

Active implantable medical devices: How to guide your career!

This helpful and informative active implantable medical device career guide was written by Dr. Nick Talbot and Dr. Arup Roy, both senior scientists at Second Sight (www.2-sight.com).

This is what I have observed in my company regarding valuable fields of study and I think this information is at least somewhat applicable to the medical device industry in general.

For us, the hardest positions to find candidates for are good quality assurance engineers, embedded system developers, RF electrical engineers, and analog ASIC designers.

Quality assurance engineers that also have a strong background in either electrical or mechanical engineering are the most valuable type of quality engineers to my company. So you could get an electrical or mechanical engineering degree and then get a certification as a quality engineer (CQE). With those skills you'll never be lacking job opportunities. There is also an increasing demand for software quality assurance (SQA) engineers, especially with the rise of automation, which is also a design assurance function. They need to be able to program test software that facilitates testing the product software in an automated way. A good SQA could advance to product software design after they have gained enough experience.

Embedded systems developers write firmware code which is the lowest level code that runs on our vision processor (usually in some flavor of C/C++). Embedded systems coding is hard to learn to do well and it's not taught much in colleges, so there are great job opportunities for qualified applicants.

Electrical engineers that know (and have experience with) RF design seem to be getting rarer and rarer. It's an extremely challenging field of study, but there are many high paying job opportunities.

Though not as hard to find, we also hire mechanical engineers and prefer those with excellent solid modelling skills and documentation skills. They also need to be creative and self-motivated. We have hired some bio-engineers that have been terrific, but only ones with either a very strong mechanical engineering or software programming background equal to a good mechanical engineer or software developer, respectively.

Also not as hard to find, but still extremely important, are software engineers to do application software development for the PC/tablet/smartphone platforms that communicate to the embedded medical device. Also, GUI designers are needed. If you can do both application software development and GUI design well you will be very marketable to a small company like ours.

Lastly, our device has a MEMS component, so we sometime hire mechanical engineers with MEMS experience. Not many medical devices have a MEMS component at this time, but that may change.

It's possible that the positions which have the most opportunity today may change by the time you graduate, so definitely choose your major to be something you can both enjoy and excel at.

One thing critical to preparing yourself for the medical device industry is to simply know that it's only 10% invention; the other 90% is proving your invention meets its requirements (usually by numerous tests) and documenting everything. Documentation is key: if it's not documented it didn't happen and it's not defined. Not to discourage you from this field (I love it and would not work in any other), but the majority of what we do is create documentation. This includes solid modelling of parts which is followed up by dimensioned mechanical drawings, test protocols, test reports, design analyses, project plans, software development plans, requirements documents, specifications documents, and more. And all these documents need to be reviewed by several people (including a quality engineer and a regulatory specialist), corrections made, and then subsequently approved by the appropriate department leader. This is all done through a computer database known as a document control system. This amount of documentation is just the nature of a tightly regulated industry like medical devices or aerospace. In the medical device industry, it's the only way to be certain patient safety is ensured, which is why the FDA requires so much documentation. So you need to get used to producing lot of engineering drawings and documents in between the opportunities to flex your creative muscles. ***But it's all worth it when you see how your product is positively impacting people's lives.***