Peter Fitzgerald, M.D., Ph.D., '87: Master plumber

By Amos Esty

Peter Fitzgerald had a problem. He enjoyed the research on satellite communications that he carried out while earning a master's degree in engineering at Rensselaer Polytechnic Institute in the late 1970s. But, he says, "I could never explain what I did to my mother."

So Fitzgerald, a native of California's Bay Area, called up Richard Popp, M.D., the chief of cardiology at Stanford. He told Popp that he was an engineer but had an interest in medicine, knew something about computers, and would like to apply his engineering training to cardiology. Popp agreed to hire him, and in 1980, after completing his master's degree, Fitzgerald began working at Stanford as a research assistant.

Fitzgerald knew that there are electrical signals emanating from the heart, and he thought he might be able to use computers to analyze them. "I started applying some of the engineering algorithms and rigorous image processing to something that could beat, something that moved," he says. "That got me excited." Even better, the research had clear, understandable implications. "I could explain it to my mother," he says. That was the start of Fitzgerald's work combining medicine and engineering.

At Stanford, Fitzgerald met two Dartmouth professors who helped direct the next step along his career path. In 1981, John Strohbehn, Ph.D., a professor at Dartmouth's Thayer School of Engineering and an adjunct professor at DMS, visited Stanford on a sabbatical. Strohbehn was one of the leaders of an effort to start a joint-degree program at Dartmouth that would combine an M.D. with a Ph.D. in engineering, something bound to be of interest to an engineer who wanted to improve medical care. Around the same time, Douglas James, M.D., a DMS cardiologist, spent some time in Popp's lab.

The interaction with Strohbehn and James was one reason Fitzgerald chose to attend DMS. Another was geography. "I picked medical schools based on rivers, because I love to fly-fish," he says. In the fall of 1982, he left California for Hanover, N.H. And, in 1987, he became the first graduate of the new joint-degree program.

Grew up: Near San Francisco, Calif.

Education: Santa Clara University '78 (B.S. in computer sciences); Rensselaer Polytechnic Institute '80 (M.S. in electrical system engineering); Dartmouth Medical School '87 (M.D., Ph.D. in biomedical engineering)

Training: University of California, San Francisco (residency in medicine, fellowship in cardiology)

Appointments at Stanford: Associate professor of medicine (cardiology); associate professor of electrical engineering; director, Core Cardiovascular Analysis Lab; codirector, Center for Research in Cardiovascular Interventions

Why he enjoyed doing research at Dartmouth: "The departments there were perfect in the sense that they really didn't need to think out of the box—they just didn't allow there to be a box."

Children: Michael, 12, and Shannon, 8

Hobbies: Skiing and fly-fishing with his family

Since 1994, Fitzgerald has developed and sold 11 start-up medical device and biotechnology companies.

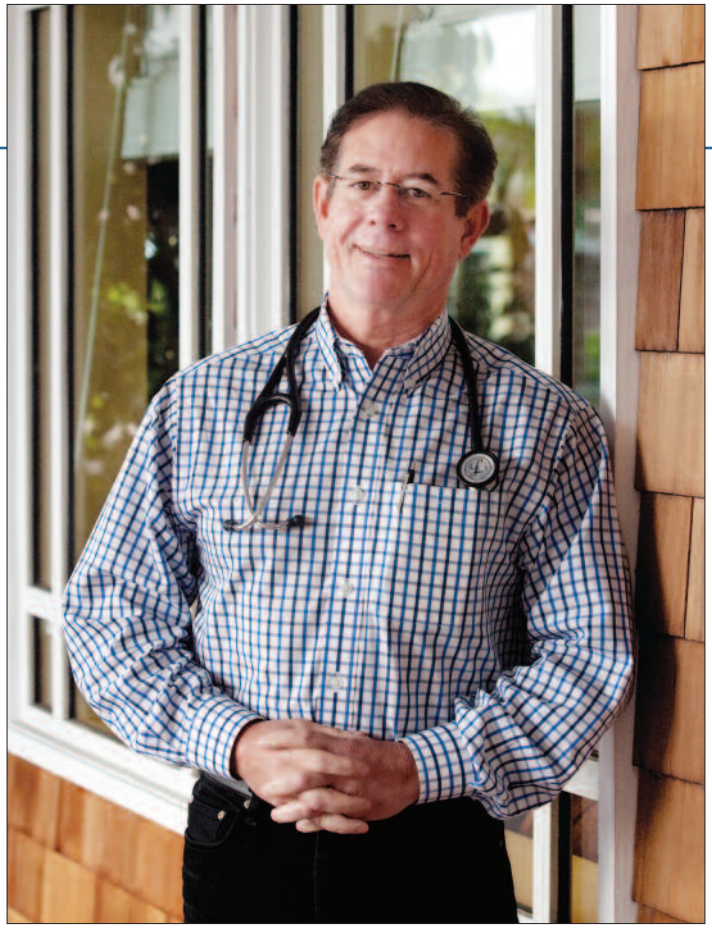
The choice to go to Dartmouth, Fitzgerald says, was a good one—for both the fly-fishing and the education, particularly for someone with such diverse interests. "The interdisciplinary barriers at Dartmouth aren't as high as they are at the Harvards, the Stanfords, the Yales," he says. "You can maneuver back and forth."

After graduating, Fitzgerald returned to California, first as a resident and fellow at the University of California, San Francisco, and then as a faculty member at Stanford, where he has remained ever since 1994. Fitzgerald's appointment at Stanford is as an interventional cardiologist, or, as he describes it, "a plumber, basically." His background has given him an unusual perspective on how to improve patient care, and his location—in the heart of Silicon Valley—has put him in contact with engineers, physicians, and venture capitalists who are interested in developing new medical products.

That environment has allowed Fitzgerald to become involved in what he says are the three essential aspects of successful biomedical engineering: the clinical work that inspires a new idea, the process of turning that idea into a tangible product, and the acquisition of the funding needed to pay for its development. Over the course of his career, he has worked as a clinician and a researcher, helping to develop and test new technologies while remaining directly involved in patient care. At the same time, he has gained entry into the world of venture capital, starting a number of new companies. He has now developed and sold 11 start-up medical device and biotechnology companies, and he cofounded the venture capital firms LVP Capital, based in San Francisco, and TriVentures, based in Israel.

At Stanford, Fitzgerald has supported the kind of interdisciplinary environment that he says was so important to him at Dartmouth. "The only way you can actually come up with solutions is to expose people of different disciplines to the clinic," he says. "That's when you see the real needs addressed." So he has helped to create programs that take engineers, chemists, and other researchers

Amos Esty is the managing editor of Dartmouth Medicine *magazine.*



NORBERT VON DER GROEBEN

DMS alumnus Peter Fitzgerald is an engineer, an inventor, an entrepreneur, and an interventional cardiologist—or, as he puts it himself, "a plumber, basically."

and put them into hospitals to identify needs and possible solutions. "We throw them into clinic, we throw them into some imaging center, and we let them just simply observe," Fitzgerald says. The researchers provide a new perspective on problems that physicians had simply ignored for years, he explains. "The needs have to come from the bedside. They don't come from the bench."

Over the years, Fitzgerald has learned how to take ideas that are proposed to fill clinical needs and turn them into products. The technologies he has worked on, he says, are "not huge contributions, but small, focused contributions that really can make the workflow more effective in a hospital."

As an example, he cites a stapler designed to improve the experience of undergoing the insertion of a stent—through an artery in the groin—into a blocked artery. The problem was that a physician had to hold closed the hole through which the stent was inserted. So he helped develop a stapler that can close the hole, streamlining the procedure.

Several years ago, Fitzgerald led an effort to bring to the United States a new imaging system used elsewhere around the world. The system helps doctors evaluate the success of coronary artery bypass surgery while the patient is still on the operating table. By inserting a fluorescent dye that highlights proteins in the blood, and then viewing the dye on a monitor, physicians can tell how well blood is flowing, lowering the risk that the surgery will need to be repeated later. He and surgical colleagues were the first in the U.S. to make use of this imaging system.

The imaging technology was produced by Novadaq Technologies, and at the time he brought it to the U.S., Fitzgerald was on the company's board. It's one example of the many collaborations Fitzgerald has forged with partners in industry, something he feels is vital to the success of biotechnology.

Fitzgerald likes to come up with ideas for improvements and to be involved in getting those technologies off the ground, including securing funding to form a start-up company that can work out the details of the technology. But at some point, he says, it makes sense for the start-up to hand off the idea to a larger company that has the size, money, and experience to get the technology tested and then, hopefully, into widespread use. He says that sort of partnership can shorten the time it takes to get a new product into clinical use, and it also frees up his time so he can continue to work on developing new ideas.

"If I have to spend all the time and all the dollars to get a commercialized product," he says, "then that's a seven-, eight-year process. What I'd rather do is get it to patients as efficiently as possible. So often you hand off those batons to the big companies earlier, because they can do what they do best, and you can do what you do best—and that is to innovate based on patients' clinical needs."

As someone who has collaborated with industry throughout his career, Fitzgerald is keenly aware of the controversy over conflicts of interest. So he says it's important for people to understand that when they have a financial stake in the success of a new technology, they would inherently have a conflict if they were to test that product. That's why he believes it's necessary for other physicians around the country and the world to test the new technology. "Those people have to authenticate it and integrate it, and you have to back off," he says. "You have to back off out of respect for the patient and respect for the potential conflict that you have."

But at the same time, he believes that collaborations between academe and industry are essential to medical advances. "It's the interaction that is critical," he says. "It's important to have that integration." So, he argues, policies that prohibit those kinds of partnerships are counterproductive.

Back in 1987, long before Fitzgerald had dipped his toes into venture capital or sold his first company, he talked to this magazine about how he planned to pursue his interests in both engineering and medicine. "I'll try to keep a balance," he said. "The scary part of all this is that you could become a jack-of-all-trades and master of none." Over the past two decades, Fitzgerald seems to have kept his balance quite well, mastering more trades than even he might have imagined. ■