

NOSy: A Non-invasive Oyster Sensor to monitor spawning in bivalves

SUPERVISORS

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Scientific background: In the life-cycle of many commercially-grown bivalves including oysters, the settlement of free-swimming larvae onto suitable substrate is a key challenge in extensive aquaculture that provides the foundation for crop growth. In oyster aquaculture, this is either (i) managed through traditional knowledge of oyster farmers (e.g. River Colne, UK), (ii) unmanaged but bypassed with the import of oyster juveniles from other areas or hatcheries (e.g. Colne River, UK and Saldanha Bay, South Africa). This project will address this aquaculture challenge to increase oyster recruitment.

Research Methodology

We developed a sensor prototype that can quantify the gaping/spawning activity in bivalves and demonstrated proof of concept (Figure 1). This project aims to develop this prototype into functional units for deployment in oyster aquaculture.

The student will address the following objectives:

1. Test the existing prototype under laboratory conditions to quantify the effect of environmental variables (e.g. temperature, salinity) on the gaping activity in the Pacific rock oyster (*Crassostrea gigas*) and the commercially superior European flat oyster (*Ostrea edulis*).
2. Develop the prototype into autonomous field units for deployment in the UK and South Africa.
3. Advise oyster farmers on best management strategies to maximise species-specific oyster recruitment under climate change.

Training

Generic training will be provided by the EnvEast Doctoral Training Partnership (<http://www.enveast.ac.uk/programme>). You will join the Ecology and Environmental Microbiology Group at Essex (www.essex.ac.uk/bs/research/centres_and_groups/eem/default.aspx) to receive specific training on field experimentation, oyster behavioural and reproductive biology, electronic sensor networks and telecommunications, and the management of oyster fisheries. The project is led by Dr Michael Steinke, (marine ecologist) and co-supervisors Dr Tom Cameron (animal ecologist), Dr John Woods (telecommunications and electronic sensor engineer), and the CASE partner Mr Paul Harding (oyster farmer at Colchester Oyster Fishery). You will be exposed to diverse disciplines and sectors, gaining professional skills in fieldwork, sensor technology and aquaculture.

Person specification

You have an enthusiastic personality and an aptitude for fieldwork in the UK and overseas, a degree in a relevant discipline (e.g. Marine/Freshwater Biology or computer science/electronic engineering) and can work cross-disciplinarily. You must possess well-developed time management, oral and written scientific communication skills.

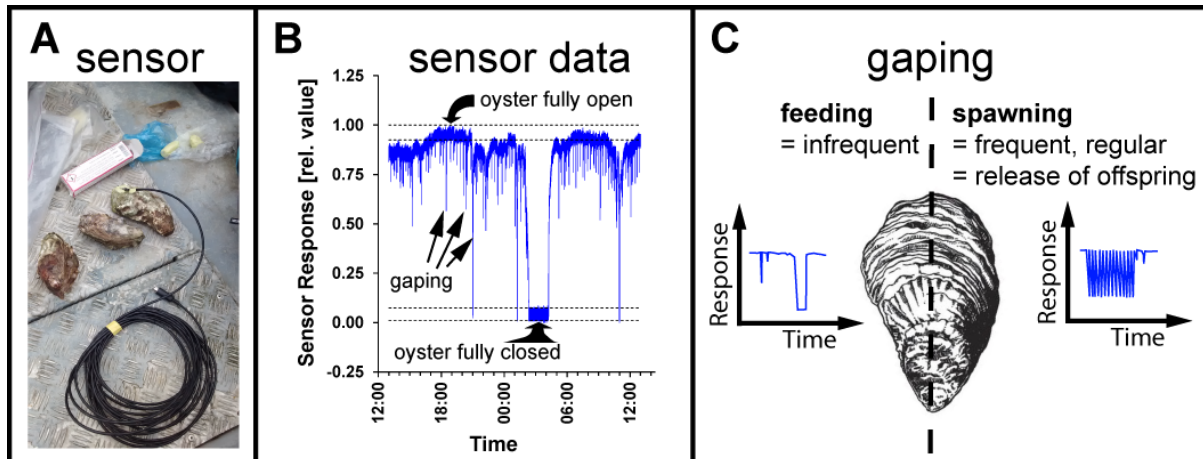


Figure 1. Schematic to illustrate magnetic valvometry in the functioning of the Non-invasive Oyster Sensor (NOSy). **(A)** Photograph showing the sensor and oyster arrangement during our field trials with *Crassostrea gigas* individuals in 2017. **(B)** A 24 h snapshot of high-resolution sensor data illustrating the gaping activity and feeding behaviour in one of the *C. gigas* individuals during the field trials in 2017. **(C)** Assessment of gaping frequency to identify and monitor spawning via a change in the frequency of gaping behaviour.

This project has been shortlisted for funding by the EnvEast NERC Doctoral Training Partnership, comprising the Universities of East Anglia, Essex and Kent, with twenty other research partners. Undertaking a PhD with the EnvEast DTP will involve attendance at mandatory training events throughout the course of the PhD.

Shortlisted applicants will be invited to interview on 13/14 February 2018.

Funding

Successful candidates who meet RCUK's eligibility criteria will be awarded a NERC studentship - in 2016/17, the stipend was £14,296. In most cases, UK and EU nationals who have been resident in the UK for 3 years are eligible for a full award. For non-UK EU-resident applicants NERC funding can be used to cover fees, RTSG and training costs, but not any part of the stipend. Individual institutes may, however, elect to provide a stipend from their own resources.

For further information, please visit www.enveast.ac.uk/apply.

Closing date for this application is midnight 8 January 2018. Please apply online via <https://www.essex.ac.uk/pgapply/enter.aspx>