



Profiles in *Creativity*

BY ELIZABETH SVOBODA

David Baker

What does it take to become a true innovator—to expand the borders of human knowledge to include new territory no one else thought existed? Natural talent is one variable, but it’s by no means the whole story. According to Boston College psychologist Ellen Winner, young prodigies—the types of kids who ace the SAT, for instance—often fail to develop into genuinely groundbreaking innovators. Because they’ve been so lavishly rewarded for mastering an existing domain, Winner’s theory goes, they may have less incentive to chart new territory.

Although the qualities that make a great innovator can’t be measured by standardized tests, they’re exemplified in the life stories of the foremost innovators in this country—inventors, composers, policymakers, and others who have beaten the odds to break new ground. The innovators we profile here hail from a wide variety of fields, but they have a few key

attributes in common: a burning curiosity about the world; an unusual willingness to implement new concepts and ideas; and an unrelenting work ethic that enables them to turn mistakes into successes.

David Baker

David Baker knows a little something about thinking outside the box. As a high school student, he fell so deeply in love with music that he resolved to learn how to play the sousaphone, even though his school music department didn’t own one. “I took a cigar box, made holes in the top, put some springs and pieces of wood inside, and used that to learn the fingering for the tuba,” says Baker, now chair of the jazz department at Indiana University’s Jacobs School of Music. “When the sousaphone finally became available, my band teacher, Russell Brown, was enamored that I was so serious about it.” Still,

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predictable and yet so inexplicable, and I wondered how all of this happened.”

Once Kamen realized that inventing new products involved understanding these laws of nature and applying them through engineering, he was off and running. He derived special pleasure in finding unexpected uses for existing technology. When his older brother was in medical school and designing drugs to help babies with leukemia, Kamen realized available drug delivery systems were too large

willing to adapt your ideas quickly, no matter how passionate you are about them, and just keep chipping away.”

Esther Takeuchi

From an early age, Esther Takeuchi liked to get into just about everything—whether that meant peeling apart golf balls or exploring inside the walls. “My father was an electrical engineer, and I would follow him around the house,” she remembers. “Whatever he did, I would do.”

Takeuchi, now an engineer at the State University of New York at Buffalo, has parlayed her penchant for figuring out how things work into a wildly successful career. She holds over 120 patents—more than any other woman alive—and has received multiple regional Inventor of the Year awards. While working at the technology company Greatbatch, she developed the Lilliputian battery that powers implantable cardiac defibrillators, a scientific leap forward that has improved the lives of thousands of patients.

Perfecting her most famous invention, Takeuchi says, proved a long, slow slog. “The battery didn’t leap forward fully formed—a lot of steps led to the development and improvement of the technology.” She doesn’t discount the importance of split-second inspiration, but emphasizes that innovators need to lay an extensive groundwork of knowledge to pave the way for that eureka moment. “What was important was spending time thinking about the problem and reading about it. Sometimes I would set the problem aside,

and at the strangest moment it would occur to me, ‘Hey, we could do it this way.’ But being diligent in exploring the problem—that part is a disciplined process.”

After a successful career in industry, Takeuchi returned to academia in 2007 for two reasons: to pursue more freewheeling research on ways to improve battery performance and to help equip the next generation of innovators in a time of increasing global competitiveness. “The United States is just an unbelievable country—there’s such a tradition of innovation and great thought. But I do have concerns about how the United States is going to remain competitive, and I thought, ‘Well, maybe I can contribute to that.’”

Although Takeuchi believes inspiring teachers can help spur youthful creativity, she also thinks the government needs to pitch in by delivering sustained funding for science to help the country shift its focus toward innovation. “We have bright, diligent, motivated young people, but what fields are they attracted to? We need to value, as a society, the contributions that scientists, engineers, and technical educators make.” ■



Esther Takeuchi

and began devising a solution. “I went down to the basement and built him the equipment he needed: tiny pumps that would deliver a very small amount of drug,” he remembers. “Then one of the professors my brother was dealing with said, ‘That little pump is so small you could put it on your belt or put it in your pocket.’” Inspired, Kamen used the mini-pump technology he’d developed to create the first portable insulin pump—now used by diabetics around the world.

Aspiring innovators, Kamen believes, would do well to adopt this kind of flexible mind-set. It’s important for ambitious creators to get comfortable with end-arounds, unexpected eureka’s, and periodic failures, he says, because the ride is bound to be a bumpy one. To that end, Kamen founded FIRST, a high school robotics competition designed to give students a firsthand taste of what the innovation process is like. “I think the public has this perception that inventors run around with great ideas, get the parts, and make the product. But the process of inventing couldn’t be further from that—it’s not a linear, straightforward process. You have to be