

Features

Healing by Design



By Michael I. Cohen

They are two very different people from different generations, but Harry Wotton '94, '96(MS) and Doug Noiles '44 share a common passion—solving important problems by looking at them in new ways. They also share the entrepreneurial courage to launch companies, developing their innovative designs when others would not take the risk. Because of their work, people who need knee or hip replacements now live better lives, and pets who suffer from orthopedic injuries or disease have better care. Meet the bone fixers.

When freshman Harry Wotton stepped onto the WPI campus in 1990, he had a plan. Train as an engineer, then apply that knowledge to medicine. He hoped to become a medical doctor, but along the way—while planning for his Major Qualifying Project (MQP), actually—a flash of insight set Wotton on a different path.

It started when his advisor, Rick Sisson, the George F. Fuller Professor in Mechanical Engineering at WPI, spoke with Dr. Karl Kraus, who was then a veterinary surgeon at Tufts University. Kraus told Sisson that orthopedic devices to treat dogs with broken legs were not optimal; many dogs did not heal well because the existing devices were prone to failure. Sisson arranged for Wotton to meet with Kraus, and the seeds of his MQP took root.

As Wotton listened to the veterinarian, he immediately realized an underlying flaw with the existing orthopedic products—they were derivatives of devices first designed for humans. "When people leave the hospital with a broken leg they have crutches or a wheelchair, so they don't have to carry their

weight on the broken limb while it heals," Wotton says. "That doesn't work for dogs—they need to walk on the broken leg right away. The design for a dog device had to be different."

So Wotton began to design a new orthopedic device for dogs with broken legs. The project combined engineering with his passion for working in a medical field. The fact that it was a canine, not human, medical problem was a modest adjustment he was comfortable making.

For the remainder of his senior year and into his graduate studies at WPI, Wotton worked on the problem and eventually designed an external fixation device. The design provided stability for the bone and tissues to heal, while carrying the animal's weight while it walked.

Wotton built and tested his prototypes in the Washburn Shops. When the design reached a mature enough stage, and the mechanical testing results were optimal, Kraus agreed to test it in the clinic. "A dog had come into the emergency room at Tufts with a fracture and, with the owner's consent, Dr. Kraus used the new device," Wotton recalls. "It worked well, right away."

That first success led to several additional clinical studies at Tufts, with similar results, all of which were published in leading veterinary journals. Kraus confirmed that the new device was a breakthrough—it helped the dogs heal quickly and it was exceedingly reliable. "After those studies, I tried to sell the idea to a company that is now my competitor. But they didn't want it," Wotton says. "Professor Sisson encouraged me to start my own company."

It was 1996 and Wotton faced a major decision. In spite of his growing interest in product design, and the success of his MQP (shown in photo), he had applied and was accepted to medical school. He could have been a doctor if he so chose. "Ultimately, I had to say no to medical school. I was having too much fun," Wotton says. "I love the creative process of design—and there is a real excitement to building your own company. I've never regretted the decision."

With an initial investment of \$250, a \$5,000 gift from his mother, and hours of sweat equity, Wotton started SECUROS in 1997 to build and market the external fixation device. (SECUROS comes from "secure Os," a nod to the Greek word for bone.) The product was a success from the start, and SECUROS attracted a following among veterinary surgeons, who in turn became a source of ideas for new products. "The surgeons were constantly telling me about the problems they were dealing with," he says, "and asking me if I could come up with something to fix them."

Since 1997 Wotton has designed hundreds of innovative products, from small screws to large implantable devices, to meet the surgeons' needs. "I tend to do my best thinking at night," he says. "I'll have a thought during the day, and I'll fall asleep thinking about a problem or a design, and I'll often wake up in the middle of the night with ideas to write down."

SECUROS has since grown to 29 employees, with locations in Massachusetts and Germany. The company has seven product lines, hundreds of products, five U.S. patents, and seven patents pending.

In 2007 Wotton sold SECUROS to MWI Veterinary Supply, one of the country's largest animal health products distributors. But Wotton, who lives in northeast Connecticut with his wife and three children,

remains the principal designer for the company. "I sold the company only to make it better," he says. "As part of a larger company with a national sales force, we can do so much more. I stayed on as president, and I have quite a long-term contract, so I'll be here for a while. It's fun for me."

This year, Wotton's story came full circle when he became directly involved in the MQPs again, this time as an advisor. Working with Glenn Gaudette, assistant professor of biomedical engineering, Wotton advised four seniors who took on his challenge to design a new product to treat chronic hip dislocations in dogs. The students, Meghan Pasquali, Nicholas Pelletier, Jennifer Richards, and Jonathan Shoemaker, developed a product design, then built and refined several prototypes. They received the 2009 Provost's Award for their work, and now SECUROS will explore commercializing their concepts. "It was great working with the students," Wotton says. "WPI changed my life, and I want to continue to be a part of it. So this is my way to stay involved and give back."