*Richard on the ice in Cambridge Bay in the Kitikmeot Region of Nunavut, Canada, in May 2019. Richard and colleagues were taking sea-ice cores in order to melt them and measure the total alkalinity of the ice and dissolved inorganic carbon content; they were also were deploying an ice-tethered tilt current meter.
(Photo: Zoe Walker)*

I am currently using the Fluxengine to compute the impact of tropical cyclones on the atmosphere–ocean exchange of CO_2. I will present my first piece of work using the Fluxengine at the 8th International Symposium on Gas Transfer at Water Surfaces in Plymouth this year (2022). I also plan to see the project that was funded by the Stepping Stones Bursary through to completion with the aim of getting the results published later this year.

I would encourage other early-career researchers to apply for the Bursary, especially as its flexibility means that it can be used in many different ways and the funding is upfront and not conditional on any research output.

The Bursary helped me learn new research skills and eventually helped me secure a postdoc which has benefitted my career immensely.

Richard is currently at the University of Exeter, where his research focusses on CO_2 in the surface ocean, and the atmosphere–ocean flux of CO_2. Richard enjoys going to sea to make observations but is also interested in how autonomous systems and big data can help us better understand the oceanic carbon system. R.Sims2@exeter.ac.uk

Using a Stepping Stones Bursary to attend a key conference   *Siddhi Joshi*

The Challenger Society for Marine Science's Stepping Stones Bursary gave me the opportunity to present my research at the international GeoHab 2022 Marine Geological and Biological Mapping Conference on San Servolo Island in Venice.

GeoHab conferences have been of great significance in my marine science career. I was first told about them, with enthusiasm, by Dr Veerle Huvenne, my undergraduate supervisor at the University of Southampton way back in 2005, when the conference was in Sidney, Canada. Importantly for me, while investigating the conference, I discovered the novel approach to marine habitat mapping done at the National University of Ireland (NUI), Galway, led by my future Ph.D supervisor.

Goehab had been held in Galway in 2004. As it happens, I had been inspired by a quote that I discovered my future Ph.D supervisor, Professor Colin Brown, had put in the final slide of his presentation: 'The difference between a Stepping Stone and a stumbling block is how you use it.' I ended up doing my Ph.D and a postdoc (both working on maerl in Galway Bay), and a Master of Laws (LLM), all at Galway, over the course of 11 years!

After my post-doctoral year, I returned to the UK and found myself unemployed/on long-term medical leave during Lockdown. As an Independent Marine Scientist, not affiliated to or funded by any academic institution, I felt helpless until I decided to apply for the Challenger Society Stepping Stones Bursary.

I finally had the opportunity to attend GeoHab when it was in Winchester, UK, in 2016, but without making an oral presentation, so in 2022, after 16 years I was determined to showcase my work on Galway Bay to the international habitat-mapping community by presenting it in Venice, The topic of my talk was 'Integrating sediment dynamics into habitat mapping approaches in Galway Bay, Ireland'.

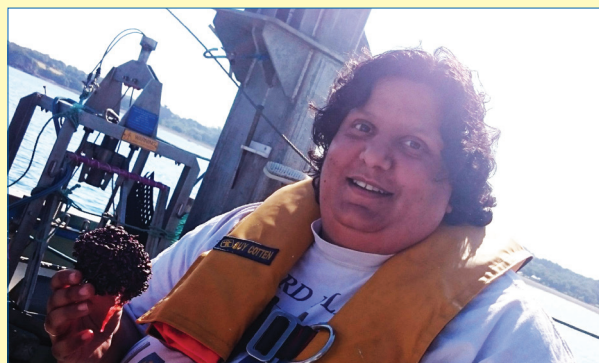### Maerl sediment dynamics

Maerl (or rhodolith) beds are made up of non-geniculate (i.e. not bent like a knee) coralline red algae which

*Maerl grains from Carraroe maerl beach which fringes Greatman's Bay in South Connemara, County Galway, Ireland
(Photo: Emer O'Shea)*

form dense biogenic gravel beaches, intertidal beds and marine beds worldwide. They are in the OSPAR list of threatened and/or declining habitats, and in Ireland and the EU are protected under the Habitats Directive. My Ph.D had focussed on obtaining a detailed understanding of the sediment dynamics of maerl in Galway Bay, determining import- ant quantities such as grain shape, density and grain size, settling velocity and critical bed shear stress for initiation of motion. I had then obtained sediment mobility indices by integrating the characterstics of maerl into coupled hydrodynamics– wave–sediment transport models for both calm and storm conditions. The results of my modelling showed that the key hydrodynamic parameter determining the distribution of maerl

Siddhi in the Bay of Brest, holding a specimen of living maerl that she has just collected from the sea bed .

habitat, and of grain sizes within it, is the peak combined wave–current-in- duced sediment mobility during storm conditions.
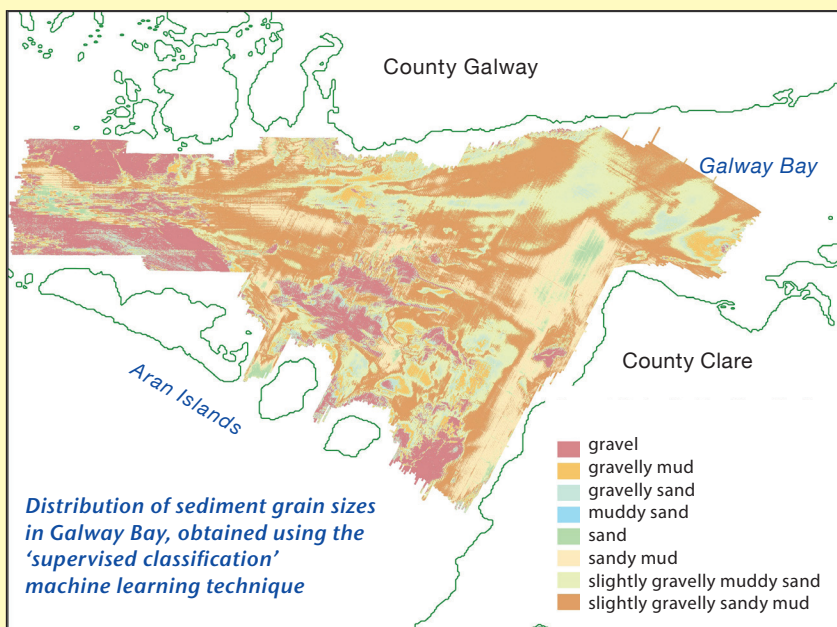
The next step following my Ph.D research was to integrate sediment dynamics into marine habitat-map- ping approaches using 'supervised

classification'. In this machine learning technique, a classification algorithm is used to identify the categories of new observations (e.g. sediment grain sizes) on the basis of 'training data'; the program learns from the given dataset and then clas- sifies new observations into a number of classes, in this case, the grain-size classifications shown on the map.

Information about marine sediment dynamics provides vital insights into the important role of oceanographic forcing factors in determining habitat distribution, yet remains under- utilised in marine habitat-mapping studies. I cared passionately about my work in Galway Bay, and was pleased when It was generally well received, with positive feedback and lots of fruitful discussion afterwards.

Thank you to the Challenger Society for this wonderful opportunity when I needed it most!

Siddhi has recently joined the Challenger Society Council, and coordinates the Early Career Researcher Network. Her publications can be found at: https:// siddhijoshi.com/ Email: siddhi@hotmail. co.uk Twitter: @seabedhabitats

County Galway

Galway Bay

Aran Islands

County Clare

- gravel
- gravelly mud
- gravelly sand
- muddy sand
- sand
- sandy mud
- slightly gravelly muddy sand
- slightly gravelly sandy mud

Distribution of sediment grain sizes in Galway Bay, obtained using the 'supervised classification' machine learning technique

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How to apply for a Stepping Stones Early Career Bursary

Stepping Stones bursaries are designed to support career development for members of the UK marine science research community who are not employed. Applications are not accepted from researchers holding permanent positions, but those on fixed-term contracts may apply up to three months before the end of their contract.

Individuals may receive only one bursary in any three-year period and the maximum amount that any individual can be allocated in any one funding round is £1000. Bursaries can be used for research-related activities which could enhance career prospects including, but not limited to, travel, collaborative visits, laboratory time, fieldwork and conference participation. It cannot be used to pay salary. The Society aims to fund four bursaries per year, and applications will be considered quarterly (deadlines: 15 February, 15 May, 15 August and 15 November).

The application form and full guidance notes for applicants can be found on the Challenger Society website.
https://www.challenger-society.org.uk/Stepping_Stones
Applications should be sent to Sophie Wilmes (s.wilmes@bangor.ac.uk).

See the Challenger Society website for other awards and grants that are available, including the new Virtual Conference Award which aims to cover the costs of registration and administration involved in attending virtual conferences.