A Reflective Journey: Navigating Your Cumulative Experience at Iowa State University

Nathan Stark

My education at Iowa State University has exposed me to many different challenges and opportunities that required new learning approaches and design processes to tackle various issues. These opportunities arose from classes as well as extracurricular activities and my internship and co-op experience in industry, where I got to help solve real world problems with engineering. This has helped me be better prepared for life after college, where continued learning and different approaches will be needed to succeed in my career in industry.

Many college classes I took at Iowa State University required learning outside of class to succeed. For example, COM S 309, a course primarily consisting of a team programming project in an Agile environment, contained very little information on the libraries and tools necessary to build an application, instead focusing on the project management side. For my group and I to succeed, we needed to use library documentation, Internet tutorials, and experiments with the code to generate a functioning product. This was similar to my experience working at Collins Aerospace as an intern/co-op, where I was often using new tools that were unfamiliar to me or even others at the company due to the cutting-edge nature of components being used. This required reaching out to other industry professionals for assistance with tools, taking courses on new concepts, and experimenting both in simulations and on real hardware to get a better understanding of what I was working with.

My work at Collins Aerospace also exposed me to projects that dealt with a number of real-world problems. The group I worked with primarily produces radios for government and military applications. This kind of work has many economic and global factors. Anything used

by the US Military has the potential to have global impacts in protecting the USA's interests and those of our allies. Being funded by taxpayers also means that the projects I work on have an ethical responsibility to spend money wisely and not abuse the economic resources of the US Government.

During my time at Collins Aerospace, I also volunteered with a local high school robotics team in Marion, IA. This gave me another opportunity to see a societal impact of engineering in teaching kids about engineering and the educational and career opportunities available to them after high school. It also provided more opportunities for learning, such as learning about printed circuit board (PCB) design, which is not a topic taught in Iowa State courses. This helped to reinforce the importance of my own learning outside of formal education to learn new skills that can help me approach engineering problems. I identified a potential need for a circuit capable of driving DC motors at a more affordable price than the current solutions the team was using and developed a solution. This utilized both knowledge from university courses, such as microcontroller programming and circuit analysis, and concepts I learned from tutorials and experiments in order to succeed. In the end, my project was a success and could drive DC motors for around $15 a unit, much cheaper than the other solutions which ranged from $70 - $90.

After returning from my co-op at Collins Aerospace for my final year at the university, I enrolled in the senior design project. This gave a group of my peers and I a chance to approach an engineering project larger in scope than what I had done on my own. My team was tasked with developing a microcontroller with RF capabilities, which requires knowledge from courses in addition to new knowledge specific to the fabrication process and communication protocols

being used. At the time of this writing, the project is still ongoing but has been a great learning experience both with respect to project planning and management as well as technical skills.

Throughout my time at Iowa State University and my additional activities, I have had the opportunity to learn about a variety of topics and apply my knowledge to real-world problems. This has given me an appreciation both of the challenges facing engineering in many contexts, but also underlined the need for my continued learning to be able to solve more engineering problems. It has also enabled me to approach problems and design solutions to those problems using prior experience, which will prove useful in my future.