

German Scientists Tap NVIDIA GPUs to Unlock Secrets of the Brain

ISC'12 -- NVIDIA today announced that its GPUs will be used by scientists at Germany's Forschungszentrum Jülich, which hosts the [Jülich Supercomputing Centre](#), one of Europe's largest and most powerful [supercomputing](#) resources, to accelerate advanced neurological research targeted at unlocking secrets of the human brain.

NVIDIA also announced a new, multiyear collaboration with the center to drive the next generation of GPU-accelerated scientific research in neuroscience and a range of other fields, including astronomy, astrophysics, material science, particle physics, and protein folding. Together the two organizations are launching the "NVIDIA Application Lab," a jointly run and staffed resource for the European scientific community located at the center's facilities in Jülich.

The lab will enable scientists across Europe to take advantage of GPU-accelerated supercomputing by providing optimized [scientific applications](#) and technical support.

"Jülich is one of the most influential supercomputing facilities in Europe, with an impressive track record of solving some of the most challenging scientific problems," said Steve Scott, chief technology officer of the Tesla business at NVIDIA. "The new application lab focused on the breakthrough advantages of GPUs will further enhance their position as one of the world's foremost institutions driving the next wave of scientific discovery."

Advanced Brain Research at Jülich

Neuroscience is among the most exciting and increasingly important research focus areas at Forschungszentrum Jülich. The center is undertaking a new approach to advanced neuroscience research, and potentially uncovering the causes and treatments for autism, multiple sclerosis, Alzheimer's, and other debilitating neurological diseases.

Researchers from the [Jülich Institute of Neuroscience and Medicine](#) (INM-1, Structural and Functional Organization of the Human Brain), also at Forschungszentrum Jülich, are using NVIDIA® Tesla® GPUs to accelerate by as much as 50x the reconstruction of histological brain sections necessary for the rendering of a high-definition, structurally accurate and realistic model of the human brain. Once fully developed, the model will give researchers a previously unattainable level of visibility into brain architecture, function and interconnections with levels of detail never before available to neuroscientists.

To create this model, researchers at the institute INM-1 are reconstructing a vast collection of data sets including images of histological sections (microscopic tissue structure), magnetic resonance images and images from an advanced [3D polarized light imaging \(3D-PLI\)](#) technique developed at INM-1. 3D-PLI provides, for each voxel of the brain, information about the direction and the inclination of fiber tracts. To trace the tracts over long distances, tractography algorithms are applied, which also require high-performance GPUs.

"3D-PLI is the only way to achieve highly detailed images of nerve fibers in adult human brains, but reconstructing and rendering them in real time into the world's first micro-atlas of the human brain poses a major computational problem," said Professor Katrin Amunts, director of INM-1. "Imagine the billions of nerve cells inside the human brain, connected via fibers. This gives you a sense of the complexity and intricacy needed to accurately model the network within the human brain."

Jülich hopes to leverage key learnings from its neuroscience research to serve as a blueprint for the NVIDIA Application Lab to enable other advanced GPU-accelerated research projects across a range of scientific fields.

Enabling Hundreds of European Scientists - New NVIDIA Application Lab

Beginning later this month, the NVIDIA Application Lab will focus on enabling hundreds of scientists across Europe, including members of the [PRACE high performance computing organization](#), to take advantage of GPU-accelerated systems at the Jülich Supercomputing Centre by providing optimized [scientific applications](#) and technical support.

"The new lab will streamline the process of setting up and optimizing new and existing scientific applications to take advantage of GPU acceleration," said Professor Thomas Lippert, director of the Jülich Supercomputing Centre. "This agreement will enable hundreds of researchers to more easily access the game-changing power of GPU computing to advance all types of research."

Researchers in and outside of Jülich are using Jülich's GPU-accelerated supercomputers, including the 206-node [Jülich Dedicated GPU Environment \(JuDGE\)](#) system equipped with [NVIDIA Tesla GPUs](#), which delivers approximately 240 teraflops of peak performance.

About the Jülich Supercomputing Centre

The Jülich Supercomputing Centre operates supercomputers of the highest performance class in Europe. It enables scientists and engineers to solve highly challenging and complex problems in science and engineering in collaborative infrastructures by means of supercomputing and grid technologies. More information is available at the [Jülich Supercomputing Centre](#) website.

About NVIDIA Tesla GPUs

NVIDIA Tesla GPUs are massively parallel accelerators based on the NVIDIA CUDA® parallel computing platform. Tesla GPUs are designed from the ground up for power-efficient, high performance computing, computational science and supercomputing, delivering dramatically higher application acceleration for a range of scientific and commercial applications than a CPU-only approach.

More information about NVIDIA Tesla GPUs is available at the [Tesla website](#). To learn more about CUDA or download the latest version, visit the [CUDA website](#). More NVIDIA news, company and product information, videos, images and other information is available at the [NVIDIA newsroom](#). You can also follow us on [Twitter](#) ([@NVIDIATesla](#)).

About NVIDIA

[NVIDIA](#) (NASDAQ: NVDA) awakened the world to computer graphics when it invented the [GPU](#) in 1999. Today, its [processors](#) power a broad range of products

from [smartphones](#) to [supercomputers](#). NVIDIA's [mobile processors](#) are used in [cell phones](#), [tablets](#) and [auto infotainment systems](#). [PC gamers](#) rely on GPUs to enjoy spectacularly immersive worlds. Professionals use them to create [3D graphics](#) and visual effects in movies and to design everything from golf clubs to jumbo jets. And researchers utilize GPUs to advance the frontiers of science with [high performance computing](#). The company has more than 5,000 patents issued, allowed or filed, including ones covering ideas essential to modern computing. For more information, see www.nvidia.com.

Certain statements in this press release including, but not limited to statements as to: the benefits and impact of NVIDIA Tesla GPUs; and the effects of the company's patents on modern computing are forward-looking statements that are subject to risks and uncertainties that could cause results to be materially different than expectations. Important factors that could cause actual results to differ materially include: global economic conditions; our reliance on third parties to manufacture, assemble, package and test our products; the impact of technological development and competition; development of new products and technologies or enhancements to our existing product and technologies; market acceptance of our products or our partners products; design, manufacturing or software defects; changes in consumer preferences or demands; changes in industry standards and interfaces; unexpected loss of performance of our products or technologies when integrated into systems; as well as other factors detailed from time to time in the reports NVIDIA files with the Securities and Exchange Commission, or SEC, including its Form 10-Q for the fiscal period ended April 29, 2012. Copies of reports filed with the SEC are posted on the company's website and are available from NVIDIA without charge. These forward-looking statements are not guarantees of future performance and speak only as of the date hereof, and, except as required by law, NVIDIA disclaims any obligation to update these forward-looking statements to reflect future events or circumstances.

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About NVIDIA

Since 1993, [NVIDIA](#) (NASDAQ : NVDA) has pioneered the art and science of [visual computing](#). The company's technologies are transforming a world of displays into a world of interactive discovery — for everyone from gamers to scientists, and consumers to enterprise customers. More information at <http://nvidianews.nvidia.com/> and <http://blogs.nvidia.com/>.

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