



Innovator

BY LUBA VANGELOVA

Innovators develop new ideas and better solutions. Josh Makower, MD, is a serial entrepreneur, inventor, and innovator with more than 300 patents to his name. He is the founder and executive chairman of ExploraMed, a medical-device incubator that has started more than 10 companies. He also teaches at the Stanford Biodesign Innovation Program, which he co-founded, and runs the medical-device investing practice at New Enterprise Associates (NEA), a global venture capital firm.

Work overview

The process of innovating new medical technologies starts by looking at problems in a rigorous and unbiased way, and trying to characterize what would need to be done to solve them. The most recent company we launched created the first-ever wearable, concealable, quiet, breast pump. We listened to nursing moms who found pumping uncomfortable and inconvenient, and prioritized their needs.

The second step is inventing, during which you try to create a solution

that meets the needs criteria. You throw a lot of ideas on the board, prototype the best ones, and test them. If they don't sufficiently address the criteria, you keep on iterating until you find the best solution. The third step is implementation. This is when you ask additional questions, such as how much it will cost and whether there are safety concerns, to determine the idea's probability of success. Finally, after you've fully vetted a product concept, you can build it into a company. This involves hiring people, performing formal stud-

ies, getting the product approved by the Food and Drug Administration, training doctors to use it, publishing academic papers, and making sure insurers will pay for it.

Josh Makower with several of the devices he has developed. In Josh's hand: UroLift Delivery Device (by Neotract). From left to right: Willow wearable breast pump, RELIEVA SPINPLUS® NAV Balloon Sinuplasty System (by Acclarent), Coravin wine preservation system, Atlas™ System by Moximed. Photo: NEA.

I live to do things that have never been done before, and that will help people in a personal and fundamental way. My least favorite part of the work is dealing with organizations such as insurance companies that can stand in the way because of short-term profitability concerns.

Career highlights

When people approach me and express how products or procedures I played a

fundamental role in creating have improved and changed their lives, it's the best reward anyone could ask for.

Career path

From an early age, I was fascinated with inventions and how living organisms work. I earned a mechanical engineering degree with a biomedical emphasis. Because I wanted to build things that would improve medical care and health, I decided to learn more about the human body by going to medical school. After getting my medical degree, I took a technology analyst job at Pfizer's medical devices division. While working at that job I also obtained an MBA.

Pfizer's CFO asked me to figure out why acquired companies became less innovative once they became part of Pfizer. I found that after entrepreneurs solve a need using a certain technology (for example, a catheter), they think of themselves as a catheter company, and their next ideas are more derivative than innovative. I proposed that these teams should go into clinical settings of their strategic interest, expose themselves to needs and problems, and create products based on the needs themselves, rather than limiting themselves to the technologies of the products they already sell.

The CFO told me to prove that this approach could work, so my job at Pfizer morphed into running an innovation strategy team for several years. The process proved successful, and some of our ideas made their way into research and development. Unfortunately, the division leaders preferred to see such disruptive innovations created elsewhere, and then swoop in to buy those businesses once they were proven. I found this very frustrating.

I realized that if I really wanted to be part of creating new and innovative products, I would need to become an entrepreneur. In 1995 I left Pfizer and started a medical-device incubator called ExploraMed, with a plan to use the process I'd developed at Pfizer to create new

companies. Within two years, I had created and sold my first company, which made a product that helped doctors treat urinary incontinence. I then started and sold more companies. After each new company was spun off, I would stay to help it as chairman of the board, and then go back to the lab with my ExploraMed colleagues to figure out our next idea.

The products we have created are used in many different branches of medicine. Outsiders like us can come in without biases and ask why things are done a certain way, and whether the outcomes are really acceptable. We then engage experts in the field and also study the literature so we can become focused domain experts ourselves over time.

About midway through my career, I cut back to part time at ExploraMed so I could co-found the Stanford Biodesign Innovation Program to train the next generation of innovators. I helped develop the curriculum, and I teach our innovation method to graduate students and fellows. I now also lead the medical device investing practice at NEA, evaluating opportunities and guiding the firm to invest in startups that we think will have the greatest potential.

Knowledge, skills, and training needed

There are many different roles you can play in this process, from engineer to scientist to patent attorney. The specific training you have is less important than your ability to be optimistic, yet realistic, about your projects. It is extremely useful to understand both medicine and engineering when inventing these types of devices. Being able to speak the language of business is also useful. It's helpful but not actually necessary to have degrees in each of these fields.

Advice for students

Channel your creativity into building things and learning how things work. If you enjoy thinking about how to

BONUS POINTS

Makower's education: B.S. in mechanical engineering, with biomedical emphasis, MIT; M.D., New York University; M.B.A., Columbia University

On the web: <https://www.exploramed.com/>; www.nea.com; <https://www.amazon.com/Biodesign-Process-Innovating-Medical-Technologies/dp/0521517427>

Related careers: Product-development engineer, physician, business manager, salesperson, manufacturer, quality-control engineer.

make the world better, and how to fix things that are broken, go ahead and try, by breaking the problem down into manageable pieces. Just tinkering at home, trying to solve real problems of any size, can be great training for this kind of career.



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