The Canadian Medical and Biological Engineering Society and
the Atlantic Canada Clinical Engineering Society presents

CMBES/SCGB

ACCES

CMBEC47 / ACCES26

JOINT CONFERENCE

Innovations in Health: Improving Patient Outcomes through Sustainable Design & Appropriate Adoption

May 26-29, 2025

Fredericton Convention Centre
Fredericton, NB

Endorsed by: IFMBE

WELCOME

Welcome to Fredericton

Mayor's Message

On behalf of Fredericton City Council and my fellow Fredericktonians, welcome to our wonderful city! Fredericton is delighted to be host of the 2025 Canadian Medical and Biological Engineering Society and Atlantic Canada Clinical Engineering Society's joint conference.

I hope you all find these few days in Fredericton to be educational, productive and empowering. Conferences provide the necessary time and space for like-minded individuals from across the country to get together, share information, learn from each other and find innovative paths forward.

Enjoy your time in our province's Capital and be sure to take in the varied tourism offerings in Fredericton. Our city is a destination built to be discovered, with a vast trail system, vibrant arts scene, rich heritage and generous Maritime hospitality. There is something for everyone.

Thank you and take good care,

Mayor Kate Rogers

Message de la mairesse

Au nom du conseil municipal de Fredericton et de mes concitoyens, je vous souhaite la bienvenue dans notre merveilleuse ville ! Fredericton est ravie d'accueillir la conférence conjointe de la 2025e Société canadienne de génie biomédical et de la Société de génie biomédical du Canada atlantique.

J'espère que vous trouverez ces quelques jours à Fredericton éducatifs, productifs et stimulants. Les conférences offrent le temps et l'espace nécessaires pour que des personnes partageant les mêmes idées et venant de tout le pays se réunissent, échangent des informations, apprennent les uns des autres et trouvent des moyens novateurs d'aller de l'avant.

Appréciez votre séjour dans la capitale de notre province et ne manquez pas de profiter des diverses offres touristiques de Fredericton. Notre ville est une destination à découvrir, avec un vaste réseau de sentiers, une scène artistique dynamique, une histoire riche et une hospitalité maritime généreuse. Il y en a pour tous les goûts.

Sincèrement

Kate Rogers, Mairesse

WELCOME

Welcome to Fredericton

Conference Chair's Message

On behalf of the entire CMBEC47/ACCES26 Joint Conference Organizing Committee, I am pleased and honored to welcome you to beautiful Fredericton, New Brunswick, for the joining of our two Societies' annual Educational Seminars and Medical Device Trade Shows.

The Atlantic Canada Clinical Engineering Society (ACCES) and the Canadian Medical and Biological Engineering Society (CMBES) have been collaborating through shared projects for many years now. CMBEC47/ACCES26 marks the third joining of our two Societies' annual conferences, the first being in Halifax, NS, in 2012, then again in Charlottetown, PEI, in 2018.

As you can tell, this joining of our Societies doesn't come around very often, and you're a part of it here, today! I encourage you to make the most of it. Be engaged, network with your colleagues and our many generous vendors and sponsors, exchange ideas, participate, learn, make new friends, and most of all improve on our passion to support and advance safe and sustainable patient care - together!

What a program this year's Joint Conference has to offer: a half-day technical workshop; over 45 vendor booths in a two-day Trade Show; a banquet and Awards Gala with entertainment that's guaranteed to get your toes tapping; a welcome reception that doubles-up as a fundraiser for our local hospital foundation; over 20 diverse education sessions – from workshops and panels to luncheons and presentations covering a wide range of technical and professional development topics; a new 1-minute fast-track poster podium showcasing academic papers/abstracts; guided tours of local research and care facilities; and, our Societies' Annual General Meetings.

As you take it all in, I encourage you to explore the many ways in which our keynote speakers, continuing education seminar speakers, academic researchers, industry speakers, invited guests, and over 45 booth vendors have chosen to showcase this year's theme: "Innovations in Heath: Improving Patient Outcomes through Sustainable Design and Appropriate Adoption". It is my hope that you will walk away from this event with a deeper knowledge of the many ways in which we can all improve patient outcomes, every day.

Finally, I'd like to extend my deepest gratitude to all the individuals who have made this Joint Conference possible: the core Organizing Committee members and their sub-committees. These 16+ individuals graciously accepted to dedicate many hours of their days over the past year to make this marvelous event happen. They have demonstrated dedication, leadership, and passion at every step along the journey – thank you!

Sincerely, on behalf of the CMBEC47/ACCES26 Joint Conference Organizing Committee,

Welcome / Bienvenue / Kulasihkulpon!

Natalie Boudreau

WELCOME

Welcome to Fredericton

CMBES President's Message

On behalf of the Canadian Medical and Biological Engineering Society (CMBES), it is my sincere pleasure to welcome you to CMBEC47/ACCES26, our joint Conference with the Atlantic Canada Clinical Engineering Society.

Whether you are a long-time member, first-time attendee, student, industry partner, or guest, we are honoured to have you with us as we come together under the theme of Innovations in Health: Improving Patient Outcomes through Sustainable Design & Appropriate Adoption. Over the coming days, we will explore topics that highlight the critical role clinical/biomedical engineering plays in advancing safe, effective healthcare through innovation, design, and collaboration.

A heartfelt thank you to the Conference Organizing Committee, led by Natalie Boudreau, whose dedication and effort have created a rich program filled with insightful sessions, dynamic speakers, and meaningful engagement with our industry partners.

As you navigate the program and make the tough choices between sessions and events (or hallway conversations), I encourage each of you to be active participants. Ask questions, share insights, engage with experts in your field of interest, reconnect with colleagues, and forge new connections.

Also, be sure to visit our industry partners in the exhibit hall. One of the many benefits of collaborating with ACCES on this event is their strong ties to the medical device community. And thanks to holding the event at a conference centre this year (versus a hotel) we've been able to expand the number of exhibitor booths to meet growing demand. This is a valuable opportunity to connect with many exhibitors eager to showcase their latest innovations in products and services. Staying informed about these developments is one of the ways we can bring fresh ideas and added value back to our local teams.

Most importantly, thank you all for being here. This conference would not be the same without each one of you choosing to invest your time, energy, and resources into this shared experience. Let's make the most of the next few days together.

Welcome to CMBEC47/ACCES26!

Sincerely,

Sarah Kelso

WELCOME

Welcome to Fredericton

ACCES President's Message

On behalf of the entire ACCES board and the Atlantic Canada biomedical and clinical engineering community, I would like to welcome everyone to the great city of Fredericton to partake in one of the country's best technical and educational conferences. Throughout the next few days, you will enjoy the world-renowned Atlantic Canada hospitality, great food, and even better musical entertainment.

The joint conference between CMBES and ACCES has always been a successful venture and with a full vendor hall and above anticipated registration. This only shows the value of bringing these two great organizations together once again.

ACCES would like to extend a huge congratulations to the organizing committee for putting this conference together in a challenging time frame. It was a daunting task but the efforts of everyone were amazing. I want to give a special shoutout to Natalie Boudreau for taking on the role of Conference Chair. Keeping everything and everyone on track was not easy. THANK YOU!!

It will be a busy and fun-packed week but be sure to spend time with all our vendors who came here to display their latest technologies. I also encourage you to get out and visit some of the local attractions, if time permits. Network as much as you can with everyone from coast-to-coast-to-coast.

Peter Butt

AGENDA - MAY 26

Day 0 - May 26

12:00 PM – 4:00 PM: Tradeshow & Poster Set-up

Dedicated time for vendors and delegates to set-up trade show booths and hang up academic posters.

12:30 PM – 4:30 PM: Technical Workshop
Speaker: Michel Brossoit *Technical Advisor, CSA Group*
Topic: *"CSA Z32:21 Electrical safety and essential electrical systems in health care facilities"*

Join us as we explore in-depth the CSA Z32:21 Standard with topic expert and CSA Technical Advisor, Michel Brossoit. Afternoon refreshments will be provided.

6:30 PM – 8:30 PM: Welcome Reception

The Canadian Medical and Biological Engineering Society and the Atlantic Canada Clinical Engineering Society invite you to an evening of fun and games, while raising funds for a local hospital foundation.

The Chalmers Foundation
The Chalmers Foundation raises funds to support healthy, caring communities by enhancing health and well-being through innovative and effective programs and initiatives.

"*Meeting the needs of our patients is the primary goal of Horizon's Dr. Everett Chalmers Regional Hospital and the Foundation. The Chalmers Foundation works with Horizon to identify the highest priority medical equipment and health care projects that are not funded with government funding.*"

AGENDA - MAY 27

Day 1 - May 27

7:30 AM – 3:30 PM: Registration

Register, pick up your conference badge, and ask questions - we'll be here all day!

7:30 AM – 8:30 AM: Breakfast

Fuel up for the day ahead.

8:30 AM – 8:45 AM: Grand Opening

Join your colleagues as CMBEC47/ACCES26 Joint Conference Chair, Natalie Boudreau, comes up to the podium alongside esteemed guests, Annick Godin Bourque, Vice President of Health Services at Service New Brunswick and Jon Sensinger, Director at the Institute of Biomedical Engineering, and Professor of Electrical and Computer Engineering at the University of New Brunswick, to kick-off the Conference.

9:00 AM – 10:00 AM: Opening Keynote: Virtual Technologies for Improved Outcomes in Rehabilitation

This session will explore the current and emerging applications of virtual technologies, enabling synchronous and asynchronous telerehabilitation through mainstream platforms such as videoconferencing and virtual reality, to advanced applications of robotics, biosensors and augmented reality. Offering improved access, such technologies can overcome geographic and environmental obstacles allowing rehabilitation assessment, therapy and support for persons with disability, with demonstrated utility in situations of disasters and humanitarian crisis. Dr. O'Connell will share her experiences "in the field" over 25 years of employing virtual rehabilitation care.

Colleen O'Connell, MD, FRCPC is a professor of Physical Medicine and Rehabilitation at Dalhousie University. She specializes in neuro-rehabilitation, and is Medical Director and Research Chief of New Brunswick's Stan Cassidy Centre for Rehabilitation and is Clinical Research Director of University of New Brunswick Institute of Biomedical Engineering.

As Co-Chair of the World Health Organization supported World Rehabilitation Alliance, and chair of the International Spinal Cord Society emergencies subcommittee, she collaborates with an international team to advocate for the strengthening of rehabilitation in health systems. Research interests are broad, tending to early adoption of technology (FOMO) in mobility and function. She has authored and provided technical guidance on rehabilitation in the humanitarian space, including disaster and conflicts, with infield emergencies humanitarian work including Haiti, Nepal and Ukraine.

AGENDA - MAY 27

Day 1 - May 27

9:45 AM – 10:00 AM: Refreshment Break

Refreshments served inside the Trade Show Area.

10:00 AM – 11:30 AM: A1 Academic Program

A1.1 PACT: A predictive algorithm for automated upper-limb prosthetic socket design
Vishal Pendse, Calvin C. Ngan and Jan Andrysek

A1.2 End-To-End Automated Mean Linear Intercept Measurement System
Atallah Madi and Adrian Chan

A1.3 Investigating the Efficacy of an EMF Blocking Blanket on Sleep Quality
Madhuri Sinha, Zahra Moussavi and Abnoor Kaur

A1.4 Modeling Blood Flow in Microcirculation: An In Vitro Study Using Capillary Microchannels
Maya Salame and Marianne Fenech

10:00 AM – 11:30 AM: B1 Industry Innovation Program

B1 The Power of Virtual Reality in MedTech Innovation
Seana Martin, Senior Product Manager, Clinical Education, Draeger Medical Canada Inc.
Explore the transformative impact of virtual reality (VR) on healthcare training in this presentation tailored for the medtech sector. Delve into how VR has the potential to enhance critical decision-making skills, improve communication, and foster collaboration among healthcare professionals. Discover the ultimate promise of VR in revolutionizing training methodologies and accelerating advancements in healthcare.

AGENDA - MAY 27

Day 1 - May 27

10:00 AM – 11:30 AM: C1 Clinical Engineering Program

C1 Panel on Standards used in Canada related to the Application of Electrical Safety in Healthcare

C1.1 Overview of CSA Z32

Glen Hughes, Engineering Manager, NB Hospital Medical Engineering Program, Institute of Biomedical Engineering, University of New Brunswick

Overview of CSA Z-32 Electrical safety and essential electrical systems in health care facilities: History, Applicability, How it ties into regulation, and what we may expect as future changes/challenges.

C1.2 Overview of CSA 60601

Michel Brossoit, Technical Advisor, CSA Group

Overview of CAN/CSA-C22.2 NO. 60601-1:14 (R2022) Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance: History, Applicability, How it ties into regulation, and what we may expect as future changes/challenges.

C1.3 Overview of IEC 62353

Michel Brossoit, Technical Advisor, CSA Group

Overview of IEC 62353 Medical electrical equipment - Recurrent test and test after repair of medical electrical equipment: History, Applicability, How it ties into regulation, and what we may expect as future changes/challenges.

C1.4 Overview of SPE-3000

Pierre Daigle, Chief Electrical Inspector, Department of Public Safety, Government of New Brunswick

Overview of CSA SPE-3000:19 Model code for the field evaluation of medical electrical equipment (MEE) and medical electrical systems (MES): History, Applicability, How it ties into regulation, and what we may expect as future changes/challenges.

11:40 AM – 12:00 PM: P1 Poster Fast Track

1-minute Podium Presentations by accepted poster authors/presenters.

12:00 PM – 1:00 PM: Lunch

Thank you to our lunch sponsor:

CMEPP
Trust.Flexibility.Savings

AGENDA - MAY 27

Day 1 - May 27

12:00 PM – 1:00 PM: Lunch & Learn

The Repair and Maintenance Landscape in 2025: CMEPP's Perspective and the Delegate Experience

*TJ Jarvis, Director, National Participant Accounts, CMEP*P

CMEPP will present an overview of the pressures facing hospitals and biomedical engineers in the current environment and how we're working with hospitals to optimize the life of equipment in view of these constraints. A key part of our strategy is introducing cost mitigation strategies that give clarity and time back to hospital staff. Interaction will be integrated throughout the presentation, with questions for delegates aimed at promoting discussion about new approaches and how we can shape a positive path forward.

1:00 PM – 1:30 PM: Dessert Break

Dessert served inside the Trade Show Area.

1:00 PM – 1:30 PM: Poster Presentations

Self-directed viewing of Posters.

1:10 PM – 1:25 PM: Premium Exhibitor Demo

Stop by Booth #11 for a special demonstration by Baxter Corporation.

1:30 PM – 3:00 PM: A2 Academic Program

A2.1 Validation of Centre of Pressure Trajectory from a Portable Gait System
Kasra Moradi and Chris McGibbon

A2.2 A Mechatronic Needle Guidance System for Prostate-Specific Positron Emission Tomography and 3D Transrectal Ultrasound-Guided Trans-perineal Prostate Biopsy
Sule Karagulleoglu-Kunduraci, Jeffrey Bax, Lori Gardi, David Tessier, Alla Reznik, Ian A. Cunningham and Aaron Fenster

A2.3 Enhanced Image Processing of Implanted Hydrogel Scaffold Images Using Propagation-Based Imaging Computed Tomography
Xiao Fan Ding, Zahra Khoz, Daniel Chen and Ning Zhu

A2.4 Preliminary Characterization of Transradial Prosthesis Alignment
Katrina Meng, Calvin C. Ngan and Jan Andrysek

AGENDA - MAY 27

Day 1 - May 27

1:30 PM – 3:00 PM: B2 Industry Innovation Program

B2.1 Invisible Gaps: Skin Tone Bias in Pulse Oximetry

Chekema Prince, Medtronic Canada

Pulse oximeters are indispensable in patient monitoring, providing a noninvasive estimate of arterial oxygen saturation (SpO_2) that informs critical clinical decisions across care settings. However, growing evidence reveals that these devices may not perform equally for all patients. In particular, skin pigmentation has been shown to affect measurement accuracy. Melanin can alter how red light is absorbed by the skin, potentially leading to overestimated SpO_2 readings and unrecognized hypoxemia in patients with darker skin tones. Emerging research also points to the compounding effects of additional factors, such as low perfusion, that further impact device performance. These findings underscore an urgent need to address disparities in how medical technologies serve diverse patient populations. This presentation will explore the cumulative impact of skin pigmentation and low perfusion on pulse oximeter accuracy, highlighting both the clinical implications and the broader equity concerns they raise. We will also examine potential solutions, including more inclusive testing protocols, improvements in device design, and clinical strategies to mitigate risk. By narrowing the accuracy gap, we move closer to achieving equitable care for all patients.

B2.2 Leveraging Handheld Ultrasonic Technology for Leak Detection in Medical Environments

Colin Sewell, Founder and CEO, Prosaris

In critical medical environments, the integrity of compressed air, gas, and vacuum systems is non-negotiable. Even the smallest leak can compromise sterility, patient safety, and operational efficiency.

This presentation explores the transformative role of **handheld ultrasonic visual and audible devices** in proactively identifying and locating leaks within these systems, often before they escalate into failures.

Ultrasonic leak detection is a non-invasive, real-time method that is ideally suited to the noise-controlled, regulation-heavy settings of healthcare facilities. Devices operating in the 10-80 kHz range are capable of pinpointing high-frequency emissions from leaks in oxygen lines, suction systems, and compressed air and other medical gas networks even in the presence of ambient noise.

With recent advances in **MEMS microphone arrays, AI-based acoustic imaging**, and **24-bit high-resolution audio capture**, modern handheld tools provide a fast, intuitive alternative to traditional inspection methods.

This talk will showcase how ultrasonic technology aligns with medical facility maintenance standards, supports NFPA 99, ISO 7396-1 and HTM 02-01 compliance, and contributes to sustainability goals by reducing energy waste. Through real-world case studies and visual demonstrations, attendees will gain insight into why handheld ultrasonic tools are becoming an essential part of medical asset integrity and predictive maintenance programs.

AGENDA - MAY 27

Day 1 - May 27

1:30 PM – 3:00 PM: C2 Clinical Engineering Program

C2.1 Lessons Learned from Effective Password Management for Medical Devices in Hospitals
Victoria Lu

C2.2 A Regional Review of Flexible Endoscope Service Delivery Models and Preventive Maintenance Practices
Nancy Suarez

C2.3 A Provincial Strategy for Clinical Engineering SOP and Policy Standardization: Challenges, Findings, and Solutions
Maryam Samiee, Chris Bzovey and Mohammed Tawhidul Islam

1:30 PM – 3:00 PM: CE2 Continuing Education Program

CE2 Healthcare Incident Investigation Best Practices and the ECRI Alerts Program
Jeremy Suggs, Engineering Manager and Sr. Investigator HII-Tech Consulting & Device Safety, ECRI
Tom Toczylowski, Associate Director, Alerts, ECRI

ECRI has been the world's primary source of independent, trustworthy medical technology evaluation for more than fifty years. Over the years, we have conducted thousands of healthcare incident investigations designed to uncover and document facts, determine causes, and prevent recurrence. Our accumulated knowledge, honed expertise, and unbiased judgment is coupled with a systems approach that considers technology, users, patients, and the environment. We will give an overview of what we've found to be effective and help you manage and investigate incidents at your facility. In addition, we will discuss ECRI's role in helping healthcare facilities with medical device recall management, and provide best practices on helping you manage technology recalls and corrections.

3:00 PM – 3:30 PM: Refreshment Break

Refreshments served inside the Trade Show Area.

1:00 PM – 1:30 PM: Poster Presentations

Self-directed viewing of Posters.

1:10 PM – 1:25 PM: Premium Exhibitor Demo

Stop by Booth #13 for a special demonstration by Getinge.

AGENDA - MAY 27

Day 1 - May 27

3:30 PM – 5:00 PM: B3 Industry Innovation Program

B3 Medical Device Incident Reporting – Health Canada

Jimmy Huynh, Problem Report Information Specialist, Medical Devices Operations Section, Health Products Surveillance and Epidemiology Bureau, Health Canada

Medical device reporting for medical devices consists of a combination of spontaneous reports from various sources and mandatory reporting by hospitals and manufacturers and importers of medical devices. In this presentation, attendees will learn about the reporting of Medical Device Incidents with a focus on mandatory reporting by hospitals and voluntary reporting via the Canadian Medical Devices Sentinel Network (CMDSNet), a pro-active surveillance program.

Health Canada will outline the medical device program's departmental structure and provide an overview of the regulations for medical devices and medical device reporting. The presenter will also provide tips on how to recognize a Medical Device Incident, information on the incident investigational processes from the regulator's perspective and the number of mandatory and voluntary reports submitted to Health Canada for the year of 2024.

Attendees will leave with a better understanding of the Medical Device Reporting before and after the submission to Health Canada.

The presentation will be followed by an open Q&A session.

3:30 PM – 5:00 PM: C3 Clinical Engineering Program

C3 Biomedical Education in Canada

Payal Mandot, Clinical Engineer, Children's Hospital of Eastern Ontario
Adrian Chan, Professor, Department of Systems and Computer Engineering, Carleton University
Rachel Patenaude, Acting Chair - Biomedical Engineering Technology, Northern Alberta Institute of Technology

This session will present the current state, the challenges and opportunities in education regarding biomedical engineering, clinical engineering and biomedical technology.

AGENDA - MAY 27

Day 1 - May 27

3:30 PM – 5:00 PM: CE3 Continuing Education Program

CE3 The Engineer's Role in Alarm Fatigue: Balancing Safety Strategies and Caregiver Well-Being
Rebecca Paalman, Senior Director of Clinical Strategy and Solutions, Stryker

Biomedical and Clinical Engineers play a vital role in shaping how alerts impact patient safety and caregiver experience. With nurses spending nearly half their time on administrative tasks instead of direct care, optimizing alarm management is key to reducing cognitive burden and improving workflows.

This session explores frontline insights, industry best practices, and emerging technologies to help ensure alerts reach the right person at the right time.

Attendees will gain a deeper understanding of how intelligent alarms, dynamic clinical workflows, and data-driven decisions enhance both patient safety and clinician well-being.

5:00 PM – 6:00 PM: ACCES Annual General Meeting

Agenda
1. Review of Agenda
2. Review of Previous AGM Minutes
3. Director's annual reports
   - Webmaster
   - Education
   - Finance
   - Memberships
   - Communications
   - Secretariat
   - President
4. Appointment of Officers
5. Selection of Annual Auditor

New Business
6. Issues Arising
7. Close and Schedule

AGENDA - MAY 28

Day 2 - May 28

7:30 AM – 3:30 PM: Registration

Register, pick up your conference badge, and ask questions - we'll be here all day!

7:30 AM – 8:30 AM: Breakfast

Fuel up for the day ahead.

8:30 AM – 8:45 AM: Welcoming Remarks

Join your colleagues as CMBEC47/ACCES26 Joint Conference Chair, Natalie Boudreau, kicks off day 2 of the Conference.

9:00 AM – 10:00 AM: Opening Keynote: From PhD to MedTech CEO: Untold Stories of the Road Less Traveled

Are non-linear careers the future of work? Inevitably yes, according to a recent article in Forbes[1]. Join me to hear how my career took me from a PhD Chemist to a two-time MedTech CEO. Learn how to recognize the signals for navigating the career path that uniquely awaits you. I'll also share the secrets I learned about what it takes to create products that impact peoples' lives, highlight important skills for industry, and why I think the future of healthcare innovation relies on clinical engineers.

[1]Suggested background reading (3 minute read): "Why Non-Linear Careers Are The Future Of Work" Forbes online March 18, 2025.

Fazila Seker, PhD, has 20+ years of experience in new technology commercialization within healthcare, energy, and specialty materials sectors. She has held leadership roles with the GE Global Research Center in Niskayuna, NY; MaRS Innovation and, as Co-Founder, President and CEO of MOLLI Surgical (acquired by Stryker) in Toronto, Canada.

In 2023, Fazila was appointed CEO and Board Director of Insight Medbotics, an early-stage medical device company developing a new category of surgical robotics for use inside MRI. Under Fazila's leadership, the company achieved the first and only FDA 510K clearance for use of a robot inside MRI and is focused on enabling a better standard of precision cancer care, starting with prostate.

Building high-performance, award-winning cultures means Fazila's teams have been recognized for their work across her career. Those accolades include Gold in the prestigious Medical Design Excellence Awards in the ER & OR (tools and supplies category); TIME Best Inventions 2022; Fast Company Next Big Things in Tech 2022; the 2021 list of Best WorkplacesTM Managed by Women; and the 2022 list of Best WorkplacesTM in Health Care.

AGENDA - MAY 28

Day 2 - May 28

9:45 AM – 10:15 AM: Refreshment Break

Refreshments served inside the Trade Show Area.

10:15 AM – 11:45 AM: A4 Academic Program

A4.1 Mixed Reality-Enhanced Translation of CTA Data for DIEP Flap Reconstruction
Tony Jiang, Philip Edgcumbe, Joshua Ho, Michael Martin, Michael Stein and Kathryn Isaac

A4.2 Automatic Segmentation of the Left Ventricle from Pediatric Echocardiography Images Using SegFormer Architecture
Melisa Mateu, Jimena Olveres-Montiel, Boris Escalante-Ramírez, Marie Josée Raboisson, Joaquim Miró and Luc Duong

A4.3 Automatic Hand Hygiene Monitoring Systems for Infection Prevention in Healthcare Settings: A Short Review of Literature
Ali Barzegar Khanghah, Shaghayegh Chavoshian and AtenaRoshan Fekr

A4.4 Slip Resistance Comparison of Footwear on Two Flooring Types Using Mechanical Testing Approach
Shaghayegh Chavoshian, Chantal Gauvin and Atena Roshan Fekr

10:15 AM – 11:45 AM: B4 Industry Innovation Program

B4 Technology Meets Possibility - The Future of 3D Printing for Healthcare
Mark Gillingham, President, PolyUnity Tech Inc.

Join PolyUnity Tech at CMBEC for a forward-looking session on how medical 3D printing is evolving into a critical pillar of modern healthcare. From bio-printed implants and open-source repair parts, to personalized assistive devices – 3D printing is taking us into a future of care that's faster, smarter, and deeply patient-centred.

This presentation explores where the technology is headed, what breakthroughs are emerging at the edge, and how engineers, clinicians, and healthcare leaders can shape what comes next. This isn't another trend; it's a transformation. Don't get left behind and join us in leading the change!

AGENDA - MAY 28

Day 2 - May 28

10:15 AM – 11:45 AM: C4 Clinical Engineering Program

C4 Introduction to the CMBES Clinical Engineering Information Technology Working Group

Alan Spurway, Clinical Engineer, Medical Device Cybersecurity, Nova Scotia Health
Greg Dickinson, Healthcare Technical Lead, Clinical Engineering Program Management Group, Service New Brunswick
Danny Yang, Clinical Engineer, University Health Network

This presentation is an introduction to the CMBES Clinical Engineering Information Technology (CEIT) working group, our mission, our initial progress, and will provide an interactive workshop to discuss common interface issues between CE and IT.

10:15 AM – 11:45 AM: CE4 Continuing Education Program

CE4 Resuscitation Technologies: A Check on State of the Art and Technology Updates

Kellan King, Technical Service Manager, ZOLL Medical Canada
Shelley Buckborough, Territory Manager, Braemed Ltd.

Kellan King is the Technical Service Manager at ZOLL Medical Canada and has his Bachelors Degree in Biomedical Engineering from the University of Guelph and Project Management from McGill. With expertise in medical device management and biomedical technology, Kellan plays a key role with Zoll in supporting the development and implementation of cutting-edge innovations in resuscitation and patient monitoring. So, it was felt that this was a “winning combination” to provide our CMBES and ACCES memberships with an update on latest technologies being used in resuscitation (both in-centre and in the field) as well as tools that are at a biomed’s disposal to support their clinical partners who use these technologies.

AGENDA - MAY 28

Day 2 - May 28

12:00 PM – 1:00 PM: Women in STEM Luncheon

Empowering Equity-deserving Groups to Foster Innovation

Join us for an insightful panel discussion where we explore the critical role of equity-deserving groups in driving innovation within the biomedical engineering and medical device industry. Our distinguished panelists, including leaders in entrepreneurship, clinical practice, and engineering, will share their experiences and successes in creating inclusive environments that empower diverse voices. Discover how fostering equity not only enriches the engineering field but also leads to groundbreaking advancements and sustainable solutions. Be part of the conversation that champions diversity, equity, and innovation.

Presented in partnership with IFMBE Women in Engineering.

Fazila Seker, PhD, has 20+ years of experience in new technology commercialization within healthcare, energy, and specialty materials sectors. In 2023, Fazila was appointed CEO and Board Director of Insight Medbotics, an early-stage medical device company developing a new category of surgical robotics for use inside MRI.

Colleen O'Connell, MD, FRCPC is a professor of Physical Medicine and Rehabilitation at Dalhousie University. She specializes in neuro-rehabilitation, and is Medical Director and Research Chief of New Brunswick's Stan Cassidy Centre for Rehabilitation and is Clinical Research Director of University of New Brunswick Institute of Biomedical Engineering.

Michael Barton, Clinical Engineer with Nova Scotia Health, has been practicing Biomedical Engineering for 27 years. He graduated from the Electrical and Computing Engineering undergrad and Master's programs from UNB.

Rashmi Prakash leads a dynamic team of 8 engineers and nurses who have developed an innovative, 100% compostable menstrual pad that utilizes natural fibres derived from repurposed food and crop waste.

Marla Calder has been a practicing occupational therapist for the past 25 years who has worked in the field of Assistive Technology for more than 19 years at the Stan Cassidy Centre for Rehabilitation in Fredericton, New Brunswick.

Rachelle Bernier has an education in Biomedical Mechanical Engineering and has been working as a Rehabilitation Engineer at the Stan Cassidy Centre for Rehabilitation for 7 years.

Clinical Engineering | Continuing Education | Industry Innovation | Academic Podium | Academic Posters | Trade Show

AGENDA - MAY 28

Day 2 - May 28

12:00 PM – 1:00 PM: Lunch

Fuel up!

1:00 PM – 1:30 PM: Dessert Break

Dessert served inside the Trade Show Area.

1:00 PM – 1:30 PM: Poster Presentations

Self-directed viewing of Posters.

1:10 PM – 1:25 PM: Premium Exhibitor Demo

Stop by Booth #6 for a special demonstration by Savaria Patient Care and Lawtons Home HealthCare Equipment Division.

1:30 PM – 3:00 PM: B5 Industry Innovation Program

B5 Incorporating Wearables in Patient Care Environment

Myles Smith, Masimo

Wearable sensor technology within and outside the hospital is becoming more and more common. Masimo is one of the leading companies in this space, developing wearable devices for vital signs capture that are both convenient to wear for the patient and every bit as reliable and accurate as the tethered solutions traditionally used in hospital. Our ambition at Masimo is to provide solutions that enable all patients to be monitored continuously within the hospital with data flowing to your connected solution. Please join us to learn more about how wearable, connected devices can fit into your hospital ecosystem.

AGENDA - MAY 28

Day 2 - May 28

1:30 PM – 3:00 PM: C5 Clinical Engineering Program

C5 Right to Repair Working Group Updates

C5.1 Update on the Right to Repair Working Group
Ted MacLaggan, Vancouver Island Health Authority

C5.2 An Update on Canada's Medical Right to Repair & the Unlocking Healthcare Research Project
Anthony D. Rosborough, Assistant Professor of Law & Computer Science, Dalhousie University

Canada has taken bold steps toward the Right to Repair over the last year at both the federal and provincial levels. Professor Anthony Rosborough will cover recent legislative developments furthering the Right to Repair in Canada and their potential impacts for the medical device industry. Professor Rosborough will also provide an update on his research project Unlocking Healthcare, which involves an investigation into the technical and legal barriers to independent medical device repair in Canada.

C5.3 Competition Policy and the Right to Repair
Keldon Bester, Executive Director, Canadian Anti-Monopoly Project

Recent years have seen Canada's competition policy experience a sea change as federal policy makers reform ineffective law and the Competition Bureau steps up enforcement activity across the economy. While competition policy touches all parts of the economy, there is a particularly rich intersection with the growing international right to repair movement. The presentation will provide an overview of the changes that have taken place in the competition policy space and speak to the potential of Canadian competition policy to complement broader right to repair efforts.

AGENDA - MAY 28

Day 2 - May 28

1:30 PM – 3:00 PM: CE5 Continuing Education Program

CE5 A Survivor's Guide to EMC and Spectrum Management in the Hospital Environment

Michael Barton, Clinical Engineer, Cross-appointed: NSH Redevelopment (NS Build) and Clinical Engineering Department, Nova Scotia Health

The exponential proliferation of wireless devices in our hospitals means that spectrum management is even more important than ever. Biomedical Engineering has a key role to play in managing the spectrum in its hospitals. Indeed, spectrum management and electromagnetic compatibility / electromagnetic interference (EMC/EMI) has its own section in the CMBES Biomedical Engineering Standards of Practice. Recall that Accreditation Canada bases several of its evaluation criteria on this SOP so, EMC is expected to be managed by Biomed in a concerted manner.

My goal with this talk is to provide you some tools and a few ideas on how you might adapt your current EMC programs to address the current and coming wireless challenges even better. I will share with you some tips and tricks that I have picked up over my 27 years practicing Biomedical Engineering since graduating from the Electrical and Computing Engineering undergrad and Master's programs from UNB. This will not be a lecture on deriving Maxwell's Equations; that's the realm of the E3 engineer. I will go over the key maths required, but really, this is intended to be a very practical talk to help you immediately in your work supporting your hospital.

3:00 PM – 3:30 PM: Refreshment Break

Refreshments served inside the Trade Show Area.

3:00 PM – 4:00 PM: Poster Presentations

Self-directed viewing of Posters.

3:30 PM – 5:00 PM: B6 Industry Innovation Program

B6 Mobile MRI - Challenges, Innovations, Virtual Cockpit and Mobility

Kevin Losier, Project Manager, Siemens Healthineers

The MRI field confronts significant sustainability and accessibility challenges, driven by extended waiting lists and staff shortages. This presentation will highlight innovative solutions to enhance patient access to this essential imaging modality. Technologies like the Syngo Virtual Cockpit enable remote operation, streamlining workflows and expanding access to advanced diagnostics. We will also be discussing the various implementation methods currently available, beyond the traditional MRI trailer.

AGENDA - MAY 28

Day 2 - May 28

3:30 PM – 5:00 PM: C6 Clinical Engineering Program

C6.1 Role of Medical Engineering in Patient Handling Equipment Support
Liane Ladouceur and Keili Shepherd

C6.2 Capital Planning in Imaging: A Dashboard Approach for Strategic Decision-Making
Griffin Copp, Sonja Pejcic and Ian Connell

C6.3 Usability Evaluation of Computerized Maintenance Management System Replacement in British Columbia Biomedical Engineering
Cherryl Li, Alanna Bateman, Elizabeth Pratt and Emily Rose

C6.4 Leveraging Existing Vital Signs Monitors for Early Warning Score Implementation
Liane Ladouceur and Danny Yang

C6.5 Transforming Health Systems through Digital Infrastructure: Insights from CSA Z8005
Taurai Kurebwa and Andrew Henneberry

3:30 PM – 5:00 PM: CE6 Continuing Education Program

CE6 Current and Next Generation Anaesthesia Technologies
Danny Van Kersschaver, Marketing Manager Workplace Infrastructure and Systems and ad interim Marketing Manager Patient Monitoring, Draeger Medical Canada Inc.

Join us for a check-in on the current state of the art, as well as a look forward to coming technologies would be well-timed for everyone right across Canada. With TIVA really taking off, targeted anaesthesia really becoming popular, changes in agent usage (reducing if not eliminating Des & N2O to be greener, for instance), smarter syringe pumps, lower and lower flow anesthesia with tighter and tighter circuits, and other practice shifts, it just seems a perfect time to “take the pulse” as well as hear what’s on the horizon.

Draeger Canada has arranged for Danny Van Kersschaver, their Marketing Manager Workplace Infrastructure & Systems (and Covering for Monitoring/IT and Digital Products) to talk about these next generation anesthesia technologies.

5:00 PM – 6:00 PM: ACCES Exhibitor Awards and Cocktail Reception

Join us in the Tradeshow and celebrate the long-time support of three ACCES exhibitors.

AGENDA - MAY 28

Day 2 - May 28

5:00 PM – 6:00 PM: ACCES Exhibitor Awards and Cocktail Reception

Join us in the Tradeshow and celebrate the long-time support of three ACCES exhibitors.

6:00 PM – 10:00 PM: Awards Gala and Banquet

Join Don Rigley and Michelle Daigle of Frantically Atlantic during the CMBEC47/ACCES26 Gala and Awards Banquet on May 28th, 2025, for an East Coast Style Interactive Kitchen Party. An evening of toe tapping Celtic songs, tunes, singalongs, storytelling and Barn Dances!

Frantically Atlantic is a musical band based in Fredericton New Brunswick. They have a broad repertoire of East Coast style / Folk / Celtic / Roots and Acadian tunes and songs – original and traditional.

AGENDA - MAY 29

Day 3 - May 29

7:30 AM – 3:30 PM: Registration

Register, pick up your conference badge, and ask questions - we'll be here all day!

7:30 AM – 8:00 AM: Breakfast

Fuel up for the day ahead.

8:00 AM – 9:30 AM: Academic, Industry Innovation and Clinical Engineering Programs

From Incident to Innovation: Collaborative Approaches to Medical Device Innovation
Alice Casagrande Cesconetto, Regional Engineering Team Leader, Lower Mainland Biomedical Engineering
Michael Jameson, President, Delfi Medical Innovations Inc.
Rashmi Prakash, Co-founder and CEO, Aruna Revolution

This 90-minute workshop aims to bring together professionals and researchers in the fields of medical, clinical, biomedical, and rehabilitation engineering, healthcare technology, patient safety, quality, and medical device development to explore innovative strategies for transforming patient safety incidents, alerts, and recalls into actionable insights and groundbreaking medical device solutions. The session is also suitable for students and early-career professionals looking to expand their knowledge and network within these domains.

In partnership with: Medical Device Development Centre (MDDC).

8:00 AM – 9:30 AM: CE7 Continuing Education Program

CE7 Nova Scotia OPOR: Integration Planning and Delivery of EMR and Medical Devices
David Hancock, Clinical Engineering Lead, Nova Scotia Health
David Gillis, Senior Systems Analyst, Nova Scotia Health
Luke MacKenzie, Senior Systems Analyst, Nova Scotia Health

One Person One Record (OPOR) is a clinical transformation that will improve healthcare delivery for patients in Nova Scotia. Regardless of where a patient accesses care, if they are adults or children, they will benefit from their care teams using consistent, standardized, best care practices. Bedside Medical Device Integration, or BMDI, will facilitate connectivity directly to the OPOR Clinical Information System (CIS), allowing the automatic upload of patient data from bedside medical devices into the electronic patient record. This will improve clinical workflow, data quality, and enhance clinical decision support and patient safety. The OPOR Bedside Medical Device (BMDI) team provides an overview of the approach and lessons we have learned as we prepare for our Go Live.

AGENDA - MAY 29

Day 3 - May 29

9:30 AM – 9:45 AM: Refreshment Break

Refreshments served in the Foyer.

9:45 AM – 11:15 AM: B8 Industry Innovation Program

B8 Safeguarding Care Delivery: Exposure Management with Claroty

Raj Dilawri, Sales Director, Healthcare-Canada, Claroty
Randy Guerette, Senior Solutions Engineer, Claroty

To protect Care Delivery from ever present cyberthreats hospitals must secure their medical devices, IoT and OT assets. The challenge is knowing where to begin, which medical devices and which vulnerabilities should be addressed first? Claroty's approach to Exposure Management empowers Biomedical Engineering and IT Security to focus on the most serious vulnerabilities to the most critical medical devices as a starting point. Randy Guerette will explain and demonstrate Claroty's approach to Exposure Management and share his years of experience in securing Care Delivery by efficiently protecting medical devices, IoT and OT assets.

9:45 AM – 11:15 AM: C8 Clinical Engineering Program

C8 Cross-Canada Check-In

Leanna MacLean, Director Clinical Engineering, Nova Scotia Health
Ronald Sturge, Executive Director Clinical Engineering, Service New Brunswick
Peter Butt, Project Manager - Capital Planning and Engineering, NL Health Services
Martin Cyr, Président, Association des Physiciens et Ingénieurs Biomédicaux du Québec
Matthew Stacey, Health Technology Management Consultant, Department of Health, Government of Nunavut
Manuel Velasco, Manager - Clinical Engineering, Health Sciences Centre, Winnipeg
Rachel Zhang, Manager, Biomedical Engineering, Vancouver Island Health Authority

Don't miss out on this year's Cross-Canada Checkup!

Our panel of distinguished speakers will be focusing on:

- Financial challenges and best practices to adapt to these challenges
- Strategies to promote hiring, retention and career growth
- Projects or innovations from the last year that your team is particularly proud of

AGENDA - MAY 29

Day 3 - May 29

11:30 AM – 12:00 PM: Closing and Paper Awards

Celebrating our student academic presenters.

12:00 PM – 1:30 PM: CMBES Annual General Meeting

Agenda

1. Welcome and Land Acknowledgement
2. Approval of the Agenda
3. Approval of the Minutes of the 2024 Annual General Meeting
4. Reports:
   - President (Sarah Kelso)
   - Vice President (Marie-Ange Janvier)
   - Treasurer (Maryam Samiee)
   - Secretary (Natalie Boudreau)
   - Standing Committees, Appointed Committees, Workgroup Reports
     - Membership Committee (Marc Heroux)
     - Professional Affairs Committee (Adeel Alam)
     - Long Term Conference Planning Committee (Rachel Zhang)
     - Awards Committee (Rebecca Austman)
     - Academic Committee (Arash Mohammadi)
     - Information Technology Committee (Tim Wu)
     - Publications Committee (Payal Mandot)
     - Indigenization, Inclusion, Diversity, Equity, and Accessibility (IIDEA) Committee (Alice Casagrande Cesconetto)
     - Bilingual Affairs Committee (Anikke Rioux)
     - Outreach Committee (Martin Poulin)
   - Other Reports
5. Other Business
6. Adjournment

AGENDA - MAY 29

Day 3 - May 29

12:00 PM – 1:00 PM: Lunch

Fuel up before heading home!

1:00 PM – 2:30 PM: Site Tour

Stan Cassidy Centre for Rehabilitation Smart Tech and Innovation in Rehab

Tour the Stan Cassidy Centre for Rehabilitation (SCCR) as we present an overview of our facility and services, highlighting our Smart Home suite, Adaptive Gaming, and Rehab Engineering.

1:30 PM – 3:00 PM: Site Tour

Institute of Biomedical Engineering

Join us at the Institute of Biomedical Engineering for a tour of the Atlantic Clinic for Upper Limb Prosthetics and the Centre for Adaptive Rehabilitation Engineering (CARE)! The CARE is a unique facility that provides state of the art equipment and facilities to research and provide clinical care for mobility rehabilitation.

The centre comprises three labs:

- Our Mobility Lab enables us to safely analyze mobility using motion-capture while subjects walk around a track, up and down stairs, using functional-electrical-stimulation bikes, wearing exoskeletons, and more! A Zero-G dynamic harness enables weight reduction for subjects with mobility-impairments.
- Our Virtual Reality Lab has a CAREN virtual reality platform. This platform enables us to create immersive environments in which the platform moves, spins and tilts. Motion-tracking and force-plates enable responsive reactions from the environment, and a split-belt treadmill lets subjects walk through the virtual environment. We can improve rehabilitation, assess stability, and research how the human brain works in new environments.
- Our Activity of Daily Living Lab lets us assess how rehabilitation is helping in everyday environments. Adjustable appliances let us assess how helpful environmental changes can be. Stepscan pressure tiles let us measure people's sway and posture. Pupil-dilation, eye-tracking, and EEG measurements let us assess cognitive load.

MEMBERSHIPS

JOIN NOW!

Atlantic Canada Clinical Engineering Society (ACCES)

Our ACCES Corporate Membership program drive was very successful again this year as we now have 9 Corporate Members joining ACCES for 2025.

The Corporate membership period is from January to December and allows Corporations the benefit of displaying their Logo on our ACCES website with active links to information on that company.

Another benefit is a corporate section in our membership newsletters that allows these corporate members to display company information that is relevant to our membership.

It also allows discounted pricing for a vendor booth at the ACCES conference which includes advanced notification for our conference registration.

The cost of an annual corporate membership $500.00.

ACCES is always looking to have more companies sign up in the future as they become aware of the benefits this membership can provide them.

For more information on this program you can visit our ACCES website at: Atlantic Canada Clinical Engineering Society - Home and select the “Corporate Members” Tab to visit our ACCES Corporate Membership Offerings.

You could also send an email to the ACCES Director of Membership at membership@accesociety.org and he will be happy to reply.

Canadian Medical and Biological Engineering Society (CMBES)

If you are Interested in becoming a member, please complete the online individual membership application form at cmbes.ca/membership. Memberships are valid for 1 year from the date of registration.
Membership Types:

- Full Membership (annual fee: $130)
- Associate Membership (annual fee: $45)
- Student Membership (annual fee: $35)

ACADEMIC ABSTRACTS

Academic Program

A1 Academic Program

A1.1 PACT: A predictive algorithm for automated upper-limb prosthetic socket design

Vishal Pendse, Calvin C. Ngan and Jan Andrysek

The objective of the presentation is to showcase the development and validation of a predictive algorithm for transradial prosthetic socket design, demonstrating its potential for personalized and remote prosthetic care.

Prosthetic socket design significantly affects prosthesis comfort and abandonment [1]. However, current processes are subjective and time-intensive, relying on extensive clinician–patient interactions that can result in long lead times and reduced access to care. Advances in digital scanning, additive manufacturing, and machine learning present an opportunity to streamline the initial stages of this design process, freeing up clinicians' time to focus on where their expertise is most impactful [2]. Despite these advances, there remains limited understanding of digital design applications for upper-limb prostheses [3]. To address this gap, we developed and validated the Predictive Algorithm for Customized Transradial socket design (PACT), which accurately approximates prosthetist-fabricated sockets (PFSs) for individualized prosthetic care.

Nineteen (n=19) participants with transradial limb absence were recruited during regular fitting appointments. Their limbs and corresponding PFSs were scanned using the Spectra scanner (Vorum, Canada) to create a limb–socket library. Our algorithm takes a new client's limb as the input, scaling and comparing it to all limbs in the library using the average Euclidean distance to determine the best match, whose corresponding socket is used as a basis for design. Critical areas affecting socket functionality—such as the distal end and supracondylar suspension—are then adjusted for optimal fit.

Using leave-one-out validation, sockets were predicted for all 19 limbs and compared to their respective PFSs. Strong Spearman's rank correlation ($\rho = 0.81$, $P < 0.05$) between scaled limb shapes and socket fits validated the accuracy of our scaling method. The algorithm consistently predicted reasonable approximations of PFSs, with a mean deviation of only 2.1 ± 0.6 mm across the dataset—within the acceptable range of typical inter-prosthetist variability observed during rectification for lower-limb [4] and transradial sockets [5]. Data clustering using machine learning (DBSCAN) identified localized regions on the socket needing improvement, specifically in anterior–posterior compression and the trimlines. Preliminary client fitting sessions on a subsample of participants showed that the 3D-printed predicted sockets provided satisfactory fit and suspension.

The results demonstrate that PACT predicts reasonable approximations of PFSs, marking the first integration of clinician-created designs into predictive modeling for prosthetic sockets. Unlike prior research using genetic algorithms [6] and the eigenvector algorithm [7], PACT offers a more tailored fit by incorporating clinician-informed adjustments. The widespread deployment of this algorithm could significantly reduce the burden of prosthesis provision on clinicians and patients. Limitations include a relatively small sample size; future iterations of this algorithm will incorporate machine-learning techniques for limb classification and additional fitting parameters to advance toward end-to-end modeling.

ACADEMIC ABSTRACTS

Academic Program

A1 Academic Program

A1.2 End-To-End Automated Mean Linear Intercept Measurement System

Atallah Madi and Adrian Chan

The objective of this work is to demonstrates the system's performance vs. human raters in computing MLI using a generalized CNN model.

The Mean Linear Intercept (MLI) measurement is a quantitative metric for assessing air space size in histopathological images of lung tissue. Currently, MLI measurement involves human raters conducting manual image assessment that is time-consuming, labour-intensive, and subject to inter- and intra-rater variability. Our system utilizes a deep learning approach for semantic segmentation to achieve a fully automated MLI measurement system with a graphical user interface. The system was trained on mouse lung images and tested on a rat lung image to investigate the generalizability to other animal models. The system computed an MLI score of 62.20 within 90 minutes using 8255 field-of-view (FOV) images extracted from the whole slide image. The human rater found the MLI score to be 62.49 within 41 minutes using 500 randomly selected FOVs. This result suggests that the system maintains its accuracy with rat lung images. Although the system took twice as long as the human rater, it processed >16× more FOVs, which leads to lower standard error in the MLI score.

A1.3 Investigating the Efficacy of an EMF Blocking Blanket on Sleep Quality

Madhuri Sinha, Zahra Moussavi and Abnoor Kaur

The objective of this work is to examine the impact of an EMF-blocking blanket on sleep quality through the analysis of EEG data and sleep patterns.

Sleep Quality may be affected negatively by continuous electromagnetic fields (EMF) exposure from telecommunication devices, which may further lead to mental health disorders such as anxiety and depression. There are multiple products that claim to block EMF exposure and improve sleep quality. The objective of this study was to have an unbiased quantitative investigation of the efficacy of one such product called “SleepGift” blanket, on sleep quality. A single-blind cross-over study was conducted and the sleep study data of 16 healthy participants, who finished the study, was analyzed. Each participant used real and sham SleepGift blankets for two 10-day study blocks, separated by 30 days of washout period. Sleep data were recorded at pre- and post-intervention of each real and sham block. Sleep quality was assessed using the Odds Ratio Product (ORP) and sleep architecture, along with Electroencephalography (EEG) metrics such as delta power, delta durations and spindles. The results show no significant changes in any of the measured parameters due to using SleepGift real blanket. Given the small samples of this study, a larger data set is recommended to achieve robust conclusion about the efficacy of SleepGift blanket.

ACADEMIC ABSTRACTS

Academic Program

A1 Academic Program

A1.4 Modeling Blood Flow in Microcirculation: An In Vitro Study Using Capillary Microchannels

Maya Salame and Marianne Fenech

The objective of this work is to evaluate and compare the performance of the Core-Plasma model with existing rheological frameworks in capturing velocity profiles, shear dynamics, and cell-free layer characteristics in microcirculatory blood flow.

Microcirculatory blood flow is influenced by complex non-Newtonian properties, including shear-thinning behavior and the presence of a cell-free layer (CFL), a plasma-rich zone near vessel walls caused by hydrodynamic forces. Existing rheological models, such as Newtonian, Power Law, and Carreau, capture certain aspects of blood properties but fail to fully describe its dynamic flow characteristics. This study introduces the Core-Plasma Model, which combines Newtonian and non-Newtonian elements to represent the RBC core and CFL as a two-phase system. Evaluation across microchannel sizes and hematocrits highlights the Core-Plasma Model's superiority in capturing velocity profiles and shear dynamics, particularly in channels with larger CFLs. The Core-Plasma Model stands out as a promising tool for advancing microscale hemodynamic predictions and understanding microvascular flow.

A2 Academic Program

A2.1 Validation of Centre of Pressure Trajectory from a Portable Gait System

Kasra Moradi and Chris McGibbon

The objective of this work is to improve gait analysis.

In New Brunswick, an average of eight seniors are admitted to hospital each day for a fall-related injury, costing the New Brunswick health care system almost $250M per year and representing the largest single contributor to injury-related health care costs in the province. Although international fall-risk assessment guidelines exist for identifying seniors at risk of falls, they are subjective and rarely employ technology. StepScan™ (Charlottetown PE) pressure sensitive tiles offer a potential solution for integrating portable technology into routine falls-risk assessment that can be performed in community clinics or the home; however, have not yet been subjected to head-to-head comparison with an accepted "gold standard" measurement system, for suitable tests of mobility and balance. The aims of this study were to fill this gap in knowledge. Fifteen healthy participants performed quiet standing, 5-times sit-to-stand task, and a surrogate test for walking – the step-up/step/down task, on the StepScan™ pressure tiles mounted on top of in-floor, rail mounted AMTI (Amherst MA) force plates in a motion analysis laboratory. Simultaneous registered trajectories of the centre of pressure (CoP) during standing and stepping tasks were compared for accuracy in global position (random error + bias) and relative position (random error only). Slow tasks such as standing had high bias (>20mm) but very good accuracy (1-2mm). Moderate speed tasks such as the 5-times sit-to-stand also had high bias (>20mm) but did not have acceptable accuracy (>15mm). Rapid stepping tasks had very low bias (<2mm) and acceptable accuracy (4-7mm). We conclude that StepScan™ CoP measurements have excellent precision for static balance assessment, and acceptable precision and trueness during a rapid stepping task, but limitations may exist for motor tasks such as the sit-to-stand. The variable bias observed for the different standing and stepping tasks is highly curious and requires more study.

ACADEMIC ABSTRACTS

Academic Program

A2 Academic Program

A2.2 A Mechatronic Needle Guidance System for Prostate-Specific Positron Emission Tomography and 3D Transrectal Ultrasound-Guided Trans-perineal Prostate Biopsy

Sule Karagulleoglu-Kunduraci, Jeffrey Bax, Lori Gardi, David Tessier, Alla Reznik, Ian A. Cunningham and Aaron Fenster

The objective of this work is to develop and integrate a P-PET with a 3D TRUS-guided prostate biopsy system featuring advanced robotic technologies, including a motorized 3D TRUS mechanism, a tracking arm, and a mechatronic needle guidance system.

Prostate cancer (PCa) is the most frequent cancer in men in Canada which the underlines importance of the development of new methods for diagnosis. The current study presents a mechatronic needle guidance system which is to be used in conjunction with a prostate specific PET (P-PET) system and 3D transrectal ultrasound (TRUS) for trans-perineal prostate biopsy. The system consists of a motorized 3D TRUS system for the generation of volumetric images, a tracking arm for targeting and a needle guidance device for needle placement and repositioning. The mechatronic needle guidance system includes a needle template which is capable of two-dimensional manual translation, and it helps in the alignment of the needle with the P-PET defined lesions in real time with the help of TRUS. To coordinate the biopsy, a functional and anatomic imaging from P-PET and 3D TRUS were co-registered with the help of a landmark-based registration method. The system was assessed using a phantom which was designed to simulate the prostate gland with artificial lesions and the outcomes indicated that the needle path planning and placement was accurate with a mean guidance error of 0.85 ± 0.22 mm. This innovation incorporates the 3D TRUS imaging technology and the P-PET functional information and the mechatronic needle guidance system for accurate and efficient needle replacement. This paper aims at overcoming the challenges that are associated with 2D TRUS-guided techniques; hence it reduces false negative rates, the rates of repeat procedures, and improves the identification of the early stage and high-grade PCa. Further research will concentrate interoperability, on the enhancement of the needle system's guidance system to achieve better accuracy and the assessment of the system in clinical trials as a diagnostic and therapeutic tool in prostate cancer.

A2.3 Enhanced Image Processing of Implanted Hydrogel Scaffold Images Using Propagation-Based Imaging Computed Tomography

Xiao Fan Ding, Zahra Khoz, Daniel Chen and Ning Zhu

The objective of this work is to develop the image processing steps to mitigate the limitations posed by strong signal from bone in PBI-CT of low-density hydrogel scaffolds ex vivo.

This study showed how effective masking of dense components (i.e., bone) in propagation-based imaging computed tomography (PBI-CT) scans of biological samples can enhance the outcomes of deep learning denoising techniques. This was performed on ex vivo scans of hydrogel scaffolds implanted into animal hind limb and suppressing the overwhelming signal from the bone allowed for clearer and more distinct visualization of hydrogel scaffolds. This proved essential for observing the interactions of hydrogel within the physiological environment. The detailed image processing steps offer to improve the practical application of PBI-CT in tissue engineering and regenerative medicine research.

ACADEMIC ABSTRACTS

Academic Program

A2 Academic Program

A2.4 Preliminary Characterization of Transradial Prosthesis Alignment

Katrina Meng, Calvin C. Ngan and Jan Andrysek

The objective of this work is to describe methods and results of preliminary characterization of transradial prosthesis alignment.

A transradial (TR), or below elbow, prosthetic device is an artificial limb designed to replace the function of a missing upper extremity. However, there are several barriers to accessing quality prosthetic care, including a scarcity of highly trained prosthetists, long turnaround times, and material-intensive manufacturing processes[1]. Recent advancements have shown that digital technologies, such as CAD software and 3D printing have the potential to provide better-fitting devices while reducing clinician resources[2,3]. Despite these advancements, no methods for digitally designing TR prostheses have been fully integrated into clinical practice. The lack of literature on conventional TR prosthesis design makes it especially difficult to translate into digital workflows. The alignment, described as the precise position of the prosthetic components relative to the socket and arm, is critical for proper fit and function[4]. However, conventional alignment practices remain largely subjective, relying on the expertise of each prosthetist. This research aims to leverage digital technologies, such as 3D scanning, to quantify conventional alignment practices and translate these insights into data-driven digital workflows.

This study addresses these challenges through two objectives. First, semi-structured interviews with prosthetists reveals that alignment strategies often involve a combination of visual approximations and quantitative tools. Guiding lines are drawn on sockets to approximate wrist placement, supplemented by measurements such as the distance from the olecranon to the thumb tip and tracings of the contralateral limb. Common adjustments include medial wrist positioning and incorporating approximately five degrees of flexion and adduction to improve control. Prosthetists emphasized the relationship between function, cosmesis, and body symmetry, noting that deviations are highly case-specific and informed by collaborative discussions with patients. Second, imaging protocols were developed to quantify alignment using 3D scanning. This involves exploring two potential methods of measuring alignment for their relevance and repeatability: a global reference, which positions the prosthetic wrist in relation to a constant such as landmarks on the body or the contralateral limb; and a system reference, which aligns components using a joint and link biomechanical model. Preliminary testing demonstrated the feasibility of these methods for examining measurable trends. In one case study, the prosthetic limb was 19 mm longer than the contralateral limb, contrary to prosthetist expectations of maintaining body symmetry. Angular measurements indicated prosthetic adduction and pronation between 1-12 degrees, aligning with prosthetist reported practices.

This work establishes a foundation for ongoing analysis with a larger sample size, which will refine statistical models correlating measured alignment patterns with qualitative prosthetist input. By bridging conventional and digital approaches, this research provides quantitative insights which may be used for education and the development of data-driven digital workflows, ultimately improving the efficiency and effectiveness of TR prosthesis design.

ACADEMIC ABSTRACTS

Academic Program

A4 Academic Program

A4.1 Mixed Reality-Enhanced Translation of CTA Data for DIEP Flap Reconstruction

Tony Jiang, Philip Edgcumbe, Joshua Ho, Michael Martin, Michael Stein and Kathryn Isaac

The objective of this work is to apply Mixed Reality (MR) technology in translating preoperative imaging to improve precision and efficacy.

Background:
A CT angiogram (CTA) is commonly used to identify perforators in preparation for breast reconstruction with a deep inferior epigastric perforator (DIEP) flap. The utility of this imaging data is limited by a surgeon's ability to precisely translate the vascular anatomy from the CTA onto the patient to inform their flap design and harvest based on perforator location and intramuscular course. This study sought to evaluate the application of Augmented Reality (AR) for optimizing preoperative imaging to improve the efficacy of reconstruction with a DIEP flap.

Methods:
A novel software was developed to translate patient-specific CTA data from the institutional imaging system was developed on two separate platforms, the Meta Quest 3 and the Apple Vision Pro. The accuracy of digital imaging segmentation, registration, and projection was evaluated on a mannequin. With institutional ethics approval, patients planned for breast reconstruction with a DIEP flap consented to the use of AR. In this single-surgeon feasibility trial, the visualization, registration, and interaction with the segmented vascular anatomy were evaluated for its safety and utility in pre-operative flap design and intra-operative flap harvest. The AR headset was used to visualize and interact with the segmented imaging data to identify perforators and their intramuscular course.

Results:
The reprojection error between the segmented virtual anatomy and the real-world patient anatomy was measured at 1.3mm. Three patients underwent immediate breast reconstruction with AR-assisted DIEP flap planning and harvest. Preoperatively, AR was used to translate the perforator locations and their intramuscular course from the CTA onto the patient, facilitating flap design and perforator selection. Intraoperatively, the application of AR effectively delineated the vascular anatomy of the DIE perforators and pedicle relative to the rectus muscle, fascia, and overlying subcutaneous tissue. With the AR headset, the surgeon registered, visualized and interacted with the digital imaging. Using AR, digital information was safely and effectively applied to inform flap design and harvest, with guidance on perforator selection, fascial incision placement and length, and intramuscular pedicle dissection.

Conclusions:
AR can accurately, safely, and effectively translate preoperative imaging for clinical use in DIEP flap design and harvest. By leveraging this immersive technology, AR may serve as an adjunct in reconstructive procedures to optimize safety, efficacy, and operative workflow.

ACADEMIC ABSTRACTS

Academic Program

A4 Academic Program

A4.2 Automatic Segmentation of the Left Ventricle from Pediatric Echocardiography Images Using SegFormer Architecture

Melisa Mateu, Jimena Olveres-Montiel, Boris Escalante-Ramírez, Marie Josée Raboisson, Joaquim Miró and Luc Duong

The objective of this work is to present to peers the novel computational method, SegFormer, used for pediatric echocardiography analysis.

Echocardiography is the most widely used imaging technique for congenital heart disease (CHD) detection, assessing risk, and guiding treatment strategies in pediatric cardiology. However, interpreting and analyzing these types of images can be challenging due to their complexity, which is some cases leads to inter-observer variability. This research work aims to develop an automated left ventricle (LV) segmentation method for pediatric echocardiography images using a semantic transformer model known as SegFormer, for aiding in the measurement of clinical image technique. Semantic transformers have demonstrated exceptional performance in segmentation tasks in recent years, making them a suitable choice for this application. To achieve accurate LV segmentation, the SegFormer model is trained using the EchoNet-Peds dataset, which consists of annotated pediatric echocardiography videos. The experimental results include segmented left ventricle images, evaluated in accuracy, mean absolute error (MAE), recall and dice score metrics for performance comparison with other pediatric segmentation method.

A4.3 Automatic Hand Hygiene Monitoring Systems for Infection Prevention in Healthcare Settings: A Short Review of Literature

Ali Barzegar Khanghah, Shaghayegh Chavoshian and AtenaRoshan Fekr

The objective of this work is to provide a short review of literature on the advancements of automatic hand hygiene monitoring systems for infection prevention in healthcare settings.

Healthcare-associated infections (HAIs) remain a global challenge, with significant morbidity, mortality, and economic implications. Improving Hand Hygiene (HH) compliance is one of the most effective strategies for reducing HAIs. However, compliance rates remain suboptimal. Electronic Hand Hygiene Monitoring Systems (EHHMS) have emerged as a promising solution to address this challenge by providing real-time feedback and promoting behavior change among healthcare workers. This narrative review examines the methodologies used in EHHMS, classifying them into four key categories: rule-based systems, signal processing, machine learning, and data fusion approaches. Rule-based systems, though widely used, are limited by their static nature and inability to adapt to dynamic healthcare environments. Signal processing methods focus on localizing hand hygiene events, while machine learning (ML) approaches mostly focused on HH quality. Data fusion techniques improve monitoring by integrating inputs from multiple sensors. Despite their potential, EHHMS face challenges in accuracy, intrusiveness, and integration into clinical workflows. This review highlights the potential role of ML in overcoming these limitations. By addressing current barriers, EHHMS can play a crucial role in enhancing HH practices and reducing HAI rates, ultimately improving patient safety and healthcare quality.

ACADEMIC ABSTRACTS

Academic Program

A4 Academic Program

A4.4 Slip Resistance Comparison of Footwear on Two Flooring Types Using Mechanical Testing Approach

Shaghayegh Chavoshian, Chantal Gauvin and Atena Roshan Fekr

The objective of this work is to emphasize the importance of footwear design and surface interaction for slip and fall prevention.

Slips and falls are major safety concerns across various populations, including healthcare workers, kitchen staff, warehouse employees, etc. Footwear type plays a crucial role in preventing slip-related falls. A high Coefficient of Friction (COF) between footwear soles and flooring surfaces is essential to maintain balance and stability. This study evaluated the COF of 12 commonly available footwear in the market on two types of floorings — quarry tile and Majorca Fog polished rectified porcelain (MFP) — under dry and wet conditions. According to the ASTM F3445-24 threshold of 0.4, all footwear was safe on dry surfaces for both types of tiles, and on wet quarry tiles, except footwear 2, but unsafe on wet MFP tiles. Statistical analysis showed that COF values for quarry tiles were significantly lower under dry conditions compared to MFP tiles. However, under wet conditions, the COF values for the quarry tile increased significantly, exceeding that of the MFP tile. These findings were proof of concept for ongoing efforts to design safer footwear considering footwear characteristics such as outsole material, and tread patterns that may influence slipping risk.

A4.3 Automatic Hand Hygiene Monitoring Systems for Infection Prevention in Healthcare Settings: A Short Review of Literature

Ali Barzegar Khanghah, Shaghayegh Chavoshian and AtenaRoshan Fekr

The objective of this work is to provide a short review of literature on the advancements of automatic hand hygiene monitoring systems for infection prevention in healthcare settings.

Healthcare-associated infections (HAIs) remain a global challenge, with significant morbidity, mortality, and economic implications. Improving Hand Hygiene (HH) compliance is one of the most effective strategies for reducing HAIs. However, compliance rates remain suboptimal. Electronic Hand Hygiene Monitoring Systems (EHHMS) have emerged as a promising solution to address this challenge by providing real-time feedback and promoting behavior change among healthcare workers. This narrative review examines the methodologies used in EHHMS, classifying them into four key categories: rule-based systems, signal processing, machine learning, and data fusion approaches. Rule-based systems, though widely used, are limited by their static nature and inability to adapt to dynamic healthcare environments. Signal processing methods focus on localizing hand hygiene events, while machine learning (ML) approaches mostly focused on HH quality. Data fusion techniques improve monitoring by integrating inputs from multiple sensors. Despite their potential, EHHMS face challenges in accuracy, intrusiveness, and integration into clinical workflows. This review highlights the potential role of ML in overcoming these limitations. By addressing current barriers, EHHMS can play a crucial role in enhancing HH practices and reducing HAI rates, ultimately improving patient safety and healthcare quality.

CLINICAL ENGINEERING ABSTRACTS

Clinical Engineering Program

C2 Clinical Engineering Program

C2.1 Lessons Learned from Effective Password Management for Medical Devices in Hospitals

Veronica Lu

The objective of this work is to share effective strategies for managing passwords in hospital medical devices to enhance security and ensure compliance.

Introduction

The growing interconnectivity of medical devices in healthcare environments has significantly heightened cybersecurity risks, leaving many devices vulnerable to unauthorized access and exploitation due to weak security features. Effective password management is crucial not only for safeguarding sensitive patient data but also for ensuring the continuous and safe operation of clinical systems (https://www.cisa.gov/topics/cybersecurity-best-practices). This is also gaining the attention of governing bodies, with the Office of the Auditor General in British Columbia setting out requirements for healthcare organizations, of which password management is one key recommendation. Managing passwords in hospitals presents unique challenges due to the vast number of devices uncertainty around the current status of passwords, and variation in the appropriate selection password management tools. These challenges are compounded by limited resources, both in terms of personnel and time, making the implementation of robust protocols particularly difficult in busy healthcare environments. This presentation outlines a practical, secure, and scalable approach to medical device password management that balances real-world usability with strong cybersecurity demands.

Methods (Approach)

Our solution, prompted by a password exposure incident, was designed to protect against cyber threats while being feasible for biomedical teams to adopt consistently.

To address the unique structure of our organization, which supports four distinct health authorities, we adopted a flexible approach. Health Authority directory logins were integrated with medical device where possible to streamline access, while centralized password management tools and two-factor authentication (2FA) were used for devices without directory support. This ensured secure password storage across all systems.

Changing password is integrated into the computerized maintenance management system work-order process, ensuring that password management tasks were clearly documented, tracked, and updated on a daily basis. Through this integration, technologists were able to promptly address issues as they arose, while also maintaining visibility and accountability across all teams involved.

Additionally, biomedical technologist were sent on dedicated cybersecurity education classes, as education was recognized as a key component to raising cybersecurity awareness and ensuring the long-term success of these protocols.

Results

Lower Mainland Biomedical Engineering manages a total inventory of 115,001 devices, and has successfully secured 93.8% of them, leaving only 7,171 devices still requiring password management work. This reflects the efficiency and effectiveness of our ongoing efforts to secure medical devices across the entire organization.

Conclusions

This presentation emphasizes the importance of establishing effective communication with technologists to manage unknown password statuses across large inventories, all within the constraints of available resources. Real-world examples demonstrate how these solutions have improved device security, ensured compliance with Office of the Auditor General of B.C. recommendations, and minimized operational disruptions. By achieving a balance between protection and practicality, this approach offers hospitals a viable pathway to enhanced cybersecurity.

CLINICAL ENGINEERING ABSTRACTS

Clinical Engineering Program

C2 Clinical Engineering Program

C2.2 A Regional Review of Flexible Endoscope Service Delivery Models and Preventive Maintenance Practices

Nancy Suarez

The objective of this work is to address inconsistencies in flexible endoscope management and propose strategies to optimize maintenance practices, standardize workflows, and clarify the role of Biomedical Engineering.

While the literature surrounding flexible endoscopes predominantly focuses on disinfection and sterilization processes, there is a notable lack of guidance on managing these devices beyond reprocessing. This paper examines the broader role of the Biomedical Engineering (BME) Department in managing flexible endoscopes throughout their lifecycle. A regional review of service delivery models and preventive maintenance (PM) practices was conducted across 24 healthcare sites in the Lower Mainland of British Columbia. Using work order data extracted from the Computerized Maintenance Management System (CMMS), along with insights from site visits and interviews with BME technologists, Medical Device Reprocessing Department (MDRD) staff, and clinical teams, the study revealed crucial yet inconsistent BME involvement, variations in PM practices, gaps in data tracking, and communication barriers between departments. These findings highlight the need for clearer processes and guidance from a clinical engineering perspective. Practical recommendations are provided to address these gaps, focusing on standardizing workflows and defining the roles where BME provides the most value in flexible endoscope management.

C2.3 A Provincial Strategy for Clinical Engineering SOP and Policy Standardization: Challenges, Findings, and Solutions

Maryam Samiee, Chris Bzovey and Mohammed Tawhidul Islam

BACKGROUND

The establishment of consistent and robust Standard Operating Procedures (SOPs) and policies in Clinical Engineering (CE) is essential for optimizing service efficiency, ensuring regulatory compliance, and aligning practices with industry standards. The CE program within Shared Health Manitoba, recently established, encompasses diverse service teams across the regions. The program faces a lack of uniformity in existing SOPs and policies following the recent merge. This lack of standardization is exacerbated by several factors such as redundant or outdated legacy documents, and limitations in stakeholder engagement. Addressing these discrepancies necessitates a comprehensive and strategic approach to evaluate current documents, categorize them, and prioritize areas for improvement. To tackle these challenges, a detailed environmental scan was conducted to gather and analyze existing SOPs and policies. The Clinical Engineering Standard of Practice (CESOP) served as the primary reference for identifying strengths, weaknesses, and gaps. Through this analysis, some gaps were uncovered in some areas, while other areas, were found to have substantial documentation. Additionally, the analysis highlighted some gaps within CESOP itself.

By presenting a systematic approach to SOP and policy standardization, this session aims to provide a replicable framework for other jurisdictions while fostering discussion on best practices in CE management.

CLINICAL ENGINEERING ABSTRACTS

Clinical Engineering Program

C6 Clinical Engineering Program

C6.1 Role of Medical Engineering in Patient Handling Equipment Support

Liane Ladouceur and Keili Shepherd

The objective of this work is to discuss the implications of in-house and outsourced support models for PHE, as well as identify the appropriate department to support this equipment.

C6.2 Capital Planning in Imaging: A Dashboard Approach for Strategic Decision-Making

Griffin Copp, Sonja Pejcic and Ian Connell

The objective of this work is to demonstrate how Power BI Dashboards can be used to increase the transparency of medical imaging equipment status and capital needs.

C6.3 Usability Evaluation of Computerized Maintenance Management System Replacement in British Columbia Biomedical Engineering

Cherryl Li, Alanna Bateman, Elizabeth Pratt and Emily Rose

The objective of this work is to share learnings from usability evaluation of a new CMMS product.

C6.4 Leveraging Existing Vital Signs Monitors for Early Warning Score Implementation

Liane Ladouceur and Danny Yang

The objective of this work is to encourage Medical Engineering departments to have stronger voices at the project leadership level and emphasize the changing need for post-implementation support in Medical Engineering projects.

CLINICAL ENGINEERING ABSTRACTS

Clinical Engineering Program

C6 Clinical Engineering Program

C6.5 Transforming Health Systems through Digital Infrastructure: Insights from CSA Z8005

Taurai Kurebwa and *Andrew Henneberry*

The objective of this work is to bring awareness to the Common Challenges faced by Health Care Facilities (HCF's) and the goals of the Z8005 standard.

In this presentation, attendees will be provided with a detailed overview of the framework for planning, designing, and implementing digital infrastructure that can support current and future health care digital infrastructure and technologies.

Key Learning Points:

- Framework for Digital Infrastructure: Attendees will learn about the comprehensive framework provided by CSA Z8005, which includes guidance for planning and implementing digital infrastructure and digital health technologies. They will learn how the framework provides health care facilities direction on scalability, security, and future-proofing, to meet both current and future health care demands.
- Integration and Interoperability Best Practices: Attendees will be introduced to principles and requirements for achieving integration and interoperability of digital health systems within healthcare facilities. This includes the responsibilities of different interested parties, the importance of a master systems integrator, and the use of an integration platform. The session will highlight how the standard, in light of the Connected Care for Canadians Act (Bill C-72), can be an important tool for hospital administrators and policymakers, helping them drive the transformation needed to meet the demands of modern health care delivery.
- Health System Transformation Tools: The presentation will cover tools for transforming health care systems through digital infrastructure. These include costing templates that help facilities budget for capital, implementation, and maintenance expenses. Operational readiness checklists are also provided to ensure that telecommunication spaces are suitable for the installation of active equipment.

Furthermore, the standard includes templates for selecting wireless staff communication devices, which guide HCFs in choosing devices that meet specific requirements such as ruggedness, waterproofing, and barcode reading capabilities. CSA Z8005 also offers guidance on developing business cases for digital health care technologies, maintaining equipment lists, and creating security roadmaps. These tools are designed to help HCFs plan, implement, and maintain their digital infrastructure effectively, ensuring that all technological investments are aligned with the facility's overall digital health vision and strategy.

By the end of the presentation, attendees will have a clearer understanding of how to leverage the CSA Z8005 standard to transform their health care systems through effective digital infrastructure and technology integration. They will also be equipped with strategies on using the standard to implement scalable and interoperable digital solutions in their health care facilities.

POSTER ABSTRACTS

Poster Program

P1 Segmentation of Muscularis Propria in Colon Histopathology Images Using Vision Transformers for Hirschsprung's Disease

Youssef Megahed, Anthony Fuller, Saleh Abou-Alwan, Dina El Demellaw and Adrian Chan

The objective of this work is to present the application and effectiveness of Vision Transformers (ViTs) for muscularis propria segmentation in Hirschsprung's disease histopathology images, highlighting their superior performance compared to CNNs and shallow learning methods.

Hirschsprung's disease is a congenital birth defect diagnosed by identifying the lack of ganglion cells within the colon's muscularis propria, specifically within the myenteric plexus regions. There may be advantages for quantitative assessments of histopathology images of the colon, such as counting the ganglion and assessing their spatial distribution; however, this would be time-intensive for pathologists, costly, and subject to inter- and intra-rater variability. Previous research has demonstrated the potential for deep learning approaches to automate histopathology image analysis, including segmentation of the muscularis propria using Convolutional Neural Networks (CNNs). Recently, Vision Transformers (ViTs) have emerged as a powerful deep learning approach due to their self-attention. This study explores the application of ViTs for muscularis propria segmentation in calretinin-stained histopathology images and compares their performance to CNNs and shallow learning methods. The ViT model achieved a DICE score of 89.9% and Plexus Inclusion Rate (PIR) of 100%, surpassing the CNN (DICE score of 89.2%, PIR of 96.0%) and k-means clustering method (DICE score of 80.7%; PIR 77.4%). Results assert that ViTs are a promising tool for advancing Hirschsprung's disease-related image analysis.

POSTER ABSTRACTS

Poster Program

P2 Experimental and Numerical Investigation of Polydopamine Nanoparticles for Enhanced Photothermal Cancer Therapy

Abby Chapman, Diego Combita, William Whelan, Marya Ahmed and Sundeep Singh

The objective of this work is to showcase the development and evaluation of biodegradable polydopamine nanoparticles for enhancing the precision and efficacy of photothermal cancer therapies.

Photothermal therapies are considered to be a safe and promising choice for small, localized superficial tumors. During photothermal therapies, near-infrared light generates heat and selectively destroys the tumorous tissue. However, achieving precise control over the tissue heating confined only to the localized zone remains a challenge. Any deviation from the intended heating can lead to over-ablation, resulting in significant damage to the surrounding healthy tissue and critical structures, or under-ablation, which increases the chances of tumor recurrences. To overcome these challenges, administering nanoparticles within a target tumor has been proven to generate more precise heating and minimize damage to the surrounding healthy tissues, thereby increasing the overall efficacy of the procedure. The use of metallic nanoparticles (e.g., silver, gold) to enhance photothermal effects has received significant attention over the past decade. However, this approach introduces concerns regarding material toxicity and patient risk. Polymer-based nanomaterials, with their biocompatible and biodegradable properties, offer a promising alternative to address these complications, warranting further exploration. This study aims to investigate the potential of polymer-based nanoparticles composed of polydopamine (PDA) to enhance the effectiveness of photothermal therapies for cancer treatment. PDA nanoparticles are melanin-like structures synthesized through the oxidation of 3,4-dihydroxy-L-phenylalanine (DOPA) in an alkaline aqueous environment with oxygen, and their size can be easily controlled by adjusting the solution's pH. In this study, the influence of various concentrations of spherical PDA nanoparticles (1000, 400, 200, 100, 50, and 25 µg/mL) was explored through in vitro photothermal experiments. The temperature profile of the samples during 808 nm laser irradiation with an intensity of 1.4 W/cm2 was captured with a thermal camera. A concentration-dependent relationship was identified, and the highest PDA concentration of 1000 µg/mL led to the largest temperature change of 19.4 °C. Furthermore, a finite element-based computational model was developed to quantify spatio-temporal thermal dynamics across different PDA nanoparticle concentrations. The absorption cross-sections of individual PDA nanoparticles were derived using Maxwell's equations and extrapolated to different concentrations. The computational absorption spectrum was compared to experimental data obtained using a spectrophotometer, highlighting reasonable agreement. Beer-Lambert's law was then applied to model the heat transfer within the nanoparticle suspension utilizing a Gaussian laser profile across different concentrations. The model was validated against experimental in vitro photothermal data of maximum attained temperature, and a parametric sensitivity analysis was conducted to assess the impact of laser power and nanoparticle size on the efficacy of nanoparticle-assisted photothermal therapy. Both experimental and computational results highlight the significance of nanoparticle concentration, size, and laser power in improving the photothermal response of polymer-based nanoparticles. The optimal nanoparticle parameters generating enhanced photothermal effects have also been identified based on parametric sensitivity analysis. This study offers valuable insights into the future advancements and clinical translation of precision photothermal therapy, benefiting millions affected by cancer.

POSTER ABSTRACTS

Poster Program

P3 The Role of Autonomy in Electronic Hand Hygiene Monitoring Systems

Ali Barzegar Khanghah, Shaghayegh Chavoshian, Geoff Fernie and Atena Roshan Fekr

The objective of this work is to explore innovative ways to reduce healthcare associated infections.

Proper hand hygiene (HH) is one of the most effective measures to prevent HAIs by minimizing the transmission of pathogens. Reminder prompts have been demonstrated to play a significant role in improving HH compliance among healthcare workers (HCWs). Previous studies have explored the efficacy of electronic hand hygiene monitoring systems (EHHMS) by enforcing uniform prompting protocols across all users. However, little is known about the effects of allowing HCWs to choose whether to activate or deactivate the prompting feature. This study investigates the impact of voluntary prompt deactivation on HH compliance rates in a Toronto hospital's respiratory unit. A cohort of 23 HCWs was equipped with EHHMS badges and given the option to activate or deactivate the prompt. The badges delivered real-time prompting via discrete vibrations when HH is required upon entering or exiting patient areas. Over a 6-month period, their HH compliance rates were monitored. Compliance data were categorized into periods when the prompt was activated (Prompt-On) and deactivated (Prompt-Off), allowing for analysis of individual variability in prompt usage, as participants switched between activating and deactivating the prompt at different times. The system automatically collected compliance data, which were then analyzed using Wilcoxon signed-rank tests due to the non-normal distribution of the two groups. A total of 58,060 HH opportunities were recorded. The study revealed a significant difference in HH compliance rates between the Prompt-On and Prompt-Off groups ($P<0.0001$). Participants in the Prompt-On group demonstrated a mean compliance rate of 85% ± 16%, significantly higher than the Prompt-Off group, which had a mean compliance rate of 58% ± 25%, suggesting the critical role of real-time feedback in maintaining HH adherence. The findings of this study align with prior research emphasizing the importance of reminder prompts in enhancing HH compliance. Unlike previous studies, which applied uniform prompting protocols, this investigation highlights the detrimental effects of allowing HCWs to opt out of prompting [3]. The autonomy to deactivate prompts appears to undermine the overall effectiveness of EHHMS, leading to lower compliance rates and potentially increasing the risk of HAIs.

POSTER ABSTRACTS

Poster Program

P4 Effect of Mesenchymal Stem Cell Conditioned Media on Fibroblasts: Implications for Skin Regeneration and Wound Healing

Arushi Tandon, Aidan Schafer, Devon Stone, Robert Burrell and Hilal Gul

The objective of this work is to use stem cell conditioned media as an alternative to stem cell transplantation therapy.

Introduction

Stem cell-based therapies show great promise in regenerative medicine, with bone marrow-derived mesenchymal stem cells (BM-MSC) being particularly noteworthy for their high multilineage differentiation and paracrine signaling. MSC, derived from sources like cord blood, adipose tissue and bone marrow, are multipotent cells capable of differentiating into various tissues as well as known for their regenerative and immunomodulatory properties. Conditioned media from MSC (MSC-CM), rich in bioactive factors, offers a practical therapeutic alternative, reducing immune reactions and ensuring consistent effects. MSC-CM has shown promise in wound healing, skin rejuvenation, and other skin applications. In this study, we investigated the effects of BM-MSC-CM on human dermal fibroblasts (HDFs), focusing on their proliferation, migration, and the promotion of collagen and elastin synthesis. The research underscores the potential of BM-MSC-CM in developing safer, more effective regenerative therapies for skin applications including skin regeneration, wound healing and anti-aging.

Methods

Flow cytometry evaluated BM-MSC markers using antibodies for CD73, CD105, CD90 and CD34, CD45. BM-MSC-conditioned media (CM) was prepared by centrifuging and filtering media collected after 48 hours. Superficial and deep tissue dermal fibroblasts were treated with 5%, 10%, and 20% BM-MSC-CM. Proliferation was assessed with Alamar Blue. Migration was measured using a scratch wound healing assay in confluent fibroblasts in 6-well plates, with healing observed and analyzed using ImageJ from day 0 to 3. Collagen content was measured using Condrex Sirius TotalCollagen Kit, and elastin content was measured using Fastin Kit.

Results

Flow cytometry results showed BM-MSC demonstrate the expected phenotype for human MSC (highly positive expression of CD105, CD73, CD90, and negative expression of CD34 and CD45). The Alamar Blue assay demonstrated that BM-MSC-CM significantly improved proliferation of fibroblasts compared to the control conditioned media. The scratch wound healing assay revealed that BM-MSC-CM at 5%, 10%, and 20% enhanced migration of fibroblasts (resulted in closure of the gap) with respect to control.

Conclusions

This study demonstrated the remarkable potential of BM-MSC-CM for enhancing the functional properties of HDFs, which are crucial for skin regeneration and wound healing. However, further studies are needed to evaluate/identify the key bioactive factors in BM-MSC-CM as well as their effects on skin tissue repair and wound healing in vivo.

POSTER ABSTRACTS

Poster Program

P5 Regulatory Ambiguities in the Classification of Rehabilitation Equipment as Medical Devices in Canada

Susanne Tiraei

The objective of this work is to raise awareness about the ambiguities regarding classification of rehabilitation/exercise equipment.

Rehabilitation devices often used for therapeutic purposes, present a regulatory challenge as they blur the lines between medical and non-medical devices. Many of the devices used in rehabilitation settings, including hospital rehab centers, meet the broad definition of medical devices under Health Canada's Medical Device Regulations. However, these devices often do not conform to the CSA 60601-1 standard, which outlines specific safety and performance requirements for electrical medical equipment. Additionally, the manufacturers typically so not intend for them to be used in this manner, creating ambiguity regarding their classification The absence of uniform adherence to this standard leads to a regulatory ambiguity, particularly as provincial jurisdictions hold discretion over whether to apply the CSA 60601-1 standard within their healthcare facilities.

While Health Canada's MDR encompass a wide range of rehabilitation equipment, including devices used for physical therapy or rehabilitation exercises, the application of CSA 60601-1 is not universally mandated. This creates inconsistencies in the safety and regulatory oversight of such devices across different healthcare settings. Provincial authorities' varying decisions on the application of this standard result in a lack of standardization in terms of compliance, leaving rehabilitation equipment subject to differing levels of safety scrutiny depending on regional policies.

The need for a more consistent regulatory approach becomes evident when considering the potential risks associated with the use of non-compliant equipment in clinical environments. A standardized framework for classifying rehabilitation devices, which includes clear guidelines for the application of CSA 60601-1, could provide clarity to manufacturers, healthcare providers, and regulatory bodies. Establishing such a framework would ensure that all devices falling within the definition of medical devices under the MDR meet a consistent standard for safety and performance, regardless of provincial jurisdiction.

POSTER ABSTRACTS

Poster Program

P6 Adoption of an In-House Calibration Program for Biomedical Test Equipment

Scott Olsen, Alanna Hinchey, Mubshra Arshad and Nilay Lad

The objective of this work is to describe the considerations that a Clinical Engineering Department should take when determining if they should calibrate their biomedical test equipment in-house.

This report describes the results of a capstone project undertaken by students in the Bachelor of Technology program at the Northern Alberta Institute of Technology (NAIT). The sponsor of this project was the Northwest Territories Health and Social Services Authority (NTHSSA) Biomedical Engineering Department. The purpose of this project was to develop a business case to inform the sponsor of the viability of adopting an in-house calibration program for biomedical test equipment. Phase one involved a pan-Canadian survey of the Biomedical and Clinical Engineering Departments, a cost and benefit analysis, and a review of the current calibration and operation practices.

Three recommendations from the business case were presented to the project sponsor for review. The recommendations focus on addressing the availability of test equipment, reducing shipping delays, potential cost savings, and improved training and development of in-house expertise for biomedical engineering technologists. The final selection of the business case recommendation and implementation of that recommendation will be completed in phase two of this project. Conclusions and discussion from phase two of the capstone project included in this article will provide a protocol for the development of an in-house calibration program for biomedical test equipment. Further adoption of this protocol may be considered by in-house biomedical and clinical engineering departments across Canada.

The findings will be showcased in April 2025 at the NAIT Bachelor of Technology Capstone Project Showcase and are anticipated to contribute to ongoing discussions on calibration practices within biomedical engineering.

POSTER ABSTRACTS

Poster Program

P8 Automated 3D Doppler Ultrasound Imaging for Comprehensive Breast Lesion Assessment

Amal Aziz, Rayhan A. Rahman, Claire K. Park, Tiana Trumpour, Jeffrey Bax, Lori Gardi, David Tessier, Kevin Barker, Tamie Poepping and Aaron Fenster

The objective of this work is to develop a cost-effective 3D automated whole breast ultrasound (ABUS) device with 3D Doppler capability to facilitate early and definitive breast cancer diagnosis.

Breast cancer is the most common cancer in women worldwide. Two million women are diagnosed annually, resulting in 685,000 annual deaths. Early diagnosis is critical to reducing mortality. Although screening with mammography has been shown to have reduced breast cancer-related mortality through early detection, dense breast tissues reduce mammographic sensitivity, potentially delaying diagnoses, and contributing to poorer outcomes. Therefore, there is a need for more accessible and cost-effective supplemental screening technologies, especially for high-risk populations and women with dense breasts. To address these challenges, a promising approach involves combining widely available, cost-effective, and accessible ultrasound-based technologies with economical hardware, software modules, and automated techniques. Among these technologies, Doppler imaging plays a crucial role in the clinical evaluation of breast abnormalities, as intratumoural blood flow has been shown to correlate with the aggressiveness and histological grade of the tumour. The development of a novel automated, portable, and patient-dedicated 3D automated breast ultrasound (ABUS) system for point-of-care breast cancer supplemental screening holds significant promise. The proposed system has previously demonstrated the capability to generate accurate whole-breast B-mode images, which can aid in the early detection of breast cancer in women with dense breasts. Additionally, it offers the advantage of incorporating Doppler imaging to assess blood flow within suspicious lesions, a capability not commonly available with commercial ABUS systems. By leveraging Doppler imaging in conjunction with 3D B-mode ABUS, this innovative approach could improve breast cancer-related health outcomes and equity in access to healthcare, especially for underserved and vulnerable populations.

POSTER ABSTRACTS

Poster Program

P9 Leveraging 3D Printing for a Low-Cost Loupe-Mounted Camera in Surgical Education

Tony Jiang

The objective of this work is to demonstrate the development of a low-cost, customizable, 3D-printed loupe-mounted camera to enhance surgical education and intraoperative visualization.

Background:
Cleft palate surgery presents unique challenges, as it requires intricate work within confined spaces. These spaces are often obscured from the view of students and observers, limiting effective intraoperative education. The use of a camera to capture the surgeon's perspective can significantly enhance both intraoperative and post-operative teaching by providing a clear and direct view of the surgical field. However, existing solutions pose several challenges. Non-specialized action cameras are cumbersome to mount and operate. While commercially available surgical loupe cameras are expensive, thus limiting accessibility.

Methods:
The proposed solution employs an off the shelf, 4K 30fps, M12 mount camera, secured to the headlight mount of surgical loupes using a custom-designed, 3D-printed adjustable bracket. This ensures precise alignment with the surgeon's line of sight and compatibility with various loupe manufacturers and configurations. An additional Bluetooth foot pedal enables sterile hands-free operation, while a wireless video transceiver streams real-time video to external displays.

Results:
The camera was tested by two plastic surgeons and delivered satisfactory results. The camera costs $84 CAD in parts and materials, weighs 28 grams, and provides 8.4 hours of battery life if streaming wirelessly in 4K at 30 fps.

Conclusion:
This case highlights the potential of 3D printing to create highly customizable, low-cost solutions for addressing challenges in clinical medicine. With further promotion and awareness of 3D printing as a transformative technology, clinicians can be empowered to identify key areas for innovation and foster collaboration with engineers, driving the development of novel and effective tools for medical practice.

POSTER ABSTRACTS

Poster Program

P10 Use of graph theory for biomimetic microchannel network blood flow analysis

Jesús Ávila Trigueros and Marianne Fenech

The objective of this work is to share a powerful new tool to microfluidic network analysis.

This paper presents a novel application of graph theory to represent and analyze microcirculatory networks, specifically a biomimetic microfluidic chip designed to mimic the human retina. Utilizing experimental data obtained via high-speed video microscopy and Particle Image Velocimetry (PIV), the study develops a comprehensive graph-based framework. Key contributions include mapping experimental images onto a labeled retinal network, encoding fluid mechanical properties in graph nodes and edges, and storing experimental data in an organized structure. Results demonstrate the feasibility of the approach with a fully labeled network of 193 channels, offering insights into fluid dynamics and mass conservation in microcirculatory systems. The methodology facilitates future microfluidics research by providing a robust and scalable data storage and analysis tool, though further automation is needed to optimize workflow.

P11 Three-Dimensional Ultrasound Synovial Blood Flow VolumeAssessment in Thumb Osteoarthritis Patients

Megan Hutter, Clara Duquette-Evans, Randa Mudathir, Carladu Toit, Assaf Kadar, Aaron Fenster and Emily Lalone

The objective of this work is to investigate the relationship between 3D Doppler ultrasound measures with functional and pain measures of thumb osteoarthritis.

The basal thumb joint is commonly affected by osteoarthritis, which impacts hand function. Inflammation and changes in blood flow are known to be involved in the disease process and progression. The role of inflammation and blood flow in thumb osteoarthritis is not fully understood. Ultrasound imaging is used to assess the soft tissue features of the disease but remains limited to two-dimensional visualization. The development of three-dimensional ultrasound for thumb osteoarthritis assessment provides comprehensive visualization and volumetric measures. This study investigated three-dimensional ultrasound measures and their associations with existing imaging and functional measures of thumb osteoarthritis. Our results showed lower pain and higher functional scores in thumb OA patients with synovial blood flow volumes using Superb microvascular imaging. This work demonstrated differences in pain and functional measures, while radiographic grading of patients with and without synovial blood flow was similar. These quantitative measures of synovial blood flow enable assessment and monitoring of vascular changes within the joint. Further investigation into the three-dimensional blood flow volume measures over time can improve the understanding of blood flow changes and their role in disease progression.

POSTER ABSTRACTS

Poster Program

P13 Development and Validation of a Textile-Based Pressure Sensing System for Lower-Limb Prosthetic Sockets

Thierry Dugas, Calvin C. Ngan and Jan Andrysek

This work focuses on the development of a comfortable and practical pressure-sensing system for lower-limb prosthesis users, enabling data collection in both clinical and daily living environments.

Ill-fitting prosthetic sockets can lead to health complications and gait abnormalities for lower-limb prosthesis users [1]. To avoid these issues during limb growth, children require socket replacements every 1 to 2 years [2]. The exact frequency depends on the patient's growth rate, making timely replacements challenging during rapid limb growth, particularly for individuals living far from a prosthetics clinic. Additionally, socket shape modifications during and after the fabrication process depend on subjective patient feedback, which can be challenging to obtain from children. Pressure sensors have been used in research to study limb-socket interfaces but remain largely impractical for clinical socket fit assessments and in-community socket fit monitoring [1], [3]. Through a collaboration with Myant Inc. (Toronto, Canada), this project developed textile-based pressure sensors integrated into a prosthetic sock format to address these challenges.

The first step in the development of this system is the selection of the optimal pressure-sensing textile material for the fabrication of the prosthetic sock and the sensors. Myant fabricated six textile pad samples made from different materials, each containing one textile-based pressure sensor. The sensor performance was evaluated using a universal testing machine (ZwickRoell, Ulm, Germany) against a validated commercially available point sensor (SingleTact, Glasgow, UK) [1]. Sensitivity was first confirmed by applying incremental loads of 2 N within a 40 N range and ensuring that the sensor readings increased relative to the applied force. The sensor repeatability was then evaluated by applying five repetitions of eight forces within a 40 N range in a randomized order. The percentage coefficient of variation is used to express the results from this test. Therefore, lower values indicate higher repeatability. Finally, loads of 10 N, 25 N, and 40 N were applied on the sensors for 10 minutes each to assess drift (i.e. measurement consistency over time). The repeatability and drift test sequences were repeated five times on each sensor.

The pad with sensitivity, repeatability, and drift equivalent to or greater than the SingleTact was selected as the optimal material for the sock fabrication. The optimal pad and the SingleTact showed average repeatability of 0.68 ± 0.05% and 0.98 ± 0.25%, respectively. The average drift for the optimal pad and the SingleTact was 2.56 ± 0.72% and 2.43 ± 1.78%, respectively. These results are comparable to those of other commercially available point sensors [4], [5]. Following this evaluation, Myant integrated 144 textile-based pressure sensors into a prosthetic sock format. The next step is to recruit three prosthesis users to validate the performance and comfort of the system during weight-shifting and walking.

The textile composition of the system will enable comfortable and seamless sensor integration at the limb-socket interface. The sock form factor will allow a high level of usability, enabling pressure monitoring in clinical settings or during daily activities [3]. Continuous socket fit data from free-living environments can help prosthetists intervene earlier to replace sockets, enable remote prosthetic care, and supplement subjective feedback for socket adjustments. The proposed system, therefore, has the potential to address the unique needs of pediatric prosthesis users.

POSTER ABSTRACTS

Poster Program

P14 Development of a Music-Based Wearable Biofeedback System to Improve Lower Limb Amputee Gait Symmetry

Sebastian Silva, Calvin Ngan and Jan Andrysek

The objective of this work is to inform others of the exciting possibilities for music and biofeedback in rehabilitation applications.

Lower-limb amputees (LLAs) can exhibit asymmetric gait, commonly observed as stance-time asymmetry, which may contribute to the development of secondary conditions [1]. Access to conventional gait training is often impeded by factors such as healthcare funding, long travel times, or occupational obligations [2]. This has created a growing interest in technology-based alternatives for in-community gait rehabilitation. One such promising technique is the use of wearable biofeedback systems (WBSs) for gait training, with multiple studies utilizing various feedback modalities (visual, auditory, and vibrotactile) to attain positive outcomes for LLA participants, including a more normal gait pattern and improved gait symmetry [2]. Within the realm of auditory stimuli, rhythmic auditory stimulus (RAS), and more specifically music, may provide distinct advantages when applied to LLA gait. The entrainment of walking cadence and music tempo is a well-documented phenomenon, with studies having shown that music stimulus can improve the gait symmetry of hemiparetic stroke patients [3]. However, to date, there are no gait training systems that have applied music-based feedback to correct gait asymmetry of LLAs. To address this gap, the goal of this project is to design and validate a wearable biofeedback system that employs a music-based strategy to improve the temporal gait symmetry of LLAs. The physical WBS consists of two inertial sensors to measure cadence and gait symmetry, an Android phone to run the feedback algorithm, and headphones. Twenty able-bodied participants and ten LLA participants will be recruited to evaluate the effectiveness of the proposed system. Participants will first complete a baseline assessment without RAS, to determine their average gait symmetry and cadence. They will then perform RAS walking trials with three different closed-loop feedback strategies, as well as with open-loop RAS. The music used in walking trials will be of a constant tempo matching the participant's average cadence, and rhythmically enhanced via metronome tones using beat detection algorithms [4]. Spotify's API was used to generate a library of music with movement inducing features [5], across a range of tempos and covering a variety of genres. The developed closed loop feedback strategies include: 1) the metronome fades as the participant improves symmetry, 2) the volume of the music increases in response to better symmetry, and 3) a combined strategy where both effects occur simultaneously. Participants will complete questionnaires to assess system usability [6], as well as the enjoyment [7], and task load [8] of each strategy.

AGENDA - MAY 27

Day 1 - Opening & Keynote

7.30 AM - 06.00 PM

7:30 AM – 3:30 PM: Registration
Location: Level 2 - Foyer

Register, pick up your conference badge, and ask questions - we'll be here all day!

7:30 AM – 8:30 AM: Breakfast
Location: Level 2 - Pointe Sainte-Anne Atrium

Fuel up for the day ahead.

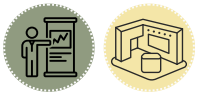
8:30 AM – 8:45 AM: Grand Opening
Location: Level 2 - Pointe Sainte-Anne A

Join your colleagues as CMBEC47/ACCES26 Joint Conference Chair, Natalie Boudreau, comes up to the podium alongside esteemed guests to kick-off the Conference.

8:45 AM – 9:45 AM: Keynote by Dr. Colleen O'Connell, MD, FRCPC
Location: Level 2 - Pointe Sainte-Anne A

Dr. O'Connell will address the audience on the topic of Virtual technologies for improved outcomes in rehabilitation *(see Keynote section for more details).*

10:00 AM – 10:30 AM: Refreshment Break & Posters
Location: Level 2 - Pointe Sainte-Anne BCD & Atrium



Self-directed viewing of Posters. Refreshments served inside the Trade Show Area (Pointe Sainte-Anne BCD).

KEYNOTES

Dr. Colleen O'Connell, MD, FRCPC

Professor, Dalhousie University Faculty of Medicine, Dalhousie Medicine NB
Medical Director and Research Chief, Stan Cassidy Centre for Rehabilitation
Clinical Research Director, University of New Brunswick, Institute for Biomedical Engineering

27.05.2025 | 09:00 AM – 10:00 AM

Location: Level 2 - Pointe Sainte-Anne A

Topic: *"Virtual technologies for improved outcomes in rehabilitation "*

Colleen O'Connell, MD, FRCPC is a professor of Physical Medicine and Rehabilitation at Dalhousie University. She specializes in neuro-rehabilitation, and is Medical Director and Research Chief of New Brunswick's Stan Cassidy Centre for Rehabilitation and is Clinical Research Director of University of New Brunswick Institute of Biomedical Engineering.

As Co-Chair of the World Health Organization supported World Rehabilitation Alliance, and chair of the International Spinal Cord Society emergencies subcommittee, she collaborates with an international team to advocate for the strengthening of rehabilitation in health systems. Research interests are broad, tending to early adoption of technology (FOMO) in mobility and function. She has authored and provided technical guidance on rehabilitation in the humanitarian space, including disaster and conflicts, with infield emergencies humanitarian work including Haiti, Nepal and Ukraine.

Fazila Seker

CEO, Insight Medbotics

28.05.2025 | 08:45 AM – 09:45 AM

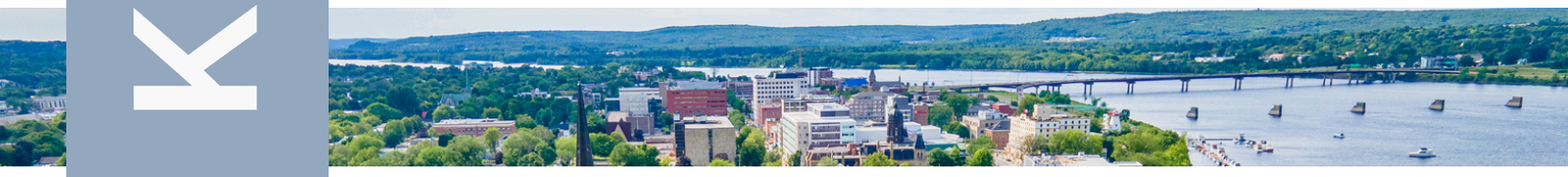
Location: Level 2 - Pointe Sainte-Anne A

Topic: *"From PhD to MedTech CEO: Untold stories of the road less traveled"*

Fazila Seker, PhD, has 20+ years of experience in new technology commercialization within healthcare, energy, and specialty materials sectors. She has held leadership roles with the GE Global Research Center in Niskayuna, NY; MaRS Innovation and, as Co-Founder, President and CEO of MOLLI Surgical (acquired by Stryker) in Toronto, Canada.

In 2023, Fazila was appointed CEO and Board Director of Insight Medbotics, an early-stage medical device company developing a new category of surgical robotics for use inside MRI. Under Fazila's leadership, the company achieved the first and only FDA 510K clearance for use of a robot inside MRI and is focused on enabling a better standard of precision cancer care, starting with prostate.

Building high-performance, award-winning cultures means Fazila's teams have been recognized for their work across her career. Those accolades include Gold in the prestigious Medical Design Excellence Awards in the ER & OR (tools and supplies category); TIME Best Inventions 2022; Fast Company Next Big Things in Tech 2022; the 2021 list of Best WorkplacesTM Managed by Women; and the 2022 list of Best WorkplacesTM in Health Care.



WELCOME RECEPTION

May 26, 2025

6.30 PM - 08.30 PM

*The **Canadian Medical and Biological Engineering Society** and the **Atlantic Canada Clinical Engineering Society** invite you to an evening of fun and games, while raising funds for a local hospital foundation.*

Location: Fredericton Convention Centre
Level 2 - Pointe Sainte-Anne BCD & Atrium

- Free event
- Simple registration
- ***43 Exhibitors*** in the Medical Device Trade Show
- Donations accepted on-site and online
- 100% of donations going toward the *Chalmers Foundation Cancer Support Program*
- Donors receive raffle tickets for prize draws, carnival games, etc.
- Announcement of fundraising total & cheque presentation at the end of the evening
- Hors d'oeuvres & cash bar

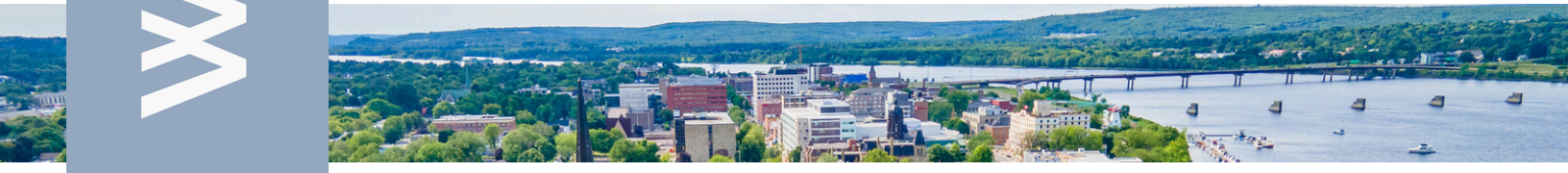
The Chalmers Foundation raises funds to support healthy, caring communities by enhancing health and well-being through innovative and effective programs and initiatives.

"Meeting the needs of our patients is the primary goal of Horizon's Dr. Everett Chalmers Regional Hospital and the Foundation. The Chalmers Foundation works with Horizon to identify the highest priority medical equipment and health care projects that are not funded with government funding."

REGISTER NOW

Registration Required

(full and one-day conference delegates are automatically registered)



ENTERTAINMENT

Frantically Atlantic

East Coast Style Interactive Kitchen Party

Don Rigley & Michelle Daigle

28.05.2025 | 06:00 PM – 10:00 PM
Location: Level 2 - Pointe Sainte-Anne A

Join Don Rigley and Michelle Daigle of Frantically Atlantic during the CMBEC47/ACCES26 Gala and Awards Banquet on May 28th, 2025, for an East Coast Style Interactive Kitchen Party. An evening of toe tapping Celtic songs, tunes, singalongs, storytelling and Barn Dances! Try your hand at a set of musical wooden spoons or a Bodhran (Irish Drum).

Frantically Atlantic is a musical band based in Fredericton New Brunswick. They have a broad repertoire of East Coast style / Folk / Celtic / Roots and Acadian tunes and songs – original and traditional. Their instruments include fiddle, vocals, Irish bouzouki, banjo, Shruti box, bodhran, tin whistles, guitar, ukulele, and spoons. In their combined history they have performed the Maritimes, Newfoundland, Quebec, Ontario, New England, and Ireland...

Their self-titled album was nominated for the Music NB Awards in the category of traditional/roots artist of the year ||| *artiste traditionnel / roots de l'année*. They conduct workshops in music and culture, host East Coast Style Interactive Kitchen Parties and so much more!

CMBEC47/ACCES26 Gala and Awards Banquet sponsor:

Baxter