**Chris Ramming**

Senior Director of Research and Innovation, VMware

FY2021 UIDP Board Chair

# Powerful ideas shape a career

Sometimes, an idea is powerful enough to inspire a person's career. For Chris Ramming, who came to computer science via philosophy, that idea was the Sapir-Whorf hypothesis, which states that language shapes how people think.

Ramming realized that Sapir-Whorf helped explain his own experience in computer programming. His first computer science class, taught by his undergraduate advisor Alan Perlis at Yale, exposed Ramming to a spectrum of languages

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including APL, Pascal, and a dialect of Scheme named T. He found that different programming languages led him to take different approaches to problems. He later became interested in designing programming languages to help computer users find more natural solutions to problems. Ramming then spent much of the first decade of his career at Bell Labs developing and implementing "domain specific languages" to concretely leverage the Sapir-Whorf hypothesis.

One day Ramming got an eye-opening phone call from Eric Sumner, a former manager, suggesting that he consider getting involved with the Defense Advanced Research Projects Agency (DARPA). Ron Brachman, another former manager who had gone to DARPA, suggested that Ramming come work in DARPA's Information Processing Technology Office.

Ramming realized that being so involved with Bell Labs and AT&T Research, he had overlooked DARPA's accomplishments, what he calls "another amazing research organization that had an enormous impact on the world." He found the thought of going there "daunting, but irresistibly exciting." A move to DARPA meant that he could create research programs on a national scale.

Ramming went to DARPA as a program manager where he led projects that explored the future of wireless networking, with leading researchers from academia, industry, and national labs. It was a chance to become steeped in a new body of organizational knowledge about research best practices. It also gave him a new perspective on the challenges of transitioning research results into practice—a challenge that had become a significant focus for Ramming late in his AT&T role and has since become one of his central missions.

"There was a pattern of practitioners working with researchers," notes Ramming. "And often, the researchers were from universities." Ramming recognized these partnerships as a critical component for project effectiveness and for technology transfer. That insight sparked his interest in seeking opportunities to work at the industry-university boundary.

From his first day at DARPA, Ramming's days were numbered. "When you walk in the door, you have a badge, and it has the date of your exit," explains Ramming. "And that helps keep

people focused on getting something done during their tenure. DARPA is very proud of the 25% turnover."

When his time to leave arrived, Ramming considered work in the venture capital community. But Arno Penzias, physics Nobel prizewinner and Bell Labs researcher, offered a crucial piece of wisdom: VCs would not pay for his type of skills and "get for free" the insight he might be able to offer. Instead, Ramming

decided to focus on companies with a research component and with a bridge to practice.

The opportunity that appealed most was at Intel. The company's guiding principle was Moore's Law, which predicts that the number of transistors in a microchip will double every few years. "Intel was an influential part of the computing industry," says Ramming. "I was lucky to be able to go from a Bell Labs (later branching into AT&T Research), to DARPA, to Intel, three of the strongest research organizations in the world."

Ramming created the Intel Labs External Research Office, reformulating Intel's approach for midsized academic research alliances. "I was able to bring some ideas from DARPA to that effort," he says. He later became director of Intel's University Collaborations Office and led Intel's large-scale interdisciplinary research centers.

Meanwhile, others in Ramming's circle were making moves. David Tennenhouse, who had been in leadership roles at DARPA and Intel, moved to VMware as its chief research officer in 2014. Ramming eventually joined him to help implement and streamline an approach to systematic organic innovation.

Ramming became the lead for VMware's academic program (VMAP) and an internal incubator (VRTX) that strives to build new products and services from cutting-edge research ideas. The role placed him at the intersection of research and practice while increasing his scope.

"Driving these two interconnected programs at VMware has been a great experience," he says. "Earlier in my career, I had narrower responsibilities and could influence the broader innovation pipeline, but here I have direct responsibility at multiple stages in the lifespan of an idea. And it's wonderful to help create a new state-of-the-art industry research lab."

When Ramming moved from DARPA back to industry, there were some challenges. "You have to learn the culture," he says. "You have to build relationships with new colleagues." That can be difficult; it takes years to build trust with people, he notes, but knowing people in the computing community helped. "Researchers have careers spanning many years, and they move around, but it's a community where you get to know people over decades. And that makes it a bit easier to try new things."

## Ramming's primary career advice:

- **Follow your passion**. "There's nothing wrong with moving between sectors," he says. "It helps to learn about a couple of different (environments). I've stayed in most of my roles a long time by Silicon Valley standards, but long enough to grow some knowledge and experience and to put me in a position to take on the next challenge."

- **Understand the culture**. "Every organization develops its notion of best practices, and they will often specialize in what they're trying to accomplish," he says. "And those ideas of what they're doing help shape the way they work."

Ramming's career has taught him that research has an immense impact on industry. "On a national scale, we are moving industries forward, hopefully in positive ways," he says. "The actions of an individual (researcher) can make a difference. It might take 20 years, but I've seen, again and again, that ideas

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become important themes in industry. It's what you hope for, and it's nice to see that it happens." He is still inspired by the 1932 mural in the lobby of the AT&T Long Distance Building in Manhattan, which depicts a map of the world and the phrase "Telephone wires and radio unite to make neighbors of nations."

Much of what Ramming has accomplished in his career grew out of the Sapir-Whorf hypothesis, the idea that inspired him from the start. "I grew and thought about different aspects of an idea and eventually grew in my career by going from one idea to the next logical progression of that idea," he says. "That has led to a very satisfying career for me. And (even though) it sounds trite, this 'follow your passion' idea has been working out for me." ∞
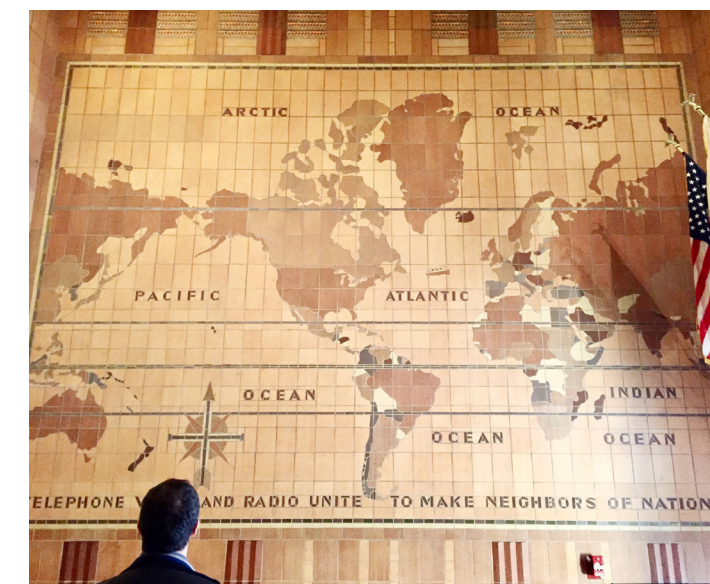


The AT&T Long Distance Building Lobby Map (*courtesy of ShareAlike 4.0 International*)