Globetrotting Biomedical Student Defines Success

By: Desiré Bennett

CEAS biomedical engineering student excels through public service and serves as a global liaison during his co-op work assignments.

Benjamin Ko is the UC College of Engineering and Applied Science Engineer of the Month for December. Ben maintains a 3.92 GPA in his senior year in the biomedical engineering program. He is working toward a Bachelor of Science degree via the program’s medical device track.

For Ben, UC was always “that college just down the road.” And even though he was born in Cincinnati and raised only 20 minutes North in Fairfield, OH, he wasn’t always convinced it was where he’d ultimately end up. “Originally, it was my backup plan,” Ben explains. “But then I took a tour with Dr. Jeffrey D. Johnson, and he introduced me to a few BME seniors.”

Ben spoke with seniors during his campus visit about their co-op experiences and learned about their senior capstone projects. “They were actually making devices that had the potential to go on and get patents – and as undergraduate students. It blew my mind that they were doing that here at UC,” Ben describes. “So between co-op and the BME (biomedical engineering) senior capstone, I was hooked.”

Soon after, Ben hit the ground running. “I fell in love with the major so there hasn’t been a big problem with handling the coursework,” he said. “But the biggest challenge for a budding biomedical engineer is to determine ‘what passions do you have for the field and what classes do you need to take so that you have the skills to work in that field?’ Just making that commitment of determining what you want to do – that’s the real challenge.”

Ben thought about what he wanted to do and it wasn’t long before he secured a co-op position working in the field of medical devices. This helped to solidify his class choices. “I realized that taking classes in the electrical engineering department allowed me to better understand how our handpieces and our generators worked, so when I’m talking to the engineer, who has been in the field for 30 years, I can actually communicate with him about what I need to have done,” he explains. “Or taking a fluid dynamics and thermal transfer class because I work in cryogenics and a lot of what I have to deal with is the transfer of energy.”

Through his co-op position at AtriCure, Inc., a company that develops, manufactures and sells surgical ablation systems, Ben acquired an extensive skill-set of technical expertise as well as interpersonal skills by working closely with design engineers.

“During my first rotation, I worked on a product development team where we made medical devices for cardiac surgery and I was really able to see what my contributions were,” he said. “It is a really important step for a student worker to take some ownership in the projects and see that he or she is making a difference and see that the engineers actually value you as a member of their team.”
Ben was so valued by the company that he was extended an offer to take the lead in training the US sales force on the new cryogenic product. “Ben was one of only two co-op students who conducted sales training and who participated in the release system validation studies around the US,” said Christopher Park, AtriCure’s director of engineering (2004-2012) and Ben’s supervisor. “Ben was able to communicate both the technical design aspect of the medical device and the science behind its functional operation in a manner such that even a non-technical sales person was able to comprehend and take the message forward.”

As a result, Ben’s training talent was extended to the European sales force, taking him across the Atlantic on numerous occasions, making him a global liaison for AtriCure. “He is the only co-op student at AtriCure to have ventured internationally because of his accomplishments,” said Park. “Ben also took the lead in performing field hardware and software upgrades of the cryogenic ablation systems, both domestically and internationally.”

As part of a User Preference Evaluation study at AtriCure, Ben was required to interact with hospital staffs and surgeons to in-service them in the recommended use of the equipment for the cardiac procedure. “I’ve been in 30 to 40 open heart surgeries in the past couple years,” said Ben. “Legally, we as engineers and sales reps can’t touch the patient. We can’t ‘scrub in’ but we do get sterile, put on the scrubs and face mask, and then either stand behind the surgeon, across from the surgeon or at the head of the patient.”

Ben reflects on his past experiences. “There were five to 10 surgeries where I stood at the head of the patient and I got to look into their chest cavity and see the beating heart and see where the doctors were making incisions to replace the mitral valve,” he remembers. “It was fascinating – absolutely amazing – to see a beating heart.”

During the procedure, called Cryosurgery, using AtriCure’s equipment, the surgeon freezes part of the heart. “It sounds counterintuitive because you’re basically giving the heart tissue frostbite and then it dies, but the hope is that when the heart tissue dies, and you do it very specifically, you have these aluminum probes and tubes that you lay on the heart in certain positions,” he explains. “And when you freeze the heart and it dies, it scars over and then you can block electrical conduction. The hope is to accomplish a treatment for atrial fibrillation”

Ben collaborated with the surgeons, during these surgeries, to make sure he or she was comfortable with the equipment. He then gathered feedback from the surgeons for continuous improvement of the products.

During his third and last rotation, Ben’s supervisor, who had also been his mentor, left the company just weeks before Ben was slated to start. This led to Ben taking on somewhat of a managerial role, leading a small medical device team. “That was an interesting experience trying
to lead people who were many years my senior and who had a lot more experience and more expertise in the field,” he said.

Ben worked with the engineering director to ensure that the project still moved forward and worked with suppliers to make sure that everyone was doing what they needed to do to make the changes and improvements that needed to be made. Ben says the knowledge and experience he gained was invaluable. “It was the epitome of the three years culminated in this last rotation, when I moved beyond engineering and into resource allocation and business planning. It was a great opportunity.”

Outside of co-op and class work, Ben has kept himself busy during his collegiate career. He’s played, what he describes as, an auxiliary leadership role in the CEAS Tribunal.

“I’ll fill in where some kind of effort is needed,” he explains. “I’ll take on small projects that other committees might have like engineering week or the career fair and if they need someone to help out with the corporate sponsor or arranging information sessions and interviews, I’ll help.”

Through Ben’s leadership, a chapter of the Biomedical Engineering Society (BMES) has become a dynamic and popular student group. “I became involved as a freshman. The president at the time took me under his wing,” he said. “Over the next couple of years, I worked on starting a poster symposium for undergraduates so that they could showcase the research they had done as underclassmen.”

During his third year, Ben took on the role of president and continued that on into his fourth year. During this time he developed more alumni relations within the society. “We tried to reconnect with alumni, who are now working in the field, and then connect them with students who are looking for co-op positions.” Ben has since passed on the presidency to one of the younger members, but still offers consulting and advice and still participates in events, the meetings and the community service.

Ben now works on the School of Energy, Environmental, Biological & Medical Engineering (SEEBME) curriculum committee. “The idea is that, now that we’re in semesters, we have freshmen who are completing their first class set,” he explains. “So we’re gathering takeaways from that, like, ‘what’s been good’ and ‘what’s been bad’ and how we can revise the curriculum for next year to improve it.”

He continues, “In an academic institution the size of ours, you can’t stay stagnant – you may have some curriculum standard that may or may not work, but if you don’t address it, you’re going to fall behind,” he said. “When I graduate, I’d like to see the students who come in to have a just as good or better of an education as I’ve had.”
Associate Professor Johnson has been an academic advisor for Ben. “I would place Ben in the top five percent of all BME students, past and present, in terms of intellect, maturity, service to UC and our profession,” he said. “I am extremely impressed with his academic achievements and with his character.”

Ben has also served his community through tutoring math and reading to fourth graders at Frederick Douglass Elementary located in the Walnut Hills area of Cincinnati. “In the state of Ohio, the way prison beds are allocated is by looking at the fourth grade reading proficiency tests from 10 years prior,” Ben explains. “And in doing so the state can determine who’s going to end up in prison based on how well they can read.”

Ben considers this to be a terrifying prediction. He not only wanted to tutor students, but he also wanted to make a difference in their lives. “I worked with one student for two years and I’d like to think that I was able to help him improve his reading, but the bigger impact was just trying to be a positive role model,” he reflects. “It was something completely different from what I do every day in the classroom and in the workplace and it’s a way to connect with people on a very real level to impact your community in a very positive way.”

Ben believes that the University of Cincinnati students and faculty have an obligation to the community to get in contact with the community and improve it wherever they can. “Ben has been a tremendous benefit to UC as a student,” said Johnson. “There is no question in my mind he will continue to be a benefit to UC after he graduates.”

After graduation, Ben would like to work in industry in medical devices as a biomedical engineer but also plans on applying to a program at John Hopkins graduate school. The program is focused on third world application of medical devices.

“We can develop all types of amazing technology for the US and Europe but in places like Africa and some areas in India, where they don’t even have a consistent power source, you don’t always have the same design considerations and the people doing the surgery might not even be trained,” he said. “So here’s this whole new engineering problem that can potentially affect hundreds of thousands of lives.”
ENGINEER OF THE MONTH

As one of the most innovative colleges, the College of Engineering and Applied Science at the University of Cincinnati takes pride in its exceptional students and their successes. “Our vision is to produce outstanding engineers and technologists,” states Interim Dean Teik C. Lim, PhD. “WE ENGINEER BETTER™ starts with our training the next generation and we are proud to introduce a few of our leaders.”

Starting in August and each month this academic year, the college is recognizing one of our upper classmen (junior or senior) as our Engineer of the Month.

Each Engineer of the Month has demonstrated excellence in the classroom, success in their co-op assignments, and leadership through extracurricular activities on campus and/or in the community. These students have found the balance needed to be leaders and exemplary scholars.

The College of Engineering and Applied Science salutes their efforts and recognizes:

Benjamin Ko

Engineer of the Month for December

Senior - 3.92 GPA

Biomedical Engineering