

## LABUST – Increasing Croatia’s marine robotics research capacities



*Laboratory for Underwater Systems and Technologies (LABUST) was founded in December 2011 at the University of Zagreb Faculty of Electrical Engineering and Computing. Since then, LABUST serves as the focal point for applied research and development activities in unmanned marine systems and technology for end-users. We exist to create new knowledge, educate students, provide advice for end-users, innovate, and implement solutions for our customers. We contribute to innovation in the sustainable exploitation of ocean resources. LABUST sets itself apart from others in its values and mission to inspire and seek challenging tasks. Our vision is to advance in multidisciplinary engineering research that innovates, applies, and teaches world-class attainment in autonomous marine systems, sensor processing, and underwater acoustics for marine science, maritime archaeology, maritime security, the offshore energy sector, and other applications.*

*Since 2011, we’ve successfully finished over 15 international and over 23 national research projects (FP7, H2020, ONR, HRZZ, ERDF, Interreg Italy-Croatia, Horizon Europe, Erasmus+ K2). This lecture will give an overview of our R&D activities, including development of custom surface and underwater robots; their application in underwater acoustic localization, maritime ecology, archaeology, bathymetry, mariculture; autonomous ship situational awareness; autonomous inspection; cooperation of heterogeneous vehicles; and internet or underwater things. Since 2011, we’ve successfully finished over 15 international and over 23 national research projects (FP7, H2020, ONR, HRZZ, ERDF, Interreg Italy-Croatia, Horizon Europe, Erasmus+ K2). This lecture will give an overview of our R&D activities, including development of custom surface and underwater robots; their application in underwater acoustic localization, maritime ecology, archaeology, bathymetry, mariculture; autonomous ship situational awareness; autonomous inspection; cooperation of heterogeneous vehicles; and internet or underwater things.*

**Nadir Kapetanović** was born in 1990 in Sarajevo, Bosnia and Herzegovina. He graduated from the University of Sarajevo Faculty of Electrical Engineering in 2015, at the Department of Automation and Electronics and he got his PhD degree in 2023 at the University of Zagreb Faculty of Electrical Engineering and Computing.

He is an employee of FER since the beginning of 2017. at the Laboratory for Underwater Systems and Technologies (LABUST). Since 2017, he’s been involved in several research projects, namely MORUS (2015-2019), EXCELLABUST (2016-2018), BLUEMED (2016-2019), e-URready4OS (2017-2018), CUV-ME (2017 and 2021), EUMarineRobots (2018-2021), HEKTOR (2020-2022), and INNOVAMARE (2020-2022).

In the scope of HEKTOR project (2020-2023) he was actively involved not only in the research, but also in technical project management together with the coordinator prof. Zdenko Kovačić and prof. Nikola Mišković. At the 13th international innovation fair AGRO ARCA held in 2022 in Croatia he and his team were awarded with Grand Prix for the innovation named „Autonomous catamaran for mariculture applications“. The same innovation received the prize of the World Intellectual Property Organization as the best international innovation at ISIF 2022 International Innovation Fair held in Turkey.

His research interests include model predictive control, path and coverage planning of autonomous marine vehicles, bathymetric models of the seabed, photogrammetric 3D models of objects, state estimation methods, as well as signal and image processing.