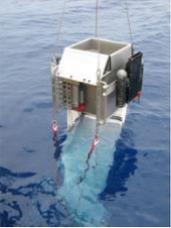
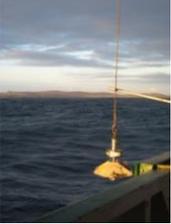


# OCEAN INSTRUMENT QUIZ

This downloadable shows some of the instruments we use in NUI Galway when we go scientific sampling. There are many manufacturers of ocean instruments and here is just a flavour! Why not try and guess what they measure before you read about them!

<p>1</p> 	<p>2</p>  <p>1</p>
<p>3</p> 	<p>4</p>  <p>2</p>
<p>5</p> 	<p>6</p> 
<p>7</p>  <p>3</p>	<p>8</p> 

<sup>1</sup> <https://www.seabird.com/moored/sbe-37-sm-smp-smp-odo-microcat/family?productCategoryId=54627473786>

<sup>2</sup> <https://www.rsaqua.co.uk/products/adcp/>

<sup>3</sup> <https://www.hydrobios.de/shop/horizontal-oceanographic-plankton-nets/manta/>

- 1 **CTD sampler with water bottles.** You might recognise it from our previous oceanography blogs! It is used throughout the world on many research vessels. This one here is onboard the Marine Institute RV Celtic Explorer. It is lowered off the boat using a winch and deployed down through the water column at a speed of around 1m per second. It is tethered to the boat via the winch (winch arm seen as the white 'block' at the top of the picture) and it also has a real-time cable. This real-time cable connects into a computer onboard the vessel and allows scientists to watch the data recording as it goes through the water column. It can measure temperature, salinity (how salty the water is), dissolved oxygen, fluorescence (we use this for chlorophyll concentrations), turbidity (how many particles are in the water) and many other parameters depending on the survey. The instrument that collects that data is below the grey water bottles shown in the photo. As it goes down through the water column it is called the downcast and as it comes up it is called the upcast. On the upcast the water bottles are closed at certain depth-where there are changes in the temperature or oxygen or fluorescence. This allows water samples to be taken and analysed on board.
- 2 **Temperature and Conductivity sensor.** This particular one is made by a company called Seabird but there are many other manufacturers. It measures pressure (depth), temperature, conductivity and using these parameters to calculate salinity. It is different to the CTD sampler because these sensors are deployed on moorings. They can be left there for months or often years to record. They might record every 10,20,30,60 minutes and the data is stored in the instrument. When the instrument is brought back ashore the data is downloaded onto the computer through the black connector at the bottom of the sensor. Moorings allow us to look at long term changes in an area.
- 3 **XBT-eXpendable Bathy Thermograph.** It sounds more complicated than it is!! It also measures temperature in the ocean. It was designed by a company called Sippican to be used when boats are moving. The reason for this was to save time and allow temperature to be taken on non scientific vessels as they were travelling. The long black tube contains a weight and a long coil of very fine copper wire, as thin as your hair! There is a pin on the bottom of the black tube and once it is pulled the weight drops out into the water and the copper wire unravels. The person holding the orange instrument keeps holding it away from the vessel as the copper wire unravels. The weight has a thermometer on it and as it drops through the water column it transmits the readings to the orange instrument. The orange instrument is connected into a computer and records the readings. When the copper wire runs out it snaps off and the profile is finished.
- 4 **Acoustic Doppler Sensors.** They measure ocean and river currents using sound. The red circles which we call beams send out sound pulses that scatter off any particles in the water e.g. phytoplankton. The sound beams hit these particles and it uses the Doppler Effect to calculate water speed and direction. The sensors can be moored on the sea/river bed or can be attached underneath a moving vessel. The sensors can be set up so that we can get data from different depths through the water column for a number of months or even years. The white tubes behind the beams contain batteries as well as the onboard computer that stores all the data. The data is downloaded once the instrument is brought ashore. For more information on the Doppler effect check out Alt Shift X visual explanation here <https://www.youtube.com/watch?v=h4OnBYrbCjY>

- 5 Zooplankton net. This style of net is used for zooplankton and phytoplankton. The phytoplankton net is a mini version of what you see here. The silver ring keeps the mouth of the net open and the net is attached into this using a zip. At the end of the net is a bottle. The net is deployed off a winch system and lowered into the water column to a depth that the scientist decides on. It is then pulled up vertically through the water. Once onboard the net is washed down with a hose. This allows any zooplankton that are stuck on the net to be washed into the bottle at the end of the net. This bottle is then clipped or unscrewed off the net and taken into the laboratory on the vessel and the contents are either sorted under a microscope or stored for future analysis.
- 6 Multinet. This is the same as the zooplankton net except it can have up to nine nets attached to the silver square. Each net can be opened and closed at a particular depth. The instrument has a cable that connects to a computer onboard the boat. The net is lowered again by a winch and the software on the computer on the vessel is used to open and close each net. This allows different depths from the one place to be analysed.
- 7 Manta Net. This is used to collect microplastics in the surface of the water. It floats on the surface of the water and is towed by the boat. Check out this link where a manta net is deployed from a sailing boat <https://www.youtube.com/watch?v=6EBCTDY3C4E>
- 8 Shipek Grab. Many different types of grabs are used to sample the seafloor sediment. A Shipek seen here is used for a wide variety of sediment types from soft sediment to pebbles. It is lowered to the seabed open and then once it lands on the seabed it closes. The following video from Leslie Sautter shows how the instrument is armed, lowered and how the sediment is collected from it when it is brought back on board. <https://www.youtube.com/watch?v=GafY4dBuA3g>

These are just some of the sensors we use on our surveys. I hope you have enjoyed learning about them!

This blog is brought to you by Sheena Fennell, an oceanographer in [Earth and Ocean Sciences at NUI Galway](#).

Part of a Nature Series by the Ryan Institute during #LockDownIreland

