Message in the medium

In 35 years, Dr. Herb Dershem of the computer science faculty really has seen it all.

When he arrived as a young professor of mathematics (there wasn't yet a department of computer science) in 1969, Hope had one computer: a room-filling IBM 1130 that weighed 2,250 pounds, had 8K of memory capacity and 1 megabyte of disk capacity, and cost $80,000 ($450,000 in 2003 dollars). No monitors. Lots of manila-type punch cards.

Today, students in a new version of Computer Science 120 piloted by his colleague (and former student) Dr. Ryan McFall '93 have all been issued their own portable Compaq Tablet PCs so that they can read and even refine their course's text online—and share insights the same way. The textbook-sized machines weigh four pounds, have 256,000K and 30,000 megabyte (30GB) hard drives, and cost about $1,700. Students can take notes by writing *on* the monitor, their pen strokes translated to type by the computer. Built-in wireless connections allow ready access to the campus-wide computer network and, by extension, the world-spanning Internet.

The degree of change illustrates the department's major challenge and guiding principle: to prepare students to thrive in a field in which science fiction transforms to science fact at a dizzying rate.

"The key thing in terms of computer science—it's true in every field, but maybe even more so in computer science—is learning how to learn, because that's what they're going to be doing for the rest of their lives," Dr. Dershem said.

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>
> **— Dr. Herb Dershem, professor of computer science**

"If what we focus on is the technology itself, it's not going to serve them well through a 30- to 40-year career in this field," he said. "What they do have to learn is how to learn, and they have to learn the general principles that underlie the technologies, because those principles will be maintained no matter what technology comes along."

As a result, Dr. Dershem noted, the department exposes students to multiple technologies and multiple programming languages, to help prepare them for the changes that will be a constant. Junior Nick Sumner of Midland, Mich., who is triple majoring in computer science, mathematics and German, understands the rationale.

"You can get a lot of exposure to different languages, and that certainly provides a greater ability to see patterns in the languages and learn how to program, rather than how to just code in a language," he said.

Classmate Chris Johnson of White Lake, Mich., a computer science and mathematics double major, agreed.

"Some of the earlier classes are more programming-based, but as you move along you can refer to that as a sort of reference to you as you are learning new concepts," he said. "As you move along it really opens you up to all the different areas of computer science and how all of them work together."

Given the usefulness in patterns, Drs. Dershem and McFall are team-teaching a new course titled "Great Debates in Computer Science." Their premise is that much in the discipline proves cyclical, and that issues and reasoning from bygone days can inform decision-making in the 21st century.

For example, in the era of the IBM 1130, each machine had one user at a time. Successors (like the Vax at Hope) permitted multiple users simultaneously. As stand-alone personal computers became in vogue, each machine again had one user. In today's era of networks, though, those individual machines are often tied together in a hybrid model of computation with features of both local and centralized processing.

In the early days of personal computing, lack of memory was often a limitation. Today, Dr. McFall noted, as even inexpensive machines come with hundreds of megabytes of RAM and multiple gigabytes of storage space, it's less of an issue. Or is it? Developers of applications for technologies such as Palm Pilots have to work around limited memory (for now, at least...), as do those dealing with equipment such as a modern automobile's computer brain.

"It seems like nothing is the same, but in reality it is," Dr. McFall said. "And so people are attacking those same problems still."

Dr. McFall, who joined the faculty in 2000, enjoys teaching the course with his former undergraduate mentor, and noted that his colleague's involvement presents students with a unique opportunity.

"It's more than that he was chair for nearly 30 years," he said. "It's that he's been sort of a witness to the entire evolution of computing. I don't think there's anybody else on campus that's been around for the whole history of their discipline."

Dr. McFall recognizes that computers have been around for far longer than Dr. Dershem's tenure, but notes that it is really only since the late 1960s that they have followed the trajectory that has taken them to their current prominence.

Hope's program has developed apace. The first course, Math 27, was in beginning FORTRAN and taught by the late Dr. Richard Brockmeier '59. Dr. Dershem took over the course when he joined the faculty. He had completed his doctorate in computer science at Purdue, and at the time was one of fewer than 30 people in the world with a Ph.D. in the field.

The rate of change in computer science makes adaptability a key trait—and important lesson for students. Dr. Herb Dershem, who joined the faculty in 1969, holds a present-day Tablet PC amidst a variety of machines from earlier eras.

The department itself began in the early 1970s, chaired by Dr. David Marker (who was this year's Opening Convocation speaker—please see page two). Dr. Dershem became chair in 1975, serving until succeeded by Dr. Michael Jipping this year. Today the department has four full-time faculty, and degree options include a bachelor of arts or bachelor of science in computer science as well as (through the department of physics and engineering) a bachelor of science in engineering with a computer engineering emphasis.

Emphases within the department also include the college-wide staple of involving students in original collaborative research with faculty. Both Sumner and Johnson have participated in summer research projects, as did recent graduate Alex Sherstov '03 of Qaraghandy, Kazakhstan, who is now doing graduate work in artificial intelligence at the University of Texas.

"The computer science department at Hope offers exclusive research opportunities for undergraduates, a factor that was particularly important for me because of my interest in becoming a researcher/professor in the field," he said.

Reflecting on his experience in the program, Sherstov gives the department high marks on multiple measures. "Among the most salient ones are: enthusiastic, highly qualified faculty who have a genuine personal interest in their students; abundant state-of-the-art facilities; an outstanding research program; intellectually stimulating and emotionally rewarding coursework; and a very supportive department culture," he said.

All of course also takes place within Hope's broader liberal arts context. Just as the discipline does not remain static, neither does it take place within a vacuum. In fact, the college's breadth played a major role in Emily Tennant '03's decision to attend.

"I picked the school because I like the size, the atmosphere and the broadness of the education," she said. Tennant, originally from Pinckney, Mich., is now applying that breadth in graduate school, pursuing a master of science in information science at the University of Michigan. She is interested in working with library computer systems.

"I may not be a typical computer science student, but I feel that there is every advantage to having an interdisciplinary education," she said. "The skills learned in other classes teach you critical thinking, writing, etc., that really are helpful in the 'real' world. I personally think that it just makes you such a more well-rounded, truly 'educated' person."

As he anticipates his post-Hope career, Johnson has the same perspective.

"Computer science is stereotypically a very closed field, with sort of an antisocial aura about it," Johnson said. "Yet in the workplace, interactions with people, writing reports, writing proposals, making presentations, expressing your ideas to people who may not know the lingo of computer science, who may not have had the background that you've had—people in human resources or in management that you are trying to explain these things to—make the liberal arts education essential in helping you express your ideas and interact with people from a variety of backgrounds."