics-related domains in an efficient and systematic way according to each system's needs. The outcome will be models and industry-grade tools that can be used in a broad set of different application areas, like automotive production, logistics, healthcare, agriculture and many more.

Robotics software developed according to the RobMoSys approach will include a description and information about its quality, maturity and usage constraints. Integrators or end-users will be able to integrate software components that were developed in a given environment, in their own proprietary environment thanks to proper bridges between the platform-independent model and the target platform.

The presentation will explain the basic concepts of model-driven software engineering in robotics, look at the user expectations and explain the main incentives of the approach from a commercial perspective.

KATHOLIEKE UNIVERSITEIT
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# Speaker

## Francesco Ferro, PAL Robotics

**Francesco Ferro** is the CEO and co-founder of **PAL Robotics**, one of the top service robotics companies in the world, and a euRobotics asibl Board Director. He received a BSc+MSc degree in Telecommunications Engineering at Politecnico di Torino in 2002 (Italy), a Master at ISEN (Lille, France) and an Executive MBA at the University of Barcelona (Spain) in 2011. Since 2004 he develops cutting-edge humanoid service robots at PAL Robotics.

## Dr. Herman Bruyninckx, KU Leuven

**Dr. Herman Bruyninckx** obtained the Masters degrees in Mathematics (Licentiate, 1984), Computer Science (Burgerlijk Ingenieur, 1987) and Mechatronics (1988), all from the KU Leuven, Belgium. In 1995 he obtained his Doctoral Degree in Engineering from the same university, with a thesis entitled ``Kinematic Models for Robot Compliant Motion with Identification of Uncertainties.''

He is full-time Full Professor at the KU Leuven, and partime at Eindhoven University of Technology. He held visiting research positions at the Grasp Lab of the University of Pennsylvania, Philadelphia (1996), the Robotics Lab of Stanford University (1999), and the Kungl Tekniska Hogskolan, Stockholm (2002).

Between 2007 and 2015, he was leading the European academic community, first as Coordinator of the European Robotics Research Network EURON, and later as Vice-President Research of euRobotics.

His current research interests are on the formal specification, realtime execution and on-line Bayesian estimation of model uncertainties in sensor-based robot tasks, kinematics and dynamics of robots and humans, and the software engineering of large-scale robot control systems; formal modelling of functionalities and software artefacts has become a key focus in all this research, with formal certification as a specific medium-term objective.

He participated in more than a dozen European research projects on robotics, with a focus in the recent years on the software engineering aspects. In October 2014, he received an honorary doctorate from the University of Southern Denmark, for his leading role in software development and research in robotics.

# About PAL Robotics

PAL Robotics' mission is to create disruptive service robots that enhance society's quality of life and solve daily problems. Robotics can make a difference by collaborating with humans, providing support for domestic tasks and increasing efficiency in industrial workflows. PAL Robotics develops customizable, tailor-made platforms and modular robotic parts that adjust to people's needs. We design and manufacture highly integrated and reliable solutions for service industries and research institutions worldwide.

PAL Robotics started in 2004 when a small group of engineers built the first fully autonomous humanoid biped robot in Europe. With over 10 years of experience in R&D, today we are known for our humanoid robots TALOS, REEM-C, and REEM. We also develop TIAGo, an innovative robot for mobile manipulation applications in Ambient-Assisted Living and Industry 4.0, and StockBot, a robot that overcomes retail challenges by automating inventory-taking.

# About RobMoSys

RobMoSys (Composable Models and Software for Robotic Systems) is a four-year innovation project establishing model-driven software-engineering in robotics, receiving funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 732410.

RobMoSys will coordinate the whole community's best and consorted efforts to realize a step-change towards a European ecosystem for industry-grade software development open sustainable industrial quality RobMoSys is part of the effort towards a European Digital Industrial Platforms for Robotics.

Project partners are COMAU, PAL Robotics, Siemens, CEA, KU Leuven, TU München, HS Ulm, Eclipse Foundation and EUnited. Half of the project budget of € 8 million are spend as financial support to third parties to interested companies and research groups developing models, tools and software in line with the RobMoSys approach.