# SEMINAR

Department of
Mechanical Engineering

## Innovative Robotic Systems for Societal Impact


**SPEAKER**

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**ABSTRACT**

As robotics rapidly transitions from factory floors to unstructured environments, the need for adaptability, safety, and intelligence becomes paramount. In this talk, I will present my recent research focused on the design, development and translation of robotic systems that address these critical challenges in two areas: healthcare and sustainability.

The first part of my talk will focus on medical soft robotics, which aims to safely navigate the body's most hard-to-access and delicate regions. I will present two novel soft robotic solutions that we developed for endoscopic procedures. First, I will discuss the development of a growing soft robot for colonoscopy, detailing the pneumatic propulsion mechanism that led to an approved patent. Second, I will present our untethered, millimeter-scale, magnetic soft robots for capsule endoscopy, focusing on a novel magnetization strategy for wireless actuation.

In the second part of my talk, I will discuss robotics for sustainability and introduce our ongoing Horizon Europe project, SHEREC. As the Coordinator of this project, I will explain how we are developing robotic and AI solutions for the ship recycling industry to improve worker safety and prevent environmental pollution. I will present two mobile manipulators that can perform semi-autonomous cutting tasks, as well as AI-driven methods for generating digital inventories of hazardous materials.

My long-term goal is to develop unprecedented procedures by integrating innovative robotic systems into real-world applications. To that end, I will present my vision for the future of robotics, with a focus on the next generation of robots aimed to address critical societal challenges.


**ABOUT THE SPEAKER**

Evren Samur is an Associate Professor of Mechanical Engineering at Boğaziçi University and the founder of the university spin-off Samurai Robotics & AI. He received his B.S. from METU in 2003, his M.S. from Koç University in 2005, and his Ph.D. in Robotics from EPFL in Switzerland in 2010. His Ph.D. thesis won the EuroHaptics Society's Best Ph.D. Thesis Award in 2010. Dr. Samur was a Postdoctoral Fellow at Northwestern University in 2011 and a Fulbright Visiting Professor at Boston University in 2021. His research primarily focuses on soft and medical robotics, and encompasses broader areas such as industrial robotics, marine robotics, and haptics. Dr. Samur was the principal investigator for several TÜBİTAK- and EU-funded projects, including a Marie Curie Career Integration Grant. Currently, he coordinates the SHEREC project, which is funded under the Horizon Europe program. He is a senior member of the IEEE and a member of the IFToMM and serves as an Associate Editor for the International Journal of Robotics Research (IJRR) and the ACM Transactions on Human-Robot Interaction (THRI).

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