

Project Title	Neural Architectures for Predicting the Behaviour of Dynamical Systems
Supervisor	Prof Anil Bharath
Theme(s)	Computational and Theoretical Modelling Neurotechnology and Robotics
Project Type	Lab based
Project Description	<p>Fuelled by artificial neural architectures and backpropagation, data-driven approaches now dominate the engineering of systems for pattern recognition. However, the predictive modelling of the behaviour of complex dynamical systems - such as those governed by systems of coupled differential equations - remains challenging in two key ways: (i) long term prediction and (ii) out-of-distribution prediction.</p> <p>Recent progress in disentangled representations (Fotiadis et al, 2021) has nudged the field forward, but it is now time to return to the underlying neural architectures, seeking those that are better suited to the intrinsic dynamics implicit in a system of equations. We seek to explore different approaches to this problem, including Siamese network structures, progressive network growth or, perhaps, neurons which incorporate some form of plasticity.</p>