

# Summer Internship: Complete

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[newcomb@tulane.edu](mailto:newcomb@tulane.edu)

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Well classes start Monday so today is my last day at Bioceptive. I have learned so much this summer, and I know my experience here will greatly help me in my future studies and career. I started out the summer by writing a clinical review for the purpose of obtaining a CE mark in Europe (the equivalent of FDA approval) for Bioceptive's new IUD insertion device. In order to do this I had to learn just about everything there is to know about IUDs and the IUD insertion process, as well as how medical device approval works in Europe and the US. This not only opened my eyes to an entire subfield of women's health, it also showed me the types of jumps and

hurdles I will have to overcome in order to get a medical device approved in the US and in Europe if I ever decide to open my own medical device startup company.

By observing the day to day operations of Bioceptive and by having both business and engineering related discussions with my bosses, I have come to realize just how much work goes into not only designing a medical device, but also just running a startup company. One device can undergo thousands of design iterations before it works correctly, and there are many other things besides just function that you have to take into account during that process. Second only to functionality and safety, manufacturing is an incredibly important aspect to consider. Designs and materials have to be optimized to allow for the cheapest and most effective manufacturing. It's not enough to just design something that works if it is too difficult or expensive to produce. This is probably one of the most important lessons I have learned here. From the business side of things there are also a million little details to think about. There's the big challenge of getting funding. Whether it is through grants or investors, there's a lot of work that goes into it and a lot of different people to talk to and convince you're worth it. There's the marketing of your product to consider, too. It has to have a name that is both catchy and friendly, and you have to convince both patients and doctors that they want to use it. There's also the search for the ever-important manufacturers and distributors, and let's not forget the business plan that serves as the company backbone. All of this takes a lot of work, and the most important thing I've learned about the business side of things is that connections are everything. Hard work will get you a lot of places, but a good connection can actually open that door of opportunity that you've been banging on.

The last thing I've been working on this summer is research and development of a potential new product. I've been able to see the second act of the project my boss started when he had an idea for a new IUD inserter, and now I get to see the beginning of a project as I start my own from scratch. It's still in its infancy, but I have made a lot of progress on it this summer, and I am rather proud of it. All of the things I've learned here will help me in both my studies and my career. This knowledge will especially come in handy as I start my senior year and begin my senior design project. Now that I've seen what goes on in a biotech startup, I would like to gain some experience working at a larger, more established company. That way I will have witnessed the life cycle of a biotech business in its entirety.

Working at a women's health company has also brought several gender issues to my attention. Women's health is not a booming branch of medicine. It is widely

understudied and underutilized. The majority of women's health medical devices were invented decades ago, and not much progress has been made since. This means that there is a lot of room for improvement, and I hope that with time the field will be able to catch up to the rest of medicine. This summer I learned a lot of things, but most importantly, I learned how to solve real problems. I learned how to look at a problem that didn't already have a solution and come up with an answer of my own. This process can be scary, as it is a difficult one, but this internship has taught me how to apply the problem-solving skills I've learned in classes to real world problems. This is one of the most important skills an engineer can possess, and I am grateful that I had the opportunity to grow and develop it.