**USING SPATIO-TEMPORAL POPULATION MODELS TO INFORM MIXED FISHERY MANAGEMENT**

Dolder, Paul J.1,2, Minto, Cóilín.1, Thorson, James T.3

1 Marine and Freshwater Centre, Galway-Mayo Institute of Technology, Dublin Road, Galway, Ireland

2 Fisheries and Ecosystems Division, Centre for Environment, Fisheries and Aquaculture Science, Lowestoft, United Kingdom

3 North West Fisheries Science Center, National Marine Fisheries Service, Seattle, United States

**Contact email**: [paul.dolder@gmit.ie](mailto:paul.dolder@gmit.ie)

Fisheries exploit fish populations that are heterogeneously distributed in space and time, yet different species exhibit spatial correlation where there is similar habitat or environmental preference. Consequently, some species are more likely to be caught together in ‘mixed fisheries’, which may impact the success of management when a weaker population is caught along with a healthier population. In Europe, where fisheries are predominantly managed by species-specific landings quotas, discarding of the weaker population (the throwing back of fish for which you don’t have quota) has undermined efforts to rebuild depleted populations. Since the 2013 reform of the Common Fisheries Policy (CFP) a requirement to land all fish caught has started to come into force which means this is no longer possible. To maximise benefit from fisheries that catch multiple species there is a need to allow catches from healthy populations while protecting weaker ones. Thus, there is increasing interest in spatial management measures that can decouple exploitation among species, which requires a detailed understanding of spatio-temporal dynamics of fish populations. Here, we employ advanced model based geostatistical methods to understand co-occurrence of nine of the most commercially important quota species in the Celtic Sea. We fit a ‘Vector Autoregressive Spatial-temporal model’ (VAST) to 25 years of survey data, integrating across seven fisheries independent research surveys. We use the results to draw inference on how geostatistical methods can be used to understand inter-species dynamics and support spatio-temporal management measures to improve sustainability in mixed fisheries.

Oral – preferred, Speed talk – considered, Poster – considered

Theme: Tools for understanding and managing fish populations (modelling); Valuing and managing fish populations (fisheries and aquaculture)