How filter-feeding bivalves could be used to clean up microplastics

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UConn's Water Pollution Control Facility. Researchers are testing the abilities of certain kinds of shellfish to remove microplastics from water. Credit: Baikun Li

On a hot summer day in Connecticut, it's common to go to a beach-side restaurant, eat some fresh oysters and mussels, and enjoy the crashing of the waves against the sand. For a group of University of Connecticut faculty and a Florida Atlantic University professor, their plan is to skip the beach and the restaurant and use relatives of those delicious animals for another reason—filtering the harmful microplastics that end up back in our environment.

"Suspension-feeding bivalves, such as oysters, clams, and zebra mussels are very efficient at filtering water and capturing on their gills (the 'filter') particles as small as four micrometers in size [less than 1000th of an inch]. Their 'filter' is self-cleaning and they often filter water for 12 or more hours per day. They are nature's perfect filtering machine," Marine Sciences Professor J. Evan Ward says.

Over the next four years, the group—including Associate Dean Leslie Shor, Chemical and Biomolecular Engineering Professor Kelly Burke, Molecular and Cell Biology Professor Daniel Gage, Civil and Environmental Engineering Professor Baikun Li, and Ward—will use a $2 million grant from the National Science Foundation's Emerging Frontiers in Research and Innovation (EFRI) program to study the use of mussels (part of the bivalve family), combined with microplastic-degrading bacteria, in the filtration of microplastics from the discharge that flows back into our surface water from wastewater treatment plants.

Other faculty members involved in the project include CEE Professor Christine Kirchhoff, CBE Professor Matthew Stuber, CBE Professor Jeff McCutcheon, Marine Sciences Professor George McManus, and Florida Atlantic University Biology Professor Tracy Mincer.

Microplastics, an umbrella term for particles of many different shapes, sizes (