



CMBES/SCGB

CMBEC40 2017

PROGRAM

MAY 23-26, 2017

**The Fort Garry Hotel,
Winnipeg, Manitoba**

Endorsed By :





CMBES/SCGB

Thank you to our Sponsors for their support!

**AWARDS BANQUET &
DELEGATE BAG/GIFT**



**WELCOME NIGHT MUSEUM
TOUR AND COCKTAILS AT
THE CANADIAN MUSEUM
FOR HUMAN RIGHTS**



TRADE SHOW LUNCH

BANQUET COCKTAIL HOUR



**BREAKFASTS &
REFRESHMENT BREAKS**

NAME BADGES



PROGRAM COVER

ADVERTISING



OPENING RECEPTION





A MESSAGE FROM THE PREMIER

On behalf of all Manitobans, I am pleased to welcome those attending the 2017 Canadian Medical and Biological Engineering Conference to Manitoba.

As the field of medical and biological engineering evolves through the use of sophisticated technologies and techniques, it is increasingly important to exchange accurate information relating to the latest innovations and practices. This conference addresses this need, enabling practitioners from throughout Canada to exchange views, improve knowledge and work together to strengthen the state of medical and biological engineering in Canada.

Once again, welcome to our province and welcome to Winnipeg. I convey my best wishes for a rewarding, informative conference.

A handwritten signature in blue ink, appearing to read "BP".

The Honorable Brian Pallister



MAYOR'S MESSAGE



On behalf of the City of Winnipeg and my city council colleagues, it is my pleasure to welcome delegates of the 2017 Canadian Medical and Biological Engineering Conference to our city. We're proud to be your host.

Winnipeg has a diverse cultural and arts community, as well as a variety of restaurants, shopping experiences, and sporting events for you to explore and enjoy. I hope that you will enjoy our warm hospitality and take in some of the iconic attractions including our stunning Canadian Museum for Human Rights and the unique Journey to Churchill exhibit at the Assiniboine Park Zoo.

This Canadian Medical and Biological Engineering Conference is an amazing opportunity to come together with other professionals to discuss the advancements and challenges in your field, and enjoy valuable networking opportunities.

Best wishes for a professionally rewarding conference and a great stay in our city.

Sincerely,

Brian Bowman

MAYOR

Welcome / Bienvenue

Message from CMBES President, Martin Poulin



On behalf of the Canadian Medical and Biological Engineering Society, I would like to welcome each of you to Winnipeg for the 40th CMBES conference.

The committee organizers and countless volunteers have worked hard to put forward a great program including an impressive line-up of educational courses.

I would like to extend my appreciation for the support of the Sponsors and Exhibitors who will be on hand Wednesday through Thursday to market their latest products and services. Please spend some time at the Exhibit Hall to see what's new and improved.

Please enjoy the learning and sharing with colleagues from across Canada over the next few days and don't forget to join us for the Gala dinner on Thursday night and the AGM on Friday at noon. I also hope you have a little bit of spare time to enjoy some of the sights around Winnipeg.

Au nom de la Société Canadienne de Génie Biomédical, j'aimerais souhaiter la bienvenue à chacun de vous à Winnipeg pour la 40th conférence de génie biomédical.

Les organisateurs du comité et les innombrables bénévoles ont travaillé très fort pour mettre en avant un excellent programme qui inclut également un nombre impressionnant de cours en formation continue.

Je tiens à exprimer ma gratitude pour le soutien des commanditaires et des exposants qui seront sur place du mercredi au jeudi pour présenter leurs plus récents produits et services. N'oubliez pas, s'il vous plaît d'en profiter pour prendre quelques minutes pour aller au salon des exposants afin de découvrir les dernières nouveautés et améliorations.

Je vous souhaite une bonne conférence et j'espère que vous profiterez de cette occasion pour apprendre et partager avec les collègues de la communauté nationale du Canada au cours des prochains jours. N'oubliez pas de nous rejoindre pour le dîner de gala du jeudi soir et l'Assemblée Générale du vendredi. Enfin, j'espère aussi que vous trouverez un peu de temps libre pour profiter de certains des attraits touristiques de Winnipeg et sa région.

Sincerely,

Martin Poulin, M.Eng., P.Eng.

President, CMBES/SCGB

Welcome from the CMBEC40 Organizing Committee

Message from CMBEC40 Organizing Committee Chair, Kyle Eckhardt



On behalf of the CMBEC40 Organizing Committee, I am incredibly proud to welcome you to the conference and to Winnipeg, the heart of the continent! It has been just over a quarter of a century since Winnipeg hosted a CMBEC event; we are incredibly excited to show you the city and present our four day conference program at the Historic Fort Garry Hotel.

For the past year, the organizing committee has pulled out all the stops to bring you an incredibly thoughtful and diverse program. I would like to take this opportunity to express my thanks to all members of the committee for their endless efforts, as well as Natalia Kaliberda and the Willow Group for all their hard work & support and ensuring we stayed on schedule.

Our line up includes the Clinical Engineering, Academic and Industry streams alongside a deep Continuing Education program. We hope you had to think long and hard about which sessions to attend.

We wanted to ensure there would be plenty of time for networking with colleagues from across Canada, so we have arranged a Meet & Greet Reception on the eve of the conference, Tuesday May 23rd, at the Canadian Human Rights Museum, the only National Museum outside of Ottawa. On Wednesday afternoon, May 24th, there is an Opening Reception in the Grand Ballroom of the Fort Garry Hotel and finally, a Cocktail Hour and Dinner Banquet on May 24th at the Historic Fort Gibraltar where we will present our annual awards to this year's honored recipients.

We have listened to your feedback and to that of our vendors and are unveiling a new format this year with more time to complete your exhibit hall passports and interact with exhibitors. Please make a point of being a regular in the exhibit hall to ensure you are up to date with respect to the latest technological advances of our industry partners. They make the conference possible. There are also many more opportunities to attend keynote addresses this year!

With such a busy schedule we're still hopeful that you'll be able to find some time to see the sights and attractions around town! The Forks, a gathering place for First Nations for the past 6,000 years is right across the street. The rivers that flow through Winnipeg come from almost as far away as you did. Winnipeg also has the largest concentration of historic buildings in North America a few blocks away in the Exchange District.

Thank you for participating in CMBEC40 and I look forward to seeing you all during the conference.

Sincerely,

Kyle Eckhardt

CMBEC40 Organizing Committee Chair



2017 CMBEC40 CONFERENCE ORGANIZING COMMITTEE

Chair

Kyle Eckhardt

Vice Chair

Maryam Samiee

Treasurer

Amanda Saigeon

Clinical Engineering Program

Paul Prowse

Academic Program

Zahra Moussavi

Chase Figley

Bertram Unger

Industry Innovation Program

Blake Podaima

Olivia Essex

Richard Dyrkacz

Local Arrangements

Maryam Samiee

Chris Bzovey

Continuing Education Program

Gord McNamee

Bindu Mathews

Tara Cobbett

Publications

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Publicity

Sarah Kelso

Rebecca Austman

Exhibits and Sponsorship

Emil Sosnowski

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Kelly Kobe

Conference Secretariat

Natalia Kaliberda

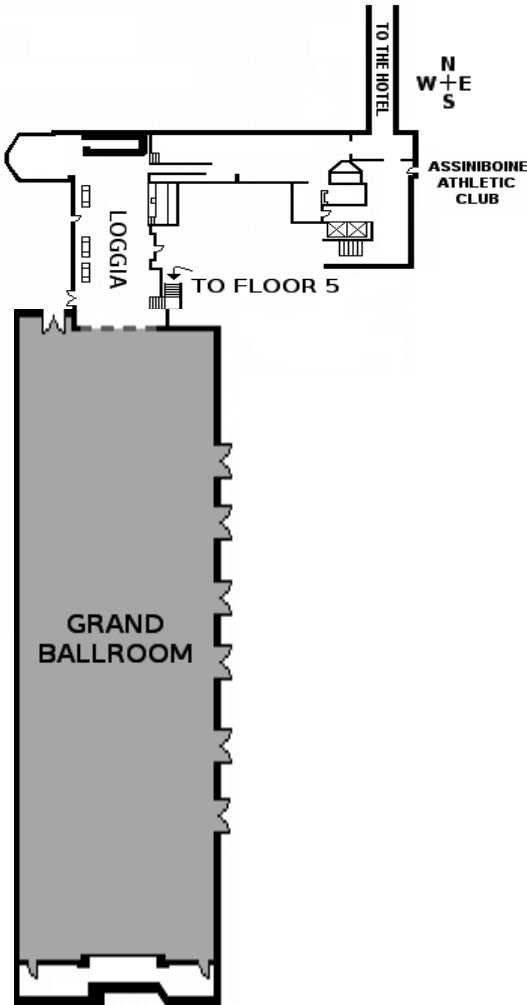
Camille Sherwood

CMBES would like to thank this dedicated group of volunteers for their time and energy in coordinating this year's Conference.

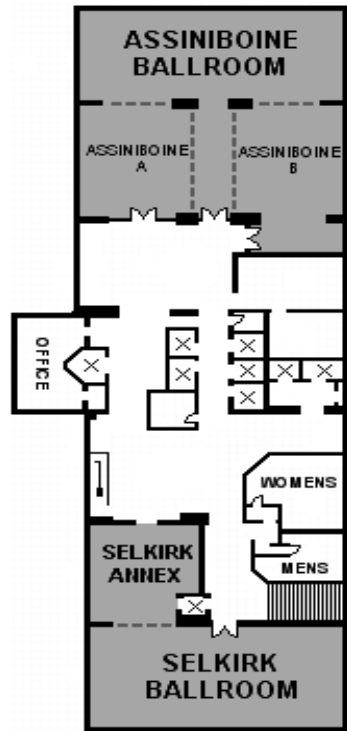


LOCATIONS OF MEETING ROOMS IN THE FORT GARRY HOTEL & CONFERENCE CENTRE

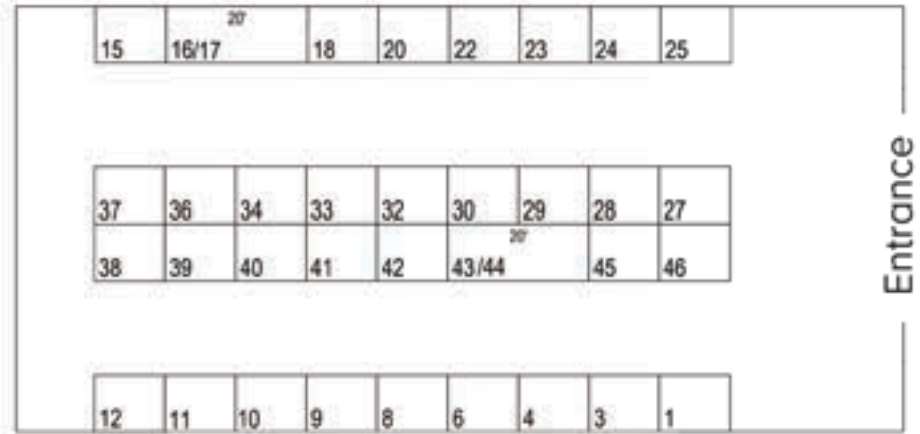
TRADE SHOW & POSTER PRESENTATIONS



KEYNOTES AND SESSIONS ROOMS



TRADE SHOW FLOOR PLAN



TRADE SHOW LOCATION AND HOURS:

The Trade Show will take place at The Fort Garry Hotel,
Grand Ballroom, 4th floor

Wednesday, May 24, 2017

TRADE SHOW OPEN FROM 10:00 AM TO 6:00 PM

10:00 am - 10:30 am: Trade Show Networking: Refreshments in Exhibit Hall

12:00 pm - 1:30 pm: Trade Show Networking: Lunch in Exhibit Hall

4:00 pm - 6:00 pm: Opening Reception in the Exhibit Hall

Thursday, May 25, 2017

TRADE SHOW OPEN FROM 10:00 AM TO 5:00 PM

10:00 am - 10:30 am: Trade Show Networking: Refreshments in Exhibit Hall

12:00 pm - 1:30 pm: Trade Show Networking: Lunch in Exhibit Hall

3:00 pm - 5:00 pm: Trade Show Networking: Refreshments in Exhibit Hall

CMBEC40 EXHIBITORS

| Exhibitor | Booth | Exhibitor | Booth |
|--|--------------|--|--------------|
| Summit Imaging | 1 | Ultra Solutions, LLC | 27 |
| Zoll Medical | 3 | BD Canada | 28 |
| Acertara | 4 | STANLEY Healthcare..... | 29 |
| Pacific Medical | 6 | B Braun | 30 |
| Roxon Medi-Tech Ltd..... | 8 | BBM Biomedical Battery Manufacturing | 32 |
| USCO Medical | 9 | Prescott's Inc | 33 |
| SciCan Ltd. | 10 | Smiths Medical | 34 |
| GE Healthcare | 11 | The Medical Battery Corp..... | 36 |
| Spacelabs Healthcare (Canada) Inc..... | 12 | Philips Canada | 37 |
| Fibertech Canada | 15 | Datrend Systems Inc..... | 38 |
| Fresenius Kabi Canada Ltd..... | 16/17 | Bayer Multi Vendor Service..... | 39 |
| Getinge | 18 | Medset Specialities Ltd. | 40 |
| BRACCO IMAGING Canada | 20 | Local Manitoba Based Vendors | 41 |
| BOMImed | 22 | Cardinal Health Canada / Mindray | 42 |
| CADTH | 23 | Umano Medical | 43/44 |
| Canadian Hospital Specialties Ltd..... | 24 | Draeger Medical Canada Inc. | 45 |
| Baxter | 25 | Technical Prospects, LLC | 46 |



2017 CMBEC 40 CONFERENCE - KEYNOTE SPEAKERS



Tim Hague Sr.

Tim Hague Sr. overcame the odds when he went from a diagnosis of Parkinson's disease to winning season #1 of the Amazing Race Canada. Now, as an international sought after speaker, he shares with his audiences the lessons learned from having run and won this amazing race with Parkinson's.

Tim was formally diagnosed with Parkinson's in February 2011. Two years later he and his son, Tim Jr., were selected from over ten thousand applicants to be one of nine teams to run the race. After coming in last twice and nearly being eliminated The Tim's not only survived but went on to produce an epic come from behind victory. Tim's keynote draws on this experience while weaving a tale of failure and success that moves his audience.

A masterful story teller Tim interlaces humour and wit with sadness and despair. He guides his listeners on a journey of discovery by unpacking what it means to Live Your Best. He explores the themes of;

Simplicity: the art of focusing your life in a chaotic world.

Contentment: that often illusive gift of peacefully accepting what your best produces. And,

Perseverance: the iron will to continue on even when there is no evidence that you will ever be successful.

Tim's message of Live Your Best empowers his listeners to meet Life's challenges and accomplish more than they ever thought they could.

Tim will be the conference's opening speaker on **Wednesday May 24th, 2017.**



Dr. Zahra Moussavi

Dr. Zahra Moussavi is a professor, a Canada Research Chair and also the founder and director of Biomedical Engineering Graduate Program at University of Manitoba. She is the recipient of many awards including the "Canada's Most Powerful Women (Top 100) in 2014. With over 215 peer-reviewed publications in prestigious journals and conferences, her current research includes biological signal processing, diagnostic pattern recognition and medical devices instrumentation with applications on sleep apnea, and Alzheimer disease. She has given 78 invited talks/seminars including 2 Tedx Talks. Aside from academic work, she has also developed and offered memory fitness programs for aging population.

Dr. Moussavi will give her keynote address to the conference on **Wednesday May 24th, 2017**



Charles LaFlèche

Charles "Chuck" LaFlèche is a Vice President at Global Philanthropic, the past President and CEO of the St. Boniface Hospital Foundation and a leader in healthcare and health informatics innovation. By founding Momentum Healthcare, Chuck endeavoured to realize the benefits of electronic clinical documentation to support both clinical and research efforts. His leadership at the helm of the St. Boniface Hospital Foundation continues to support the daily activities of 4,000 clinical staff and 250 researchers. As Diamond Jubilee medal recipient in 2012, Chuck was recognized for his significant

achievements and contributions to the community and to the health system in Manitoba. Chuck will be speaking about the important role that Foundations play in linking clinical care, academic and research initiatives and fostering a community of innovation and philanthropy.

Chuck will give his keynote address to the conference on **Thursday May 25th, 2017.**



CMBEC40 SOCIAL EVENTS



Tuesday, May 23 – 19:00 – 21:00

Opening Reception - Canadian Museum of Human Rights
(All Conference Attendees Welcome)

Located a 10 minute walk from the Fort Garry Hotel

The Canadian Museum for Human Rights will take you on a journey of education and inspiration unlike anything you've experienced before. Join your colleagues for an evening of conversation, networking, snacks and music performed by Winnipeg BMET **David Jung** and his **Jungtion band**.

Sponsored By: **ZOLL**



Wednesday, May 24 – 16:00 – 18:00

Welcome Reception - The Fort Garry Hotel

Exhibit Hall / Grand Ballroom

Come, network and take a tour of all exhibit booths while enjoying an early evening of snacks and drinks.

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Thursday, May 25 – 18:00 – 19:00

Cocktail Reception

Fort Gibraltar

*Shuttles leave the Fort Garry Hotel at 17:30.
Banquet ticket required for entrance.*

Sponsored By: **Baxter**



Thursday, May 25 – 19:00 – 22:00

Awards Banquet

Fort Gibraltar

Banquet ticket required for entrance.

Situated on the banks of the Red River, Fort Gibraltar will take you back 200 years to the period of the fur trade and the voyageurs. Come and enjoy an evening of events including a blacksmith, fur trade, dinner, and awards.

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2017 CMBEC40 CONFERENCE

Schedule-at-a-Glance

Tuesday, May 23, 2017

10:30 - 12:00

Continuing Education Program

| | | | |
|--|--|---|---|
| <p>CE11a Location: Selkirk Annex</p> | <p>Alaris Plus Syringe Training</p> | <p>CE15 Location: Assiniboine A Annex</p> | <p>Fundamentals of Testing Infusion Devices and NIBP Equipment</p> |
|--|--|---|---|

12:00 - 13:30

Lunch 5th Floor Foyer

13:30 - 15:00

Continuing Education Program

| | | | |
|--|--------------------------------------|---|--|
| <p>CE11b Location: Selkirk Annex</p> | <p>Alaris System Training</p> | <p>CE15 Location: Assiniboine A Annex</p> | <p>Fundamentals of Testing Infusion Devices and NIBP Equipment (cont'd)</p> |
|--|--------------------------------------|---|--|

18:00 - 19:00

Museum Tour (*Register in Advance*)
Location: Canadian Museum of Human Rights - humanrights.ca
10 minute walk from the Fort Garry Hotel

Sponsored By: **ZOLL**[®]

19:00 - 21:00

Conference Welcome Reception - *All Conference Attendees Welcome*
Location: Canadian Museum of Human Rights - humanrights.ca
10 minute walk from the Fort Garry Hotel

Sponsored By: **ZOLL**[®]

Complimentary WiFi in all meeting space and guest rooms:
WiFi network : TheFortGarry Password: broadway



Wednesday, May 24, 2017

7:00 - 16:00 **Registration** 4th Floor Foyer

7:30 - 8:30 **Networking Breakfast** Selkirk Ballroom

Sponsored by:



8:30 - 10:00 **Conference Opening**

Welcoming Remarks by Kyle Eckhardt **and Blessing** by Elder Mary Wilson

Keynote Address

Tim Hague Sr., Nurse, Parkinsons Advocate, Winner of The Amazing Race Canada

Location: Selkirk Ballroom

10:00 - 10:30 **Refreshment Break and Trade Show** Exhibit Hall / Grand Ballroom

Sponsored by:



10:30 - 12:00 **Concurrent Sessions**

CE4

Location: Selkirk Annex

**Endoscope Inspection
and Training Course**

A1

Location: Assiniboine B
Annex

**Biomedical Imaging and
Image Processing**

B1

Location: Selkirk Ballroom

**Local Medical Device
Industry Presentations**

CE5

Location: Assiniboine A
Annex

**Electrical Safety
Inspections and
Equipment**

C1

Location: Assiniboine
Ballroom

**Paper Presentations:
Technology
Management**

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Wednesday, May 24, 2017

12:00 - 13:30 **Lunch and Trade Show** *Exhibit Hall / Grand Ballroom*

Sponsored by:



13:30 - 15:00 **Concurrent Sessions**

CE12

Location: Assiniboine A Annex

Computed Tomography, The How and Why of its Importance

A2

Location: Assiniboine B Annex

Biomechanics 1

B2/B3

Location: Selkirk Ballroom

Keynote Presentation

Dr. Mark Torchia

Panel Discussion Supporting Industry Innovation

CE4

Location: Selkirk Annex

Endoscope Inspection and Training Course (cont'd)

C2

Location: Assiniboine Ballroom

Cross-Country Checkup

15:15 - 16:00

Keynote Academic Address

Dr. Zahra Moussavi

Director, Biomedical Engineering Program, Professor & Canada Research Chair

Department of Electrical & Computer Engineering University of Manitoba

Location: Assiniboine Ballroom

16:00 - 18:00

Opening Reception

Refreshments and Appetizers

Location: Exhibit Hall / Grand Ballroom

Sponsored by:





Thursday, May 25, 2017

7:30 - 16:00 **Registration** 4th Floor Foyer

7:30 - 8:30 **Networking Breakfast** Selkirk Ballroom

Sponsored by:



8:30 - 10:00

Welcoming Remarks

Marilyn Peckett, Parks Canada

Keynote Address

Charles "Chuck" LaFlèche, Vice President and Senior Consultant, Global Philanthropic

Location: Selkirk Ballroom

8:30 - 10:00

Continuing Education Program

CE2

Location: Assiniboine A Annex

Engineering Report Writing Workshop

10:00 - 10:30

Refreshment Break and Trade Show Exhibit Hall / Grand Ballroom

Sponsored by:



10:30 - 12:00

Concurrent Sessions

CE10

Location: Selkirk Annex

Medical Imaging: The Who and-What-For!

A3

Location: Assiniboine B Annex

Biosignals

B4

Location: Selkirk Ballroom

Health Information Management Presentations

CE2

Location: Assiniboine A Annex

Engineering Report Writing Workshop (cont'd)

C3

Location: Assiniboine Ballroom

Medical Devices Supportability Summit

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Thursday, May 25, 2017

12:00 - 13:30 **Lunch and Trade Show** *Exhibit Hall / Grand Ballroom*

Sponsored by:



13:30 - 15:00 **Concurrent Sessions**

| | | |
|---|---|--|
| <p align="center">CE6 Location: Selkirk Annex</p> <hr/> <p>Minimizing Ultrasound Transducer Failure Through Proper Care and Early Detection</p> | <p align="center">A4 Location: Assiniboine B Annex</p> <hr/> <p>Neuroengineering and Biosignals</p> | <p align="center">B5 Location: Selkirk Ballroom</p> <hr/> <p>Keynote Innovation Presentations</p> <ul style="list-style-type: none"> • A Conversation about Digital Health • True Interoperability for Medical Devices |
| <p align="center">CE3 Location: Assiniboine A Annex</p> <hr/> <p>Standard Operating Procedure (SOP) Writing Workshop</p> | <p align="center">C4 Location: Assiniboine Ballroom</p> <hr/> <p>Building Bridges</p> | |

15:00 - 15:30 **Refreshment Break and Trade Show***Exhibit Hall / Grand Ballroom*

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Thursday, May 25, 2017

15:30 - 17:00

Concurrent Sessions

CE7

Location: Selkirk Annex

**Innovation in Ultrasound
System Diagnostics**

A5

**Location: Assiniboine B
Annex**

Biomechanics 2

B6

Location: Selkirk Ballroom

Panel Discussion

Digital Health Innovation

CE3

Location: Assiniboine A Annex

**RGI Standard Operating Procedure (SOP) Writing
Workshop (cont'd)**

C5

**Location: Assiniboine
Ballroom**

Education/Certification

18:00 - 19:00

Cocktail Reception (*Banquet ticket required for entrance*)

Shuttles leave the Fort Garry Hotel at 17:30

Location: Fort Gibraltar

Sponsored by:

Baxter

19:00 - 22:00

Awards Banquet (*Banquet ticket required for entrance*)

Location: Fort Gibraltar

Sponsored by:



BD

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world of health*

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Friday, May 26, 2017

7:30 - 15:00 **Registration** 4th Floor Foyer

7:30 - 8:30 **Networking Breakfast** Selkirk Ballroom

Sponsored by:



8:30 - 10:00 **Concurrent Sessions**

| | | |
|--|---|--|
| <p style="text-align: center;">CE9 Location: Selkirk Annex</p> <hr/> <p>CBET Preparation Course</p> | <p style="text-align: center;">A6 Location: Assiniboine B Annex</p> <hr/> <p>Health Informatics</p> | <p style="text-align: center;">B7 Location: Selkirk Ballroom</p> <hr/> <p>Local Industry Presentations</p> |
| <p style="text-align: center;">CE14 Location: Assiniboine A Annex</p> <hr/> <p>Introduction to Lean Management and Six Sigma</p> | | <p style="text-align: center;">C6 Location: Assiniboine Ballroom</p> <hr/> <p>Donation of Used Medical Devices</p> |

10:00 - 10:45 **Poster Presentations and Refreshment Break** 4th Floor Foyer

The Biomedical Engineering Program at the University of Manitoba generously sponsored three cash awards on behalf of CMBES for the three top selected science projects at the 2017 Manitoba School Science Symposium in April. Local CMBES and University of Manitoba members actively participated in judging the projects to identify talented and enthusiastic Manitoba school students (senior, intermediate and junior levels), and promote professions related to biomedical engineering to them. The top selected projects received a certificate from CMBES and an invitation to compete in the CMBEC40 poster competition on Friday, May 26th. These students also received a complimentary day registration to the conference and one year student membership with CMBES.



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Friday, May 26, 2017

10:45 - 12:00

Concurrent Sessions

| | | |
|---------------------------------------|--|--|
| CE9 Location: Selkirk Annex | A7 Location: Assiniboine B Annex | B8 Location: Selkirk Ballroom |
| CE9 CBET Preparation Course (cont'd) | Introduction to Medical Device Regulations | Keynote Presentations • Beyond the Device • Healthcare Analytics |

| | |
|--|---|
| CE14 Location: Assiniboine A Annex | C7 Location: Assiniboine Ballroom |
| Introduction to Lean Management and Six Sigma (cont'd) | Paper Presentations / Technology Management |

12:00 - 13:30

Lunch and CMBES Annual General Meeting

Location: Selkirk Ballroom

13:30 - 15:00

Concurrent Sessions

| | | |
|---------------------------------------|--|---|
| CE9 Location: Selkirk Annex | A8 Location: Assiniboine B Annex | B9 Location: Selkirk Ballroom |
| CBET Preparation Course (cont'd) | Biomaterials | Keynote Innovation Presentation <i>Frank Hivert</i> |

| | |
|---|------------------------------------|
| C8 Location: Assiniboine Ballroom | Regulations and Third Party Repair |
|---|------------------------------------|

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Friday, May 26, 2017

15:00 - 15:30

Closing Remarks/Paper Competition Awards

Location: Selkirk Ballroom

15:30 - 17:00

CE9

Location: Selkirk Annex

**CBET Preparation Course
(cont'd)**



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Contamination

*Suction Regulators: A Potential Vector for Hospital Acquired Pathogens by Keith S. Kaye, MD, MPH; Dror Marchaim, MD; Chester Smialowicz, MD; Lauren Bentley, MSBME.

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CMBEC40 Program

TUESDAY, MAY 23, 2017

Continuing Education Program

10:30 - 12:00

Continuing Education Program

CE11a

**Meeting
Room:**

Selkirk Annex

Alaris Plus Syringe Training



Instructor: Becton Dickinson, Carefusion

A 2 hour Best Practices & Usage Training: BD Carefusion technical expert will walk the attendees through key aspects of syringe pump service.

- Assembly & Disassembly of the pump unit.
- Preventative Maintenance
- Q&A session



**CANADIAN MEDICAL EQUIPMENT
PROTECTION PLAN**

CE15

Meeting
Room:

Assiniboine A
Annex

Fundamentals of Testing Infusion Devices and NIBP Equipment



Instructor: Julio Castro, Pronk Technologies

Presentation #1: Is the Medical Device Really Ready to Go Back to the Clinical Department?

Overview:

- Untangling the difference between medical device accuracy specifications and medical device manufacturer testing requirements.
- Translating the test equipment specifications as it relates to the medical device and accuracy of the test equipment.
- Comparing the minimum requirements of the medical device to the translated specifications of the test equipment to be used.
- Choosing a test device that meets the manufacturer requirements and ensures that the medical device is ready to be returned to the clinical department.
- Potential Test setup errors that can also impact medical device readiness.

Presentation #2: Fundamentals of Testing Infusion Devices

Overview:

- Design techniques of common infusion devices on the market. Review patient safety concerns that have occurred including actual patient incidents investigated by the FDA.
- Review of common testing methods including digital scales, graduated cylinders, burettes and the Pros & Cons of each method.
- Service and maintenance recommendations for each measurement technique.
- Key AAMI standards, factors that influence test results, as well as, service/maintenance best practices.

Presentation #3: NIBP Fundamentals and Troubleshooting

Overview:

- Background and history of blood pressure measurements.
- Basic design principals of NIBP including DC and AC channel signal processing and protection circuits.
- AAMI standard on accuracy requirements. Various measurement techniques utilized in vital signs monitors.
- Why there can be variations in the readings from manufacturer to manufacturer or model to model.
- Sources of measurement errors and troubleshooting strategies.

12:00 - 13:30

Lunch

5th Floor Foyer

13:30 - 15:00

Continuing Education Program

CE11b

Alaris System Training

Meeting
Room:



Instructor: Becton Dickinson, Carefusion

Selkirk Annex

A 2 hour Best Practices & Usage Training: BD Carefusion technical expert will walk the attendees through key aspects of the Alaris system pumps service.

- Assembly & Disassembly of the pump unit.
- Preventative Maintenance (PCU & LVP)
- Utilization of the Maintenance Software.

CE15

Fundamentals of Testing Infusion Devices and NIBP Equipment (cont'd)

Meeting
Room:



Instructor: Julio Castro, Pronk Technologies

Assiniboine A
Annex

View details on page 22

18:00 - 19:00

Museum Tour (Register in Advance)

Sponsored By:

ZOLL®

Location: Canadian Museum of Human Rights - humanrights.ca
10 minute walk from the Fort Garry Hotel

19:00 - 21:00

Conference Welcome Reception (All Conference Attendees Welcome)

Sponsored By:

ZOLL®

Location: Canadian Museum of Human Rights - humanrights.ca
10 minute walk from the Fort Garry Hotel



WEDNESDAY, MAY 24, 2017

Conference & Trade Show

7:30 - 16:00

Registration

4th Floor Foyer

7:30 - 8:30

Networking Breakfast

Selkirk Ballroom

Sponsored By:



8:30 - 10:00

Conference Opening

Selkirk Ballroom

Welcoming Remarks

Kyle Eckhardt, CMBEC40 Committee Chair

Blessing by Elder Mary Wilson

Known to many as Grandmother of Four Directions and She Who Walks With Wolves. Renowned in Canada and many parts of the world as a spiritual teacher, Spirit Walker, and Healer Mary's gentle presence has touched many lives over the past forty years helping people heal, emotionally, physically, and spiritually. Mary is presently working as a Resident Elder at the University of Manitoba, Manitoba Adolescent Treatment Centre. Mary has worked as an Elder at the Circle of Life Thunderbird House co-creating programs with Elder Mary Richard. She has served as an Elder and Spiritual Care person at Neeginan Emergency Centre (First Nations Homeless Shelter). While she was there, Mary created addiction therapy groups, a literacy program, and a safe place for individuals to lay down their pain. As the founder Core Area Christmas she orchestrated a dinner and gift giving for thousands of children for many years. Recently she provided support as Elder for the movie *We were Children* (Residential School survival) and also with the murdered and missing series *Taken*. She has been asked by the Province of Manitoba to support as Elder/Therapist for *The 60's Scoop* (stolen Aboriginal children). Frequently involved as a psychotherapist and interventionist she provides support to many as well as providing individual life coaching and healing. Over the years she has worked in conjunction with medical specialists (psychiatrists and psychologists), family physicians, as well as social workers, teachers, and lawyers.

Keynote Address

Tim Hague Sr., nurse, Parkinsons advocate, winner of the Amazing Race Canada

A masterful story teller Tim interlaces humour and wit with sadness and despair. He guides his listeners on a journey of discovery by unpacking what it means to Live Your Best. He explores the themes of;

Simplicity: the art of focusing your life in a chaotic world.

Contentment: that often illusive gift of peacefully accepting what your best produces. And,

Perseverance: the iron will to continue on even when there is no evidence that you will ever be successful.

Tim's message of Live Your Best empowers his listeners to meet Life's challenges and accomplish more than they ever thought they could.

10:00 - 10:30

Refreshment Break and Trade Show

Exhibit Hall / Grand Ballroom

Sponsored By:



10:30 - 12:00

Continuing Education Program

CE4

Meeting
Room:

Selkirk Annex



Endoscope Inspection and Training Course

Instructor: Ramiro Paez, Fibertech Canada

Topics to be covered through this course include:

- Description of the endoscope - describing each area of the scope using proper terms such as Insertion Tube, Distal End, Electrical Connector, etc.
- Proper handling and care, handling for storage for transportation to cleaning room and leak testing.
- Parts presentation, showing internal and external components.
- Showing an exposed working endoscope; providing a unique internal look at a scope as it angulates.
- Q & A Session

CE5

Meeting
Room:

Assiniboine A
Annex



Electrical Safety Inspections and Equipment

Instructor: Ian Marlay, Maquet Dynamed

Electrical leakage data is routinely collected according to test procedures during electrical safety testing; however, it may not always be understood why particular tests are done, what the data collected means, and when corrective action is required. This course will aim to improve understanding of electrical safety testing, why it is important, and what actions to take based on the results.

10:30 - 12:00
Academic Program

A1

Meeting
Room:

Assiniboine B
Annex

Biomedical Imaging and Image Processing



Chair: Dr. Bertram Unger, University of Manitoba

Life Science Programs at the Canadian Light Source: Overview of the Biomedical Studies at BMIT

Presenter: Tomasz Wysokinski

The Bio-Medical Imaging and Therapy (BMIT) Facility provides synchrotron-specific imaging and radiation therapy capabilities. There are two separate beamlines used for experiments: the Bending Magnet (BM-POE-2) that was opened for general user program in 2011 and the Insertion Device (ID-SOE-1) that started its general user program in 2015. The two beamlines are devoted to advanced X-ray imaging and X-ray therapy techniques. Ongoing core research programs include: bone and cartilage growth and deterioration, cardiovascular and lung imaging and disease, human and animal reproduction, cancer imaging and therapy, spinal cord injury and repair, medical device and scaffold imaging, developmental biology, as well as the introduction of new imaging methods.



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10:30 - 12:00

Academic Program

A1

Meeting
Room:Assiniboine B
Annex

Chair: Dr. Bertram Unger, University of Manitoba



Biomedical Imaging and Image Processing

Effects of Formalin Fixation on Myelin Water Fraction MRI Measurements in Human White Matter: A Novel Ex Vivo Study

Presenter: Anwar Shahadat Shatil

The Bio-Medical Imaging and Therapy (BMIT) Facility provides synchrotron-specific imaging and radiation therapy capabilities. There are two separate beamlines used for experiments: the Bending Magnet (BM-POE-2) that was opened for general user program in 2011 and the Insertion Device (ID-SOE-1) that started its general user program in 2015. The two beamlines are devoted to advanced X-ray imaging and X-ray therapy techniques. Ongoing core research programs include: bone and cartilage growth and deterioration, cardiovascular and lung imaging and disease, human and animal reproduction, cancer imaging and therapy, spinal cord injury and repair, medical device and scaffold imaging, developmental biology, as well as the introduction of new imaging methods.

Comparison of Multi-Echo Gradient and Spin Echo (GRASE) and Fast Spin Echo (FSE) MRI Sequences for T1w/T2w Ratio Mapping

Presenter: Nasir Uddin

Myelin plays an important role in normal brain function. However, damage of myelin (or demyelination) can occur in diseases such as multiple sclerosis (MS). Recent advances in MRI methods that enable the estimation of myelin content in the human brain include diffusion tensor imaging, magnetization transfer imaging, multicomponent T2 relaxation-based myelin water fraction (MWF) imaging, and the ratio of T1- and T2- weighted MRI images (T1w/T2w). A recent study documented that T1w/T2w ratio mapping is a very reliable measure and might be suitable for longitudinal studies. The purpose of this study was to compare T1w/T2w ratio mappings obtained using FSE and GRASE sequences for T2w images, and to correlate the T1w/T2w measures with MWF.

Quantitative Tract Integrity Profiles (Q-TIPs): A Novel Neuroimaging Toolbox for Assessing Along Tract White Matter Integrity

Presenter: Sohail Younas

In this paper, we present a novel neuroimaging toolbox called "Quantitative Tract Integrity Profiles (Q-TIPs)", which performs tract-based analyses by quantifying the integrity of white matter along tracts. Q-TIPs extracts the orientation of any user-defined ROI mask or atlas using a novel 3D centerline extraction algorithm to automatically identify the principal orientation along the ROI. After extracting the centerline, quantitative white matter imaging values can then be extracted from any user-defined quantitative image (e.g., fractional anisotropy, mean diffusivity, T1w/T2w ratio, myelin water fraction, magnetization transfer ratio, etc.) along the fiber tract.

10:30 - 12:00

Industry Innovation Program

B1**Meeting
Room:****Selkirk
Ballroom****Local Medical Device Industry Presentations***Chair: Olivia Essex, BOMImed*

This session brings together entrepreneurs and innovators from across Winnipeg to showcase their companies and technologies while speaking to the risks, rewards and challenges they have experienced.

Alan Rattan, Precision ADM

- Precision ADM Inc. (PADM) identifies, develops, and manufactures high value components and device applications for the medical, aerospace, energy and industrial sectors. The medical industry is moving towards patient specific devices to offer better, more personalized therapies. Additive manufacturing technology enables complex geometries to be made at reduced costs, on demand, while meeting high quality standards. From design and engineering, PADM has made a significant investment to control the entire manufacturing process by incorporating complimentary systems including subtractive manufacturing, finishing, heat treating, testing and inspection. PADM is solving today's complex manufacturing issues using innovative engineering and Advanced Digital Manufacturing™ (ADM) solutions.

Trevor Gascoyne and Leah Guenther, Orthopaedic Innovation Centre

- The Orthopaedic Innovation Centre (OIC) provides the orthopaedic industry with both leading clinical research as well as integrated testing of medical devices. The OIC is unique in its support of this field as its team is composed of surgeons, scientists, engineers, and technologists working in tandem to evaluate new medical devices and surgical practices. Specific capabilities include; design validation, wear and durability testing, regulatory consultation, manufacturing quality assessment, clinical performance evaluation, and device failure analysis.

Dr. Pallav Shah, St. Boniface Hospital

- Dr. Pallav Shah is a cardiac surgeon at St. Boniface Hospital in Winnipeg, Manitoba, as well as the inventor of the Aortic Annular Support System. The system consists of a ring and a band, which are both implanted during surgical reconstruction or repair of a diseased aortic valve. The system prevents annular dilation while preserving 3D motion during the cardiac cycle.

Dr. James Schellenberg, Cubresa

- Dr. James Schellenberg, Founder and CTO at Cubresa, has participated in start-up technology companies from 1989 to the present. He has executive management experience with Broadband Networks Inc., Nortel Inc., Centara Corporation, James Schellenberg Inc. and most recently with IMRIS Inc. He has participated both as an investor and contributor for numerous technology based companies, including Texar Corporation, Edge Networks Inc., Esion Networks Inc., Photonami Inc. and iMagicTV. James graduated with a Ph.D. in Electrical Engineering from the University of Manitoba in 1990 and has filed over 10 patents.

Mark Younes, Younes Medical Technologies

- Mark Younes is the Vice President at Younes Sleep Technologies, an innovative medical devices company that dramatically improves the diagnosis and treatment of sleep disorders. The principal offering is the Michele Sleep Scoring system.

10:30 - 12:00

Clinical Engineering Program

C1

Meeting
Room:Assiniboine
Ballroom*Chair: Essi Shams, WRHA***Paper Presentations / Technology Management****Defining the BC Provincial Preventive Maintenance Program: World Health Organization Device Type Classification***Presenter: Andrew Ibey*

There is no slowing down the perennial increase of in-hospital medical devices, which presents an ongoing challenge to BME departments with limited resources available for service demands. A computerized maintenance management system (CMMS) is a prerequisite for the execution and sustainment of a successful preventive maintenance (PM) program. This paper will focus on the successful implementation of a Provincial PM program in British Columbia and the historical context to arrive at this point. It will also describe the risk and frequency of device types that constitute the PM schedule using the World Health Organizations "Medical Equipment Maintenance Programme" methodology.

Implementation of Evidence Based Maintenance at the University of Ottawa Heart Institute to Optimize Biomedical Engineering Maintenance Strategies*Presenter: Sarah Bruch*

Determining alternative maintenance strategies that are more efficient, is desirable. Strategies would require data to indicate equivalent safe and effective outcomes as those recommended by manufacturers. This data-based methodology is called evidence-based maintenance (EBM). EBM is defined as "a continual improvement process that analyzes the effectiveness of maintenance resources deployed in comparison to outcomes achieved previously or elsewhere, and makes necessary adjustments to maintenance planning and implementation". The objective of this research was to measure and monitor the effectiveness of the BME maintenance strategies at the University of Ottawa Heart Institute (UOHI) by implementing the EBM technique. It was also to identify any issues and barriers for EBM implementation in order to provide insight and assistance to other hospitals wanting to monitor the effectiveness of their maintenance strategies.

10:30 - 12:00

Clinical Engineering Program

C1

Meeting
Room:

Assiniboine
Ballroom



Chair: Essi Shams, WRHA

Paper Presentations / Technology Management

Improved Replacement Plan Strategy: An Application of Equipment Replacement Prioritization Scores on Patient Monitor Replacement

Presenter: Avwerosuo Amromanoh

This paper will address how an existing equipment replacement prioritization scoring (ERPS) system developed by the WRHA clinical engineering team was leveraged for creating replacement plans with less effort than previous plans thus avoiding a single large expenditure on monitoring equipment.

How Well are Equipment Replacement Prioritization Scores Followed? A Case Study

Presenter: Avwerosuo Amromanoh

Healthcare organizations around the world are increasingly making use of mathematical models to provide objective analysis of equipment in the inventory for equipment replacement. These mathematical models involve Equipment Replacement Priority Scores (ERPS) that entail allocating a numerical score to various criteria. The criteria and methods for determining ERPS vary across regions. While studies exist to demonstrate various ways to calculate and implement ERPS, little is known on how well these systems are followed within the organizations and how they affect the equipment replacement priorities.

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12:00 - 13:30

Lunch and Trade Show

Exhibit Hall / Grand Ballroom

Sponsored By:



13:30 - 15:00

Continuing Education Program

CE12

**Meeting
Room:**

**Assiniboine A
Annex**



Computed Tomography, The How and Why of its Importance

Instructor: Kenneth Hable, Technical Prospects

"Computed Tomography, the how and why of its importance" provides a multifaceted view into the high-tech world of CT. Attendees will learn when and why CT is used and how it helps in the diagnoses of illness and disease. We will discuss the impact of the different departmental roles and responsibilities that play upon the personnel called to service these machines and why service and maintenance play such significant roles in "uptime" requirements. Lastly, we will discuss overall operation of the scanner and how it's technology is used to produce images including discussion of the different imaging planes as well as the differentiation between CT and general X-ray imaging.

CE4

**Meeting
Room:**

Selkirk Annex



Endoscope Inspection and Training Course (cont'd)

Instructor: Ramiro Paez, Fibertech Canada

View details on page 25

13:30 - 15:00

Academic Program

A2

Meeting
Room:Assiniboine B
Annex**Biomechanics 1***Chair: Dr. Zahra Moussavi, University of Manitoba***Assessment of Hip Fracture Risk with an Image Based Three Level Biomechanical Model***Presenter: Yunhua Luo*

Accurate assessment of hip fracture risk is necessary for taking appropriate preventive and protective measurements. Conventional population-based statistical models are not accurate in predicting fracture risk in individual subjects. Single-level biomechanical models are not able to accommodate all biomechanical variables that take effects at different musculoskeletal levels. We developed an image based three-level biomechanical model to predict hip fracture risk caused by sideways fall from standing height. A small-scale clinical study was conducted to examine the ability of the three-level model to discriminate clinical hip fracture cases from matched controls. The obtained results show that the model has superior performance than the existing clinical tools.

Design and Load Control Experimental Testing of a Customized Surface-Guided Total Knee Replacement*Presenter: Shabnam Pejhan*

The development and use of total knee replacements (TKRs) aims to relieve the pain and restore the normal knee functionality. However, previous studies on the performance of the artificial knee joints after implantation reported significant alteration in the movement patterns of the joint, which lead into limitations in the range of motion and performing activities of daily living. The goal of this study was to introduce and evaluate a customized surface-guided knee implant aiming to achieve close to a normal pattern of motion. The virtual simulation, along with the experimental testing by using a load controlled knee wear simulator verified the capability of the design features in achieving the predefined design target pattern of motion.

Validation of a Computational Wear Model for Total Knee Replacement Polyethylene Wear Prediction*Presenter: Sean O'Brien*

Total knee replacements (TKRs) are becoming increasingly prevalent among younger, heavier and more active patients, resulting in increased tribological demand. The development of more efficient methods for evaluating and predicting TKR wear could greatly improve the design of TKRs. Computational wear simulations have demonstrated greatly improved time and cost efficiency over the use of knee simulator wear tests, which are the current standard for evaluating TKR wear performance. However, the application of computational wear simulations has previously been limited due to the weak correlation strength of the available computational wear models compared to knee simulator wear test results. In the present research, a recently developed computational wear model was validated for the prediction of TKR tibial insert polyethylene wear. The recently developed time-dependent cross shear and energy dissipation wear model was implemented within the colloidal boundary lubrication model (CBL) recently developed by O'Brien et al. The greatly improved tribological representation of the TKR conditions by the CBL computational wear model was anticipated to result in greatly improved predictive capabilities over the previously available computational wear models.

13:30 - 15:00

Industry Innovation Program

B2

**Meeting
Room:
Selkirk
Ballroom**

Keynote Presentation



*Dr. Mark G. Torchia, Co-Founder of Monteris Medical
Executive Director, The Centre for the Advancement of Teaching
and Learning Associate Professor of Surgery, University of
Manitoba*

Mark will be speaking about his career in the medical devices industry and some of the key ideas, decisions and relationships that led to his success.

Dr. Mark G. Torchia is the co-creator of the NeuroBlate System, a medical device that combines a novel laser probe system with real-time image guidance. Using magnetic resonance imaging and sophisticated software, the tool allows neurosurgeons in Canada and abroad to treat brain tumours and other intracranial targets in a minimally invasive way that also reduces post-operative care and health costs. Mark Torchia is a 2016 winner of the Governor General's Innovation Awards.

B3

**Meeting
Room:
Assiniboine B
Annex**

Panel Discussion - Supporting Industry Innovation



*Moderator: Marshall Ring, Manitoba Technology Accelerator
Associate Professor of Surgery, University of Manitoba*

The panel will discuss the state of medical device development in the Province of Manitoba and explore avenues that could spur the creation of a technology hub that would lead to improved cooperation and collaboration in the community.

Panelists:

- Dr. Pallav Shah, St. Boniface Hospital
- Dr. Urs Wyss, University of Manitoba
- Dr. John Saunders, Cubresa
- Mark Younes, Younes Medical Technologies

13:30 - 15:00

Clinical Engineering Program

C2

Meeting
Room:

Assiniboine
Ballroom



Cross-Country Checkup

Chair: Martin Poulin, Vancouver Island Health Authority

Topics:

- Whats Happening in Your Neck of the Woods
- Funding Sources and Program Scope of Work
- How is your Department Transforming?

15:15 - 16:00

B2

Meeting
Room:

Assiniboine
Ballroom



Keynote Academic Address

*Dr. Zahra Moussavi, Director, Biomedical Engineering Program
and Professor, Department of Electrical & Computer Engineering,
University of Manitoba, Canada Research Chair*

Dr. Zahra Moussavi is a professor, a Canada Research Chair and also the founder and director of Biomedical Engineering Graduate Program at University of Manitoba. She is the recipient of many awards including the Canada's Most Powerful Women (Top 100) in 2014. With over 215 peer-reviewed publications in prestigious journals and conferences, her current research includes biological signal processing, diagnostic pattern recognition and medical devices instrumentation with "applications on sleep apnea and Alzheimer disease." She has given 78 invited talks/seminars including 2 Tedx Talks. Aside from academic work, she has also developed and offered memory fitness programs for the aging population.

16:00 - 18:00

Opening Reception

Refreshments and Appetizers

Location: Exhibit Hall / Grand Ballroom

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THURSDAY, MAY 25, 2017

Conference & Trade Show

7:00 - 16:00

Registration

4th Floor Foyer

7:30 - 8:30

Networking Breakfast

Selkirk Ballroom

Sponsored By:



8:30 - 10:00

Welcoming Remarks

Selkirk Ballroom

Marilyn Peckett, Parks Canada

Marilyn is the Superintendent responsible for the effective stewardship of nine national historic sites and Wapusk National Park that comprise the Manitoba Field Unit. Her role includes oversight of maintaining ecological and commemorative integrity at our park and sites, maintenance of our assets and upholding the fiscal, human resources, health & safety and other regulatory and policy accountabilities of Parks Canada. She is passionate about helping achieve Parks Canada's vision: Canada's treasured natural and historic places will be a living legacy, connecting hearts and minds to a stronger, deeper understanding of the very essence of Canada.

Keynote Address

Charles "Chuck" LaFlèche, Vice President and Senior Consultant, Global Philanthropic

Charles "Chuck" LaFlèche is a Vice President at Global Philanthropic, the past President and CEO of the St. Boniface Hospital Foundation and a leader in healthcare and health informatics innovation. By founding Momentum Healthcare, Chuck endeavoured to realize the benefits of electronic clinical documentation to support both clinical and research efforts. His leadership at the helm of the St. Boniface Hospital Foundation continues to support the daily activities of 4,000 clinical staff and 250 researchers. As Diamond Jubilee medal recipient in 2012, Chuck was recognized for his significant achievements and contributions to the community and to the health system in Manitoba. Chuck will be speaking about the important role that Foundations play in linking clinical care, academic and research initiatives and fostering a community of innovation and philanthropy.

8:30 - 10:00

Continuing Education Program

CE2

Meeting Room:

Assiniboine A Annex



Engineering Report Writing Workshop

Instructor: Lisa Moretto, RGI Learning

In the book *English for Engineers*, published in 1926, the author states that "An engineer's handling of his report indicates his grasp of the engineering project, his aptitude, his vision and his insight. Upon his reports, the engineer is judged as to his ability and reliability."

Reports are a major deliverable for any technical professional but often, these same people are not confident in their writing skills. Even with advancement in communication tools, the report is still the main way firms distribute their ideas and findings.

By the end of the session participants will be able to

- Understand the importance of a written report
- Determine the purpose of a report
- Present the most important information for the audience at the very beginning
- Write a clear, concise, and complete Executive Summary
- Structure content in a logical format
- Ask questions to understand the audience's needs
- Structure various types of short reports
- Understand the content and requirements of the Professional Progress Report required by engineering societies

10:00 - 10:30

Refreshment Break and Trade Show

Exhibit Hall / Grand Ballroom

Sponsored By:



10:30 - 12:00

Continuing Education Program

CE10

Meeting Room:

Selkirk Annex



Medical Imaging: The Who and What For!

Instructor: Kenneth Hable, Technical Prospects

A candid discussion regarding the individual modalities making up the Medical Imaging Department. Attendees will learn the primary application of and reason for each modality, the similarities and differences between them and why it seems that someone loses their mind when a system goes down. This insider information comes from someone lucky enough to have been; a patient, a Radiographic Technologist, a Medical Imaging Assistant Director, a Doctor and now a Service Engineer.

10:30 - 12:00

Continuing Education Program

CE2

Meeting
Room:

Assiniboine A
Annex

Engineering Report Writing Workshop (cont'd)



Instructor: Lisa Moretto, RGI Learning

Continued from page 37

10:30 - 12:00

Academic Program

A3

Meeting
Room:

Assiniboine B
Annex

Biosignals



Chair: Dr. Chase Figley, University of Manitoba

Expiratory Breathing Sounds Characteristics During Wakefulness and Sleep in Mild and Severe Apneic Groups

Presenter: Zahra Moussavi

We investigated plausible changes in spectral and phasic properties of tracheal respiratory sounds from wakefulness to sleep in relation to obstructive sleep apnea (OSA). Data were expiratory sounds of 30 subjects during wakefulness and sleep, both in supine position. Subjects were divided into two groups of mild and severe OSA (15 in each group) based on their apnea/hypopnea index (AHI). Power spectral density (PSD) and phase response were estimated from each normalized expiratory sound; their characteristics were compared within and between the groups. Spectral analysis during wakefulness showed an opposite pattern between mild and severe groups in low and high frequencies. The mild group's PSD on average was higher than that of the severe group in lower frequencies, while this pattern was reversed in high frequencies. During sleep, however, the PSD of the severe group was higher than that of mild group across the spectrum. On the other hand, during sleep, the average phase response of the severe group showed larger delay than that of the mild group, especially at higher frequencies. The physiological and pathological interpretations of these findings are discussed.

The Effects of Anthropometric Parameters on the Breathing Sound Features while Screening Obstructive Sleep Apnea during Wakefulness

Persenter: Ahmed Elwali

Anthropometric characteristics, such as gender, body mass index (BMI), age, etc. are considered as risk factors for obstructive sleep apnea (OSA). These information are used for screening OSA during wakefulness, but they provide a poor specificity compared to our screening method using tracheal breathing sound analysis. Despite that, one of the main challenges of using breathing sounds analysis for classification of OSA during wakefulness is the effect of confounding variables. Breathing sounds are not only affected by OSA, but also by the anthropometric factors. In this work, we investigated which sound features show the least correlation to anthropometric factors. Tracheal breathing sounds of 114 individuals (66 subjects with apnea/hypopnea index (AHI)15) were recorded during wakefulness in supine position. Spectra and bispectra of the signals of the two AHI groups were analyzed to extract the most significant features. Our results suggest it is possible to find the best features with high sensitivity to AHI and least sensitivity to confounding variables.

10:30 - 12:00

Academic Program

A3**Meeting
Room:****Assiniboine B
Annex****Biosignals***Chair: Dr. Chase Figley, University of Manitoba***Biceps Brachii Muscle Fatigue Progression Analysis using Extended Modified B-Distribution based Time-Frequency Features***Presenter: Karthick PA*

Evaluation of muscle dynamics is an important component in the field of biomedical signal processing research. For this purpose, signals are acquired under well defined protocols and are processed to extract useful information that reflects the functional state of neuromuscular system. Surface electromyography (sEMG) is a noninvasive technique which is used to record the electrical activity of neuromuscular system. The sEMG signal characteristics depend on several physiological parameters such as firing rate, motor unit recruitment pattern, types of motor unit, muscle fiber conduction velocity and low pass filtering effect of volume conductors. These signals are random, nonstationary and multicomponent. In this work, sEMG signals are recorded from biceps brachii muscles during isometric contraction.

EVestG Recordings are Vestibuloacoustic Signals*Presenter: Brian Lithgow*

Electrovestibulography (EVestG) has been considered as a method to record and detect vestibuloacoustic signals originating mainly from vestibular systems. EVestG recordings can be made while the subject is resting (no motion) or during a whole-body tilt. The EVestG methodology using the "Neural Event Extraction Routine" (NEER) has been shown to be able to detect small field potentials buried in noise, average them and display the averaged FP as well as the FP firing time intervals. An FP can be defined as the 'synchronous' firing of many of vestibuloacoustic nerve fibres. Classifier features are measurable properties of an observation from the averaged FP and/or their firing histogram that can be useful in providing separation of two pathologies or symptomatologies. Features extracted from EVestG recordings have, in pilot studies, been successfully applied to the classification and or measure of the symptomology of Parkinson's disease, Major Depressive Disorder and Vertiginous Disorders. However, a clear picture of the likely acoustic, vestibular or vestibuloacoustic origin and the physiologic basis of these field potentials (FP's) is lacking. Thus, it is necessary to determine and better define the true EVestG FP template as well as determine the origin of the EVestG FP.

10:30 - 12:00

Industry Innovation Program

B4**Meeting
Room:****Selkirk
Ballroom****Health Information Management Presentations***Chair: Blake Podaima, Virtuistix*

This session brings together entrepreneurs and innovators from across Winnipeg to showcase their companies and technologies while speaking to the risks, rewards and challenges they have experienced.

Luc Bohunicky, Business Developer and CBO, Consultica Inc.

- Luc Bohunicky is a Canadian business-developer with an obsession for doing things differently. Luc attended the Asper School of Business at the University of Manitoba, where his interest in startups was born. Luc is the Co-Founder and Chief Brand Officer at Consultica (www.consultica.ca), a mobile app consultancy with a presence in Canada, the U.S. and in Europe, working with Silicon Valley startups and Fortune 500 brands. A big believer in continuous improvement, he and his team find projects which empower end-users to be better, faster, and happier today than they were yesterday. With an interest in healthcare technology, Luc lead a partnership with the Paramedic Association of Manitoba creating the next-gen application for front-line responders through the new brand of MedicHero (www.medichero.ca).

Dr. Ganesan Abbu, LogixMD Inc.

- Dr. Abbu is the President and CEP of LogixMD, a dynamic digital health solutions company. LogixMD created innovative software and web apps that transform complex medical decision making processes into simple and logical workflows. Their goal is to develop products that will help doctors, medical practices and hospitals to revolutionize current tedious and time consuming paper based systems into a more efficient electronic one.

Vergil Kanne, Tactica Interactive Inc.

- Virgil is Interactive Producer leading the development of high-impact, engaging interactive digital media projects for television producers, broadcasters, and marketers. His specialties include, Interactive Digital Media, mobile application development, unity 3D development, web applications, financing planning and funding and online strategy.

10:30 - 12:00

Industry Innovation Program

B4

Meeting Room:

Selkirk Ballroom



Health Information Management Presentations

Chair: Blake Podaima, Virtuistix

Continued from page 40

Dr. Nick Pizzi, IMT Inc.

- Dr. Pizzi’s clarion call is “Let The Data Speak”. He provides research and technical services relating to predictive analytics and big data technologies. He has extensive experience in the analysis of complex, voluminous data in order to discover new generalizations, nuanced trends, and unanticipated patterns.

Dr. Ali Esmail, PopRX

- Medical doctor Ali Esmail founded Toronto-based PopRx in early 2015. He and his partner successfully pitched PopRx on the CBC web series Next Gen Den that same year, earning a \$100,000 investment from OMX founder Nicole Verkindt and Shopify COO Harley Finkelstein. Previously, Dr. Esmail co-founded Koronis Health Inc. and their secure mobile collaboration platform, Medlinx, that allows every medical professional to access the information they need quickly and easily, and to share information with patients.

10:30 - 12:00

Clinical Engineering Program

C3

Meeting Room:

Assiniboine Ballroom



Medical Devices Supportability Summit

Chair: Mike Capuano, Hamilton Health Sciences

Speakers:

- Andrew Ibey, Providence Health
- Mario Ramirez, SunnyBrook Hospital
- Kelly Kobe, Alberta Health Services
- Martin Poulin, Vancouver Island Health Authority
- GE Healthcare
- Spacelabs Healthcare

12:00 - 13:30

Lunch and Trade Show

Exhibit Hall / Grand Ballroom

Sponsored By:



13:30 - 15:00

Continuing Education Program

CE6

Meeting
Room:

Selkirk Annex

Minimizing Ultrasound Transducer Failure Through Proper Care and Early Detection



Instructor: Kyle Grozelle, Summit Imaging

Preventing transducer failure is incredibly important as faulty probes can compromise patient safety by impacting image quality and potentially putting patients at risk for infection. The key to preventing transducer failure is implementing proper care methods and ensuring that everyone who handles the transducer is able to identify early warning signs. In this session, Kyle will break down a transducer so he can explain the function of each part and where failures typically occur. He will bring real-life examples of transducers in various conditions so participants can see what a damaged probe looks like, making it easier for them to identify problems on their own. He will then demonstrate techniques for detecting common problems, such as how to detect interior probe damage by examining the exterior.

CE3

Meeting
Room:

Assiniboine A
Annex

RGI Standard Operating Procedure (SOP) Writing Workshop



Instructor: Lori Marra, RGI Learning

Let's face it, SOPs are a necessary part of the regulated and non-regulated fields but we all hate reading and more importantly writing them. They are often very long, receptive, overly detailed, and hard to comprehend. This is a waste of time and money and potentially opens our organizations up to risk. Although regulations dictate what companies must do, they don't clearly explain how to it.

This session will offer ideas on audience analysis, document structure, version control, clear language, common SOP terminology, and editing.

By the end of the session participants will be able to:

- Understand common terminology
- Understand the purpose of SOPs
- Determine the audience for their document
- Develop and use structured SOP templates
- Write a clear, concise, and complete information

13:30 - 15:00

Academic Program

A4**Meeting
Room:****Assiniboine B
Annex****Neuroengineering and Biosignals***Chair: Marcus Ng, University of Manitoba***Preliminary study of EEG Brain Synchronization in Epileptic Patients During Sleep***Presenter: Samaneh Baghbani*

Brain synchronization occurs when different areas of the brain work simultaneously and communicate together. However, if there is over-synchronization of the brain, then this can lead to the medical condition of epilepsy, which is defined as the tendency to recurrent unprovoked seizures. Cortical hypersynchronization facilitates spatial and temporal summation of aberrant neuronal activity into epileptiform discharges and seizures. We hypothesize that there are measurable EEG brain synchronization changes in epileptic patients during sleep. Brain synchronization can be inferred by calculating statistical interdependencies among signals in coupled neuronal systems. These dependencies can then be analysed using quantitative EEG measures. This study aims to identify brain synchronization changes in epileptic subjects during REM and NREM sleep by using EEG spectral analysis.

Repetitive Transcranial Magnetic Stimulation (rTMS) as a Treatment for Post-Concussion Syndrome*Presenter: Grant Rutherford*

As part of an ongoing study, a small group of volunteers with post-concussion syndrome (PCS) were given either real or sham rTMS treatment. Thirteen treatment sessions over three weeks applied 20 Hz rTMS to the left dorsolateral prefrontal cortex. Assessments to determine cognitive ability, memory, depression symptoms, and PCS symptom burden were done before and after treatment, and twice following up at one and two months post-treatment. Significant improvements were found at two months post-treatment in the measurement of symptom burden using the Rivermead Post Concussion Symptoms Questionnaire. This result suggests that rTMS may be an effective treatment for some of the symptoms of post-concussion syndrome.

13:30 - 15:00

Academic Program

A4**Meeting
Room:****Assiniboine B
Annex****Neuroengineering and Biosignals***Chair: Marcus Ng, University of Manitoba***Using EVESTG Assessments for the Detection of Symptomology Consequent to A Lateral-Impact Concussion***Presenter: Abed Suleiman*

Concussion symptoms can vary, and depend on the site of the head impact. Many studies on humans have demonstrated lower head impact tolerance for lateral- (i.e. side impact) than anterior-posterior (i.e. forward-backward impact) or axial (top of the head impact). According to a study on football, hockey and soccer players who received a concussion, impact to the side/temporal region is more probable to result in a concussion. In this study, we used a novel technology called Electrovestibulography (EVestG) that holds the potential to objectively and cost-effectively for diagnosing PCS. Using EVestG, we investigate the plausible differences between left and right vestibular responses for individuals with PCS who sustained a side/lateral-impact.

An Innovative Mobile Game for Detecting Cognitive Changes*Presenter: Marcia Friesen*

This paper presents a mobile game for smartphones and tables, developed to detect the frequency and extent of memory slips. Memory slips are a natural phenomenon associated with cognitive changes as one ages. Although everyone will experience memory slips or more colloquially "senior moments", not everyone who experiences memory slips will develop dementia. However, memory slips can be symptomatic of more serious cognitive decline and the onset of dementias. In this work, we present an innovative means to quantitatively assess and monitor memory slips through a non-invasive mobile game.

13:30 - 15:00

Industry Innovation Program

B5

**Meeting
Room:**

**Selkirk
Ballroom**



Keynote Innovation Presentations

Chair: Marianna Fradkov, WRHA

These keynote presentations will look at the current trends in connectivity and interoperability and report on the benefits of investing in data capture and analytics.

- **Jim Mickelson, Executive Director - Western Canada, Canada Health Infoway**
A Conversation About Digital Health
- **Jeffery Fleming, Clinical and IT Pharmacist, Children's Hospitals and Clinics of Minnesota**
Trusted Information Leading to Clinical Action – True Interoperability For Medical Devices

Sponsored By:



13:30 - 15:00

Clinical Engineering Program

C4

**Meeting
Room:**

**Assiniboine
Ballroom**



Building Bridges

Chair: Tidimogo Gaamangwe, WRHA

Working with Medical Physics:

Dr. Harry Ingleby, CancerCare Manitoba

Working with Infection Prevention Control:

Monique Liarakos, IP&C, WRHA

Working with Information Technology and Communications (ICT):

Martin Poulin, VIHA

Effective patient care depends on the collaboration of a multi-disciplinary care team of professionals to provide safe services in an efficient manner. There are also many support teams that ensure the necessary utilities, information technology, and equipment are available for use and are safe to use on patients. This session explores the collaboration between Clinical Engineering and other support teams to improve services and enhance patient care. Relationships with Infection Prevention and Control, Medical Physics, and Information and Communications Technology will be discussed with representatives from each of these disciplines.

15:00 - 17:00

Refreshment Break and Trade Show

Exhibit Hall / Grand Ballroom

Sponsored By:



15:30 - 17:00

Continuing Education Program

CE7

Meeting
Room:

Selkirk Annex



**Innovation in Ultrasound System Diagnostics feat.
American College of Radiology Preventative Maintenance**

Instructor: Kyle Grozelle, Summit Imaging

Learn about new and emerging tools and skills to troubleshoot and diagnose equipment in-house effectively, allowing a lower cost and reduced downtime. Using tools available in any biomed shop and the knowledge of technicians, we will examine common symptoms and errors along with the installation of common parts that sometimes require additional steps and configuration to restore a system to working order. At the end of the presentation, attendees will have the knowledge and skills to diagnose a wide variety of ultrasound equipment and the resources to repair a system to full functionality.

CE3

Meeting
Room:

Assiniboine A
Annex



**RGI Standard Operating Procedure (SOP) Writing Workshop
(cont'd)**

Instructor: Lori Marra, RGI Learning

Continued from page 42

15:30 - 17:00

Academic Program

A5Meeting
Room:Assiniboine B
Annex**Biomechanics 2***Chair: Dr. Richard Dyrkacz, WRHA***The Dynamic Properties of the Human Skull: The Effect of Impact Location and Impact Energy on the Vibrational Response of the Head***Presenter: Claudia Blandford*

The vibrational response of the cranio-facial skeleton (CFS) to impact is a dynamic response often neglected in head injury research, in part because of the lack of experimental evidence against which to validate. Past research on the vibrational response of the craniofacial skeleton to impact has focused on the vibrational response of both dry cadaver skulls and in vivo subjects. The current study examines the in vitro vibrational responses of five skulls to impact using a drop-weight tower impactor. Specifically, this study measures the resonant frequencies of the skulls and how they are affected by impact location and impact energy.

Comparison of Energy Absorption Between Lumbar Spine Implants During Daily Activity*Presenter: Mohammad Hodaei*

A contact model has been offered to compare the effect of roughness on energy absorption in different lumbar spine implants. In this research, we develop a statistical contact model to investigate interaction of Lumbar implant surfaces, ball and socket, from L1 to L5 including normal contact load in which the effect of roughness is included. It is found that the energy absorption between lumbar implant increases from lumbar 1 to lumbar 4, L1 to L4, and decreases from lumbar 4 to lumbar 5, L4 to L5, as it has effect on design performance and durability of implants.

A Robust Algorithm for Muscle Conduction Velocity Estimation*Presenter: Patrick Wu*

Muscle conduction velocity (CV) is used for detection of muscle fatigue and nerve malfunctioning, and for localization of the muscle innervation zone. Conventionally, CV is determined from the delay between two adjacent electromyogram (EMG) electrodes and the inter electrode distance (IED), i.e., $CV = IED / \text{delay}$. However, the accuracy of the CV estimate highly depends on the quality of the EMG signals. In this paper, a method to improve the robustness of the delay, and consequently the CV, estimate is developed and tested.

15:30 - 17:00

Academic Program

A5

Meeting
Room:

Assiniboine B
Annex

Biomechanics 2



Chair: Dr. Richard Dyrkacz, WRHA

Why is it Crucial to use Personalized Occlusion Pressures in Blood Flow Restriction (BFR) Rehabilitation?

Presenter: Jeswin Jeyasurya

Blood Flow Restriction (BFR) applied to a limb during low intensity exercise has been shown to increase muscle size and strength across different age groups. However, a review of BFR rehabilitation literature shows that inconsistencies exist in methodology, equipment and in levels of restriction pressure used. This paper explains why it is crucial to use surgical-grade tourniquet technology with automatic LOP measurement capability, adapted to incorporate and deliver optimal protocols, for safe and effective application of BFR to consistently achieve optimal patient outcomes in rehabilitation.

15:30 - 17:00

Industry Innovation Program

B6

Meeting
Room:

Selkirk
Ballroom

Panel Discussion - Digital Supporting Health Innovation



Moderator: Trevor Strome, WRHA

The panel will explore the state of health information management in the Province of Manitoba and across the country. The discussions will explore opportunities that could lead to business development, innovation, cooperation and collaboration in the community.

Panelists:

- Charles "Chuck" LaFlèche, Vice President and Senior Consultant, Global Philanthropic
- Frank Hivert, CEO, Oculys Health Informatics Inc.
- Charles Conway, CIO, Diagnostic Services Manitoba
- Jim Mickelson, Executive Director, Canada Health Infoway
- Dr. Nick Pizzi, Chief Data Scientist, IMT Inc.

15:30 - 17:00

Clinical Engineering Program

C5

Meeting
Room:

Assiniboine
Ballroom

Education/Certification



Chair: Andrew Ibey, Providence Health, Professional Affairs Chair,
CMBES

Panelists:

Certified Clinical Engineer

Tim Zakutney, University of Ottawa Heart Institute, CCE Exam Board Chair

Certified Biomedical Engineering Technologist

Kelly Kobe, Alberta Health Services, Member of CBET Exam Board

Accreditation and Professional Registration

Anthony Chan, BCIT, Program Head

Education

Rick Tidman, Durham College

Whether you want to be a certified Clinical Engineer, a certified Biomed Technologist or a certified Technology Manager, there are always a number of unanswered questions pre and post exam; usually even reading documented guidelines by the official entities does not answer all your questions and sometimes they may add more to your confusion! In this session, experts from our Canadian Board of Examiners will provide you with insight into each of these processes and will answer your questions. Other background information including associated statistics and expected benefits of having these certifications will be discussed and compared with similar certifications for the other allied health bodies.

18:00 - 19:00

Cocktail Reception (Banquet ticket required for entrance)

Shuttles leave the Fort Garry Hotel starting at 17:30

Sponsored by:



19:00 - 22:00

Awards Banquet (Banquet ticket required for entrance)

Location: Fort Gibraltar

Sponsored by:





FRIDAY, MAY 26, 2017

Conference & Trade Show

7:00 - 15:00

Registration

4th Floor Foyer

7:30 - 8:30

Networking Breakfast

Selkirk Ballroom

Sponsored By:



8:30 - 10:00

Continuing Education Program

CE9

**Meeting
Room:**

**Selkirk
Annex**

CBET Preparation Course



Instructor: Rick Tidman, Durham College

Biomedical Technicians and Technologists attending this course will review the information required for the successful completion of the BMET certification examination. The format of the exam will be discussed, as well as general study tips and techniques that will aid in preparation for the exam.

8:30 - 10:00

Continuing Education Program

CE14**Meeting
Room:****Assiniboine A
Annex****Introduction to Lean Management and Six Sigma***Instructors:**Paul Frenkel and Laurie Gosselin, George and Fay Yee
Centre for Healthcare Innovation*

Lean Six Sigma is a methodology that relies on a collaborative team effort to improve performance by systematically removing waste and improving efficiencies. Its Lean portion consists of practices focused on value creation, methods of identifying and eliminating wastes throughout production systems. Six Sigma is a set of techniques and tools for process improvement. It seeks to improve the quality of the output of a process by identifying and removing the causes of defects and minimizing processes variability.

This presentation will cover the origins of the concepts of Lean and Six Sigma and describe their relevance in the healthcare system.

Learning Objectives:

1. Provide an overview of Lean, Six Sigma, and Lean Six Sigma
2. Outline concepts used in the Lean and Six Sigma approach to continuous improvement
3. Provide examples of Lean and Six Sigma applications

8:30 - 10:00

Academic Program

A6**Meeting
Room:****Assiniboine B
Annex****Health Informatics***Chair: Dr. Mark Driscoll, McGill University***A Comparison of Classifiers for Detecting Tumours Using Microwave Scattering in Numerical Breast Models***Presenter: Jorge Sacristan*

The reported incidence of breast cancer is higher in the developed nations. However, people in emerging economies have lower survival rates. For instance, the five-year survival rate for breast cancer is less than 50% in Gambia, Uganda, and Algeria, while it is nearly 90% in the United States. In Manitoba, Canada, women from rural areas have a cancer incidence-to-mortality rate of 60%, while their urban counterparts have a rate of 37%. The research presented in this paper is part of an ongoing project that aims to improve the availability of breast cancer screening by providing a portable device that is suited to the needs of low and middle-income countries and rural communities. The feasibility of a portable breast microwave sensing (BMS) system is being evaluated. This portable and inexpensive system, which does not require highly trained operators, is being developed to bring breast cancer screening to remote communities that might not otherwise have access.

8:30 - 10:00

Academic Program

A6Meeting
Room:Assiniboine B
Annex**Health Informatics***Chair: Dr. Mark Driscoll, McGill University***Classification of Undetermined Deaths by Poisoning: Comparison of Homogeneous and Heterogeneous Databases***Presenter: Alana Esty*

Identifying factors that differentiate suicides from unintentional deaths by poisoning is essential for accurate monitoring of suicide in order to help develop prevention measures. The results of our research demonstrated that the use of machine learning techniques such as: Artificial Neural Networks, Decision Trees, and Case-Based Reasoning have enabled us to classify the majority of undetermined cases found in the two databases analyzed. The data originated from the Canadian Coroner and Medical Examiner Database (CCMED): the first dataset included deaths in the Province of Ontario; the second dataset included cases from several other provinces excluding Ontario.

Modelling of West Nile Virus: a Survey*Presenter: Hamid Reza Nasrinpour*

West Nile Virus (WNV) is an arbovirus virus, first isolated from a feverish woman in 1937 from the West Nile in Uganda. In the 1950s, the ecology of the virus and its symptoms were discovered. Outbreaks have since been found in various European countries. In 1996, there was an epidemic in Bucharest, where WNV became a public health concern. In 1999, WNV appeared in New York. In 2001, WNV reached southern Ontario, with the first human cases detected in August 2002. Agent-based modelling (ABM) is a modelling system where many individual agents (e.g. people, mosquitoes, birds) play key roles. From micro-level interactions between agents within the system, the macro-level dynamics of the whole emerge. A heterogeneous population of agents is inherently suitable to an ABM where each agent can have their own profile of movement and interaction. In WNV epidemiology, the main means of the virus transmission is the interaction cycles within different agent types. This makes ABMs an ideal tool to investigate the WNV epidemiology.

8:30 - 10:00

Academic Program

A6**Meeting
Room:****Assiniboine B
Annex****Health Informatics***Chair: Dr. Mark Driscoll, McGill University***Predicting Cognitive Status of Older Adults by Using Directional Accuracy in Explicit Timing Tasks***Presenter: Omid Ranjbar Pouya*

The early effects of age-related cognitive decline on explicit timing have been widely reported in literature. However, it is not clear to what extent the reported decline in older adults' timing ability is caused by its underlying cognitive components such as internal pacemaker (i.e. clock) and working memory. Furthermore, the duration of the investigated intervals in timing tasks was shown to be a critical factor due to recruitment of different brain regions in judgments of shorter and longer intervals.

8:30 - 10:00

Industry innovation Program

B7**Meeting
Room:****Selkirk
Ballroom****Local Industry Presentations***Chair: Trevor Strome, WRHA*

This session brings together entrepreneurs and innovators from across Winnipeg to showcase their companies and technologies while speaking to the risks, rewards and challenges they have experienced.

Presenter: Andrew Frank, Vista Medical

In 1991, he helped found Vista Medical, a company specializing in the design and manufacturing of high-tech sensors for a variety of healthcare applications. He currently serves as Vista Medical's Chief Operating Officer, overseeing the company's activities in over 30 countries around the world.

Presenter: John Kun, Arterial Stiffness Inc.

John Kun is a graduate of the University of Manitoba, Faculty of Engineering and possesses 20+ years of experience in the medical device industry. John is currently employed as a Bioinformatics Developer with Arterial Stiffness Inc. He has also worked as a hardware and software developer for the University of Manitoba, Department of Internal Medicine, Respiratory Section Younes Respiratory Technologies and Younes Sleep Technologies and with Intelligent Hospital Systems/Arxium.

8:30 - 10:00

Industry innovation Program

B7**Meeting
Room:****Selkirk
Ballroom****Local Industry Presentations***Chair: Trevor Strome, WRHA**Presenter: Ian Maclean*

Ian is the Director of Research and Engineering at Koven Technology Canada. Ian studied Engineering at the University of Manitoba and has been a registered Professional Engineer in the Province since 2007. Ian was influenced to put his Engineering skills to work in the Medical Devices Arena after learning about his Great Grandfather's transformative medical practice in the city of Winnipeg. Ian brings a combination of Project Management skills and proven Innovation Strategies to his role as Director of Research and Engineering for Koven Technology Canada. He is actively working on innovative Medical Devices and core research projects in the vascular diagnostics space. Ian enjoys the collaborative nature of the Winnipeg Medical Device space and enjoys the people that make up this community.

Presenter: Lawrence (Larry) Goren

Larry created KOMODO Technologies with one goal in mind: he wanted to connect people to things they value most and the people they love and make it affordable to everyone. With that in mind, he created the ultimate monitoring device to help people achieve a worry-free lifestyle.

8:30 - 10:00

Clinical Engineering Program

C6**Meeting
Room:****Assiniboine
Ballroom****Donation of Used Medical Devices***Chair and Presenter: Bill Gentles, BT Medical Technology Consulting, CMBES Outreach Chair**Presenters: Dr. Thomas Turgeon, Operation Walk; Chris Bzovey, WRHA Clinical Engineer*

By replacing existing inventory of medical equipment in use, we always are challenging ourselves if the old inventory of our used but perfectly functional and supportable medical equipment should go to trash or shall be used by charity entities, underdeveloped countries or even by the third party repair centers. Unfortunately, resell/donation process of used medical equipment by most healthcare facilities across Canada is not clearly laid out and always legal. Ethical challenges make the resell/ donation situation so complicated that facilities end up disposing of equipment. In this session we will discuss various aspects of this practice by the Canadian stakeholders including Health Care Legal Entities, Health Canada, Clinical Engineering, Charity and National Organizations which use or export used medical devices in or to underdeveloped countries.

10:00 - 10:45

Poster Presentations and Refreshment Break

Foyer 4th Floor

POSTER PRESENTATIONS:

Ishant Gupta – Physiological And Biomechanical Responses In Male School Going Children Using Frameless And Internal Frame Backpacks

Dr. Richard Dyrkacz – Reengineering the Veress Needle for Laparoscopy

Evan Phillips – Investigating Early Development in a Murine Model of Dissecting Abdominal Aortic Aneurysms

Monte Raber – Continuing Evolution Of Standards In Health Care

Dr. Miroslaw Pawlak – Brain Tumor Detection by Using Moments and Transforms on Segmented Magnetic Resonance Images

Susan Crawford-Young – Imaging Early Stage Axolotl Salamander Embryos Inside and Out

Dr. Zahra Moussavi – Video-Chat -Mediated Visits In A Personal Care Home

Gelareh Hajian – Effect Of Joint Angle And Forearm Posture On The Elbow Flexor And Extensor Muscles During Isometric Contraction

James Reeves – Thin Film Silicon Biosensor For The Detection Of Spinal Cord Injury (Sci)

Mehrangiz Ashiri – Visio-Vestibular Interaction In Humans: Changes In The Vestibular Response Following Visual Stimuli Of Different Colors

Orlando Simpson – Modeling The Emergence And Progression Of Cardiovascular Diseases In The Jamaican Population

Dr. Zeinab Dastgheib – Evestg Diagnostic Potentials For Neurodegenerative Disorders

Kazushige Kimura – Reorientation in an Immersive Virtual Reality

MANITOBA SCHOOLS SCIENCE SYMPOSIUM POSTER PRESENTATIONS:

Manitoba Schools Science Symposium (MSSS) is the largest annual science event held for students throughout Manitoba. This event celebrates and encourages our province's young minds and helps the love for science flourish from a young age. Each year, approximately 550 young scientists (from grades 4-12) present their scientific research to top scientists and industry experts. This year, the 2017 MSSS was held April 21st to April 23rd, 2017 at the University of Manitoba Max Bell Centre. CMBEC40 sponsored special awards in MSSS 2017 to promote our profession amongst Manitoban school students. Biomedical Engineering program at University of Manitoba generously provided three cash awards for the three top presented projects. Also top projects were invited to compete in the poster presentation at our annual conference on Friday May 26th. They were entitled to receive a complementary day registration to the conference and a student membership with CMBES.

Ethan Lin – Muscles Alive

Danielle Marie Borbajo – The Effect of Electromagnetic Radiation on Living Organisms

Adham El-shebin – How to Perceive After Image?

Hope Appelmans – The Effect of Nail Polish on Pulse Oximetry

Aliya Kabani – The Effect of Nail Polish on Pulse Oximetry

Gabriela Todescan – UV-C Disinfection

Jordan Bowley – Low-cost Circular Polarized Antenna for Detection of Breast Tumors

Ariel Lezen – Powered Exoskeletons on a Budget

Caleb Turon – Transcranial direct current stimulation as a visual prosthetic to those with acquired blindness

Matthew Hewlett – Transcranial direct current stimulation as a visual prosthetic to those with acquired blindness

10:45 - 12:00

Continuing Education Program

CE9

Meeting
Room:
Selkirk
Annex

**CBET Preparation Course (cont'd)**

Instructor: Rick Tidman, Durham College

Continued from page 50

10:45 - 12:00

Industry Innovation Program

| | |
|---|---|
| <p style="font-size: 24px; margin: 0;">CE14</p> <p style="margin: 0;">Meeting Room: Assiniboine A Annex</p> | <p>Introduction to Lean Management and Six Sigma (cont'd)</p> <p><i>Instructors:</i> Paul Frenkel and Laurie Gosselin, George and Fay Yee Centre for Healthcare Innovation</p>  |
| <p><i>Continued from page 51</i></p> | |

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| <p style="font-size: 24px; margin: 0;">A7</p> <p style="margin: 0;">Meeting Room: Assiniboine B Annex</p> | <p>Introduction to Medical Device Regulations</p> <p><i>Presenter:</i> Daphne Chen, Health Canada</p>  |
| <p>This presentation will provide an oversight to what the Medical Devices Regulations are, how Health Canada regulates medical devices, the licensing requirements of Health Canada, an overview of how medical device recalls, and where to find information on Health Canada's website relating to medical devices.</p> | |

10:45 - 12:00

Industry Innovation Program

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| <p style="font-size: 24px; margin: 0;">B8</p> <p style="margin: 0;">Meeting Room: Selkirk Ballroom</p> | <p>Keynote Presentations</p> <p><i>Chair:</i> Blake Podaime, Virtuistix</p>  |
| <p>These keynote presentations will look at the current trends in connectivity and interoperability and report on the benefits of investing in data capture and analytics.</p> | |
| <p>Beyond the Device: The Importance of Data Analytics, Surveillance and Connectivity BD Canada <i>Presenter:</i> Robert Schad, Director of IT and Connectivity Sales, Medication Management Solutions</p> | |
|  | |
| <p>Healthcare Analytics – What we're doing and what we can do better! <i>Presenter:</i> Trevor Strome, Director, Business Intelligence and Analytics, WRHA</p> <p>Trevor is a healthcare analytics, business intelligence, and quality improvement specialist. An experienced leader with broad healthcare transformation, software development, and clinical/operations research experience, his current activities include developing and implementing innovative analytics tools for use in healthcare quality improvement initiatives.</p> <p>Trevor has been involved in the successful commercialization of health information technology, including an Emergency Medical Services data system launched in cooperation with the University of Alberta and other commercial partners. Trevor's other entrepreneurial ventures include the formation of companies providing multimedia production services and developing software for online surveys and conference abstract review management.</p> <p>Trevor's first book (as sole author) is "Healthcare Analytics for Quality and Performance Improvement" (http://HealthcareAnalyticsBook.com), published by John Wiley & Sons, in October 2013. You can read more of Trevor's work on the HealthcareAnalytics.info blog (http://HealthcareAnalytics.info).</p> | |

10:45 - 12:00

Clinical Engineering Program

C7

Meeting
Room:Assiniboine
Ballroom*Chair: Maryam Samiee, WRHA***Paper Presentations / Technology Management****Calibration of an Instrumented Surgical Forceps Using Bootstrap Technique: A Comparative Study***Presenter: Yaser Maddahi*

Developing SmartForceps, a bipolar forceps retrofitted by a set of strain gauges, has helped to quantify the interaction forces using voltages read from strain gauges mounted on both prongs of the tool. Each cell of a strain gauge is based on an elastic element to which a number of electrical resistances are bonded. When an external force is applied to the rigid body (e.g., a bipolar forceps) to which the strain gauge is attached, the elastic elements are deflected and a voltage is produced due to changes in the resistance. Thus, there is a relationship between the external force (explanatory variable) and the read voltage (response variable) that should be quantified to estimate the force. In this paper, we employ a linear regression methodology and use a Bootstrap approach to obtain both point and interval estimates of the applied forces at the tool tips. We use a nonparametric Bootstrap approach that does not require the normality assumption about the distribution of produced voltages and provide the precision associated with each estimate. Compared to the method employed in, the proposed methodology incorporates the effect of each surgeon using the forceps in the estimation process through a pooling stage required in the procedure.

Electric Bed Design and Features for Next Generation of Bedside Nursing*Presenter: Gnahoua Zoabli*

On Easter Sunday 2016, I was hospitalized for a week at the brief hospitalization unit of St. Eustache Hospital; an institution of which I am the Chief of Biomedical Engineering since September 9, 2009. Beyond the great technological achievements that I benefited as a patient, I noticed a few dysfunctions from the point of view of the patient that I became. The purpose of this article is to suggest a better arrangement of medical devices at the bedside of the patient to improve their episode of care. Based on the premise that any medical device basically at the patient's bedside should be incorporated into the bed, if technologically possible, we propose the design of a first-generation intelligent medical bed, using current bedside concepts, embedded or not. Some improvements are also proposed for the accessibility of the patient to the controls of existing beds. The second generation will focus on patient communication with the nursing station. Thus, the patient call will be graded and interpreted to discriminate the regular calls to medical emergencies. The third generation will consider network communication and the incorporation of medical and pharmacological transactions from the bedside to the patient record via the bed that will be networked and the patient, geographically identifiable, in real time. One of the objectives of this article is to encourage healthcare professionals who would eventually become a client of the healthcare network to report their observations and thus contribute to alter the services from within.

10:45 - 12:00

Clinical Engineering Program

C7

Meeting
Room:Assiniboine
Ballroom

Chair: Maryam Samiee

Paper Presentations / Technology Management

Preliminary Development of a MRI Compatible Syringe Pump Adapter

Presenter: Charlene Leung

In pediatric magnetic resonance imaging (MRI), an anesthetic agent is often administered using an infusion pump to ease the child's discomfort and reduce their movement during the scan. Conventional infusion pumps, however, are prohibited from the scanner room due to its ferromagnetic and metallic components. The interaction between these materials and the scanner's strong magnetic fields can lead to patient injury or death. Commercially available MRI-compatible pumps are expensive, have different user interfaces than conventional in-house pumps, and do not offer a standby function which is critical in a clinical pediatric setting. Common but cumbersome, unsustainable and wasteful work-around solutions involve directly infusing the anesthetic using consecutive extension intravenous (IV) lines connected to an infusion pump in an adjacent room. The MRI Syringe Pump Adapter (SPA) acts as an intermediate device that facilitates the transfer of the infusion rate delivered by the pump to the anesthetic-filled patient syringe. The preliminary development process of the MRI SPA consisted of needs finding through clinical interviews and observations, concept generation, risk analysis, rapid prototyping, and testing. The SPA costs \$32, can be 3D-printed in less than 2 hours, and is constructed of ABSM30 plastic. Preliminary verification tests revealed the system transfers the infusion rate from the syringe pump to the patient with an acceptable 10% accuracy. This setup, however, created a significant increase in the line pressure, which requires further investigation and mitigation. Continual development and testing are being performed to verify the accuracy and pressure profile of the SPA system.

Design of a MRI Compatible Faraday Cage for Syringe Pumps

Presenter: Dr. Richard Dyrkacz

The goal of this project was to design a MRI compatible Faraday cage for syringe pumps that do not display any artefacts during a MRI scanning procedure. A Faraday cage was fabricated consisting of stainless steel that contained a Medfusion® 3500 syringe pump and a power supply unit. When the syringe pump was running with water flowing at a rate of 3 mL/hour in a 1.6 Gauss magnetic field, artefacts appeared during the MRI scans. Once the syringe pump was placed inside the Faraday cage and ran on its own battery power, no artefacts appeared on any of the MRI scans. The syringe pump was then connected to a power outlet using an extension cord; slight artefacts appeared on the MRI scans. Although the Faraday cage can prevent artefacts from appearing on MRI scans, it is strongly recommended that they run on their own battery power.

12:00 - 13:30

Lunch and CMBES Annual General Meeting

Selkirk Ballroom

13:30 - 15:00

Continuing Education Program

CE9**Meeting
Room:****Selkirk
Annex****CBET Preparation Course (cont'd)***Instructor: Rick Tidman, Durham College**Continued from page 50***12:00 - 13:30**

Academic Program

A8**Meeting
Room:****Assiniboine B
Annex****Biomaterials***Chair: Emil-Peter Sosnowski, WRHA***In Vitro Simulation of Electroporation Using Potato Model***Presenter: José Alvim Berkenbrock*

Electrochemotherapy (ECT) and Irreversible Electroporation (IRE) for tissue ablation are two non-thermal recent techniques employed for the treatment of tumors. These well established approaches exploit the physical phenomenon firstly described as a 'dielectric breakdown', but now called cell electroporation (EP, or electropermeabilization). At the tissue level, EP is employed in food processing techniques for conservation, and extraction of macromolecules. As aforementioned, new clinical approaches were also developed based on EP. The ECT takes advantage of the momentary pores in the cell membrane to introduce chemotherapy drugs (e.g. bleomycin) into tumor cells. This work compares four numerical models, found in the literature, to in vitro experiments. Our aim is to point out the most suited model.

**BD**Advancing the
world of health

13:30 - 15:00

Academic Program

A8Meeting
Room:Assiniboine B
Annex**Biomaterials***Chair: Emil-Peter Sosnowski***Sterilization of Medical 3D Printed Plastics: Is H2O2 Vapour Suitable?***Presenter: Jason Morrison*

3D printers that precisely fuse plastic filament are enabling the medical device manufacturing sector to produce high-quality plastic medical devices and implants. However, the low-temperature fusing process implies that post-production sterilization must also occur at a low temperature or destroy the precision of the product. This study characterizes the effects of hydrogen peroxide (H₂O₂) vapour sterilization on ASTM-compliant 3D printed tensile samples of polylactic acid (PLA), polycaprolactone (PCL), and polycarbonate (PC). The sterilization process caused physical deformations in PCL. Additionally, increases were observed in PCL and PC sample thickness, and in PC sample width. Decreases in Young's Modulus (E) were found in all three materials, while UTS decreased in PC, and strain at UTS increased in PCL. The findings demonstrate that the 3D printed materials can be compatible with H₂O₂ vapour sterilization, but products must be designed to accommodate for changes that occur due to sterilization.

Synthesis of Highly Sensitive Graphene Nanocomposite for Biosensing Glial Fibrillary Acidic Protein (GFAP)*Presenter: Varun Kundra*

The pathophysiology of spinal cord injuries can be divided into the primary and secondary injuries. Primary injury consists of the mechanical damage to the spinal cord caused by the impact, while secondary injury is the resulting cellular and molecular events that are initiated by the primary injury. Here, we report the development of a highly sensitive immunosensor fabricated using graphene composite. This graphene compositebased immunosensor created on screen-printed electrode would allow detection of GFAP using electrochemical impedance spectroscopy.

**CANADIAN MEDICAL EQUIPMENT
PROTECTION PLAN**

13:30 - 15:00

Academic Program

B9

**Meeting
Room:
Selkirk
Ballroom**

Keynote Innovation Presentation*Chair: Blake Podaima, Virtuistix**Presenter: Franck Hivert, Oculys Health Informatics*

This presentation will address the current challenges in patient flow and management and how technology can help the healthcare system reduce wait-times, provide timely care and maximize the utilization of services that are available to the public.

As CEO, Franck leads the Oculys team and drives the overall strategic direction of our technology and commitment to current and future hospital clients. He has more than 20 years of executive experience in various areas of business development, marketing, finance, and operations. This diversity and his dynamic approach feed his passion and vision for improved healthcare.

13:30 - 15:00

Clinical Engineering Program

C8

**Meeting
Room:
Assiniboine
Ballroom**

Regulations and Third Party Repair*Chair: Kyle Eckhardt, Providence Health*

Panelists: Ramiro Paez, Fibertech; Jeff Regan and Krystal Giron, Pacific Medical

While Health Canada will share recent changes on the Medical Device regulations with the audience, we are providing a great opportunity for the third party service repair centers, our Clinical Engineering Community and Health Canada representatives to discuss legality and potential associated risks with the topic of "repair of Medical Devices by third party vs OEM" in Canada.

Repair of the medical devices by the third party seems to be a gray and unregulated area in North America. FDA has already started to collect feedback from various stakeholders to understand baseline issues in an effort to verify if this practice needs to be regulated. In this panel discussion we exchange our thoughts to better understand various aspects of the current practice and straight our thoughts when, where, why and how using third party service repair is the proper option.

15:00 - 15:30

Closing Remarks/Paper Competition Awards

Selkirk Ballroom

1530 - 17:00

Continuing Education Program

CE9

**Meeting
Room:**

**Selkirk
Annex**

CBET Preparation Course (cont'd)



Instructor: Rick Tidman, Durham College

Continued from page 50



NOTES



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