



## Big Data Solution for a Big Name University

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Professor Milos Popovic, University of Colorado Boulder

### Their Challenge

When Milos Popovic, Assistant Professor of Electrical Engineering, was looking for a reliable partner to build a scientific computing cluster, he thought of Ace Computers.

Milos and his students, along with their collaborators at MIT, were working on optical (photonic) circuits on chips capable of replacing electrical communication links in multicore processors and memory, which have reached their performance limits because of energy efficiency constraints. The photonic circuits enable much more energy efficient communication links inside a microprocessor— allowing the continued scaling of Moore’s Law. To successfully design new photonic circuits requires enormous computing resources – processing power and memory bandwidth.

Mike Leach, Ace Computers’ Account Manager, understood Milos’ need to maximize memory bandwidth at minimal cost. “I knew they needed to crunch large amounts of data,” he said. “They were using highly sophisticated data computing apps like MATLAB and needed maximum computing power.”

More specifically, Milos was looking for a cost-effective way to build a scientific computing cluster for running large-scale simulations using both commercial and custom simulation codes. “The computation power and memory bandwidth we needed was significant,” he said. “We needed a fast set of compute nodes, each with several microprocessors – 32-48 cores in each machine. And, we needed to maximize memory bandwidth. We didn’t have the time to figure it out ourselves so we found industry experts that we could trust to provide a solution.”

### Our Solution

Milos had worked with Ace Computers before to build compute nodes, so he just let the engineers know what he needed to get done and they configured it for him. The university group initially bought 2 Ace Computers Powerworks nodes and purchased 2 more a few months later. The biggest machine has over 100 GB of memory. Ace Computers was able to replicate the previous system configuration on the new nodes, with upgraded microprocessors, to make them compatible with the existing nodes in the university group. As a result, the new nodes could be cloned from the existing nodes and were up and running in a couple of days. “They put together a more sophisticated and robust system than my students and I could put together,” Milos said.

Mike was aware that, like most educational institutions, the university is always under budgetary constraints. Experience has shown him that custom technology is an excellent solution for clients, such as University of Colorado, who know exactly what they need the equipment to do and don’t need or want to pay for a lot of unnecessary capabilities and features.

## Their Success

In the end, it was the depth of industry experience, expertise, and price that led Milos to choose Ace Computers. "We are a university so we are always on a budget," he said. "We don't have funds to throw around and try random things. Ace Computers provided the best value for us." It's been 2 years since the university purchased the first computers and all is well. "The project is going great," Milos said. "In January, based on designs carried out using these machines, we demonstrated the world's first optical modulator in an advanced, microprocessor-grade CMOS process and we have applied for patents. We don't have a lot of time, so I just needed good things to happen by using Ace Computers and I wasn't disappointed. We wanted something reliable that would do exactly what we wanted within our budget and that's what we got."

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### About Ace Powerworks

The Ace Computers Powerworks family of enterprise class servers features the follow standard criteria: rackmount or tower; multi-CPU designs (1/2/4/8 socket); Intel Xeon or AMD Opteron; memory expansion up to 64 DIMMS and 2TB; standalone, cluster, or datacenter; extensive storage options (HDD/SSD) in LFF/SFF; RAID solutions with up to 4GB cache; battery-backed write cache options; environmentally friendly CacheVault (NAND Flash and Supercapacitor) cache options; and connectivity specs (10GbE, Infiniband, FiberChannel). Ace Computers' Powerworks servers are aggressively priced, and utilize an ISO 9001:2008 quality-controlled assembly and testing process.

### About Ace Computers

Multiple award-winning Ace Technology Partners (Ace Computers) is a Woman-Owned Small Business custom technology systems builder and reseller for the public sector as well as the commercial sector. It has been an industry leader since 1983. In addition to some of the finest academic institutions in the U.S., long-term clients include the U.S. Department of Energy and the U.S. Department of Defense. Ace Computers builds custom technology with the same components that top manufacturers use without the premium price. Its principal, recognized industry expert John Samborski, is an alumnus of Intel's prestigious board of advisors. In addition to its Greater Chicago headquarters, Ace Computers has locations in New Jersey, Minnesota, and Idaho. To contact Ace Computers, call 1-877-223-2667 or 1-847-952-6900 or visit [www.acecomputers.com](http://www.acecomputers.com).

### About University of Colorado Boulder

As the flagship university of the State of Colorado, CU Boulder is one of only 34 U.S. public institutions belonging to the elite Association of American Universities. The school has a tradition of academic excellence, with four Nobel laureates and more than 50 members of prestigious academic academies. Today, CU Boulder's goal is to become the standard for the emerging generation of great comprehensive public research universities.

### About MATLAB®

MATLAB is a high-level language and interactive environment for numerical computation, visualization, and programming. MATLAB allows users to analyze data, develop algorithms, and create models and applications. The language, tools, and built-in math functions enable users to explore multiple approaches and reach a solution faster than with spreadsheets or traditional programming languages, such as C/C++ or Java. MATLAB can be used for a range of applications, including signal processing and communications, image and video processing, control systems, test and measurement, computational finance, and computational biology. More than a million engineers and scientists in industry and academia use MATLAB for technical computing.

### Links

The University of Colorado System

<http://www.colorado.edu/about>

MATLAB

<http://www.mathworks.com/products/matlab/>