STREAM Workshop on Technology for Marine Sensing - SWANSEA, 3rd and 4th, 2023

Gweithdy STREAM ar Dechnoleg ar gyfer Synhwyro Morol - ABERTAWE, 3ydd a 4ydd, 2023

Village Hotel Swansea

The WCPC is a renowned institution that specialises in researching and developing printing and coating processes. They are experts in various printing methods, including screen flexographic, lithographic, rotogravure, digital, pad printing, and 3D printing. Additionally, they are leaders in modelling the print process through advanced techniques like finite element analysis, finite difference analysis, and statistical and neural networks.

Mae'r WCPC yn sefydliad enwog sy'n arbenigo mewn ymchwilio a datblygu prosesau argraffu a chaenu. Maent yn arbenigwyr mewn amrywiol ddulliau argraffu, gan gynnwys fflecsograffig sgrin, lithograffig, rotogravure, digidol, argraffu padiau, ac argraffu 3D. Yn ogystal, maent yn arweinwyr wrth fodelu'r broses argraffu trwy dechnegau uwch fel dadansoddi elfennau meidraidd, dadansoddi gwahaniaeth cyfyngedig, a rhwydweithiau ystadegol a niwral.

The STREAM project is working on creating sensors and monitoring tools to track changes in water and weather patterns. This will help assess the effects of both annual variations and climate change. When analysing water quality, various parameters need to be tested, such as chemical, physical, and biological properties. The STREAM project is specifically measuring the physicochemical properties of seawater, which are its inherent physical and chemical features. These parameters include water temperature, dissolved oxygen, salinity (conductivity), pH, turbidity, chlorophyll, biotoxins, and different nutrients.

Mae prosiect STREAM yn gweithio ar greu synwyryddion ac offer monitro i olrhain newidiadau mewn patrymau dŵr a thywydd. Bydd hyn yn helpu i asesu effeithiau amrywiadau blynyddol a newid yn yr hinsawdd. Wrth ddadansoddi ansawdd dŵr, mae angen profi paramedrau amrywiol, megis priodweddau cemegol, ffisegol a biolegol. Mae'r prosiect STREAM yn mesur yn benodol nodweddion ffisigocemegol dŵr môr, sef ei nodweddion ffisegol a chemegol cynhenid. Mae'r paramedrau hyn yn cynnwys tymheredd y dŵr, ocsigen toddedig, halltedd (dargludedd), pH, cymylogrwydd, cloroffyl, biotocsinau, a gwahanol faetholion.

The Swansea University Welsh Centre for Printing and Coating (WCPC) STREAM Workshop on Technology for Marine Sensing was held in Swansea on May 3rd and 4th, 2023. The workshop aimed to explore the significance of marine sensing, advancements in sensor technology, and its impact on aquaculture and environmental monitoring. The event featured talks by various experts, including representatives from the Centre for the Study of Aquatic Resources (CSAR), the Welsh Centre for Printable Sensors (WCPC), and the South East Technological University (SETU).

Cynhaliwyd Gweithdy STREAM Canolfan Argraffu a Chaenu Cymru Prifysgol Abertawe (WCPC) ar Dechnoleg ar gyfer Synhwyro Morol yn Abertawe ar Fai 3 a 4, 2023. Nod y gweithdy oedd archwilio arwyddocâd synhwyro morol, datblygiadau mewn technoleg synhwyrydd, a'i effaith ar ddyframaeth a monitro amgylcheddol. Roedd y digwyddiad yn cynnwys sgyrsiau gan arbenigwyr amrywiol, gan gynnwys cynrychiolwyr o'r Ganolfan Astudio Adnoddau Dŵr (CSAR), Canolfan Synwyryddion Argraffadwy Cymru (WCPC), a Phrifysgol Dechnolegol y De Ddwyrain (SETU).

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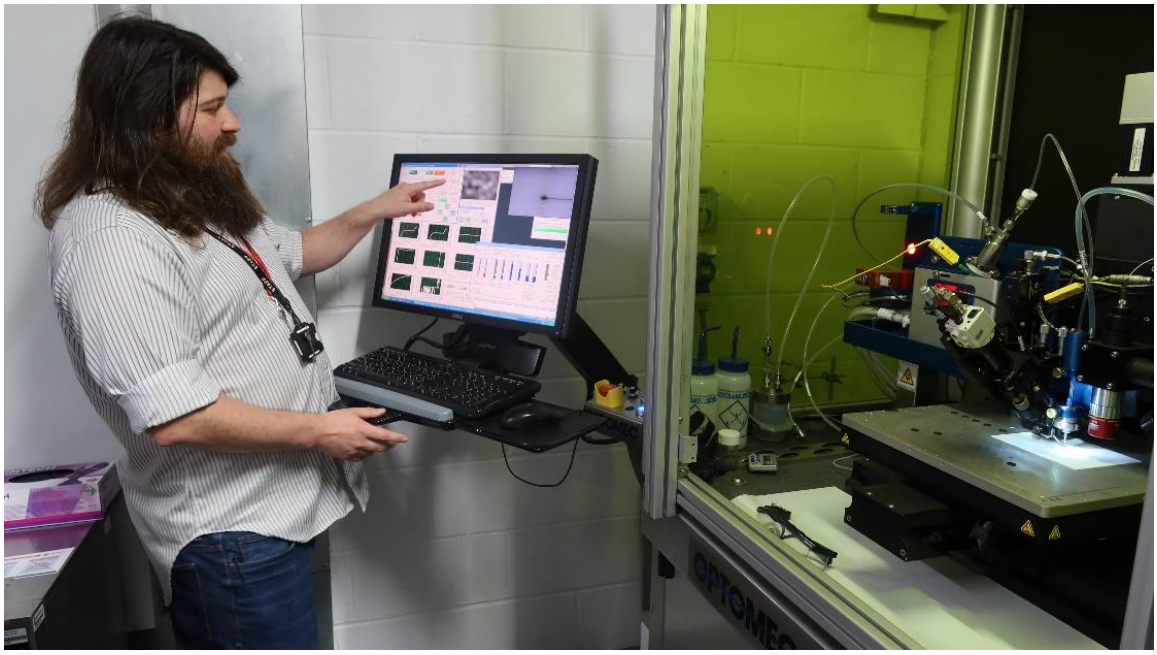
Demonstration of Sensor Printing Systems, Calibration, and Deployment

Before the conference on the 3rd of May, there was a hands-on demonstration of sensor printing systems and their calibration on the 4th. Attendees also had the opportunity to witness how commercial sensors were deployed and integrated into marine STREAM sensing systems.

This practical day involved visiting the Centre for Sustainable Aquatic Research (CSAR), which is part of the Department of Biosciences, where we were shown the work they are involved with and the equipment known as a shuttle box that is used by CSAR to ascertain the thermal niches for fishes as part of the STREAM project. After CSAR, we visited the 360 Aquaculture site on the Old Distribution Terminal, Queens Dock, Swansea. We saw one of the two multi-parameter sondes broadcasting live data. On our return to the Welsh Centre for Printing and Coating, the STREAM weather radar operating on one of the campus buildings was pointed out to us, and this was monitoring the rain clouds over Swansea Bay.

At the WCPC premises, we were shown the principals involved in designing and manufacturing sensors and a screen printing demonstration.



Many discussions were held during the demonstrations, allowing participants to exchange ideas, address questions, and delve deeper into the presented topics. After the engaging discussions, attendees enjoyed lunch, fostering networking and collaboration opportunities.

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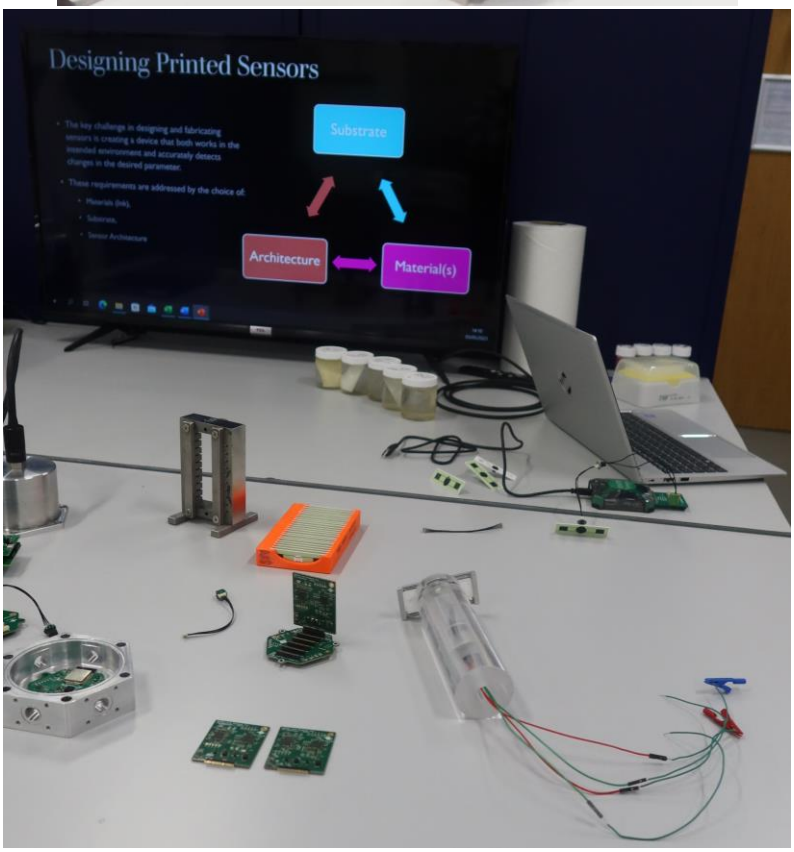

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WCPC Conference 4th May 2023

Professor David T Gethin, WCPC Swansea University, warmly welcomed the attendees and outlined the plans for the conference.

The first session focused on the "Need for marine sensing." In this session, Prof. Carlos Garcia De Leaniz (CSAR) presented insights into the critical role of marine sensing and its relevance to aquaculture. The presentation highlighted measuring key marine parameters such as temperature and its influence on aquaculture.

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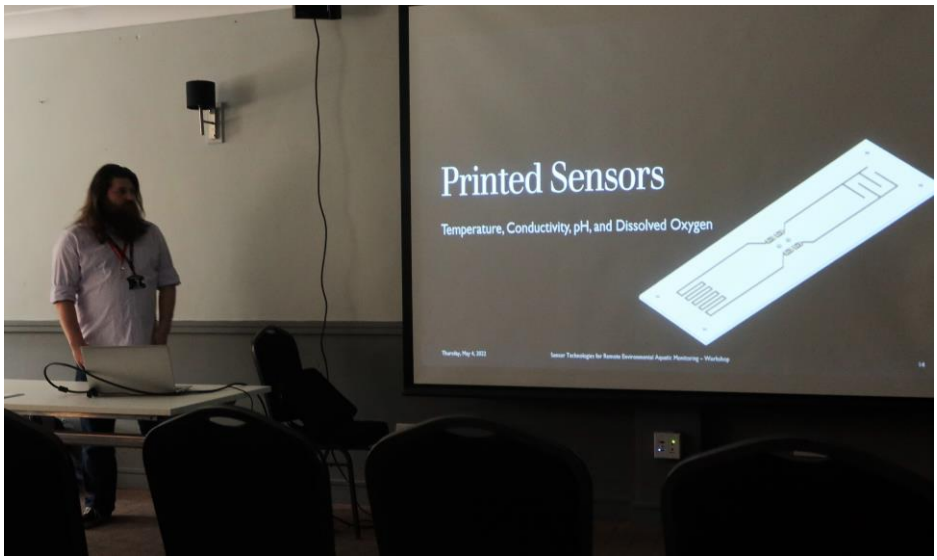
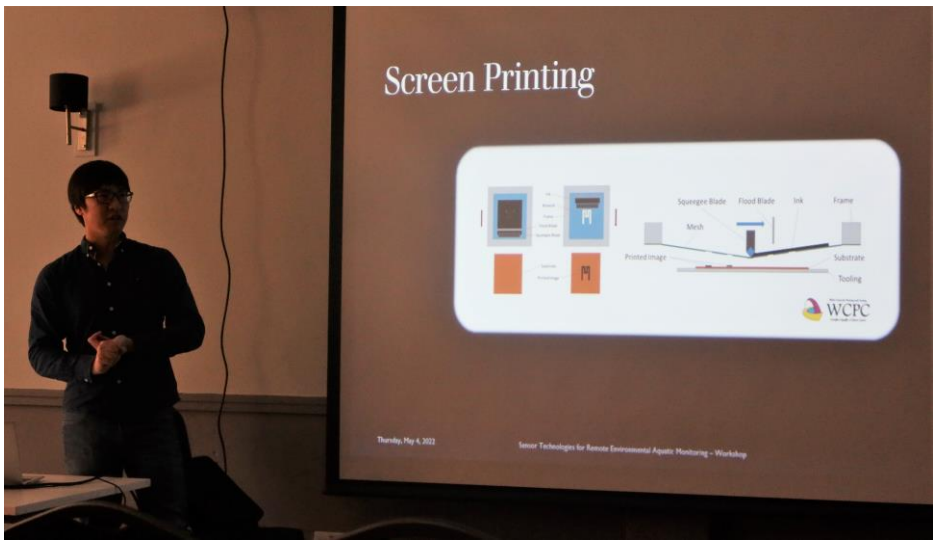
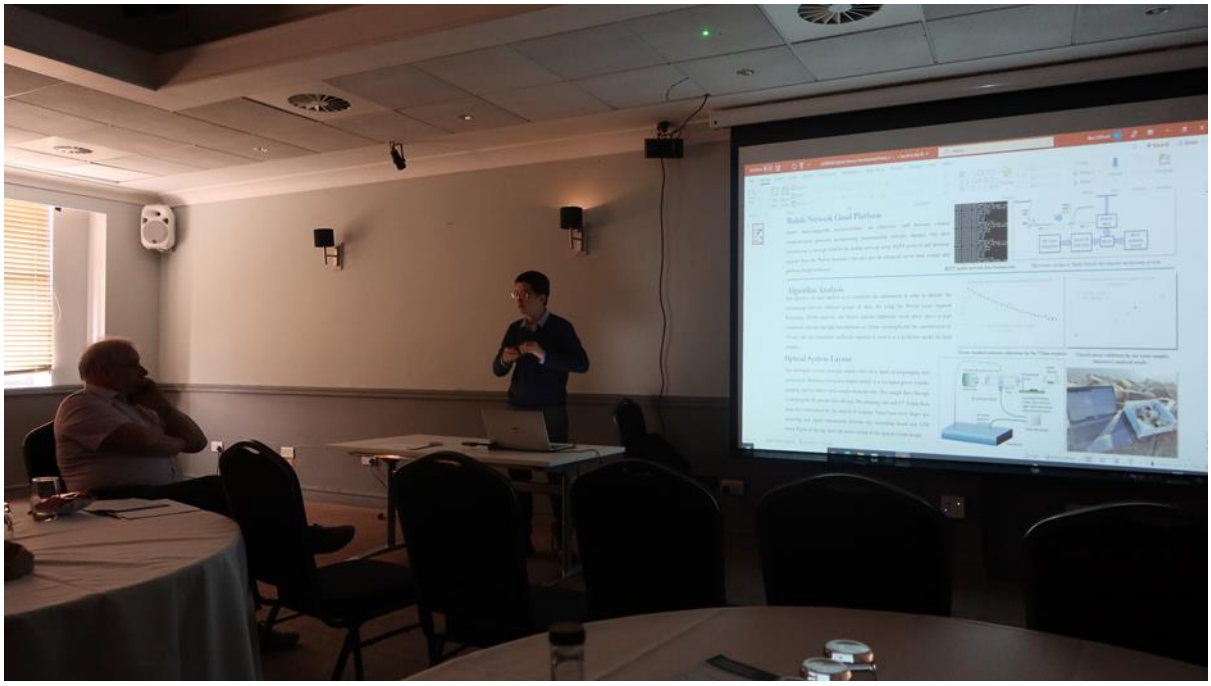
Drs. Tim Mortensen, Ben Clifford, and John Lau provided an interesting session described as "Printable Sensor Design and their Manufacture". Here they presented the WCPC's progress in fabricating sensors through printing technology. This session shed light on manufacturing sensors using printing techniques and the associated systems.





Dr Joseph O'Mahony (SETU) had been timetabled to present on MEMS Spectrometers with Edge Processing for Nutrient Evaluation (SETU presentation of optical sensors for Nitrates/bacteria) but unfortunately, due to other commitments, he was unable to travel. Benyuan Yu and Dr Mitra Abedini ably spoke and described some of the activities involving Novel Sensor Developments at SETU. They presented their innovations in marine sensing, focusing on optical sensors for Nitrates and biotoxins. These novel sensor developments have the potential to advance marine monitoring capabilities significantly. The presentation provided insights into these sensors' working principles and potential applications.



John Ronan (SETU/Walton) covered their cloud facility and system integration, mentioning weather radar deployments by the Marine Technology Unit (MTU). The cloud facility allows efficient data capture and storage and provides information for analysis in marine sensing applications. Weather radar deployments in marine monitoring showcased the diverse range of technologies employed in the field.

Dr Alan O'Riordan, of the Tyndall Institute: Electrochemical Nanosensors for Sustainable Agriculture and the Environment was to give a presentation on ongoing work on environmental sensor development at the Tyndall Institute but was unfortunately unable to attend the event.

Dr Ronan Browne SETU provided Case Studies of Marine Monitoring around Ireland with a presentation on historical marine environment data and its impact on aquaculture, using Ireland as a case study. This showcased real-world examples of how marine sensing and data analysis have influenced aquaculture practices and environmental decision-making.

Conclusion: The STREAM Workshop on Technology for Marine Sensing held in Swansea provided valuable insights into the significance of marine sensing and the latest advancements in sensor technology. Attendees learned about measuring key marine parameters, printable sensor design, and the potential for optical sensors for marine applications. Additionally, the workshop highlighted the importance of data capture, analysis, and cloud integration for efficient marine monitoring. The case study on marine monitoring around Ireland exemplified the practical implications of marine sensing on aquaculture and environmental management.