



Seminar Announcement

Master's degree in Biomedical Engineering

Course of Assistive Robotics

24/04/2024 – 14.30-16.30 – Room 140/3

AMBER: AdvanceMents in Behavioral autonomy for mEdical Robots

Prof. Elena Torta & Ing. Marco Alonso
University of Eindhoven

Abstract: Image Guided Therapy robots are designed to consistently and efficiently help the user navigate equipment (such as catheters) inside arteries or veins, as well as to help visualize in three dimensions the anatomic regions of interest. These robots are manipulated manually to reach desired positions during clinical procedures in crowded and dynamic settings. While easy to operate, the user is required to always monitor the movements of the robot and to reposition it manually after every procedure. Moving from manual manipulation to robot autonomous decision making could enhance the user experience and increase usage efficiency. In this talk we are going to present the ongoing collaboration between Philips IGT (MDC cluster) and the Robotics group of TU/e to advance the behavioral autonomy of Image Guided Therapy robots. The talk will present very results in terms of the development and integration of world modelling, model predictive control and Bayesian Optimization to increase the level of autonomy of medical robots.

Elena Torta is an assistant professor at the Robotics group of the Eindhoven University of Technology (TU/e). She obtained her M.Sc. degree in Industrial Automation Engineering from the Università Politecnica delle Marche (IT) in 2009. In 2010 she joined TU/e as PhD student and performed research in the domain of cognitive autonomous robots and human-robot interaction for care applications for the EU-FP7 KSERA project. After obtaining her PhD degree (*cum laude*) in 2014, she joined ASML, where she worked as software architect and Matlab competence leader. In 2020 she joined the mechanical engineering department of TU/e as assistant professor. Her research is focused on autonomous robots and systems with applications in human-robot collaboration, mobile robots and digital twins and medical robotics.

Marco Alonso is a Senior Architect at the Image Guided Therapy (IGT) Systems Mechatronics department of Philips. He obtained his M.Sc. degree in Embedded Systems from the Eindhoven University of Technology (TU/e) in 2010. He has experience in the areas of software and mechatronics development together with model-driven engineering techniques for system development. He is responsible for the Mechatronics development and roadmap of robotic positioning systems for X-ray imaging. He is a Technical Leader and Architect working on the Mechatronics roadmap of the next generation of IGT systems. He is the work package leader for the data analytics within the IMOCO4.E. He is actively collaborating with the TU/e to enable the future generation of IGT robots.

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