Ajit Pillai

2018 – Lecturer – University of Exeter
2016-2018 – Postdoctoral Research Fellow – University of Exeter
2012-2016 – Offshore Wind Research Engineer – EDF Energy/University of Edinburgh

2019 - PI – EPSRC I-CASE Studentship – Autonomous Systems for Offshore Wind O&M
2019 - Co-I EPSRC Supergen ORE Hub FlexFund – Accounting for Current in Wave Buoy Measurements

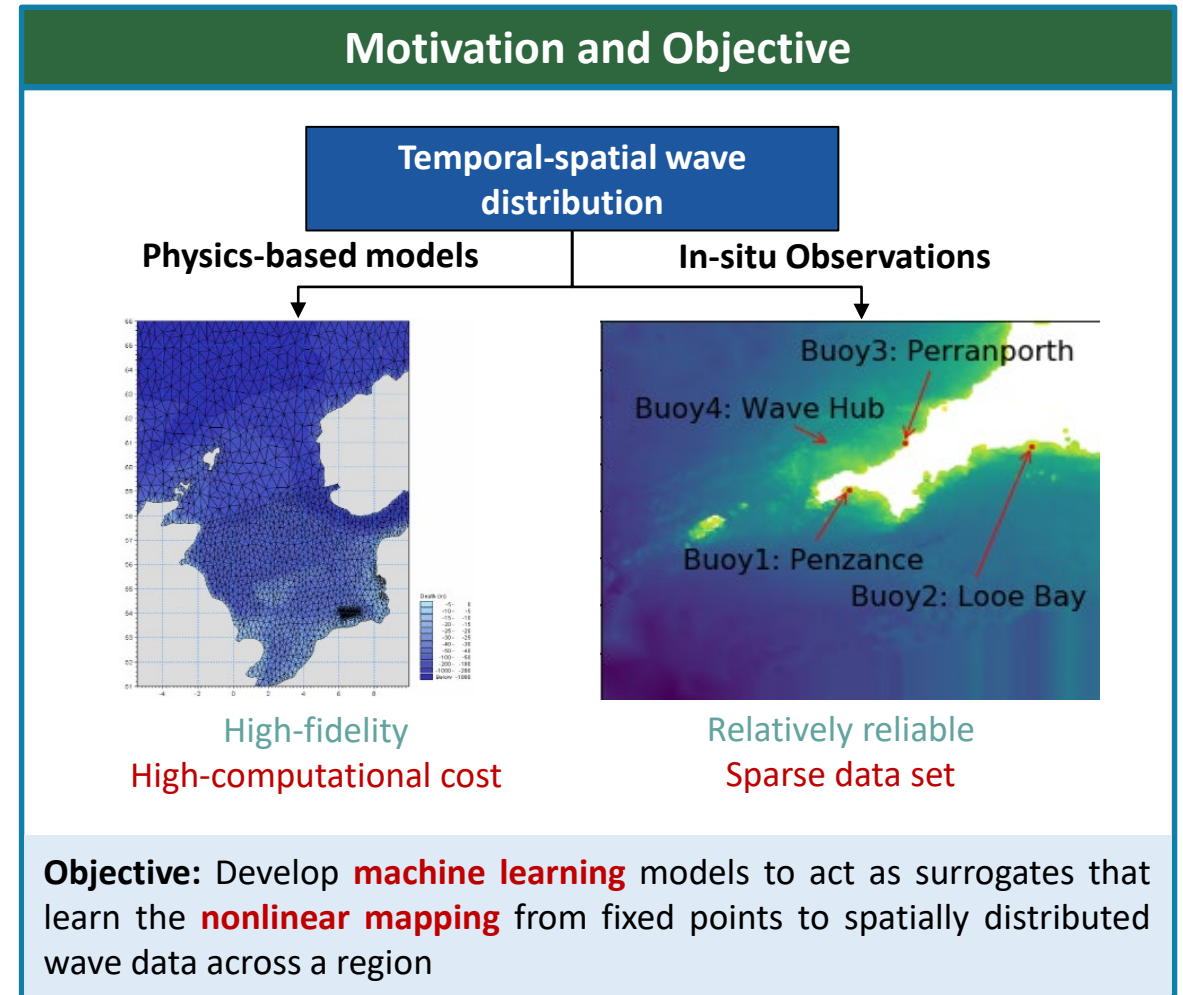*2020 – Co-I – InnovateUK KTP – Machine Learning for Structural Health Monitoring*
2020 – Co-I – EU Interreg-Channel – EuroSwac
2020 – PI – EPSRC Supergen ORE Hub FlexFund – Machine Learning for Low Cost Offshore Modelling
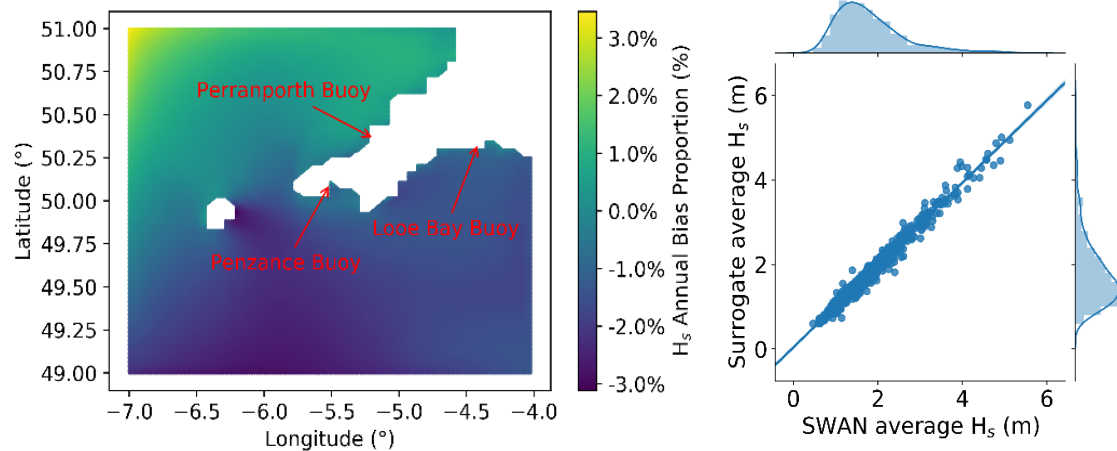
AIMS AND OBJECTIVES

- MaLCOM aims to demonstrate a **machine learning system** that can **integrate metocean sensor networks** and **physical models**, to **improve** the provision of met-ocean data
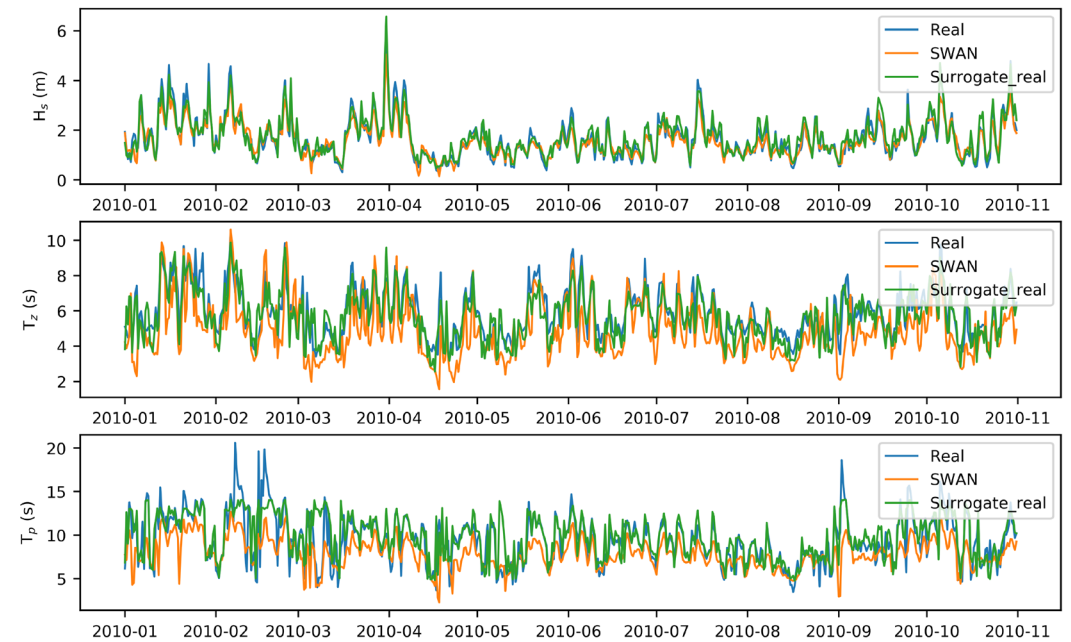

Motivation and Objective

Temporal-spatial wave distribution

Physics-based models — In-situ Observations

High-fidelity
High-computational cost

Relatively reliable
Sparse data set

Buoy3: Perranporth
Buoy4: Wave Hub
Buoy1: Penzance
Buoy2: Looe Bay

Objective: Develop **machine learning** models to act as surrogates that learn the **nonlinear mapping** from fixed points to spatially distributed wave data across a region

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PRELIMINARY RESULTS

Accuracy of Surrogate model

Surrogate Model Verification (@ Wave Hub)

- At the Wave Hub buoy, the surrogate model outperforms SWAN for now-casts in all four parameters

- RMSE of surrogate T_z predictions was half that of SWAN predictions

- Offers instant access high-accuracy model output with limited computational requirements

		R²	RMSE	NRMSE
H_s	SWAN	0.8521	0.3218	19.01%
	Surrogate	0.9067	0.2556	15.10%
T_z	SWAN	-0.0257	1.3903	23.71%
	Surrogate	0.7205	0.7258	12.38%
T_p	SWAN	0.2263	2.4852	26.26%
	Surrogate	0.5558	1.8831	19.89%

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