

# Corporate partners see benefits in Theory Center program

## *Ford: Reducing time from design to production*

By Faith Short

Ford Motor Co. of Dearborn, Mich., has joined the Cornell Theory Center's Corporate Partnership Program (CPP). The company plans to apply CTC's high-performance computing capabilities in order to reduce the time it takes to bring a new car to market.

"We're eager to scale up the numerical simulations to help system design," said George Shih, a supervisor in Ford's Advanced Vehicle Technology group. "HPC will help us reduce the time from initial design to a new car rolling off the assembly line."

The physical prototyping of automotive parts and components is time-consuming and expensive. Physical prototypes also limit the number and accuracy of scenarios that engineers can initiate. The reduction of physical parts prototyping with numerical simulations is crucial in order to ensure U.S. auto industry competitiveness in a global market.

"The Cornell Theory Center looks forward to helping Ford accelerate its product development cycle with our advanced parallel computing capabilities," said Malvin H. Kalos, Theory Center director. "Our 512-node IBM RS/6000 SP and new high-performance storage system offer industry a unique, scalable environment to develop and test solutions to complex engineering problems ranging from computational fluid dynamics to crash simulations."

## *Kodak: Speeding efforts in research and development*

By Faith Short

Eastman Kodak Co. has joined the Cornell Theory Center Corporate Partnership Program (CPP) to access strengths in algorithm development as well as the center's 512-node IBMRS/6000 Scalable POWERparallel Systems (SP).

"Kodak is working on a number of uniquely interesting scientific problems having to do with making good photographic emulsions that lend themselves to computational modeling," said Malvin H. Kalos, Theory Center director. "We are delighted to be able to explore with them the ability of our SP computers to accelerate their designs. With Kodak's base in Rochester, we're also happy to help a New York state industry stay at the leading edge of the latest technology."

"In our first project, we plan to run a new MultiMATLAB implementation on the IBM RS/6000 SP to simulate photo electron-hole processing by silver halides," said Peter Castro, Eastman Kodak's supervisor of applied mathematics. "We're not only interested in the IBM SP, but in close interactions between Kodak researchers and Cornell scientists in the areas of mathematical analysis and new algorithm development," Castro said. "These areas are critical in the effective modeling of charge carrier processing."

A second Kodak project expected to benefit from interactions with CTC is the visualization of time-dependent charge transport in solid

Ford's simulations will include under-body, under-hood, power trains and exteriors. Software will be tested for scalability and performance. "The goal is to increase the accuracy of our simulation models without sacrificing the number and speed of simulation runs," Shih said.

When Ford incorporated in 1903, its staff of 10 people worked in a converted wagon factory in Detroit. Today, more than 338,000 men and women work in Ford factories, laboratories and offices around the world, and Ford products are sold in more than 200 nations and territories.

Ford is among 19 companies currently using CTC's advanced computing capabilities and staff expertise to accelerate their R&D and information technology initiatives.

CTC is one of four high-performance computing and communications centers supported by the National Science Foundation. Activities are funded also by New York state, the Advanced Research Projects Agency, the National Center for Research Resources at the National Institutes of Health, IBM and other members of CTC's Corporate Partnership Program.

state image sensors. This capability will help Kodak better understand and control the electronic processes that are central to high-quality electronic imaging.

Rajinder Khosla, technical associate to the chief corporate technical officer at Eastman Kodak, is spending a year at Cornell as the liaison between Kodak and Cornell. His mission is to enhance the scientific interactions between the institutions.

"The Theory Center looks forward to accelerating Eastman Kodak's research and development efforts," said Peter M. Siegel, director of the CPP. The corporate program has grown to 17 members, several of whom are working in materials science research. "The growth of our corporate program reflects not only the robustness of the IBM RS/6000 SP, but recognition by the materials science research community of our expertise in algorithm development and performance optimization," Siegel said.

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