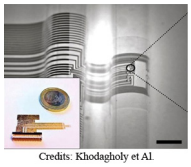

Credits: Khodagholy et Al.

Cornell University and the Ecole des Mines de Saint-Etienne work together for a better understanding of the brain

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The Department of Bioelectronics (BEL) at the Microelectronics Center of Provence, Ecole des Mines de Saint-Etienne in Gardanne (CMP-EMSE), produced the first microscopic and organic transistors in the world, making it possible to amplify and record brain activity in situ.

In the study "In vivo recordings of brain activity using organic transistors" published in March 2013 in the journal *Nature Communication*, scientists from the CMP-EMSE, Inserm (UMR 1106 - Institut de Neurosciences des systèmes) and the University of Aix-Marseille, said they based their research on lithography and characterization tools from the Cornell NanoScale Science and Technology Facility (CNF) in order to produce prototypes.

This French-American collaboration was awarded funding from the Partner Univerisity Fund (PUF) from 2010 to 2013 in the subject area “Interdisciplinary Research and Training Collaboration on Bioelectronics."

This microscopic and organic transistor, which is biocompatible and flexible enough to mold to the shape of the brain’s surface within the skull, provides better quality recordings with more neuronal activity, compared to existing electrodes usually placed outside of the skull. George Malliaras, one of the lead authors on the research in the CMP, confirms, “To understand how the brain works, we record the activity of a large number of neurons. Transistors provide higher-quality recordings than electrodes – and, in turn, record more neuronal activity."

These new nanotechnologies will help us better understand how the brain functions, and then, for example, allow us to scout the regions of the brain responsible for seizure genesis. Furthermore, it can improve treatments for several illness like brain tumors.

The Microelectronics Center of Provence, located in Gardanne, was built in 2002 as one of the six training and research facilities of the Ecole des mines de Saint-Etienne. It has 350 students, 25 PhD students and a staff of 100 that includes 40 researchers.

The Cornell NanoScale Science and Technology Facility is a center of the National Nanotechnology Initiative, funded by the National Science Foundation and hosted at Cornell University. Cornell University is a private American research university (member of the Ivy League), founded in 1865 and located in Ithaca, New York. Cornell is one of two private land grant universities with 20,000 students from all over the United States and 122 countries.

For more information:

- Study published in *Nature Communication*: http://www.nature.com/ncomms/journal/v4/n3/full/ncomms2573.html
- Article on the Cornell University website: http://news.cornell.edu/stories/2013/04/micro-transistor-prototypes-made-cornell-map-mind
- News article on the Gardanne city website (French): http://www.ville-gardanne.fr/A-l-heure-de-la-recherche
- Microelectronics Center of Provence: http://cmp.mines-stetienne.fr