



Receiving a Bachelors and Masters degree in Mechanical Engineering from Northeastern University (Boston, Massachusetts) Katie Portale Karmelek, Product Development Engineer at TDC Medical Inc. has been on the fast track to a rewarding career in the medical device industry.

During her undergraduate studies, she gained professional experience through Northeastern's cooperative education program. By the time she obtained her bachelors degree, she had 1-1/2 year of professional experience working for companies like Aspect Medical Systems, NMT Medical and Boston Scientific. These experiences allowed her to continue with her university studies in a masters degree program with confidence going into the industry.

"One of the challenges we face as an industry, is understanding how the body will react to various materials and designing devices that are innovative in addressing these concerns"

**Q: Tell us about TDC Medical Inc.**

TDC stands for The Device Company. We specialize in providing design, product development, quality systems and manufacturing services for the creation and production of innovative single use and reusable therapeutic medical devices.

TDC was formed in 2004 by its six founders. Their goal was for TDC to become the premier service provider focused on delivering prompt, responsive and creative product development with the capability to produce finished devices for clinical studies and pilot level manufacturing. Today TDC has more than seventy people in three facilities. Eighty percent of our employees are engineers working in product design and development, manufacturing and quality.

The devices that we develop are often first of their kind in type or function, considered disruptive technology and designed to solve an unmet medical need. Our customer's devices cover a broad ranges of markets; cardiovascular, gastroenterology, spine and orthopedic, among others.

**Q: How did you make the decision to accept your current job?**

I was fortunate enough to work as a contractor at TDC Medical while I was finishing up my master's thesis. This opportunity gave me a better understanding of what my experience would be like working there and allowed me to make the best decision when I was faced with multiple offers. In hindsight, this approach of weighing various factors worked well for me. Having worked at different companies through my educational process at Northeastern, I was able to see firsthand what the differences were between working at a large company versus a small company and helped me understand the role I would play at the company and how this would help the company succeed with its vision.

**Q: What is your role at TDC Medical Inc.**

I worked in the design and development of products that deal with various systems of the body, mainly the cardiovascular system. In order to do this it is necessary to develop knowledge about the body's interaction with a wide range of materials.

One of the most interesting aspects of working for TDC Medical is that each day can differ widely from the previous. It is highly dependent on the phase and number of projects that are currently ongoing. The employees of TDC rarely work on one project at a time and tasks can vary from engineering design and testing, customer interaction to general project management.

**Q: What type of challenges have you incurred or learned along your career?**

When I was working at Boston Scientific, I was involved at the design level of a new product line. Since I had very little experience, my voice was not always heard as much as I thought it should have been. The project went through several design iterations; throughout the process I continued testing my ideas and stood by my original thoughts. At the end, the collaboration between the members of the team ultimately produced a patent which my ideas became a part of.

Early in your career, it's easy to get discouraged and feel intimidated. My advice is to stay motivated and never let anything suppress your abilities as an engineer.

**Q: What are the trends on the forefront in your industry?**

In the medical device industry, minimally invasive technology is the focus of design. The most recent and popular trend in the advancement of medical devices is Natural Orifice Translumenal Endoscopic Surgery, also known as NOTES. This means the ability to deliver a medical device through an existing opening in the body (e.g. nose or mouth) and eliminate the need for any surgical incisions. Almost all medical devices are being delivered through catheters into the body and eliminating any surgical incisions decreases recovery times and length of hospital stays.

**Q: What benefits does your work offer society?**

TDC Medical offers the ability to design creative medical devices that enhance the way surgical procedures are performed. These innovative devices expand medical treatment options, decrease recovery times, and create safer procedural techniques, among many other benefits to the patient and surgeon.

The variety of project types and the medical areas we serve is a key reason that we have attracted and retained our experienced engineering and technical team. At TDC our engineers get to work on the very latest technology across medicine. We specialize in solving difficult technical challenges. This experience helps us deliver efficiency and effectiveness on projects combined with a great cross fertilization for technical solutions for many first of their kind devices.

**Q: What are the considerations one should keep in mind when deciding whether to work in the medical device industry?**

The medical device industry is a fast paced and dynamic field. Engineers in the medical device industry are always learning about new materials and discovering creative ways to solve problems. Every medical device that gets designed is also very closely regimented and everything needs to be extremely well documented, especially when considering the need for FDA (Food and Drug Administration) approval. Therefore with most projects, more time is spent documenting the processes than actually designing or testing.

**Q: Why did you decide to become an engineer?**

My grandfather was my inspiration to become a mechanical engineer. When I was young, he would take me around the house and show me how to fix or install items. By the time I was 10 years old, I could install electrical outlets, bleed our hot water heating system and had developed various other skills. His passion always fascinated me and I looked up to him for that. These experiences, coupled with a strong medical background in my family, allowed me to develop my own sense of passion for the medical device industry.

**Q: What are your plans for the future?**

Always be passionate about what I do. At this point in my career, I am excited about working at TDC Medical and learning as much as I can. I believe that experience is what helps expand and develop an engineer and that is what I hope I can accomplish for many years to come.

If you have comments about this spotlight or would like to contact Katie, please email us.