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Computer speed faces limits

Scientists look ahead at future of technology

By Kimm Groshong , Staff Writer

PASADENA -- Anyone who has bought a computer knows that by the time you get that state-of-the-art system home, it seems a newer, faster model has already hit the market. And that's the way it's been since the dawn of the computing age.

But scientists and engineers predict that within about 10 years the improvement of computers through traditional methods will hit a wall. Since 1965, a theory known as Moore's Law, which says that the number of transistors that can fit on a silicon computer chip doubles every 18 months or so, has held true. Now researchers are trying to figure out how computer design will continue to progress once silicon computing hits the foreseen impasse.

Over the past month, 50 promising young scientists have been living at Caltech, learning about proposed alternative computing methods and the related cutting-edge science that supports those theories. They've come from the nation's top schools, such as Stanford, Harvard and the Massachusetts Institute of Technology, as well as from abroad, to absorb as much as they can at Caltech's Computing Beyond Silicon Summer School.

The all-expense-paid academic camp is funded by a unique Caltech initiative called Information Science and Technology, which strives to study the way the world works in the Information Age by joining, rather than isolating chemists, physicists, biologists and computer scientists to define and solve important questions.

"It's clear that things are going to change,' as the computing field progresses toward work on the scale of single atoms, said Andre DeHon, the founding chair of the summer school and an assistant professor of computer science at Caltech. "But it's not clear how that's going to pan out."

DeHon said at this dynamic point in scientific history, undergraduates must think about which questions they want to try to tackle when they get to graduate school.

"There is a new synthesis of ideas across fields,' he said, that students need to prepare themselves for; meaning they must understand the important concepts in all the related fields before they get to grad school.

To help them prepare, the summer school provides an introductory "brain drop" to those ideas by some of the leading experts in the fields from around the country.

"This has opened up my mind to biology ... things I had no idea about,' said Akhsar Kharebov, a sophomore computer science major at UC Santa Barbara, who is attending the summer school.

Maya Lowell, a junior from the University of Washington, said the camp was unique in that it provided an open, non-competitive environment where enthusiastic students interested in related fields could easily share information with one another and professors.

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