

Engineers' Forum

VOLUME 40 – No. 3
September 2019

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On the Cover

Rolls-Royce Trent 1000 Engine placed in Goodwin Hall and donated to Virginia Tech to inspire future engineers. Photograph taken by Hunain Shamsi.

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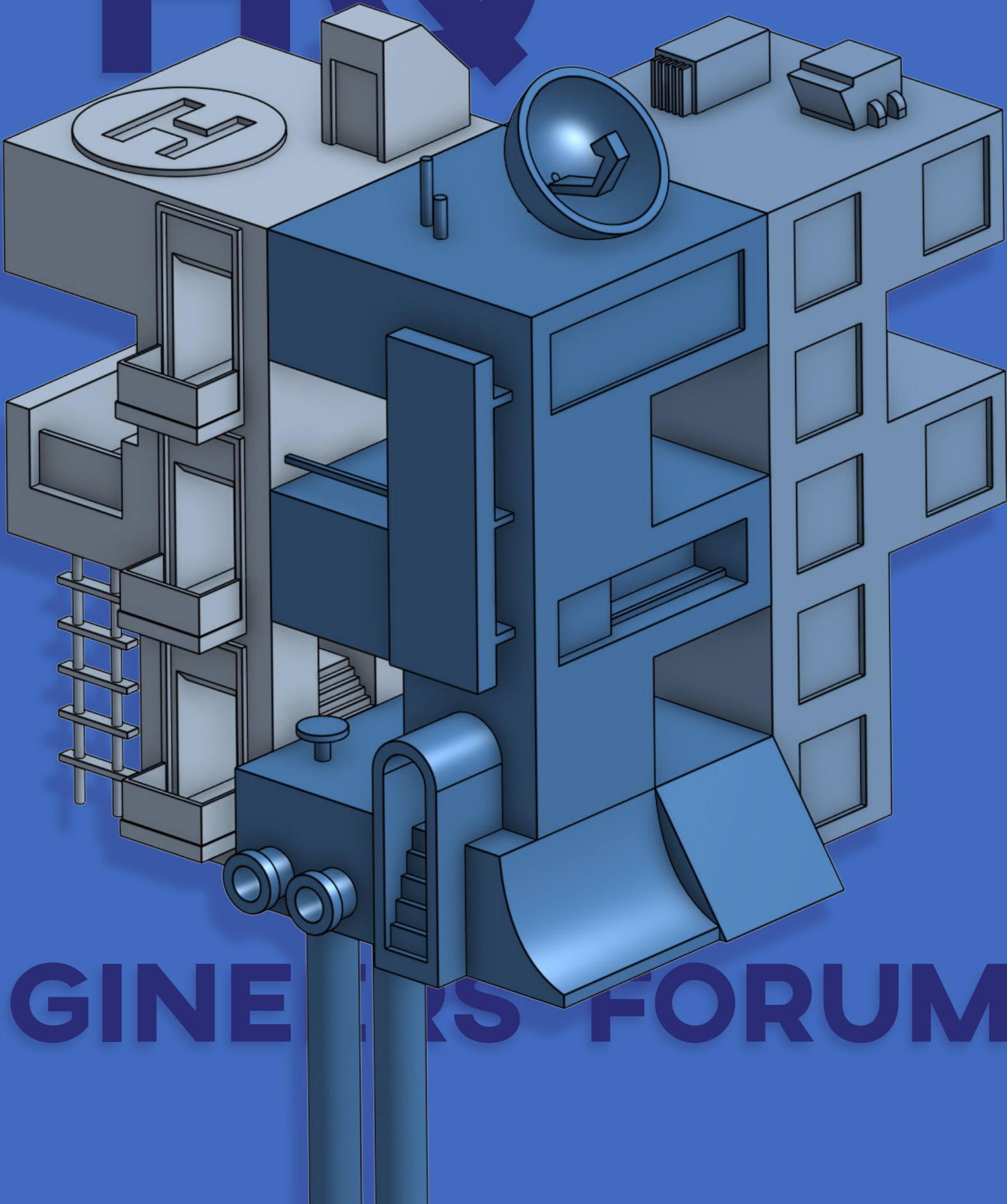


Entrepreneurship In Engineering

Melanie Do



HQ



ENGINEERS FORUM

LETTER FROM THE EDITOR

Welcome to the Fall 2019 semester! I hope everyone had a great summer – whether that be at an internship, working another job, studying, traveling, or just relaxing! At Engineers' Forum, we are excited to release our first magazine of the 2019-2020 academic year.

With the annual Engineering Expo coming to Virginia Tech on September 10 – 12, Mehak Kamal wanted to highlight the premier of a brand new app introduced by the Student Engineers' Council for the event. Find the best ways to navigate the career fair in her piece.

Learn efficient ways to transition back to school with Caitlin McConnell as she relays valuable advice to help you make the most out of the opportunities on campus. She hopes to shape your time at VT by passing along her knowledge and unique experiences.

Elisabeth Robb shines a spotlight on new Virginia Tech professor and former student, Dr. David Gray. If you are a first-year taking Foundations of Engineering or are interested in exploring his story involving self-driving cars and magnets, this is a worthy read.

Highlighting the exciting careers of engineering Hokie alumni at NAVAIR, Soumya Khanna gives insight on what's in store after graduation. Read about how overcoming challenges have broadened their skillset, thus preparing them for real-world experiences.

Interested in exploring a new perspective of engineering? Look into the Theme Park Engineering and Design Club at Virginia Tech. Read about networking with industry professionals, roller coaster modeling competitions, and behind-the-scenes tours of theme parks in my piece.

In her article regarding Entrepreneurship in Engineering, Melanie Do features 3 successful engineering entrepreneurs who founded successful, well-known companies. For a look into these leaders of technological innovation and Virginia Tech alumni, read Melanie's piece.

Lastly, if you are interested in joining our team and contributing to our magazine as a writer, photographer, or social media personnel, reach out to us at vtengineersforum@gmail.com! And don't forget to check out our website: <http://www.ef.org.vt.edu/>.

Until next issue,



Julia Pimentel

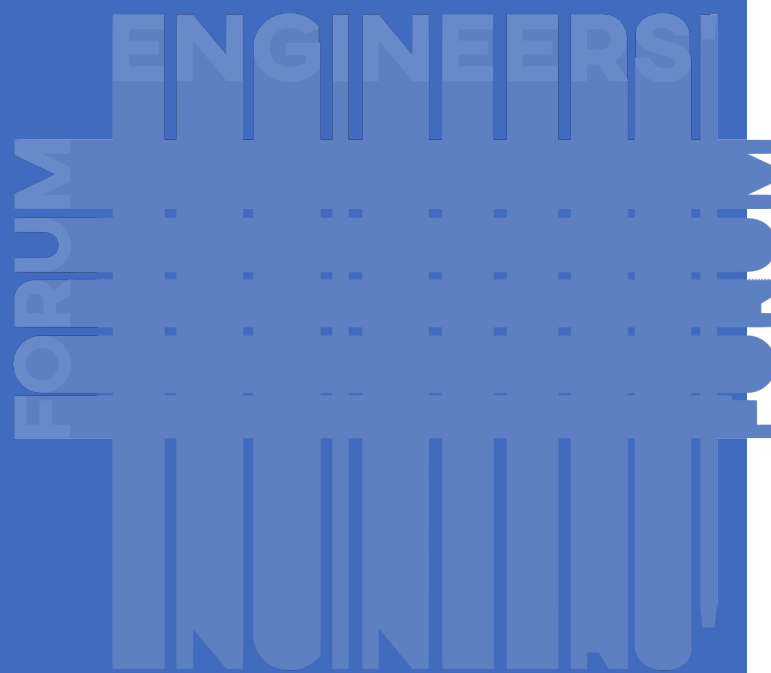
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Engineers' Forum at Virginia Tech

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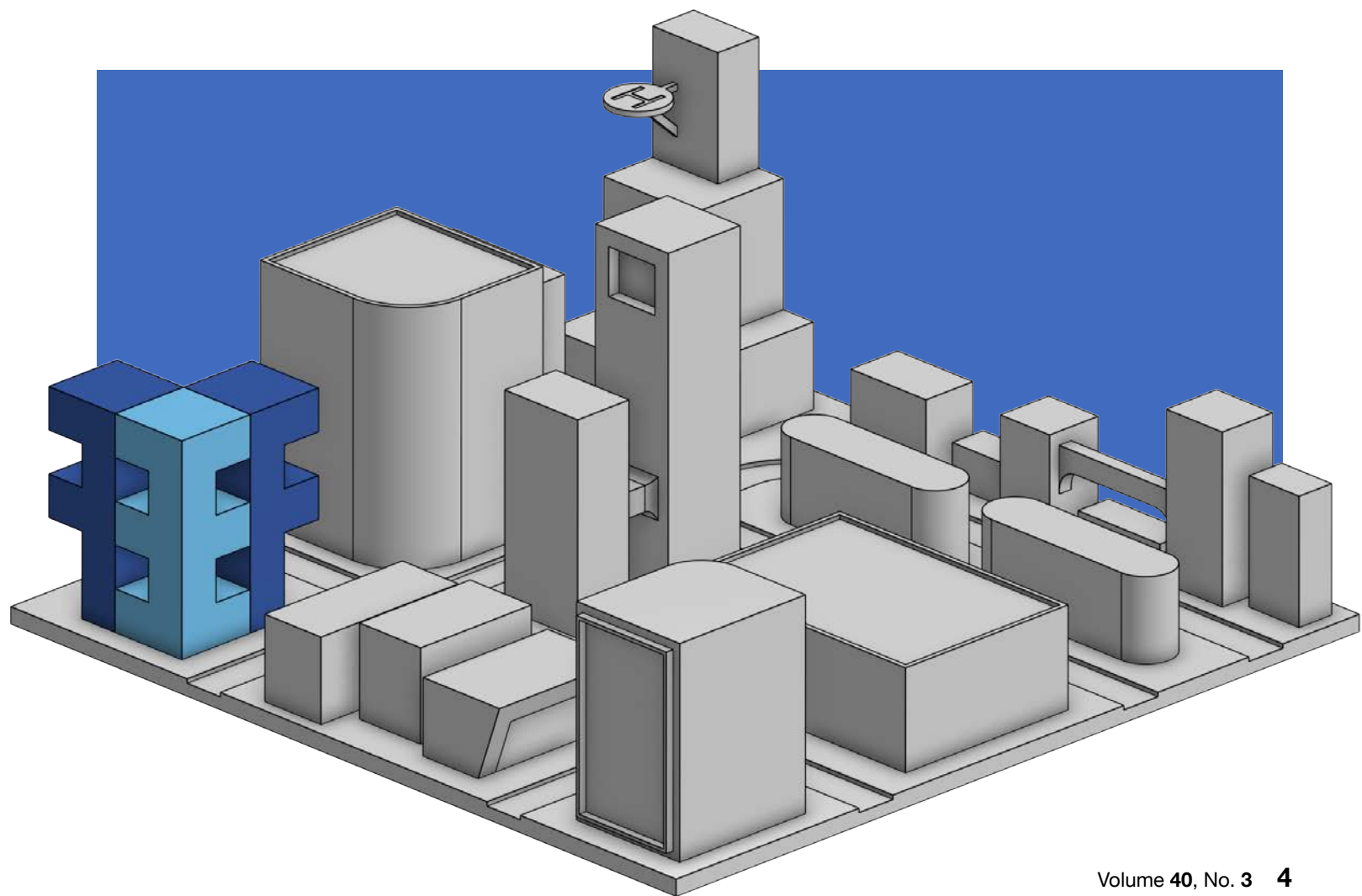
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September 2019



Career Fair Plus: New Engineering Expo App

“An app to improve your career fair experience”

Input from: [Matt Genberg: 2019 Engineering Exposition Chairman,](#)
and [David Nicol: Career Fair Plus representative](#)

Article: Mehak Kamal

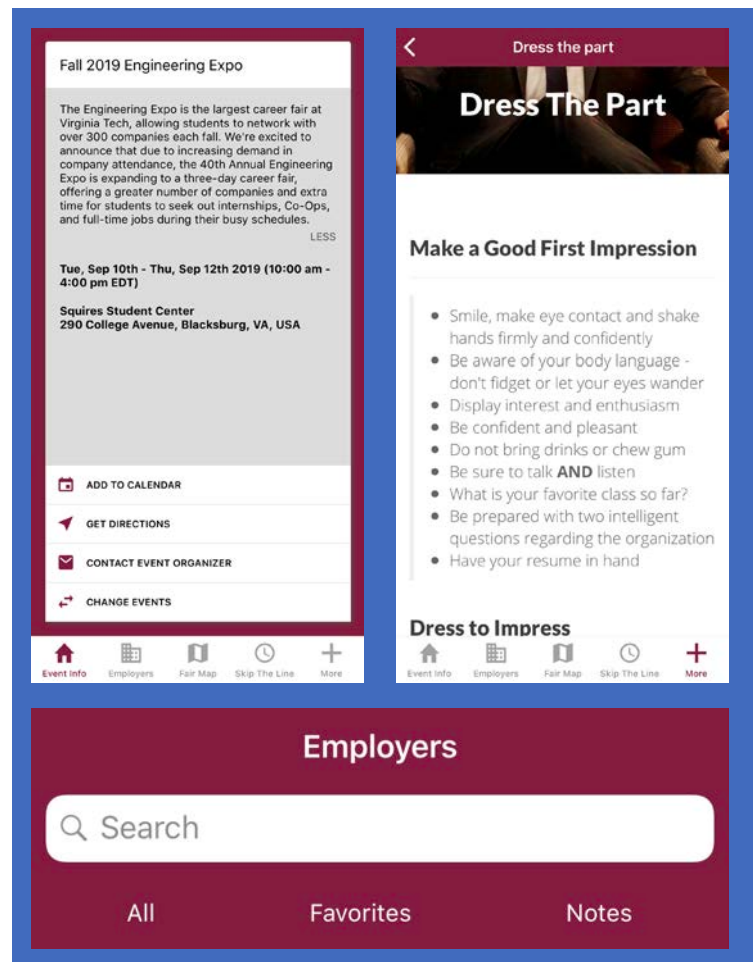


If you are attending the 2019 Virginia Tech Engineering Exposition, here is an app designed to help you succeed in obtaining professional development opportunities. Career Fair Plus simplifies the process of preparing for and navigating career fairs. It helps in every step of getting a job, including preparing for interviews, researching companies, and facing the recruiters.

The Student Engineers' Council (SEC) at Virginia Tech collaborated with Career Fair Plus to create a customized app containing information about the Engineering Expo and the attending employers. This app allows students to filter the employers they wish to interact with, according to their major, desired roles (internship, co-op, or full-time), location, and citizenship.

New York University, Stanford University, Purdue University, and the University of Pennsylvania, have also used the app for their career fairs. Virginia Tech is next in line since this will be the first time the app is implemented for Engineering Expo.

The mobile app comes with impressive features such as a constantly updated list of employers attending the



fair, comprehensive information about each employer to accelerate your research, ability to search for employers that match user preferences, ability to mark potential employers as favorites, and a detailed floor plan with employer booth locations. Employers can even schedule events and interviews with students. The latest information regarding the event is at your fingertips.

Even before the fair you can plan your visit by specifically viewing your favorite employers on the floor plan, receive advice on your appearance through blogs, prepare the perfect elevator pitch, take notes, and prepare an action plan before or during the fair.

The Skip the Line feature is truly one of the most advantageous features introduced in this app that can change how career fairs work. With this feature you can



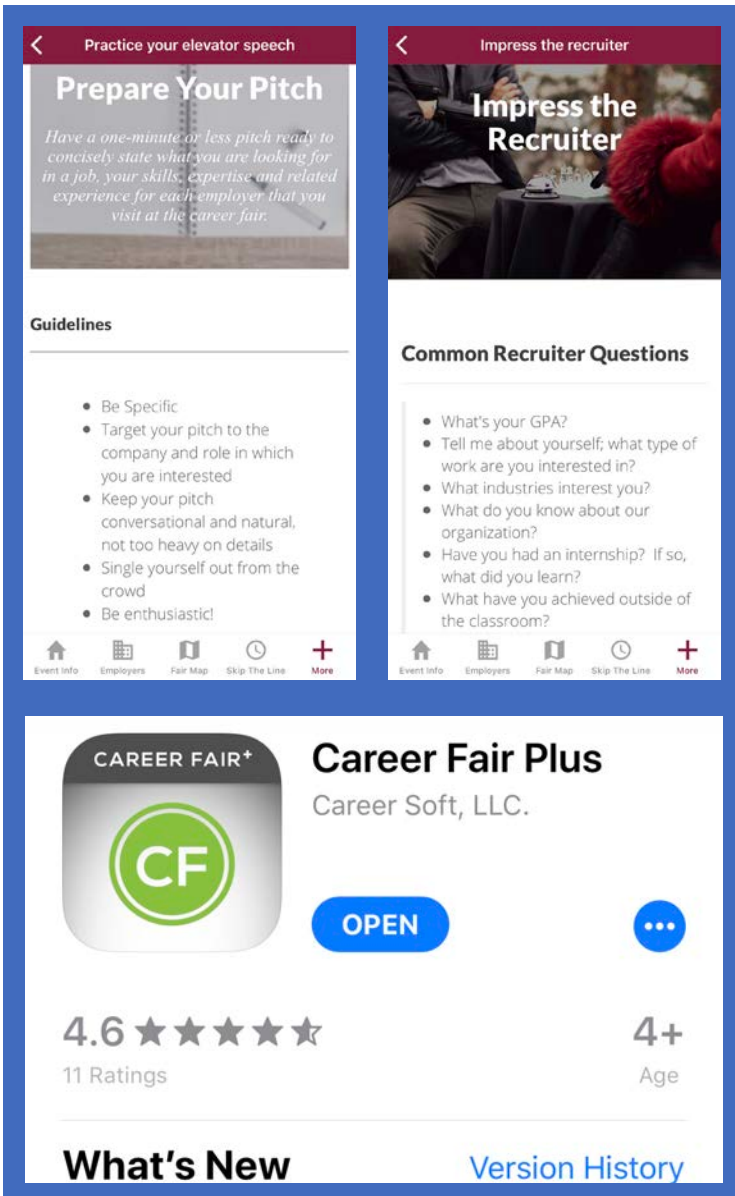
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An effective way to use this app is to create an account with your resumé. This document can then be electronically shared with selected employers, so they know about you even before you walk up. The information is securely stored and is only shared with your career counselors and employers that you choose. [Download Career Fair Plus today on IOS and Google Play Store to excel at Virginia Tech's 2019 Engineering Expo.](#)

*photos provided by CareerFairPlus.com and mobile app

Work to School Transitions

Article:
Caitlin
McConnell

To all the Hokies returning to our beautiful campus, welcome back! And to all the incoming Hokies, welcome to your new home! College is a time of transitioning, understanding, and navigating different opportunities from classes to clubs to jobs and everything in between.

As an engineer, it is not mandatory to pursue an internship, co-op, or undergraduate research, but it is an amazing opportunity. Internships are normally over the summer, and co-ops are typically during the school year, often requiring a semester or more off. I am on my fourth co-op term, and I do not regret a single thing. I have gained an abundance of skills that I would not currently have if I did not pursue the jobs offered to me.

Co-ops and internships can be found in different ways, such as Handshake, LinkedIn, or Engineering Expo. All three are incredible ways to search for jobs that may be of interest to you, but Expo is my personal favorite. This year, the Virginia Tech Engineering Expo will take place over the course of three days, instead of two, due to the size and historical success of the event! Expo will take place September 10th-12th and will host various companies from all over the country. It is an incredible way to network and find a career in something that you are passionate about.



Once you receive and accept a job offer, the transition from school to work may be a little overwhelming. Thankfully, Virginia Tech does a tremendous job helping students navigate co-ops and internships. The university is also extremely supportive in finding research opportunities on campus for students.

If you decide to go on a co-op, you can enter the Cooperative Education Program at Virginia Tech and pay \$75 to remain enrolled as a student. While in the program, Kathy Jordan and Jenean Meadows will help answer any questions that you may have about the process or what to do while you are gone. You will also be responsible for filling out two surveys about your goals and skills going into and coming out of your work experience.

If you are living on campus when you accept the job, you will need to visit Housing and Residence life to tell them that you are leaving, and it will be easily resolved. If you are living off campus, you can post on various pages or reach out to peers to potentially sublease your home while you are away. For meal plans, you will need to go into HokieSpa and make the appropriate changes in the system.

When I accepted my first co-op, I was in the fall semester of sophomore year and was living in Hillcrest. I decided to take off the spring and summer of 2017 and work nineteen hours away from home in a small town called Sweetwater, Texas. Before I left, I signed a lease for a townhouse in 2017-2018 for when I returned to school. Also, I followed the steps that I mentioned above and talked to the appropriate people to have arrangements made to cancel my payments for housing and food plans for the spring.

I began my first engineering position in January 2017 as a project engineering co-op for United States Gypsum. While I was there, I worked on 32 different projects, attended a rattlesnake roundup, and met the CEO of the company at the time. I was exposed to challenging problems and was able to learn different skill sets and use my knowledge from school to help me succeed. Also, I networked with people at the company, made several new connections, and worked with different engineers at the facility to better understand their jobs. While there, I decided to complete two co-op terms (spring and summer) and return to school in the fall of 2017.



The transition from work to school was relatively easy. I continued to take online classes through Virginia Tech and other schools while working. I recommend this to anyone considering a co-op because it helps to keep your mind active and school-oriented while on the job.

I accepted a second position at the Engineering Expo with WestRock in fall 2018 and started working January 2019. While there, I completed two co-op terms in the spring and summer, as well. I worked as a process engineering co-op in two different departments: power and recovery and the pulp mill. I was involved with many different projects that challenged me daily and kept me busy. I learned and adapted on the job and am excited to return to school to complete my degree in chemical engineering so that I can begin a career in a manufacturing environment.

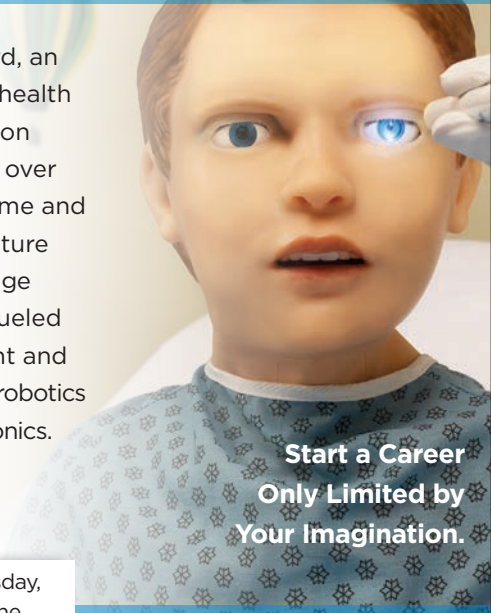


Another aspect to consider is working for different companies in the same year. For example, you could work for one company in the spring and another in the fall. You can find jobs through Handshake during a co-op or accept opportunities for specific terms during Expo. Also, while working, it is important to keep track of course request deadlines so that you will get into the classes that you desire once you return to campus.



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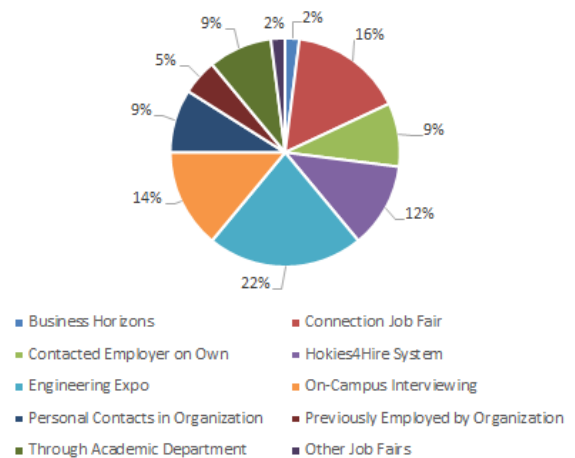
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As you can see, everyone will have different experiences. You can stay with the same company or move companies. You can have several co-ops, internships, or research positions or just one. You may love or hate your job, but regardless, there will be people to help you navigate your positions and answer all your questions. Job experiences are incredible resume boosters and can help you to narrow down what you want to do after graduation.

How Students Found Co-Op/Internship Positions



Good luck with your studies this academic year! If you have any questions about the Cooperative Education Program, please visit the Smith Career Center or call Career and Professional Development at 540-231-6241.

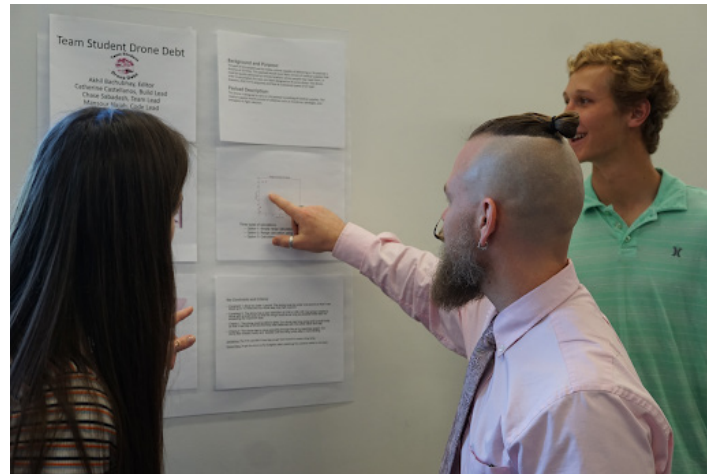
Professor Spotlight

Article and Photos:
Elisabeth Robb

Professor David Gray came to serve us at Virginia Tech in the Fall of 2018. His promotion this August to professor is quite the achievement, and we hope to keep him here for his exceptional talent in his field. He teaches Foundations of Engineering (ENGE 1216) for first-year students.

Graduating in 2000 from Virginia Tech, Gray received his undergraduate degree in Electrical Engineering. However, his master's degree and PhD were in Materials Science and Engineering. He values the education he received at Tech, but he also remarked that experience is quite important to finding a career path. For his post-doc he worked with Dr. Viehland on magnetolectric laminate sensors that caused him to "fall in love with everything magnetic."

He wants students, especially freshmen, to know that no matter what engineering concentration they choose, everything will work out. He ended up working in a different



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type of engineering than his undergraduate degree was in, but his experience allowed him to get the jobs he wanted and pursue his individual path.

After graduating, Gray worked in both the government and the private sector. One of his jobs was working at Torc Robotics developing autonomous systems (aka self-driving cars). Gray and I spent some time discussing how he believes these cars could be revolutionary, but they would require a major change in the road systems, since the cars would not need stop signs or stop lights as human-driv-

en cars need. His sight for revolutionary and ground-breaking products make him a valuable addition to the creative minds beginning their education at Virginia Tech.

Not only is he an academic asset to this institution, but he also has incredible faith in his students, as well as this generation, to help repair the broken world around us. One of his hopes for this next generation is that they will find a more flexible work schedule that can accommodate professional as well as personal lives. He criticizes the 40-hour work week for being inflexible and unnecessary. His hope is that the future generations can become healthier and more efficient in their work by eliminating this 9 to 5 mentality. As a professor, he enjoys the more relaxed atmosphere that values him as a person and not just another paycheck.

If you know or have a class taught by Professor Gray, spend some time getting to know what goes on inside his head, underneath the man-bun. I guarantee you'll walk out knowing more about the world around you and with a new friend.



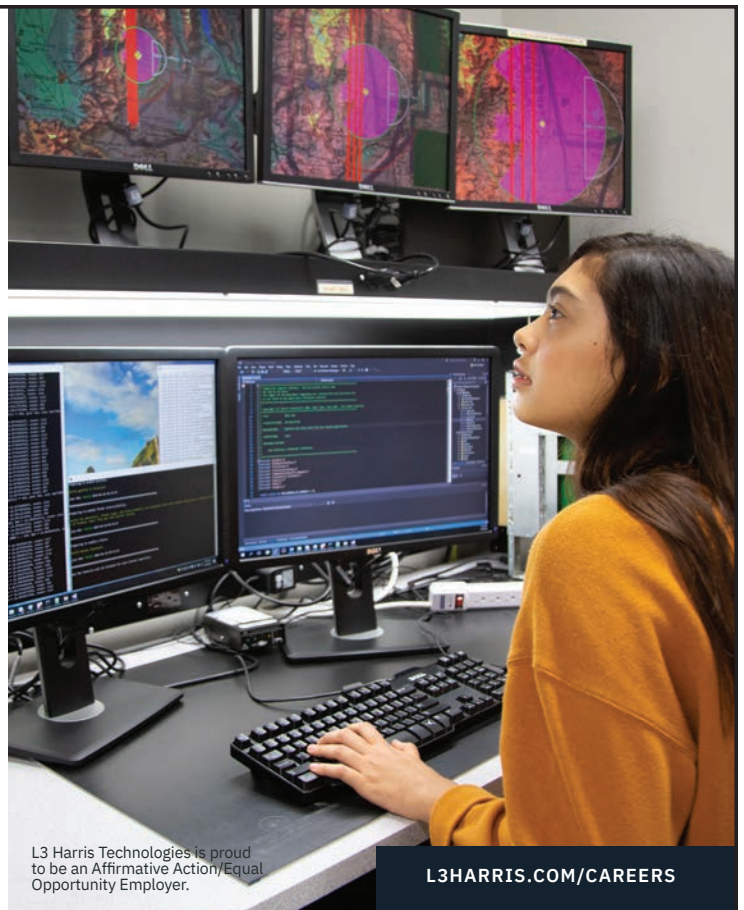
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Hokie Success



at NAVAIR FRC East

Article: Soumya Khanna

Transitioning to professional life can be incredibly exciting, yet intimidating. The workplace has its own set of challenges whether it is more responsibilities or just a change of environment. “Real world” jobs require students to step out of their comfort zone and apply their theoretical knowledge in a practical setting. This article features Kristine Roberts and Mike Fertall, who discuss how Virginia Tech helped them prepare for the workplace.

The Naval Air Systems Command (NAVAIR) provides material support for aircraft and airborne weapon systems for the US Navy. NAVAIR’s mission is to provide full life-cycle support of naval aviation aircraft, weapons, and systems operated by Sailors and Marines. NAVAIR provides work opportunities in various fields of engineering such as aerospace, chemical, computer, and other related fields. Understanding the varying work life experiences at NAVAIR will help you better prepare for the future.

FRCE has provided maintenance, repair, and overhaul support to virtually every weapons platform the Marine Corps has flown – from the inverted gull-winged F4U Corsair of World War II fame, to the Corps’ newest aircraft, the F-35B Lightning II. FRCE is a Naval Aviation maintenance and repair depot under Naval Air Systems Command, headquartered in Patuxent River, Maryland. It is one of eight fleet readiness centers located around the globe. It is also the Department of Defense Vertical Lift Center of Excellence.



William “Mike” Fertall

Fertall, who currently works on the F-18 environmental control system (ECS) at FRCE, graduated with a Bachelor of Science in Mechanical Engineering at Virginia Tech. A unique journey led him to



graduate from VT. Fertall graduated high school in 2000 and went to VT that fall. “Unfortunately, I enjoyed extracurricular activities more than class, so I ended up on academic suspension, Fertall says. “I did not come back right away. Though, I ended up joining the Navy and working on F-18s for a number of years. After getting married and spending more of my first year of marriage apart from my wife than with her, we decided I would go back to school and finish what I had started.”

Fertall returned to VT in the fall of 2008 with a very

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Another thing that Fertall learned from Virginia Tech is the importance of real-world engineering. The various classes he took, such as industrial engineering, helped him get hands-on experience. “I can calculate the dimensions of a part to meet certain strength requirements down to as many decimal places as I want, but when you try to make that part on a machine, you can only cut the material as precise as that cutting tool,” Fertall says. “Having a

different perspective. Fertall recalls, “I was effectively an aerospace mechanic while in the Navy. I worked on the environmental control systems for the aircraft, which takes high-pressure/high-temperature air from the engines and regulates it to cool the avionics systems and provide cockpit temperature and pressure control. While in the Navy, I was very good at troubleshooting faults within the system. I took the time to read all the technical information we had on hand, but I didn’t always understand it.”

At VT, he had the opportunity to learn about the application of thermodynamics, the Brayton cycle, and Bernoulli’s principle in the operation of aircraft. “Literally everything on aircraft was being explained to me in a whole new way. Virginia Tech was teaching me how the things I loved worked,” he exclaims. VT also taught him effective communication with people from non-technical backgrounds. “Learning how to effectively communicate very complex technical things so that they can be understood by others, who are not from a technical background, is so critical in the industry,” he says.

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true hands-on understanding of what you are engineering is just as important as understanding the math behind it.” Using the CNC at one of VT’s industrial process labs to machine steel and weld it together introduced Fertall to sintering powdered metal to make a coin, which Fertall has on his desk right now. In Dr. Torgersen’s Theory of Organization class, he learned how people from a variety of backgrounds can work together as a team. “His class provided me invaluable insight and knowledge of how people come together and bring all their diverse skills to achieve amazing things. Learning how to fit into that environment, excel, and empower others drives the entire organization forward. Understanding that has helped me tremendously in my NAVAIR career here at FRC East,” Fertall explains.

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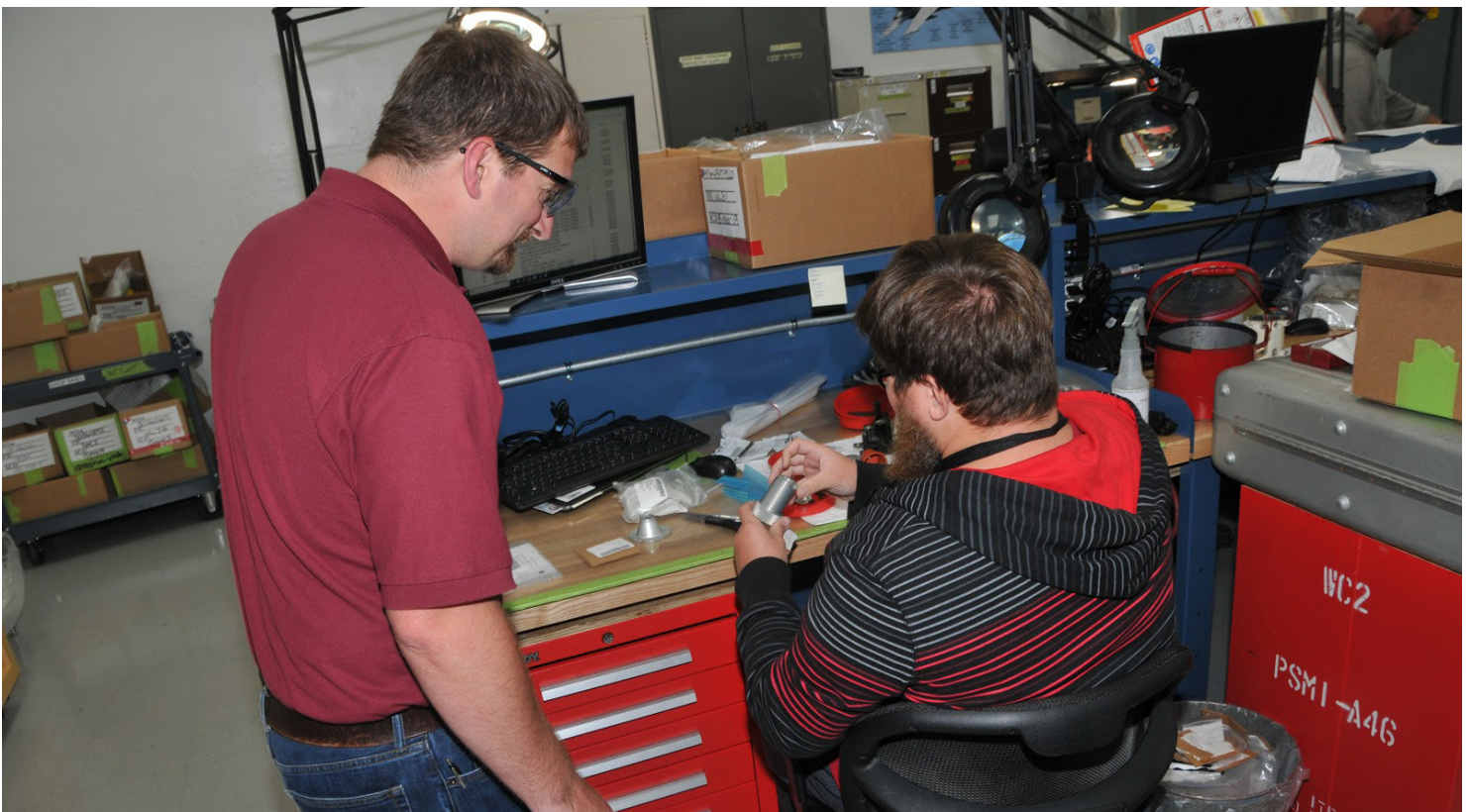
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Mike discusses assembly procedures with an artisan.

At FRCE, Fertall works on the F-18 environmental control system (ECS) in which the facility can take an aircraft from the fleet, completely disassemble it, repair the airframe and overhaul all of the removed components, and put it back together to go back out to the fleet for service. “I am involved in maintenance planning and aircraft troubleshooting to determine if my components are failing, how often they should be removed before they fail, and many other things. Once the components

are removed from the aircraft, I am responsible for how they are repaired,” Fertall says. The design work for many components was done over 20 years ago and most of the people who created the design have moved on. “I do a lot of reverse engineering to determine why my components do what they do, and how they do it.” The work is very complex. “Our fleet counts on us; when a part fails on an aircraft, they can’t just pull over and pop the hood to see what’s wrong. I feel very fortunate to get to support our fleet and work on some truly amazing machines.”

Fertall says being willing to go above and beyond his duties has helped him be successful. “I have found that throughout my time in the Navy, at VT, and here at FRC East, being open to doing anything has really gotten me where I am today,” he says. “My role in problem-solving is definitely centered around my engineering abilities, but just because I am an engineer doesn’t mean I can’t ask the right people the right questions to get things moving. It has also unintentionally helped my career along the way as well.”



Kristine Roberts

Kristine Roberts, currently working in the Subsystems and Flight Controls Division at FRCE, graduated with a Bachelor of Science with Honors in Materials Science and Engineering at Virginia Tech. Roberts went on to complete a Master’s of Science in Mechanical Engineering and Materials Science at Duke University.

When asked about how VT helped her transition to the industry, Roberts says “The curriculum at VT, engineering specifically, was rigorous. Although challenging, I believe it set me ahead of my peers in the industry by strengthening my problem-solving skills and resourcefulness. The opportunities at VT are endless. I kept a very busy schedule - Marching Virginians, Tau Beta Sigma, on-campus research, TA, honors classes - that helped me be more efficient and



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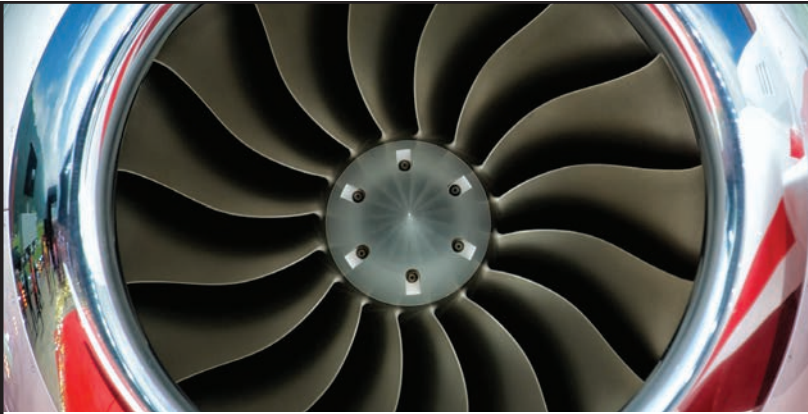
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organized in my job. It also helped that VT had such a strong alumni cohort at NAVAIR.”

“FRC East is great because of the variability of work,” Roberts describes her experience at NAVAIR and FRCE. Ten years ago, Roberts started in the Materials Engineering Division working on composite repair for Navy and Marine Corps helicopters and Vertical Short Take-Off Landing (VSTOL) aircraft. Since then, Roberts has held four different positions in project and personnel management in three different departments – all at Marine Corps Air Station Cherry Point in North Carolina. Currently, Roberts supervises a team of more than 20 people across four sites in the Subsystems and Flight Controls Division. “The culture at FRC East is a huge reason I love my job. We share a combined goal of service to the fleet and ensuring the Marines and Sailors have the weapons, aircraft or support equipment they need. “It’s unique to have a job that so clearly makes an impact on the lives of others.” Roberts says of the shared will to help others that is common among NAVAIR employees.

A word of advice from Roberts, “Start looking for internships, co-ops or research opportunities immediately. Employers want a well-rounded person with many experiences. Take advantage of the design teams like Formula to get as much hands-on experience as you can.” Roberts also advises taking some time to see family, travel, and relax after graduation. After



Here and below: Using a cross section of the product, Roberts explains the complex composite composition of a V-22 Osprey rotor blade.



Kristine Roberts

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entering the workforce, it's difficult to take time off as a new-hire.

“Virginia Tech is an outstanding university - arguably one of the best - and you should be proud to be a Hokie!” Roberts concludes.

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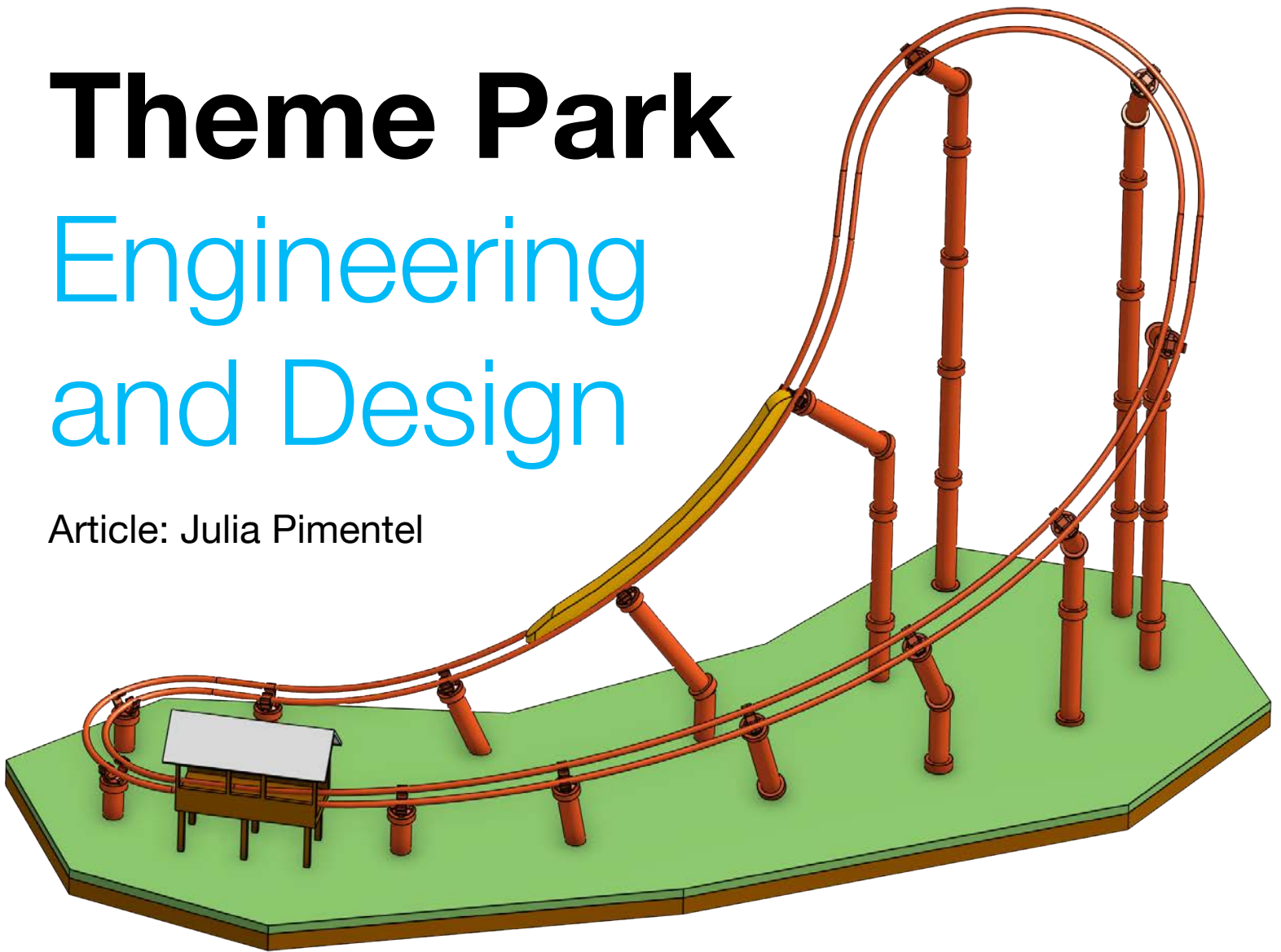
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Theme Park Engineering and Design

Article: Julia Pimentel



When you think of engineering, do you imagine high-speed rollercoasters or think of popular destinations like Disney World and Universal Studios? At the Theme Park Engineering and Design (TEPD) club at Virginia Tech, members explore the wide array of engineering opportunities in the theme park entertainment industry. Brenden Bowerman, mechanical engineering super senior and President of the club, believes that this group is perfect for those who share a passion for amusement parks.

“We’re one of the newer engineering clubs, but we’re here to stay.” - Bowerman

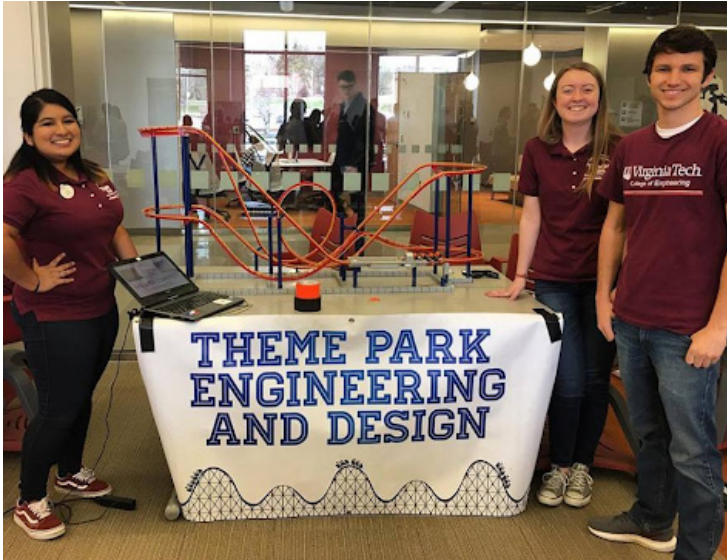
Promoting both social events and professional development opportunities, the club attracts those studying mechanical engineering, civil engineering, electrical engineering, computer science, and other engineering



Networking event hosted by Skyline Attraction in Orlando. Photograph from TEPD Facebook page.

disciplines – even some non-engineering disciplines.

Bowerman highlights “We have a very experienced group of individuals. They have hands-on experience in constructing and maintaining rollercoasters, or even just [understanding] theme parks in general.



TEPD club representation with Riley (second from left) at VT Spring 2019 Girl Scout Day. Photograph from TEPD Facebook page.

Brenna Riley, an underclassmen member of TEPD club, says “the coolest thing that I’ve done with the club so far is modeling competitions.” She explains how small teams

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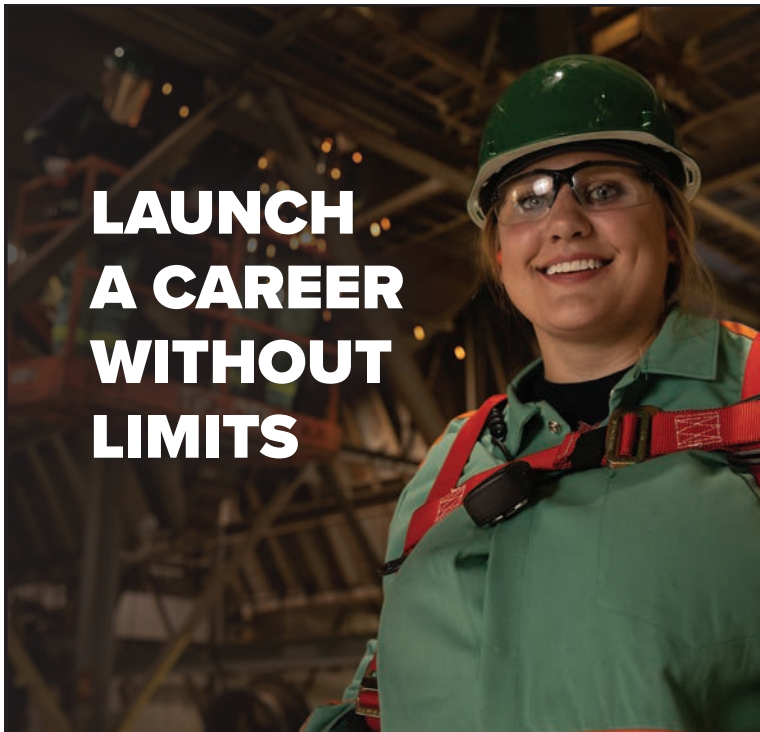
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are tasked with designing and understanding the general process of creating a ride or attraction. In the club, students can learn to use tools and software such as AutoCAD and the NoLimits rollercoaster simulator.

“The most fun professional club you could be a part of.” - Riley

With alumni currently working at well-known companies such as Walt Disney Imagineering, Disneyland Parks and Resorts, Universal Creative, Universal Parks and Resorts, the club emphasizes valuable networking events and skype calls with industry professionals at general assembly meetings. Bowerman makes a strong point in describing how the student-led organization at its core showcases and educates members with a different perspective of engineering.

One unique part of the club is that they take field trips to various theme parks across the country. Their extensive network has allowed them to take behind-the-scenes tours of rollercoasters from Carowinds in Charlotte, Kings Dominion, Williamsburg’s Busch Gardens, and other well-known destinations. These trips also serve as engaging



Skype Call with industrial professional. Photograph from TEPD Facebook page.

social events. There, students learn how the structures are engineered whether that’s from a design or maintenance perspective. Riley states, “After I went on the spring break trip, I realized that [involvement in the club] would be an opportunity to build my interest and knowledge about the industry.”

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“At the end of the day, we all want to share our passion.” - Bowerman

Looking to expand their member base, the Theme Park Engineering and Design Club is looking for enthusiastic engineers in any discipline, including architecture, art, and business majors. Bowerman reveals “when you talk about theme parks, there’s a lot more than just the theme park itself. There’s parking structures, resort hotels, civil and transportation aspects. We want to make sure we capture the whole industry, not just the engineering side. Our name is engineering AND design.”

Join them at their next general assembly meeting! You can find them at GobblerFest, on GobblerConnect, or on their social media.



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President Bren (on right) with Chewbacca. Photograph from Brenden Bowerman.



Entrepreneurship in Engineering

Article: Melanie Do
Photographs: Julia Pimentel

When you think entrepreneurship, you usually think business, however have you ever thought of engineering instead? This is exactly what Virginia Tech students in CORE and Virginia Tech's Entrepreneurship Club are partnering to change. CORE stands for Community and Opportunity through Resourceful Engineering. The whole mission behind CORE is to create a community of engineers; delineating individual and impactful campus leadership; fostering internal and external relationships; dedicated to lifelong learning. They do this by providing leadership opportunities and educational lessons with industry leaders, whether it be meeting vice presidents, ambassadors, etc. Members also have the opportunity to venture off campus to take tours of local company facilities. This student organization is for those innovative engineers who all have the same



passion and drive to create something new for our workforce. The goal is to create a Hokie network with outside companies, and to do this, members are paired with mentors in their desired field. CORE decided to collaborate with the Entrepreneurship Club (E-Club) to co-host the "Entrepreneurship in Engineering Panel," an event for students to have the opportunity to learn from and ask questions to a panel consisting of three distinguished Virginia Tech engineering alumni. The panelists discussed their individual paths to starting their own companies, the challenges they faced, and how the era of technology has affected and is currently impacting their businesses. The three alumni were: [Michael Fleming, CEO and co-founder of Torc Robotics](#), [Daniel Surber, CEO and founder of Alpine Consulting Partners, LLC](#), and [Stephan Sabo, CMO and co-founder of Card Isle](#). What was different about this panel was that they were "more consulting-based, rather

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than past presentations, [that were] more product-based," and some conference attendees, such as Callie Zawaski, a graduate student in mechanical engineering, thought they benefited from this uniqueness more. Zawaski mentioned that "although Card Isle is like a product-based company with the cards as a product, they really make the machine, so that makes it [more service-oriented]."

Speaking of Card Isle, Engineers' Forum had the chance to speak with Stephan Sabo, the co-founder of Card Isle, after the presentation. Sabo explained that his first prototype was a folding table with a printer on top placed in front of Randolph Hall. This was right before Mother's Day, so they were able to print the personalized cards right then and there, in time for the students to send before the big day. Sabo and his Card Isle group collected data for 3 months prior to the first prototype. 6 months later, the first Card Isle kiosk was made. Card Isle



is constantly collecting data to see what their customers want and need, so they can develop solutions to these problems. As an entrepreneur, you yourself are constantly learning and changing based on the development around you and the leaders you meet. Sabo, a 2013 Virginia Tech alumnus, says that Torc Robotics, co-founded by Fleming, a 2003 alumnus, was “certainly a company that I admired since I was a freshman.” Sabo was inspired by Fleming when he was a freshman, and now he was sitting right next to the man himself. Maybe there was a freshman in that room inspired by Sabo to take a leap of faith and who knows? Maybe they will be the next set of great entrepreneurs and leaders in technological innovation for future generations of Hokies. Although the panelists did an incredible job with a wide array of answers, there is much more that the future holds for CORE and their relationship with E-club. This will not be the last time these two organizations work together. E-club themselves are planning on creating a student co-working space for student startups in their office space in the Corporate Research Center. As for the future of CORE and the ideas they have, they are hoping to find some female representatives that can offer insight in future panels. Through the Entrepreneurship in Engineering Panel, both organizations demonstrated strong commitment to strengthening the presence of entrepreneurship at Virginia Tech. Now it's your turn!

Interested in getting involved with entrepreneurship in engineering?

CORE

Adam DeAtley: adeatley@vt.edu

<https://gobblerconnect.vt.edu/organization/core>

Entrepreneurship Club

Glenn Feit: president@vteclub.org

<https://gobblerconnect.vt.edu/organization/eclub>



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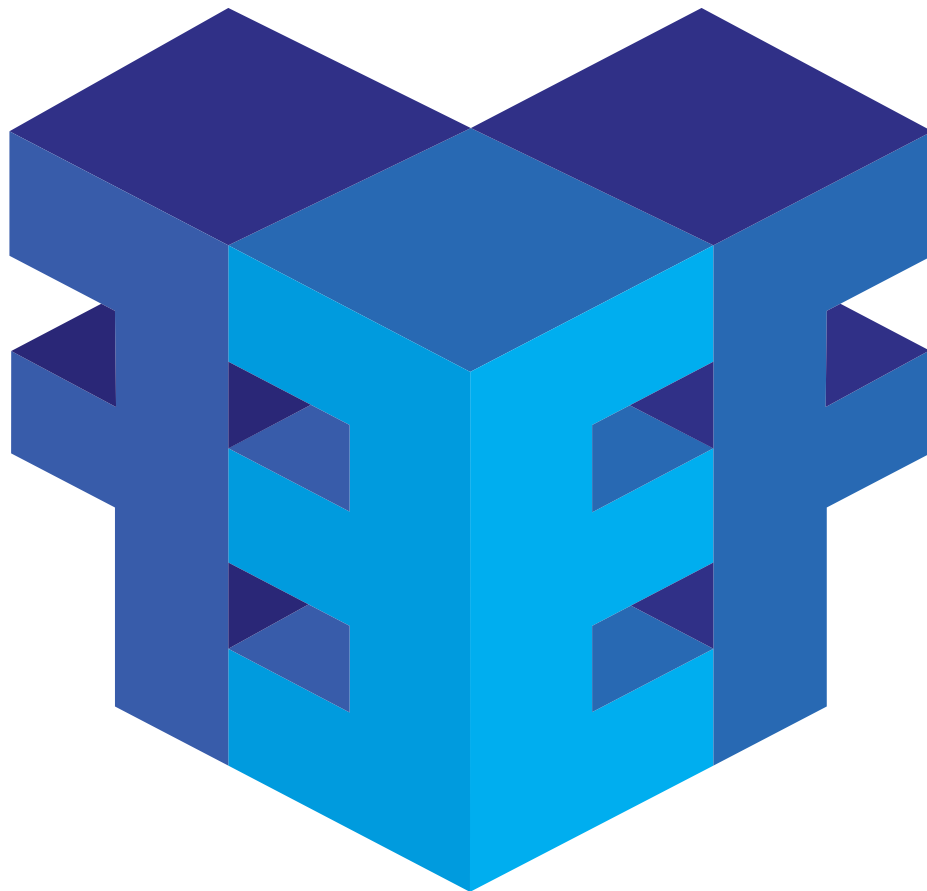
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