For Immediate Release
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New Convey Customer, University of South Carolina, Takes On Phylogenetics Applications; Emerging Computer Architectures

High-Performance Science Powers Innovations in High-Performance Computing

RICHARDSON, Texas (May 24, 2010) — Dr. Jason Bakos, assistant professor at the University of South Carolina Department of Computer Science and Engineering, is a man on a mission to "accelerate applications that have never been accelerated before."

So, when Dr. Bakos learned about Convey Computer's innovative hybrid-core computing systems, it was a partnership made in heterogeneous computing heaven.

After all, Dr. Bakos is looking for new ways to speed up applications ranging from computational phylogenetics and sparse linear algebra to data mining and logic minimization. Additionally, the Heterogeneous and Reconfigurable Computing Group at the University of South Carolina focuses on uncovering new design methodologies for high-performance computing ranging from developing new automatic partitioning tools to improving system architecture with multi-FPGA interconnects.

Dr. Bakos explains that his research group wants to "make heterogeneous platforms and associated coprocessor development as ubiquitous as traditional HPC platforms, such as clusters and SMPs and their programming models." Why such an interest in the hybrids? According to Dr. Bakos, it is "because

heterogeneous platforms offer the potential to achieve a 100x or more performance improvement over traditional platforms. I am interested in heterogeneous computing – and high-performance reconfigurable computing in particular – because I'm a computer architect and designing custom FPGA-based accelerators is one of the purest forms of applied computer architecture."

Convey's revolutionary hybrid-core computing architecture tightly integrates advanced computer architecture and compiler technology with commercial, off-the-shelf hardware – namely an Intel® Xeon® processor and Xilinx® Field Programmable Gate Arrays (FPGAs). The systems help customers reduce energy costs associated with high-performance computing while dramatically increasing performance over industry standard servers. Additionally, Convey systems are easy for programmers to use because they provide full support of an ANSI standard C, C++ and FORTRAN development environment.

Beyond working with new computer systems, Dr. Bakos and his team develop "non-traditional applications" such as computationally intensive phylogenetics inference methods. Computational phylogenetics, which studies the evolutionary development of a species or group of organisms, involves the search for the most accurate "evolutionary tree" from a space of possible trees. The search space grows exponentially with the number of inputs, going from 2 million possible trees for 10 species to 25 *trillion quadrillion* (2.5×10^{28}) possible trees for just 25 species.

Aside from the size of the search space, assessing the accuracy of each candidate tree itself involves complex methods in order to match a specific tree to its evolutionary model – a computationally expensive operation. By studying the past and building accurate phylogenetic trees, scientists are able to more quickly identify treatments to combat everything from an emerging virus to pesky weeds growing in a front yard.

"Computational biology is a relatively new area and there are not a lot of *defacto* standards and algorithms like there is with traditional HPC applications. A lot of what we do is experimental."

That makes Convey's flexible architecture for application development especially well suited for the research underway at the University of South Carolina. "Convey's FPGA-based coprocessors are much more flexible and amenable to the optimization algorithms used in computational biology," said Dr. Bakos. "Convey offers a complete system and full support, which allows us to focus on using the machine for our research as opposed to wasting time on getting the machine to work."

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About Convey Computer Corporation

Based in Richardson, Texas, Convey Computer breaks power, performance and programmability barriers with the world's first hybrid-core computer—a system that marries the low cost and simple programming model of a commodity system with the performance of a customized hardware architecture. Convey brings decades of experience and intellectual assets to performance problem solving. Its executive and design teams all come from successful backgrounds of building computer companies, most notably Convex Computer Corporation and Hewlett-Packard. Convey Computer investors include Braemar Energy Ventures, CenterPoint Ventures, Intel Capital, InterWest Partners, Rho Ventures, and Xilinx. More information can be found at: www.conveycomputer.com.

About the Heterogeneous and Reconfigurable Computing Group at the University of South Carolina

The Heterogeneous and Reconfigurable Computing Group at the University of South Carolina (herc.cse.sc.edu) was founded in 2000 by Dr. Duncan Buell, a pioneer in the field of high-performance reconfigurable computing. Dr. Jason Bakos succeeded Dr. Buell as the group's leader in 2005 and, under Bakos's leadership, the group was one of the first in the world to accelerate computational biology applications with FPGAs and was the first to accelerate non-distance based phylogeny reconstruction. The group actively publishes in several IEEE Computer Society transactions and participates in the world's largest FPGA conferences. The group is funded by the National Science Foundation and is part of the Department of Computer Science and Engineering in the College of Engineering and Computing at the University of South Carolina.

For More Information:

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