



Prifysgol Abertawe
Swansea University

Sensor Technologies for Remote Environmental and Aquatic Monitoring

Ben Clifford*, Tim Mortensen, John Lau, David Gethin**

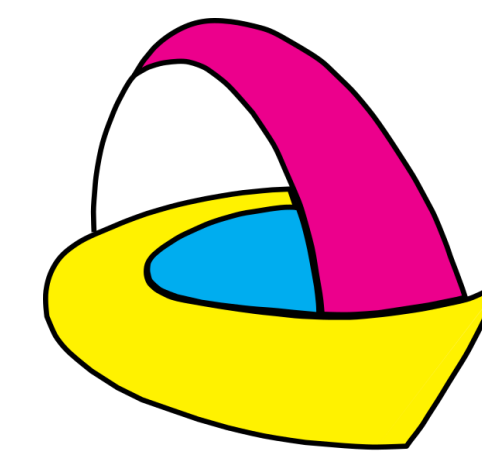


STREAM: Sensor Technologies for Remote Environmental Aquatic Monitoring



As part of the STREAM project, researchers in the Welsh Centre for Printing and Coating (WCPC), at Swansea University are developing a modular water quality sensor platform designed to incorporate low-cost printed sensors focused initially on pH, temperature, conductivity, and dissolved oxygen properties.

This research focusses on the use of advanced printing technologies to create low-cost volume sensors with high stability and resolution whilst overcoming the challenges of the harsh environment, biofouling, and lifetime.

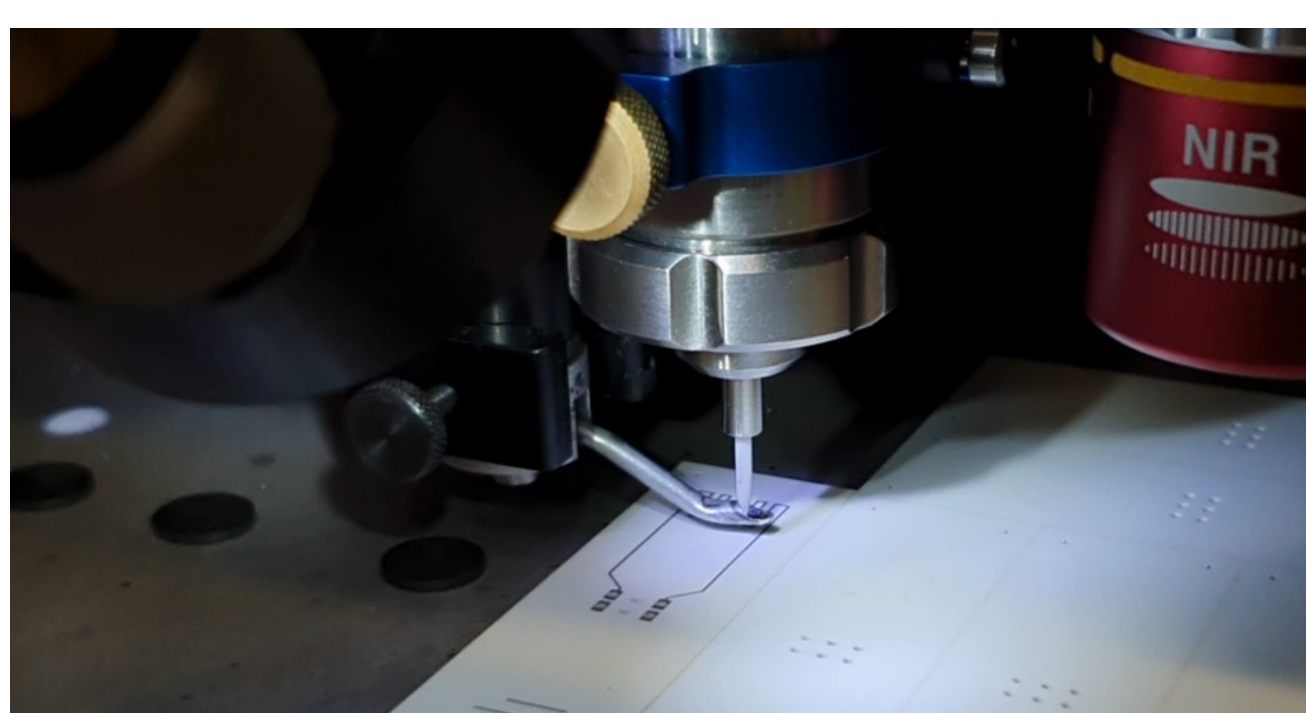


Welsh Centre for Printing and Coating
WCPC
Canolfan Argraffu a Chaenu Cymru



Aerosol Jet Deposition (AJD) is a digital process allowing designs to be rapidly created, modified, and printed whilst using small quantities of ink.

Within the STREAM project, the technique is being used to prototype sensors, evaluate designs and materials, and to produce the temperature and conductivity sensors for deployment.



Sensor Fabrication

Printing of remaining temperature and conductivity sensors. Printing and characterisation of pH and DO sensors.

October 2022



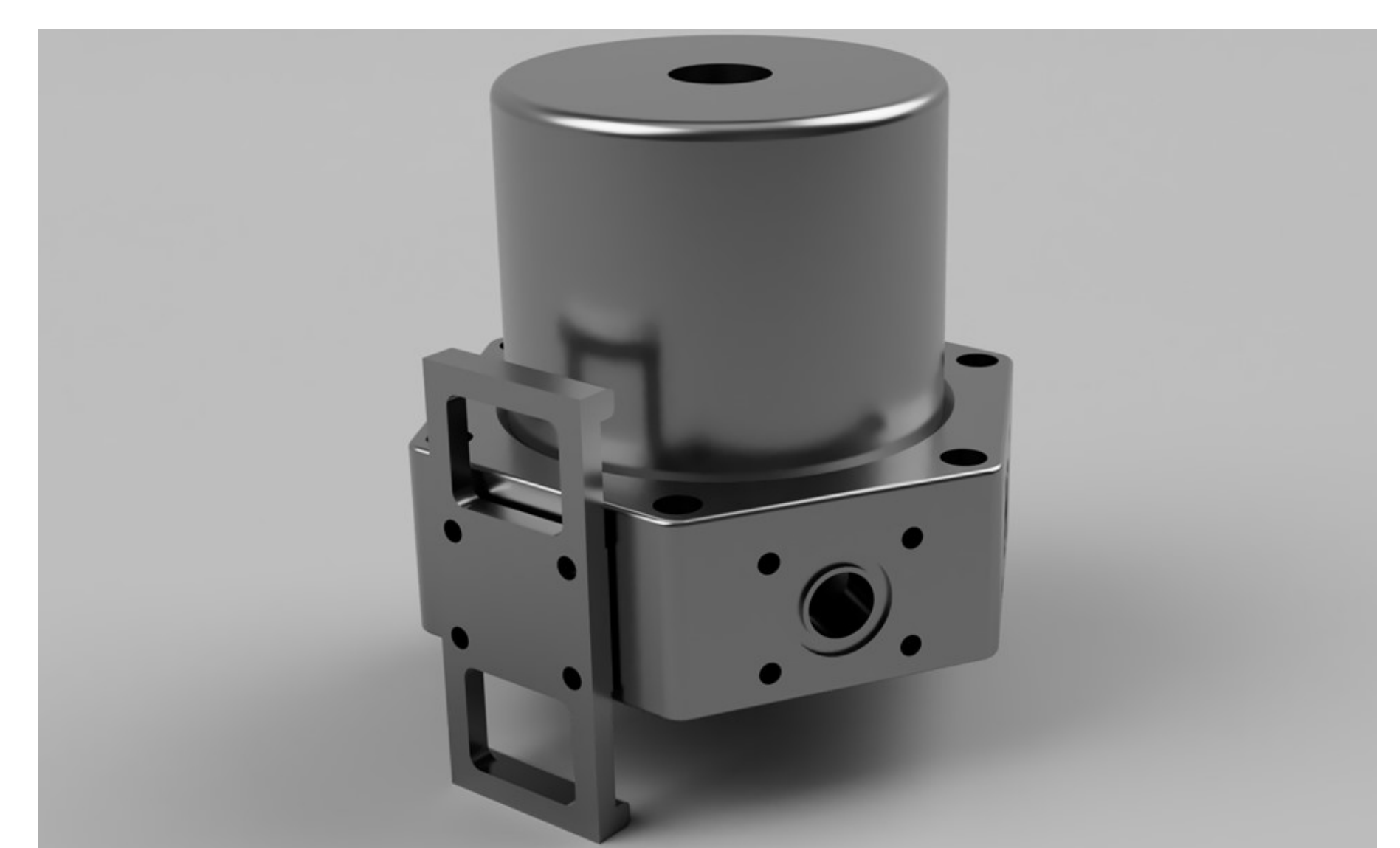
Screen printing is one of the most commonly used printing technologies in the field of printed electronics used extensively in sensor production. In production environments, screen printers can produce thousands of sensors each minute. In the STREAM project screen printing is being used to produce the pH and dissolved oxygen multilayer devices.

One of the key design considerations in salinity measurement, is the cell constant of the sensor with different values being optimal for fresh, brackish and sea water. Printing as a fabrication technique allows the tuning of the cell constant and therefore sensor for the particular environment without having to redo the optimisation and development stages.

Calibration of Sensors

Calibration and deployment of sensor systems around Swansea bay and southern Ireland.

February 2023



A modular design for the control and measurement electronics and enclosure has been developed in-house at Swansea University supporting up to 6 rigid ceramic substrates, with each substrate supporting up to 2 individual sensors giving a total of 12 possible sensors when fully populated.

The use of a ceramic substrate enables the use of high temperature processing of the various inks and allows the substrate to form a sealing surface against an O-ring. Each substrate can be individually replaced at end of life on location, and the additional sensor ports allow for overlap of successive sensors with the previous batch to ensure continuity in the collected data.

STREAM Project Concludes

STREAM project concludes end of 2023. Currently seeking follow-on funding opportunities and collaborations

June 2023

Assembly of Sensor Systems

Assembly and testing of sensor systems in partnership with CSAR including water tightness, remote data transmission, and power.

Monitoring of Deployments

Monitoring and maintenance of existing deployments, increase sensor network size, dissemination of work.

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<https://www.marinestream.eu/>

*b.r.clifford@swansea.ac.uk, d.t.gethin@swansea.ac.uk

Welsh Centre for Printing and Coating, Faculty of Science and Engineering, Swansea University, Fabian Way, Swansea, SA1 8EN

