



Faculty

Interview by
Jane M. Sanders

Computing Contributions

College of Computing Dean Rich DeMillo reveals his vision.

Rich DeMillo is dean of the College of Computing at the Georgia Institute of Technology, home to one of the highest-ranking computer science programs in the country. He returned to academia in 2002 after a career as an industry and government executive. DeMillo was chief technology officer for Hewlett-Packard (HP). Before that, DeMillo was in charge of information and computer sciences research at Telcordia Technologies. DeMillo has also directed the Computer and Computation Research Division of the National Science Foundation.

Q: How can College of Computing research meet one of your goals — to contribute to breakthroughs in the health industry?

A: We don't know yet what the breakthroughs will be. This is really only a problem that's appeared on the national radar screen in the last couple of years. It's been a problem for a long time, but it hasn't affected the collective consciousness of the country until recently. The thing that strikes us about healthcare, medicine and biological sciences is that every single discussion that takes places at the national level involves computing technology in an essential way. We don't know what those technologies are going to be able to deliver to the healthcare system, but we know their impact will be crucial.

We've started in the College of Computing to look at where the pain points are for health-care costs in this country. It's very difficult to figure that out, but if you look at the productivity gains made in business data processing, for example, we think almost none of those gains have been transferred over to the healthcare system. We're going to figure out how to do that.

Take the Aware Home (a research initiative to explore the future of computing technologies to support people in their homes). In many senses, that's

the kind of situated laboratory where people can figure out what the breakthrough technologies are going to be.

Q: What are your key concerns about Voice over Internet Protocol (VoIP) technology? And what steps are under way to address these problems?

A: It's an intriguing technology. I worked on it in the early days of the Internet because it was clear that voice communication was going to be one application of the public Internet. The difficulty is that it is prone to the same kind of security problems that you see on your laptop or desktop computer. Viruses are a significant threat to VoIP. So is the ability of people who are unauthorized to log into your account. Not to mention the spamming that we see in email. All of those things apply to VoIP. These were problem areas that were known early in the specification of voice over IP protocols.

It's been a bit disheartening that the industry hasn't taken them seriously until now. So we're seeing a mad scramble to figure out how we can retrofit this technology to make it safer than familiar information technology like email or Web browsing. That's significant because we rely on the telephone for things that we don't rely on a Web browser for — like 911 services.

I think the good news is that there's a consensus around the industry that we've waited too long to attack these problems and that these are things that need to be worked on now by a combination of research and industry groups and regulators to get back on track. We're well on our way to doing that.

Q: What needs to be done to secure cyberspace from a terrorist attack? How can College of Computing research help?

A: It's been a slow process. There's been so much focus at the federal level on other aspects of homeland security that it's sucked all the oxygen away from areas of concern like how to secure cyberspace. The fact of the matter is that there are vast organizations with state sponsorship that are capable of disrupting the power, transportation, communications and utility systems of this country. They're going to do it by attacking the way we interact with our basic infrastructure, which is increasingly through the Internet.

Federal government investments in this problem haven't kept pace. The amount of money that's available to mount a significant counterattack on state-sponsored cyberterrorism is miniscule compared to what's being poured into planning attacks.

Until there's an initiative that says, "We're going to put as much effort into what protects our basic infrastructure as the attackers are putting into damaging that infrastructure," we're going to lose.

If you look at the national and international scale and ask what it's going to take to really make progress, it's going to

take a level of investment and activity that's way above what we have today.

Q: What is your vision for the College of Computing with regard to the digital technology revolution that is under way?

A: It's interesting that this college is called the College of Computing and not the College of Computer Science. That's a great platform for thinking about what the vision of this place is. The technology has been around for a while, and it's been used in a lot of interesting places. We don't think the real value of information technology has been defined yet. That's what the College is all about — figuring out what the future of computing is, how it affects people's lives, how it affects the way they work and play. We believe computing technology is key to solving some of society's most critical problems.

Q: What new or enhanced capabilities will the Klaus Advanced Computing Building (which is under construction and expected to open in mid-2006) give the College of Computing?

A: It's a building that makes a statement about information technology. Driving from the Ferst Street entrance to the campus west, the building dominates the horizon. Placing the College centrally on the campus says a lot about the way we're going to interact with the rest of the campus. The Klaus Building will bring us together in a collaborative environment that hasn't existed before. The College has been scattered among six buildings on campus. Our new building also will give us a modern collaboration space. We'll have the ability to instrument this environment. We'll have state-of-the-art displays. We'll have the ability to

network the building in ways we couldn't do when our present building was built 15 years ago. We intend to use these capabilities in defining our program.

Q: What is the significance of interdisciplinary research for the College of Computing in fulfilling its vision?

A: Interdisciplinary is a word that we're not really happy with anymore. The way to look at computing and the way we interact with other disciplines is to look at the agendas for other disciplines. Information technology is a critical part of what they do. That's why at the College level we're creating partnerships with disciplines like literature, music and architecture.

If you look at all the disciplines that are important to Georgia Tech, information technology turns out to be a lens that you look through and see the world in a very different way.

From biology to mechanical engineering to electrical engineering to architecture to management, you find that computing technology forms a critical path to everything they want to do. We want to be partners in that process.

Q: Why did you decide to return to academia after a successful career in industry and government?

A: I think the thing that attracted me back to Georgia Tech was a chance to continue

to innovate. Industrial innovation has become focused on operational efficiency and, frankly speaking, I was more attracted to the ability to innovate technologically. The amount of money that is available in the computer industry to do basic research is not what it was 10 years ago. Basic research is going to be done on university campuses. The thing that has driven me through my whole career is being where the action is and anticipating where innovation is going to be.

Q: You are a self-described problem solver. What is it about problem-solving that gets you excited?

A: It's actually a physical rush. There's something about focusing — almost to the exclusion of everything else — on a difficult problem. It's the same kind of high that runners get. You concentrate your energy on one particular channel. When you're successful, it really does result in a physical reward.

Q: What computing problems have been the most rewarding to you to solve?

A: It's hard to talk about that because the most rewarding ones to me are probably the least accessible to people outside the field. The ones that I take the most pride in are the problems that I've worked on that have been

deep technological problems, mainly mathematical in nature. However, the ones that have had the most impact have not been the most technologically difficult problems. They've been the ones that have tried to move a field or organization in some direction.

Q: Why did you choose a career in computer science and what makes it a good area of study today?

A: I actually didn't choose a career in computer science. I'm revealing something about my age when I explain that when I decided to make this career choice, computer science didn't really exist. I've had the opportunity during my career to see the field defined and evolve into what it's become today.

What drew me to this discipline was the chance to solve a problem that no one else has been able to solve before. In my early experience with computers, I used them to solve very large physics problems and to visualize things that were happening at the very smallest atomic scale. No one had been able to do that before. When you get that kind of feedback as a young grad student, it's easy to be attracted to the discipline.

I think what attracts people today to computing is the ability to combine the technology with something that interests them. Last year, we started an undergraduate degree

PHOTOS BY GARY MEEK



program in computational media. The reason that people are attracted to the program is that it gives them the ability to focus on something that's intrinsically interesting to them and combine it with computing technology.

@ Read more at: gtresearchnews.gatech.edu/reshor/rh-f05/demillo.html

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