

Department	School of Engineering and the Built Environment
Supervisors	Dr Abdelfateh Kerrouche
Project Title	Autonomous Underwater Vehicle with multi-sensors prototype for underwater onsite monitoring

PROJECT DESCRIPTION

Maritime activities remain a crucial factor to the economy with high expectations for future growth. According to the United Nation, there are more than three billion people depend on marine and coastal biodiversity for their livelihoods. However, there is a significant deterioration of coastal waters due to pollution which affecting the functioning of ecosystems and biodiversity. So, achieving a sustainable use of the marine environment remains a big challenge.

The use of modern technologies such as Underwater Vehicles to reform the traditional underwater activities is of great significance for improving the efficiency and quality of the monitoring systems in coastal or near-coast areas. The aim of this project is to, design, build and test an innovative pilot solution based on optical sensors technology and image processing coupled with novel artificial intelligence (AI) algorithms, for autonomous and real-time water quality monitoring.

In addition, the project will exploit the use of embedded electrochemical biosensors for molecular fingerprinting detection. This interdisciplinary project will evaluate existing biosensors and acoustics technologies to determine suitability for their integration into a next-generation portable monitoring system. Significant demand is expected for such a real-time monitoring system with environmental regulators, water utilities and environmental consultancies.

Perspective applicants are encouraged to contact the Supervisor before submitting their applications. Applications should make it clear the project you are applying for and the name of the supervisors.

Academic qualifications

A first degree (at least a 2.1) ideally in Computer Science, Electrical/Electronic Engineering, Mechanical engineering with a good fundamental knowledge of Embedded systems, IoT sensors and devices.

English language requirement

IELTS score must be at least 6.5 (with not less than 6.0 in each of the four components). Other, equivalent qualifications will be accepted. [Full details of the University's policy](#) are available online.

Essential attributes:

- Experience of fundamental Strong AI, machine and deep learning background
- Competent in Optical sensors
- Knowledge of Biomedical Optics
- Good written and oral communication skills
- Strong motivation, with evidence of independent research skills relevant to the project
- Good time management

Desirable attributes:

Practical research expertise in an optical lab and/or a clean-room environment

Indicative Bibliography	Kerrouche, A., Lithgow, J., Muhammad, I., & Romdhani, I. (2020). Towards the Development of Rapid and Low-Cost Pathogen Detection Systems Using Microfluidic Technology and Optical Image Processing. <i>Applied Sciences</i> , 10(7), https://doi.org/10.3390/app10072527
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