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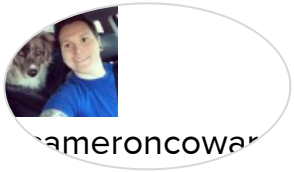
Permanent Graphene Electronic Tattoos Will Enable Around-the-Clock Brain Monitoring

A new EEG device relies on permanent graphene tattoos to enable continuous brain monitoring for patients with epilepsy and Alzheimer's.



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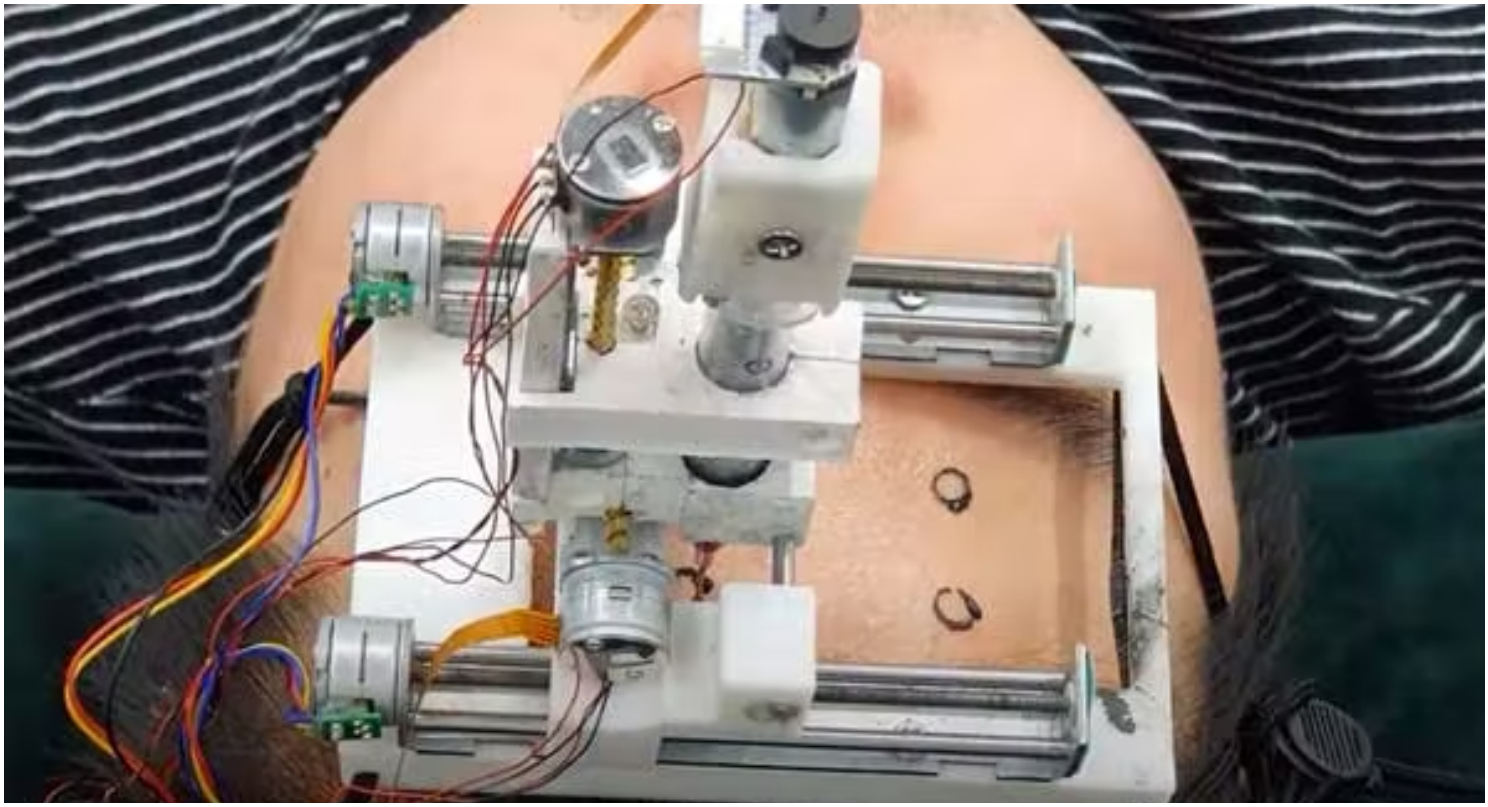

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Science fiction often does a remarkably good job of predicting near-future technologies, as authors identify needs and analyze emerging advances that could address those needs. Space travel, smartphone, video calling, self-driving cars, virtual reality, and many others were all predicted by sci-fi works several decades before they were actually seen in the real world. Electronic tattoos have long played a role in sci-fi, either for aesthetic reasons or as part of more utilitarian cybernetic augmentation. That technology may soon be a reality, thanks to a new permanent graphene electric tattoo device (https://www.globenewswire.com/news-release/2021/01/21/2162167/0/en/Brain-Scientific-Unveils-New-Initiative-to-Develop-Brain-E-Tattoo-Device-for-the-Brain-Diagnostics-Market.html) that will enable around-the-clock brain monitoring.

This proposed Brain E-Tattoo was developed by a company called Brain Scientific and presented at the Pipeline Conference in August of 2020, where it was a finalist in the 2020 Epilepsy Foundation Shark Tank Competition. While the Brain E-Tattoo has not yet been tested on people, it is built almost entirely on Brain Scientific's existing technology that has been proven and we have every reason to believe it will work. Brain Scientific has previously developed EEG (electroencephalogram) brain monitoring (https://www.hackster.io/health)products, including NeuroCap and NeuroCap-Pediatric EEG caps and the compact wireless NeuroEEG amplifier that can be worn comfortably for extended periods of time. Improvements to the NeuroEEG amplifier combined with innovative graphene electrodes make the Brain E-Tattoo quite plausible.

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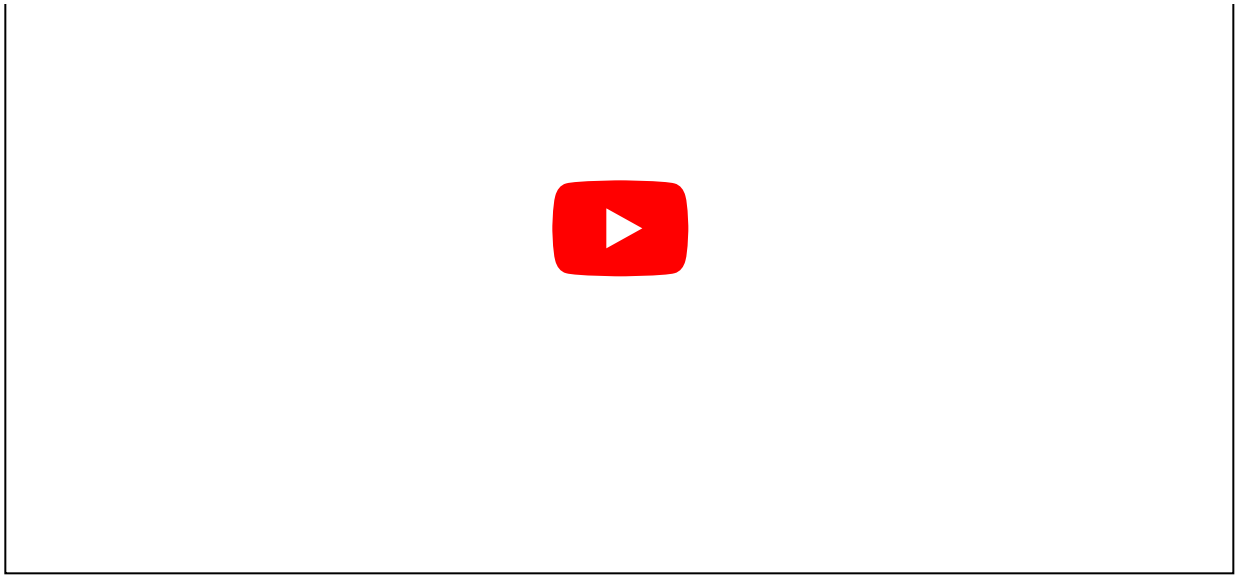

To create the Brain E-Tattoo, the Brain Scientific team first needs to miniaturize their NeuroEEG amplifier even further. The current device is roughly the size of a smartphone, but will be reduced down to the size of a postage stamp that can be worn behind the ear. In place of a traditional EEG cap that would be bulky and uncomfortable, the team plans to tattoo graphene electrodes directly into a person's skin. The tattooed graphene would be incredibly thin, to the point where it is virtually invisible, but that is still enough for brain monitoring. The Brain E-Tattoo would allow for continuous EEG scanning, which would be tremendously beneficial for research on neurological diseases like epilepsy, Alzheimer's, and many others. Instead of only being able to study the brain *after* a epileptic seizure, for example, doctors could look at the EEG data from a Brain E-Tattoo in order to see what was happening during the seizure. That information could prove to be incredibly valuable for treating neurological diseases.

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