



<b>SUPERVISOR INFORMATION</b>	
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Department	Civil Engineering
Field(s) of research	Coastal Engineering and Marine Energy
<b>PROJECT PROPOSAL</b>	
Title (optional)	Machine Learning and Artificial Intelligence Tools for Coastal Evolution Prediction – CoastLearn
Brief project description	
<p>Coastal erosion and the related retreat of the coastline are serious and recurring problems in various regions of the world.</p> <p>The necessary adaptation associated to these problems and to the future effects of climate change requires the effective implementation of coastal structures and interventions, which are considered essential to help coastal communities face the new and future challenges.</p> <p>These solutions must be properly designed and studied prior to their implementation, namely using numerical models capable of evaluating climate change scenarios (which require large temporal and spatial scales, e.g. several decades and several hectares, respectively) and dealing with complex coastal structures (e.g. groins, detached breakwaters), as well as dune interactions.</p> <p>For this aim the use of more advanced tools as machine learning and artificial intelligence can allow engineers and decision-makers to better analyze more solutions and options and to decide the best one, their future impact on the coast and various adaptation strategies.</p> <p>The application of these techniques in this specific field of coastal engineering and defense is under development. The integration of machine learning techniques in coastal engineering marks a paradigm shift in how coastal processes are modelled and understood.</p> <p>While traditional empirical and numerical models have been stalwarts in simulating coastal phenomena, the burgeoning complexity and computational demands have paved the way for data-driven approaches to become the central issue.</p> <p>CoastLearn will focus on this context and will contribute to the development of new tools and approaches for coastal engineering applications.</p>	