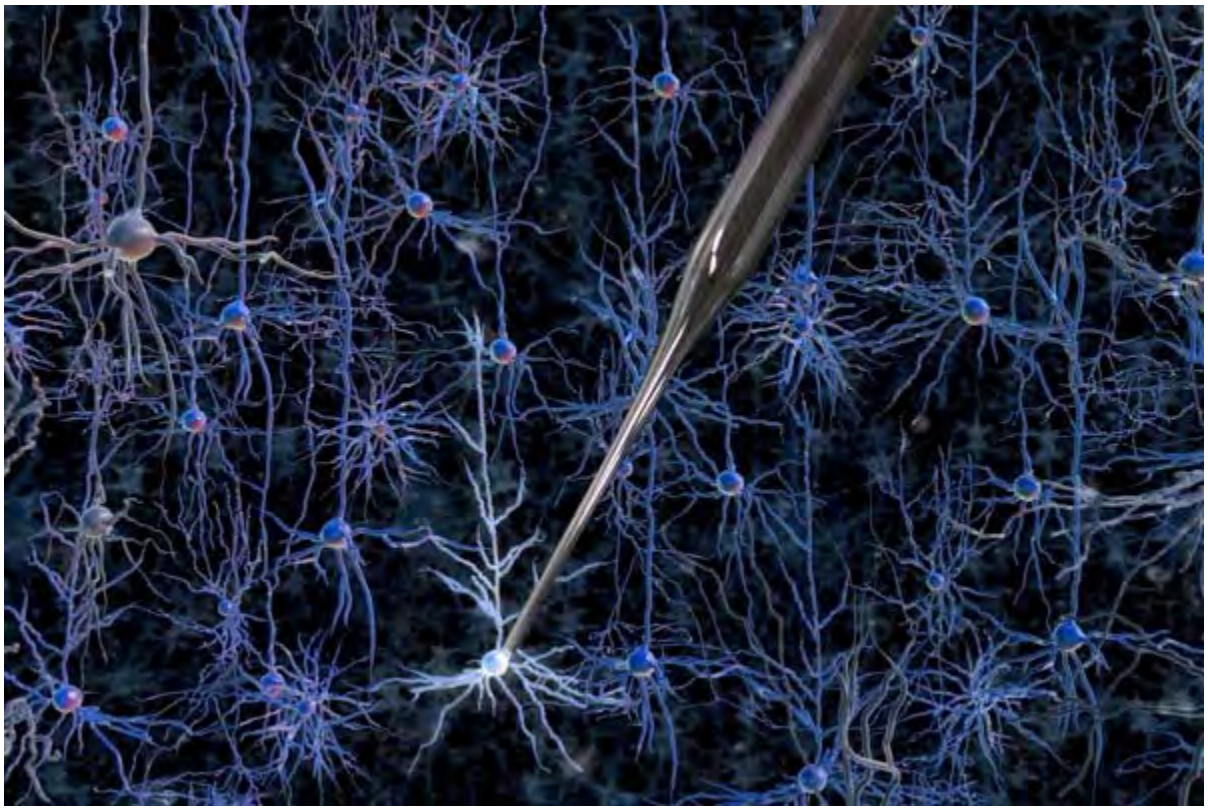
ROBOTICS

Robot That Connects to Neurons Could Provid Understanding the Human Brain

By KEITH WAGSTAFF | @kwagstaff | May 9, 2012 | 1



SPUTNIK ANIMATION AND MIT MCGOVERN INSTITUTE

Suhasa Kodandaramaiah was one of about 30 people on Earth who could perform somethi clamping, a technique for studying the inside of a cell developed back in 1981. By hand, it is good day, lets a researcher examine around three or four individual cells.

Craig Forest, an assistant professor at the George W. Woodruff School of Mechanical Engir to improve on that number. He, Kodandaramaiah and Ed Boyden, associate professor of bi

and cognitive sciences at MIT, decided to try and build a machine that would democratize a only to a talented few.

Their first attempt failed. The team initially wanted a robot that could take multiple sample didn't work, they concentrated on a robot that could measure electrical activity inside of a s

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What they developed could change how we test drugs forever, not to mention provide a kin the brain — a detailed map of which neurons do what and how they all interact. We can alr brain work with metal electrodes. That, however, only gives scientists part of the picture.

"Extra-cellular recording with a metal wire is like just hearing the drumbeat of an orchestra measurement with a glass pipette is like hearing every single instrument in an orchestra."

The machine — tentatively named an auto-patcher — uses a robot arm to move a glass pipe The pipette's point comes down to a micro-needle, which is smaller than a single cell.

MIT

As the robot inserts the micro-needle into the brain, it emits little electrical test pulses, whi presence of a cell. The micro-needle then touches down gently on a cell membrane without formed, an electrode breaks through the membrane.

"It lets you discover all the aspects of what a neuron is doing," says Forest. "Not only an ele that are being expressed and the shape of it. It gives you a complete identification of that n

(**MORE:** Controlling Your World With a Single Neuron)

Nobody knows how many different kinds of neurons are in the brain — estimates run anyw

thousands. Get this technology in the hands of multiple researchers and you could start ide exists, a cause supported by none other than Microsoft co-founder Paul Allen and his Allen task would be made even easier if the team can make good on its goal of creating a robot th at the same time, thus getting a better picture of how they interact.

The technology has more immediate implications as well. Forest, Boyden and Kodandaram called Neuromatic Devices, which could help get the robot in the hands of pharmaceutical c

"Being able to look at the programming of a cell is a very powerful way of learning what ma changes and how it responds to a treatment," says Boyden. The idea is that you could disco develop new ones to fight brain disorders such as Parkinson's disease, schizophrenia and e

(**LIST:** Top 10 Medical Breakthroughs of 2011)

Even beyond the brain, the robot has plenty of uses. The team sells the machine through its detailed instructions on how to build and program it through the website autopatcher.org. that would trade code and modify and improve the original computer algorithm for other u

For example, the robot can do more than just measure electrical activity. Once that seal is f could infuse the cell with a chemical or extract messenger RNA and figure out what makes also go beyond neurons to study things like tumors and stem cells.

The guys who developed the old hands-on approach to patch-clamping won a Nobel Prize i Kodandaramaiah can scale this technology up, they might have a few awards coming their

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