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## ***Faster and more efficient***

### **FAU computer scientists optimise high-performance computing with graphics cards**

Computer scientists from Erlangen Regional Computing Centre and the Department for Multiscale Simulation, System Simulation and Computer Architecture at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) have set themselves the goal of optimising so-called GPU Computing, i.e. scientific computing using graphics cards. Under the leadership of the FAU Central Institute for Scientific Computing, they have achieved success in two funding programmes run by Nvidia, the global market leader in Visual and High Performance Computing. The company will provide FAU computer scientists with financial support for their research over a one year period. Nvidia will also provide the university with very high performance graphics cards. This will benefit students most because the graphics cards are to be installed on publicly accessible computers in a CIP pool at the Technical Faculty.

"These are no ordinary graphics cards like those you find installed in notebooks or desk-top computers", explains Andreas Schäfer from the Department for Computer Architecture. "We will be working with high performance graphics cards, like the ones originally developed for games consoles." Thanks to the boom in computer gaming, these graphics cards are now very highly performing and, because of mass production, relatively cheap. For a long time they were almost exclusively used by the computer games industry.

However, other companies are now using them increasingly to speed up general computing processes. The graphics cards contain a number of programmes which can be used to support a computer's central processing unit. This makes the cards particularly appropriate for use in high performance computing, such as simulation computing, where the computer has to conduct millions of calculations in a very short space of time. "To date, the different programmes on the graphics cards and on the PC are still not optimally compatible with each other", says Schäfer. "That is why it is now our job to optimise the programmes' algorithms to make high performance computing more efficient and faster." The funding programme in which Schäfer is involved is titled CUDA Research Center and is mainly targeted at research scientists. However, FAU computer scientists have also been awarded support for the CUDA Teacher Center. This is the second Nvidia funding programme where students will also be included. Their involvement will be through seminars and exercises, as well as outside the classroom where they can write programmes for the graphics cards and learn how to operate them. "In the past, GPU Computing played almost no role in university teaching. However, we are now seeing increasing demand from industry for computer scientists with knowledge in this field", explains Schäfer. "That is why, for some time now, we at FAU have focused on providing our students with training in this area. The support through the CUDA Teaching Center is a great opportunity in this regard."

#### **The CUDA Programme**

CUDA is the acronym for Nvidia's parallel computing architecture. CUDA enables dramatic increases in computing performance gained through the use of graphics cards. CUDA Research Centers are recognised institutions that use GPU Computing in a range of research fields. CUDA Teaching Centers have integrated GPU Computing courses into their curricula. Both programmes include events with leading research scientists. Furthermore, teaching materials and high performance graphics cards are also made available.

More information for the media:

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