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Power Cell

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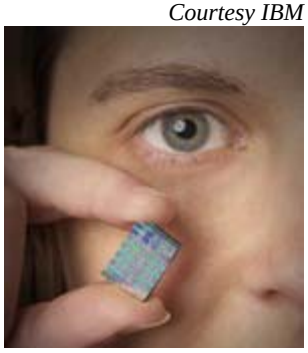

Georgia Tech has landed a prize microprocessor research center.

By Gary Goettling

Even for a campus accustomed to acquiring significant new facilities in recent years, Georgia Tech's selection as home for a pioneering microprocessor research center is very big news.

The STI Center of Competence, announced Nov. 15, will explore applications for a promising new computer microprocessor known as the Cell Broadband Engine or Cell. The "STI" in the center's name is derived from the first letters of the three corporations that collaborated in the microprocessor's development: Sony, Toshiba and IBM.

"We see Cell as the way of the future that's going to impact the entire world," says David A. Bader, associate professor and executive director of high-performance computing at Tech's College of Computing.

Conventional chips may embed two or four processors, but Cell's innovative design accommodates nine processing cores on a single chip, Bader explains.

"One processor is the standard power architecture type, a class of processor you would see in an IBM supercomputer," he says. "It's augmented with eight synergistic processing elements that can work independently or collaboratively to achieve amazing speeds — up to 10 times faster than traditional computer chips."

By 2010, Bader says, Cell design is expected to allow up to 32 microprocessors per chip.

The technique is particularly well-suited for handling the high volume of data involved with multimedia and digital content creation such as in computer games, real-time video, virtual reality and interactive TV. In fact, Cell technology is the operating heart of the recently released Sony PlayStation 3 as well as a line of IBM servers and PC accelerators. Toshiba plans to use Cell processors in its high-definition television sets.

The STI Center, which will be located in the new Christopher W. Klaus Advanced Computing Building, received startup funding from the three founding companies, Georgia Tech and the National Science Foundation. Its mission includes building a community of programmers and users and broadening industry support for Cell.

"We'll be looking at a number of everyday applications to see how they could take advantage of Cell's extremely high capabilities as well as enhancing the performance of existing products like handheld devices," Bader says. "We'll also be offering tutorials and workshops to educate users about Cell."

He adds that the center will provide remote access to Cell hardware installed at Georgia Tech and create and disseminate software optimized for Cell systems.

Georgia Tech was chosen from more than a dozen universities competing for the center. According to published reports, the keys to Tech's selection included the real-world applications orientation of the College of Computing's curriculum and areas of expertise that best matched with the interests of the three corporate Cell partners.

Cell technology is as inevitable as it is fast, Bader says. "For the past 40 years we've relied essentially on the same algorithms to increase performance by making chips faster and smaller," he explains. "But clock speeds are reaching a plateau and we're near the limits of miniaturization."

The future of computing, he continues, rests with "this new paradigm of heterogeneous multicore processing" represented by the Cell approach.

Bader anticipates a unique global role for the STI Center. "We have the first Center of Competence for Cell processors," he says. "It's a great opportunity for Georgia Tech."