

Saving the oceans one robot at a time

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Anyone who has ever seen the Hudson River can conjure up an image of a dirty, chemical-laden body of water with trash that chokes the docks and piers along NYC and New Jersey.

Earlier this summer, I watched in horror with several dozen other people, as two girls jumped into the river for a quick dip. Several people expressed their concern about the trash floating just feet away from the swimmers. I considered the several centuries worth of garbage and chemicals that we've dumped into the river, combined with the raw sewage and chemicals that have made their way down to the water. Everyone knows you don't swim in the Hudson, but is there a way to restore the river to a swimmable level?

People started realizing all the trash dumped into oceans was going to be a problem once it started washing back up on shores in the form of plastic, glass, and needles. Researchers and scientists have been trying to design technology that can clean the water, but the sheer magnitude of the problem is proving difficult.

The question still stands: How do you clean up tons of garbage spread out over hundreds of thousands of miles of oceans?

The Drone



Researchers realized they needed to design a way of collecting trash that wouldn't disturb the environment more than necessary, but was efficient and autonomous.

The [Veolia Marine Drone](#) [1] is an in-the-works machine that will hopefully help clean up the most polluted areas in the ocean. The Drone was designed to target gyres—areas in the ocean where wind and ocean currents create a whirlpool of sorts—which often trap plastics and other manmade pollution.

For those not up on their oceanography terms: There are five gyres in the world, and the North Pacific gyre is the world's largest ecosystem. Scientists have discovered that the amount of trash trapped in the gyre by the currents is becoming detrimental to the sea life.

Elie Ahovi, an industrial design student at the French International School of Design, came up with the idea of a cone-shaped filter that would travel through the water, gathering up bits of plastic before returning to its ship dock so the material could be recycled.

The Drone consists of a 2cm net with buoys to balance the machine despite the added weight of the trash, a steel body with six ballasts, and a cover made of composite material. In addition to oxygen bottles and high-powered batteries, which allow the machine to stay in the ocean for up to two weeks, it includes an infrasound system to scare fish and other wildlife and prevent them from being trapped in the net and a quiet engine to lessen the noise impact. The Drone comes equipped with sonar to communicate with other drones in the area to prevent overlapping and make the machines more efficient.

Though it's still in the design stages, the Drone is an intriguing, if not the most efficient solution. After all, we're talking about massive amount of water to filter. But, depending on price, it might be a start.

Here fishy, fishy



So, we have a way to clean up the pollution, but how do we find it?

Researchers at the BMT Group have also designed a “[robo-fish](#) [2]” called [Shoal](#) [3], capable of detecting and identifying pollution, lessening the amount of time it takes to locate the source of a chemical spilling into the ocean. It’s a more proactive approach than the Drone, which was designed with cleanup in mind.

The main feature is the fish sports chemical sensors, which allow the fish to figure out where it needs to go, what sort of samples it is taking, figure out the composition of the samples, and communicate all this information through shallow water to researchers. It can also monitor oxygen and salinity levels, in addition to detecting heavy metals and pollution while diving up to 95 feet.

The 5-foot fish is able to communicate with other “fish” using an [Underwater Mobile Ad-hoc Network](#) [4] and return in time to charge its 8-hour battery. They’re designed to blend into the natural environment with minimal impact, as much as a yellow robotic fish that’s roughly the size of Japanese Angel shark can blend in. But the sleek design and various fins allows the fish to maneuver around debris and other barriers, so it’s important with regards to the efficacy of the robot.

If you’re concerned about what happens when you drop a \$31,000 machine into the ocean with not much more than a bon voyage, the fish emits a distress signal to port authorities if it’s removed from the water by anyone who is just looking for dinner.

The researchers hope that the technology will eventually become sophisticated enough to aid emergency services during search and rescue operations.

It might seem a little weird should you ever catch one of these robo-fish on your line, but if it helps clean up some of the oceanways, it's worth it.

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Photo credit: Luke Speller, www.roboshoal.com [3]

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