STREAM: Sensor Technologies for Remote Environmental Aquatic Monitoring

Prof. Carlos Garcia de Leaniz

Centre for Sustainable Aquatic Research (CSAR), Swansea University

Application of Sensors in Precision Aquaculture

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STREAM

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Purpose:

to monitor the Coastal and Estuarine environment around both Ireland and Wales



Monitored data

Temperature Phytoplankton

The Team

Waterford Institute of Technology



development of optical sensors and electronic platforms for advanced sensor technologies through the smart systems development laboratory hosted within the Pharmaceutical and Molecular Biotechnology Research Center (PMBRC). The Walton Institute offers expertise in advanced data networking processing and storage.

Waterford Institute of Technology

(WIT) offers expertise in the

Waterford Institute of Technology



Principal Investigator and Project Lead | WIT | PMBrc

 Stephen Norton
 Dr O'Mahony heads up the Smart

 Bystems Development Lab where
 his research interests include

 Interest in clude
 organic electronics, scanning

 probe microscopy and
 nanosersm; He is responsible for

 developing the STREAM
 manufactured Optical Sensors.

John Ronan Contact Dr Joseph O'Mahony

Munster Technological University

Munster Technological University (MTU) is a multi-campus technological university and the newest in Ireland. The Mass Spectrometry Group at MTU has a long-established background in analytical chemistry, with extensive experience and capability in the areas of elemental and toxicology analysis using techniques such as separation chromatography and mass spectrometry. The Halpin Centre for Research and Innovation undertakes maritime research for the National Maritime College of Ireland (NMCI). The centre is a key partner in Ireland's national effort to build a strong maritime sector.

📶 MTU

Cormac Gebruers Dr Ambrose Fury Dr Naghmeh Kamali

Munster technological university

 Head of Collegel PI I NMCI

 Paul Shanahan
 Cormac is the founding Manager of the HALPIN Centre. Cormac is a member of the NMCI College

 Mike Griew
 Senior Executive Team, of the MTU Research Ethics Committee and the MTU School of Graduate Studies Steering Committee.

 Brid Cripps
 Control Commo Committee.

Swansea University



Swansea University is a research-led university that has been making a difference since 1920. The University community thrives on exploration and discovery.

The Welsh Centre for Printing and Coating (WOPC) offers state of the art laboratories at Swansea University's Bay campus, that are declated to the fabrication of the sensor technologies required by the STREAM operation. The WOPC is a university recognised research centre that has a strong track event in underlating is and meaned and

record in undertaking fundamental and applied research in printing, including graphics and functional materials. It is recognised Internationally and is seen as a World leader in this field.

Centre for Sustainable Aquatic

Research (CSAR) delivers innovative impacts in the aquatic sciences and education sector and has been a Centre of Excellence since 2003. CSAR have the best facilities in Europe for applied and fundamental research on aquatic ecosystems and organisms from temperate to tropical and marine to freshwater environments. CSAR will be testing the sensor technologies in controlled recirculating aquaculture system.

Swansea University

Dr Ben Clifford

Paul Howes

Dr Josh Jones

Dr Peter Jones



Dr Sara Barrento Swansea University I WCPC

> Professor Gethin is a mechanical engineer and the Co-founder and Codirector of the Welsh Centre for Printing and Coating, Professor Gethins research interests include powder forming with emphasis on tabletting: fundamental scientific work on high speed, high volume graphics printing processes and applied research in the field of polymer electronics with a future emphasis on biopolymers and biosensing devices.

Gethin

Prof. Carlos Garcia de Leaniz

Work Packages



Work Package 1: Management and Governance

This work package establishes the management structures for the STREAM operation. STREAM will successfully meet its aims and objectives through careful coordination of the operation's activities which will be led by WIT in Ireland and SU in Wales.



Work Package 2: Specification

In the specification stage, the partners will confirm the specification of the operation and the location and scope of monitoring activity for each site in SE Ireland and Wales.



Work Package 3: Dissemination

In this work package we will develop the STREAM website; promote the project among Stakeholders, Coastal Communities and the General public. The key aim is to Build Awareness of Climate Change impacts and Disseminate the Scientific publications.



Work Package 4: Development of ICT enabled Sensor Technologies for Estuarine Monitoring

Within this work package the sensor and ICT technologies will be developed. SU will develop a range of physical and chemical sensor technologies that will be interfaced with the Wireless Communications System developed by WIT-NRG. Additionally, WIT will develop a suite of wireless enabled optical sensors for the monitoring of Harmful Algal Blooms in estuarine and coastal waters.



Work Package 5: Estuary Water Sampling & Precipitation Monitoring

In this work package partners will develop, deploy and test an innovative portable submersible adsorbent pumping platform to pre-concentrate marine bio-toxins and chemical contaminants in estuarine waters.



Work Package 6: STREAM Deployment

In this work package, sensor technologies will be deployed and modern ICT constructs such as sensor fusion and data fusion will be developed to minimize uncertainties in the returned data. These constructs will be developed further in Work Package 7 with the inclusion of data mining operation.



Work Package 7: Building capacity to respond to climate change impacts on the Irish Sea

This work package is focused on providing a predictor – response solution to climate change impacts, in this scenario the monitoring system acts as the predictor of events, these events are simulated in the laboratory and the response is scientifically determined for different scenarios.

How to collect environmental data?

Using affordable sensors

Commercial sensors



Develop new sensors

Test the performance of the STREAM developed sensors against the industry standard

Deployment

Deploy a temporally and spatially sophisticated array that will monitor the coastal and estuarine environment in high resolution.



Portal

Create an online portal where users can access live and archival data from these sensor systems.



Thank you



STREAM



