SBME UBC

SCHOOL OF BIOMEDICAL ENGINEERING

SBME CONVERGENCE 2021

MESSAGE FROM THE DIRECTOR

These past two years have given the world a glimpse at the promise of Biomedical Engineering, both as a crucible for new and effective healthcare technologies, and as an impact-driven discipline to meet the immediate and global medical challenges of society.

With those challenges has come a renewed interest in science that has helped propel SBME forward with expanded programming, increased research and education capacity, and the attraction of major federal grants and awards. Rather than slow down, I'm proud to say that SBME has only accelerated.

In January 2021, we refreshed our **Five-Year Strategic Plan** with SBME's new branding as part of our push toward the completed design and breaking ground of Canada's Living Laboratory, our new state-of-the-art facility that will act as a central hub for Life Science innovation and expansion.

Last year we graduated our first cohort of students who have been with us since the inception of the undergraduate program in 2017. At the same time, we were officially accredited, and not just for the one-year norm but for three years. Our partnerships team has fostered meaningful, integrated connections with external partners and internal collaborators, resulting in expanded research capacity, new training and development programs, and entrepreneurship-enabling initiatives.

We also grew our faculty roster, and officially welcomed some familiar faces to full-time SBME roles. We activated a dedicated effort in the Respect, Equity, Diversity and Inclusion space that is action-oriented, and has already brought in multiple speakers in the area as we learn and grapple with the difficult truths of national and academic history.

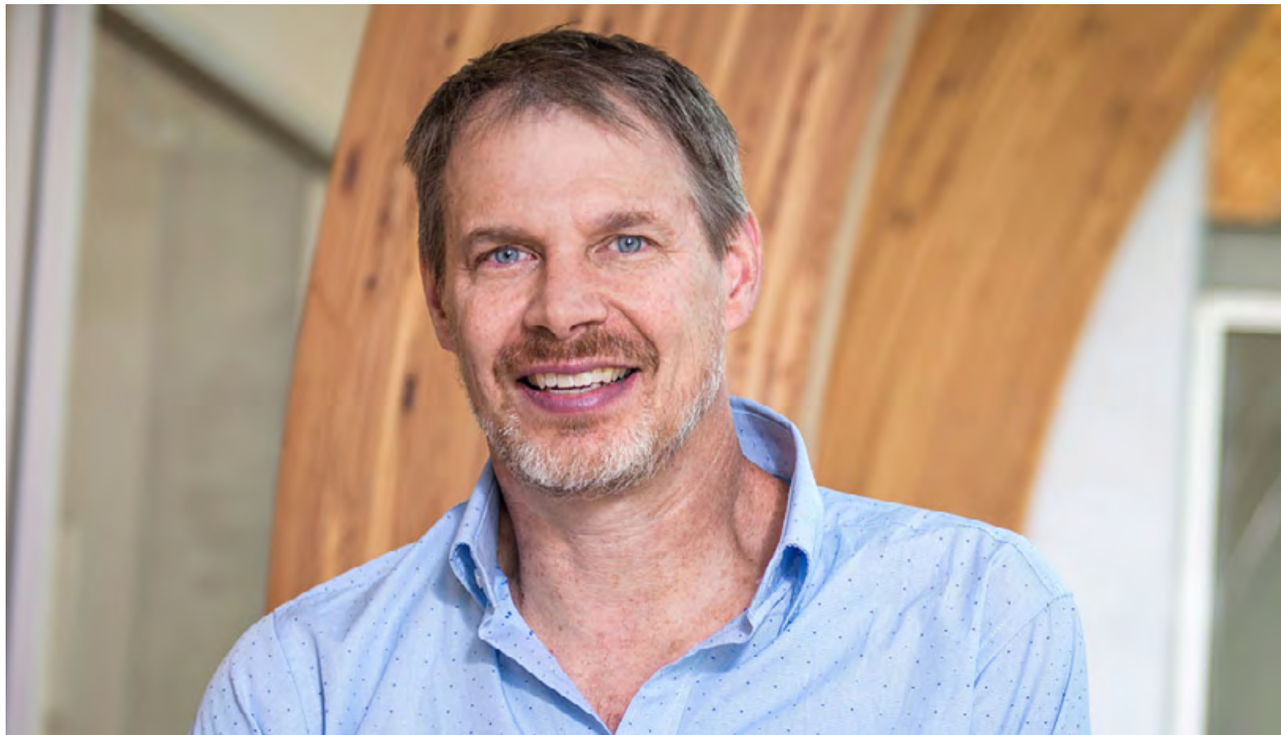
You'll find all this and more in the pages ahead, including links to our big stories for the year, program pages, media coverage and key metrics for progress across research, education and engagement.

Once again, to those who have made all this possible, including our leadership team of Drs. Karen Cheung, Peter Cripton, Fabio Rossi, Carmen de Hoog, and Raquel De Souza—you have my profound gratitude.

Without further preamble, please enjoy this overview of the amazing things the people of SBME have achieved, what they've built, and where we're going next.

Welcome to the second issue of SBME Convergence.

Peter Zandstra, CM, PhD, FRSC, FCAHS, PEng
Canada Research Chair in Stem Cell Engineering
Director and Professor, UBC School of Biomedical Engineering
Director and Professor, Michael Smith Laboratories
Fellow, Order of Canada



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WHAT'S NEW

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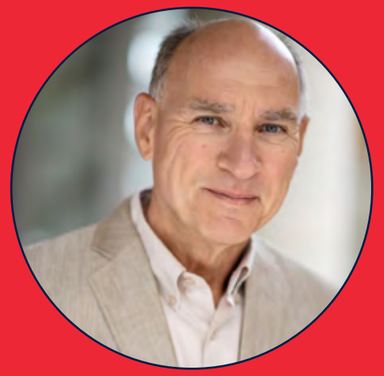
NEW FACULTY

We are very excited that some familiar faces, who helped grow the SBME to what it is today, have officially become faculty members in the school.

Negar Harandi, PhD
Assistant Professor of Teaching

Dr. Harandi's work focuses on theory and experiments involving instruments for general, orthopedic, cardiac, and minimally invasive surgery.



Tim Salcudean, PhD
Professor
CRC, Intelligent Computer Interface Design
C.A. Laszlo Chair, Biomedical Engineering

Dr. Salcudean's work focuses on ultrasound, teleoperation & image-guided surgical robotics.

Robyn Newell, PhD
Assistant Professor of Teaching

Dr. Newell's work includes Biomechanics, BME Design Projects, and integrating accessible, experiential, and student-driven learning

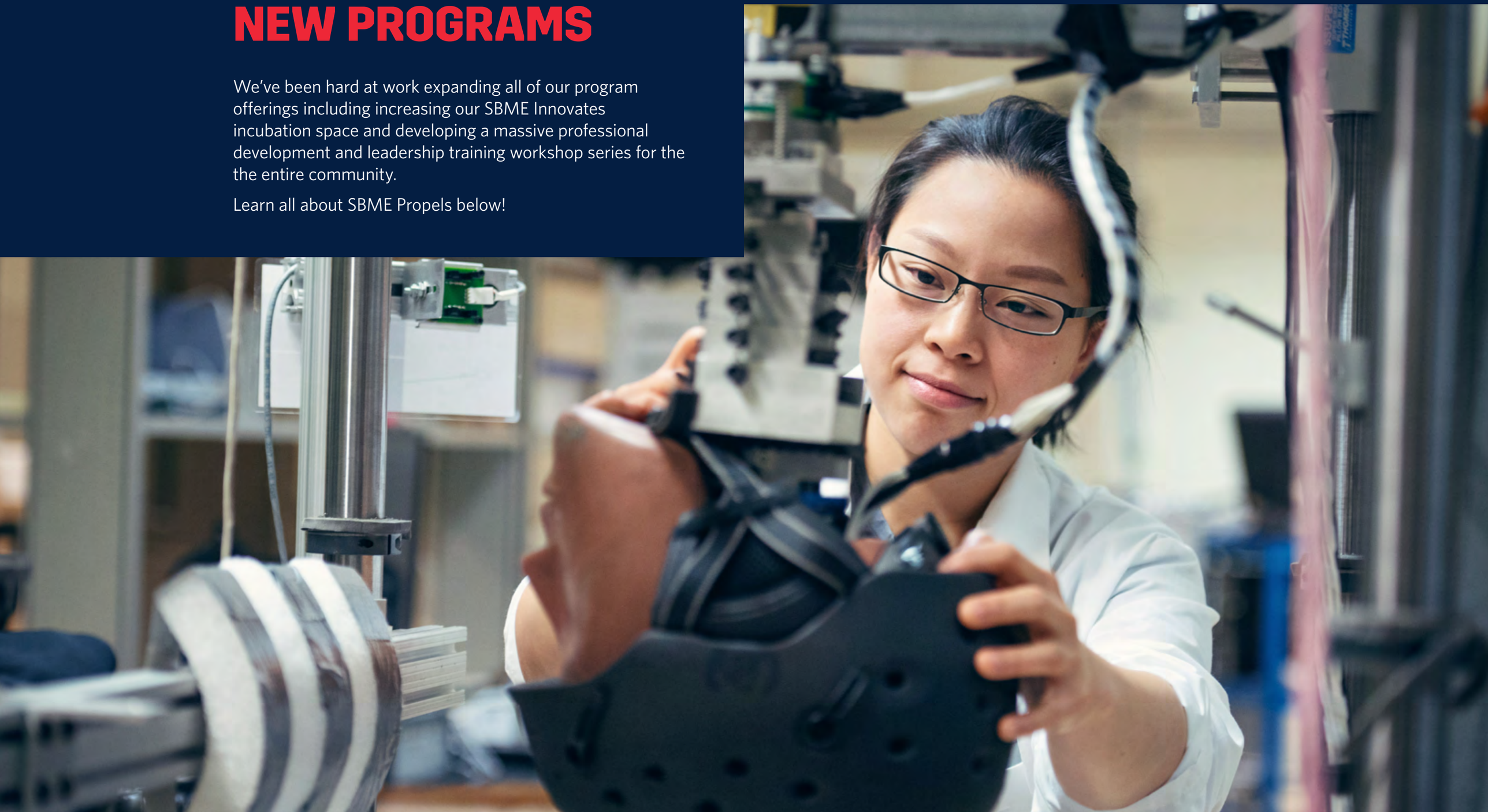
Roger Tam, PhD
Associate Professor
Director, Engineers in Scrubs^{OM}

Dr. Tam's research applies computer vision & machine learning methods to the quantitative analysis of medical images.

NEW PROGRAMS

We've been hard at work expanding all of our program offerings including increasing our SBME Innovates incubation space and developing a massive professional development and leadership training workshop series for the the entire community.

Learn all about SBME Propels below!



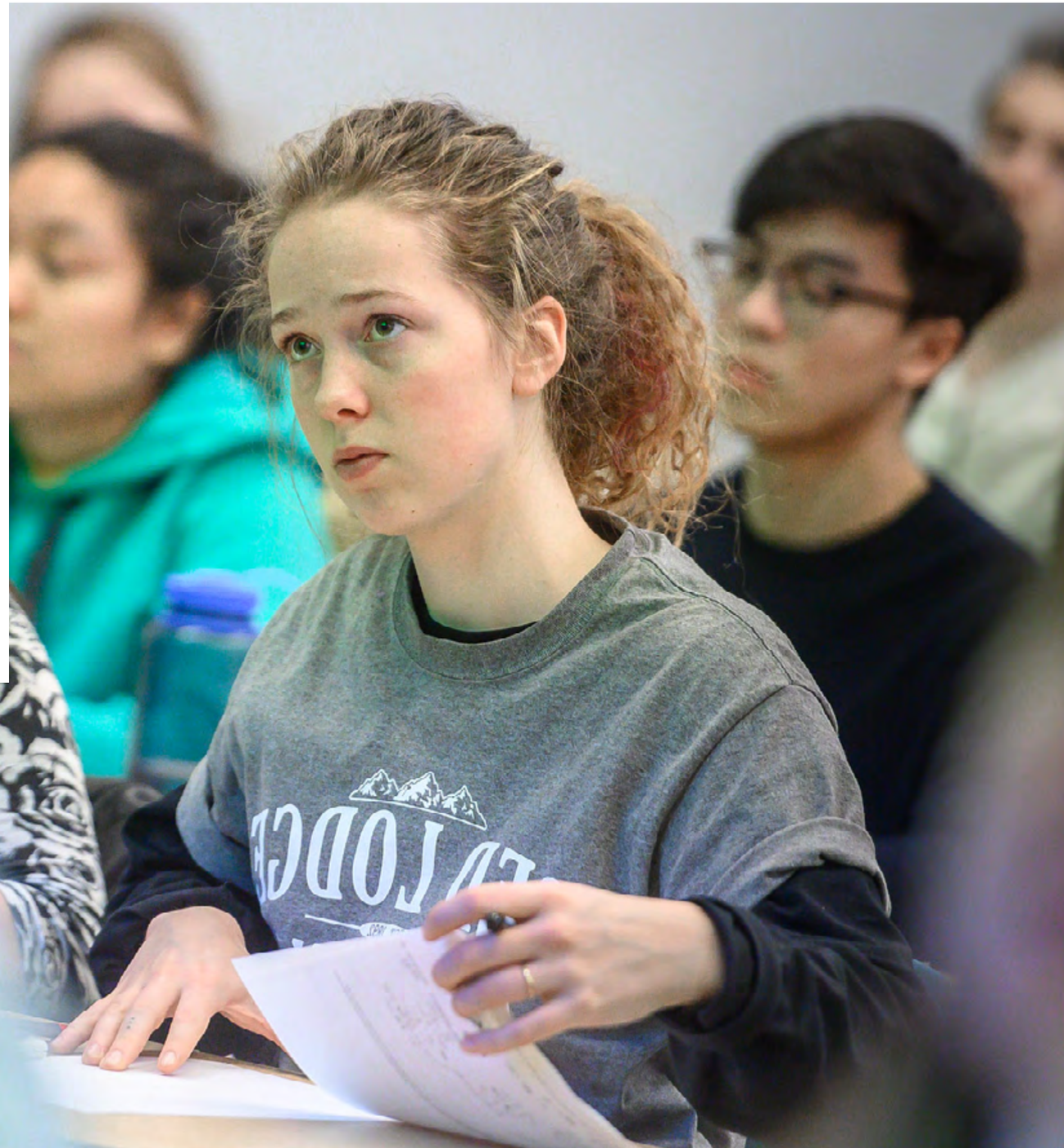
NEW PROGRAMS: SBME PROPELS

A new SBME initiative built in partnership with e@UBC, SBME Propels launched in September 2021 to provide trainees and faculty with the skills they need to translate innovations, build their careers, become effective leaders, and create lasting partnerships across the BME space.

Through over 40 virtual lunch-and-learns, the SBME community has been hearing from experts about leadership, commercialization, research partnerships, career pathing and professional skills like time management and resume writing. All free, and all led by some extraordinary people.

It's been an exciting first year for Propels and, based on the enthusiastic participation and feedback from the community, we have a wonderful foundation for an even stronger program when we launch its second year in September 2022.

Learn all about the program here.



NEWLY ACCREDITED

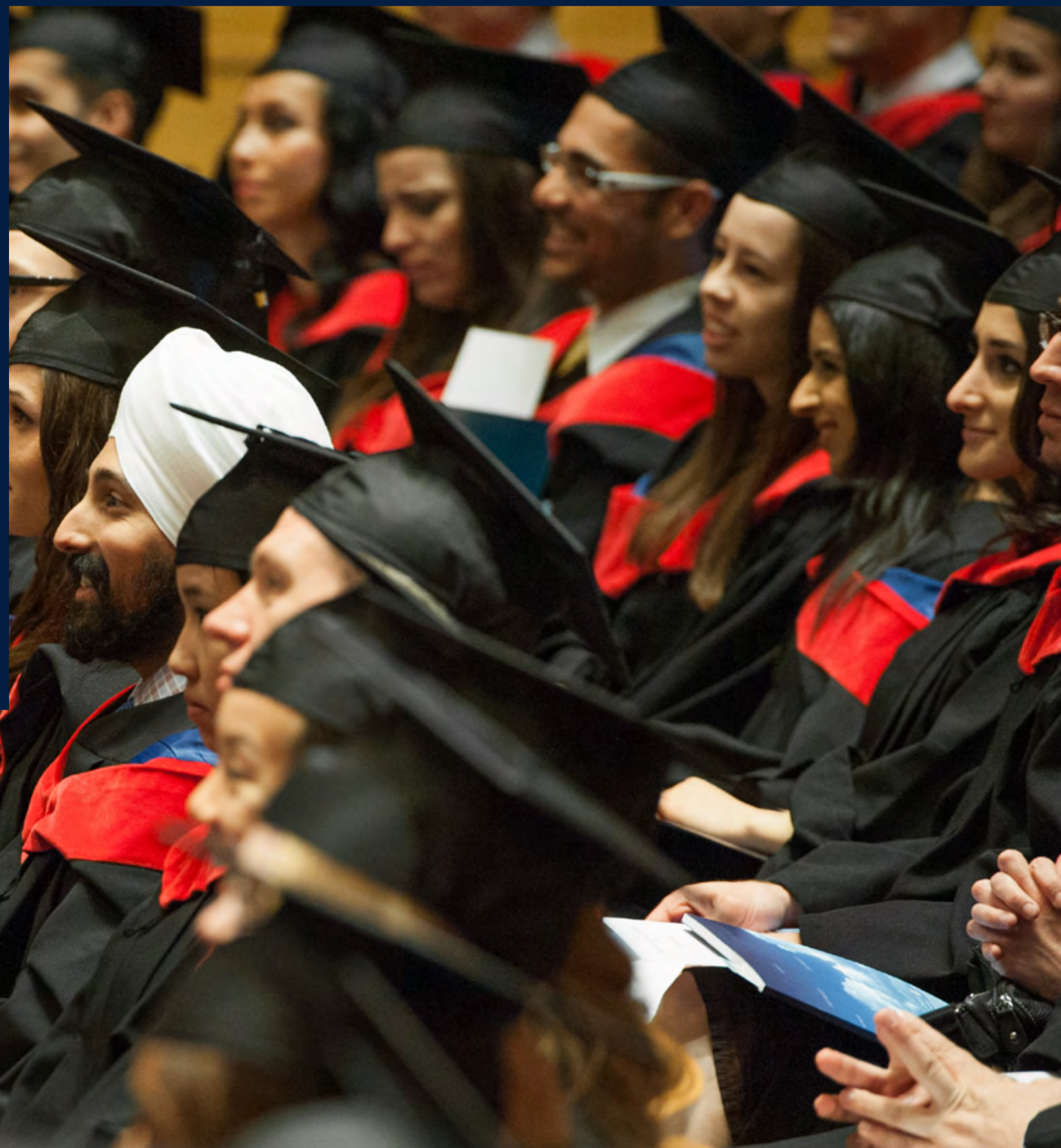
The team did it! Our accreditation team of Dr. Peter Cripton, Dr. Jenna Usprech, Dr. Negar Harandi, Tegan Stusiak, Hema Ratnasami and Rashmi Prakash led the way as the school moved through the accreditation process with flying colours.

Typically, a new post-secondary engineering program is accredited for one year with renewal intervals taking place in the years that follow but, due to the herculean efforts of SBME's accrediation team (as well as the engagement from our community) the school has officially been accredited for three years.

As we mentioned last year, this means that we're meeting the high standards of licensure, and that our degrees will be accepted by nationwide regulators as well as their international partners. It also means that Biomedical Engineering at UBC is on the map.

Our goals to continually improve and expand the culture of SBME are making an impact.

Gratitude to everyone who made this possible.



NEW BUILDING UPDATES

The building's design has been completed on schedule and there have been some exciting developments with gifts that have already been made for the planned makerspace (a story about this will be coming out by mid-2022), labs and more.

This state-of-the-art facility has been designed by **Patkau Architects** and **Architecture 49** with accessibility for all as a guiding star, from accoustics to colour palette to wheelchair accessibilty to multipurpose prayer and meditation spaces.

Want to be a part of it? Click the links below to learn more about the project and how you can donate to a future of medicine for all.

Learn About Canada's Living Laboratory

Learn How You Can Support the Project

2021 SNAPSHOT

What a difference a year makes.

PEOPLE

Science is fueled by human curiosity and is our best mechanism for progress and possibility. Despite a pandemic, we have continued to bring in curious and driven people, expanding our community of students, faculty and staff.

542 STUDENTS

375 Undergraduate Students
167 Graduate Students

85 FACULTY

35 Core Research & Teaching Faculty
42 Associate Faculty
8 Affiliate & Adjunct Faculty
across 15 departments

30+ POSTDOCTORAL SCHOLARS

25+ Postdocs
5+ Research Associates

37 STAFF

Core Facility + Administrative Staff

EXTENDING HUBS & SPOKES

Following the action items of our five-year strategic plan, we've extended the reach and capacity of our hub-and-spoke community model through new relationships and committees. The more diverse voices we add to our network, the faster we can remove barriers to participating in it.

14
MEMBER INDUSTRY ADVISORY COMMITTEE
With Partnerships, Commercialization, Education Subcommittees

6
MEMBER EXTERNAL ADVISORY COMMITTEE

11
MEMBER REDI ADVISORY COMMITEE
Indigenous Engagement Subcommittee

3
UNIVERSITIES HOSPITALS RESEARCH CLUSTERS
Expanded Partnership Programming

3
VENTURES SUPPORTED

PARTNERSHIPS

In the past year, we've created new collaborative paths and research partnerships with industry, government, academia, not-for-profits, research institutes, and beyond.

New partnerships have helped us double the capacity of our incubator space, expanding support for our resident ventures including IP strategic advising and funding.

We've also joined the **MedTech Talent Accelerator** and launched a massive **Professional Development Workshop Series** open to the entirety of our community.

Learn more about SBME Partnerships

11
CAPSTONE PROJECTS
33 participating students

60
CO-OP STUDENT PLACEMENTS
in 2021

45+
INDUSTRY PARTNERS

93%
CO-OP EMPLOYMENT RATE

SBME & 2021

ADAPTING TO A PANDEMIC

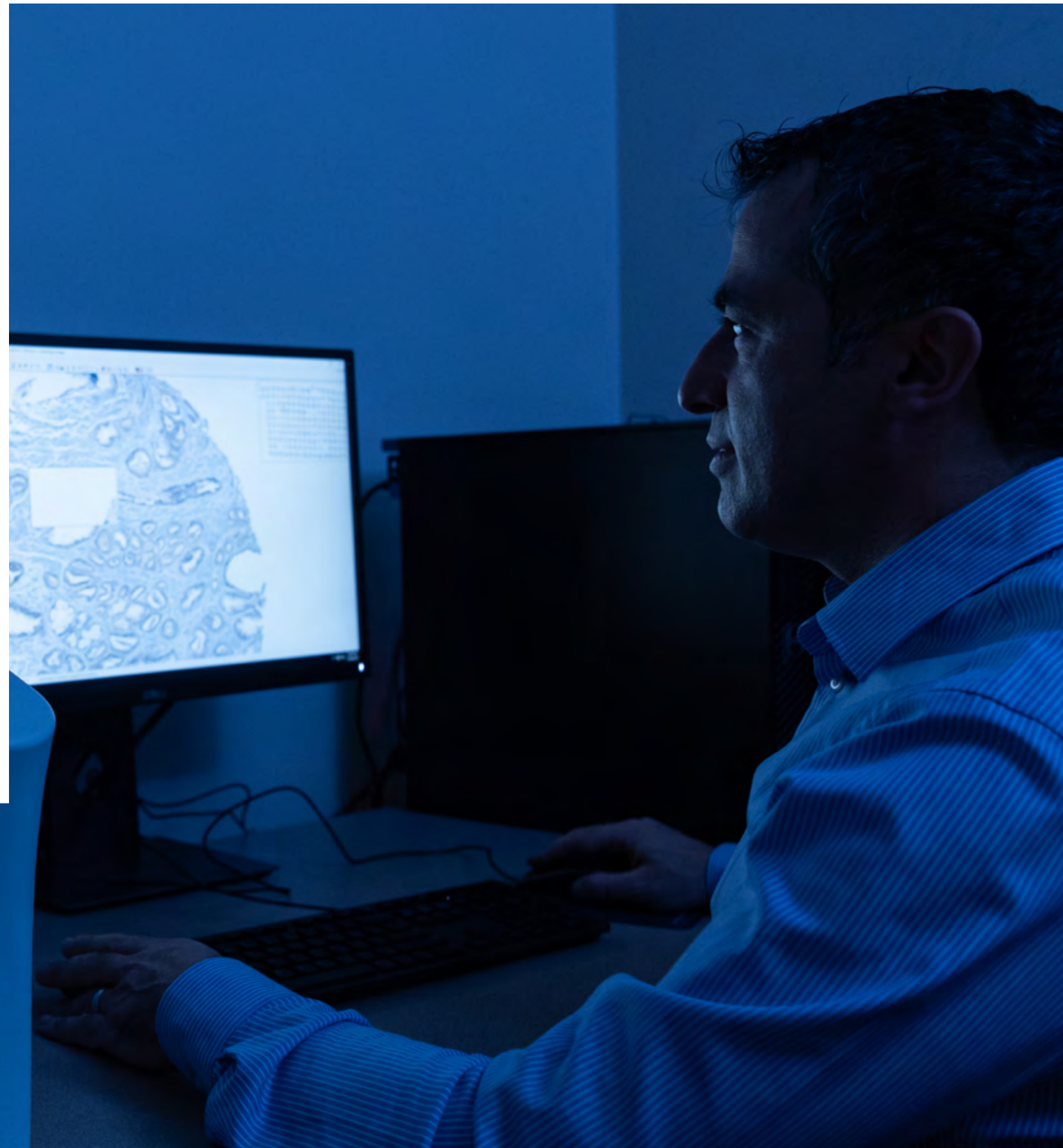
Students, faculty and staff have spent much of the last year working in either an entirely remote or hybrid model. It was no one's ideal steady-state but our community acted with all the resilience and problem solving skill that it did the year before to once again achieve far beyond any limitations of the pandemic.

Our students and faculty won **multiple awards** (including a **Vanier Scholar** and other **national recognitions**). Our students **created new solutions** and **prototypes** to medical problems that have immediate real-world impact. Our professors have continued to innovate education and have been **rewarded for those efforts**.

On top of this, our people also brought in major grants including the $24M NFRF-funded **Mend the Gap Project** which will see an SBME-led team of over 30 international scientists working to achieve what was once thought impossible: healing a damaged spinal cord.

The student body has grown, we were accredited, our faculty has expanded, and we've made national and international news across the whole of 2021, which you'll read more about below.

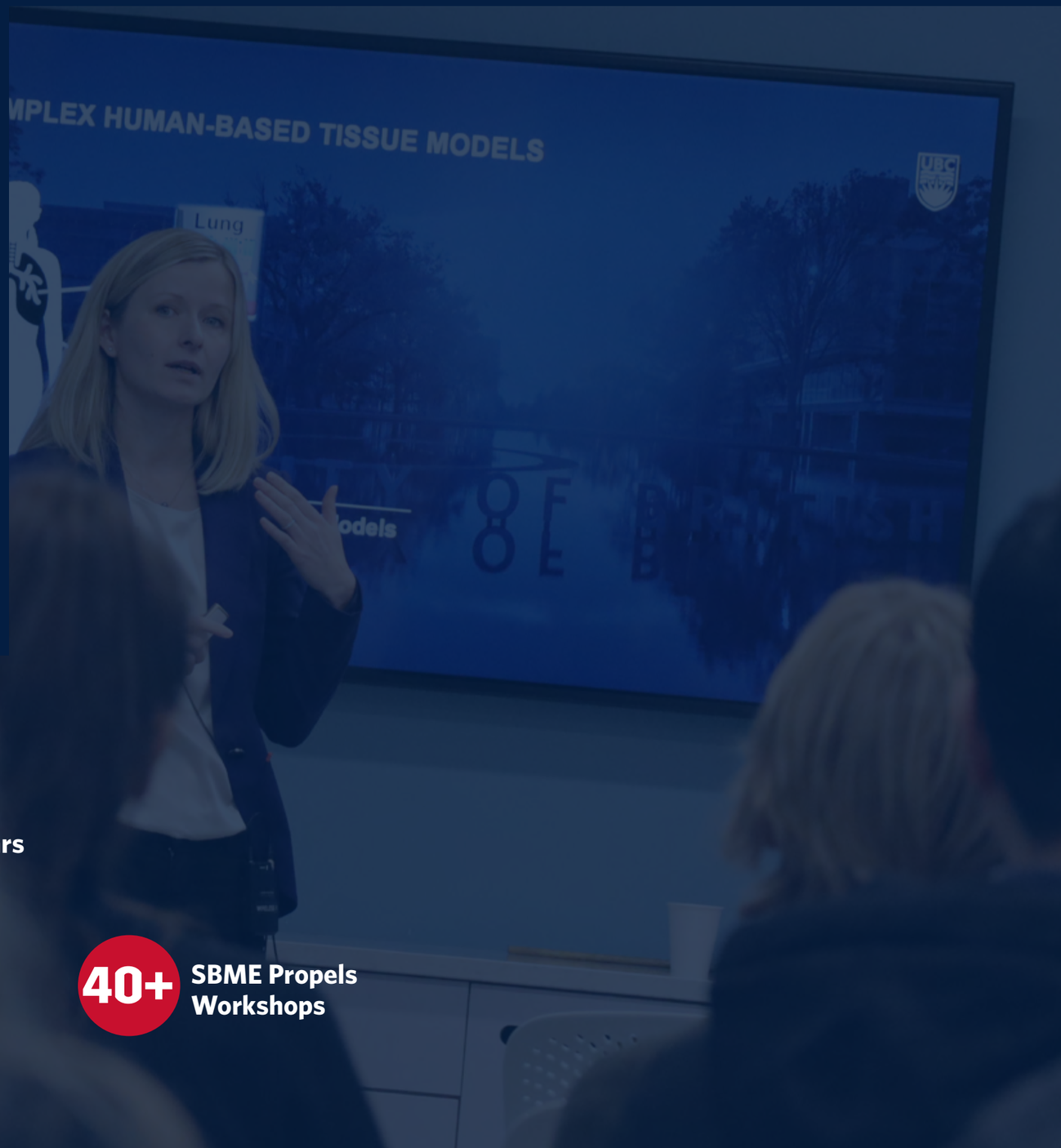
Not bad for a year spent mostly at home.



BUILDING CULTURE

Continuing our efforts from last year to connect a culture from afar, we expanded our communications and engagement platform with more research and education events, a new community newsletter **SBME Pulse,** our **annual Symposium went virtual for the first time**, we worked with **Research 2 Reality to create a video series showcasing our researchers**, we released more than thirty episodes of our podcast **SBME Interfaces**, and we even hosted a **Biomedical Engineering webinar for the Faculty of Medicine**.

We were also proud to include more talks on mental health, social justice, and leadership in academia this year as we work to better understand our community, and make it a more inclusive place.



20 SBME Invited Talks

76 SBME Research Seminars

16 SBME Special Topic Talks

21 SBME Faculty Staff Talks

40+ SBME Propels Workshops

SBME INTERFACES PODCAST

The podcast is going strong in its second year with over 600 watch hours on **our YouTube channel** and 1000 downloads across **the podcast's listings**.

We had the pleasure of interviewing incredible leaders in the BME community like **Rick Hansen**, **Wendy Hurlburt**, **Ubaka Ogbogu**, **Ananya Mukherjee Reed**, and our very own **Anna Blakney** and **Nika Shakiba**.

"Let's create labs that are 'Real World' labs, that truly represent what a scientist will face out there."

- Dr. Ubaka Ogbogu

"Let's see if we can get a group of amazing people to come together to support the idea and the dream of a person with spinal cord injury being able to summit Mount Everest."

- Rick Hansen

To watch, check out our YouTube Channel

To listen, find us wherever you get your podcasts

HIGHLIGHTING SBME INNOVATION

In September, we collaborated with Research 2 Reality to interview SBME researchers and students about their work and experience in the school.

The result has been a series of videos launched in Dec 2021 and running all the way through to mid-2022 that showcase the extraordinary work going in the school, and the extraordinary people who are making it happen.

See all the videos here

REDI

Respect Equity Diversity Inclusion. And Justice.

In a year of social and cultural turmoil that saw a public reckoning with Canada's own history of inequality and mistreatment toward Indigenous communities, it became apparent that our conversations around inclusion were not yet entirely inclusive. The difficult truths of residential schools threw into sharp focus just how recent, and how brutal, these injustices are, and how relevant they remain.

In response, SBME's REDI Committee launched the Indigenous Engagement Subcommittee to work with First Nations leaders in creating more paths to participation, especially in the life sciences, where there is a marked dearth in viable Indigenous genomic data.

As we said last year: the real gift of Equity, Diversity and Inclusion is perspective. The REDI committe conducted a community-wide survey in 2021 specifically to expand our perspectives on what is needed and where. The results of this survey have informed all REDI action items for 2022 and beyond.

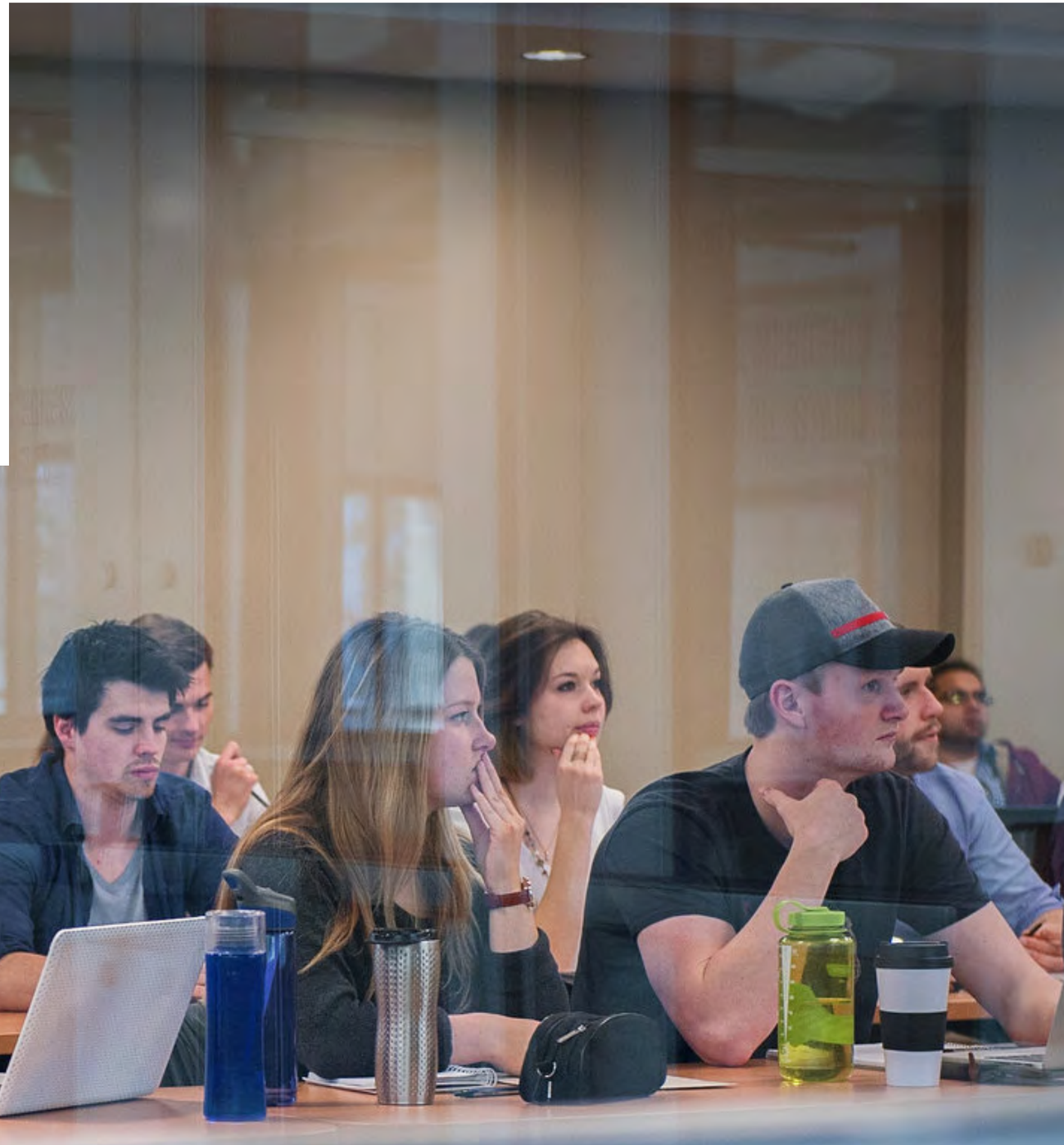
We also expanded our REDI events roster so that our community, and the larger UBC ecosystem, have ready access to the difficult process of learning and change.

Learn more about SBME REDI and stay up to date on our next steps and actions

EDUCATION

EDUCATION

One of our guiding education principles is to teach for both breadth and depth. We want students to learn not just the science, but who they are as leaders and communicators of that science. To that end, our educators added new courses that would help students think critically about their work both in the lab and as it may be presented in the public sphere. By guiding our students to go deeper, their skills only grow, and so does their potential impact.



ENGINEERS IN SCRUBS[OM]

In 2021 our EiS student teams were at it again—innovating, and making an impact as they improved on an old idea to create a **new prototype that treats infants suffering from hip dysplasia**. Special thanks goes out to the **Praxis Spinal Cord Institute** for its financial support of the program, as well as to our advising committee: **Geof Auchinleck**, **Lawrence Buchan**, **Penny Clarke-Richardson**, **Paul Cubbon**, and **Antony Hodgson**.

2021 marked 10 years of the Engineers in Scrubs program. We celebrated by making it an officially registered mark in Canada, as well as the development of an EiS-specific logo that follows our new brand conventions.

"The program gave us the opportunity to collaborate with clinicians to solve real-world medical problems, and we knew that we would end the course with something tangible."

- EiS Student Team

Learn how EiS started, and where it's going next

EiS ENGINEERS IN SCRUBS

OUR FIRST GRADUATE COHORT

2021 was the year in which we graduated our very first undergraduate cohort! These were the students who for four years played a huge part in building, shaping, and providing feedback on the new SBME undergrad program.

They worked with us, participated in and provided valuable feedback on a growing education platform, and were both leaders and ambassadors in the community. It's due in large part to their quality and resilience that we were officially accredited.

Nobody plans to graduate during a global pandemic, but these students did—and they did it in style.

"Biomedical Engineering has changed the way I think about how anything is designed."

- Gabrielle Booth, SBME Graduate, 2021

Learn about Gabrielle
Watch our faculty congratulate our grads

OUR FIRST 3MT™

SBME students put their work on the line in our very first, SBME-specific, Three Minute Thesis competition. To a virtual audience of over 90 people, each of our 10 contestants presented their thesis with nothing to help them but a single powerpoint slide.

Congratulations to our three internal winners:

1st Place: Alexi Michael
2nd Place: Justin Wyss
3rd Place: Omar Tariq

The winners from our heat moved on to compete in the overall UBC competition where one of our students, Justin Wyss, placed in the top 10.

The Three Minute Thesis (3MT) is an academic competition that assists current graduate students with fostering effective presentation and communication skills. Participants have just three minutes to explain the breadth and significance of their research project to a non-specialist audience.

Learn about the event here
View Justin's Presentation

TOMORROW'S LEADERS

Our students have achieved far more than anyone thought possible at the beginning of 2021. They are leading in the lab, in the classroom, and even in the entrepreneurial space. And they're being recognized for it as they attract top national awards like Beth Castle's Vanier Scholarship. Imagine what they can do when we establish the new norm of education and research.

"I have gained new appreciations for different techniques and approaches, experienced new ways of thinking about scientific problems, and seen the process of how lab-based science can be translated into products through the biotechnology industry.

- Beth Castle, 2021 Vanier Scholar

Read the full Vanier story here

$1.4M in Scholarships and Awards

29 Awards and Scholarships won

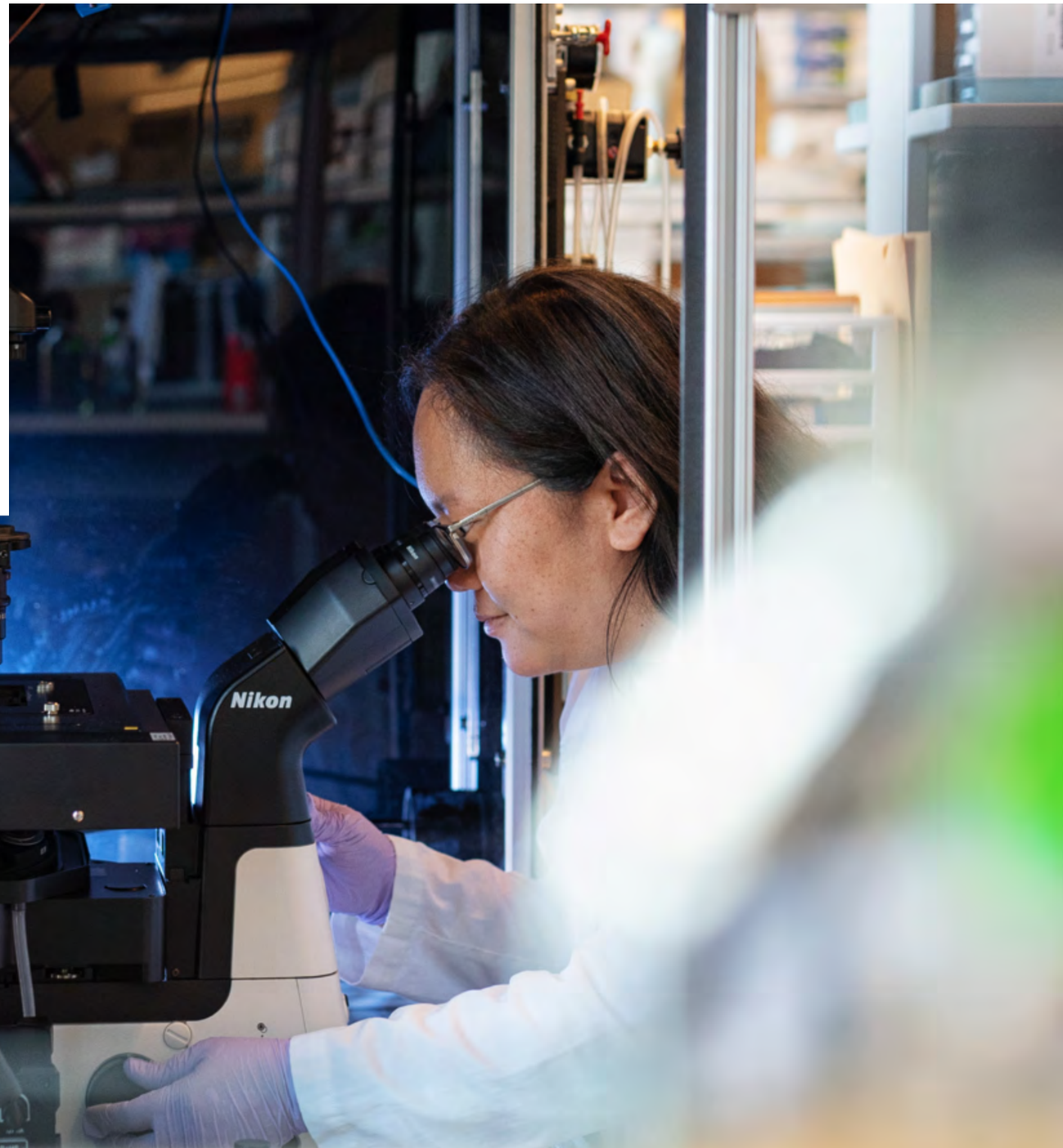
RESEARCH

4

RESEARCH

Once again our research portfolio has expanded, activating more avenues for collaboration across industry, academia and with clinical partners.

Catalyzing innovation in the biotech sector begins with our award-winning laboratories and ends with exciting discoveries on the bleeding edge of science. 2021 saw a renewed dedication to advancing both impact-driven and pure research across all three of our research pillars.



PUBLICATIONS

192

9%
IN TOP 1% JOURNALS

50%
IN TOP 10% JOURNALS

FUNDING

$18.1M

$0.5M
IN TRAINEE AWARDS

$0.7M
IN INDUSTRY CONTRACTS

$0.4M
IN CLINICAL TRIALS

$1M
IN SALARY AWARDS

$15.5M
IN OPERATING GRANTS

SBME INNOVATES

Our incubation hub for early-stage life sciences ventures on their path to market viability has once again expanded through multiple new partnerships.

Not only have we doubled the capacity of the facility, we have brought together exciting new resources for resident ventures spanning scientific mentorship, partnership support, science communication and access to the entire scope of the SBME Propels workshop series.

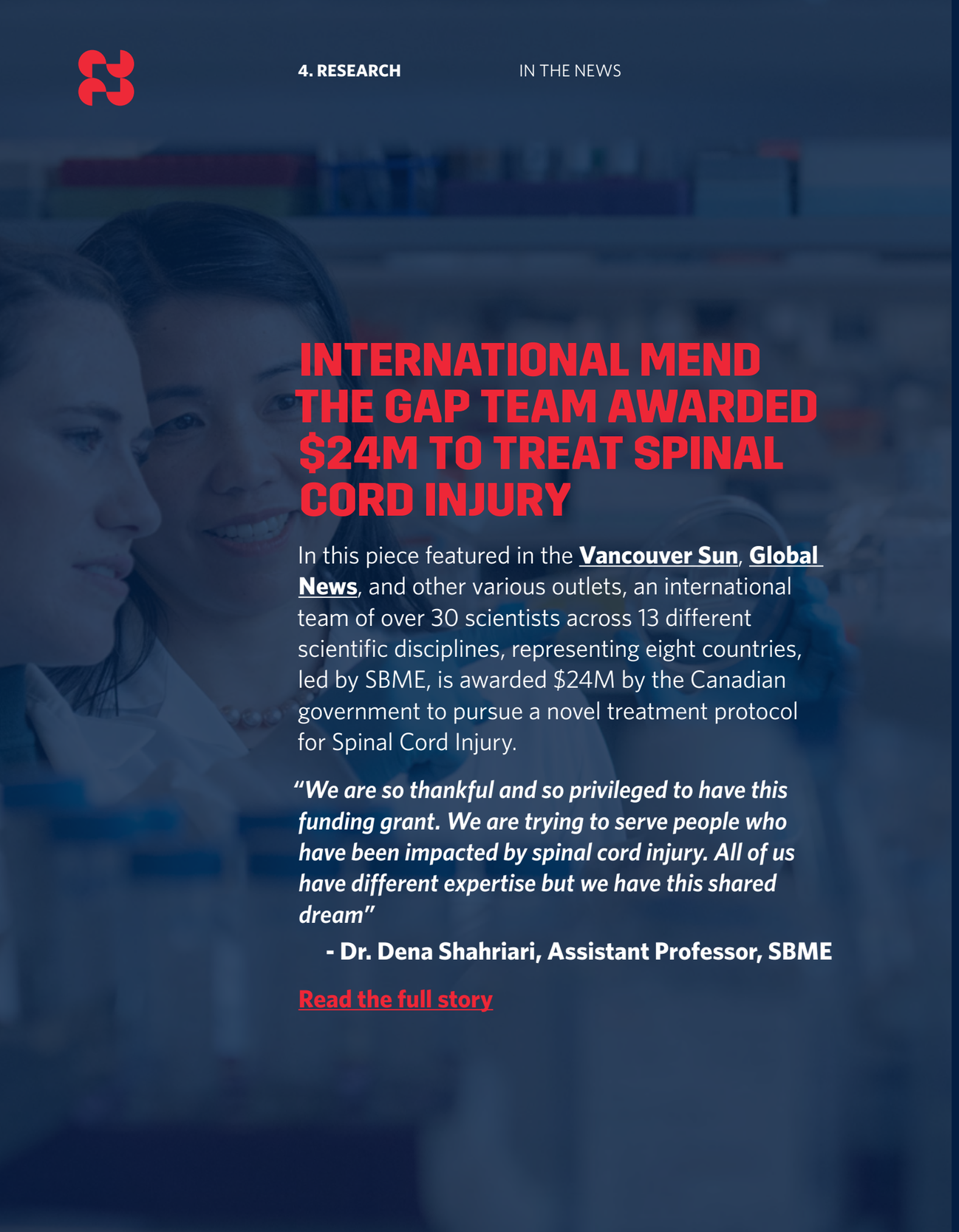
This was made possible through SBME's network of mentors, investors, and corporate and clinical partners as well as the establishment of establishment of a Commercialization Advisory Committee comprised of leaders in the space.

Special thanks to everyone who has helped us take this next step toward our goal of an SBME life sciences incubator that hosts 10+ new ventures per year.

IN THE NEWS

SBME's people are already building a future of health and healthcare for all. The national and international headlines they made this past year are evidence.

From major grants to CRC appointments, we've been busy, and the world is hearing about it.



INTERNATIONAL MEND THE GAP TEAM AWARDED $24M TO TREAT SPINAL CORD INJURY

In this piece featured in the **Vancouver Sun**, **Global News**, and other various outlets, an international team of over 30 scientists across 13 different scientific disciplines, representing eight countries, led by SBME, is awarded $24M by the Canadian government to pursue a novel treatment protocol for Spinal Cord Injury.

"We are so thankful and so privileged to have this funding grant. We are trying to serve people who have been impacted by spinal cord injury. All of us have different expertise but we have this shared dream"

- Dr. Dena Shahriari, Assistant Professor, SBME

Read the full story

DR. CAROLINA TROPINI NAMED ALLEN DISTINGUISHED INVESTIGATOR

As one of 10 new Allen Distinguished Investigators, who will be working together in teams of two or three, Dr. Tropini will explore how immune responses, metabolism, gut microbiomes and environments may contribute to widely varied symptoms and responses to treatment among people with inflammatory bowel disease (IBD).

"Our lab is very interested in studying IBD, as inflammation creates a highly modified local environment: we need multi-disciplinary approaches to tackle this complex and debilitating disease."

- Dr. Carolina Tropini, Assistant Professor, SBME

Read the full story

DR. MANU MADHAV NAMED CANADA RESEARCH CHAIR IN NEURAL CIRCUITS OF COGNITION AND CONTROL

One of our newest Faculty members, Dr. Madhav has been named a Tier 2 Canada Research Chair in Neural Circuits of Cognition and Control.

"As a scientist who likes to perform exciting but risky multidisciplinary research, and as a new immigrant to Canada, this appointment makes me feel supported as well as appreciated."

- **Dr. Manu Madhav, Assistant Professor, SBME**

Read the announcement

HOW CANADA CAN TAKE THE LEAD IN BIOMEDICAL ENGINEERING

In this Hill Times op-ed, Dr. Zandstra discusses what his appointment to the Order of Canada signals for the field of Biomedical Engineering, and the exciting future that's in store.

He also had the chance to talk about his appointment on the **Conversations that Matter podcast** as well as **Healthing**.

"Step by step, we're changing health care, and that success is getting deservedly noticed. Dr. Connie Eaves, a giant in stem cell science (and one of my PhD mentors) was also named to this year's Order of Canada cohort. So too was Dr. Pieter Cullis, a scientist who provided the key discovery that gave the world lipid nanoparticles, delivery systems that provide a way to battle everything from COVID-19 and HIV to possibly heart disease."

- Dr. Peter Zandstra, Director, SBME

Read the full op-ed

SBME UBC

SCHOOL OF BIOMEDICAL ENGINEERING

THANK YOU

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