

# Engineers' Forum

VOLUME 40 – No. 2  
April 2019

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Virginia Tech - Engineer's Forum



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# LETTER FROM THE EDITOR

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Greetings, and thanks for picking up the last issue of Engineers' Forum for the 2018-2019 academic year, and my last issue as editor-in-chief.

First, I want to thank you all for your support of the magazine, and thank all of our dedicated staff for working hard to get our issues out this academic year. I think the April issue is our best yet, and the 2019-2020 academic year promises to be a strong one for Engineers' Forum.

I joined the magazine team the summer before my freshman year in 2015, and February 2013 was the first issue I was handed in print at engineering camp. It has been a privilege to be involved in the 37+-year history of this unique publication at Virginia Tech. I am sad to leave the team, yet simultaneously confident that it is in good hands.

This issue, we have a fun read for you from writer Jin Tian Acton about the connection between philosophy and engineering. She'll walk you through why it's so popular for students to pursue coursework in philosophy concurrent with engineering, and, in the process, debunk some of the myths that float around about each field and their relation to each other.

Writer Alex Petsopoulos is back for April with an account of an immersive audiovisual experience in the Moss Arts Center. Look no further than his story for a reason to feel proud of the arts at Virginia Tech.

Meanwhile, Julia Pimentel joins this issue as a featured writer to discuss the Society of Asian Scientists and Engineers (SASE) conference for the Southeast region at Georgia Tech, as well as Virginia Tech's laptop orchestra. Check out her articles for another perspective on the arts at the university (from perhaps a less traditional lens) and a picture of an important organization for student engineers.

Elsewhere this issue, Soumya Khanna gives us a snapshot of the well-hyped Innovation Campus in Alexandria, and we provide a brief look at EF's contribution to Giving Day 2019.

Again, thanks so much for your support - you keep EF going. It's through our readers that we are able to get relevant stories and employer announcements out to Virginia Tech students. As I complete my tenure as Editor-in-Chief, I am proud of how far our magazine has come, and can't wait to see where it goes next.

Sincerely,



Arianna Krinos

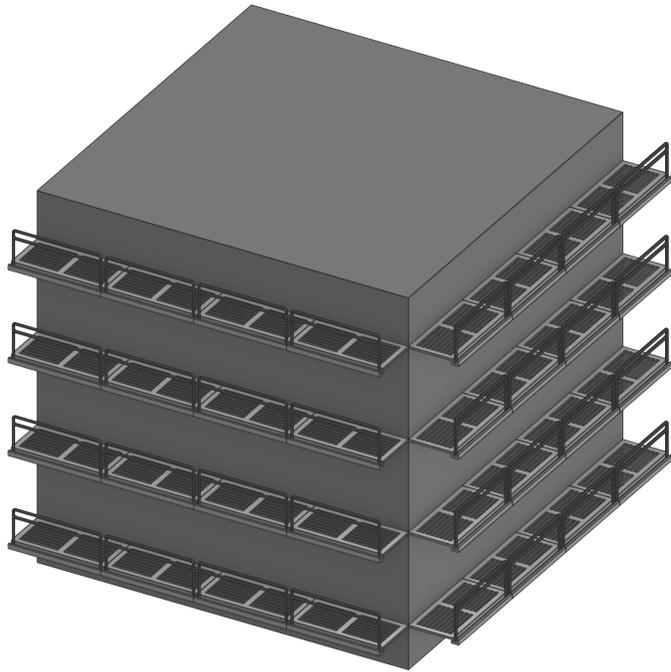
Editor-in-Chief



# This Is Maximalist:

## The Cube @ Virginia Tech

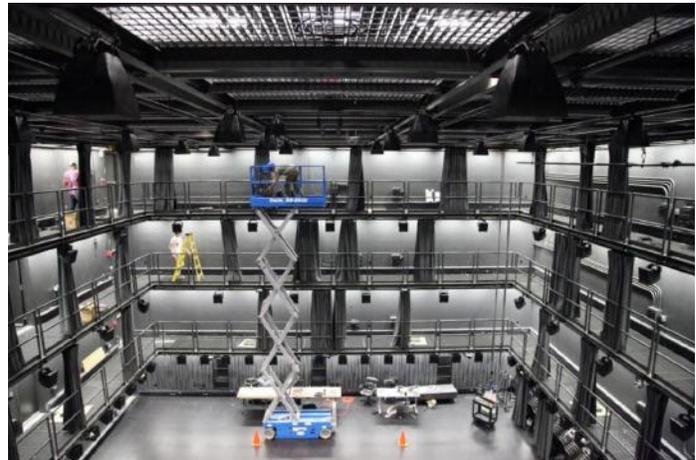
Article and Photos: Alexander  
Petsopoulos



What do Queen's Bohemian Rhapsody, the vocoder section in Daft Punk's Lose Yourself to Dance, and the video game, Fortnite all have in common? They all utilize the production method of stereophonic sound. When two speakers are operating in stereo, both speakers are outputting sound from two distinct audio channels. In rock music, that means the guitars are heard in the left ear, while the drums and vocals might be heard in the right. If your home theater setup is outfitted with surround sound, you've enjoyed seven distinct audio channels. This practice of 360-degree sound immersion, known as spatial audio, is what enabled movie producers to place the audience in the center of a pod race during Star Wars: The Phantom Menace.

We Hokies have a spatial audio facility in the Moss Arts Center called The Cube, and it's a little more impressive than your home theater. The Cube is unique in the world. Its massive, four-story space boasts 150 unique audio channels; each speaker can play something different simultaneously. On the floor, there are a dozen speakers at ear level, including two subwoofers the size of a filing cabinet. On the

edge of the first catwalk there are nearly sixty speakers, and on each of the three levels above there are even more. There are over twenty speakers on the ceiling pointing straight down. Dr. Jeffery Kyle Hutchins, Faculty Professor of Saxophone at Virginia Tech compares The Cube to the aforementioned audio systems, "Often times, we don't really get beyond four speakers, sometimes eight, maybe sixteen. In IMAX, there's probably not more than eight. This is maximalist."



The Cube at Moss Arts Center, obtained from "<https://www.performing-arts.vt.edu/events/view/disis-fall-concert>"



“It’s important to recognize The Cube is not just for music, but for interdisciplinary research as well. In addition to the loudspeaker arrays, The Cube is also equipped with an infrared camera enabled motion capture system. By first applying reflective tape to an individual, researchers in The Cube have the hardware to track that individual as they move around the space. The fluid mechanics department experimented with flying snakes by applying tape to the snakes, and then making films about how the snakes move their bodies.”

Professor Hutchins commissioned three brand new musical pieces last year to try and utilize The Cube’s unique capabilities. To describe his art, Hutchins commented, “I wanted to really use this room in a way that perhaps has never been done before.” For the last five to six years, Professor Hutchins has been working with his former college roommate and University of Chicago doctoral fellow, Ted Moore (<http://www.tedmooremusic.com/>), on their musical project, Binary Canary, a saxophone and laptop duet. Moore has coded open-source software in SuperCollider specifically for manipulating sound. His software allows him to take microphoned sound from Hutchins’ saxophone, and utilize digital signal processing to manipulate that sound in real time through nearly 30 custom-coded effect profiles.



Professor Hutchins utilizes spatial audio by moving around the Cube during the song, Alien Nail Polish.



Hutchins is a Yamaha Performing Artist, this tenor saxophone with implanted electronics was played for the song, “Column.”

When asked to describe his work in The Cube, Professor Hutchins referenced the avant-garde, “The avant-garde is fleeting. Once an audience hears something they’ve never heard before, there’s a reaction. The avant-garde

knows no discipline or aesthetic... it’s not just about having 150 speakers pumping sound at you; it’s about learning how to utilize those speakers in what’s called spatial audio.”

Spatial audio, in this case spatial music, means the sound is coded to move around the audience. All speakers aren’t making the same sound, the composer designs a sound that moves around the space.

Hutchins’ work in The Cube culminated in a recital early last February, which I was privileged to attend with press access. Just before the performance, I was able to speak with Professor Hutchins’ colleague, Dr. Eric Lyon, Associate Professor at Virginia Tech’s School of Performing Arts in Music Technology and Composition. Lyon composed one of the pieces that he and Hutchins performed that night, Blue. The song was about paranoia, and composed for saxophone and live spatial audio. I spoke with Lyon after he and Hutchins finished performing Blue, and much to my surprise, he told me that not one second of his song was pre-recorded! There were no tracks involved. The raw computer processing power required for Dr. Lyon to route 150 channel audio in real time simply did not exist ten years ago, and is a testament to the now inseparable connection between music and technology.

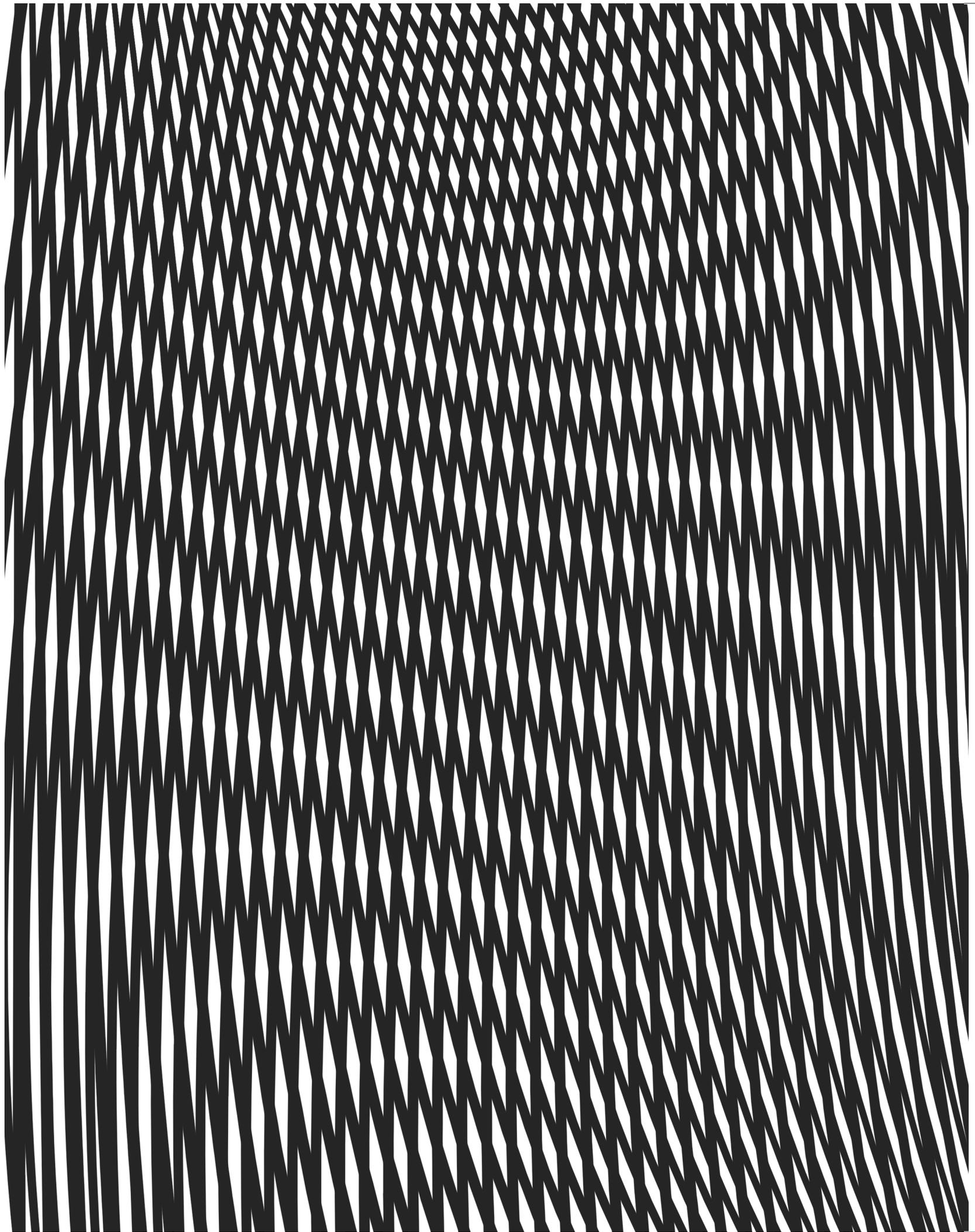


Virginia Tech Professor of Low Brass William (Jay) Crone performs on tenor trombone for Dr. Lyon’s composition, Blue.

Music in The Cube was unlike anything I had ever heard before. For example, in Hutchins’ first song, Column, the song begins with a gradual build-up in sound, until the whole Cube is filled to the brim with decibels. There’s a moment where white noise starts in the ceiling, and then waterfalls slowly down the sides of The Cube. While this

Article continued on [Page 8](#)







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Dr. Hutchins performs “Column,” a piece for saxophone with implanted electronics, live spatial audio, and lighting.

happens, all the noise is killed until the room becomes totally silent. At one point during the song, a lion can be heard breathing, pacing around the audience. At one point the lion can be heard leaping from one side of the cube to the other, and our necks all snap in the same direction, as we search for the lion we know isn’t real.

After the show, I was able to speak with Professor Lyon in more detail about the early development and design phases of The Cube. Alluding to the avant-garde, Dr. Lyon commented on The Cube, “Anything that goes on in that room is on the forefront of what can be done. In 2016 we published an article in the *Computer Music Journal* called *The Genesis of The Cube*, with great technical details about how we designed the facility. It’s all open source.” Almost every piece of equipment in The Cube is off-the-shelf. Dr. Lyon explained that anyone with the time, talent, and expertise could browse the internet, order the necessary parts, and build a similar facility of their own. “The Ut Prosim goal is to involve local and global community, and to allow the community to figure out for itself the best ways to use

the space.” Because a room of this magnitude is unique in the world, nobody has experimented with it to its fullest potential. For that reason, Dr. Lyon and his colleagues in The Institute for Creativity, Arts, and Technology (ICAT) created Cube Fest, an immersive media art and music festival where people from all over the world can submit their proposal for an immersive music experience to be performed. The overarching goal is to utilize this fifteen-million-dollar facility in ways never done before. As an artist, Lyon explained, “You wrestle with the facts that the art you make here can’t be listened to anywhere else in the world.” As we concluded our interview, I commented that any work Lyon does in The Cube is by definition revolutionary. To that he exclaimed, “Your words, not mine!”

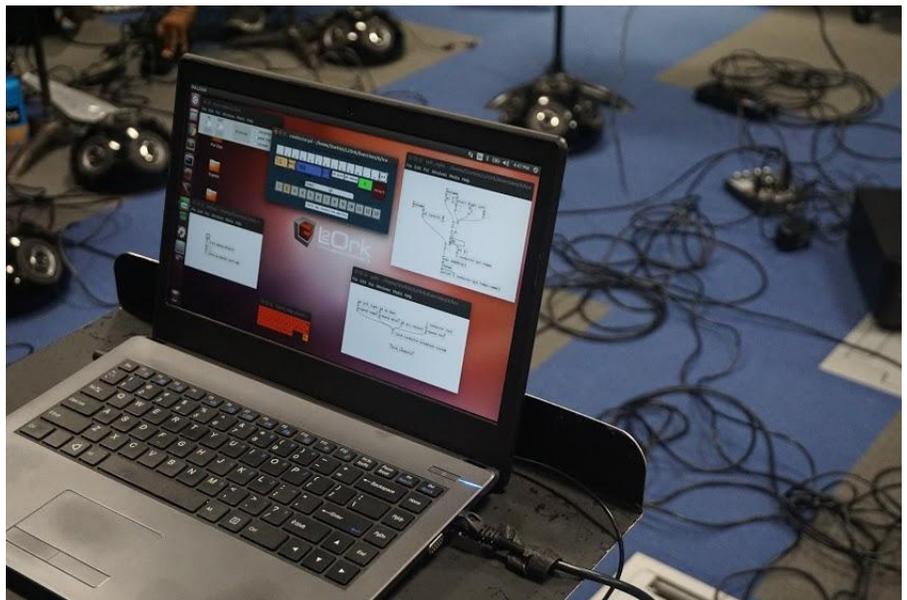
#### Author Bio-

Alexander Petsopoulos joined the *Engineer’s Forum* as a staff writer in 2018 and currently serves as the magazine’s distribution manager. He is a member of the International Association of Professional Writers & Editors and enjoys reading, writing, and solving problems.

# Linux Laptop Orchestra at Virginia Tech (L2Ork): The World's First Orchestra of its Kind

Article and Photos: Julia Pimentel

There aren't any wooden violins or cellos in this orchestra—no clarinets, trumpets, or flutes. You won't find sheet music saturated with black ink notes on a staff. Instead, music is generated through unique technologies and laptops containing the Linux operating system. In the Digital Interactive Sound and Intermedia Studio (DISIS) in Newman Library, director and founder Dr. Ivica Ico Bukvic (known as Ico by students) leads the MUS 3314 Linux Laptop Orchestra class comprised of approximately 10-20 passionate musicians captivated by new forms of producing music.



Student musicians use these Linux Laptops equipped with specialized software to produce electronic music.

**“What is a Linux Laptop Orchestra? My answer to this day, 10 years after we started this, is I don't know.” – Ico**

After visiting his class and immersing myself in their captivating music atmosphere, I was fortunately able to interview Ico, who noted, “The whole goal is that you have a musical ensemble that's based on computer infrastructure which means that there's an incredible amount of malleability and it poses a lot of interesting research questions. Every time we do a new piece, there's something different.” The possibilities are truly endless when it comes to producing electronic music in a laptop orchestra. New advances in technology as well as the development of new software enable laptop orchestras across the country to astound audiences with unique repertoire one sound byte at a time.



With profound enthusiasm for integrating technology in the arts, Ico emphasizes, “I have a longstanding passion for free and open-source stuff. Back in the early 2000’s, I was asked to lead an international consortium for Linux audio. It was in part inspired by other movements and developments in the area of computer music, where laptop-based ensembles were flourishing around that time. So we became the first fully open-source [L2Ork] ensemble in the world.” When asked about the rarity of such kinds of ensembles, Ico made the point that “it is actually more common now. We’re well over 100 now in the world. At that time [early 2000’s], there was one in Princeton, one in Stanford, and one at Virginia Tech.”



Hemispherical speaker innovatively constructed out of an IKEA salad bowl.

## Technology

The group utilizes a wide range of technology and programming developed by Ico and others in his innovative team to create novel music. He reveals, “We have a Simon game and something that sounds like a glorified ocarina band with a very dynamic range. And so the whole idea is that it can be anything and everything. We can network machines together.” Acting as an engineer, Ico took charge in constructing various audio-related instruments. The result was the production of a wide array of equipment still in use today. Ico states, “We have hemispherical speakers that we fashioned from IKEA salad bowls painted black that have laser cut face plates. And the idea is that sound emanates in all directions which means you can hear yourself and hear others. We also use Wiimotes [Wii remotes] as our default controllers. They’re affordable, durable, and sturdy.” Whilst sitting next to members, I was able to have an in-depth view of another

piece of technology: Raspberry Pis. Not a dessert item in this context, Raspberry Pis were used by L2Ork members to convert audio input from blowing into a microphone into alien-like sounds. I had goosebumps from hearing their electronic music, complete with melody, improv, and dynamic contrast.

One fascinating thing that I learned from L2Ork is that the ensemble takes into account the influence of musical gestures in performing. Ico reveals, “We still use to some extent today tai chi choreography. The problem is if you don’t have some kind of structure to a gesture—as we found out when we had our premiere—some of our performances were borderline offensive. You’re waving your hands around and they don’t look quite right. So we realized we needed to have something to anchor us. It also drew in this opportunity to bring in a mind-body practice.” It is important to note that many factors affect performances, especially those from laptop orchestras. Thus, L2Ork is highly interdisciplinary. Ico notes, “It’s education, computer science, engineering, research...”

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Constantly seeking new opportunities to grow and develop, Ico had ideas of adding more pieces of technology to his impressive collection. “We’re designing a new version [of the controller] – a hacked version of a Wiimote. We’re going to have two hands that are more independent that give us more affordances that we didn’t have before.” Ico demonstrates how the process of developing these technologies necessitates awareness of human factors and ergonomics. For instance, “hands get pretty tense. The new controllers will be suspended in your hand.” The dedication and commitment to improvement not only demonstrates innovation, but it also highlights the genuine passion of the group towards breaking music boundaries.



Three L2orkists [Brandon Hale, Aline De Souza, and Galina Belolipetski] after their Thursday class at the Digital Interactive Sound & Intermedia Studio in Newman Library.

## Performances

Galina Belolipetski, a L2Ork Computer Science and Creative Technologies major, describes one of the unique experiences L2Ork members can engage in. She reveals, “A group of 6 L2Orkists [L2Ork members] went up to DC to the National Museum of American History at a private program for the ACCelerate Festival [Creativity and Innovation Festival]” to demonstrate the power of electronic music. Another member, Brandon Hale, adds, “Nowadays, we tend to perform in The Cube. Previously we performed in a catwalk on the cube. It’s a special experience where we have all of us spread out.”

Furthermore, the ensemble has opportunities to perform alongside other professional musicians. At one point, they were able to amaze audiences with professional hand drummer Manu Delago. Many L2Orkists are also active as individual performers. For example, Rachel Hachem, a dou-

ble major in Music Technology and Creative Technology who is a sophomore L2Orkist, takes on her artist stage name “Lumelle” and promotes her music performances with flyers spread out in Squires, McBryde, and downtown Blacksburg. Three words that she would use to describe electronic music and L2Ork are “experimental, hybrid, and open.” Additionally, Hachem’s pursuit of a minor in Computer Science is a prime example of the interdependence between arts and technology. Another L2Ork performer, Aline De Souza, happily describes her experience as a L2Ork performer with another three words: “It is awesome!”



Rachel Hachem in the DISIS Studio in Newman Library. Photograph from Rachel Hachem.

## The Impact

Ico showcases his interest in influencing education when he states, “We have an ensemble that uses laptops and they utilize the Linux operating system which is a practical decision because a lot of our work stems from working with K-12 education partners. So, we want to make sure our infrastructure is as affordable as possible so we can actually implement this in K-12 context, where funding is usually pretty hard to come by.” Ico and L2Ork have an instrumental impact on their individual students as well. Ico notes, “I know we have a lot of students and alumni that have incredible identity with the ensemble, so I still have students who have graduated years ago come and sometimes join us to perform.”

Brandon Hale, a former Virginia Tech student who graduated in May, continues to take part in the ensemble to this day. Hale mentions, “For four years I was in the Music Composition and Audio Technology professional degree options and I took L2Ork every semester because I loved it. I grew up

using Linux and came here [Virginia Tech] for music. When I discovered it existed, I was like ‘People do that? That’s a thing?’” Rachel Hachem adds, “For those that are more technology inclined, L2Ork is far more beneficial than traditional ensembles.” L2Ork has had a widespread impact on the musical community both locally and nationally. The fusion between technology and music beautifully characterizes L2Ork and its members’ passions. 10 years ago, Ico saw an opportunity to pursue this revolutionary interdisciplinary project. Today, the Virginia Tech Linux Laptop Orchestra has inspired the creation of other similar groups and remains a powerful performance ensemble always looking for new ways to innovate.



Various pieces of technology that make up the L2Ork infrastructure.

## Coming Up

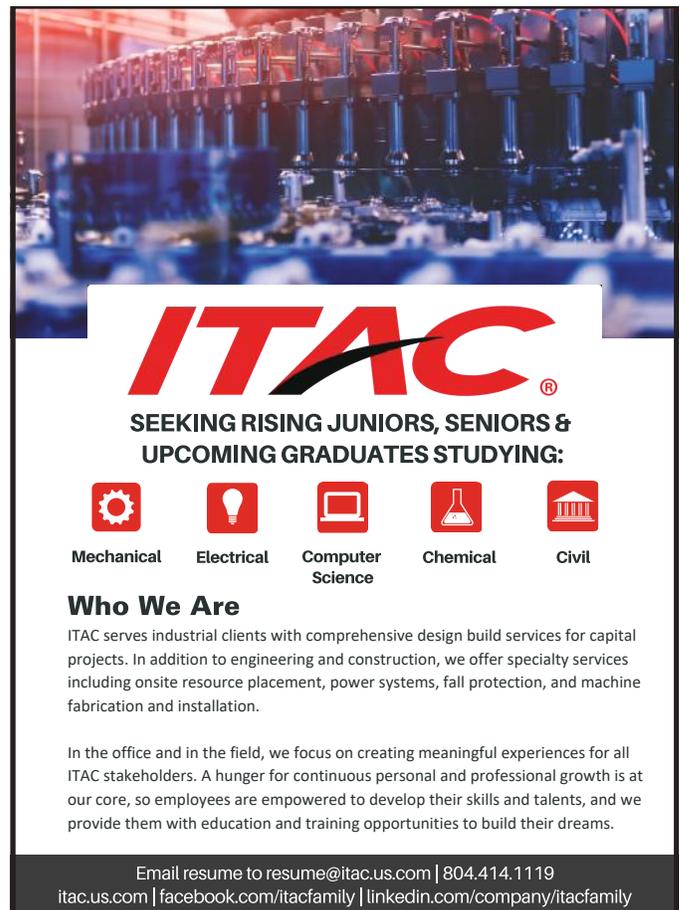
L2Ork will be a part of the Creativity and Innovation Week in May, hosted by the Institute for Creativity Arts and Technology. Performances will be held on Tuesday, May 7 and Wednesday, May 8. On Tuesday, there will be guest artists and laptop orchestra features. Wednesday will mostly showcase student works.

If you are interested in some of the other projects and performances from L2Orkists, check out the band Speakeasy (@speakeasyverified) for their performances in the spring and keep an eye on the lookout for flyers from L2Orkists such as Rachel (aka Lumelle) posted around campus!

Interested in taking the course? Here’s the info: MUS 3314 – ensemble 1 credit class that accounts for Area 6 and the only requirement is that you show up to class and have fun!

L2Ork website link: <http://l2ork.music.vt.edu/main/>

L2Ork Facebook page: @L2Ork



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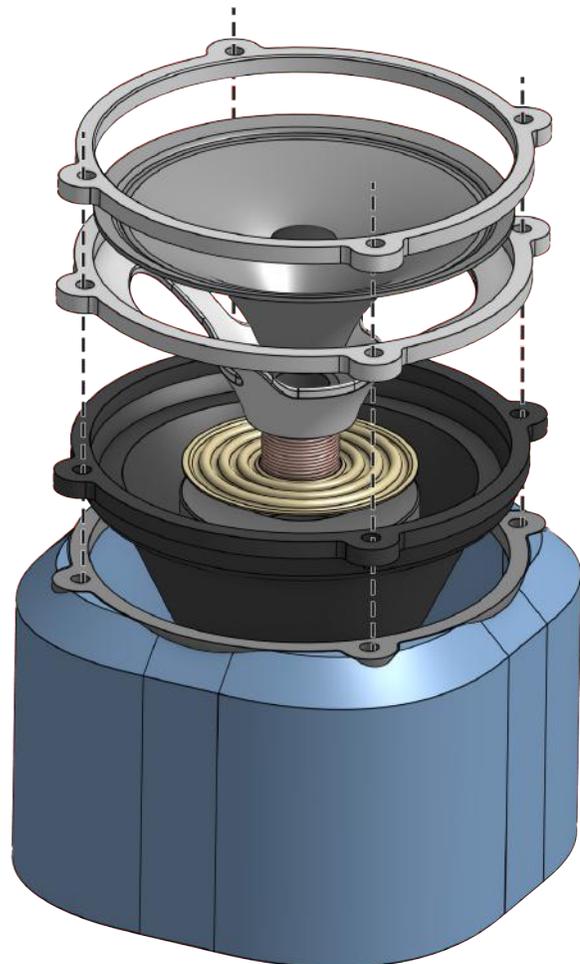
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**Who We Are**

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# The benefits of the Innovation Campus and AmazonHQ2

Article: Soumya Khanna

**“It’s not about ideas. It’s about making ideas happen,”** said Scott Belsky. On Nov. 13 2018, Amazon selected Virginia to build a new headquarters also known as Amazon HQ2. HQ2 will be a new corporate headquarters in the Crystal City of Arlington. Over the past few years, Virginia Tech has been planning to build a new technology-focused campus in Alexandria. On the day Amazon announced about HQ2, Virginia Tech President Timothy Sands said, “The Virginia Tech Innovation Campus in Alexandria will be a source of talent, research, partnerships discoveries, and economic impact.”

Undergraduate and graduate students along with the alumni are excited to hear this partnership. Jordan Sereno tweeted, “Proud to be a Virginia Tech alum. Great things happening for VT.” Many present undergraduate students talking about joining the Alexandria campus soon after their graduation. It is truly a dream come true for students in the STEM field. Amazon is one of the leading tech companies in the world. The company’s presence in the Northern Virginia region will act as

a pipeline to tech jobs.

Brandy Salmon is the Associate Vice President for Innovation and Partnerships and also the founding Chief Operating Officer of the Innovation Campus. I asked her a couple of questions to get a better idea on the Innovation Campus and its link with Amazon HQ2.

## How is the presence of Amazon HQ2 and Innovation Campus going to help Virginia Tech?

It’s important to note that the Innovation Campus is not a partnership with Amazon. We are in partnership with the state to build the Innovation Campus. Through a historic investment by the state and Virginia Tech, the Innovation Campus will spark discoveries and transform Northern Virginia and the entire D.C. metro area into a leading magnet for tech talent and innovation.

The Innovation Campus is consistent with Virginia Tech and



President Tim Sands' strategic thinking and planning for a bold presence in the Washington D.C. region to meet the needs of the region's tech industry. The Amazon proposal was the catalyst that brought to life the conceptual designs developed by the university over several years. We are confident Amazon will hire graduates from our new campus but also know that dozens of other companies are seeking the same talent.

## How are students and faculty going to benefit from this development?

All areas of our university will benefit as Virginia Tech becomes a destination for world-class faculty, researchers and students from around the world. While the Innovation Campus will recruit and attract graduate students from top schools around the country, Virginia Tech leaders anticipate that Hokie undergrads will use the \$1 billion Innovation Campus in a variety of ways, including through internships, undergraduate research, and accelerated graduate programs.

Funding for the Innovation Campus was part of the \$1.1 billion higher education package approved by the General Assembly to build a talent pipeline for Virginia and solve a critical shortage for the state. The higher education package also includes funding to allow Virginia Tech to add at least 2,000 more undergraduate students studying computer science, computer engineering, and related disciplines over the next five years. To support these new students and propel research, Virginia Tech will hire up to 140 new faculty members in Blacksburg.

The state's recently approved budget also included \$69 million toward a \$79 million project to construct a 120,000-gross-square-foot data and decision sciences building on the Blacksburg campus to help provide support to the additional 2,000 undergraduate students.

## What will be the impact on Northern Virginians and how are they being incorporated in this project?

The Innovation Campus will spark discoveries and transform Northern Virginia and the entire D.C. metro area into a leading magnet for tech talent and innovation. The campus will be designed to foster collaboration and innovation. The one-million square foot campus will have both academic and

research spaces as well as areas for housing and industry partners.

Alexandria officials have been engaged and important to us as we move forward with developing the campus. Alexandria community members will be engaged throughout the design process to ensure that the programs, people, and partnerships meet the future needs of the region and our society. For example, we are part of a town hall that the city is hosting April 1.

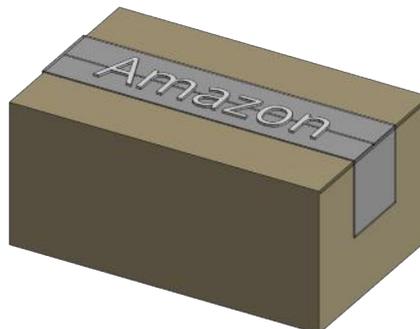
Dr. Jack Lesko is the Associate Dean for Research and Graduate Studies. Currently, his office provides guidance to faculty in developing research efforts in various ways.

## What do you think about the Innovation Campus?

I think it's a great opportunity for Virginia Tech. The state is providing various comprehensive resources to help this project. About 137 of the faculty will be appointed from the campus in Blacksburg. A little over 40 faculty positions will be opened in the National Capital Region. With the help of the development of the Innovation Campus, the College of Engineering will be able to expand its research portfolio. Research can delve deeper in emerging strengths such as Artificial Intelligence, quantum computing and many more. This will allow us to carve our path to the bigger goal: the advancement of a digital world.

## How is the faculty feeling about this upcoming development?

By and large, the faculty are very excited about this project. I have found that a lot of hard work and hard thinking is being done to make sure the faculty and students are successful. In my experience of 30 years, this is the first opportunity of this magnitude. This opportunity can boost Virginia Tech's global reputation. I'm currently thinking about the research schemes, however, there are no specific details at the moment. It is our responsibility to leverage this extension to its fullest and have a better impact on society.



# IGNITE YOUR DREAMS: 2019 SASE Southeast Regional Conference at Georgia Tech

Article: Julia Pimentel



Above. Bagels during introductory remarks. Photograph taken by Julia Pimentel.

1.

## Bagels and Business Attire in Atlanta

At 8:00 am, we're greeted by warm smiles, ironed business formal attire, and a beautiful array of bagels and cream cheese. After last night's seven hour drive from Blacksburg, we arrived in the bright, bustling city of Atlanta. Excited to explore the new environment and interact with fresh perspectives, we take in the beautiful architecture, lines of cars, and pedestrians who stroll on the sidewalk as we make our way to the Molecular Science and Engineering Building at Georgia Tech (GT), the host of the 2019 Society of Asian Scientists and Engineers (SASE) Southeast Regional Conference. Following introductory welcoming remarks, breakfast keynote speaker Dr. Hailong Chen gives career insight and a look into his research to a room full of dedicated SASE members representing universities that span the southeast region of the United States. Afterwards, we are given free range to attend a wide array of workshops and guest speaker lectures. Prior to the start of the workshops, I had the wonderful opportunity to speak with Khanh Vu, the Executive Director of SASE, to gain a deeper understanding of what SASE represents.



Virginia Tech SASE fam. Photograph taken by Alison Mak.

2.

## Summary of SASE

Vu proudly describes the organization as a whole when he notes, "SASE is short for The Society of Asian Scientists and Engineers. We're an open society, so anyone can join us—doesn't matter your ethnicity or major. The mission of SASE is to bring diversity to the workplace. At the heart of SASE is helping people find their full potential." Moreover, Vu gives insight to how he got involved with SASE; he started off as a volunteer. His continuous involvement and commitment to SASE led him to become the Executive Director of SASE about 7 years ago. When asked about member-



ship, Vu notes “I’d say we reached out to 10,000 people. We welcome everybody!” Vu happily attends SASE conferences across the nation to take part in the exchange of new ideas, stories, and upcoming research in STEM.

**3.** **Walking on Water**  
Workshops take place throughout the Georgia Tech building: Estee Lauder holds an information session in one room while David Owens, TVA Vice President of Coal & Gas Services, gives a talk on “Leadership & Teamwork: Succeeding in Corporate America”. Many students—including me—attend Dr. David Hu’s fascinating “How to Walk on Water and Climb Up Walls” presentation. Passionate about animal movements and behavior, Dr. Hu tells captivating stories about water striders, cows, cats, and other animals. His audience sits in amazement when learning about how creatures poop, pee, groom themselves, and seemingly defy the laws of physics. Truly an engaging speaker, Hu not only gets SASE members to laugh, but he also instills in us a deeper appreciation for animals and why they act the way they do. Afterwards, he holds a book signing of his book *How to Walk on Water and Climb Up Walls*, based on his prior research and unique experiences.



Dr. David Hu’s book signing. Photograph taken by Sun Yang.

Curious after his lecture, I ask Dr. Hu about his approach towards college and life in general. He states, “I think that everyone wants to make a big impact, but for me just working on a few small things and getting good at those was a good first step. And that helped me understand who I was and what my particular strengths were so I could figure out how I could make that impact. And now I figured out my impact is doing studies on animal movement and writing about it. You got to do that exercise of trying to do small things first and then eventually it will snowball into something greater.” Dr. Hu’s presentation was only one of many engaging activities SASE family [fam] were able to partake in.

**4.** **Learning Lean Six Sigma from a Naval Officer**  
Not only did the conference have numerous workshops to attend, but it also held a Lean Six Sigma White Belt Certification Training led by Chief Kelly Ringaman from the U.S. Navy. There is 1 packed room, no empty seats, 2 Navy representatives, and stacks of paper soon to be folded into hundreds of origami figures. Teams of no more than 10 are tasked to create units of origami figures while reducing waste and increasing efficiency with every round of production. Each team is given an initial amount of money and a set of instructions. Time starts to tick away and teams strategize. At the end of each round, money is removed based on the amount of paper waste made. On the other end, money is rewarded for each set of origami figures produced. The competitive activity makes individuals consciously aware of how waste diminishes time and financial resources.

Chief Kelly Ringaman, the instructor of the course, states that “the value of Lean Six Sigma is to eliminate waste, to lean out the process, to make things go smoother, to have a more accurate product for your customer...so that in the end your customer wants to stick with you. You want to make the customer happy.” When asked about the course and the SASE conference overall, she notes “It was awesome!”

**5.** **SASE Student Spotlight**  
After speaking with many SASE members from other universities, I am especially amazed at Georgia Tech environmental engineering first-year Alex Ip. More impressively, Ip is the founder of [www.thexylom.com](http://www.thexylom.com), “a site that connects scientists to people by inviting scientists to share their personal stories outside of research. I’ve [Ip] worked with researchers from 14 countries and regions around the world including early career researchers from MIT and UPenn and also a New York Times best selling author, a leading meteorologist in Hong Kong, back where I came from.” Passionate about writing and communicating ideas, specifically those STEM-related, Ip seeks to compile anecdotes from individuals of diverse backgrounds.

Ip mentions, “I realized pretty early on, that I love listening to stories and I love telling stories. So what I do is to try to bridge the perception of who scientists really are, and

how people perceive scientists. And I hope to bridge that by finding scientists that can share about something that is relatable. For example, indigenous rights, education, race relations...these are human issues that scientists and non-scientists face. We invite them to write their own stories and hope they share the unique voice of scientists that society should value and be appreciative of.”

Ip is very active and loves to get involved in STEM opportunities, which made SASE SERC a perfect opportunity for him to engage in. As a result of his continuous efforts to be active in the STEM community, Ip has received multiple prestigious recognitions. He emphasizes, “because of what I’m doing at The Xylom, I was elected to attend the Climate Reality Leadership Corps Training in March, which will be led by former U.S. Vice President and Nobel Prize Laureate Al Gore.” Moreover, Ip reveals his strong intrinsic motivation when he states, “How to engage people to make change means a lot to me and is my priority. We have done a lot of research. We have a lot of facts, but sometimes facts are not enough to change minds or change perceptions to spur action. My goal is to find a way to make that possible through different means and by collaborating with different stakeholders and institutions.” Visit his website: [www.thexylom.com](http://www.thexylom.com) and check out the Facebook page: [@thexylom](https://www.facebook.com/thexylom). Ip, a first-year, is one of many inspirational SASE fam members who attended the SASE Regional Conference. Making connections and learning from others’ stories is what conferences like SASE SERC is all about.



Lean Six Sigma White Belt SASE members. Photograph taken by Navy representative.

## 6.

### Should I go to the next SASE Conference?

Yes! Join the SASE fam! Join the Virginia Tech SASE Chapter and meet fellow SASE members!

We’ll let you know when the next regional conference is held. You’ll also have the opportunity to attend the SASE National Conference - this year it will be in Pittsburgh, Pennsylvania! Don’t miss out!

Kelly Mak, senior in Computer Engineering and President of SASE at Virginia Tech, emphasizes “SASE Nationals is definitely the ‘big thing,’ it has so many attendees, workshops, and of course the career fair. It honestly is such an amazing opportunity to talk to people from different schools and company reps! It’s such a casual setting so it’s so easy to talk to company reps, much less pressure than even an informal event like an info session. Regionals is Nationals on a smaller scale: still plenty of companies, but the focus is more on meeting more students and the workshops.”

Mak highlights that conferences are a “great way to get to know other SASE fam and learn smaller skills in a more intimate setting.” Moreover, Mak had the chance to catch up with old SASE friends she hasn’t seen in a while. Looking back on her wonderful SASE experiences, she reveals, “SASE has been an amazing influence on me. Honestly don’t think I’d end up where I am with such an amazing job lined up if it weren’t for SASE. This goes for the club itself, the officer positions I’ve held within the club, and the things I’ve learned at conferences such as Nationals or Regionals.”

To reiterate, it is very important to get involved with whatever you are passionate about. One of the ways to pursue your goals is to meet and get inspired from others. Take it from the title of the 2019 SASE Southeast Regional Conference and “IGNITE YOUR DREAMS”. Take initiative and sign up for the next conference!

If you’re interested in learning more about SASE, below are some useful links and valuable resources:

National SASE Website: <https://saseconnect.org/>

National SASE Facebook page: [@SASE](https://www.facebook.com/SASE)

Visit the VT SASE website: <http://www.sase.org.vt.edu/>

Like to the VT SASE Facebook page: [@saseatvt](https://www.facebook.com/saseatvt)



# Philosophy and Engineering

Article and Photo: Jin Tian Acton

At a first glance, Philosophy and Engineering seem to be at completely different ends of the educational spectrum. One might even go so far as to ask if there is anything in common between these two majors. Engineering focuses on mathematics and science, while Philosophy focuses on writing, reading, and speaking skills. However, not only do these two fields overlap, but according to Dr. Benjamin Jantzen, a Virginia Tech professor who works in both fields, “These things are deeply entwined; it’s not like I switch from one to the other. It’s just a set of skills that blend together to solve problems.”

Dr. Benjamin Jantzen holds an impressive number of degrees: B.S. in Physics, B.S. in Biology, M.S. in Physics, M.A. in Philosophy, and a PHD in Logic Computation and Methodology. Starting off in the sciences, Jantzen eventually moved towards Philosophy. While working on single-molecule biophysics, Jantzen became interested in various questions regarding his research that “didn’t count as science.” After working as a Physicist for the Navy, Jantzen decided to continue to pursue these questions from a different angle, applying to Philosophy of Science programs and then his PHD. Now as a distinguished Philosophy professor at Virginia Tech, he explains the usefulness of Physics and Philosophy together, “I’m constantly using philosophical tools of analysis and I’m simultaneously using mathematics that I picked up in those many years of graduate work in the sciences.” Jantzen went on to explain that many of those who showed an interest in Philosophy coming from an Engineering background were



often some of his most successful students.

While Dr. Jantzen may seem like an outlier, there are a number of students who show an interest in these two fields as well. Like Jantzen, many of those students started out in Engineering and came across Philosophy later. One student, Austin Harris, came in to Virginia Tech as an Engineering major, and has now added a Philosophy major and

plans to graduate in the spring of 2019. As president of a Philosophy club in high school, Harris decided to take an introductory Philosophy course with the esteemed and well loved professor, Dr. Joseph Pitt. After this, Harris began taking more Philosophy classes, and ended up adding Philosophy as a major. Another student, Elijah Gendron, a double major in Material Science Engineering and Physics, did not have previous experience in Philosophy coming to Virginia Tech, but was inspired by an introductory course that led him to take other similar courses what was the introductory course?. As it turns out, these two seemingly different fields have a lot of overlap and are deeply influential of each other. Kennan Murphy, a Computer Science major with a minor in Philosophy says, "I see this relationship as Philosophy providing a foundation of knowledge and determining reality so that projects in Engineering can be more efficient and better communicated between people of different perspectives." Combining these two fields can help individuals analyze problems in different perspectives. Philosophy has helped Austin Harris "figure out the why rather than just the how."

In some ways, Philosophy and Engineering are just two different ways of viewing the same problem.

Interested in trying out Philosophy after reading this? Dr. Jantzen's advice to engineers who are considering pursuing this area of study is to try and take classes that overlap into territory you are already familiar with, for example, taking a Philosophy of Science class. While this may seem difficult, Jantzen explains, "The barrier is opening yourself up to asking about some of the things you've presumed true for a long period of time. It's often the case as a product of education that engineering students aren't encouraged to question basic assumptions." If you would like to dip your toes into Philosophy, there is a workshop this summer at VT which will focus on both Philosophy and Physical Computing. Please email [bjantzen@vt.edu](mailto:bjantzen@vt.edu) if you are interested!

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# GIVING DAY 2019

Engineers' Forum donated \$1,000 for a College of Engineering Giving Day challenge. Congratulations to the Kevin T. Crofton Department of Aerospace and Ocean Engineering for winning the challenge and receiving the award!

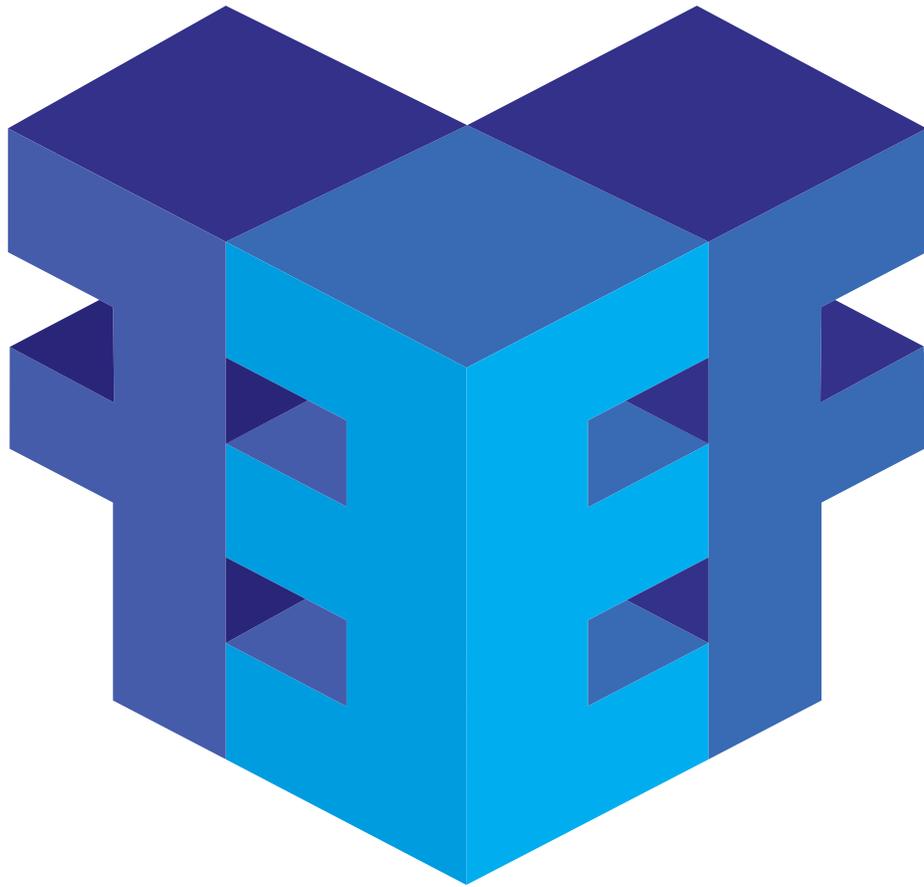


# Philosophy & Physical Computing, a graduate summer workshop

I'm pleased to announce the final iteration of a summer program for graduate students (and early career post-graduates) that will take place from June 10 to June 23, 2019 at Virginia Tech in Blacksburg, Virginia. Called "Philosophy & Physical Computing," the program is a two-week summer workshop aimed at providing philosophers, computer scientists, and experimental scientists with the technical skills and philosophical perspective necessary to collaborate with one another on problems of common interest, specifically problems concerning reliable inference from empirical data. The program is supported by the NSF and Virginia Tech, and will provide full room and board for participants. Space is limited and you must apply to participate. Full details and access to the electronic application system are available at <https://thinkandcode.lib.vt.edu/>



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