

Working with Cefas to create cutting-edge software for surveying sea life

What happened?

An ASG-funded collaboration produced neural networks-based software that works with high-speed cameras to classify plankton. Data scientists hand-picked by The Alan Turing Institute developed the software with [Centre for Environment, Fisheries & Aquaculture Science](#) (Cefas) researchers during a Turing [Data Study Group](#) (DSG). It is now in use aboard the scientific research vessel Cefas Endeavour, helping scientists to study marine life in the North Sea.

What are the real-world impacts?

- New software that automatically counts and classifies plankton at a rate of 50 organisms per second with over 90% accuracy – beyond what is humanly possible.
- Classification helps scientists gain a clearer picture of ocean health, due to the key roles that plankton play in ocean food webs, and carbon and nutrient cycles.
- The software was in use within six months of the DSG, following further development and testing by [Plankton Analytics](#).
- The open-source software can be adapted to classify images of other marine objects and species, helping to transform the way scientists study the oceans.

Why was the Turing's [ASG programme](#) uniquely placed to do this?

- ASG extracted maximum value from its £10k investment by co-funding a Turing DSG (report [here](#)), a fortnight-long, intensive 'hackathon' focused on the plankton classification problem presented by Cefas' [Sophie Pitois](#). DSGs are a well-established Turing format supported by a dedicated team.
- During the DSG, researchers were also able to test the algorithm they developed using an early-stage, open-source tool called [scivision](#), a platform designed by ASG-funded researchers that allows experimentation with computer vision data.

How did the Turing network convening capability add to the work?

- Via the Turing brand, the DSG was able to attract, and carefully select, scientists working in software engineering and computer vision from universities across the UK and further afield. This expert group helped Cefas access the knowledge it needed to gain new insights into the problem and how to address it.
- An ASG-funded [Research Application Manager](#) (RAM) took on the role of community leader during the DSG, steering the group through the problem and decisions about next steps, whilst keeping it on track to hit its goals within the short timeframe.

What's next?

- Cefas is developing the system so that plankton data can be accessed in real time, allowing scientists to guide and adapt sampling as it happens.
- One avenue for future research already identified by the researchers is the automatic detection of different types of microplastics pollution.

“Aside from the fact that we got this great algorithm out of the work, the process of being with the Turing to think through those problems with people with much wider experience, great new ideas and focus, and a fresh set of eyes was hugely useful.”

[Robert Blackwell](#), Cefas data scientist