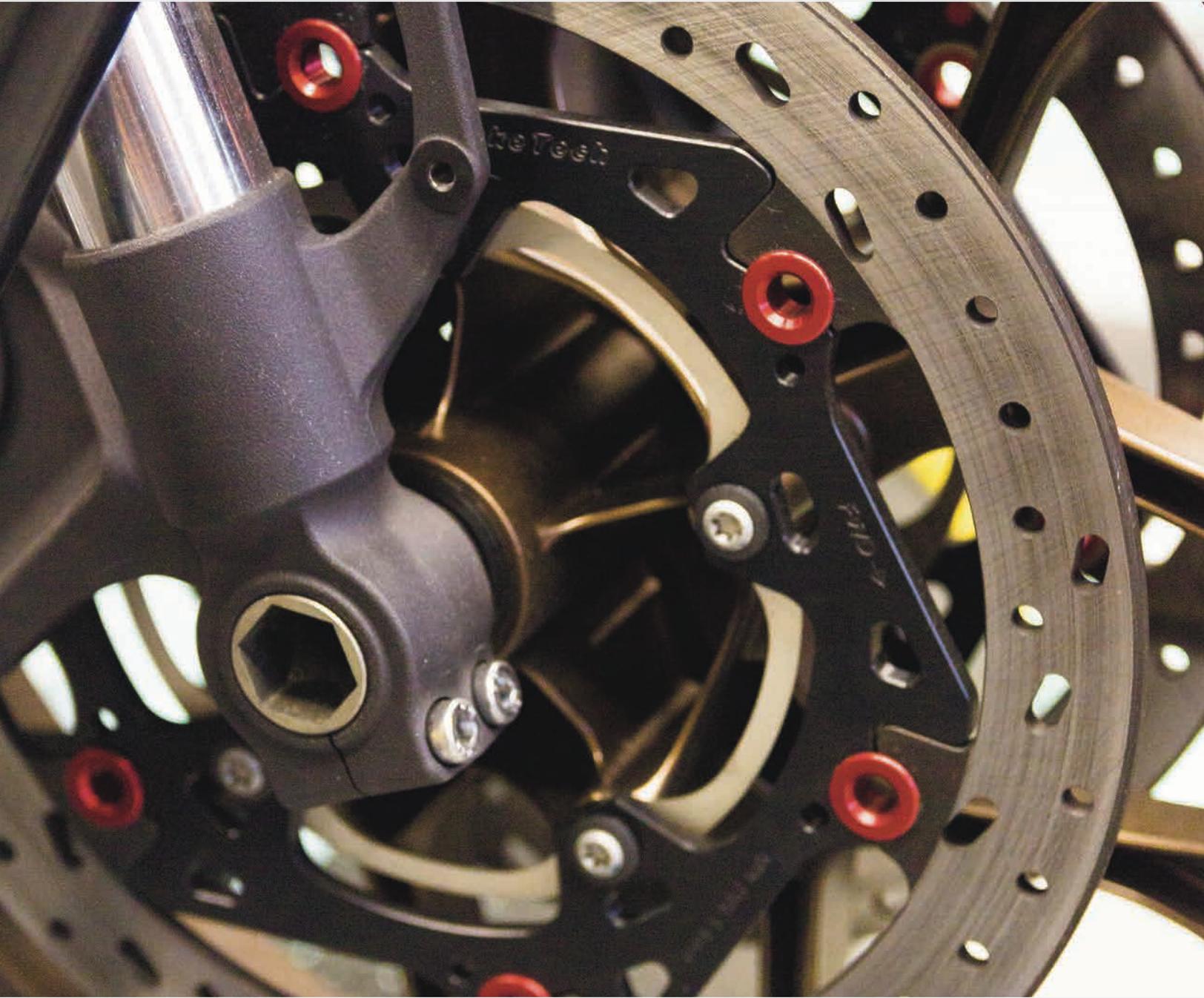


# Engineers' Forum



VOLUME 40 – No. 4 – November 2019



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# ENGINEERS' FORUM

Beyond Boundaries Scholar

## NOLAN PLETCHER

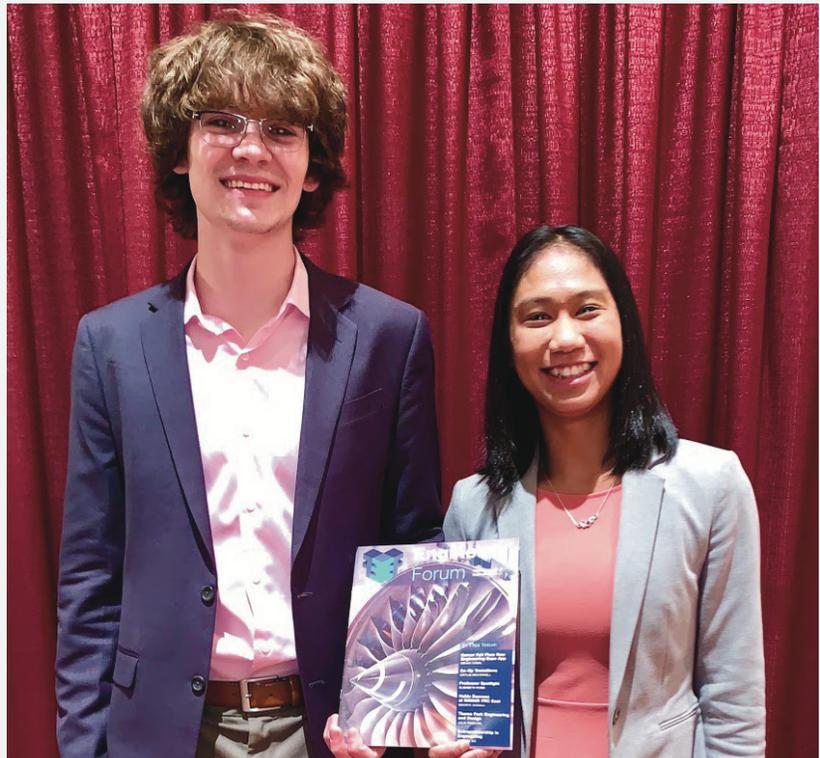
**Engineers' Forum** is a donor for the Beyond Boundaries Scholars Program, intended to support high-achieving students and put them on track to realizing their dreams.

Nolan Pletcher is our Engineers' Forum Beyond Boundaries Scholar! He is currently a sophomore studying computer engineering and pursuing a minor in mathematics. Both academically and physically active, Nolan loves to ski during the winter and rollerblade in his free time. Technology has always been a big interest of his and he enjoys programming and tinkering.

Without the Beyond Boundaries scholarship, he mentioned, "I probably wouldn't have come to Virginia Tech." Instead, he likely would have attended the University of Illinois closer to home. Nolan further mentions, "Engineers' Forum is a great magazine. It has a lot of articles in areas of engineering I wouldn't normally have known about. I'll definitely be picking up and reading the future issues. I think it's great there's so much info related to careers and networking as well."

Thank you Nolan for your outstanding accomplishments. We wish you the best of luck in all your endeavors!

If you would like to contribute to the Beyond Boundaries Scholars Program, check out their website on how to get involved: <https://give.vt.edu/ways-to-give/beyond-boundaries-scholars.html>



Beyond Boundaries Scholar, Nolan Pletcher, and Julia Pimentel, Editor-in-Chief



Photo / Kendal Price

### On the Cover

Close-up of motorcycle wheel, built by student-led Ware Lab team at the Joseph F. Ware, Jr. Advanced Engineering Lab, 320 Stanger Street, Military Building, 203.

# ENGINEERS' FORUM



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Caitlin McConnell



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# ELECTRICAL COMPONENTS FROM WARE LAB MOTORCYCLE

Photo / Ware Lab Photo Drive



# HUMAN POWERED SUB

Photo / Ware Lab Photo Drive



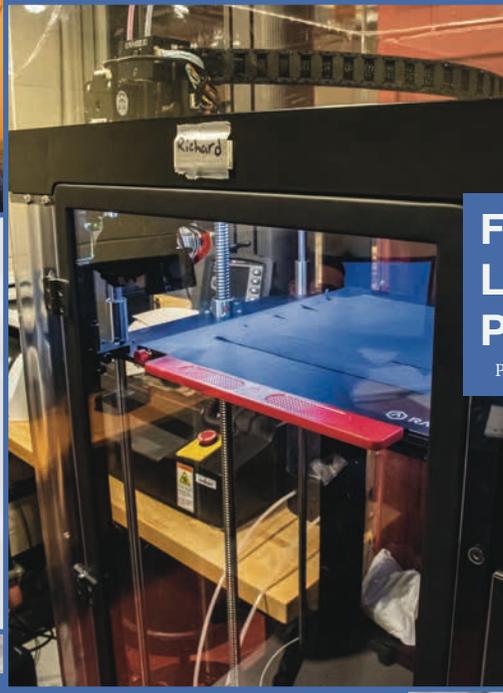
# KROEHLING ADVANCED MATERIALS FOUNDRY

Photo / RJ Weaver



# FIRTH LAB 3D PRINTER

Photo / Thanh Tran



# FORMULA SAE TEAM

Photo / Ware Lab Photo Drive



# LETTER FROM THE EDITOR

We've made it to the second issue of Engineers' Forum for the 2019-2020 academic year! Here, we'll highlight valuable opportunities open to the engineering students of Virginia Tech. We hope that these topics will resonate with your academic interests, innate passions, and ambitious goals as you finish the fall semester strong.

---

Writer **Melanie Do** shares a glimpse of the Ware Lab and its many engineering teams in her exchange with Manager Dewey Spangler. From BOLT to Baja SAE to Design Build Fly (DBF) to Hybrid Electric Vehicle Team (HEVT) and many more, the Ware Lab is the perfect place to get hands-on experience and collaborate with a team.

In an ongoing Engineers' Forum series featuring different Ware Lab teams, Melanie also shines a spotlight on the AISC Steel Bridge team. Learn about what they do by reading more!

Furthermore, you'll hear from new writer **Maaz Hasan** as he dives into the importance of mentorship and diversity in engineering.

**Isabella Bartolome's** article is a must read if you are interested in pursuing the electrical engineering or computer engineering track at Virginia Tech. Another new writer, she explores the changes made to the curriculum by speaking with department faculty to share their unique insight with you.

Also in this issue, we'll highlight prominent engineering faculty at Virginia Tech with our professor spotlight series. Catered for those interested in aviation and aerospace, **Elisabeth Robb** explores the perspective of aerospace engineering professor, Dr. Pat Artis.

Finally, **Caitlin McConnell** showcases the 2019 Blacksburg Sustainability week in her article revealing the annual events and projects dedicated to making our campus more environmentally friendly.

---

Thank you for picking up the November issue of Engineers' Forum. Through your support, we are able to give you a closer look at what the student engineering experience is like at Virginia Tech!

Sincerely,



Julia Pimentel  
Editor-in-Chief



# Engineers' Forum

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# Engineers' Forum



# n Interactive Map



Scan the QR code to visit the virtual map of campus! Each dropped pin is interactive, and when clicked, will transport you to the location of each physical magazine stand. If you have trouble locating a specific stand, this tool was made to help you! It was designed to assist you in locating the closest magazine to you, so you can always stay informed about Virginia Tech Engineering!

# A Closer Look: The Ware Lab

Melanie Do



## What is your name and role?

“My name is Dewey Spangler. I am the manager here at the Ware Advanced Engineering Lab under the College of Engineering at Virginia Tech.”

## What is the Ware Lab?

“The Ware Lab is a facility that has been in the college for over 20 years now. We have 10 teams from different majors that work on junior/senior-level design projects. Half the teams are working for academic credit. The other half are doing things for a club or [on] volunteer basis.”

Dewey Spangler



**ENGINEERING**  
VIRGINIA TECH

Joseph F. Ware Jr. Advanced Engineering Lab

Photo / Ware Lab Photo Drive

## Why should students get involved in the Ware Lab?

“One thing I think that benefits students the most here is the ability to actually build something you designed. So, you’re learning design skills in the classroom from your textbook or your lecture - which is great because that’s how I learn things - but [the Ware Lab] takes it one level higher in that you take what you’re learning in real time and apply it to something that has significant design to it. [This] gives students a chance to understand concepts that they’re learning in the classroom much better. It is a lot of real-world [and] hands-on experience.”

“Engineers don’t get a lot of experience doing that, even in the profession. If you’re lucky enough to do that, you may be able to have a job in engineering [in which] you go on-site and watch other people work. As far as picking up a welder, it’s not a part of what engineers normally do, so this provides a unique experience. One of the things they do a lot here is welding. You can’t weld certain things in certain ways because of geometry, materials, and processes. And you can read that out of a book and maybe understand it, but if you do it and you encounter those problems in reality, it’s gonna stick with you a lot better.”

“Actually build something you design.”

-Dewey Spangler

“The goal is to spread the responsibility out throughout the team. Some students like to weld, but we want to encourage them to let other people do the work and get involved. Working on a team is necessary because you have to construct something [by] designing, building, and testing as a team. When you go to competition as a unified team, you want to make sure you develop that team bonding prior to competition. It is very important when you’re out there in the middle of competition and you gotta get something done. You have to work together.”

## What are some of the benefits from being on a team?

“Learning how to be on a team. Team dynamic can be complicated. There are personal issues you [must] work around. These things are similar to what you’ll encounter in the workplace. Again, understanding the physical aspects of engineering is a big plus here. Learning to appreciate the cost of materials, the cost of labor, the cost of processes, the cost of transportation. The cost of doing anything is strongly emphasized here because teams have to raise their own money.”

“The College of Engineering gives some money to the students, but it’s on a percentage basis. The average is around 15-20% of the entire operation every year. They have to build good relationships with sponsors and maintain those relationships through the years in order to be successful. It’s like 10 separate private-sector businesses. I go to their presentations, which I enjoy. I love to learn what they’re doing. I try to help them with workshops that we [conduct] with the latest software. We have state-of-the-art equipment that students have exposure to. As manager, I try to facilitate and make sure students have access to that. On the software side, things are updated every 6 months.”

## How do students get involved in the Ware Lab?

“What I recommend they do is take the general tour to get them oriented. Probably freshman year, [you want to] think strongly about your major. Let’s say you’re a freshman, you’re into mechanical engineering, and you’re interested in Formula. Send me an email and I will send you the contact for the Formula team lead or you can come over and talk to the students. Start attending meetings and see if you like it. Something has to be a fit for you. We’ve had people who start out in one team and migrate to another, which is fine. You need to know where your passion pushes you. It’s a lot of hard work, long hours, and enjoying what you’re doing - [that] makes it a lot better.”

## Do you have to be a specific major or a certain academic level?

“It’s mostly juniors and seniors because a lot of those folks are getting their senior and independent study credits here at the lab. You can be a freshman; you can be a sophomore. You can be any major, you can be outside of your major and serve on the team if they have room for you. If you’re a student at Virginia Tech in good-standing and the team accepts you to be on the team, then you can serve on the team. We’ve had people cross majors.”

## Design Build Fly (DBF)



Photo / Ware Lab Photo Drive

## How long have you been the manager of the Ware Lab?

"I've been the manager for 10 years. We have an assistant manager, Phil Ratcliff. He is in charge of the training of the students, the weld shop, and also the truck and trailer. Every year, he has to train additional students because they graduate."

## How come you've stayed manager for so long?

"I love Virginia Tech. This position allows me to have autonomy in how I do things and I appreciate that. We have inspections of the area. We keep things nice for our over 2,000 visitors each year. This is why I get a lot of satisfaction when I see folks, especially parents, who come in and tour the Ware Lab. They're very serious about preparing their students to be good engineers, be good citizens, and be safe practitioners with what they're doing. They see this and it just sells itself."

**"You have to work together."**  
-Dewey Spangler

## What is the best thing/your favorite moment you've gotten out of the Ware Lab?

"We celebrated our 20th anniversary last year. We had a Vice President of General Motors come down and speak. He was a Ware Lab alumnus. It was very moving to see that for 20 years, Joe Ware started this in 1998. Him and his wife Jenna had the idea of just having a place for students to come in and do engineering [projects] he knew they could do. They were both visionaries."

"When I go to competition, I love seeing them cooperate with other schools. It's not like you're trying to destroy the competition. It is very uplifting, especially when the weather's nice, and there's a good event outside, the cheers, the people working, and winning - it isn't everything. Just being there and seeing the parents show up. It's just incredible that this can be part of their engineering education."

## Contact the Ware Lab

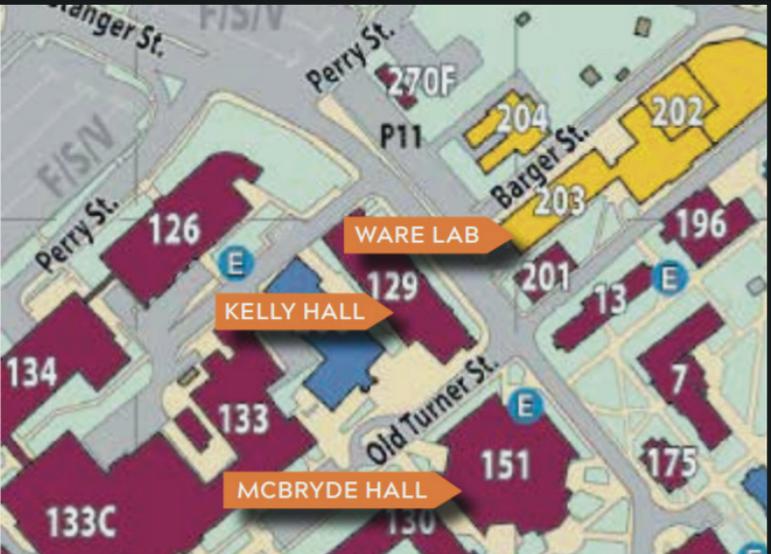
320 Stanger Street, Mail Code 297, Military Building, 203, Blacksburg, Virginia 24061  
Phone: 540-231-5837  
Visiting Hours: M-F 10AM-4PM

### Visit the Ware Lab

The Ware Lab is located diagonally across from McBryde Hall and directly across from Kelly Hall on the engineering quad of the Virginia Tech campus.

For more information on the Ware Lab's location on Virginia Tech's main campus: [www.maps.vt.edu](http://www.maps.vt.edu)

For important parking information: [www.parking.vt.edu](http://www.parking.vt.edu)



# WARE Lab Series

# AISC Steel

# Bridge Team

Melanie Do



Photo / AISC Steel Bridge Photo Drive

## What is your name, major, role?

“My name is Adam Caretti. My major is Civil Engineering with a focus in Structures. My role is captain.”

## What is Steel Bridge?

“Steel Bridge team is an AISC-sponsored (American Institute of Steel Construction) design team. We spend all fall designing a scale model of a bridge in CAD, testing it in RISA 3D, which is element analysis, ordering steel over winter break (this year, we’re trying for Thanksgiving to be proactive), and then spending all Spring up until competition building the bridge in here.”

Photo / AISC Steel Bridge Photo Drive



**“We have a lot of mechanical engineers, industrial and systems engineers (ISE), [and] civil engineers.”**

**-Adam Caretti**

## Why should students get involved with Steel Bridge?

“I’m a senior focusing in Structural Engineering at Virginia Tech - going to grad school here actually. We have a lot of mechanical engineers, industrial and systems engineers (ISE), [and] civil engineers. It’s a mix of students that want to get involved in something. We don’t have time requirements. We usually just ask for an hour a week out of everyone. Everyone can do everything. We let people cut steel, usually on the weekends, so we don’t bother others. We let members do everything with this bridge, except the actual welding.”

“We preach that it’s a great opportunity for young civil engineers to be involved in something and be involved right away. A lot of sophomores and freshmen come to us and [say] ‘we don’t know anything about structures yet?’ But, you don’t need to [know about structures yet] because that’s part of the CAD and analysis process. It is really just trial and error for a lot of us. We’re very laid back and flexible. If people want to get more involved or if people just want to come up and do the bare minimum, you’re still part of the team.”

## How do you get involved?

We do prefer people to get involved in the Fall. We don’t have any kind of interviewing - no application process. If you can reach out and find us by October, you’re part of the team. We can catch you up on speed with what we’re doing. We do go to [events] like the CEED O’Show and Gobblerfest. We don’t have social media. We’re on the ASCE website at Virginia Tech.”

## Do you take any specific majors?

“We take anyone that wants to get involved. We want to be mostly civil engineers, but we like ISE people because they have manufacturing processing lab, so that’s great! We like mechanical [engineers] for the same reason. At the end of the day, it’s all fundamental statics and deformations, besides the advanced stuff, so any major can get involved.”

## Do you have to be a certain academic level?

“Like I said, it’s never too late for anyone. I have some seniors on the team that have never been involved before. A lot of times when you’re a civil engineer, you don’t decide what you want to go into until halfway through junior year.”



Photo / AISC Steel Bridge Photo Drive

## How is Steel Bridge doing competition wise?

“We went to Nationals 3 years ago. [We were in] the middle of the pack at Nationals. The last 2 years, we did not get past Regionals. There were about 12 teams. The bridges are allowed to be 175 pounds without a weight penalty.”

“2 years ago, [we] made the bridge 120 pounds. [We tried] to be very competitive, [but the bridge] wasn’t strong enough so it broke. Last year, we went with a very innovative design. It’s called a space truss. It’s like a 3D truss - when you go to an airport and you look at the ceiling, [those are] space trusses. They distribute the load very evenly throughout the structure. We tried to do that, [but it turned] out they’re a lot stronger when they’re upside down. So, we deflected too much, we bent too much, so we weren’t good enough to go to Nationals.”

“This year, we’re going to be good enough. I can promise that. Nationals is here this year! We do not get an automatic bid. We still have to compete at Regionals. Usually about 35-50 teams compete at Nationals. We have a committee here of a couple of people who have since graduated [or] are in grad school that were in Steel Bridge last year. They are planning the entire thing.”

“This year, we’re going to be good enough. I can promise that.”

-Adam Caretti

**What is the best thing/your favorite moment you've gotten out of Steel Bridge?**

"I think going to competition a lot of the times is interesting. It was really cool [to go to competition my sophomore year and] actually hang out with the people on the design team because we're very business, business, business; we're not like close friends, but it was really cool to go on a trip with other people with similar interests as you. You meet people from other schools and talk about civil engineering at each other's schools. You spend all year working on the bridge, so you want to see what other people spend all year working on. When someone's bridge breaks, everyone's like 'awww, I feel bad for you'. When 2,500 pounds snaps the bridge in half, everyone in the room turns."

“When 2,500 pounds snaps the bridge in half, everyone in the room turns.”

-Adam Caretti



Photo / AISC Steel Bridge Photo Drive

**FALL 2019 – Spring 2020 CAPTAINS:**

Adam Caretti

John Zeglarski

Contact Steel Bridge at [Acaretti@vt.edu](mailto:Acaretti@vt.edu) with any questions!

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# Center for Enhancement of Engineering Diversity (CEED)

Maez Hasan

Sometimes to find the light at the end of the tunnel, we need someone to guide us through with a torch. Coming into college is a somewhat terrifying experience. It is a brand new environment for freshmen, who are fully independent for the first time in their lives. Virginia Tech offers many programs to try and help these new students. One of the most unique characteristics for VT's engineering program is the Mentorship program offered by the Center for the Enhancement of Engineering Diversity (CEED) that all freshmen can experience for the first 10 weeks of classes.

The CEED Mentorship program takes a group of first year engineering students and delegates them to a 2nd year mentor. The mentor's main job is to walk the mentees through engineering related tasks which they experienced in the previous year, and give them basic knowledge on various topics to try and catch them up. But why exactly do CEED mentors want to help in the first place? To find out, I sat down with Steven Shumadine, a sophomore computer engineering major at Tech and CEED mentor. The part that I found interesting about Steven's reasoning for becoming a mentor was that it specifically had nothing to do with engineering.

“Giving  
back just  
resonated  
with me.”

-Steven Shumadine

Instead, Steven pointed to an anecdote about how when he was a sophomore in high school, an upperclassman would go half an hour out of his way to drive him and other students to practice without complaining or accepting any payment. The best way Steven felt he could make it up to him would be by “driving” others in life. Steven said “that kind of giving back just resonated with me,” and as a result, he tries to

give advice to his mentees to the best of his ability by going above and beyond with the help he gives.

Steven also explained how his CEED mentor last year also tried to help his group as much as possible, whether it was related to engineering or not. "I owed it to my mentor to provide the same sort of help for the incoming freshmen and give it back to them," he explains. "One on one contact with the mentees helps a lot directly with classes or with other things, such as signing up for Course Request, or taking you to a CEED Event such as O-Show." According to Steven, he tries to help his mentees "find [their] purpose," whether that be through introducing them to a design team, just helping out with a class, or providing advice on anything really.

Beyond this, Steven tries his best to provide his group with any information that may be of use to them, including non-engineering related topics, such as off-campus housing, course request, or even information about dining halls. "Last year there were a lot of moments where I went through something and thought 'I would have loved to have known that beforehand,' whether that be what professors to have, what classes to take, when to get started on housing, all of that." He explains to his mentors, "You're starting out your freshman year, [and] we've already been through it."

Most importantly, Steven doesn't do CEED for himself, but rather to help out his mentees. He tells his group that "I enjoy coming to these meetings because I enjoy hearing about you, what you're struggling with, what you found out, what you're doing, etc.", and in the end, it's what separates him and other CEED mentors from just another person freshmen may ask help from.

While the mentors are clearly trying to help out the freshmen, how do the latter feel about CEED? Many believe that it's a great source of information. A freshman in CEED, Nick O'Neill explains how he feels about his mentor by stating, "They teach you about internships, what classes to take, professors, all that stuff.



Photo / Maaz Hassan

“I enjoy coming to these meetings because I enjoy hearing about you, what you're struggling with, what you found out, what you're doing, etc.”

-Steven Shumadine

Your mentor gives you outside knowledge and goes above and beyond to make sure any useful advice gets to us, and it helps us catch up quicker.”

Overall, the CEED mentors here at Tech seem to care more about helping the freshmen get caught up with not just engineering, but also with campus life. They go out of their way to provide useful information to their mentees just so they have a chance to compete with other engineers on campus and get a foot in the door.

# NEW ECE CURRICULUM

Isabella Bartolome

Students litter the halls with their backs resting against the aging white walls typing furiously on their laptops outside of TA office hours. They are discussing the latest coding project with their peers, exchanging their progress and helpful tips for those who are a little farther behind. Others are seated in chairs, one hand grasping a half-eaten sandwich and the other entering values into a calculator and scribbling the results on engineering paper. This is not a rare sight; these students learn to multitask on a time crunch as assignment deadlines approach.

Calling Whittemore Hall home to Electrical and Computer Engineering is not an understatement; students often study at the third floor lounge until 2 AM the night before exams and even come to work on labs or assignments together on game days. Electrical and Computer Engineering are no easy feats, which is evident by the heavy, dark circles under the eyes of any student who resides in Whittemore. Having different professors would not change this fact. However, a change in curriculum could offer these students a clearer career path and future as a professional Electrical or Computer Engineer.

The Electrical and Computer Engineering department at Virginia Tech is in the midst of modifying the curriculum due to a grant they have received from the National Science Foundation in 2016. “[They have] a program called Revolutionizing Engineering



Photo / Thanh Tran

Departments, or RED, and I was sort of the principal instigator in getting us to write one of these RED proposals,” says Dr. Tom Martin, an ECE professor and Bradley Faculty Fellow of Education who spearheaded the proposal for the grant and the resulting curriculum changes. “[RED] recently made a couple more, but, as of last year, there were only 19 awards made across the whole country so it’s a pretty big honor to get one”. According to Dr. Martin, the grants awarded are quite large, worth 2 million dollars over 5 years. “We’re one of three ECE departments and probably the biggest department to receive one.”

According to Dr. Martin, there are a few major changes to note between the old and new ECE curriculums, which are depicted in Tables 1 and 2 respectively. In the old ECE curriculum, which was implemented for ECE students

# OLD ECE Curriculum (through Class of 2021)

ELECTRICAL ENGINEERING	COMPUTER ENGINEERING
<u>Freshman Year (Spring):</u> ECE 1574 – Engineering Problem Solving with C++	<u>Freshman Year (Spring):</u> ECE 1574 – Engineering Problem Solving with C++
<u>Sophomore Year (Fall):</u> ECE 2004 – Electric Circuit Analysis ECE 2014 – Engineering Professionalism ECE 2074 – Electric Circuit Analysis Laboratory ECE 2504 – Introduction to Computer Engineering	<u>Sophomore Year (Fall):</u> ECE 2014 – Engineering Professionalism ECE 2504 – Introduction to Computer Engineering ECE 2574 – Data Structures and Algorithms
<u>Sophomore Year (Spring):</u> ECE 2204 – Electronics ECE 2274 – Electronics Networks Laboratory ECE 2534 – Microcontroller Interfacing ECE 2704 – Signals and Systems	<u>Sophomore Year (Spring):</u> ECE 2004 – Electric Circuit Analysis ECE 2074 – Electric Circuit Analysis Laboratory ECE 2534 – Microcontroller Interfacing
	<u>Junior Year (Fall):</u> ECE 2204 – Electronics ECE 2274 – Electronics Networks Laboratory ECE 2704 – Signals and Systems

# NEW ECE Curriculum (Class of 2022 and beyond)

ELECTRICAL AND COMPUTER ENGINEERING
<u>Freshman Year (Spring):</u> ECE 1004 – Introduction to ECE Concepts
<u>Sophomore Year (Fall):</u> ECE 2024 – Circuits and Devices ECE 2514 – Computational Engineering ECE 2544 – Fundamentals of Digital Systems
<u>Sophomore Year (Spring):</u> ECE 2214 – Physical Electronics ECE 2564 – Embedded Systems ECE 2714 – Signals and Systems ECE 2804 – Integrated Design Project

before and through the Class of 2021, Electrical and Computer Engineering students took similar courses but in different semesters. The new ECE curriculum better integrates the two majors, so Electrical and Computer Engineering students will take the same courses in the same semesters their freshman and sophomore years.

Moreover, the new curriculum will build upon the major specializations that were recently added within the department. Future ECE students will now have to select a secondary focus that differs from their primary focus, which will be one of the 14 majors listed in Table 3. “The students can pick from some of the predefined areas in the department, but if they have an interest that doesn’t fit into one of those, with departmental approval, they can define their own secondary focus.” Dr. Martin adds that, though the procedure to select a unique secondary focus has not been finalized, it will likely look similar to doing

an independent study or research. “The basic idea [of the secondary focus] is, if somebody was interested in something that overlapped with ECE but isn’t within ECE, they could find three courses and get that approved by the department.” A few interests some of Dr. Martin’s students have had in the past that could be addressed with the addition of the secondary focus are medical robotics or quantum computing.

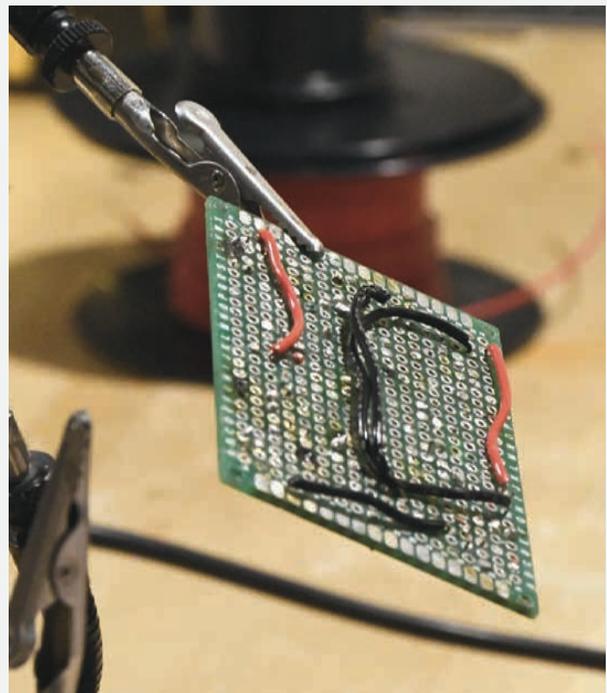
Aside from the structural differences, the new ECE curriculum is designed to be more hands-on and application-based, hence the addition of ECE 2804 at the end of sophomore year for the ECE Class of 2022 forward. “On the EE side, we’ve, for the last couple of years, done something called the Major Design Experience,” Dr. Martin says of ECE 4805, the Senior Design Project spanning Electrical Engineering students’ last two semesters at Virginia Tech. He explains that ECE 2804 is meant to prepare students for the open-ended and design-based nature of their senior projects. “This is meant to tie together everything [students have] seen before this [course], so the projects that they’ll be doing in here have some [elements] from the EE side of the spectrum and some from the CPE side of the spectrum.”

Regarding the Major Design Experience, both Electrical and Computer Engineering students will now be required to complete two semesters of senior design; in years prior, Computer Engineering students were only required to take ECE 4534: Embedded System Design. Dr. Martin hopes that Virginia Tech’s ECE will attract “a wider variety of students with a wider variety of interests.” He also anticipates that the new curriculum will better prepare future ECE students for a broader range of careers. “The real goal is to let students have more control of how they become a professional.”

Most of the current ECE sophomores have taken ECE 1004: Introduction of ECE Concepts, which was first taught last spring. One sophomore, who wishes to remain anonymous, looks back on her experience in

ECE 1004 last spring with some frustration and discontent. “I came into the class thinking that it would [introduce] us to what ECE would be about, and it was pretty much just a circuits class, and I know circuits are tough, but I feel like it just wasn’t taught in [the best] way,” she adds, “A lot of people in the class were really confused and first I [thought], ‘this is just a tough class, might as well get used to it’, but all of us shouldn’t be severely struggling.”

In addition, because her interests leaned more towards Computer Engineering, the circuit-heavy nature of the class did not appeal to her. “[ECE 1004] was definitely more EE leaning, and it might have been great for them, but for somebody who wanted to do CPE, it was a bit shocking [and not] exactly what I wanted to do.” She mentions that students did not fare very well by the end of the semester. “[The professor] would curve every test because our grades were so poor and the size of the class definitely got smaller.” She believes that the rigor of this introductory course turned many prospective ECE students away from the department entirely, herself included. “A lot of people ended up switching to Computer Science [because] people that were considering CPE thought ECE [was] all circuits and [had] no computer [aspect].” Though she is now pursuing Civil Engineering, she hopes that



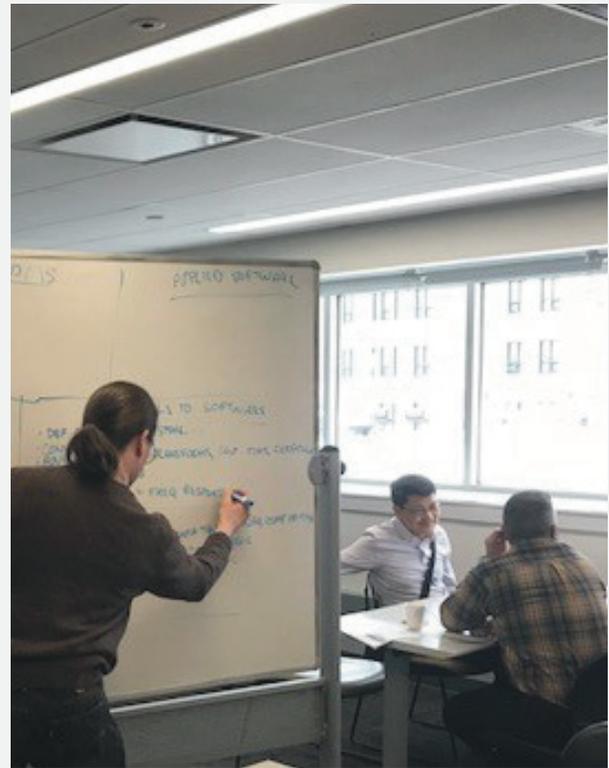
this introductory ECE course will teach EE and CPE concepts more equally in the future.

Another sophomore who wishes to remain anonymous has a unique perspective regarding ECE 1004, as she is taking the course for the third time this fall. “I took [ECE 1004] the first time it was offered, and I took it again over the summer, and now I’m taking it again, so I’ve seen all the changes they’ve made, but I will say, the first time around it was very unorganized.” She adds, regarding the first time she took ECE 1004, “Everybody I talked to was struggling with [the class] and I think the main problem [was] that [the department] expected people coming in to have prior knowledge of ECE.” She explains that, though some students who had planned to pursue Electrical Engineering early on did have some foundational knowledge of EE concepts, several others who took the course found it difficult to grasp the material.

However, she has noticed beneficial changes in the teaching of ECE 1004 over the past three semesters. “They have lab days now [where the professor] asks us to bring specific stuff from our tool kit to class and he walks through simple examples of [how to use it], and that definitely helps.”

Furthermore, she mentions that her ECE 1004 professor is helping students learn to apply the concepts being lectured in the course more effectively. “[The professor] started doing more examples in class [and] with the class, and that’s definitely helped.” Though she is currently torn between pursuing CS or CPE, she appreciates that the Electrical and Computer Engineering curriculum is becoming more integrated; she just wishes the changes happened sooner.

While it is clear that the new curriculum will take a few years to perfect, advantageous changes seem to be taking place amidst the implementation. With hard work and a purpose centered around enhancing students’ academic and professional careers, the future is promising for Virginia Tech’s Electrical and Computer Engineering department.



Top Photo / ECE Department

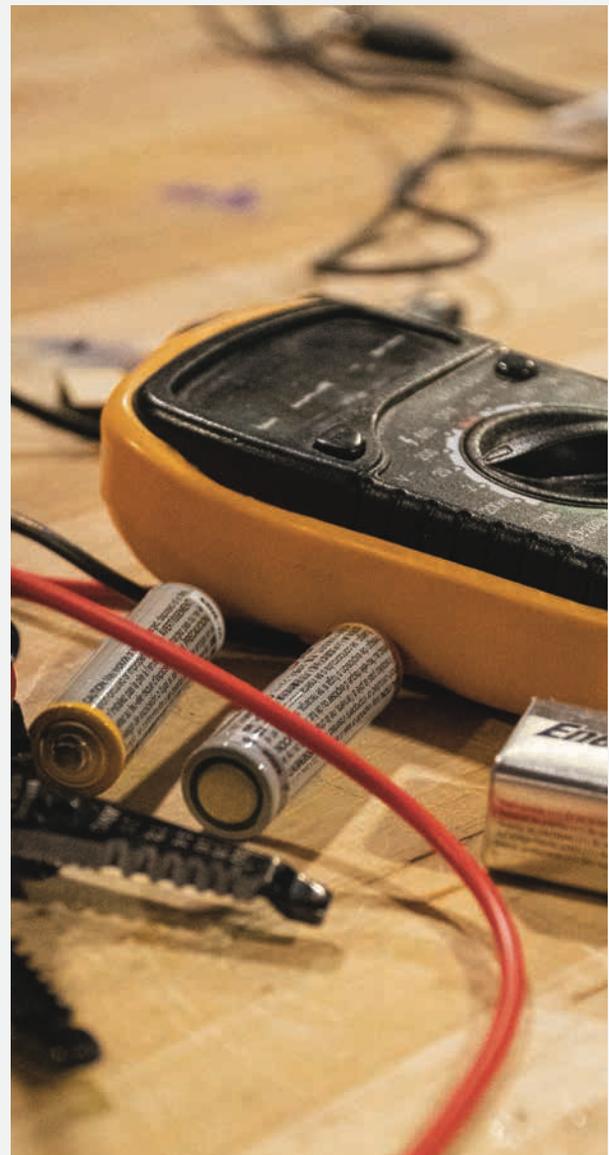


Photo / Thanh Tran

# Professor Spotlight

## Dr. Pat Artis

Elisabeth Robb



Sitting down with Dr. Artis was an encouraging time in which a Virginia Tech professor, the winner of the Distinguished Graduate award, was able to speak openly about the difficulties and triumphs of engineering. His life is a testimony to how hard work pays off and how determination can lead to greatness. He cares deeply about his students and wants to make sure they know he's "here because he wants to make better engineers." While other professors may see their students as frustrating obstacles, Dr. Artis delights in seeing his sophomores at the beginning of their aerospace career grow in knowledge and strength until they reach his senior design team ready for the workforce.

Dr. Artis has an impressive array of professional history. It would be difficult to fit all of his professional history into one article, let alone try to describe the skills he's developed along the way. His engineering career has changed as the world has changed around him. His first job fresh from undergraduate was working at Bell Labs, where he served a faithful 10 years. Later, he was able to start his own engineering firm. He has over 4,000 hours of aircraft pilot-in-command time and has worked on a wide variety of projects including aircraft, computer architecture, and rocket design. He

has dedicated every day of his career to his passion of aerospace engineering and now is able to share his "wealth of knowledge" with the students here at Tech. Because of his time in the field, he was able to return to Virginia Tech in 2015 to join as a full-time Professor of Practice. His time earning his master's and PhD has earned him valuable scholarship, while his time in the field has earned him priceless experience.

Dr. Artis' advice to engineers struggling with their course load is to reflect on their self-image. Throughout his time as a student and now a professor, he has observed that when students have trouble with a test or keeping up with the homework load, they begin to question their choice of major. However, if a student has a genuine passion for engineering, then they'll do just fine. Any student questioning if a degree in aerospace is an unattainable goal, Dr. Artis is a great resource for guidance and encouragement.

# VIRGINIA TECH CAMPUS

Photographs by Hunain Shamsi



# Blacksburg Sustainability

Sustainable Blacksburg is a non-profit community organization that strives to make the Blacksburg area an environmentally friendly and conscious place. This organization not only attempts to reduce the regional impact on the local and global environment, but also aims to improve livability in the region by facilitating events and festivals throughout the year with the help of community partners, such as Virginia Tech.

Sustainability is extremely important because almost every item that is bought, consumed, or used comes from the natural environment in some way. In order to promote sustainable living, it is important to preserve conditions where humans and nature can exist together both now and in the future.

Sustainability Week is one of the efforts to get the community involved with improving the environment and is a collaboration between Sustainable Blacksburg, the Town of Blacksburg, and Virginia Tech's Office of Energy and Sustainability. The annual week-long series emphasizes sustainability programs and practices in the Blacksburg area to build a more sustainable town. Sustainability Week has been conducted since 2007 and is hosted annually during the third week of September.

This year the event lasted from September 14th to the 22nd and included several different activities that ranged from service projects to open forums to bike tours. Each event was centered around improving and preserving the environment. Most events were FREE!

## Service Project – Invasive Species at Stadium Woods

This event occurred on September 15th and was a service project to help remove invasive species that were threatening the forest on the edge of the VT campus. Invasive species are any species that are not native to the area and cause damage to the environment or human health.

## Sustainable Eats Bike Tour: A Glimpse of Sustainable Practices at Virginia Tech's Dining Halls

A short tour of some Virginia Tech Dining Halls took place on September 17th and included learning about sustainable practices at Virginia Tech Dining Services. People traveled by bike to five dining facilities, listened to chefs about their passions and sustainable practices, and tried new menu items.



## Monarch Mania at the Market

On September 18th, Monarch Mania was held at the Blacksburg Farmers Market and taught people about the Monarch butterfly life cycle and how to help these creatures. While there, people were able to view and release different caterpillars and butterflies.

### Donation Yoga at Hahn Garden

Blacksburg Yoga Collective hosted donation yoga on September 19th in the Hahn Horticulture Garden Pavilion and included 75 minutes of basic Hatha flow yoga. This event was free, but donations were taken to support Sustainable Blacksburg.

## Sustainable Brewery Tour: Rising Silo

Rising Silo Brewery hosted an event on September 20th and included a behind the scenes tour. This event taught individuals about the meaning behind “Well Inspired, Solar Fired,” which means that the brewery has access to groundwater from a well on Glade Road and utilizes solar energy for almost half of the brewery’s energy.



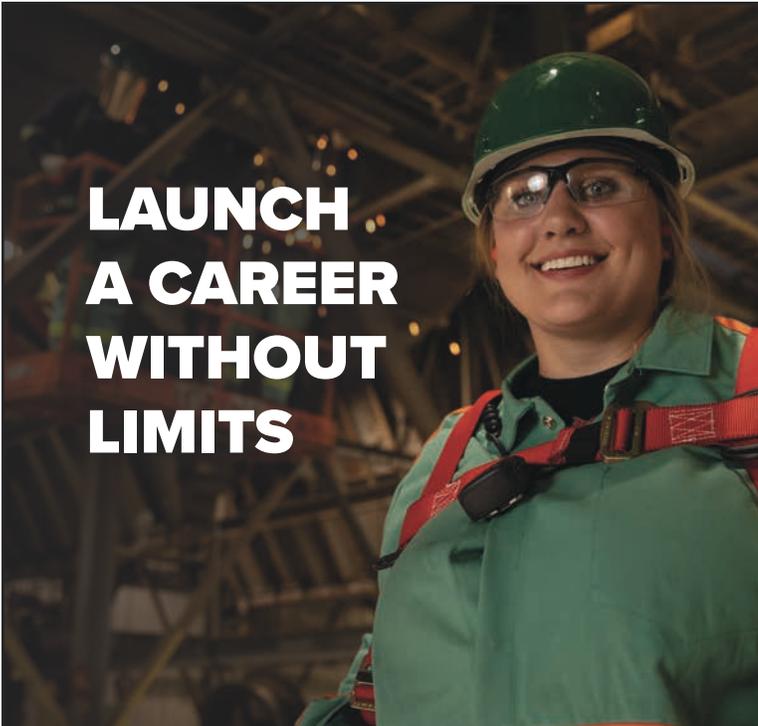
## Bike Parade to the Farmer's Market

There was a short bike parade that was hosted on September 21st that started from the Virginia Tech Electric Parking Lot to the Blacksburg Farmers Market and included all ages.

## The Last Straw Campaign

Also, some events lasted the entire week. This specific campaign celebrated businesses who made a pledge to lessen their straw usage to reduce community and global impacts. This is important because people use 500 million straws a day in the United States alone. It has been estimated that this is enough to circle the Earth over  $2\frac{1}{2}$  times, and it is one of the top 10 marine debris items found on beaches. Thankfully, several businesses in the Blacksburg area have made pledged to minimize straw usage.

500 MILLION STRAWS



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## Sustainable Blacksburg VA Website:



More about Sustainability Week can be viewed here:

<http://sustainableblacksburgva.org/sustainability-week-2019/>

As one can see, there are several different actions that can be done to create a more sustainable community. One of these is becoming a Sustainable Blacksburg Team member, which can be done following the instructions at the site below:

<http://sustainableblacksburgva.org/about-us/become-a-member/>

Additionally, individuals can volunteer with the team or give contributions to the cause. Another way to help the Blacksburg area become more sustainable is by participating in programs and events hosted by the Virginia Tech Office of Sustainability or by interning for the office. These options can be viewed at the link below:

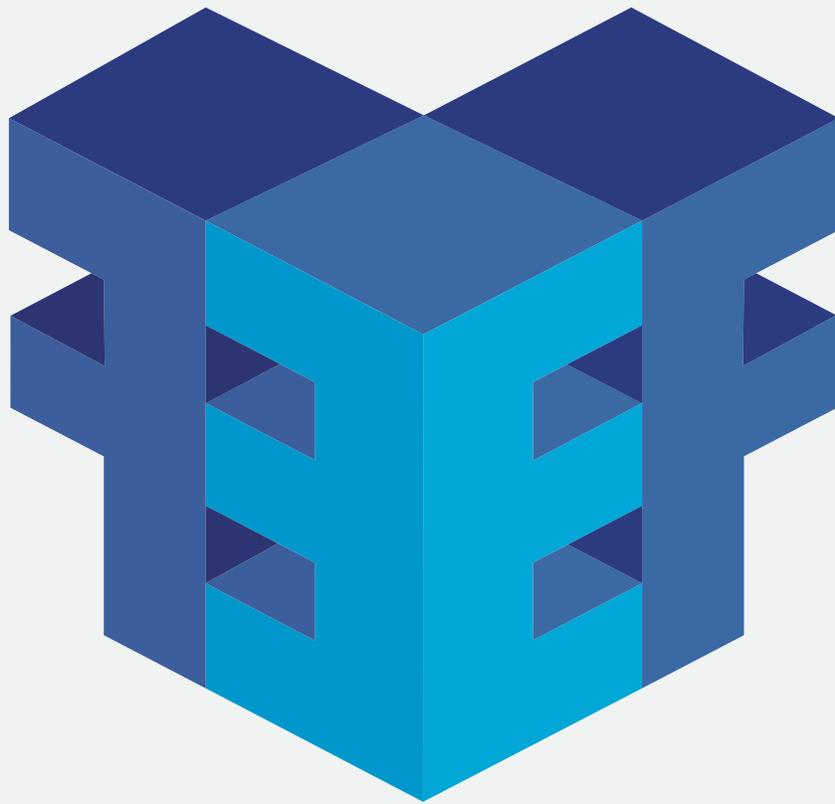
<https://www.facilities.vt.edu/sustainability.html>

Finally, if you want to learn more about making a positive environmental impact and influence different types of energy have, you can attend green engineering classes or pursue the minor at Virginia Tech. Green engineering impacts all engineering fields and works to combine these disciplines with various environmental values and principles. If you are interested in applying to this program, you can check out the page below:

<https://eng.vt.edu/academics/undergraduate-students/minors/green-engineering.html>

Overall, there are several different actions that can be completed to make an environmental impact in the Blacksburg area and globally. All you must do is figure out what you are passionate about and help!

# ENGINEERS' FORUM



Want to join our writing, distribution, photography, or graphic design team?

Contact Julia Pimentel at  
[vtengineersforum@gmail.com](mailto:vtengineersforum@gmail.com)  
to get involved!



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