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| Novel molecular biosensor systems for marine ecological monitoring  **Martha Valiadi** 1#\*, **Katherine Hartle-Mougiou** 1,2 and **Electra Gizeli** 1  1 ­ Biosensors Group, IMBB-FORTH, Heraktion, Crete  2Department of Biology, University of Crete, Heraklion, Crete  #\* Presenting and corresponding author: email: martha\_valiadi@imbb.forth.gr |

abstract

In situ systems that can autonomously detect marine organisms are needed for effective monitoring of ocean health. As part of the H2020 project TechOceanS, we are developing a new generation of nucleic acid sensors for targeted semi-quantitative detection of marine microorganisms and eDNA. Two main foci are the early detection of toxic phytoplankton blooms that impact fisheries, as well as the spread of invasive fish in the eastern Mediterranean, The system includes simplified protocols for rapid DNA isolation from marine water samples. For DNA amplification, we have optimized quantitative colorimetric loop mediated isothermal amplification (qcLAMP) to achieve high specificity and sensitivity with unpurified DNA inputs. Real-time measurement of the amplification reaction is currently achieved using the lab’s patented portable 3D-printed device with a simple heater and camera system. Ongoing work is focused on implementing the total analysis system in a flexible microfluidic format, ready for a simple, low-cost and pressure-tolerant submersible system.