CYBORG SEA SLUG

Partially organic robot could be useful for critical search and locate tasks.

Researchers at Case Western Reserve University have developed a unique biohybrid robot—a 2-inch-long living machine constructed with sea slug tissue and 3-D printed parts.

Victoria Webster, a PhD student in the Department of Mechanical and Aerospace Engineering, led the team that created this unique piece of technology. The robot is built around a single muscle from a sea slug’s mouth, which provides the movement—the robot can crawl when stimulated by an external electrical field. The researchers hope to control future iterations by incorporating living neurons into the robot as well.

The team envisions swarms of these hybrid ‘bots scouring the ocean floor in search of a black box recorder, for example, or rooting out the source of a toxic leak in a pond.

Webster worked with Roger Quinn, the Arthur P. Armington Professor of Engineering and director of Case Western Reserve’s Biologically Inspired Robotics Laboratory; biology professor Hillel Chiel; Ozan Akkus, the Leonard Case Jr. Professor in the Department of Mechanical and Aerospace Engineering; Umut Gurkan, assistant professor of mechanical and aerospace engineering, undergraduate researchers Emma L. Hawley and Jill M. Patel and recent master’s graduate Katherine J. Chapin.

Learn more at engineering.case.edu/biohybrid-robot.
**INTERNATIONAL POLYMER PROGRAM**

**Case Western Reserve launches dual PhD program in Brazil**

Polymer science students in Brazil can take advantage of Case Western Reserve’s field-leading polymer expertise, thanks to a new dual PhD program launched this year.

Funded by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, or CAPES—the Brazilian equivalent of the National Science Foundation—the program will reach a steady state of supporting 40 PhD students in polymer science. Students will start the program at their home institution in Brazil, conduct their second and third years in residence at Case Western Reserve, and complete the program in a four-year back at home.

The first 12 students started the program this spring and another seven joined this fall. The partner institutions expect to expand the program to biomedical engineering students as well.

Learn more at engineering.case.edu/Brazil/polymer-program.

**ADVANCED MANUFACTURING**

**Researchers explore how to improve performance of lightweight materials.**

Materials researchers at Case Western Reserve University are collaborating on two projects within Lightweight Innovations for Tomorrow (LIFT)—part of the Obama administration’s National Network for Manufacturing Innovation program, recently renamed Manufacturing USA—aiming to improve the production and performance of lightweight materials. John Lewandowski, the Arthur P. Armington Professor II, is leading a team in carrying out multiple validation experiments to ensure the reliability of aluminum-lithium alloys in critical applications.

And Matthew Willard, associate professor of materials science, is heading a project dedicated to exploring methods to maintain the performance of aluminum matrix-silicon carbide composites while reducing costs. Both projects have important ramifications for next-generation aerospace and automotive applications.

**GRAND OPENING**

**Department of Civil Engineering celebrates new Geotechnical Labs.**

Civil engineering students and faculty at Case Western Reserve have a new, state-of-the-art space in which to study and make discoveries—a suite of renovated labs dedicated to geotechnical engineering education and research.

The new suite includes the Frank E. Garace Geotechnical Teaching Lab, the Warren C. Gibson Library, the Saada Family Geotechnical Research Labs and the Richard A. Saada Intelligent Geosystems Lab.

Learn more at engineering.case.edu/CivilEngineering.

**SECRETS BEHIND STATIC**

**NSF-funded project will examine mysteries of static electricity.**

Chemical engineering researchers at Case Western Reserve won funding from the National Science Foundation to study the common—but little understood—phenomenon behind static electricity, an everyday occurrence with serious consequences in almost every industry.

Daniel Lack, chemical and biomolecular engineering department chair, and Mohan Sankaran, the Leonard Case Professor of Engineering, are seeking to advance the scientific community’s understanding of triboelectric charging—the process responsible for the shock that follows shuffling across a carpet and touching a doorknob.

The work builds on a 10-year collaboration between the two scientists, which includes a second recent project to study triboelectric charging in wind storms in China.
HELPING STUDENT ENTREPRENEURS SHINE

Innovators secure millions in external funding for startup companies, personal projects and more.

Students and other users of the Larry Sears and Sally Zlotnick Sears think[box] and LaunchNET at Case Western Reserve University have raised more than $5.7 million in external funding for startup companies, individual projects, commercialized research and more. This includes funding like grants, crowd-sourcing, sales, pre-sales and private funding.

Sears think[box] users have been taking advantage of the facility’s full ecosystem of innovation to develop projects like a teddy bear that doles out virtual hugs (pictured here with student innovator Xyla Foxlin), a stylish wristband that secures digital devices and a plasma-injecting device that seeks to save on jet fuel consumption. Resources available include business and legal advice from CWRU LaunchNET and the university’s IP Venture Clinic, in addition to project space, state-of-the-art prototyping equipment, entrepreneurial expertise and incubation space.

Explore more of the innovative projects developed at Sears think[box] at thinkbox.case.edu.

#NATIONOFMAKERS

It’s a fact—Adam Savage, former host of the popular TV series “Mythbusters,” visited Case Western Reserve University’s Sears think[box] this spring. Organized with the White House Office of Science and Technology Policy, the visit was part of a national initiative to promote the maker movement and the kickoff of a national tour of maker hotspots. Check out highlights at engineering.case.edu/Adam-Savage-visit-highlights.

Don’t miss all the news that’s fit to tweet!

Follow us @CaseEngineer

Adam Savage (right) tours Sears think[box] with manager Ian Charnas. Photo by Kevin Kopanski.

IN Inside TThis IIS Issue

- Cyborg sea slug
- New IoT institute
- Safe drinking water
- Fire experiments in space
- Computer-aided diagnosis