



ON MARCH 29, 2004, at its 14th Annual Innovator/Innovation of the Year Awards, *EDN* named AMD Chief Technology Officer Fred Weber and his design team Innovator of the Year for their work on the AMD64 architecture. (AMD64 is the technology that underlies both the Opteron and Athlon processor families.) Getting to this win was not without its challenges and lessons, but, given Weber's background, his propensity for hard work, and his strong ideas about innovation, it is not all that surprising, either.

Weber laid the groundwork in college. There, he says, he split his time in three ways. One was working toward his official degree, in physics, from Harvard University. On the extracurricular side, Weber, who has always been interested in architecture and design, also designed sets and did construction for theatrical productions. This endeavor gave him vital experience working as part of a group and on strict deadlines. "The curtain goes up one day, and the show opens," he says, "and it doesn't matter how done you are." Third, he participated in a program in systems analysis, which helped him understand how big systems work. "All three of those things kind of come together in what I've done since, which is really look at the combination of how design and engineering and people work together to make something happen. And it really takes all three."

When Weber was about to graduate from college, a professor he respected, Ugo Gagliardi, pointed him toward his next endeavor. Gagliardi told him that whatever industry honcho Gordon Bell was doing, Weber should also be doing. (Bell is the visionary behind Digital Equipment Corp's Vax line of minicomputers, among other things.) Weber wrote Bell a letter conveying his professor's advice. Bell apparently agreed with Gagliardi, because he wrote back, interviewed Weber, hired him, and became an early mentor to Weber as the two worked together for several years at Encore Computer.

AS FRED WEBER SETS HIS SIGHTS ON AMD'S NEXT STRATEGIC OPPORTUNITIES, HE SHARES HIS THOUGHTS ON MANAGING A LARGE DESIGN TEAM, HIS INTENSE WORK ETHIC, AND TIPS FOR TOMORROW'S ENGINEERS AND INNOVATORS.

THE TEAM RISES TO THE TOP

AND EDN INNOVATOR OF THE YEAR **FRED WEBER**



Photos courtesy Gary Laufman

In the '80s, Weber did a stint at the now-defunct start-up Kendall Square Research (KSR, Cambridge, MA). And it is here, Weber confesses, that he experienced the biggest engineering mistake of his career. Though he is quick to defend the invention and creativity at KSR, he admits that the company went after the supercomputer market at a time when the Cold War was ending and engineers had yet to make any big inroads into inventing bioinformatics. (Bioinformatics is the application of computer technology to the management of biological information.) "So, we designed a product right into the biggest slump of that product space—ever," says Weber. Later, the supercomputer market would rebound, but it would be too late for KSR. Thus, Weber warns, anticipating what the market's going to be like five years out can be difficult.

Today, as chief technology officer of AMD, where he's been since 1995, forecasting such trends is part of his job description. No longer managing his design team, Weber now concentrates on seeking new business opportunities for AMD and figuring out what the company should indeed be doing several years from now. (AMD's vice president of design engineering for the Computation Products Group, Randy Allen, is now heading up the overall design effort, and Bruce Giseke runs AMD's California design team.)

Before taking on his new role as chief technology officer in February 2004, however, Weber was overseeing a design team of 150 members. According to Weber, when man-



AMD design-team members huddle up with Fred Weber (center) before tackling another design challenge. Clockwise from Weber: Regina Schmidt, Kevin McGrath, Bill Hughes, Michael Golden, Michael Greske, Jeff Trull, and James Fan.

aging a team that large, communication is key, but it's also a difficult challenge. To succeed, he points to AMD's strategy, which is to keep the teams as small as possible. Then, though he recognizes the importance of a reporting hierarchy and schedules to an organization, *his* focus is on the people who make the work happen. He likes to walk around, talk to AMD's team members, and find out what's going on. "That's our main capital; that's our main capability," he says, "and what's important is that the people know what they need to do, know who to talk to, feel challenged and empowered to do not only their job, but even more than their job."

This notion of doing more than just your job is a recurring theme with Weber. He counsels the next generation of engineers to get in and get experience as early as possible. Though a staunch supporter of education, he strongly encourages practical training, getting onto projects when you're young, and doing more than your superiors ask you to do. This idea stems from advice someone gave Weber early in his career and that has worked for him ever since. "You can't just do your job constantly," he says. "You need little breaks during the day." It's what you do with these breaks that is important. Rather than spending these breaks surfing the Web or "vegging out,"

Weber suggests finding a friend who does something else within your organization and offering to help that person on a different project. "By constantly doing your job plus a little bit more, I think you get more experiences quickly."

Creating this type of collaborative and communicative atmosphere requires a certain kind of workplace. Often, AMD's design teams are working from multiple locations, such as the company's California and Texas offices. AMD does its best to minimize this physical separation and promote communication by flying people back and forth, holding videoconferences, and more. However, Weber is quick to point out that sometimes *physical* distance is not even the issue. "Even when you're all in the same building, if you don't create an environment where everybody has reason to talk to each other—often—you end up with a team that's not working effectively." To further his point, there's an analogy he likes: "If you look at a baseball team or a soccer team, everybody's on an open field and can see everybody else." Thus, something as simple as a cubicle set up in which employees can see each

other can be important to team building and productivity.

Even with a wide-open field, a team the size of Weber's is bound to face other obstacles. When working on the Athlon 64, a 64-bit processor that also took home the Best Processor of the Year prize at EDN's Innovation Awards, the team faced two major challenges. The single hardest problem was getting the people together—and *keeping* them together, motivated, and focused—to get the project done. AMD's team was trying to build the processor during the height of the dot.com bubble. A lot of disruption existed in the workplace; people were running

off to the latest start-ups to get rich. Thus, at one point, about two years before the project was finished, the top 20 leaders on the team, among them senior- leadership members Bruce Giseke, Alisa Scherer, and Bill Hughes, held a critical meeting. Here, the team members made a commitment to each other that they would see the project through to the end. (In the end, all but one of these people stuck it out.) "We ended up with a core team of people who were very loyal to the

HE LIKES TO WALK AROUND, TALK TO AMD'S TEAM MEMBERS, AND FIND OUT WHAT'S GOING ON.

idea, to AMD, and who, despite all the temptation to run off, stuck with this project,” says Weber. Those who stayed, he contends, did so because they believed in what they were doing and in the importance of it.

The other big hurdle was just having the guts to go through with the project. “When we started this project, the world believed [Intel’s] Itanium was the answer,” says Weber, “and it was very hard to get anyone to believe that we could pull this off or that it was the right direction.” AMD had to make a choice. “It was a very big decision to make to take a completely different direction from where Intel was leading the industry.”

Though this type of radical change in direction is certainly innovative, not all innovation needs to be radical. In fact, Weber cautions that you should carefully resist the temptation to change something more than it needs changing. “Innovation through extension is the right way to go, almost all the time,” he says. This idea, he realizes, flies in the face of the natural inclination to start with a clean slate. Though he recognizes the importance of this blank page for coming up with ideas and inventing things, Weber’s school of thought dictates that once you come up with those ideas, you should go back and ask how you can apply these ideas to something that already exists.

He returns to this lesson when addressing the need to balance R&D with innovation to bring a profitable product to market. To Weber, understanding what the true innovations are and inventing with your mind as open as possible are the important things. “I think there’s a continuum between basic research, applied research, and product development,” he says, “and how you balance your resources between those really makes the difference.”

The other clear—and perhaps obvious—lesson he’s learned about innovation is simple: “The good-enough or the somewhat-better product that is done is far more important than the perfect product that is not done.”

Given Weber’s strong feelings regarding communication and innovation, it might come as a surprise that some consider him to be something of a Luddite when it comes to many of today’s chosen modes for communicating. In his defense, however, this resistance to today’s

communications technologies, such as instant messaging and blogging, stems primarily from time limitations and not a reluctance to learn the new methods. If you want to reach Weber, e-mail is still your best option, it seems.

Despite his overloaded e-mailbox and his aversion to vegging out at work, Weber does find some time to play. And, as it did in college, his interest in design and his innovative attitude extend beyond his work life. When he’s not swimming, hiking, or camping with his wife of 10 years, Kate; his seven-year-old son, Marc; and his five-year-old daughter, Julia, he

“INNOVATION THROUGH EXTENSION IS THE RIGHT WAY TO GO, ALMOST ALL THE TIME,” HE SAYS.



often spends his weekends designing and building in his extensive garden. (At press time, adding a pond with a stream was his next goal.) As when he’s at AMD, working in the garden gives him an opportunity to come up with a design idea and then roll up his sleeves and get his hands dirty, making that idea a reality.

When he does take that rare break from designing—either privately or professionally—even his choice of reading reflects his creative spirit. John Irving’s quirky *A Prayer for Owen Meany* is his favorite fiction book. “What I like about it,” says Weber, “is that it’s at the boundary between reality and a little bit super-real or hyper-real, but not fantasy, not impossible. It’s just something a little bit...different.” Yet, ever the innovator, his choice for favorite nonfiction book, appropriately enough, is Clayton Christensen’s *The Innovator’s Dilemma*, and one he recommends that everyone in the industry read over and over again.

He also finds time to play with some of today’s technology gadgets. He’s been interested in the ability to take all of your content with you all of the time, so it’s no surprise, then, that

he’s enamored of his iPod. In fact, back in the ‘70s, he was an early adopter of the Astraltune, a musical device that skiers used to listen to music while skiing. A primitive precursor to today’s iPod, the device was basically a backpack with a tape deck inside.

As for the devices of tomorrow, Weber looks to the combination of digital content, connectivity, and rich-display devices. Because all devices are connected now—whether it’s your phone, TV, camera, or PC—and because these devices all have high-resolution displays, he contends that the next wave of devices will interact intelligently with each other and be richer than they have been in the past.

This merging of devices doesn’t necessarily mean that every device will be universal. Specialization still makes sense, Weber claims. Take, for example, cameras inside cell phones—a combination that clearly makes sense to people. “I think you’re going to see more and more of that, and that’s going to create more and more need for software on top of devices and allow them to interact with each other in very rich ways.” For Weber, this idea is exciting because he finds communicating devices to be the most interesting and the most useful to people. And this scenario will have meaning for AMD as a maker of processors, as well. Says Weber, “As software becomes more and more important, general-purpose processors and particularly the x86 instruction set become more and more valuable. So, our focus over the next five to 10 years is going to be to enable all of these very powerful devices in different form factors with lots of software content.”

As chief technology officer, Weber will watch this scenario unfold firsthand. And, true to his style, he’s still in touch with his employees, continuing to help the design teams with their strategic direction and their big architectural ideas in such areas as video processing, high-performance computing, and large-scale parallel processing. And if the teams need a break, perhaps they can offer to help out in Weber’s garden. □

You can reach Assistant Managing Editor and Webmaster Kasey Clark at 1-617-558-4324, email kase@reedbusiness.com.



TALK TO US
Post comments via TalkBack at the online version of this article at www.edn.com.