

Marine scientists explore biodiversity and ecosystems in Irish waters

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Image of rare giant hydroid over half a meter in diameter taken with the Marine Institute's Deepwater ROV Holland 1.

A team of 14 scientists, led by National University of Ireland Galway's Dr Louise Allcock, recently returned to Galway following a three-week deep sea research survey aboard the Marine Institute's RV Celtic Explorer.

Building on the success of two previous research surveys, the Biodiscovery and Ecosystem Function of Canyons Survey investigated a wide diversity of habitats and underwater communities in the Whittard Canyon system on the Irish Atlantic margin. Whittard Canyon is one of many subsea canyons that incise the eastern margin of the North Atlantic. From its head on the continental shelf, to its mouth out on the abyssal plain, the depth of Whittard Canyon is more than twice the depth of the Grand Canyon.

Speaking about the success of the survey, chief scientist Dr Louise Allcock of the Ryan Institute at National University of Ireland Galway said: "The survey is part of an ongoing effort to understand Ireland's deep-sea biodiversity working in parallel with a national biodiscovery programme."

Outlining the work of the scientists, Dr Allcock explained: "In addition to collecting samples of various [marine organisms](#), the research team investigated the impact of food quality and distribution upon life in these canyons. There was a notable difference between the delivery of [food particles](#) in the different arms of the canyon that were explored, mirrored by the types of communities found."

Dr Allcock also noted the interdisciplinary nature of the research team, which included PhD students from NUI Galway, Queens University Belfast, Trinity College Dublin, and University College Cork. Two undergraduate Marine Science students from NUI Galway, Feilim O'Toole and Sorcha Cronin O'Reilly, were selected to participate in the survey earlier this year. The 3rd year students collected data for their final year projects.



Large amount of marine particles or marine snow in suspension just above the sea floor. Picture taken with the Marine Institute's deepwater ROV.

The research team used the Marine Institute's Deepwater Remotely Operated Vehicle (ROV), Holland 1, to collect specimens of coral, sponges, sediment samples and other marine organisms. Spectacular footage captured by the ROV's high definition camera included a rare giant hydroid over half a metre in diameter, clams and oysters that are over 200 years old and a deep-water rough shark (*Oxynotus paradoxus*).

Aodhan FitzGerald, Research Vessel Program Coordinator at the Marine Institute congratulated the team's effective use of the ROV, which logged almost 150 user hours in water depths ranging from 400 to 2500 metres. He said: "This has been a highly successful survey for the Holland 1, or Holly as the scientists on-board refer to it. The ROV sampled a vast array of specimens in a variety of terrain including sheer cliff faces at amazing depths in dives that lasted up to 14 hours."

"This survey has proven the capability of the Holland 1 as a deep-water scientific ROV", he added.

Many of the specimens collected by the research team, including a rare five kilogram sponge, will be used in biodiscovery research. Marine organisms, including the bacteria in sediment, often produce complex chemicals, some of which are likely new to science. Biochemists and chemists will extract these chemicals and test them for antibacterial and other pharmaceutical properties with the ultimate aim of synthesising useful new chemicals in the laboratory.

Dr Kostas Kiriakoulakis of Liverpool John Moores University, along with Dr Martin White, an earth and ocean scientist at National University of Ireland Galway and his PhD student Annette Wilson, conducted an extensive series of water measurements during the cruise as part of their research on the relationship between the ecosystems of the canyons and marine particles.

These particles, often called 'marine snow', are key to understanding how the quantity and quality of available food impacts upon the creation of the underwater communities found in these canyons. Marine particles are the result of the decay of phytoplankton blooms; as the bloom sinks to the seafloor, the material provides food and nutrients to underwater communities. By analysing the water quality and food quality data together with the video from the ROV, the scientists hope to enhance their understanding of how this complex ecosystem functions.

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Programme provides access to the National Research Vessels (Celtic Explorer / Celtic Voyager) for research organisations based in Ireland.

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