

The brain race: Can giant computers map the mind?

March 4 2013, by Charles Watson



The race to map the human brain may be more political than scientific. Credit: brewbooks

In the past month, we have seen two major announcements of huge projects to map the brain – the [European Human Brain Project](#) (HBP) and the [Obama Brain Activity Map](#) (BAM).

What you may not have noticed is a third, much more promising project announced by the Seattle-based Allen Institute for Brain Science to do similar things – but more on this later on.

Of the first two, the European HBP will give €1 billion to the Lausanne-

based research group headed by Henry Markram. Markram is a brilliant salesman whose ambitious plan to make a working computer model of the [cerebral cortex](#) ("the [Blue Brain Project](#)") has been strongly supported by IBM since about 2005.

The fact the Blue Brain project has not produced any significant breakthroughs in recent years does not seem to have worried the European funding agencies. Apparently they like the idea of Markram building a monster computer to lead Europe into the future of brain research.

The US plan is just as ambitious, but its aims seem to be more commercial and political than scientific. Obama hopes that companies such as Google and Microsoft will combine with universities and drug companies to lead the way to curing diseases such as Alzheimer's.



"lapolab".

No start-up funds have so far been allocated, but the plan clearly centres on the building of a massive computer network to simulate brain activity.

Obama sees the project as putting the US first in what he calls the "brain race" – just as Kennedy drove the space race competition with the Russians. Of course, this kind of announcement makes great political sense, but in my opinion it may be another case of the Emperor's New Clothes.

Baby steps for the brain

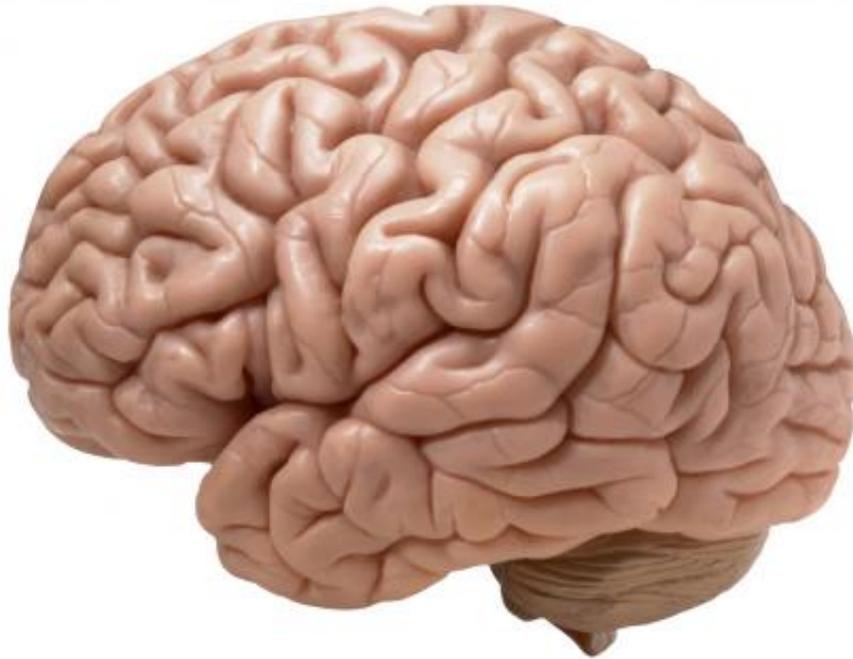
The harsh truth is that brain research is still in its infancy, and big computers cannot replace our fundamental lack of understanding of how brains work.

I have watched the Markram project over the past five years and have been underwhelmed by the insights it has generated. For a start, Markram's work focuses on a model of a tiny piece of rat cerebral cortex, which ignores the fact that the most important parts of the brain, in terms of survival, are outside the cerebral cortex.

We know that subcortical structures such as the hypothalamus can manage eating, drinking, reproduction, nurturing of offspring and defence all by themselves, but we are not even close to understanding the complex networks that make these basic systems work.

It is true the cerebral cortex of humans is awesomely powerful, but if we cannot even understand the basic survival functions of the brain, I think it's a very long shot to predict that we can make an electronic cerebral

cortex with a big computer.



Scepticism

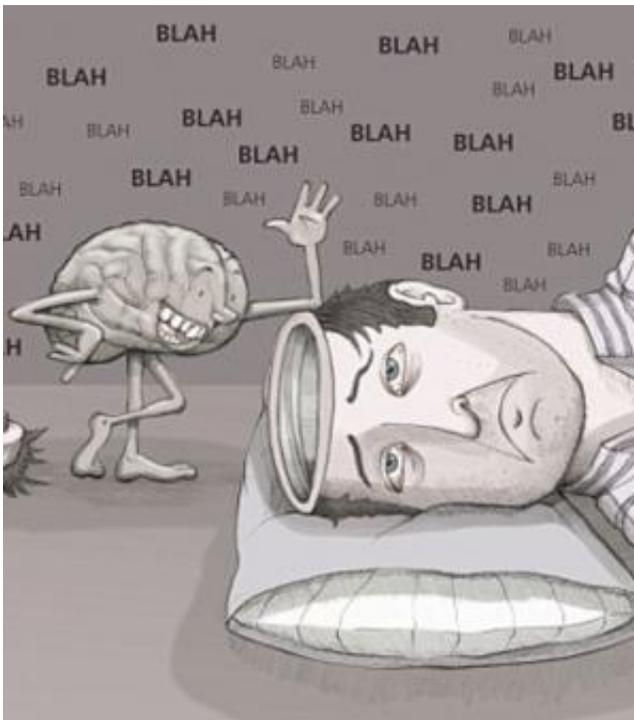
While my own concerns over these two big projects are based in scepticism, others are worried about something much more sinister. Radical commentator Jon Rappoport sees the US project as a veiled attempt to create a kind of Orwellian Nineteen Eighty-Four society, with government control of an individual's brain function.

Rappoport's views are extreme but recent history shows the US public

can easily be seduced into plans such as these.

Examples include the crazy mind-control ideas of Spanish physiology professor Jose Delgado at Yale in the 1970s ("a program of psychosurgery and political control of our society"), Nixon's thwarted plans to carry out psychosurgery on aggressive individuals (mainly African American prisoners), and George Bush's failed attempt to force early intervention on children to detect mental disorders (the Teen Screen project).

Rappoport observes that DARPA (Defense Advanced Research Project Agency) will be a major player in BAM, and to him this suggests an opportunity for some new-millennium Dr Strangelove to be let loose on the American public.



Credit: marsmet543

Heady possibilities

I'm less concerned about these dark possibilities, because I think the political hype in HBP and BAM is hundreds of miles ahead of the scientific realities of brain research. But that's not to say we should not be excited about ambitious projects.

I mentioned above that the Allen Institute for Brain Science (formed by Bill Gates' Microsoft partner Paul Allen in 2003) is also entering the fray. The difference between the Allen Institute proposal and the HBP and BAM projects is that it is much more realistic, and comes from an institute with an outstanding, perhaps unmatched, track record in brain research.



Credit: Aidan O'Sullivan

Over the past decade, the Allen Institute has mapped all 26,000 genes in the mouse brain, and has mapped the major genes in the embryonic brain.

Among other projects, they are in the midst of mapping all the genes in the human brain, and creating a library of [brain](#) wiring experiments.

All of this is open to any researcher in the world at no cost – you just need an internet connection.

Paul Allen has announced he is putting around US\$300 million into a new 10-year project to map every aspect of the visual cortex in the mouse. Not nearly as ambitious as HBP or BAM, but to me it looks achievable.

If I was investing, I would put my money on the Allen Institute.

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