



 **Biting the hand that feeds IT**

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Hacking for public health

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Etech

Forget the grand project to electronify the NHS. The real technology-induced medical changes will come from elsewhere.

For example, something you've probably never thought about when you went in for a flu shot: how does the [World Health Organisation](#) (<http://www.who.int>) decide which of the many strains to vaccinate against?

The answer turns out to be that a relatively small group of people from a variety of health organisations around the world meet twice a year to study – hard – huge tables of numbers. That sounds like the sort of thing a computer could help with, and a few years ago a team at Cambridge University led by Derek Smith set out to investigate, as colleague Terry Jones explained at [etech](#) (<http://conferences.oreilly.com/etech>) last week.

What Smith's team created is a technique for mapping viral evolution called antigenic cartography. You can, in Jones's simple demonstration, create a quick but roughly accurate geographic map from a table that lists cities and the distances between them.

The numbers in the virus tables, similarly, indicate the distance between strains of virus. The result (see map on the [left here](#) (<http://www.antigenic-cartography.org/>)), which was published in 2004, helps understand the evolution of the flu virus – and makes predicting which strains to include in the vaccine more accurate.

"It's making the process more transparent," said Jones.

A team from the MIT Media Lab, on the other hand, has created a prototype open source brain stimulator aiming to drop the commercial price by two orders of magnitude.

[Ed Boyden](#) (<http://edboyden.org/>), the assistant professor leading the effort, said the basic idea is that "targeted brain stimulation can precisely alter cognitive processing. We are trying to put together a cohesive toolbox to think about this in a systematic fashion".

There are already things doctors can do to augment or alter cognitive processing in the brain. But what Boyden is talking about leaves the blunt instrument of anti-depressants behind. How about being able to tune precisely how much risk a person is willing to

take? (Anti-doping sports authorities, take note.)

The team is currently designing a clinical trial with radiologists at nearby Beth-Israel hospital to help manage anxiety and pain. "Reducing the amount of anaesthetic and analgesics can save 20,000 people a year and reduce complications," he said.

Meanwhile, Daniel Marcus, director of the Neuroinformatics Research Group at Washington University School of Medicine, wants hackers to help study brain scans.

Functional connectivity MRI, a relatively new technique (it was used to guide surgery for the first time last December at Marcus's school), allows the detailed brain response imaging of functional MRI without requiring the patient to perform directed actions in the clinic. Many brain scans are available online, as are many open source imaging tools.

Using these, he said, why not take a crack at some of the big unsolved problems? For example: the number of networks in the brain; distinguishing differences between populations; predicting diseases and/or aptitudes; automate the process of deidentifying brain scans to protect the patients' privacy. And so on. Happy hacking! ®

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