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INSIDE TECHNOLOGY

Brain cells in sync to gain full attention

By [Jon Van](#)

Published December 25, 2006

Researchers at Northwestern University have become mindreaders in an effort to determine what happens in our brains when we concentrate our full attention on something.

Paying attention causes our brain cells to work in synchrony rather than individually, scientists found.

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"It is almost like a conductor stepping in to control a large set of unruly musicians," said Marcia Grabowecy, psychology research assistant professor at Northwestern. "Cells synchronize precisely to the conductor's cues."

To discover this phenomenon, volunteers were outfitted with caps connected to 64 electrodes used to pick up brain waves. The resulting electroencephalograms suggested the synchrony of cells.

Participants wearing the electrodes were directed to stare at a computer screen and pay attention to one flickering pattern while ignoring a different pattern. The target pattern's brightness on the screen varied over time.

Musical analogies abound among researchers who worked together on the project.

"When you need to dig deep to summon that extra ounce of attention," said Ken Paller, a Northwestern psychology professor, "it's as if you engage a symphony of brain activity that can come to your rescue as millions of neurons together make the music that represents a vivid conscious



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3-D CHIPS: Integrated circuits and computer chips made from silicon have been at the core of the electronics business for decades, but transistors and other semiconductor devices may one day migrate to more exotic locales.

Materials researchers at the University of Illinois at Urbana-Champaign have devised techniques for integrating different semiconductors in two and three dimensions on new materials, including flexible plastic sheets.

"Important new types of electronic systems will rely on the ability to mix and match wide- ranging classes of devices in three-dimensional configurations on unusual substrates," said John Rogers, an engineering professor. "Circuits enabled by such approaches will open up interesting application possibilities that lie beyond the scope of existing single-material, wafer-scale electronics."

The nanoscale printing process developed by the researchers "shows that it is possible to liberate high-performance electronic devices from semiconductor wafers and integrate them onto surfaces that better serve important applications," said Ralph Nuzzo, a chemistry professor who worked with Rogers to co-author a description of their techniques for the journal Science.

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