

Chemical Engineering \* Civil Engineering \* Electrical Engineering \* Mechanical Engineering



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**Benedictine College • School of Engineering** 

INGENIUM • Winter 2021

## **COVID on Campus**

By: Harshwardhan Anchan

Social distancing and masks have had a major impact on the social life on campus as well as academics. I myself have had mostly negative experiences with these changes, but none that seemed unfair or non-justified. For example, the requirement of masks in the classrooms makes sitting in classrooms for hours at a time uncomfortable at times, but I feel this is a fair alternative to strictly online classes. Max Palmer, another engineering student, feels similarly. He wishes that the rules were more lenient on fines "but understands that the school could be shut down by the county and so they have to follow certain parameters to prevent that". He brought up another concern about the uncertainty of some classes meeting and how it is inconvenient for people who prefer to plan ahead. The new guidelines are more difficult for people who are placed in guarantine as the online streaming format is new to many professors. The quarantined students may not have the same quality learning experience as they would in person.

The teaching of Benedictine College has also had to adjust to the new policies. Each and every professor had to modify their lesson plans over the summer and learn how to accommodate students in a distanced or online setting. Dr. Charles Sprouse, a professor of mechanical engineering, noted how he had to modify his teaching style to adhere to the new policies. He noted how he generally liked to move around the classroom and interact with students more, which was something that he now had to avoid in order to social distance. This relates to a growing concern that much of the staff had in regard to the accessibility to the students. One of the main pros of Benedictine College is its smaller size and as a result, better student to teacher interactions. COVID regulations are a detriment to this since now many professors have to limit their office hours and face-to-face interactions. However, Dr. Sprouse noted that he had not noticed a decrease in student performance. This may be due to the decrease in socialization as a result of the new regulations.

### Calling All Alums! Stay in Touch!

Hearing from our engineering alumni simply makes our day. Please consider checking in with us and sharing your success story or important events in your life. We'd love to hear from you!

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#### **Ingenium Editors**

Faculty: Steve Spencer Student: Anna Doyle



### **Rocket Club**

By: Marco Kouaty

In the fall of 2019, the BC Rocketry Club students determined to design, build, and test a high-power rocket launch system. A high-power rocket differs from a hobby model rocket in that its engine produces over 80 Newtons of average thrust or meets other similar thrust and weight criteria.<sup>1</sup> The team's goal was to build an operational solid-fuel rocket, modified from a kit, which could pass the National Association of Rocketry (NAR) Level 1 certification for high-powered rockets. The launch pad and electronics were solely designed and built by the team, shown below. The rocket itself, still being designed, was delayed in construction after the pandemic shut down the school in March 2020. Though the project was put on hold after the virus, renewed interest in the project has emerged since the return to campus for the Fall 2020 semester. a longtime model rocketry and space exploration enthusiast, I am looking forward to launch day.



## **Get Involved**

Want to be a part of the newsletter team or maybe you have a great story to share about the department? Perhaps, you're a recent graduate working for a great company and want to tell us about it? Contact either Professor Steve Spencer at

sspencer@benedictine.edu or Janis McGregor at jcmgregor@benedictine.edu to get your story published.

Thank you to our newsletter team (pictured right) who helped us write articles!





## **Student Projects**

### Mini Baja Carts

#### By: Anna Arensberg

In past years, Dr. O'Malley's Design Machinery class has designed and constructed a float for the Atchison Christmas parade for their final project. Due to the COVID-19 pandemic and the schedule change that sent students home at Thanksgiving, the class had to adapt. This year, the class is researching and designing a Mini Baja, a type of car built and raced in SAE's Baja competition each year. The competition gives students the opportunity to take what they have learned in the class-room and apply it to real world situations, accounting for factors such as durability, efficiency, and performance. For each of the seven main areas (steering, human interface, powertrain/ transmission, differential, front suspension, rear suspension, and brakes), a group of 3-4 students will research, design, and model the parts used.

The department continues this project in the Spring of 2021 semester with the Junior Design class, collaborating with the ASME club on campus to build the framework, and hopes to enter the Baja into the SAE competition the following year.

### **Student Paper Publications**

#### By: Anna Doyle

In the spring semester of 2020, Dr. Sprouse taught an elective class called Environmental Stewardship. The goal of the class was to prepare students to be good stewards of our environment through diverse readings, class discussions, and a research project. This research project resulted in a publication of a paper written by students, now graduated, Conrad Hoover '20, Olivia Obritsch '20, and Hannah Thomazin '20. Their paper can be found at <u>https://www.mdpi.com/2071-</u> <u>1050/12/18/7422</u>, titled, "Advancing Pervious Pavements through Nomenclature, Standards, and Holistic Green Design." There is another paper in the process of being submitted for publication, 'A critical survey of environmental content in US undergraduate mechanical engineering curricula,' written by senior students Anna Doyle, Grace Rembold, and Max Davy. This paper discusses the education of engineering students in regards to environmental awareness. Dr. Sprouse hopes to teach the class again, should more students show interest in the subject matter.

## **Student Projects**

### ASME

By Max Davy



Benedictine College's ASME (American Society of Mechanical Engineers) chapter has continued to be active despite an interrupted spring semester and ongoing Coronavirus restrictions. The semester kickoff meeting was held shortly after midterms, with new officers being elected and activities being planned for the remainder of the school year. The new officers are Connor Muehler, President; Isabel Cobb, Vice President; Marco Kouatly, Secretary; and Charles Sims, Treasurer. The chapter is currently planning a variety of projects and events that support its goal of providing support, engagement, and outreach opportunities for engineering students. The chapter hopes to sponsor several Discovery Day projects, including an entry in the SAE Baja competition and a remote-control aircraft. Further events are also being planned, including a shop cleanup day, a movie showing, and a career development day.



## Virtual Mock Interviews

### **Student Experiences**

By: Marco Kouatly

Given the exceptional difficulty of internshipseeking during a pandemic, I was excited when I discovered the Virtual Mock Interviews event offered by the BC Career Services. The event provided me the opportunity to have nearly half an hour of one-on -one time with engi-



neering companies' hiring personnel. The event was an excellent chance to meet the company, to put my name on their radar, and to receive feedback for my interview performance. After researching the fields of available companies and preparing questions for my interviewers, I booked interviews with JR Butler, Garmin, and Altec. Although everyone on the online platform maintained professional attire and attitude, the one-on-one interviews were comfortably conversational. The friendly, low-pressure atmosphere eased the process of discussing company interest, skills acquired during college, or diving deeper into items on my resume. Towards the conclusion of each conversation, the recruiter provided feedback on my performance during the call



and gave tips on how to improve for future interviews. Overall, the mock interviews were a solid step in my internship search during COVID-19. I am grateful to the Career Services office for hosting the interviews, and I am looking forward to future internshiphunting events. By: Diane Liebsch (Career Services Assistant)

It started as a discussion item between Megan Dougherty, past Director of Career Services, and Professor Steve Spencer during the summer. Once the idea was formed, virtual mock interviews became the alternative to table events helping engineering students find internships and job positions in the midst of a pandemic. As I stepped in to assist the Career Services office during Megan's maternity leave, I utilized all the resources in the office to make this event happen. Students submitted resumes and selected interview spots. A Zoom meeting space was created with a specific breakout room for each of the seven participating companies. As the event began, it was evident that the recruiters from the engineering firms were as nervous about the platform for the event as the 24 students were to interview. It was a pleasure to send students into their breakout rooms with good wishes, and for some, a few reminders to close a closet door in the background, unmute, or add a name to their screen.

The event was deemed a worthwhile use of time and gave our students a positive experience showcasing Benedictine College's Engineering Program. The feedback was positive, and the quality conversations that took place were richer than they would have been in the traditional career fair environment. Director of Career Services, Megan Dougherty, said, "I am so grateful for the students, recruiters, faculty, and Career Services staff that helped make this happen. I hope this event will continue to grow each year, helping students to make connections that will help them discern their career path and lead them to opportunities."

### **New Canoe Shed**



Over the summer, the new concrete canoe shed was finished. The purpose of this shed is for the ASCE concrete canoes to be built and stored. Last year, civil engineering professor Dr. Scott Newbolds worked with Benedictine Operations and they generously agreed to renovate an old shed located on campus for the civil engineering students. A concrete floor was poured, a drainage system was installed, and the electrical system was updated. The new shed is even insulated so that students can work comfortably in the shop during colder months. Before this new shed, the canoes were built in Professor Steve Spencer's own home shop and the canoes were stored in an operations facility. Construction on the new shed began last spring and was finished before

students returned in the fall. The civil engineering students are grateful to Benedictine College for this opportunity to build the concrete canoes on campus.

## **Sleep in Heavenly Peace**



By: Grace Rembold

September 26 was a typical Saturday of homework and sleeping in...except for about fifty students, who gathered in Westerman's engineering shop to volunteer their time. These students attended the semester build day for Benedictine College's chapter of Sleep In Heavenly Peace, a non-profit nationwide group dedicated to building, assembling, and delivering simple yet quality-made beds to children and families in need. Dr. Patrick O'Malley, associate professor of Mechanical Engineering, organizes the build and delivery days every year. This year, he provided enough materials for 38 beds, and over the course of three hours, 25 beds were completed thanks to the hard work of the volunteers and the direction of Dr. O'Malley.



Sleep in Heavenly Peace





### **Goodbye and Good Luck!**

Dr. Juan Carlos Araque announced he is leaving Benedictine College for a research position with the NASA Ames Research Center in Silicon Valley. The Ames Research Center performs world-class research, primarily in aeronautics. His new position applies computational chemistry to modeling batteries from the quantum to macro scales to improve their performance. Dr. Araque finds the goal-oriented nature of the science at the Ames Research Center to be stimulating. For example, his work on batteries has real-world applications in electric aircraft. These applications feedback real-world data for use in improving the models. Dr. Araque and his family will stay in the Atchison area for the next year as he works remotely.

Dr. Araque will miss his interactions with the students the most, but he gets one last stint in the classroom this spring, as he has graciously agreed to teach ENGR 3250 Thermodynamics one more time.

The search for a new ChE professor to replace Dr. Araque is currently underway.



## **Mission Trip Updates**

By: John Halberg

Preparations have begun for spring mission trips. The engineering department's 2021 mission will be to the Family Missions Company headquarters in Abbeville, Louisiana. The Family Missions Company is a quickly growing lay organization, with over 300 missionaries throughout the Americas and eastern Asia. The engineering department partnered with the FMC for the 2019 mission trip to Ecuador. This year, a team of BC engineering students will design an improvement for



the FMC campus in Louisiana. Over spring break, the team will go to Abbeville to implement their design. The team leader, sophomore MechE Marco Kouatly, is currently working with the FMC to determine the scope of the project. Possible projects include building a chapel or pavilion.

The engineering team will be joined by two more teams of BC missionaries. A homeless outreach team and the BC medical mission team will be working with FMC missionaries in Abbeville. All the BC student missionaries will be in Louisiana for a full week of ministry.

The mission trip is threatened by the COVID-19 pandemic, which caused the college to cancel spring break. The 2020 engineering mission trip, which had been scheduled to return to Ecuador, was canceled last year to prevent virus spread. Whether or not the trip can proceed, the engineers will certainly be ready.

## Endowment

#### By: James Nistler '16

"As each has received a gift, employ it for one another, as good stewards of God's varied grace." (1 Peter 4:10) In this spirit, the Engineering Mission Trips bring tremendous graces and blessings for participants and benefactors by embodying the mission to bring Christ to those in most need through our God-given talent of problem solving and receive Him in return. Thankfully, this mission does not have to end after graduation. In 2016, several engineering alumni who participated in the trips founded the Dr. Scott Newbolds Engineering Missions Endowment. The purpose is to supplement student fundraising to make future Engineering Mission Trips more accessible and to unify the prayers of the donors for the success of the trips.

The endowment has already reached almost \$35,000 through the generosity of alumni and benefactors. This is a good start toward the goal of \$120,000 to be self-sustaining and match student fundraising. Thank you to everyone who has participated in this effort! We invite you, whether you are an alumnus, a student, or just committed to our mission, to prayerfully consider donating and/or spreading the word about the mission trips and the endowment. You can donate directly to the fund through the Benedictine College giving website by specifying the Engineering Missions Endowment in the notes.

### **Summer Workers**



#### By: Anna Doyle

This past summer, the engineering department hired four summer workers to help prepare for the coming school year. From constructing a new shelf in the machine shop, to fixing and improving the water pump cart, the students were busy applying their engineering skills learned in the classroom to everyday life. The professors were grateful to

> have them on hand to help reorganize and set up for the labs taking place this year. Extra hands to help preparations were appreciated.



#### By Harshwardhand Anchan

The FE exam is the first of two exams required for a Professional Engineer license. This exam is a requirement to graduate Benedictine College with an engineering degree. With the comprehensive nature of the exam, adequate preparation is essential in order to pass the exam. Dr. Charles Sprouse, a mechanical engineering professor, recommended that students start a



study plan over the summer after their junior year and try to take the exam before the start of their senior year, since many of the design courses during that year don't cover much or any of the concepts on the FE. Dr. Scott Newbolds, a civil engineering professor, notes that most people start studying for the exam about a month in advance or over the summer as Dr. Sprouse recommended. As far as content goes, both professors highly recommended that students familiarize themselves with the 492-page reference manual that is provided during the test so that no time is wasted searching for equations and information. The end of the handbook also notes the different sections on the exam and the number of questions for each section. The Benedictine College Engineering department also has several practice tests and preparation books can be purchased that guide students through the content of the test. Finally, the NCEE website has information on the scoring, pass rates, and several exam preparation resources to help engineering students get ready for the test.





# INGENIUM

#### Benedictine College - School of Engineering Newsletter

*Ingenium* signifies intelligence, character, genius — all of which describe Benedictine College engineers. The use of the Latin language shows solidarity with the Church, whose official language is Latin, and with the scientific community, which for many years communicated primarily through Latin. *Ingenium* is a proud testament to our history and character as engineers and as members of the Benedictine College community.

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