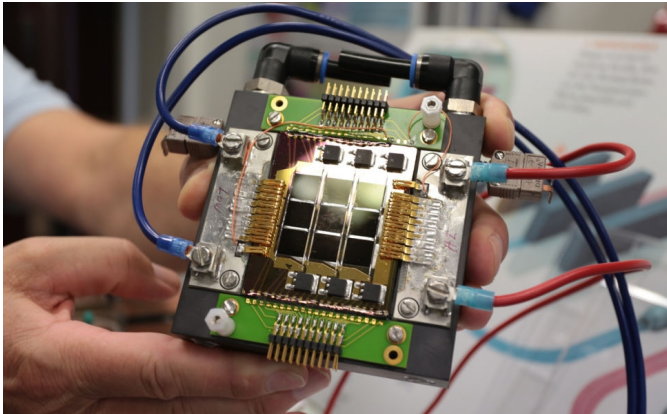


IBM Combines Power and Cooling in "5D Electronic Blood"

Written by Marco Attard
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IBM researchers to biology for inspiration in the building of the next generation of computing technology-- so much so it is set to combine power and cooling in "5D electronic blood."



The term "5D electronic blood" might sound like something out of science fiction but it is really a fairly simple, if futuristic, concept. It involves an electrochemical mix of cooling fluid and "redox couples" able to generate electricity (via oxidisation) while flowing through microfluidic channels built into a chip. Thus the fluid not only cools the chip, but also delivers power. A bit like blood, really.

The researchers say the technology allows for more innovative computer configurations, with multiple CPUs and GPUs built on top of each other and each chip getting a unique power and cooling system. Such a system eliminates hotspots, allowing for higher clocking speeds and more efficient machines.

Meanwhile the "5D" component in the name does not involve any breaking of space or time-- instead it refers to 2D chips stacked on top of each other to form 3D structures, with dimensions 4 and 5 being power and cooling, as delivered through the electronic blood.

The theory even works in practice, as IBM managed to build a chip receiving 100mW of power while dissipating heat. Of course one needs to see whether the technology works when scaled to computer (if not supercomputer) sizes, but IBM appears confident it is capable of building something that approaches biological levels of power and efficiency.

Go [Towards 5D Scaling: How Density Improves Efficiency in Future Computers](#)

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Go [IBM is Trying to Solve All of Computing's Scaling Issues with 5D Electronic Blood \(Ars Technica\)](#)