Internships sharpen ISE students' skills

Four prospective professionals share their stories

While the basics of an industrial and systems engineering degree can effectively prepare young professionals for their careers, there is no substitute for hands-on experience. To gain this, prospective ISEs seek summer internships that can provide valuable on-the-job seasoning and often lead to a full-time position after graduation.

To celebrate International Women in Engineering Day June 23 (*inwed.org.uk*), we offer four female ISE students who began their career resumes with internships that provided insight and problem-solving opportunities in a variety of industries.

Taking flight with problem-solving for United Airlines

By Aleksina Jovic

University of Illinois at Urbana-Champaign

Have you wondered what goes on behind the scenes at an airport? If you are like me, you've probably also questioned how many people and processes it takes for it to happen.

Last summer, I had the opportunity to be a digital technology intern at United Airlines on their analytics and innovation team based in Chicago. I was able to meet and work with people and engage in processes that make this industry so impactful.

I've always been fascinated by airplanes and their unique power. My earliest memory of flying is at age 5 on a journey with my dad, mom and brother moving from Serbia to the United States. I was scared of a whole new life in America; I had moved across the planet, away from most of my family and the culture I grew up knowing. What reassured me was knowing I was just a flight away. As I've gone back and visited over the years, I've come to realize the power an airline holds is in its reassurance that no place is truly out of reach. Family is often just a flight away.

Having such a close connection to this industry inspired me to apply to this internship after my sophomore year. I am a junior at the University of Illinois at Urbana-Champaign studying systems engineering and design and minoring in the Hoeft Technology and Management Program. At United, I constantly found myself applying the skills I learned in my classes to the work with my team.

I worked on a variety of projects that spanned several different segments of the company. What I found most fascinating was how crucial each part of the process was. I found that an airline functions like we do; a body of many systems where failure in one could mean failure in all.

One task I took on was net promoter scores. These metrics evaluate customers' satisfaction with the services received. I found correlations and trends from season to season and drew conclusions on how to improve the process. We were able to pinpoint where and when satisfaction was low, then specifically

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target those areas for improvement. This work magnified both United's impact on its consumers and the critical role understanding the user plays in the company's success.

My challenges were not limited to the technology of data analysis software, as I found the functionality of a business just as demanding. This drove home the idea that the intersection of technology and business is heavily enriched by the success of one another.

I also worked with a team to evaluate pilot performance and the risk of retraining rates. When a pilot joins or transfers from another commercial airline, many metrics and standards must be met. This process can be long and tedious for the pilot and also for United. To make this process smoother, data analysis allowed us to examine different pilot profiles and categorize them to determine their degree of risk for retraining. This saved time and money and allowed some pilots to return to work quicker. Like everything at United, this also benefited consumers, allowing for more pilots, reducing delays and waiting times, and making an overall smoother passenger experience.

One of my favorite aspects of the internship was the intern project. Toward the midpoint of my journey at United, I was put on a team with six other talented interns to work on a real-world problem that had not been solved. It was as intimidating as it sounds, but nonetheless a rewarding project. With the diverse skills my team possessed, we worked together to create a dashboard in a software called Splunk. This outlined the process of receiving a new plane from the manufacturer, and by loading the proper United software onto it, enabled it to perform essential tasks such as processing data, safety reports and security-related information.

Being on the analytics and innovation team was filled with constant learning and improving. Aside from the projects, there were unbeatable flight benefits. Interns could travel on standby for free, a great way to hop on a quick weekend trip and recharge from a long week of work. Through my travels, I had the opportunity to see various airports; some were United hubs and others were smaller, but each gave a different perspective and showed me the various operations that ensued based on airport size and location.

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The intern class got the chance to experience a detailed, behind-the-scenes tour of O'Hare International Airport in Chicago, where I saw some of the projects I was working on being executed. To wrap it all up, my team traveled to Houston for a work trip to visit our project sponsor.

My time at United was extremely impactful. I learned to work with people from different backgrounds and see how our various skills can complement each other. Most of all, I was constantly reminded of the power that airlines like United hold to bring people together, whether that be to my family in Serbia or back home to Chicago where opportunities such as this one await. Until last summer, I didn't realize how many people and processes it takes to make this happen. It takes a body of people and a magnitude of effort to run an airline as well as United Airlines. ❖

Coke offers a refreshing opportunity for Panamericana student

By Ana Paula Martínez Del Águila
Universidad Panamericana

Coca-Cola is a company almost everyone knows due to its strong presence in over 200 countries for producing its popular soft drink, which is always present in traditional Mexican meals and in other countries.

I am studying industrial engineering at Universidad Panamericana in Mexico. To graduate, it is required to enter an internship. In 2021, I was looking for a position that fit my skills

and my interests but mainly to learn and gain experience. I found an internship program from The Coca-Cola Co. called "Fresh Minds," so I decided to apply. It was a long selection process but I was selected.

I started the internship in September 2021 in the Dairy Business Development area. I worked on a project focused on Santa Clara, a Mexican brand that sells artisanal ice cream and premium dairy products. The internship helped me learn organization skills and better numerical analysis, and think in a more structured and strategic way. I liked learning about the dairy business as it provides foods we consume frequently and different innovations the market has presented in recent years.

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I was transferred to another area as a strategy intern. For me, this was an opportunity to learn about Coca-Cola from a new perspective. This area is completely different from the previous one; in this position, I would have a better understanding of the different brands and industries in learning how the system works. It would allow me to develop analytical skills from another perspective, the ability to optimize processes and be in constant use of the technology.

When I was selected for the internship, I never imagined the amazing company Coca-Cola is and how much it is interested in people. The company has always been at the forefront of innovation. I am impressed by the adaptability and focus on interaction with people, being part of a community by implementing many social programs, and having the commitment to be more sustainable. It is an iconic and cultural brand that is part of daily lives and the creation of memories.

I have received a lot of mentorship and support from my managers who took the time to help me grow and develop my skills. They shared their knowledge and experiences with me and were a fundamental part of my enjoyment of working at Coca-Cola and the personal and professional growth I have had since the internship began. It is amazing how much difference there is in the theoretical knowledge taught in the classrooms than the one applied in businesses.

Yet a strong mark the university and IISE chapter have left on me is that all processes can be improved. Sometimes companies with established and traditional methodologies lose the perspective of optimization and continuous improvement.

The internship positions have made me think about what fields I want to pursue in the long term and what I like about industrial engineering. First, I love to be capable of making

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analytical decisions and know how to optimize processes, skills useful in daily life. On the other hand, I realize this major gives me the opportunity to participate in different areas and projects. It has provided me with a lot of knowledge, and I have been able to confirm that I chose my career correctly and my love for it.

I am happy I was selected for this program and have the opportunity to learn from many people and to be able to make meaningful contributions to the teams I have been part of. I recommend this internship to everyone who wants to be surprised and have their knowledge challenged and enjoy an incredible experience. ❖

Getting front-line know-how with DHL Supply Chain

By Ryan Secrest
University of Dayton

"Aspire to Fly Higher!" is one of the slogans for the University of Dayton's Engineering Program, and I was certainly on cloud nine when offered a summer internship opportunity with DHL Supply Chain.

DHL assigned me to its Cisco account in Lockbourne, Ohio. The job description definitely fit the problem-solving and tech-

Ryan Secrest is an industrial engineering student at the University of Dayton. Here, she poses (third from right) with her fellow interns after completing their Capstone project with DHL Supply Chain.

nical skills I was attaining through UD's industrial engineering technology classes. I was excited about the amount of responsibility and specialized projects DHL Supply Chain entrusted to me from the start. I was also amazed by how much information I learned through my coursework at Dayton and through being a member of the Institute of Industrial and Systems Engineers that could be transferred and applied toward the projects with which I was tasked.

My first task: Flowcharts. Since I needed to have a strong understanding of Cisco's workflow operation, I created a flowchart identifying every main element involved with its inbound receiving, put away, picking and outbound packing processes. After grasping a strong understanding of Cisco's supply chain functions through this flowchart, I conducted multiple time studies relevant to each procedure and applied the collected results to develop a standard time per task.

Through this analysis, I identified inefficiencies and areas of nonvalue-added time. One area of inefficiency involved the receiving of a stock keeping unit. For each unit, there were multiple barcodes to be scanned before the unit could be put away. However, between scanning barcodes, the operator was required to go to the computer and hit "enter," decreasing time efficiency. I created a scannable barcode that automatically produced the screen needed, eliminating the "enter" key task between scans. This increased the productivity and quality of the operation.

Next task: Capacity analysis project. DHL Supply Chain was receiving a number of units from Cisco but was not given any information regarding their dimensions. There were a few aisles of racking reserved for this arriving product. My task was to determine if this area was sufficient for the units coming in or if the racking needed to be expanded. I analyzed a vast amount of existing data on SKUs and shelf sizes and confirmed that the space provided was sufficient for the expected number of units.

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Final task: Capstone project, the largest and most essential project that I worked on during my internship. This project allowed for collaboration, communication, creativity and critical thinking to problem-solve a distribution center issue.

Recently, the distribution center implemented locus robotics, also known as locus bots, which provide the technology of robotic picking assistants to increase automation efficiency in the picking process. At Carhartt Distribution Center 3.0, a locus bot is assigned a task with a list of items to retrieve for a

specific order, along with its location. The bot proceeds to the location, waits for an associate to arrive and places the item on the bot, then moves to its next location. However, there is a limit of five bots allowed down an aisle at one time. This led to considerable congestion among the robots within just a few of the active pick aisles, while the remaining aisles were open and uncrowded.

Through root cause analysis, my team was able to determine the reason behind the congestion. The replenishment logic in place would search for an available location starting at a certain aisle, work its way down the aisle, then continue to the following aisle. Because of this, the SKUs that ran out faster would be replenished in the prioritized aisle. Over time, this aisle would populate with the fastest moving SKUs. The more frequently picked a SKU is, the more it needs to be replenished, causing obstruction in the aisle.

My team considered many factors to arrive at our solution, including the scope and limitations; static and dynamic slotting; other accounts that have implemented locus; a shared warehouse management system; ergonomic and associate safety; an increased number of bots; and minimizing the associate replenishment path. The solution we created was a dynamic replenishment sequence that evenly distributes the cases throughout all the available aisles. The sequence also prioritizes the middle levels of each bay – known as the golden zone – to prevent back injuries from bending and reaching. The sequence aims to increase the locus bots' productivity, decreasing wait time and downtime. We had the opportunity to present our Capstone Project and received many accolades, which I appreciated.

During my time at DHL Supply Chain, I valued the chance to collaborate with front-line operators working on the floor and apply that information to my projects. Through speaking with them, I was able to understand more about their day-to-day processes and consider their suggestions for improving the efficiency of the operations. Additional skills I learned to apply as an industrial engineer were the importance of questioning and analyzing the different processes and procedures for continuous improvement. Processes often are done a certain way because of an established practice, even if it is not the most efficient way. Change can be uncomfortable, but sometimes necessary for improvement. It is also important to learn and understand why a process is performed a certain way and use critical thinking skills to improve it.

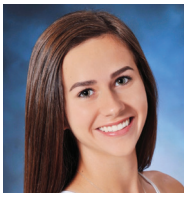
Overall, DHL Supply Chain offered me a challenging hands-on learning experience. It provided me real opportunities to problem-solve, to apply technical skills learned through both my UD coursework and IISE membership, and to collaborate with other interns, associates and engineers. I significantly grew personally and professionally from this experiential learning opportunity.

The DHL Supply Chain employees with whom I interacted were approachable and eager to help me. I collaborated with a wide range of people, learned many different aspects about the industry and enjoyed the variety of work an industrial engineer performs. I am grateful for everything I have learned through my internship and through my coursework at the University of Dayton. Both organizations have truly inspired me to fly higher as I begin my journey as an industrial engineer! ❖

Tackling issues on the warehouse floor leads to full-time role at Radial

By Caroline Veitch

Pennsylvania State University



I will never forget the day I accepted an offer to work for Radial Inc. as an industrial engineering intern in Easton, Pennsylvania. I was sitting in an engineering analytics class taking notes on my iPad when I saw an email notification pop up on my screen. I was interviewing and applying to multiple companies, so I immediately checked my inbox. The 'subject line read, "Congratulations | Offer Letter for Caroline Veitch – Radial Inc."

I'm unsure how I managed to contain my excitement. It only took me about five minutes to read through the offer letter and return it indicating I was accepting the offer to intern with Radial during summer 2022.

Before accepting this offer in spring 2022, I spent the previous fall semester researching and applying to different internships. One day, I received an email with information about a mentoring program for undergraduates sponsored by the Penn State Industrial and Manufacturing Engineering Society (PSIMES). Shortly after applying, I was paired with Sunny Ghai, a Penn State industrial engineering alumnus. We met virtually throughout the semester, and he gave me advice and recommendations for my academic and professional development.

> *As I got more practice, I was able to provide input on how clients could improve their efficiencies and increase the amount of throughput for each workstation.*

During one meeting, Sunny expressed the importance of networking and the effectiveness of LinkedIn. Afterward, he created a post introducing me to his professional network. I soon was connected to industrial engineers in all different industries. A few weeks after the post, I received a LinkedIn message from Scott DeMoss, director of optimization engineering at Radial Inc., regarding summer internship opportunities. Soon after connecting with Scott, I interviewed for the

Caroline Veitch is a recent industrial engineering graduate of Pennsylvania State University who served as an intern in summer 2022 with Radial Inc., an e-commerce company based in Pennsylvania. She begins a full-time position with the company this June.

summer position. Although the interview was virtual, I could sense Scott's pride for not only his daily work, but the company overall.

At the conclusion of the interview, I narrowed down my options to two companies. A major difference between the offers I received was that Radial's position was on-site and the other one was remote. I had made it my goal to gain true industry experience as an undergraduate and decided that accepting the role with Radial was the best decision.

I reported to the fulfillment center in Easton daily, but I also had the opportunity to travel to four other sites within the network and learn about Radial's innovative solutions for its clients. One exciting part of my travels was the opportunity to help support the expansion of Geek + robots into a client's inventory. The robots retrieved inventory from the shelves and brought it to the respective picking stations, reducing workers' labor fatigue and improving inventory picking accuracy.

To support this expansion, I recreated a new floor plan in AutoCAD that accounted for the movement of existing racks and workstations, as well as the creation of the new space for the addition of more robots. After finalizing this AutoCAD drawing with my mentor, we printed a copy and headed to the warehouse floor.

We retrieved a tape measure and industrial tape to measure out the floor and we taped an outline of the exact location for each rack. It was tedious and required great attention to detail, and I enjoyed seeing the robots operate successfully between the new rack locations.

I also had the opportunity to be a part of a kaizen event to assess the safety of robots working with humans. The kaizen consisted of data collection, brainstorming and implementing improvements for increasing the safety of the robots.

In addition, I was responsible for conducting several time studies to set standard processing rates and ensure service level agreement needs were met for various clients. The time studies were a common client request and I performed them often. As I got more practice, I was able to provide input on how clients could improve their efficiencies and increase the amount of throughput for each workstation.

For all these experiences, I had time to learn and practice before completing the task at hand. One day, however, I had the opportunity to solve a problem as it occurred. I remember receiving a message from an employee mentioning that packages were falling off the conveyor belt and onto the floor. The main problem was a shortage of the large cardboard boxes used for storing packages. In this instance, my mentor taught me how to use Pyramid, the software responsible for routing the packages to their proper destination. After getting a quick tutorial on the software, I rebalanced the conveyor line and rerouted the packages to a location with a box available.

Ultimately, I had the privilege of expanding my knowledge of optimization and continuous improvement in the logistics industry while working for Radial.

In the fall of my senior year, I attended Penn State's Fall Career Days, the largest collegiate career fair, and the Industrial Engineering Career Fair hosted by Penn State's IISE chapter. After careful thought and consideration of all options, I decided Radial Inc. provided the best opportunity to grow and develop, both personally and professionally. I am excited to join full time in June 2023 upon completion of my degree. I am extremely grateful for my time at Penn State University and the opportunities it has provided. ❖