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Editorial

Advanced Technologies for Maritime and Underwater Archaeology

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Underwater cultural heritage (UCH) is a crucial asset for our knowledge of human history and traditions. It is tangible evidence of past human life that has to be protected for ensuring its accessibility relative to present and future generations.

The documentation, preservation, and dissemination of UCH are open challenges that are highly interdisciplinary because they involve collaboration among various experts from diverse fields such as archaeology, geology, biology, marine science, engineering, robotics, computer science, and numerous other disciplines. Researchers in the field have to face several challenges: the lack of coordinated regulatory and planning policies, methods, tools, and resources; ineffective protection of cultural heritage and the inability to use them as assets for sustainable and responsible tourism development; insufficient measures to tackle the effects of climate change or the damage they suffered in the underwater environment; or the lack of knowledge and, most of all, of techniques and materials suitable for underwater in situ conservation and protection. Moreover, they have to study and manage a variety of archaeological sites from shipwrecks to submerged settlements in a wide range of underwater environments from shallow marine, riverine, and lacustrine environments to marine abyssal environments, characteristics that introduce great complexity to approaches.

In this Special Issue, we present original and high-quality research articles and technical notes devoted to the knowledge of underwater materials and promote innovative methodologies, applications, and emerging technological solutions on the subject of materials that lie underwater. The following papers were selected from a larger set of submissions.

Gkionis et al. (2021) [1] present the benefits of the integration and correlation of bathymetric, marine geophysical, and positioning data in a common three-dimensional (3D) geographical platform [1]. The authors have proved that this combined methodological approach provides the reliable and fast detection of features of archaeological interests that lay on and/or beneath the seafloor.

Scalercio et al. (2021) [2] propose three innovative underwater power tools for submerged archaeological sites: an underwater cleaning brush tool, a multifunctional underwater hammer drill, and an injection tool. The authors show with field tests that these tools can be useful for the maintenance of underwater structures.

Wang et al. (2021) [3] design a prototype of robotic fish that allows propulsion and maneuverability in any direction by changing the orientation of a spatially oscillating rigid caudal fin included in the prototype. This fin is inspired by carangiform fish and by dolphins and operated by three steering engines that were validated by means of experimental tests with a prototype.

Bruno et al. (2020) [4] present the results achieved within the BLUEMED project (https://bluemed.interreg-med.eu/, last access 10 March 2023), showing the potential

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of underwater cultural sites to support sustainable tourism development in the Mediterranean while also developing a multidisciplinary plan for managing Underwater Museums and Knowledge Centres, promoting innovation in the diving industry, and improving user/tourists' experience via value-added services and cutting-edge technologies.

Wright et al. (2020) [5] describe the experiments and results of a study carried out to determine the accuracy of 3D models created with a multi-camera, diver-operated photogrammetry platform. They demonstrate that 3D models produced by this platform are an accurate representation of what lies underwater even in a worst-case scenario with uncalibrated lenses, no ground control, and a bowling effect.

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