

COLORADO ENGINEER



**SPRING
2019:
THE
STARTUP
ISSUE**

PUBLISHING
SINCE 1904

SEE HOW
MECHANICAL
ENGINEERING
SENIOR TYLER
CAGLE IS
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Cover Photo by Elliot Whitehead
Photo by Elliot Whitehead
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The Startup Issue

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New Venture Challenge 11 Champions

PHOTO COURTESY OF GLENN ASAKAWA

The Stride Tech team, comprised of seniors Timothy Visos-Ely, Max Watrous, Humsini Acharya, Tom Saunders, and Andrew Plum, won the New Venture Challenge 11 Championship, winning a grand prize of \$100,000. "I haven't applied to any jobs with the intention of working full-time on Stride Tech after graduation," E Visos-Ely, the CEO of Stride Tech, said. "Winning the NVC was a huge relief because now I have the funding to really make this project a reality." The team's invention, Smart Step, will help seniors to detect and correct walker movements while also providing feedback to physicians to facilitate better treatment.



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THE STARTUP ISSUE

Engineering offers each of us a versatile skill set, giving us the mindset to solve whatever we put our minds to. All we need is an idea and the ability to follow through with it.

Dear readers,

We hope you've enjoyed our recent re-publications of magazine stories from issues dating in the 1900s. From these decades-old issues of the magazine, the Colorado Engineer staff has had the opportunity to witness firsthand the development of technology over the years and more definitively understand societal growth and advancements due to engineering. Since the 20th Century, the engineering field has advanced at an unprecedented rate. In many regards, what was once considered unfathomable five years ago is now considered a normality and is easily integrated into engineering projects today.

The roles of engineering positions have vastly expanded from their fundamental responsibilities. That is, a mechanical engineer today requires a far more versatile skill set than a mechanical engineer in the 1900s. Such is the case for all engineering disciplines. We've reached a time where the amount of tools we have available have both simplified and sped up the engineering process, and our capacity to learn more engineering applications has expanded as a result.

The engineering tools we have at our disposal today have presented an enhanced platform for innovation. Learning

new concepts and applications is easier with the resources available on the internet; the amount of tutorials we can follow has significantly increased; and the cost of necessary materials has become far more affordable for everyday use. Now more than ever, we are able to pursue entrepreneurial visions.

This issue focuses largely on the entrepreneurial mindsets that are present in our student body today. These students have been able to come up with and evolve new ideas as well as share their experiences of 'dipping their feet' into the unknown. We hope these stories serve as an additional reminder that an engineer has all the necessary materials to bring any new idea to fruition. In school, we are taught how to solve problems we haven't encountered before, and we are also exposed to the tools we can use to help solve these problems. The last pieces to the puzzle that each of us needs to evolve our current technology are a new idea as well as the ability to follow through with it.

With that said, we hope you enjoy this issue of the magazine, which covers entrepreneurial facets of engineering, various clubs students can become involved with, and student profiles that were inspiring to the staff.

Sincerely,

Gabe Rodriguez
Editor-in-Chief

MEET THE STAFF

Our CEM Mission

As staff of the Colorado Engineer, our mission is to inform and educate our readers and reflect pride in CU's College of Engineering & Applied Sciences world-wide. Our

student-led magazine seeks to provide a voice for CU's engineering students while also carrying on the 100-year CEM tradition: by students for students.



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The Colorado Engineer has been reporting on the "latest and greatest" from the engineering, science and technology community since 1904. We were there for the Model T, the jet engine, the IBM PC, the iPod – and we will continue to cover the future of human innovation. Today, we operate with a staff of 12 students and three advisers. We publish the magazine biannually, with a readership of over 8,000 individuals, reaching students at the university, researchers, professors and alumni. If you would like to join our staff or have questions and comments, email us at garo4938@colorado.edu. Alternatively, check out our website at <http://cem.colorado.edu>. We always enjoy hearing our readers' feedback!

STUDENT FEATURE: ANIT KOIRALA

Civil Engineering Senior Anit Koirala strives to become an engineer to serve underrepresented communities

AMY SANTOSO | PHOTOS COURTESY OF ANIT KOIRALA

A refugee camp is a temporary settlement for people forced to relocate due to violence and persecution. Anit Koirala was originally from one of these refugee camps in Jhapa, Nepal, until he migrated to the United States with his family in June 2012. Starting that Fall, Koirala attended Aurora Central High School as a junior. Koirala, now a senior in Civil Engineering, embarked on this long journey in the hope he would become an engineer and give back to his community. While he is now reaching this goal, he had to overcome many challenges during his immigration process.

"Adjusting in a new society and learning a new language was a challenge, not just for me and my family, but many other immigrants," Koirala said. However, Koirala wasn't alone in his adjustments, since Aurora Central was home to a diverse community with refugee immigrant students from all over the world.

"We were all learning a new language and trying to adjust in a new environment," Koirala said. "I took part in Speech and Debate and Mock Trial in high school, which helped to improve my speaking and communication skills significantly."

When considering his options for college,

Koirala knew he wanted to be an engineer so that he could serve people who have experienced similar living circumstances. He said it was his 'call to adventure'.

"Life in the refugee camp was not easy. It was filled with struggles and hardships, tears and fears. With no identity and permanent home, there was no future in the camp," Koirala said. "But I never lost hope. Waking up in the hut made up of bamboo and thatch every day, I realized my dream to become an engineer, [so I could] serve the poor communities around the world who are also living the life I lived. I am now on the journey to live this dream. I am striving to obtain a good education and become a good engineer and to serve faithfully."

As a first-generation immigrant student, Koirala felt that his freshman year was challenging since he felt lost and struggled academically. But he eventually found his place in the Student Academic Success Center (SASC), where he became a peer mentor, providing academic support and guidance to first-year students, as well as connecting students to campus resources.

"I found my community, resources and staff that are caring and supporting, I met students of different backgrounds who became my friends; I belonged there," Koirala said.

Paula Abita, Academic Program Coordinator for SASC and McNeill Academic program said of Koirala, "He was highly conscientious, committed and reliable ... Although Anit had a full plate, he made time to meet with his mentees, and serve as a volunteer at McNeill events for first-year students."

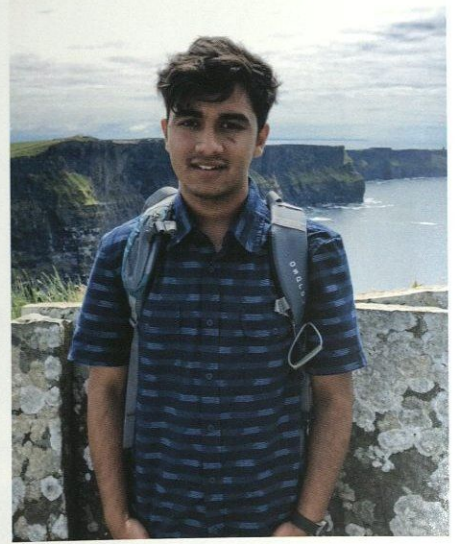
While in college, Koirala continued to give back to his community in Aurora. There, he worked as an interpreter to help Bhutanese refugee families and served as Community Navigator for RISE Colorado in the mission to bring educational equity and foster linguistic diversity in Aurora public schools. Koirala also volunteered at the African Community Center to help high school refugee students with the college application process.

Koirala is also part of the Engineering Leadership Program (ELP), where he contributed to a student-led team that has created an online hub of resources to help more undergraduates access research opportunities. The Engineering Leadership Gateway course provided him with the opportunity to gain a deeper understanding about leadership and communication.

"Anit is attuned to multiple perspectives ... He thinks in multiple dimensions," Angela Thieman Dino, faculty member of the ELP said. "The example set by Anit's team's leadership, initiative and resourcefulness is already transforming the culture of ELP."

As a Civil Engineer, Koirala's interests are in water treatment and global engineering, which suits his post-graduation goals to work on sustainability projects in Uganda and refugee camps. He already believes that engineering has fulfilled many of his goals to help those in need.

"I see it as a responsibility and opportunity to serve underrepresented communities around the world," Koirala said. "My culture taught me to have hope even when you have nothing and to give hope to others, to serve selflessly. I can use [my] engineering knowledge to live these wisdoms by faithfully serving others."



THE HERBST COLUMN

Yuval Harari's
Lessons for
21st Century
Engineers: A
Short Review
of *21 Lessons
for the 21st
Century*
(Penguin
Random
House, 2018)

PAUL DIDUCH |
HERBST TEACHING FACULTY

Yuval Harari's *21 Lessons for the 21st Century* is not a great book. All told, it is a decidedly mixed read. What Harari does well is to make some very useful points about our short term technological future, points that are especially helpful for students of applied science because, well, Harari is not an optimist. This may sound strange, but I think that for many who work closely with technology or even for those who are simply impressed by its power and utility, we are actually at risk of slipping into a kind of naïve optimism about technological progress; we tend to believe, in other words that, so long as we focus on our small part, things will work out in the end. Harari is valuable precisely because he challenges his reader to step away from this perspective. I think it is important that we follow his lead, even if it is uncomfortable, because it is an effective way to think clearly about the really big problems that we are likely to face in the next 30 – 50 years.

The main reason that Harari is not optimistic about our future is because he thinks that technology is on a development track that not only cannot

be contained by today's political controls, but is in fact undermining current social and governmental stability. To many of us, this claim might seem unbelievable given that liberal democracy—American democracy—has been the great home and source of so many pioneering technological advances. For many Americans, technology and democracy go hand in hand; they are the twin pillars of American greatness. But on Harari's view, this fellowship has unfortunately come to an end, a fact that will become increasingly clear in the next 10 – 20 years as developments in information technology and bio-technology grow apace.

To better frame the specific problem of tech disruption, Harari bids us to consider the following: Advances in both info-tech and bio-tech have already been substantial, but soon their confluence will prove tumultuous. While it is true that the new global information economy has helped to lift millions out of abject poverty, the same conditions have also given rise to the largest wealth and power gap in human history, with the richest 1 percent owning at least half of the world's wealth. The new money has been generated in no small part by the cultivation and control of information. Part

of the problem here, however, is that the same technologies and systems that sustain the information economy also weaken the governmental and social structures we need to ensure that the new technologies are put to good use. To illustrate Harari's point, let's look at the example of democracy: where liberal democracy needs the sustaining ideal of equality, technology often generates inequality; it exacerbates the wealth gap, and threatens the old jobs that were once pathways to middle-class stability. Where liberal democracy needs community, technology offers escape to virtual worlds and creates the illusion of connection. Where liberal democracy depends vitally on a knowledgeable electorate, technology helps the spread of misinformation, siloes good information, and fomenters partisan passions. Where liberal democracy relies on families to socialize future citizens, technology often encourages habits that make family life more difficult. Where liberal democracy believes in the free choice of the individual, technology seeks to hack human psychology, devising new means of extracting data, all to enhance consumer and political manipulation. And where liberal democracy seeks to protect individual freedoms, technology finds new ways to infiltrate and surveille the private sphere, including the regulation and control of free speech, one of liberal democracy's most important rights.

Harari's essential point here is to show the student of technology that she can no longer afford to trust that the current democratic order will supply the resources needed to (a) offer the best guiding regulation of future technological development; and (b), that she can no longer be certain the today's technologies are actually helping our liberal democracy operate at its best. Harari's conclusion, therefore, is that our most serious students of technology must begin to broaden their intellectual horizons. The disruptive powers of technology will only increase as our machines become more intelligent, a problem that will add to the already daunting complexity of staving off ecological collapse while managing things like nuclear and autonomous weapons systems. However much we might be tempted to push away Harari's uncomfortable conclusions, I think we can agree with him that there has never in human history been a greater need for good engineers who can also think beyond the limits of their discipline. The 21st century will belong to those STEM students who can also drink deeply from the humanities and social sciences: the student who can not only solve technical problems but who can clearly situate their efforts in broader social and political contexts—the student who understands, fundamentally, the nature of our collective risks, and who therefore realizes that technological and political development must be thought through together.



CU ALUMNUS SENTENCED 10 YEARS IN UAE PRISON

Freedom of Speech in the UAE

The UAE does not have democratically elected institutions. Citizens do not have the right to change their government or to form political parties.

It is not permitted to criticize the government, government officials, police or the royal families in any way.

Any attempt to form a union in public and protest against any issue, will be met with severe action.

GABI & NIKKI EDWARDS

On May 29, 2018, CU Alumni Ahmed Mansoor was sentenced to 10 years in prison. The State Security Chamber of the Federal Appeal Court in the United Arab Emirates convicted Mansoor of, "insulting the status and prestige of the UAE and its symbols, publish[ing] false information to damage [the] UAE's reputation abroad, and portray[ing] the UAE as a lawless land," according to Amnesty International.

Mansoor is a father of four, blogger, poet, and a distinguished defender of human rights. He is also an engineer with a love for literature. Through CU, Mansoor received his Bachelor's Degree in Electrical, Computer, & Energy Engineering and his Master's in Telecommunications. Shortly after graduation he became a pioneer in his field. He received multiple awards from the school for his activism.

Mansoor has been involved with human rights issues in the UAE since 2006, and continues to inform the international community of ongoing civil injustice there. Through social media and interviews with international media, he also speaks out more broadly on the injustices occurring throughout the Middle East and North Africa.

According to human rights organizations, the government of the UAE violates a number of fundamental human rights. There are reports of forced disappearances in the UAE, many foreign nationals and Emirati citizens have been abducted by

the UAE government and illegally detained and tortured in undisclosed locations. For Mansoor's efforts, he was awarded the Martin Ennals Award for Human Rights Defenders in 2015, which is a prestigious award presented by a Jury of 10 of the world's leading human rights non-governmental organizations (NGOs). According to Amnesty International, "he is a member of the advisory committee of the NGO Human Rights Watch's Middle East and North Africa Division, as well as the advisory board of the organization Gulf Centre for Human Rights (GCHR)." Due to his humanitarian work, UAE authorities have had Mansoor under surveillance since 2011. According to Vice News, "Mansoor has faced repeated intimidation, harassment, physical assault, and death threats from the UAE authorities and their supporters. The authorities had placed him under physical and electronic surveillance."

In March 2011, Ahmed Mansoor and 132 reputable figures signed a petition for political reform in the UAE. However, the petition aggravated UAE authorities and in April he and four other activists were imprisoned. Once he was released from jail in 2012 he was continuously threatened and harmed. "He was assaulted twice in September 2012 at Ajman University, where he had been studying law; the incident forced him to cease his legal studies. Amnesty International explained, "Ahmed Mansoor has been banned from traveling for a number of years. He was

Human Rights Activist and CU Alumni Ahmed Mansoor was sentenced to 10 years in United Arab Emirates prison for his social media posts about UAE government reform

prevented from traveling to Geneva, Switzerland, to attend the Martin Ennals Award for Human Rights Defenders' ceremony on [Oct. 6,] 2015, for which he was a finalist and the eventual winner. The UAE authorities had confiscated his passport when he was arrested in 2011 and have been refusing to return it." Implementing these prohibitive restrictions violates Mansoor's right under the international human rights law to freedom of movement. Additionally, his car was stolen in 2013, and he had \$140,000 stolen from his bank account. UAE authorities are inflicting unethically punitive measures on Mansoor for his peaceful human rights activism.

Like Mansoor, many human right advocates who have criticized authoritative figures in the UAE have been severely mistreated or subjected to unfair trial and imprisonment. Amnesty International has stated, "The authorities have arrested, detained, and prosecuted more than 100 activists, human rights defenders and other critics of the government, on broad and sweeping national security-related or cybercrime charges and in proceedings that fail to meet international fair trial standards."

Mansoor's release date is projected to be in May 2028, and the court has been ordered to place him under surveillance for three years following his release. Mansoor is currently being held in solitary confinement in the UAE and will remain there if there is no major action taken.

How CU is Getting Involved

In light of Mansoor's case and other compelling human rights cases, CU students continue to rally. Students Anuja Gore, Sama Kareem, and others have recently opened an Amnesty International CU chapter. This chapter serves to foster important student-driven events for causes that require international attention. In tandem with their work, the student body can effectively generate action and awareness in support of Ahmed Mansoor. Kareem and Gore expressed that their allegiance with Amnesty International is motivated by individuals like Mansoor who work tirelessly in favor of fundamental human rights. CEAS student government also has discussed producing a statement supporting the CU alumni.

Mansoor and his mission remind us of the necessity and incredible value of humanitarian projects that we, as students, have the chance to get involved in. His courage and commitment challenge us to give our fullest effort and appreciation to causes that we know are pertinent to the well-being and livelihood of the world. Mansoor, in the midst of doing his best and most impactful work, has been constantly harassed, interrogated, and thrown into the torment of solitary confinement and other inhumane living conditions. Mansoor, despite his ill treatment, solely desires to restore peace in his home country, but Amnesty International, his family, friends, and even many perfect strangers, are working tirelessly to ensure his immediate and unconditional release. Can we not also stand in solidarity with this man, a fellow Buff, who simply seeks peace?

Although Mansoor was prevented from attending the ceremony when he won the Martin Ennals Award for Human Rights Defenders', he wrote an acceptance speech. In that speech, after detailing the effects his work has on so many lives, he calmly states: "we are not enemies, we love our country, what we are doing is a humanistic and patriotic act, which is a key lever to establishing an environment of respect for human dignity and guarantee the right of people away from extremism and violence, [and instead] towards a healthy society."

To learn more about Mansoor's story, other human rights projects, or the individual's role in supporting Amnesty International, please visit [amnesty.org](https://www.amnesty.org).



Rachel Sharpe

Tyler Eden

STUDENTS & STARTUPS

The new podcast seeks to discuss entrepreneurial success stories of CU alumni

ANNA PYLE | PHOTOS COURTESY OF RACHEL SHARPE

The Innovation Action Team at CU, formed in 2017, serves as a group of role models in entrepreneurial and innovative efforts among the student body. Members strive to combine innovation and entrepreneurship to illuminate for students all the different resources on campus they might use. The organization is split into three sub-teams, the SEED funding team, the events team, and the podcast team, united by their seven core values:

- Demystify Entrepreneurship
- Connect the Dots
- Just Send It
- Be Comfortable with Being Uncomfortable
- Push the Envelope
- Take Chances
- Recognize the Value of the Journey

This semester, the Innovation Action Team introduced the “Students and Startups” podcast miniseries, which provides a platform for CU alumni to share their success stories about starting a new company. Through these podcasts, the team hopes to encourage others to take similar risks. “The whole reason for the podcast is to make it accessible to anyone and have students see themselves within these entrepreneurial minds,” Rachel Sharpe, senior in Engineering Plus, said.

Students and Startups is a 30- to 50-minute podcast that interviews current students and recent alumni who have founded companies. Listeners get to hear

about their experiences, what sparked the idea for a new company, and what drove them to success. They also get to hear about the pitfalls and setbacks entrepreneurs had to overcome in the business. The goal of the podcast is to give students answers to questions they would want to know and insight about how to get their own company started.

Guests on the program have included Jenna Palenksy from Specdrums and Fletcher Richman from BubbleIQ. Throughout the Spring semester, the team planned to produce eight more episodes, with podcasts interviewing the founders of Shinesty, Pastificio, and MergeLane Ventre Fund.

“My favorite podcast so far was the Fletcher Richman Interview,” Mechanical Engineering Senior Tyler Eden said. “The stories he told were incredible and his advice was invaluable—a perfect podcast for any students interested in jumping into the world of entrepreneurship. I also have a feeling that our NVC championship podcast will be one of my favorites too. Next week we will be interviewing teams during the NVC championships after their pitches. The field interview is a new style for us and I’m excited to see how it goes!”

Over the semester, the team experimented with different formats like one-on-ones, roundtables, and panels. All the recordings take place in the Williams Village Startup Hub where a producer from KGNU, a local radio station, provides all the equipment and edits the recordings so they can be aired.

The future is bright for Students and Startups and the team hopes to expand their audience in the next year. Since all the people interviewed on the program were formally CU students and their companies were made possible by the resources on campus, every student should be aware of these opportunities because they might find out they have the entrepreneurial spirit to launch a successful business too.

Podcasts to Listen to:

If you would like to listen to previous podcasts, they can be found at <https://soundcloud.com/cuengineering/sets/students-and-startups>.

Specdrums: Jenna Palenksy, PhD in Musicology and Ethnomusicology

Respect Your Mother Recycling: Kevin Emory, BA Evolutionary Biology and Ecology

BubbleIQ: Fletcher Richman, BA Electrical and Computer Engineering

BridgeUSA: Courtlyn Carpenter, BA and MA Environmental Engineering

Roundtable #1 with CU Boulder students Rachel Sharpe, Tyler Eden, and Cassie Culver

ENTREPRENEUR ESSENTIALS

ISRAEL MILES | PHOTO BY GABE RODRIGUEZ

Computer Science majors start a company from scratch in their fast-paced senior capstone class, Startup Essentials

Senior year in the school of engineering can be full of great risk and great reward. Many senior projects involve partnering with local companies to take academic knowledge and test it against the real world. For self motivated and ambitious students, the option to create a product from scratch can be especially rewarding. Students majoring in computer science through the college of engineering can learn the skills necessary to start a company through CSCI 4348: Startup Essentials.

"The entrepreneurial capstone project that I'm working on was an idea that I pitched to the class at the beginning of the semester of last year," Senior Computer Science Major Juan Vargas-Murillo said. "Everyone pitches their ideas and then everyone gets to rank the ideas from one to five, based on if the idea is plausible, if it's cool, and things like that. We're going to be participating in the new granted challenge, where there's a possibility of getting real money and continuing the project outside of class. Zach Nies is an instructor who also works with techstars, which is a startup accelerator. He said to come in with three or four ideas and share them with the class. Students give a quick elevator pitch and then people will decide whether or not they like the idea."

Students gain the benefit of mentorship from instructors who have extensive experience in the startup industry. Some of the instructors for the course at CU are also affiliated with TechStars, a startup accelerator founded in Boulder that has a combined market capitalization of over \$18.2 billion.

"Our idea basically combines Spotify Discover Weekly with a workout log like Strava or Fitbod. We're making it so that you aren't tied down to a static playlist on Spotify that says, 'Top 100 Workout Songs'. It's a way to dynamically generate playlists for a certain workout you're doing. And we're using a lot of research that has already been done, correlating the positive connection between music and exercise."

CSCI 4348 encourages students to think independently but also teaches critical business skills to compliment their past three years of technical classes. Students

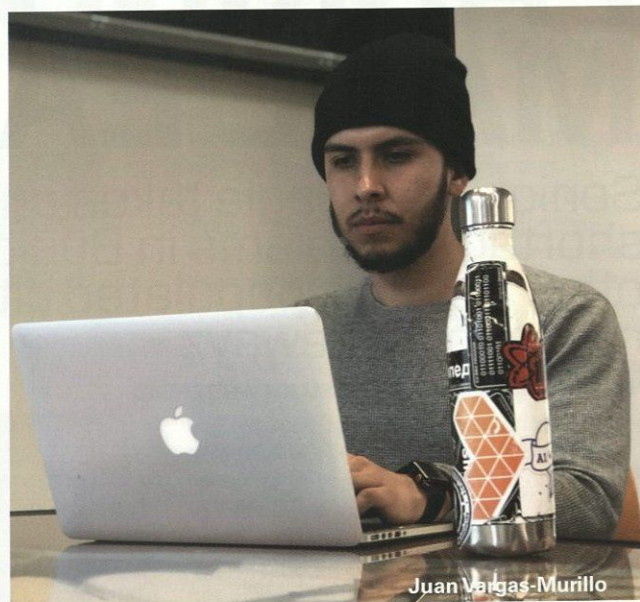
learn how to iterate on their own startup concept, and how to employ the Lean Startup methodology which teaches students to "get out of the building" and develop real customer relationships.

"There's a big startup entrepreneurship ecosystem in Boulder, and we want to take advantage of it," Murillo said. "There's a term that Zach likes a lot, which is to 'lean in'. It's an entrepreneurial phrase where you just have to put your foot through the door and initiate those conversations with the right people. Whether it's randomly stopping someone to do a customer interview to get another data point on validating your idea or seeking out the right technology, technical advisors help you understand how you're going to approach developing the product."

Students enrolled in the college of engineering take pride in being dynamic problem solvers. However, the entrepreneurial projects course demands more. Students are shown firsthand that finding a viable problem is just as important as coming up with a solution.

"I definitely thought it was just come in and build something and see if you can sell it," Murillo said. "That assumption was broken down on day one. The initial mindset of being in an engineering school and getting an engineering degree. You're taking courses where you are tested on finding the right solution for the specific problem. And in this way, Zach taught us that this is where that approach most of the time fails. Yeah, you can build something cool, but if no one wants to buy it then you just wasted your time. So instead it was focused on what type of problems do you want to solve and what are the types of questions you want to ask."

While the course does give students startup experience in a low-risk environment, there is the daunting reality



that the vast majority of startups fail. To counteract this deterrent, the class also makes sure that students are getting experience that will benefit them whether their project is able to gain venture funding or not. The class also has guest speakers that give students insight into what companies are really looking for.

"Starting your own company, you know, you hear that statistic, upwards of 90 percent of all startups fail within the first year," Murillo said. "So just from a risk assessment, you want to be developing skills that you can use to better your chances for employment. I think this class is doing exactly that, because it's basically giving you a sense of how companies work overall and how they're structured. We just had a guest speaker today talk about the skills that he sees recent grads lack when he interviews for them. Of course, if I could keep this idea going and make real money, that's the goal."

With Boulder continuing to develop into a startup hub, the entrepreneurial capstone is giving students a headstart in carving their own path. Computer science is at the forefront of the technology revolution of the 21st century. Students already majoring in Computer Science can apply to be accepted into the capstone during the spring semester of their junior year.



DRIVEWAYZ: PARKING MADE EASY

Senior Tyler Cagle takes on parking shortage problems in Boulder and other densely populated cities with his new app, Drivewayz

NIKKI EDWARDS | PHOTOS BY ELLIOT WHITEHEAD

When traveling to a densely populated city, one may find themselves driving row after row, street after street—in search of a parking spot. Whether it be a lack of parking structures, filling up the parking meter every hour, or dealing with unfair parking tickets, finding a parking spot is a continuous hassle. Mechanical Engineering Senior Tyler Cagle hopes to find a solution to this problem with the new app, Drivewayz.

Cagle created Drivewayz in 2018. After recognizing the insufficient parking spots in the Boulder area, Cagle and his team (Reese Barracks and Karina Micheli) designed an application that enables commuters to make use of alternative parking options, like other people's driveways. The user enters their desired location and Drivewayz shows the parking options within the selected area, and the user is able to reserve someone's driveway for a certain amount of time.

While commuters have a convenient place to park, homeowners are able to make a profit from their driveway. "Drivewayz is a shared marketplace that helps create public parking options around every corner: people's own driveways. Motorists now have the option to discover simple and affordable parking while monetizing empty driveways and creating a source of passive income for local homeowners," Cagle said.

Reese Barracks, co-founder of Drivewayz, contacted Cagle about this new business opportunity, when he came up

with the idea while working as a valet for Hotel Boulderado. "He realized that there are not many parking spaces and you have to drive by empty driveways all the time," Cagle said. By utilizing people's driveways, an abundance of new parking options opens up to the public.

Initially, Cagle was hesitant to take on Drivewayz—he wasn't sure if the project would be successful. "I then asked a few friends and coworkers about the idea and every one of them loved it," Cagle said. "I went to New York to visit a friend and realized that public parking in New York was extremely expensive and this business could help mitigate the stress that comes with parking in a busy city. I accepted Reese's offer right after."

After several iterations of the app's interface, Cagle released the team's minimum viable product to Apple's App Store. To establish hosts for the parking spaces, they reached out to homeowners near Folsom Field. "Our first marketing campaign to reach out to our beachhead market (fans at Folsom field) was to go door-to-door and sign people's driveways up to be rented during the [football] games," Cagle said. "We sold each of the spaces at a much lower cost than other parking in the area and sold out in under an hour."

Getting feedback and validation for Drivewayz motivated the team to keep pursuing their product. Cagle is finalizing the app before they conduct any further advertising. He listened to the customers' critiques and is building the app to be, "quick and seamless for the user."



Tyler Cagle

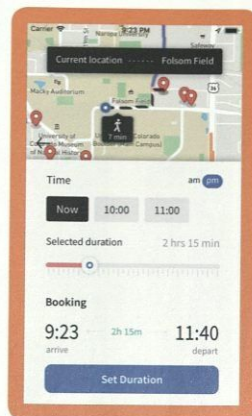
"We heard from users that they were spending about eight minutes on average to find a spot on our app. So we really focused on just reducing that time and I think we've got it down to less than a minute or two minutes max," Cagle said. Cagle and his team worked every day to have a fully functioning and aesthetically pleasing product before CU's New Venture Challenge.

CU's New Venture Challenge is an annual competition that gives entrepreneurs the chance to present their ideas in front of investors and the Boulder community. Through this challenge, Cagle has been able to collaborate with various mentors who have given even more feedback on how to effectively execute Drivewayz. These mentors have helped him and his team prepare for the challenge, making sure that the team is, "checking all our blind spots and making sure we're not missing anything," according to Cagle. Out of 35 teams, Drivewayz was one of the nine to move onto the New Venture Challenge 11 IT Track finals. Drivewayz then took second place in finals, winning \$2,500 towards funding for their company.

CU's New Venture Challenge has helped



Reese Barracks



Cagle and his team network and make many connections to develop Drivewayz. With these contacts, Cagle arranged a meeting with the President and CEO of the Boulder Chamber of Commerce, John Tayer, who manages the organization and 1,800 businesses in the Boulder community. Cagle pitched Drivewayz to Tayer, who was then on board to implement Drivewayz to better the parking situation on Pearl Street and Folsom Field. Cagle and his team are forming a partnership with Tayer and a few other chamber members to help with parking for large events. "We're trying to create overflow or supplemental parking for the city to take traffic off the street, rather than trying to compete with the city," Cagle said. This partnership has helped them gain more contacts, improve transportation in the Boulder Community, and bring awareness to the company.

In his efforts to promote Drivewayz, Cagle plans to continue the door-to-door salesman strategy. "Door-to-door salesman ship is the best form for small scale. We want to create relationships with people and tell them that our grand idea is to change the transportation industry. If we really emphasize that to them, that is the

best way to get hosts," Cagle said.

Once they have the hosts for the parking spots, Cagle wants to start using social media to advertise Drivewayz. "We're going to focus on Instagram for now and we are also doing geofencing. You send your advertisement to Google and those ads only show up if the person lives within the certain radius that we set," Cagle said. The radius will target the Boulder Community for now, but once they build enough revenue in Boulder, they are going to target cities with a large commuter populace.

After college Cagle and his team are going to travel to beachhead markets such as Portland, San Diego, and Pacific Beach to begin implementing Drivewayz. "We're planning a traveling schedule where we'll live for a month in each of the beachhead cities then move. Right now we're doing Boulder, we'll then go to Pacific Beach, then

move to Portland. We're trying to build a foundation in a few key cities and target the cities based on how large their commuter populace is." Once Cagle has the funding to expand Drivewayz, he wants to hire more salesmen to go door-to-door and computer scientists to start developing the Java side of Drivewayz. "Hiring a team for the IOS side and Java side will be huge because then we can implement all these new features that we've always been talking about, but haven't had the time to work on," Cagle said.

Cagle plans to finalize Drivewayz by April 3, which is the NVC championship. He wants the app to be as convenient and user-friendly as possible. "The end goal is to have someone use this like they would maps, but to get a parking space. We plan to have the user type in where they want to go and have the app be able to choose the closest spot, for the cheapest price, and be able to direct you straight to your parking spot," Cagle said. Cagle and his team want to have these features and more, but they need more staff to start making these ideas a reality. Cagle said, "I definitely want to get those ideas going. The sky's the limit with something like Drivewayz. There are so many cool avenues to take and I am hoping to hire a few more."

Cagle really wanted to be an engineer. He wanted to manage engineers, so he had to get the background first. When he taught himself how to code it opened so many opportunities and allowed him to learn how to operate a business. Cagle said, "I started with my original company and failed, but it opened up doors for another company. Having a little bit of prior business experience allowed me to teach myself how to code and how to do software." As they develop Drivewayz and look toward the future, Cagle wants to pursue Drivewayz full-time and be able to turn his ideas into reality. "I love to see something turn from just an idea or an initial concept to something that people can use and enjoy using," Cagle said. "My company is something that I am very proud of and I want it to succeed in every way that it can. We have a lot of exciting plans for the future and look forward to pursuing them."

"I love to see something turn from just an idea or an **initial concept** to something that people can use and enjoy using."

BOXING: THE ORIGINAL GREEK TRAINING REGIMEN FOR BODY & MIND

Professor Murray Cox leads a boxing freshman seminar to teach students discipline and time management

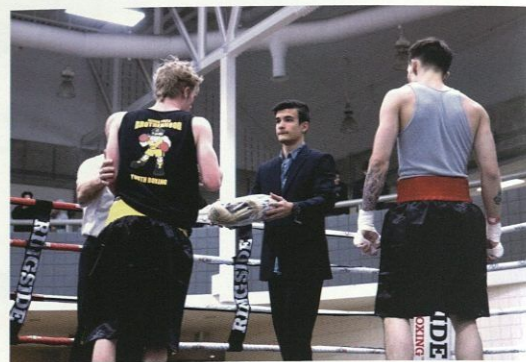
ISRAEL MILES | PHOTOS COURTESY OF ALECTUNG

The fall semester of Freshman year is often remembered as one replete with stimulus overload. I personally remember being overwhelmed by academic and athletic clubs, new friends, and the increased workload of college classes. Without proper scheduling, freshmen can struggle to eat regularly, exercise and even sleep, let alone do well in classes. But there is help: the first-year seminar titled Boxing: The Original Greek Mental and Fitness Program offers students the opportunity to learn the sport of amateur boxing in addition to teaching them discipline and time management to help them step up to the demands of college.

"The freshman seminars show

students how to adjust to college," Applied Mathematics Professor Murray Cox said. "What is the difference between high school and university level reasoning and expectations, and what tools do I need to succeed in college? The same tools you need to succeed in college are the ones you use in boxing."

Dr. Cox partnered with U.S. Olympic boxer Carrie Barry to offer students training in amateur boxing at Barry's gym, The Corner Boxing Club, located about 15 minutes from main campus. Barry is a 10 time national champion; she won the Pan American championship, Police Athletic League Nationals, the Golden Gloves; and, in her prime, she was ranked 5th in the world. Dr.



Cox, an amateur boxer himself, first became involved with the sport while he was a student in college, and he now organizes the freshman seminar to give students the mentality needed to succeed at university.

"The interval training, being on time, pushing yourself, time management, all of these things that we want you to teach for a first year seminar... well that's boxing," Dr. Cox said. "That's exactly what you learn when you step into the ring. It's going to be scary. You have to challenge yourself [but] it's self discipline really. It's what it comes down to—discipline."

I came to know Dr. Cox while he was teaching the Calculus II course I was taking through the Applied Math department. He came to know that I had a passion for martial arts, and one day during his office hours he offered me the position of teaching assistant for the freshman boxing seminar. I immediately said yes, and in the past two years, have had the privilege to see the seminar's positive impact on students.

"I thought it was just going to be a class where we learn about the history of boxing," Jon Guay, a sophomore Applied Mathematics major, who took the class in Fall 2017, said. "I had no idea we would actually be boxing. We would start with a class group training session and then you would go to technical boxing training. We did everything from jumping rope to foot work to hitting the heavy bags."

Over the duration of the course, students learned about the rules of boxing, the kinematics of the human body, and how to box themselves. They also learned the important and distinct difference between professional and amateur boxing.

"If I said I'm going skiing this weekend and I'm going to be wearing shorts, would you think I was crazy?" Dr. Cox asked by way of explaining the distinction. "Well, there's two kinds of skiing. There's water skiing and there's snow skiing. They're vastly different. They're both called skiing."



Professional boxing and amateur boxing are nothing alike, other than that you both wear boxing gloves. Amateur boxing is very short rounds. You're only allowed to go three rounds. It's all about points. Professional boxing is a business, and the whole idea of being a professional boxer is trying to drum up business. The pros will just mouth off saying I'm going to crush you, and then you watch movies about Rocky where their faces are all swollen up and bleeding and it's just not real. In amateur boxing, somebody might get a bloody lip or a bloody nose. That's rare in this day. There is almost never ever, ever a knockout in amateur boxing. It's like an elaborate game of tag. How many times can you touch and get a scoring point?"

"That's exactly what you learn when you step into the ring. It's going to be scary. You have to challenge yourself [but] it's self discipline really. It's what it comes down to—discipline."



To reiterate Cox's point, in The National Safety Council's list of sports and their injury rates, amateur boxing is ranked 23rd, safer than football, wrestling, soccer, and gymnastics. Furthermore, students in the freshman seminar class are in no way, shape, or form required to step into the ring. If students even desire to spar with other boxers, they must be registered with U.S.A. boxing and have Coach Barry's personal approval.

The boxing class has a final project titled the CU Quadrivium, named after the four pillars of the Greek education. Students plan and organize their own official boxing competition, or boxing bout, with up to dozens of local amateur boxers competing in the day of the event. There is extensive planning required, and students have to figure out some of the tasks themselves. For example, they must find a venue for the event, contact licensed doctors who are registered with U.S.A. boxing, contact judges and referees, advertise, and set up the ring. There have been two CU Quadriviums to date, with the last being held at the CU Rec Center in the Fall of 2018. Guay was able to compete in the first CU Quadrivium and recounts stepping into the ring for the first time.

"It was just crazy," Guay said. "The months before the bout I would have dreams about boxing in the ring. When you get in there, I can't even describe it. All of your thoughts—everything just leaves. The adrenaline rush and the chills when they ring the bell and introduce you. The walk out is sick, you feel so cool. And then after about a minute you're so tired. The only thought on your mind is that I am so tired and I want this to end."

The freshman seminar class also emphasizes famous historical figures and the reverence Greeks had for boxing. Famous boxers in history include John McCain, Dwight Eisenhower, and Theodore Roosevelt. Engineering students who are familiar with Pythagoras' Theorem should

note that Pythagoras himself was a boxer.

The Corner Boxing Club also promotes volunteering and community involvement for students. I was given the opportunity to tutor a high school student at the gym in physics in exchange for private boxing lessons. Students in the seminar are also able to boost their grades by volunteering at Barry's Parkinson's class on Saturday mornings. Not just that, but the Parkinson's class shows students that boxing isn't just for young athletic individuals, it helps people who are fighting for their very lives.

"Boxing is one of the only sports or physical activities that reduces symptoms with Parkinson's patients," Barry said. "We've actually seen people rewind the clock in the progression of the disease, which is amazing. You put on these big gloves, you make big movements, and I make you be really loud. You're interacting with other people, this type of outlet is really good for people affected by the disease or not."

The freshman boxing seminar doesn't just introduce students to the sport of amateur boxing—it gives students a sense of organization, self-discipline, and teaches how to be part of a community. More than 30% of college freshman dropout after their first year, and Guay states that the boxing class prevented him from taking a year off himself.

"I lived in Will Vill my first semester and I was not having a good time," Guay said. "I honestly attribute this boxing class and boxing in general to one of the reasons why I stayed in school. I was thinking about taking a gap semester to work because I was not having fun, and going to box every single night, that honestly kept me in it."

For students who want to get involved in boxing, The Corner Boxing Club offers a free intro to boxing class on Saturdays from 12 – 1 p.m. Hand wraps are provided, and all that is needed is athletic attire and running shoes. The Corner Boxing Club will also be hosting Founder Fights, which has raised over \$237,000 for local charities, at the Boulder Theater May 18 at 7 p.m.

GRANTED HANDS-ON EXPERIENCE

The Colorado Space Grant Consortium offers CU students the opportunity to develop skills for the workforce of tomorrow

SKYLAR EDWARDS | PHOTOS BY ELLIOT WHITEHEAD

Headquartered at CU Boulder is the Colorado Space Grant Consortium, an organization that provides students access to space through innovative courses, hands-on projects and interactive outreach programs. Students from a variety of majors interact and engage in an immersive skill-building curriculum.

In my own experience, Space Grant has provided me the opportunity to explore my passion for space exploration and research, while also gaining workforce skills. Space Grant provides a helpful foundation for any student that gets involved like Hanna Gailmanis and Joaquin Castillo, to grow as an engineer.

Gailmanis has been apart of the Space Grant Program since her freshman year and enjoys the hands-on experience it provides her. "It is one thing to learn about a concept in a class, but it is a completely different experience to actually utilize that concept to a real-world application," Gailmanis said. "My favorite thing about Space Grant is that everything we do is for the purpose of learning. Every project, every program, every day at Space Grant revolves around ensuring that the over 100 students involved learn something new."

Space Grant looks for highly motivated and enthusiastic students. The organization

hires students for projects once a semester through an online application. During the application process, students can see which projects are available that semester and can apply for one or multiple projects. From there, students are interviewed by Space Grant staff to see if they are a good fit for a project. Each project is student-led, typically with subteams and a project manager. Schedules are made for the benefit of each member. Some positions available require specific skills or experience but many positions only require the interest to learn and become engaged in a project. Within each team there are multiple subteams where students can tailor their skills to a certain area of work. Whether that skill be manufacturing, projects design, electrical systems, or research, there is always a part of the project a student can work on.

Currently, I am working on the Thwaites-Amundsen Regional Survey and Network Project. The TARSAN project team works in collaboration with Space Grant and the National Snow and Ice Data Center to help understand the regional processes driving surface and basal ice melt and to connect this ice melt with its impacts on ice-shelf stability and ground line retreat. The project provides a unique opportunity for students to experience firsthand how to carry out scientific field research in Antarctica using



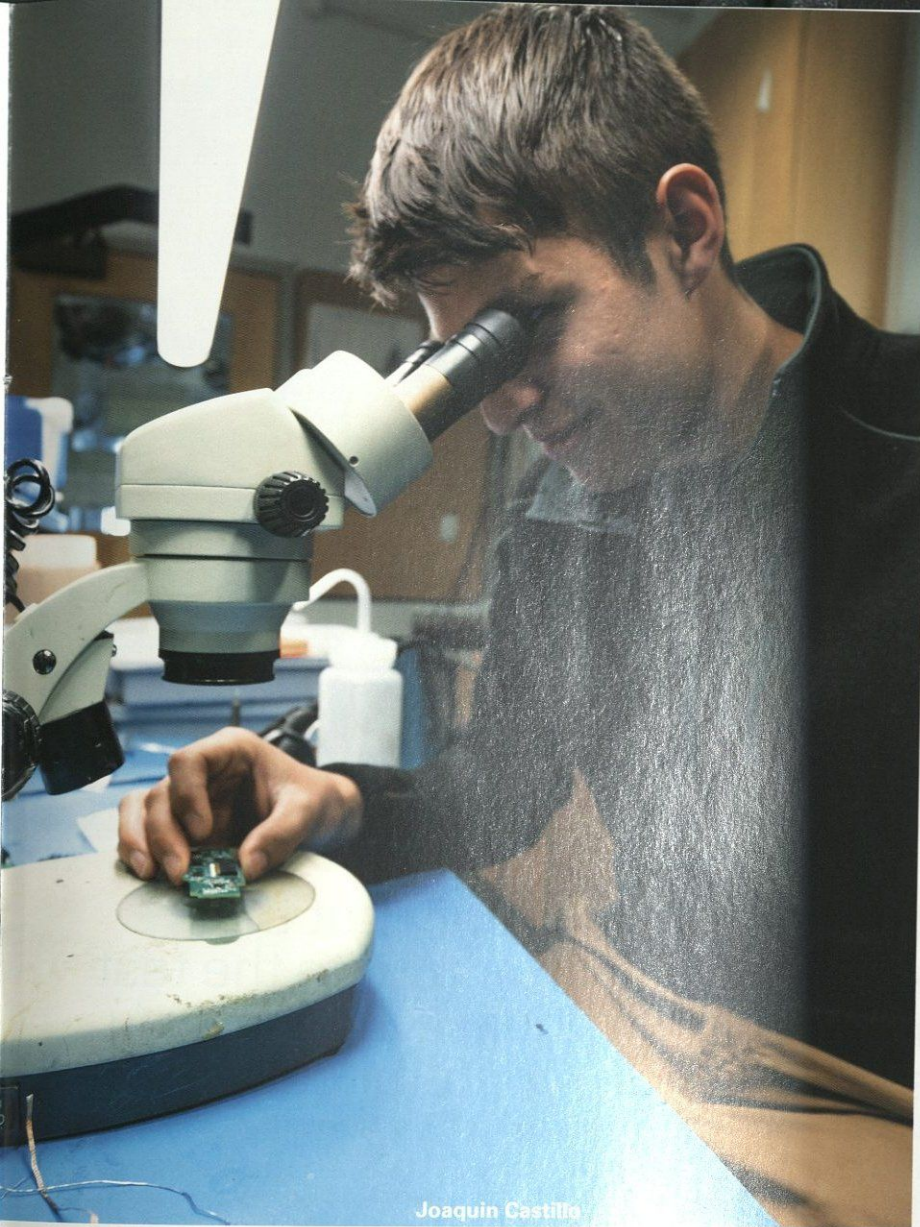
cutting-edge technologies with established scientists in an international setting. This year our team built a pressure vessel that can withstand more than 2000 psi. In addition, we calibrated a thermistor system and wrote a proposal for a battery turbine system. Working at Space Grant has helped me exceed my own expectations for what I thought I could accomplish over Freshman year - I have more skills and knowledge than I ever thought possible!

Castillo has been participating in Space Grant for three years, and last summer he was project manager for PolarCube. He managed about 20 students who worked on a device that can perform tropospheric temperature profiling in order to assist with weather models for severe weather conditions, such as storms and hurricanes. The PolarCube project was completed in mid-March and awaits its launch date later this year in the second ever launch of Virgin Orbit's new LauncherOne system.

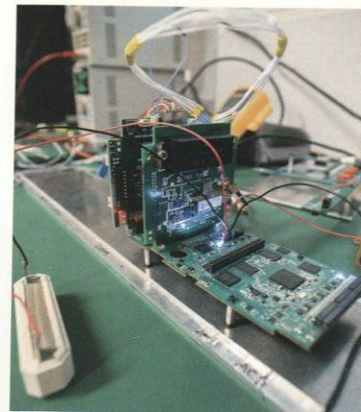
"Space Grant has provided me with invaluable opportunities to not only apply myself but challenge myself as well," Castillo said. "It is a space where I have been able to work alongside and learn from some truly incredible people who have helped shape my understanding and appreciation for engineering as a whole."

Castillo also worked on the PolarCube during both his freshman and sophomore years. As a freshman, he was the Structures Design Engineer. "My primary tasks were to reorganize the CAD file system, resolve any remaining issues with the satellite structure and mechanical systems, support any other teams needing testing fixtures or mock hardware, help finalize the mechanical design of the radiometer payload MiniRAD, oversee the manufacturing of nearly all the satellite's flight components (including creating drawings for many parts), and perform

"Every project at Space Grant revolves around ensuring that the 100+ students involved **learn something new.**"



Joaquin Castillo



the integration and assembly of all flight hardware," Castillo said.

Later on, he worked on designing a new vaned baffle for the star camera, which required metal powder additive manufacturing as well as a redesign for their deployable solar panel wings to have a high density packing of monocrystalline cells with a 2024 aluminum frame for added panel rigidity. "These were fun to make," Castillo said. "By the second semester of my sophomore year I also took on the role of Chief Systems Engineer, where I wrote plans for all the environmental tests for our flight unit to qualify us for launch. I also interfaced with our mission integrator and NASA to ensure our satellite was compliant with their requirements."

This semester, Gailmanis is the project

manager. "The Colorado Space Grant's Laboratory Lab Team is an interdisciplinary group of students who work on a variety of projects for Space Grant. The three main focuses of the Lab Team are creating workshop tutorials, designing and building the base for the Colorado Robotics Challenge, and the general upkeep of lab equipment at Space Grant," Gailmanis said.

Working at Space Grant personally challenged me to use my problem-solving skills to work individually and in team settings. Seeing students grow from their projects into the workforce has given me motivation to challenge myself and think creatively. It is not every day I get to see engineering and space in a whole new way with people who inspire and motivate me.

Students can look at the projects description on the Colorado Space Grant Consortium website. To apply, students should be on the lookout for when the applications opens typically at the beginning or end of each semester, students can then fill out the interest form on the website for a project of their interest.

To any student looking to improve their engineering capabilities, I highly encourage you to reach beyond and look to gain exposure into the field of engineering. The skills you are learning today can be very beneficial to project innovation. Being involved at Space Grant as a freshman has taught me so much about the field of engineering, so what is stopping you from reaching for the stars?

SHAKING IT UP WITH SEISMIC DESIGN TEAM



Lauren Kercheval Malia Sharp Michael Nietes

The Seismic Design Team put their latest balsa wood structure to the test at the annual Earthquake Engineering Research Institute conference

DAVID BALCELLS & MICHAEL NIETES | PHOTOS COURTESY OF SEISMIC DESIGN TEAM

Every year the Earthquake Engineering Research Institute (EERI) hosts a conference where members of industry, students, and faculty gather to learn about advancements in the research of Earthquake Engineering. These conferences center around the seismic design competition, where teams from different universities construct a balsa-wood structure and present it in front of a panel of engineers. The structures are then tested on a shake table to simulate different ground motions. This past March, the conference took place in Vancouver, British Columbia, where the CU Boulder EERI student chapter had the opportunity to compete in the seismic design competition.

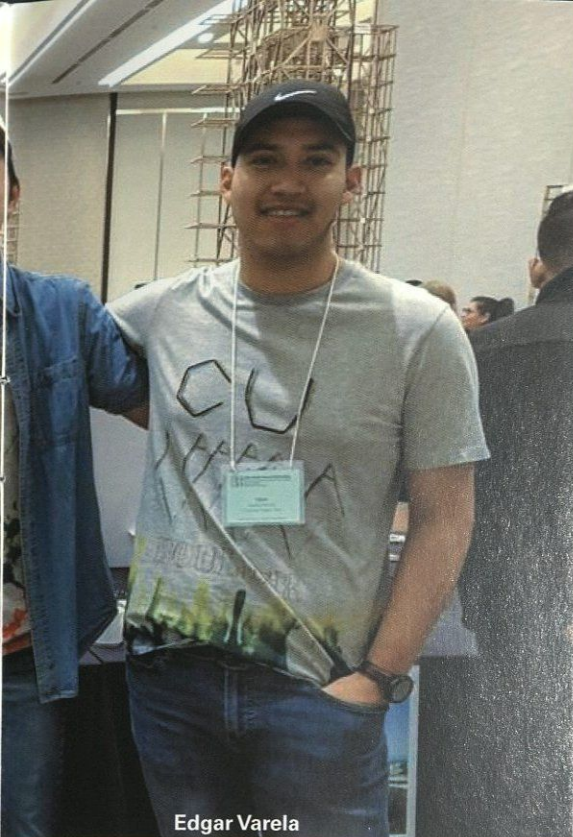
Preparation for the competition started in the Fall 2018 semester, when the team started formulating ideas for their structure. This year, the team got to design a building with a base floor plan in the shape of a "T," which presented several challenges since the floor plan was asymmetric and the team had no prior design for reference. Designing a structure that fit these specifications was no small task, especially because the team had just

lost most of their seniors the prior year.

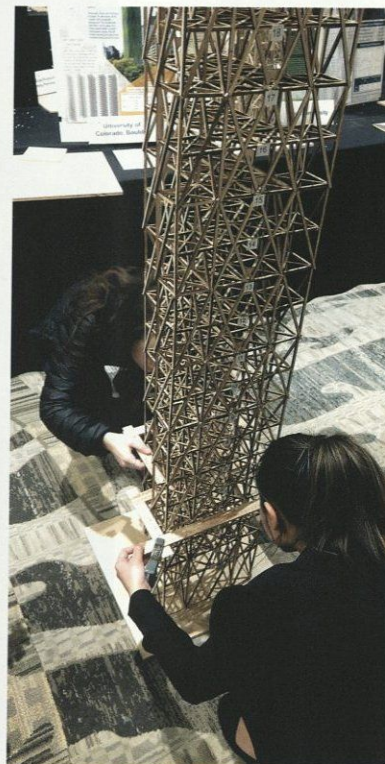
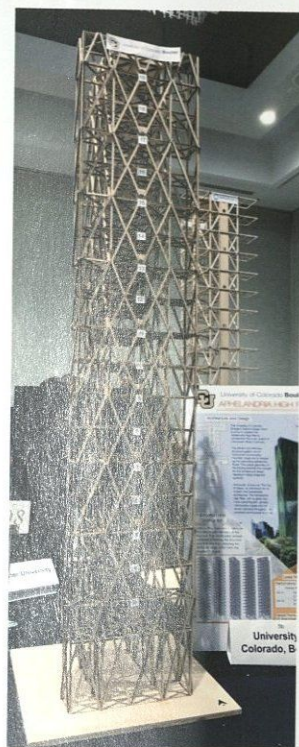
"The team got a lot smaller since all of last year's seniors graduated. This made it a great opportunity for me to get more involved, though, and those of us still around were hard working," returning member and Civil Engineering Junior Lauren Kerchval said. "For example, I got to write a lot of the proposal and practice technical writing this year, whereas I did not help too much with writing last year."

During the design process, several floor plans were drafted in AutoCAD and Revit, after which the construction process began. Columns, bracing, and other structural components were laser cut and assembled using super glue. As the structure was being built, other team members ran analyses on the structure to predict building accelerations and displacements using a program called SAP 2000.

This was by far the greatest challenge the team faced throughout the year since none of the members had any experience using the program. "I think the biggest challenges that we faced had to do with our understanding of the rules and specifications," Kercheval said. "Even with all of the help we did get, a lot of things we had to figure out on our own."



Edgar Varela



At the conference, Varela and Kercheval presented the structure, discussing the structural aspects of the building and the architectural pieces that complemented the building in front of a panel of engineers. "I had to get a major crash course on the design and structure of our building in order to prepare for the presentation," Kercheval said. "It definitely makes me want to be more involved in the design this coming year so that I will know all of the details behind the design decisions." After their presentation, the panel followed up with several questions to challenge the design of their building and the presenters were able to answer each question with confidence and poise.

The following day at the competition was shake day, where each team tested their building by placing it on a shake table and simulating two different ground motions. Since 38 schools were present at the conference, the team was able to observe many structures and take note of the various design aspects that worked well for other teams.

"Shake day is always one of the most fun days of the week," Kercheval said. "Although it is a competitive environment, everyone wants to see other teams succeed during shakes. There's a sense of camaraderie amongst all of us engineers as we hold our breath as a building begins to collapse and as we cheer when a building survives GM2. It's exciting to see if your design and hard work will make it through."

The team's building survived the first ground motion. Unfortunately, the building

"Although it is a competitive environment, everyone wants to see other teams succeed during shakes. There's a sense of camaraderie among all of us engineers as we hold our breath as a building begins to collapse and as we cheer when a building survives GM2."

was not able to withstand the seismic loading of the next ground motion, which ended up shearing the building right off of its baseplate. Miraculously, the building did not fall off the shake table. Instead, the building was able to stand tall and "dance" on the base plate to the amusement of other students and faculty in the crowd.

"Personally, I was super anxious going through the shakes," Kercheval said. "The first GM was relatively uneventful – it didn't even look like our structure budged. For the second though, I thought it was going to fall over, but it never did! I was hopeful that the judges would not consider it collapsed even though it completely sheared from the baseplate. I was not sure

what the rule was at the time, so I was excited to think that our structure survived. Even despite the actual results, I am incredibly proud of the work we did."

While the building was not a complete success, the team learned what it takes to design and construct a building that can withstand several ground motions. Equipped with more knowledge and more motivation to improve over the past year's performance, the team will look to find a new level of success when they travel to compete again in the beautiful city of San Diego.

Kercheval is excited to work towards the next competition. In reflecting the opportunities the Seismic Design Team has presented her, she said, "Having the opportunity to experience the competition with my peers is incredible. Not only is it a chance to get to know the members of the team and students from other schools, but there is always so much to learn. Other schools are so talented, so it's great to talk to them about their ideas and be inspired by their creative architecture. Being a member of the SDT constantly reminds me of my passion for structural engineering. I want to design a building one day that actually will withstand a megathrust earthquake – and this gives me the chance to try it out!"

STORIES FROM 1942



Bill Hanna

Feb. 7, 1922

May 31, 2013



The Colorado Engineer has been publishing since 1904. The prints within this spread are from the Spring 1942 issue to pay tribute to Bill Hanna, a former business manager for the Colorado Engineer. The Spring 1942 issue was one of the last issues Hanna was involved in before graduating from CU with his Electrical Engineering degree. Hanna was also a professor at CU for 46 years. The current CEM staff is deeply sorry to learn of his passing, and we would also like to thank the Hanna family for their contributions to the Colorado Engineer.

The Colorado Engineer

November, 1942

UNIVERSITY OF COLORADO

John Clark Condolences

Bill and Helen were friends of my father, Melvin Clark, both engineers and fellow grads of CU Boulder. I chastise myself for not keeping up with these dear folks. Both of these men contributed in several important ways to years of students at the University. One of the activities was the Colorado Engineer Magazine (CEM), a student-produced magazine that expanded the experience of the students' knowledge of their university and taught publishing skills. The CEM, through its Advisory Board critiques the efforts of the student staff and provides cash awards twice per year - proceeds from an endowment funded in part by the Hannas.

With honor and fond remembrance,

John R. Clark
PhD CEM Advisory Board

Women Engineers

With the coming of this war came a great draught on the engineers working in private industry. Although the colleges of the country will produce twelve thousand graduate engineers this coming year, only four thousand of them will be available for private industry. To combat this deficiency of labor, many of the large industries of the country began hiring "women engineers." Preference is given to those women who have had basic science training with mathematics and physics background. They have been set to work charting graphs, calibrating fine instruments, doing testing work, and figuring computations. In some companies they attend classes where they are taught the fundamentals of engineering and advanced mathematics. Shown in the cut is Catherine Hertha, an alumnus of Colorado University now working in the General Electric Laboratories.

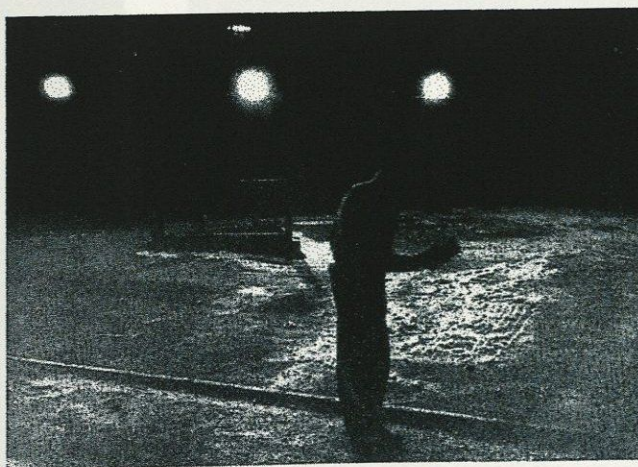
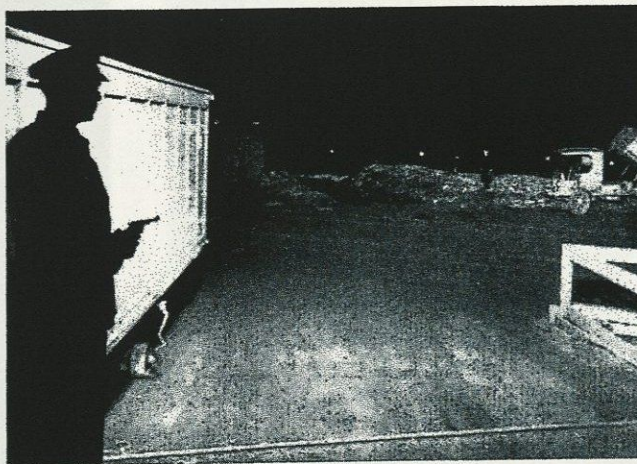
Cut Courtesy General Electric



Lighting in Reverse

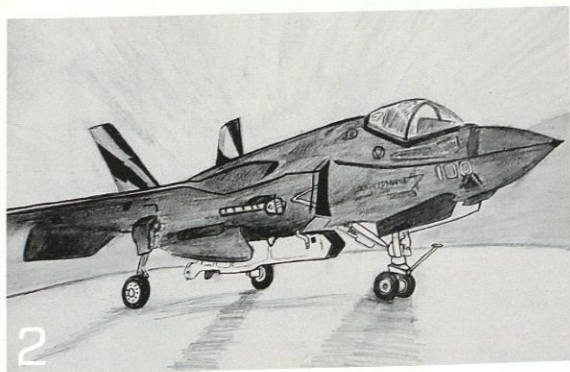
Glare, the anathema of lighting engineers, is now welcomed as an ally in the present defense against the saboteur. Lighting engineers are using it to blind a would-be intruder to a war-materials plant while the guards remain inconspicuous in the shadows, just as one at night can see clearly into a lighted room but cannot be readily seen by those inside. The luminaire design used in the scheme is old, the principle is simple. A lens that is in reality a miniature lighthouse beacon throws a flat, fan-shaped beam of light. A row of these luminaires is set on a post several feet away from the buildings to be protected and aimed so their light is projected slightly downward away from the buildings. The space between the luminaires and the building is virtually in darkness. A would-be intruder approaching the plant sees only these blinding spots of light; guards behind the lights see him clearly.

Cut Courtesy Westinghouse



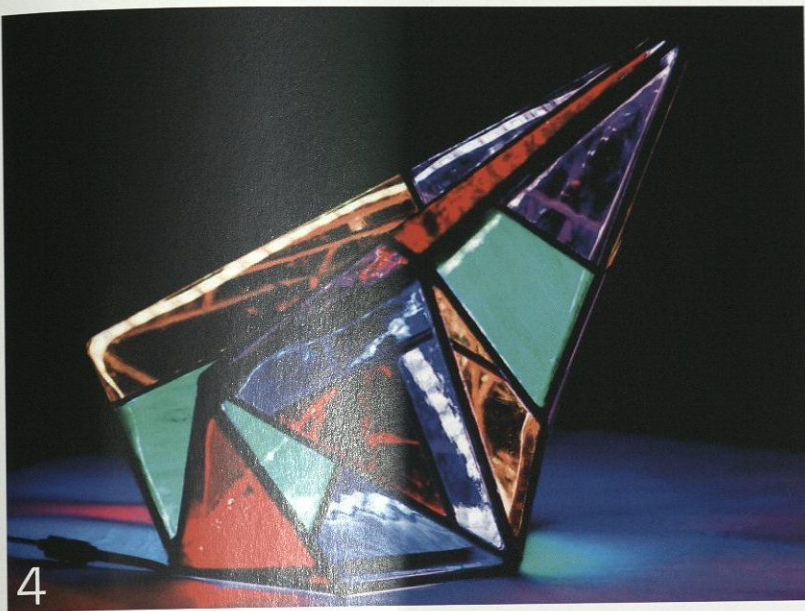
ARTISTS & ENGINEERS: ONE & THE SAME

Engineers are too often seen as students who only excel at math and sciences, but these engineering students defy the stereotype



3





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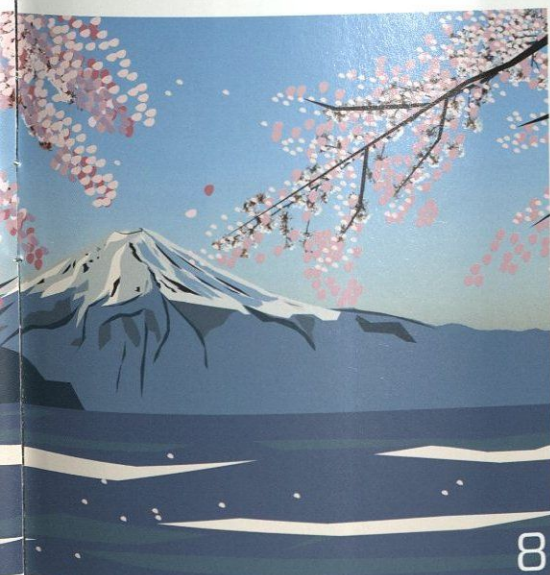
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6



7



8

1. Cora Bradley: Senior
Major: Chemical & Biological Engineering
Sunrise painting

2. Melanie Smith: Senior
Major: Aerospace Engineering
Plane Sketch

3. Chet Roe: Senior
Major: Mechanical Engineering
Medium: Woodworking
Telecaster Style Guitars

4 & 5. Sam Brown: Fourth Year
Major: Mechanical Engineering
Medium #4: Wood and steel brazed with brass
Medium #5: Stained glass and LEDs
Instagram: @sam11758

6. Gabe Rodriguez: Senior
Major: Mechanical Engineering
Morning Alpenglowl Portrait

7. Cora Bradley: Senior
Major: Chemical & Biological Engineering
Arctic Fox Sketch
Instagram: @chetroe

8. Megan Byers: Senior
Major: Computer Science
Mount Fuji Digital Art with mouse
Instagram: @meganbyers.jpeg

If you would like to submit your own artwork, please do so by sending it to garo4938@colorado.edu or anna.pyle@colorado.edu!



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