Researchers Create Robot Driven by Moth's Brain

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Robo-Moth: UA robot driven by moth's brain.

In a notion taken from science fiction afficionados, University of Arizona researchers presented a robot that moves by using the brain impulses of a moth at the 37th annual Society for Neuroscience meeting in San Diego.

Charles M. Higgins, UA associate professor of electrical and computer engineering, and doctoral student Timothy Melano presented their findings and outlined the mechanics behind the robot's movements.

The robot's motion is guided by a tiny electrode implanted in the moth's

brain, Higgins said, specifically to a single neuron that is responsible for keeping the moth's vision steady during flight. The neuron transmits electrical signals which are then amplified in the robot's base and through a mathematical formula, a computer translates the signals into action, making the robot move.

The moth is immobilize inside a plastic tube mounted atop the 6-inch-tall wheeled robot. To get the moth to imitate flight, Higgins and his team placed the moth in its apparatus on a circular platform surrounded by a 14-inch-high revolving wall painted with vertical stripes. The moth's neuron reacts to the movement of the stripes and the process begins.

The brain of a moth is about the size of a grain of rice. Although small, "its compact size and simplicity allows for an efficient way to do brain research," Higgins said.

'The underlying point in the creation of the robo-moth is the notion of advancing neuroscience," he said.

The Society for Neuroscience meets annually to show advances made by scientists who work to study the architecture of the brain and use that knowledge in the design of new machines.

"Combining the study of machines and the mechanics of the human body has led to great advances that have direct health benefits such as the development of the mechanical heart. Unfortunately, we are nowhere as advanced in our study of the brain as we are in the study of the heart," Higgins added.

"Scientists have reached a frustrating point in understanding the brain - we know how it operates, to an extent but don't know how to stop brain damage or repair it when it occurs." Higgins said. But that may change in the future. Higgins has thus far been able to have robo-moth turn left or

right but not forward or backward. The longest recorded movement has been 88 seconds.

Higgins' work is funded through grants from the National Institutes of Health and the U.S. Air Force. Both agencies granted funding to help gain an understanding of human visual operations. Higgins' research is a step toward a future in brain engineering that will help repair damage or replace lost brain functionality.

Source: University of Arizona, By Rebecca Ruiz-McGill