ENGINEERING

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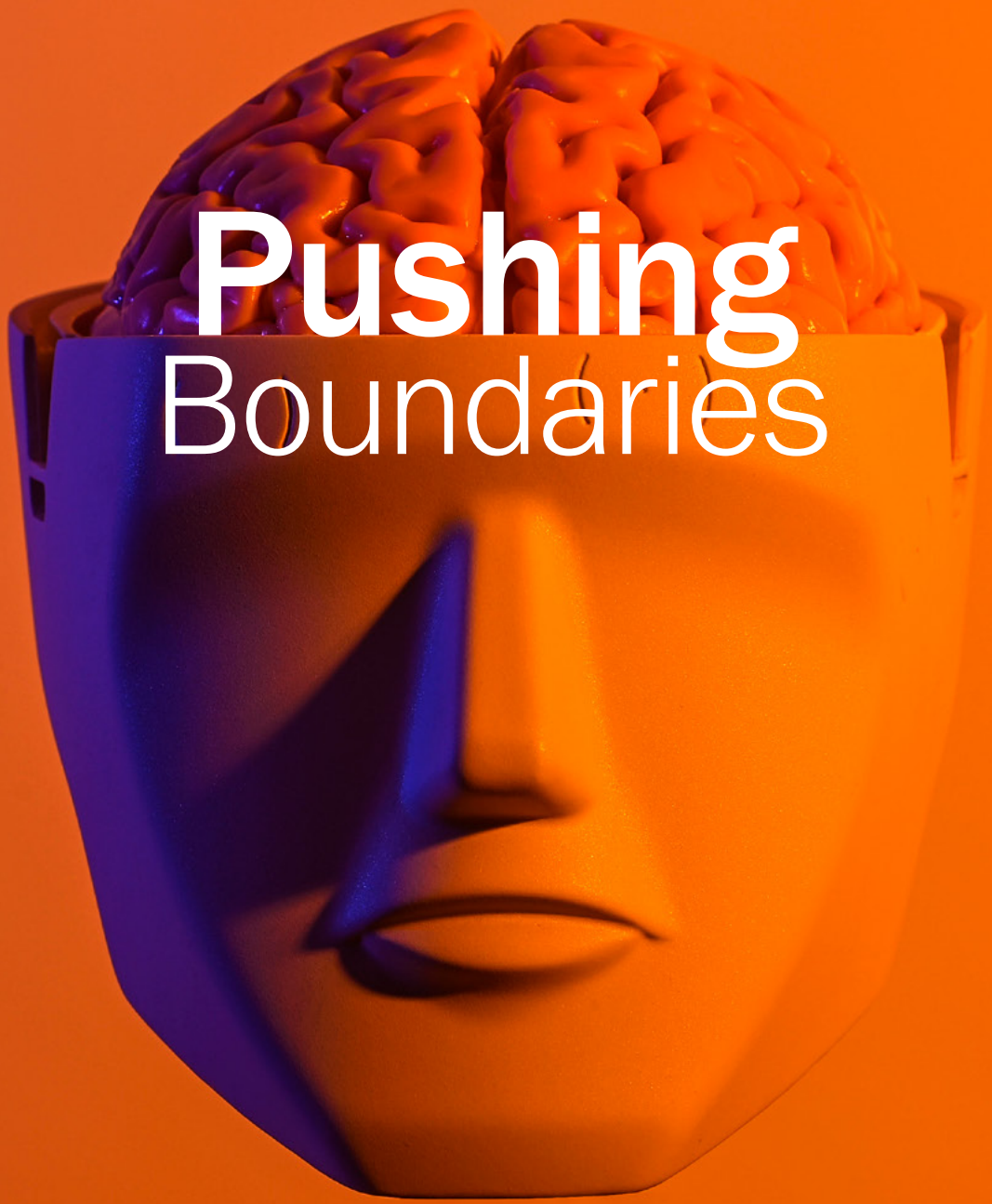
17 | SPRING 2023



Pushing Boundaries

DALHOUSIE UNIVERSITY | FACULTY OF ENGINEERING

ENGINEERING

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Dean's Message

Greetings to our engineering community. We are pleased to release the spring 2023 issue of our Engineering Magazine.

This year, you can really feel the energy and enthusiasm on Sexton Campus as we've watched our faculty re-bound to pre-pandemic norms.

With the roll out of our new strategic plan, our enrolment numbers have begun to increase and we are successfully reaching a generation of future engineers with a desire to positively improve our society. We've placed a strong focus on supporting these modern engineers and creating a learning environment that is responsive to their needs and interests.

Thanks to our donors and partners, we have the state-of-the-art facilities in place to inspire innovation. Now we're investing in new programs and faculty members who will continue to enhance student learning and advance our research capabilities in areas such as sustainability, wastewater treatment, and healthcare. The time to contribute is now. These investments will help position Dalhousie University amongst the top engineering schools in Canada.

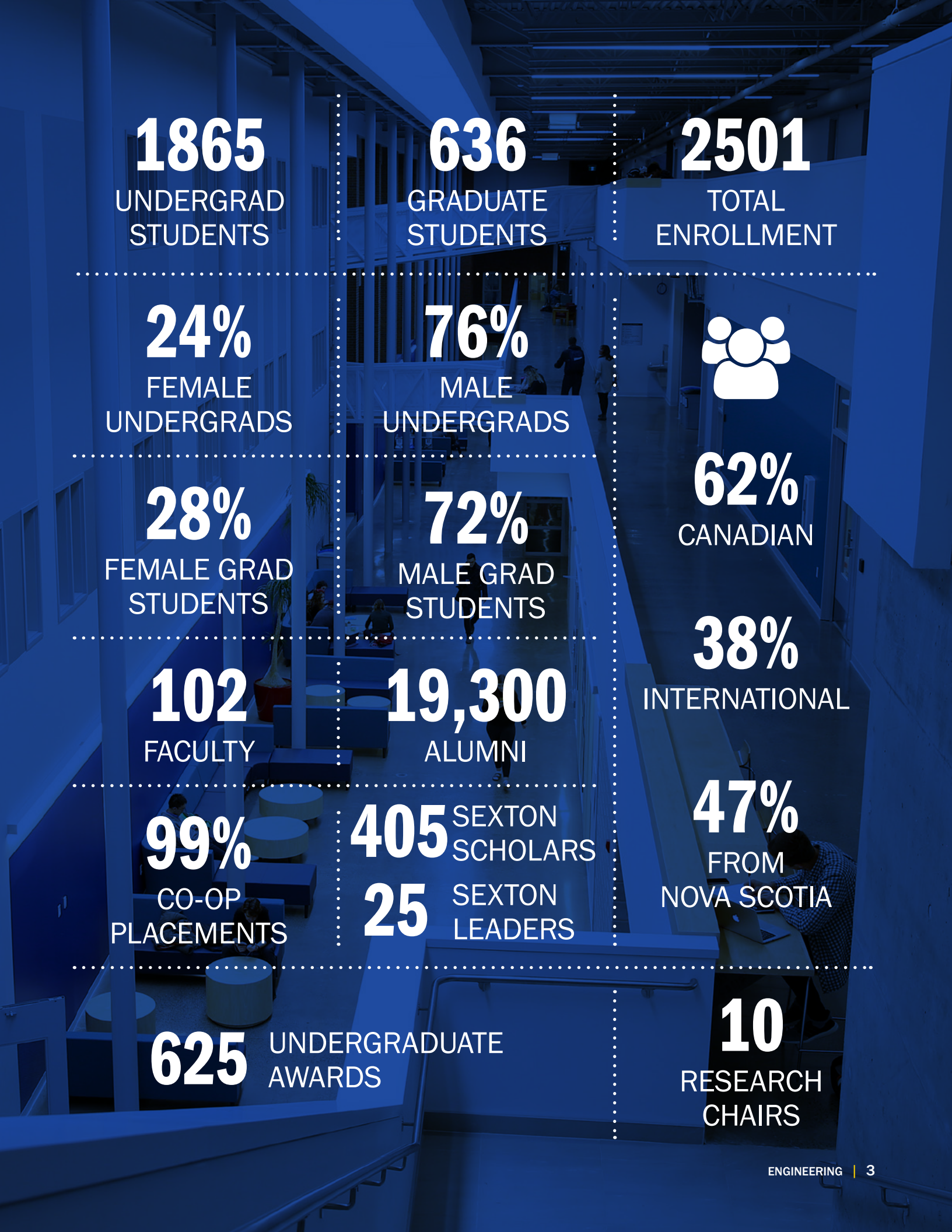
We are pushing the boundaries in engineering. Within our School of Biomedical Engineering, our students are participating in some of the most ground-breaking research across the country. These include new solutions for cancer care treatment and robotic assisted surgeries. Biomedical engineering is a field that has rapidly grown over the years. Within our faculty, we've seen a steady increase in the number of undergraduate students enrolled in our Certificate of Biomedical Engineering Program. The program provides students with an excellent opportunity to discover how engineering and medicine come together.

In this issue of our spring magazine, you'll learn more about our innovative research in biomedical engineering, and other advancing fields such as additive manufacturing. You'll also discover how the Emera ideaHUB continues to attract new founders and entrepreneurs through enhanced programming and relationships that have led to deeper integration with industry partners.

We hope you enjoy the 2023 issue of Engineering.

Sincerely,

Dr. John Newhook, P. Eng., FCAE
Dean, Faculty of Engineering



1865 UNDERGRAD STUDENTS

636 GRADUATE STUDENTS

2501 TOTAL ENROLLMENT

24% FEMALE UNDERGRADS

76% MALE UNDERGRADS

28% FEMALE GRAD STUDENTS

72% MALE GRAD STUDENTS

102 FACULTY

19,300 ALUMNI

99% CO-OP PLACEMENTS

405 SEXTON SCHOLARS

25 SEXTON LEADERS

625 UNDERGRADUATE AWARDS

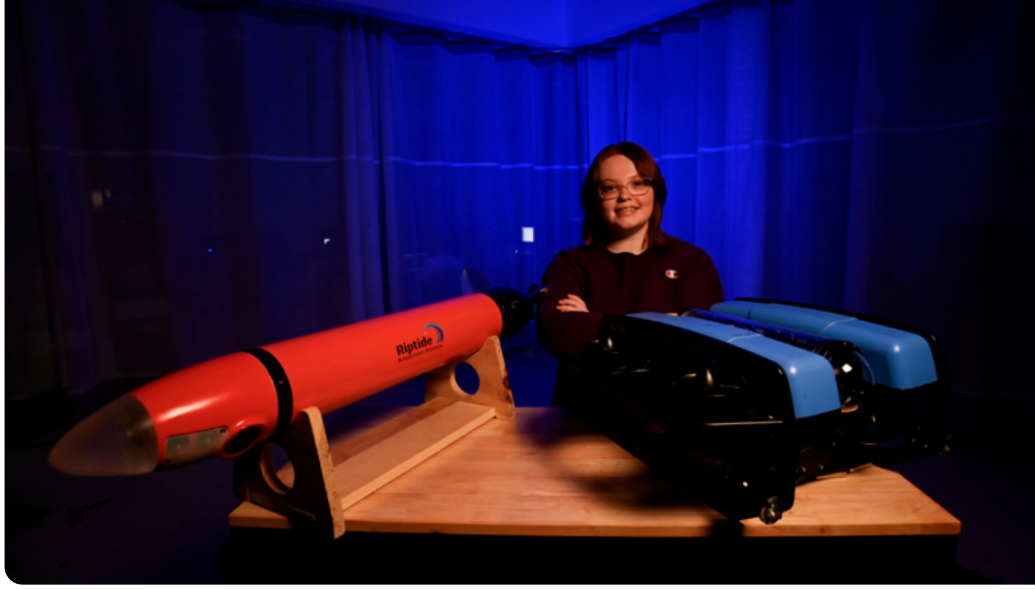
62% CANADIAN

38% INTERNATIONAL

47% FROM NOVA SCOTIA

10 RESEARCH CHAIRS

Designing the Next Generation of Leaders



It's a Sunday afternoon in February and 14 members of the Dalhousie Autonomous Underwater Vehicle student design team (DAT) are gathered in the Emera Idea Building on Sexton Campus.

They sit and chat amongst themselves. Most likely about the underwater robot they are currently building and plans to promote their new design team to engineering students on campus.

The group is gearing up to take part in the 2024 RoboSub Student Competition. It's an international event where student teams from around the world design and build robotic submarines, otherwise known as Autonomous Underwater Vehicles (AUV). These robots compete against one another in challenges designed to mimic the behaviours of real-world systems currently deployed around the world for underwater exploration.

This will be the first time DAT has taken part in the competition. It's also the first time its members have designed an autonomous underwater vehicle. They don't mind. It's all part of the challenge and excitement of being an engineering student at Dal.

"We felt like autonomous underwater vehicles provide an opportunity for students to engage with technologies in the marine field that are important to Dalhousie and important to Nova Scotia as a whole," says Kevin Schwarzer, a senior electrical and computer engineering student, and one of the founding members of the design team.

Over the past 12 months, Schwarzer and his teammates have been working to promote their design team to engineering students at Dal. They've also been working to secure project funding and sponsorships to help purchase materials to build their AUV. Recently, the team acquired International Submarine Engineering Ltd. as their first sponsor and industry partner. It was an exciting moment for the group who say they look forward to further connecting with Nova Scotia's robust marine technology sector.

"Everyone who joins the team gets to decide what they are interested in learning and how they would like to contribute."

— MARIA MACDONNELL

DAT is one of several design teams at Dal Engineering. These groups typically consist of multi-disciplinary students who work together to design and build innovative solutions to real-world problems. Students working on design team projects get the opportunity to participate in various roles including design, fundraising, communications, software development, and more. They also gain an exceptional amount of hands-on experience outside of the classroom.

This is exactly what appealed to 3rd year electrical engineering student Maria MacDonnell when she first heard about DAT.

"I wanted to take my learning experience beyond the classroom and apply my knowledge and skills in a collaborative, hands-on environment," she says. "When I joined the team, Kevin asked me what I was most interested in learning. He introduced the new members to the different subsystems of the design, and we all got the opportunity to choose what we wanted to do."

Schwarzer, who is graduating this spring, has stepped back from his duties with the team to give students such as MacDonnell and 3rd year mechanical engineering student Chloe Harper the opportunity to step into leadership roles.

In her new role as co-team lead, MacDonnell's first goal is to grow the team. While the group is primarily comprised of electrical and mechanical engineering students, MacDonnell would like to get engineering students from other disciplines and faculties at Dal involved with the project.

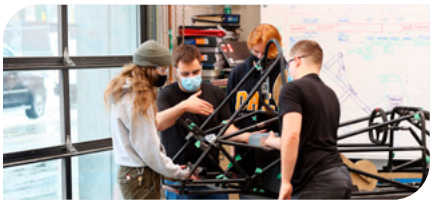
"Everyone who joins the team gets to decide what they are interested in learning and how they would like to contribute. This approach is empowering

for students because it provides us with the opportunity to explore our individual career interests, and apply our skills and knowledge to projects we are passionate about," she says.

The team has over a year to design and build their AUV. MacDonnell says their robot will be expected to perform certain exercises and tasks throughout the competition such as navigating on its own underwater.

"Our AUV will need to grab and manipulate objects, listen and respond to sonar pings, and use cameras to visually distinguish objects underwater. It will be performing all mission objectives autonomously without any assistance or manual control" she adds. "These requirements are what drive our team to explore creative solutions and work together to overcome the competition's challenges with our design."

Dalhousie's Formula SAE (DALFSAE)



Dalhousie's Formula Society of Automotive Engineers (FSAE) student team is also preparing for competition. The team is currently building the university's first electric-powered car thanks to a generous $70,000 sponsorship from Emera.

Their vehicle will compete at the Formula Student Collegiate Competition in Michigan this summer. Formula SAE is an interdisciplinary design and engineering challenge for university students across the world. Teams are tasked with building formula-styled race cars that test the vehicle's performance in areas such as acceleration, endurance, autocross and overall engineering design.

Dalhousie's Space Systems Lab (DSS)

Last Fall, the Dalhousie Space Systems Lab (DSS) launched a small satellite that they had designed and built into space. In 2018, several universities across the country received federal funding from the Canadian Space Agency to build nanosatellites and engage students in space exploration. Dal's satellite, named LORIS, was the first satellite in Atlantic Canada to ever go into orbit.

With the mission now complete, DSS is monitoring LORIS in space. Although small, it packs a significant amount of new technology which will be tested for the first time in a space environment.

DSS has now set its sights on a series of new projects, including the design and launch of a rocket.

Dalhousie Solar Race Team (DalSOL)

Dalhousie's first solar care powered vehicle has hit the road! The car drove its first 100m in February. The vehicle is being designed and built by the Dal Solar Car Team (DalSol). The multi-disciplinary group is primarily composed of undergraduate engineering students from mechanical and electrical engineering. Over the past year, the group has been fundraising to purchase the tools, parts and batteries required to build their solar car and compete at the 2023 Formula Sun Grand Prix (FSGP) in June. FSGP is a track style race that provides teams with the opportunity to test and compete off the open road. Right now, Dal's car can reverse, brake, and gear into parking.

Dalhousie Microtransat Autonomous Sailboat Team (DalMAST)

Next year Dalhousie's Microtransat Sailboat team (DalMAST) will ship their autonomous sailboat across the Atlantic Ocean. The project is part of the Microtransat Challenge, a transatlantic race designed for autonomous boats.

DalMAST's robotic sailboat measures 1.76 meters long, and is equipped with a number of sustainable features, including solar panels. It's also rugged enough to withstand harsh weather conditions at sea.

Driven by a group of student leaders from all engineering disciplines at Dal, the team is divided into four subgroups which include: Management, Electrical, Software and Mechanical.

DalMAST will deploy their sailboat off the coast of Cape Breton in the Fall of 2024.

THE FUTURE OF BIOMEDICAL ENGINEERING IS BRIGHT AND PROMISING.

Today, Biomedical Engineering field is one of the fastest-growing disciplines within engineering. In fact, due to an aging population, and an increased demand for medical technologies, the number of biomedical engineering jobs has increased by 72 per cent over the last ten years.

Biomedical engineers are in high demand because they bring the expertise of an engineer to the world of medicine and biology. They design the machines and devices that physicians use to save and improve lives. From health monitoring systems to diagnostic tools, surgical devices, artificial limbs and so much more, the field of biomedical engineering is a hotbed of innovations.

Within Dalhousie's Faculty of Engineering you'll find the School of Biomedical Engineering. Programs include opportunities to study at the MASc and PhD level. Dalhousie also offers the opportunity for undergraduate engineering students to combine their degree with a Certificate in Biomedical Engineering. The certificate is open to 3rd year students in Chemical engineering, Electrical & Computer engineering, Industrial engineering and Mechanical engineering.

Students in the certificate program have the chance to explore and better understand the world of biomedical engineering through a well-rounded set of courses that include human anatomy, human physiology, biomechanics, design, and the opportunity to complete a Capstone Project in Biomedical Engineering.

It also gives engineering students the opportunity to participate in some of the most ground-breaking research in Canada.

CURING AN INCURABLE CANCER

In Canada, 27 people are diagnosed with brain tumours each day, and an estimated 50,000 Canadians are currently living with the devastating condition.

These cancers affect both children and adults, and often have low survival rates. Aggressive treatment options are available such as surgery, radiation and chemotherapy, however, current standards of care have failed to advance in decades.

This is partly because the brain is a critical organ and poses unique barriers for physicians and surgeons. This includes difficulty accessing the tumours during surgery and difficulty efficiently removing the tumour mass without compromising healthy tissues.

Over the past decade however, researchers and students from Dalhousie's School of Biomedical Engineering have been pushing the boundaries in brain cancer treatment. Led by Dr. Jeremy Brown, the team has designed the world's first high-resolution endoscopic surgical and imaging probe. It uses an ultrafast imaging platform to allow surgeons to see brain tumours with ten times the resolution of conventional imaging such as MRI and CT scans. The 3mm-by-3mm device is inserted through a small keyhole created in the skull and allows surgeons to follow an exact path to the tumour so that it can be surgically removed.

While the probe itself is already a first of its kind, Brown is now working on a secondary feature for the device; a therapeutic tool that will non-invasively vaporize cancerous tissues with high-intensity sound waves.

"You'll be able to image and treat tumours at the same time. This is ground-breaking research," he says. "These brain tumours are universally fatal, so the question now is, can we cure an incurable cancer?"

Brown, who is an associate professor in the School of Biomedical Engineering and the Department of Electrical and Computer Engineering, was inspired to create the device after his PhD supervisor was diagnosed with a brain tumour over

ten years ago.

"My PhD. Supervisor, Dr. Geoff Lockwood, was diagnosed with a glioblastoma brain tumour and given just 1-2 years to live following surgery," says Brown. "When he told me that his cancer was terminal, I couldn't believe that there was nothing that could be done. As a result, I started to look into this particular pathology more and more to see what improvements in treatment and patient survival could be made."

Today, Brown and his group of graduate and undergraduate students have begun conducting tests with the therapeutic probe. The device uses sound to induce bubbles in tumors that mechanically rip cancer cells into small fragments. It also offers a much greater level of precision and effectiveness than other forms of treatment such as radiation therapy.

Brown is also collaborating with immunotherapy professors at Dal to look at how the body's immune system could respond to this new form of ultrasound ablation.

"When tumours are disrupted, they release antigens that trigger an immune response, so the next step it to ablate some of these tumours and then combine it with immunotherapy," he says. "There is have been several preclinical studies and one clinical study for liver cancer by groups outside of Dal that have demonstrated the positive immune response from this new therapeutic technology. After ablating primary liver tumours, all of the other secondary liver tumours shrank because it stimulated the immune system."

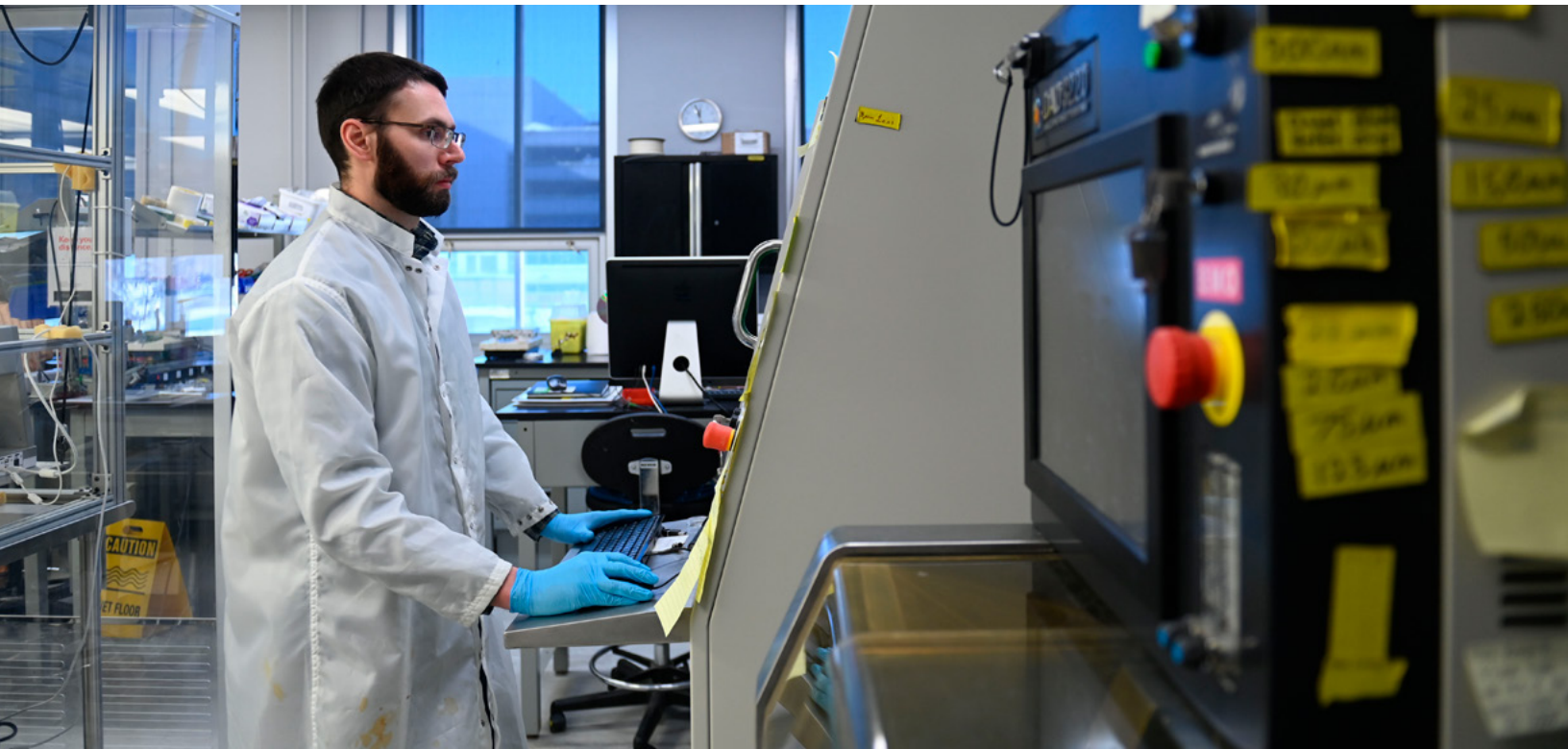
Over the past year, students enrolled in the School's Certificate of Biomedical Engineering program have been working on a variety of applications to improve the efficacy of the device. This includes developing new micro-fabrication processes to build ultrasonic imaging and therapy devices.

"Undergraduate student groups have worked on developing new electronic hardware for the imaging and therapy system and the odd group would work on developing software for the imaging probes," says Brown. "I have had really stellar students from Electrical and Computer Engineering and most of my graduate students are recruited from this program."

Brown says students working on the research project benefit from the

school's unique multidisciplinary training environment, which he adds is viewed as an enormous asset by industrial and academic recruiters.

"All these skills are highly sought-after in growing sectors of the economy such as the semiconductor and med-tech industries," he says. "Most previous graduates from my lab have gone on to work in fast-growing start-ups developing new biomedical devices."



From One Groundbreaking Device to the Next

Nearby, students in Dr. Robert Adamson's lab are also contributing to cutting-edge research using an emerging imaging technology called optical coherence tomography (OCT).

Adamson's group has pioneered the use of OCT to obtain high resolution images of the middle ear. While middle ear problems are common, they are often difficult to diagnose because current imaging tools don't allow physicians to see past the eardrum. Often conditions such as conductive hearing loss are not properly diagnosed until patients are in the operating room, and surgeons have cut and lifted the eardrum out of the way.

Adamson, a Professor in the School of Biomedical Engineering and the Department of Electrical and Computer Engineering, has been developing OCT for the middle ear over the past decade. He says the technology can see through the eardrum to produce high resolution images of the ear using safe, non-ionizing light. The device also provides physicians with the ability to measure the vibrations of middle ear structures caused by sound. This lets doctors identify problems that block sound from getting into the inner ear and cause hearing loss.

"In comparison to cancer, heart disease and other problems that can lead to death, hearing loss is often overlooked by biomedical engineers, but it can have a huge impact on quality of life," says Adamson. "We want to make sure that ear surgeons have the diagnostic imaging tools they need to make good decisions about treatments that can improve patients' lives."

"Right now, doctors can look at the eardrum with a microscope, but they can't see through it into the middle ear. Imaging technologies like CT and MRI are used,

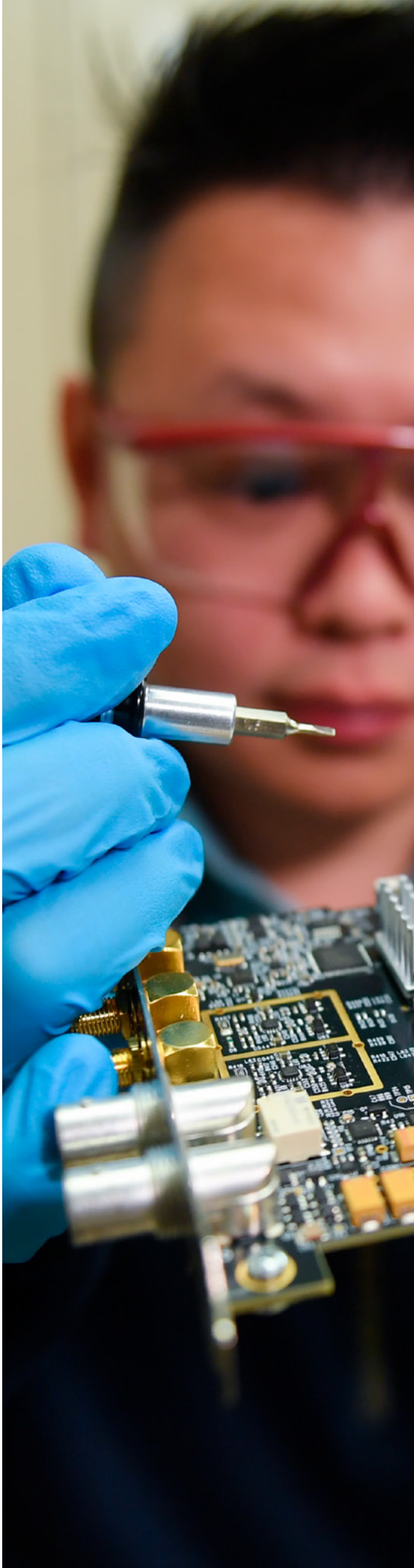
but their low resolution makes it difficult to see the tiny structures in the middle ear and CT exposes patients to substantial radiation. We want to provide doctors with a tool that they can use in their clinic, safely that gives them a preview of what they'll find in surgery."

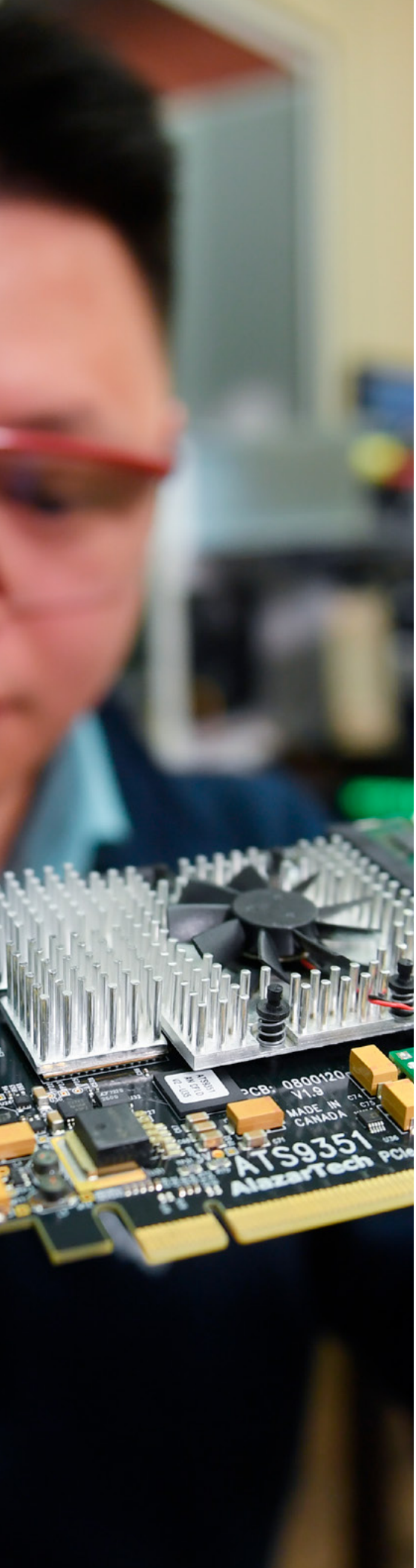
Adamson and his team are now exploring how OCT can be used to diagnose a variety of different middle ear diseases to help ear surgeons better plan surgeries and counsel patients.

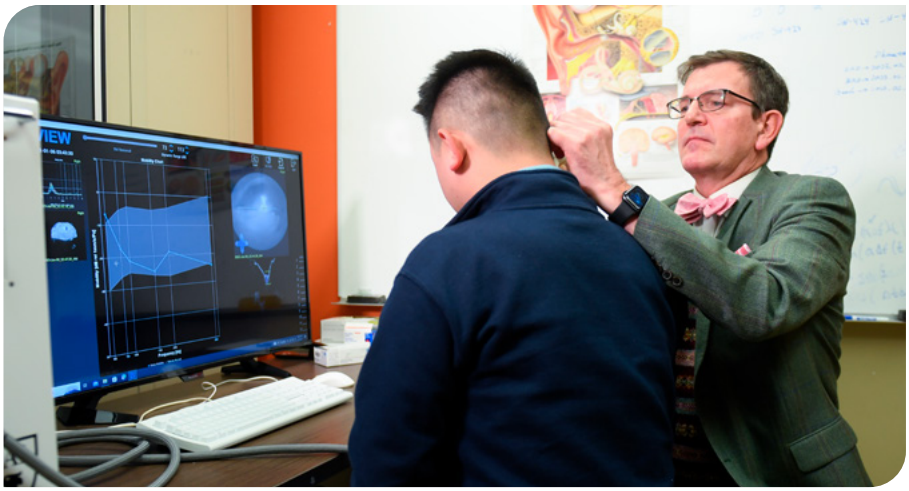
"We believe that OCT can play a role in the diagnosis of many middle ear problems including ear infections, otosclerosis, hearing loss from head injury and cholesteatoma. There may even be a role for OCT in planning and guiding robotic surgeries which are becoming increasingly common in the ear," says Adamson. "We launched a startup company, Audioptics Medical that is working on commercialization the technologies we developed in my lab. The company is on track to have the system on the market by next year."

Today, Adamson has three graduate students working on his research project and has had dozens of undergraduates work on Capstone projects related to his work. He says his undergraduate students have played an important role contributing to areas such as software, mechanical design, benchtop testing and patient testing.

"In addition to engineering students, we've had medical students, surgical







fellows and audiology students make contributions in developing and testing the system. I've found that engineering students love the chance to work with students in other disciplines on a project with clear patient impact," he adds.

This year, 45 engineering students are set to graduate from Dalhousie's Certificate in Biomedical Engineering program. Adamson, who along with his research work, is also the Coordinator for the School's Certificate program, says the program is gaining popularity as students began to learn more about the versatility of the field.

"When I first arrived in Halifax fifteen years ago there were only a handful of biomedical device companies. Now, there is a whole ecosystem for the biomedical industry and several major success stories, many of them started by Dalhousie students," he says. "At the same time, interest in biomedical research and the number of opportunities available for undergraduates with an interest in biomedical engineering has never been higher."

He adds that as the healthcare systems continues to evolve, biomedical engineers will find more opportunities to apply technology to patient care. "This is why I think there are so many startup companies being created – there are a million places where engineering principles could be applied to healthcare to let doctors do their jobs better and to improve the lives of patients."

And because of the rapid growth of the biomedical sector, Adamson says there are now plenty of great opportunities to start a career in biomedical engineering right here in Halifax.

"The feedback I've gotten from students in the certificate is that they really enjoyed working on biomedical Capstone projects. The process of interviewing doctors to understand their needs and those of their patients and to translate them into an engineering solution is very satisfying. It's also feels great to work on a project that can potentially make a real difference in people's lives."

FEATURE 2

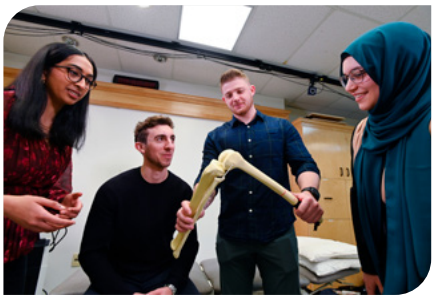
Students Assist with Robotics Research that Could Revolutionize Joint Surgery Patient Outcomes

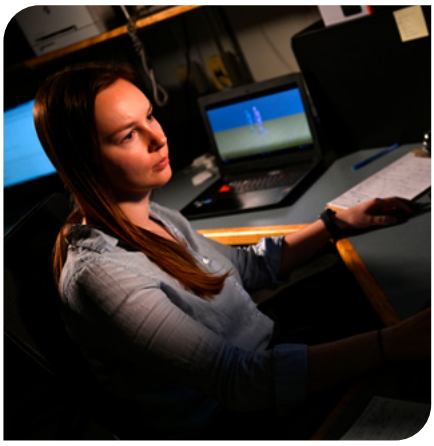
Working directly with patients, students gain valuable experience in biotechnology and collect data that assists in planning surgeries.

In Dalhousie University's Dynamics of Human Motion lab, Dr. Janie Astephen Wilson, Director of the School of Biomedical Engineering, conducts groundbreaking research. In partnership with Nova Scotia Health, Wilson's teams of undergraduate and graduate students are researching how an orthopaedic surgical robot — the Mako SmartRobotics system — can provide better outcomes for patients undergoing joint replacements.

Tackling Real World Problems in the Lab

Researchers at the lab already know that surgeries using the Mako system give better outcomes in terms of post-surgical pain and recovery times, but more data will help surgeons to use this tool more effectively to customize surgery to each





patient's needs. Nadim Ammoury is part of the graduate student team working on a 5-year longitudinal study into total knee arthroplasty surgeries at the Halifax Infirmary as part of the Robotics Research Project with Wilson.

"Patients come into the clinic the first day that they meet with the surgeon, and we record their gait using wall-mounted cameras. Every time they meet the surgeon, before surgery, after surgery, two years after, at all these time points we collect data using this very easy, quick, markerless system," Ammoury explains, adding that traditionally collecting data requires placing up to 50 small reflective markers on patients while they wear tight-fitting clothing, "Our system can collect data in less than five minutes, whereas with the marker system, an appointment can take two hours."

The post-grad team is working directly with the orthopaedic robotic system to obtain extremely accurate implant position and fit with respect to knee anatomy. They are combining this data with pre-operative CT scans to identify which patient-specific morphological factors and implant-bone configuration lead to favourable outcomes, allowing surgical teams to personalize surgery to patient-specific anatomy. "We are also monitoring the physical activity of knee replacement patients during the surgical wait period and quantifying the changes in patients' quality of life during the pre-operative period," Ammoury says.

In simplified terms, the data collected by the post-grad research team will be used to help surgeons determine the type of surgery a patient requires, where that patient fits in terms of priority on a surgical wait list, and how factors before and after surgery impacted their surgical outcome. This vital information will have a huge impact on public health.

Nashita Jalal is in her final year of an electrical engineering degree and is also enrolled in the Certificate in Biomedical Engineering program. One certification requirement is to complete a Capstone Project in a biomedical field, and the opportunity to work alongside Wilson was hugely appealing.

"They definitely hooked us in from the start. Even before I knew a lot about the details of this project, I thought "Oh my God, that sounds really fascinating," Jalal says, who along with her three undergraduate teammates picked this project as their first choice, and were very excited to be selected.

Jalal and her teammates are working on a prototype of a clinical tool for the preoperative assessment of the knee. "Right now, before a patient goes in for a knee replacement surgery, the surgeon might not have quantitative data on that patient's range of motion. Often, surgeons are working with observed data. They are watching the patient walking around and looking at static X-rays, but they don't necessarily have numbers that might help in creating a patient plan," Jalal explains, "My team is trying to come up with a prototype for a system to measure the angle of motion for patients during the preoperative assessment process. This would not be as complex and robust as current systems, but it would be definitely refined enough and portable enough that it could be used at any clinic."

While Jalal doesn't expect the prototype that her research team is working on will be used in clinical practice, she hopes it is going to lay the groundwork for other researchers. "We're the first team to tackle this idea and work on a prototype device to measure the angles. It could be passed on to future Capstone students to build upon," Jalal says.

A Firm Base for a Future in Engineering

While Jalal is not yet decided on whether she will pursue biomedical engineering full-time after graduation, she says that working in Wilson's lab has given her a unique opportunity to understand the kind of innovation that is happening in this field, especially in her home province.

This Capstone project, alongside three co-op terms — including one in the military industry working on power systems — that Jalal has taken throughout her degree program all help her feel like she is graduating with a wealth of different engineering experiences.

"That's one of the great things about engineering in general, it's easy to maneuver into a field or an area that interests you because you learn skills that can be applied in many occupations," she says.

As for Ammoury, he chose this area of research because he is looking to make a difference in people's lives. "With patient healthcare and bio-engineering you work directly with human subjects and get to see the results of your work," he says, "And this area of healthcare is booming, it's a field that is exploding and holds a lot of promise for the future."

STUDENT PROFILE

Capstone Students bring fresh set of eyes to a Salty problem

"It's great to have a fresh set of eyes—and young and eager eyes as well—to solve problems."

— MIKE PETROSONIAK

In 2010, Mike Petrosoniak and a friend spent four months teaching sailing in the Bahamas.

They were out on the water—a lot. And they loved what it did to their hair. "We really didn't need to use anything in our hair because of the salt in it. I could just run my hand through it and it would stay in position," Petrosoniak recalls.

A chemical engineer with a Master's in Resource and Environmental Management from Dalhousie, Petrosoniak thought it would be great to get that effect in a bottle. And so, in 2018, he founded Salty Hair. The company bills its signature product as a "surf-inspired naturally-sourced sea salt spray." In developing the product, Petrosoniak started as simply as possible: with ocean water in a bottle. But that left a bit to be desired. "It really didn't do anything," he says. So he started creating a more concentrated solution, then perfected the recipe by adding all-natural ingredients including aloe and flax.

But while Petrosoniak has refined the recipe over the years, the process for making Salty Hair—boiling seawater and

multiple stages of filtering—has remained largely unchanged. And that's where Dalhousie Engineering students and the Capstone Program come in. Capstone projects connect teams of engineering students with companies facing an open-ended problem they don't have the resources to tackle on their own.

In Salty Hair's case, that means optimizing the production process so it uses less energy and allows Petrosoniak to scale up from the current 100 or so bottles per batch. "It takes many hours," he says, "and I realized if I'm going to try to move this to a bigger scale, then I definitely need to optimize the production process. I'd also like to add some other products down the line, and if I spend all my time trying to make batches of Salty I'm not going to get anywhere."

Hailey Taylor is a senior chemical

engineering student, and part of a team working with Salty Hair for their Capstone project. Each team member works on a different aspect of the process. Taylor's challenge was concentration control—finding a way to concentrate the salt water without spending hours and hours burning fossil fuels to boil it off.

"There are other options out there that separate the fresh water, let's call it, from the salt water. It leaves the salt behind and creates that concentrated product by relying on pressure instead of temperature," Taylor says. "We can't just get something straight off the market. We have to customize it ourselves, so it will work and be appropriate for concentrating the salt water." Other members of the team are working on different aspects of production, like exploring ultraviolet (UV) light and ultrafiltration as an alternative to some of the filtering stages.

Taylor says she enjoys the technical challenges of the project, but also the real-life experience it provides—not only from an engineering perspective, but in terms of client management as well. She says, "This is the first time we get to handle a client on our own. Of course we have lots of support from our profs and TAs, but it's mainly our responsibility to make sure we are communicating regularly and that we are on the right track for the client's idea."

For Petrosoniak, the process of working with the students has been "really great." He says it's been interesting watching them come together and develop as a team, and seeing their proposed solutions.

"They bring in new ideas, which is great," he says. "Obviously, me looking at the same process over and over again, I'm only going to come up with so many ways to do something. So it's great to have a fresh set of eyes—and young and eager eyes as well—to solve problems."

From left to right: Meredith Tulloch, Alanna Brathwaite, Hailey Taylor, Anthony Douchant

Inspiring diversity in future engineers

TheSTEMGirl, Alumnus Jennifer Ladipo combines her love of writing with math and science to inspire the next generation.

Studying engineering on the Truro campus combined Jennifer Ladipo's (BEng'16) love of math and science with the opportunity to be closer to her older brother.

"I was there with my brother, and it was one of the few times we were in school together," said Ladipo. "I really enjoyed the campus and town. I enjoyed how small it was. I didn't realize how cool it was to have such small classes," she recalls.

While studying in Truro, Ladipo also found confidence in her creativity and writing ability. Combining her love of math and science and her ability to think and act creatively, Ladipo created TheSTEMGirl website. STEM encompasses science, technology, engineering, and math and TheSTEMGirl site aims to encourage young girls to view themselves as both feminine and scientific by telling representative stories. In addition to writing most of the content, Ladipo also runs the day-to-day operations of the site.

"I don't think I could say I'm doing traditional engineering but, in the content creation, I use a lot of my engineering background in a non-traditional way" she elaborates.

Ladipo's online story telling has since led to five published books aimed at representing young women in STEM. Her first book, The Red Elephant started as an assignment in a required writing course on the Truro Campus. Ladipo not only enjoyed the required writing course but was inspired to write.

"I wasn't confident in my writing; you don't know many Black authors," she explains. "To be honest, I didn't know any off the top of my head. I didn't know if I could write. And then Professor Stiles told me 'You have a gift for dialogue'. And I heard that, and I was like if this professional lady thinks that, I trust her. I come back to that a lot, so if I am not confident in my writing or am freaking out, I think of her," says Ladipo.

"I use a lot of my engineering background in a non-traditional way."

— JENNIFER LADIPO

Ladipo continued her work in engineering outreach during her Industrial Engineering studies Dalhousie's Sexton Campus, volunteering her time with Imhotep's Legacy Academy, an organization that works to introduce youth of African Nova Scotian decent to the world of STEM.

Her career continues to embrace creativity and outreach, helping female and Black youth to see themselves in engineering and science careers. Ladipo is now the National Program Manager for Black Youth and Girls at Actua. She works tirelessly with 43 network members across Canada, including SuperNova at Dalhousie, creating content to bring engineering and science to life.

A signed copy of Jennifer's book, *Tess Makes a Mess*, is on display in Banting Building on the Truro Campus. Her continuing efforts to motivate a generation of young woman and Black youth will no doubt help to build the next generation of engineers.

thestemgirl.com

Meet a Young Alumni Contributing to Climate Change Response

For Sarah van den Heuvel (BEng'22), pursing an environmental engineering degree was the perfect way to incorporate her love for the outdoors, while addressing global issues such as climate change.

Today, van den Heuvel is a Climate Resilience and Coastal Engineer in Training with CBLC. Working in collaboration with the company's Climate Resilience and Coastal Engineering teams, she says her position includes climate risk assessments and coastal analysis.

"We develop projections of the climate for the future, and then we use those to complete risk assessments for the clients' infrastructures," she explains. "We do risk assessments to inform the client as to what aspects of their project or infrastructure might be impacted by the climate changing. Then we make recommendations on how to make their assets more climate resilient."

Hired in the spring of 2022 following her graduation from Dal's environmental engineering program, van den Heuvel says her she loves working in a fast-paced environment that can vary so much daily.

"The range of projects is just incredibly captivating to me. One day I could be contributing to a flood study in my hometown of Antigonish and the next day I could be working on a coastal protection project in the Caribbean or collecting data for global climate resilience projects," she says. "I really feel like I'm doing meaningful work".

van den Heuvel's contributions and global influence span beyond her work with CBCL. As an engineering student, she played a key role in student life initiatives, both on Dal's Agricultural Campus in Truro where she started her engineering degree, and later, on Halifax' Sexton Campus.

"In Truro I was involved with everything. I was very active in student life and gained a lot of valuable experience. In my second year I was really involved with the engineering society and held a co-president position," she explains. "When I got to Halifax, I was able to leverage my experiences on the Agricultural campus to continue growing."

In May of 2022, she led a team of engineering students to Honduras to help design a new water system for a local community in need. The mission was a part of project by Dalhousie Engineering Global Brigades, a chapter of the larger non-profit organization, Global Brigades. Global Brigades is an international movement of university students who work alongside local communities and technicians to reduce inequalities.

"In our first couple days in Honduras, we met with community members so we could better understand their issues," recalls van den Heuvel, who was president of the Chapter at the time. "Although they did have an existing water system, it was only serving about one third of their community, so we needed to design an expansion to that."

For a week, van den Heuvel and her team worked with a local engineer to collect necessary data and design a water system that they later passed along to the community. She says the opportunity to apply her engineering skills to a project that could help vastly improve the lives of those community members, was the highlight of her academic journey.

"Everyday I was there, I went to bed feeling totally fulfilled. It made all the hard work that I put into my engineering degree and my extracurriculars feel so well worth it," she adds.

van den Heuvel says she feels the same way about her work at CBCL and credits her extracurricular activities and a strong community support at Dalhousie Engineering for leading her down the right path.

"My advice to students is that I strongly recommend seeking out opportunities to enrich your educational experience as there is so much to learn outside of the classroom. Taking advantage of such opportunities not only helps you stand out when you are job hunting down the road, but also makes you a better global citizen in general."

BUILDING VALUABLE RELATIONSHIPS AT THE EMERA IDEAHUB

"There is a saying in Atlantic Canada: it takes an ecosystem to build a start-up. At the Emera ideaHUB, we know the difference relationships make - not only to the success of our founders, but also to the economic impact they have on our region. One of the HUB's most valued relationships is with Neocon International and its CEO, Pat Ryan (BEng'83). Neocon is an award-winning manufacturer that brings innovative products to OEM Automotive companies around the world. I sat down with Pat recently, to learn from his experience leading an innovation culture and always evolving to drive growth. As the Emera ideaHUB plans its growth in partnership with industry, academia and government, my hope is that Pat's experience inspires more alumni to explore how they can collaborate with us and create value for their company as well as this region."

— ERIN O'KEEFE GRAHAM

When you set out to become an entrepreneur, what did that involve?

As I finished my engineering degree, I had my father and grandfather saying, 'there are no jobs around here: you'll have to move away'. But I had this burning feeling of wanting to do things here. I was interested in automotive and how I could be a supplier of ideas. Of course, I had naysayers, but nothing in life is worth it unless you take a risk. I could have been caught up in the economic conditions, uncertainty, whether I was meant to do this, but I made a choice to be bold. I've made tons of mistakes, but I've followed my purpose, stuck to my values, and taken calculated risks. It's been worth it.

What was your first occasion engaging with the Faculty of Engineering as an Alumni?

As Neocon grew, Dal reached out to ask me to speak to students, probably 20 years ago now. I started doing this annually, and when the coop program developed, I started bringing students in. Some years I've had upwards of 24 people come through the building; I have

four students here right now. The most successful ones turned into employees; I can think of at least 8 who became remarkable Neocon team members.

What do you think has changed about being an entrepreneur since you started Neocon?

So much has changed when it comes to the tools available – we didn't have the internet! But what has stayed the same is that you're doing this for yourself, and it must be your vision and your dream. When you start a company, you are also starting work on yourself. It's going to be a reflection of you. You will have the insecurities and you have to defeat them.

Neocon has an innovation culture. What does this mean to you?

There is a difference between invention and innovation. If invention is the eureka moment, innovation is taking it to market and making it commercially available and successful. In our world, if we work with automotive companies on lightweight material, we start with all sorts of inventions. But getting it to commercial viability is the innovation. Our core value is innovating all the time. That means starting with something but not looking for perfection; it can't be so gift wrapped that it doesn't fit anyone.

What excites you about the Emera ideaHUB?

One of the obvious things is that if the HUB existed when I started my company, I probably would have gotten to where I needed to be in half the time: what took me 10 years would have taken me 5, and I'm not exaggerating. There was nothing. From developing an idea, learning about manufacturing, cost control, market dynamics and IP – we just had to find our way. With the HUB, whether it's building prototypes, gaining access to industry experts, or having experienced entrepreneurs as your coach, ideas become innovation much faster. But the vision and purpose of the HUB also excite me because we want to create unique ventures but also jobs and economic growth, so people stay in Atlantic Canada.

What made you interested in working with Katchi, a HUB resident company?

There's a real purpose to this start-up. One of the co-founders came from generations of fishing and has seen ecosystem destruction and wanted to figure out how not to destroy young eggs and fish and how to use less fuel. When they met with us, we looked at how we could share our experience of how to make something manufacturable. Failure Mode Effect Analysis in automotive is crucial to ensure design intent makes it through all sorts of conditions, so we've helped Katchi explore this with their product.

What does our region need to do more of when it comes to innovation in this economy?

We need more people to want to stay here. We need industry to foster opportunities for new ideas to grow. Let's be an innovative part of North America and give people confidence in building here.

What advice would you give your fellow Engineering alumni about engaging with the HUB?

Realize that the young minds out there are so brilliant and often untapped: I meet people who have completely different experiences from my life, and that means they have ideas I won't have thought about.

What's next for Neocon?

We are facing an advent of electrification and energy transformation – this is a once-in-a-generation opportunity. Whether that's about wind energy, electric vehicles, or the infrastructure that enables all of this, we are thinking about how we harness and tap into these ideas. We have a lot of EV-based projects at Neocon; we tackle different materials and lightweight objectives. And we also look beyond transportation, casting a wide net because our team is so passionate about taking new things to market. We really are growing people who can make great things happen, and I'll never get tired of that.

Top 5 Ways Industry can engage with the Emera ideaHUB

1. **Peer mentoring.** Create development opportunities for your engineers and other technical employees to partner with a founder and help them accelerate.
2. **Fractional advisors and coaches.** Create development opportunities for your non-technical employees, whose insights in marketing, finance, and HR can fill knowledge gaps for deep tech founders.
3. **Customer discovery support.** Invite a start-up to see the market through your lens, to help them focus their venture on genuine customer need.
4. **Problem definition.** Contribute to the data on key issues, such as energy transformation, so that more founders can accurately understand challenges industry is facing.
5. **Investing in prototype development.** Deep tech ventures take more time and capital than digital-only start-ups. Investing in ventures that will accelerate innovation in your sector can help advance a start-up as well as your own business.

WATER TESTING REVOLUTIONIZED:

At Drinkable, Dalhousie Engineering alum Danielle Dey is helping to bring an impressive tech solution to market

A lack of access to fast, accurate water testing has long been an issue for those using well water, and according to Halifax startup Drinkable Water Solutions, around 30 per cent of private wells are providing water that is unfit for human consumption.

In August of 2022, Danielle Dey (BEng'22) joined the small but brilliant team at Drinkable to help design a product that would not only help homeowners but anyone looking to monitor water quality, anywhere in the world.

The team at Drinkable has created a fast, easy, and accurate water testing sensor that is able to give detailed analysis just from being placed in a glass of water.

"Right now, to get a lab test you have to pick up the bottles, go back home to get your water, bring back the bottles during work hours and wait for your results. The results that you get back are often highly scientific," Dey explains, "Our device provides those results in three minutes, in language that anyone can understand."

Although yet to launch publicly, Drinkable's device has won several awards and in the past few months there has been more than $6,000 in pre-orders—this is especially impressive when you consider the pre-order sale price of the unit is just $100 (full retail will be $150). Consumers can expect delivery in October 2023.

Fast-track career development

Dey initially came on board to help design the water testing device last August, after graduating with her mechanical engineering degree from Dal in the Spring of 2022.

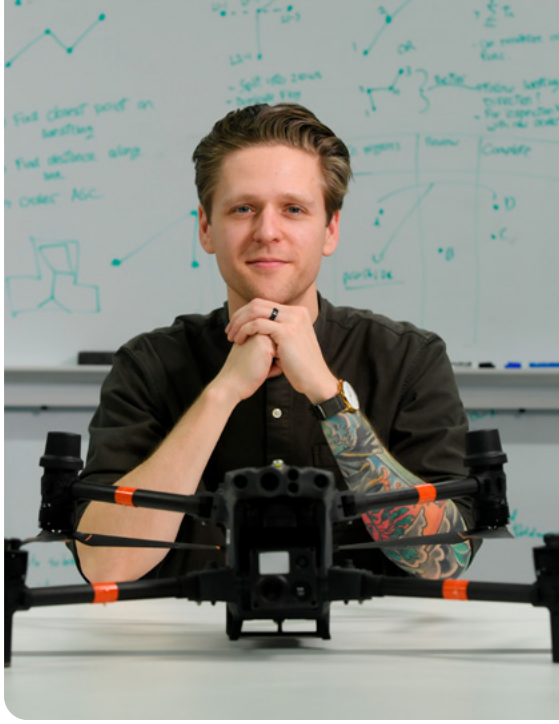
"I was lucky to join the company when there was still so much to be done on the technical side," Dey says, though she moved from designer to product manager within a couple of months, then was offered the CTO position soon after.

"It felt like a huge risk to take the position, but I knew as soon as I met the team that there was something special about these folks and that this product was going to be huge," Dey says, "The technology is unique, and I'm working with a group of incredibly talented and intelligent people who could all have taken more stable and secure work with better pay, but we were all willing to take that leap for this product that we believe in."

Dey confesses that she has always been a risk taker so jumping on board with Drinkable was pretty on brand. "I was a competitive gymnast for 10 years, and risk comes with the gig, plus the confidence I gained through studying at Dalhousie made me feel a lot more comfortable taking this position," she says.

Drinkable is based in the Emera ideaHUB, an advanced business incubator located on Dalhousie's Engineering campus.

"The Emera ideaHUB adds a whole other layer to the resources and knowledge already available to students. If you have an idea and want to innovate, you can build a company and have a workspace and be backed by all these tools, working with all these incredible people, even after you've graduated," says Dey.



DRONES ARE JUST THE FIRST STEP FOR THIS NOVA SCOTIA STARTUP

"Building the Path to Preventative Maintenance"

Traditionally, there have been two ways to inspect power transmission lines—and they haven't changed much in decades.

"Either someone walks the line, taking notes—and maybe a couple of photos from their cell phone, or it's flying a helicopter", explains Joe Richard (BEng'17).

Richard is speaking while parked at a gas station, his phone propped up on the dashboard. "This is how I take most of my meetings these days," he says. As Head of Product for Detect, he finds himself on the road a lot, often with a drone along for the ride.

A resident company at Dalhousie University's Emera ideaHUB, Detect is dedicated to modernizing inspections through drone imagery and artificial intelligence. (The company was spun off from utility services provider Connect Atlantic Utility Services, which is owned by the private equity firm Pilot Wave Holdings.)

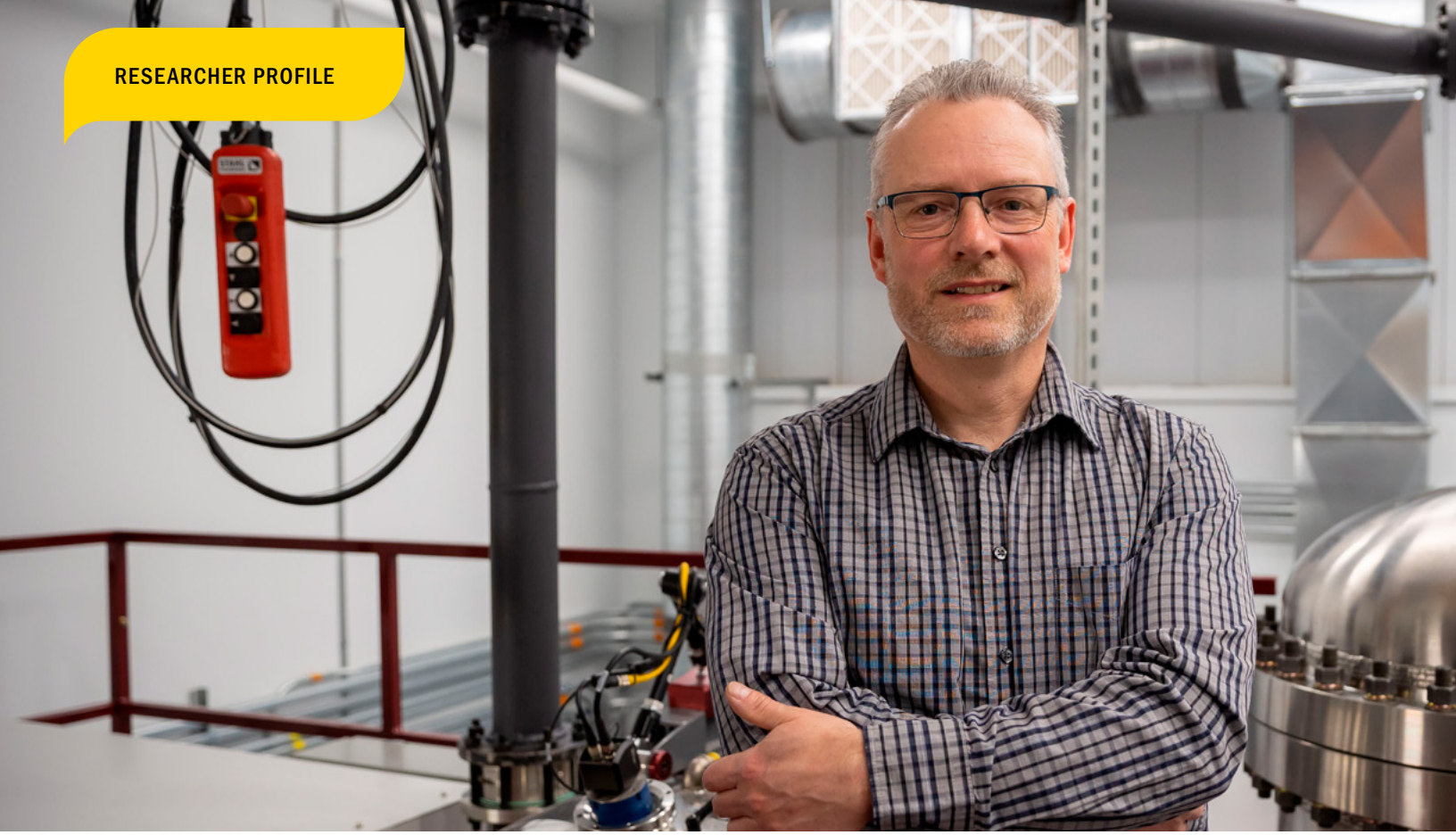
Richard says drones offer the speed of helicopters, but with more precision, and at lower cost. He points to "one of the most challenging" transmission lines in Nova Scotia, along the Cabot Trail. "It would have taken a month or two for someone to walk it. We did it in three and a half days."

Solving problems like figuring out drone flight plans comes naturally to Richard—a by-product of his engineering education at Dalhousie. "What I gained from my education set me up for success—to know that every problem is solvable, and that you need a functioning team to solve these problems," he says. "The soft skills, the problem-solving, the determination—that's what I pulled most from my engineering degree. I knew coming out of school that I didn't want to be explicitly on the engineering design side. I thought engineering was a really good way to get a technical background and refine those problem-solving skills."

At Detect, which prefers to think of itself as "a data company", drones are just the first step. The company can geo-tag inspection imaging and upload it to its proprietary Scope platform, which Richard describes as "like Google Maps, but for inspections." Detect can then generate inspection histories through the platform, and apply analytics to notice trends and prioritize future inspections. "We can slowly build models to predict where the failures will happen before they do – we're building the path to preventative maintenance" he says.

Richard, who founded the Dalhousie Renewable Energy Society as a student at Dalhousie Engineering, says ultimately, the technology developed could be used not only for power lines, but for any critical infrastructure such as wind and solar farms, telecommunications structures, and more.

The Emera ideaHUB was founded after Richard graduated, and while he is sorry to have missed it as a student, he is happy to be there now. "We wanted a space close to the university, close to other startups in a creative space, and we have access to really brilliant engineering minds. I'm a big believer in how design can impact behaviour, and the ideaHUB is the absolute ideal spot for our growing team."



In Dr. Paul Bishop's Lab, Students Access State of the Art Metal 3D Printing Equipment

The ability to 3D print in metal is still a relatively new, and game-changing area of research that Dalhousie students have unique opportunities to be a part of.

Over the past few months, Dr. Paul Bishop has overseen the setup of a research facility on Dalhousie's Engineering campus dedicated to the 3D printing of metallic materials. This allows his students to conduct comprehensive and high-quality, high-level research on many different metallic systems.

"The chain of equipment that we have is such that we can study all stages of the production cycle going from the design of a part on the computer to actually make a finished metallic version of it through 3D printing," explains Bishop.

The parts that Bishop and his team are producing are stronger, lighter, and more geometrically complex than could ever be created by traditional methods

such as casting and forging. The research includes finding the perfect alloy for each part, converting that alloy into powder form using a process called gas atomization, and then processing the powder through the advanced printers to produce a finished component.

"Gas atomization capability is the real differentiator here as it allows us to convert almost any alloy into a powdered feedstock suitable for printing on campus. Think of gas atomization as when you use a bottle of cleaning fluid with a trigger spray, but our fluid is a molten alloy that we hit with a very high-pressure gas to obliterate it into tiny droplets that subsequently solidify into powder particles," Bishop explains.

"That in turn allows me to train even more undergraduate and graduate students at the university in metal 3D printing"

— DR. PAUL BISHOP

There are very few educational facilities in North America with comparable equipment, and certainly no other Canadian universities that do — meaning that students working with Bishop are given exclusive access to equipment that puts them at a unique advantage in this exciting branch of engineering. Bishop is currently working with several exciting industry partners, including the Royal Canadian Navy (RCN), who are interested in harnessing his lab's potential to help them understand how 3D printing can be used to fabricate replacement parts that they currently have difficulty sourcing.

"The problem is that for an organization like the RCN, complex naval assets such as warships, submarines, and frigates contain many different components made from many different alloys. Some of these naturally degrade over time and must be replaced, yet the companies that originally made the parts say 30 years ago are frequently no longer in business. Therefore they see tremendous benefit in leveraging metal 3D printing to address this problem "on demand". Working with my team and the specialized equipment we have at Dalhousie is a critical first step towards that end goal as we can research a wide array of alloy chemistries and rapidly amass data on the complex parameter sets needed to print the alloys effectively." says Bishop.

Bishop was recently appointed Dalhousie's C.D. Howe Research Chair in 3D Printing of Advanced Structural Alloys. A major benefit of holding this position is that it frees up more of his time to conduct this research.

"That in turn allows me to train even more undergraduate and graduate students at the university in metal 3D printing, which is exploding globally in terms of the companies using and implementing it," Bishop says, "It is a cornerstone of the next generation of manufacturing of metallic components. There's just no question about it at this point."

PAVING THE PATH FOR OTHERS TO SEEK HELP

Siobhan Coady (BEng'13) has battled depression, post-traumatic stress and breast cancer. But her past battles don't define her.

Instead, her strength, courage and determination are characteristics you would use to tell her story. And it's a journey she's very open about. Speaking candidly about her battles throughout university, she's hoping her story will encourage others who may be dealing with their own mental health issues.

That story begins in the first year of her engineering degree at Dal. Although she had already received a Bachelor of Arts degree from Saint Mary's University, Coady says her interest in renewable energies swayed her towards a mechanical engineering degree. But shortly into her first year, she began to feel a sense of hopelessness and struggled to get out of bed to attend classes. So she took a step back. A brief medical leave from university and a chance to clear her mind was all she needed to continue her studies. The following year she was back at Dal to complete the first year of her degree.

After that, things dramatically changed.

"I went abroad for the summer. I was traveling by myself and ended up having a remarkably traumatic experience," she says as she pauses to wipe away her tears. "I was alone in a foreign country and I was attacked. I ended up having post-traumatic stress disorder."

Despite the incident, she returned to school that September.

"I was determined that I was going back to university, and I would continue along my path. Nothing was going to get in my way," she explains. "But you know, having this new post-traumatic stress disorder to deal with on top of my studies was a hell of a lot. I found I was having a really hard time focusing on my studies and finding strategies to get me through."

Coady says this time, she wasn't ready to take another medical leave of absence from university. "I really wanted to get through my studies without letting the thing that happened to me get in the way and mess it all up."

So she sought out the help she needed to complete her degree. She took advantage of the multiple resources available at the university including Dalhousie's Mental Health Services and Dalhousie Accommodations. Although the supports were useful, she says it was a strong and supportive Dal Engineering community that really gave her the strength and guidance she needed to survive. Especially one professor in particular.

"Dr. Darrel Doman was the advisor for lower level students at the time and I ended up having regular meetings with him. We would check in together, and he'd ask how I was doing, and if there was anything I was struggling with." she explains. "He was a remarkable support and a mentor from then on."

Through those meetings, Coady was able to find effective ways to cope with her anxiety and manage her studies. By her third year of engineering, she was named a Sexton Scholar, a designation given to students who achieve a GPA of 3.85 for higher while maintaining a full course load.

"I've been to a few different universities and Dalhousie Engineering definitely has a great community. From day one I felt like they cared," she says.

Dal Engineering Supports

Over the years, Dalhousie Engineering has continued to significantly increase their supports and services for students. In 2018, the Melda Murray Student Centre opened its doors on Sexton Campus, offering tailored and accessible programming, appointments and services to meet student needs and enhance their experience on campus. In addition, student groups such as Jack.Org Engineering and the Women in Engineering society actively raise awareness about mental health issues, and support students in their struggles.

The problem, says Coady, is that often times many students feel too afraid and ashamed to seek the same help she sought out. It's a stigma she hopes her story can change.

"It's not weak to accept help from other people," she says. "The supports are there to help you succeed and you should use them in any way possible. If you're having a hard time, there are ways to get through it."

Moving Forward

Following graduation, Coady continued to face challenges. In 2014, shortly after beginning a new position with a consulting firm in Vancouver, she was diagnosed with breast cancer. That didn't keep her down. Already a proven fighter, she prevailed.

Today, she says she is happy and healthy. She now lives in her home province of Newfoundland, working as an app developer for a company that was founded by her former engineering classmate, Josh Green (BEng'13). The company, Mysa Smart Thermostats, designs smart home energy tools that help combat climate change.

She says she's now in a place where she feels fulfilled in her career, and proud of the steps she's taken to reach that goal. Although she continues to seek professional help to manage the struggles she's faced over the years, she says she no longer feels ruled by the events of her past. She hopes others like herself, can find a similar path.

"I've been to a few different universities and Dalhousie Engineering definitely has a great community. From day one I felt like they cared,"

— SIOBHAN COADY

The Face of the Melda Murray Student Centre

Daryll Lambert takes a straightforward approach to her job: If students come to her with questions, she helps them find answers. And she does it with heart.

"They ask me anything," says Lambert, sitting by her desk at the Sexton Campus' Melda Murray Student Centre (MMSC). "They come in looking for everything from a Dal card, to where's the library. I say sit down, we'll find out. We'll connect you with the right service that you might need. That's the whole thing—we don't want students to leave here with a business card and have to go somewhere else."

Warm, friendly, and outgoing, Lambert has quickly become the face of the Centre, since she started in January 2022 as Administrative Secretary. Her desk sits at the front of the study hall, from where she can quickly direct students to appointments, help them find the information they need—or maybe even take them over to a part of campus they're not familiar with. "I can get up from my desk, take someone down the hall, walk them over to the Design Commons, or show them where the Student Union Centre is," Lambert says. Students might ask, "'Do you have any COVID tests?' No, but they're at the library. Here, I'll walk you over! No problem."

The Centre opened in 2019, to fill a gap for Sexton campus Engineering students. While Dalhousie offers a full range of student support options, many of these were only available at the main Studley campus. That may not seem like a big deal, but, as Lambert points out, it's a 30-minute walk each way, which can take a big chunk out of a class day. The Centre offers a range of supports, including mental health and career counselling, peer support, and services for international students and Black, Indigenous, and 2SLGBTQ+ students.

Over the past three and a half years, the MMSC's offerings have expanded, and include events Lambert and the team have recently created —from Fruitful Fridays (free nutritious snacks, coffee and hot chocolate), to dumpling-making and more.

On an early February afternoon, the doorway at the Centre is festooned with red balloons. Nearby, a table is covered in red paper lanterns and lunar new year wishes. Across from Lambert's desk, the bulletin board is full of notices for everything from a quick reference guide to MMSC services, to Halifax Public Library events, to information on where to find the area for nursing parents.

The nursing area came about when a student was looking for a place to breastfeed, and there was no nursing station—but there was a quiet room with blinds that could easily be turned into one. Lambert got on the case. When an international student was feeling lonely and missing his cat, Lambert encouraged him to book an appointment with a counsellor—and brought him cookies when he came in. As a way to get to know the students better, she held a "build your own sundae" event. "We had over 100 kids come in, and we were scooping ice cream for three hours."

Ultimately, Lambert says she thinks she "just wants to be everybody's mother. I'm over 60, and these are kids in their 20s, so it's fun to deal with them. I like to listen, and I like to help people."

Engineering Student Honoured for Exceptional Contributions to Student Life

Zoë Smith effortlessly bounces around Sexton campus, from one initiative to the next. She's one of the most active students at Dal Engineering.

Sometimes you'll find her selling grilled cheese with the Gearheads volunteers, other times she may be assisting students in the engineering society office. It's not a problem for this senior year chemical engineering student. She can easily attend her lectures and labs, participate on student government, assist in publishing the yearbook, and hold the position of President of the Dalhousie Engineering Undergraduate Society. It's no big deal she says.

"It's been the best five and a half years of my life," she enthusiastically adds as she lists off her extra-curricular activities.

Inspiring Community Engagement

Last November, the Canadian Engineering Memorial Foundation honoured Smith as the 2022 Marie Carter Memorial Undergraduate Engineering Scholarship Winner. The prestigious scholarship pays tribute to the memory of 14 women who lost their lives in the École Polytechnique massacre on December 6, 1989. The scholarship is awarded annually to the most promising woman in engineering at the university level who demonstrates exceptional leadership within their community.

"It recognizes students who are going out of their way to promote engineering," says Smith. "They are promoting good experiences to their peers. Whether it's getting young women involved in engineering, or getting their peers more involved in activities that aren't just academic."

"I think there are a lot of awards that focus on good grades, and that is very important, but there are a lot of other aspects of being a good engineer that I think are sometimes overlooked, like teamwork and leadership."

Smith says she's spent a lot of her academic career trying to get an many students involved in the engineering community as possible. From the opportunity to join student design teams, to simply handing out welcome packages at Dalhousie's annual Go Eng Girl event, Smith is always the first to take a new student by the hand, and introduce them to different societies and groups.

"We have so much going on, you can definitely find your niche," she says. Though, she does add that sometimes she can sense their anxiety and fear.

"It can be very intimidating for younger students. They may think to themselves 'I have too much work, engineering is hard, I have so many courses, I can't do that.' But I promise you, you can do that. It's fun. And honestly, it's nice to have something productive to do that isn't just school, at least for me."

Home away from Home

Smith is counting down the days until graduation in May, but not because she's excited to leave. She's quick to point out that her involvement on campus has helped her build a community of peers who now feel like family.

"We're a very tight knit community at Dal Engineering," she says. "I've had the chance to work with students across all disciplines. You get to meet a lot of interesting and exciting people and you feed off of each other. This is a space where you can really be yourself and grow as a person,"

Smith says she's had the opportunity to do just that. In fact, through her co-op programs she discovered her love for renewable energies and hopes to work in the field when she graduates with her degree.

Until then, she says she'll take one last moment to enjoy a place she now considers home.

"Dal Engineering is a great program. I'm very happy with my choices, and I really hope that other people (future students) can see that and take that into account when they're figuring out what they want to do."

DALHOUSIE UNIVERSITY | SCIENCE, INFORMATION TECHNOLOGY, ENGINEERING CO-OPERATIVE EDUCATION

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Co-op at Dalhousie

WHAT IS CO-OP?

Co-operative Education gives you the opportunity to gain relevant work experience while completing your degree as you alternate between study terms and co-op work terms. Co-op programs begin in the third year of your degree, and applicants typically apply for the program 8 months before the start of their first work term.

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Not sure what you want to do when you graduate? Co-op gives you the opportunity to test-drive different career paths.

Experience
Co-op allows you to use skills you learned in the classroom in the workplace.

Earn
Co-op work terms are paid experiences. Employers pay competitive wages and sometimes relocation expenses.

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What students are saying about co-op

"You are valuable and employers love having co-op students because you bring new and different approaches to problems and have a fresh perspective. Know that you have a lot of potential and value that you can bring to any organization and be confident that you deserve to be there and that you can make a difference, regardless of having little to no experience in that field."

— KATRINA BAGNELL, INDUSTRIAL ENGINEERING

"Don't be nervous, you will have an amazing experience! Getting out of your comfort zone is the best thing you can do for yourself."

— EMILY VEINOT, MECHANICAL ENGINEERING

"Because Dal is so well respected, it brings in a lot of really interesting industry partners from all over Nova Scotia and beyond to give students a real-world application of their skills. My co-op experiences were a privilege, and gave me access to work with industry experts, preparing me for the incredible opportunity that I have with Drinkable."

— DANIELLE DEY, MECHANICAL ENGINEERING

"With each co-op, I slowly developed a better understanding of the type of career that I want to pursue. I was able to discover what I enjoyed doing, what I didn't enjoy doing, and career paths that I didn't know existed. The true benefit of the co-op program is the opportunity it provides to students to explore different career options before graduation. Not only has this program helped me to hone my technical and non-technical skills, but it has taught me that every experience is valuable and can contribute to my personal development."

— EMMA LEESHANOK, INDUSTRIAL ENGINEERING

Congratulation to Dalhousie engineering alumnus Dr. Feridun Hamdullahpur (PhD EN'85) who was among 99 new appointments this year to the Order of Canada. Hamdullahpur was honored for his ground-breaking research in mechanical and mechatronics engineering and for his visionary leadership in academia. Hamdullahpur was the University of Waterloo's sixth president and vice-chancellor (2010-2021) and has been an engineer, educator, and leader over the span of his career in research and higher education, which also included time teaching at Dalhousie.

Dr. Mohammad Saeedi has joined the department of Mechanical Engineering at Dalhousie University. Saeedi brings expertise in computational fluid dynamics, turbulence modeling and high-performance computation. His research area will include energy harvesting, clean tech and bluff-body aerodynamics. Saeedi received his PhD from the University of Manitoba and did his postdoc at the University of Calgary with 7 years of experience of academic and industrial work.

Dalhousie chemical engineering student Kaitlyn Woodworth was among 15 engineering varsity student-athletes who achieved U SPORTS Academic All-Canadian status during the 2021-22 school year. To qualify as an Academic All-Canadian, student-athletes must maintain a GPA of at least 3.50 over the academic year while competing in a varsity sport. Hard work, dedication, sacrifice, and support are crucial in these students' lives. Woodworth is a three-time Academic All-Canadian winner.

Two members of the Dalhousie engineering community represented Canada this year on the world stage of curling. Jeffrey Meagher and David McCurdy were part of the bronze medal winning team at this year's 2023 FISU World University Games in Lake Placid, New York. Both Meagher and McCurdy are members of Dalhousie's men's curling team.

The FISU Games are similar to the Olympics, but for university athletes, and this year's event featured more than 1,000 athletes competing in 12 sports over the course of the 10-day event. The Dal Tigers won a qualifying tournament in September to earn the privilege of representing Canada.

Dr. Paul Amyotte, from Dalhousie's department of Process Engineering and Applied Science, was honoured at this year's Legacy Awards. Amyotte received the President's Research Excellent Award as one of Dal's newest Distinguished Research Professors. The title of Distinguished Research Professor is granted to faculty members who have achieved distinction as leading scholars in their fields. They demonstrate research excellence through their publications, impact, research funding and training of the next generation of leading scholars.

Amyotte is a prolific scholar whose research has been cited more than 12,000 times. Sought after for his expertise, he has played an important role in high-level proceedings involving safety failures, including the Westray Mine disaster in Nova Scotia and the Upper Big Branch Mine disaster in West Virginia.

Dr. Ya-Jun Pan from Dalhousie's Department of Mechanical Engineering, has been selected as a CSME (Canadian Society for Mechanical Engineering) Fellow for her contributions to the progress of engineering. Dr. Pan is a renowned researcher who has made contributions in robust nonlinear control and cyber physical systems with in-depth applications to tele-robotics, cooperative and unmanned systems, intelligent robotics, rehabilitations, and industrial automation. Dr. Pan has contributed extensively to engineering and professional societies.

A pair of engineering alumni who transformed the standard of care provided to patients with rings stuck on their fingers, pitched their revolutionary products to Canada's most well-known venture capitalists. Their startup company, Ring Rescue, appeared on an episode of CBC's Dragon's Den last Fall. The Dartmouth-based company was founded in 2018 by engineering alumni Brad MacKeil (BEng'17), Patrick Hennessey (BEng'17), and Dr. Kevin Spencer (BEng'00 and MD'09), who is also a Dartmouth General emergency medicine physician.

Their first product, a Compression Device Kit, offers emergency responders with an alternative method to cutting valuable rings stuck on a patient's finger. The device uses air pressure to shrink the swelling in a patient's finger, allowing the stuck ring to easily slide off with the aid of a water-soluble lubricant. However, it's the company's latest product line that stole the attention of the Dragons. Known as the Dolphin Ring Cutter, the device is designed to cut rings that are more severely lodged in place. It does so safer and faster than any other product on the market, using a sophisticated computer system that allows the blade to spin at a slower rate, minimizing the amount of heat produced and protecting patients from the risk of potential burns.

SAVE THE DATE

ANNUAL ENGINEERING GOLF TOURNAMENT

MONDAY, SEPTEMBER 11, 2023

Glen Arbour Golf Course
40 Clubhouse Lane, Hammonds Plains, NS

NSTC, TUNS and Dalhousie Engineering alumni and friends are invited to join us in support of the Engineering Student Experience Fund.

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