



Innovation Nation

2016 INNOVATION NATION

CONFERENCE & ROBOTICS COMPETITION



MAY 29, 2016

LIUNA STATION, HAMILTON, ON



For information visit:

www.innovation-nation.ca



Acknowledgement:

The National Centres of Excellence (NCE) are committed to building on Canadian expertise in engineering, health and natural, social and biomedical sciences to enhance Canada's economic competitiveness globally by developing new discoveries and transforming these discoveries into products and services that will create jobs, build a stronger domestic economy and improve the quality of life for all Canadians.

By funding research partnerships between academia, industry, government, and not-for-profit organizations, NCE programs turn Canadian research and entrepreneurial talent into economic and social benefits for all Canadians.

NCE initiatives engage thousands of talented researchers, attract and train tomorrow's scientific and industrial leaders.

To date the NCE networks and centres have helped to train more than 36,000 highly skilled personnel and create over 100 spin-off companies, and since its inception, the NCE has invested more than \$1.5 billion in networks and centres,

funding research, commercialization and knowledge translation to enhance the lives of Canadians.

The NCE is mobilizing Canada's best research and development talent to build a more advanced, healthy, competitive, and prosperous Canada.

In support of these objectives the NCE Secretariat manages four national programs: Networks of Centres of Excellence (NCE); Centres of Excellence for Commercialization and Research (CECR); Business-Led Networks of Centres of Excellence (BL-NCE); and Industrial Research and Development Internships (IRDI).



Government of Canada
**Networks of Centres
of Excellence**

Gouvernement du Canada
**Réseaux de centres
d'excellence**

welcome

It is my pleasure to welcome you to the sixth annual CSii Innovation Nation Conference and Robotics Competition.

We are pleased to once again be hosting this event in Hamilton, Ontario, where CSii offices are headquartered at St. Joseph's Healthcare Hamilton and McMaster University's Innovation Park.

The Innovation Nation Conference features diverse voices of national and international thought leaders whose stories showcase ideas and innovative concepts that open us to a world of possibilities and fuel change.

The event is a tribute to talent, intellect and tenacity and to the extraordinary work being done by innovators in science, medicine and commerce. The talks provide us with an opportunity to glimpse the future with the insights provided by this group of gifted innovators.

This year we have chosen individuals who are leaders in thought and action, individuals who apply their unique gifts to the task of making their vision a reality.

Once again, the Robotics Competition will showcase the innovations of Canadian university, and high school students. We hope to encourage our colleagues, industry partners and friends to support the work of these dedicated students who spend much of their time and resources exploring the limits of their imaginations and their abilities to create devices that will serve a purpose, solve a problem or create new efficiencies.

We applaud their efforts, one and all, and encourage them to continue their quest to learn more about science, engineering and medicine so that they can help to build a new entrepreneurial culture that will create jobs for Canadians and enhance Canada's reputation as a world leader in advanced technologies.

Innovation Nation provides an opportunity for all of us to learn from the accomplishments and ideas of our distinguished guest speakers and to once again be inspired.

I would like to thank the National Centres of Excellence CECR program and the Government of Canada for their continued support of our work as well as our sponsors for helping to make this event possible.

I look forward to meeting you at the conference.

Best wishes,

Dr. Mehran Anvari

Scientific Director and Chief Executive Officer
Centre for Surgical Invention and Innovation (CSii)





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2016

Welcome to the sixth annual CSii Innovation Nation Conference.

The Centre for Surgical Invention and Innovation (CSii) is now seven years old. Under the dynamic leadership of Dr. Mehran Anvari, CSii continues to make remarkable progress towards the goal of improving the speed and accuracy of minimal access surgery through innovations in image guided robotic tools. We have focused in the first application on developing a platform and tools for biopsy of breast cancer using magnetic resonance imaging (MRI). We began clinical testing in 2014 and completed 45 tests to date in Canada. These tests demonstrated greatly improved accuracy and patient comfort. We delayed testing and approval action in the USA due to limited resources. However, funding prospects exist and we have now recruited a recently retired leader of global medical instrumentation and associated practice to define and initiate our approach to world sales. In eight months he plans to staff and set us on the road to beginning commerce.

For our conference we are very fortunate to have a group of outstanding speakers who have advanced knowledge in many areas related to the goals of CSii. Their participation in this conference will give us opportunity to receive input and interaction that will be beneficial in our ongoing progress. We are a Centre for Commercialization and Research. Our goal is to demonstrate value in image guided robotic surgery and to establish the means to deliver that commercially to the world. Our time is short. We look forward to a productive and stimulating conference.

H. Douglas Barber

Chair, Centre of Surgical Invention and Innovation (CSii)
Distinguished Professor in Residence, McMaster University
A Founder of Genum Corporation



Centre for Surgical Invention & Innovation

The Centre has continued to adapt Canadian expertise in space robotics and minimally invasive surgical techniques and leverage the technology to develop and commercialize a new class of advanced surgical image guided robotic systems which will extend the diagnostic and interventional capabilities of surgeons and health care professionals through increased access, precision and dexterity.

The research driving these technical advances will enable highly effective diagnosis and treatment of disease down to the macroscopic and microscopic cellular levels while reducing the trauma caused by accessing the treatment site.

The development of the Image Guided Automated Robot (IGAR) breast platform is the first product of the CSii mission to adapt image guided robotic technology to provide a targeted solution to the

detection and treatment of cancer. Phase two of clinical trials for the IGAR Breast robotic system were conducted in Quebec City and Hamilton at St. Joseph's Healthcare Hamilton with excellent results. CSii is now moving forward with pivotal trials to collect information that will help to secure the regulatory approvals that will enable the product to be marketed in North America and abroad.

CSii has worked in partnership on this project with MDA, creators of the Canadarm, Canadarm2 and Dextre. MDA's advanced technologies span markets as diverse as manned and unmanned space exploration, robotic surgery and nuclear reactor maintenance and operation in the most challenging and demanding environments. MDA has partnered with CSii through every step of this journey as the primary corporate partner for CSii's robotic development.

The Centre for Surgical Invention and Innovation (CSii) was established in 2009 as a NCE research accelerator.

MDA has confirmed that it is keenly invested in the success of CSii and plans to continue to partner with CSii to successfully launch our first commercial system, and to develop and build future platforms.

This year CSii received the support of the Canadian Space Agency (CSA) through the Build in Canada program established by the Government of Canada. CSii is working with MDA and CSA to develop telerobotic capabilities for IGAR-Breast and future IGAR platforms in development with the goal of increasing access to quality healthcare for Canadians living in remote areas of the country and beyond.

In addition CSii has worked with the Additive Manufacturing Lab at Mohawk College to develop 3D printed tools that can be used with IGAR medical devices.

With the benefit of significant financial support from the Government of Canada through the NCE CECR program. CSii has continued to adapt a multi-disciplinary approach to research and development that has enabled the Centre to combine the medical, engineering, biological, information technology and systems integration expertise available at McMaster University, St Joseph's Healthcare Hamilton and institutions and corporations located throughout Canada. This expertise is used to develop the IGAR Breast platform, which is expandable, and to develop research projects from associated medical fields.

The Centre is committed to attracting exceptional human talent and Canadian industry support to

accommodate new development projects working with clinical experts both here and abroad to refine our approach to the development of robotic instruments that have a direct impact on clinical use.

CSii will expand its role to enable inspired research to reach commercialization in record time, obtain the necessary regulatory approvals for medical robotic technologies in Canada and internationally and to provide training opportunities for highly qualified personnel in medical and engineering fields.

The Centre has continued to recruit key staff and position them within host facilities at St. Joseph's Healthcare Hamilton, McMaster University and McMaster Innovation Park (MIP) and worked to consolidate and expand the number of valued corporate partnerships.

The outstanding success of the past Innovation Nation Conferences and Robotics Competitions reinforced the Centre's commitment to professional development and educational outreach.

This year the 2016 Innovation Nation Conference will bring together an eclectic and interesting group of innovators to share their stories and network with the assembled, researchers, physicians, academics, students and participants in attendance.





A Message from Kathleen Wynne, Premier of Ontario

On behalf of the Government of Ontario, I am pleased to extend warm greetings to everyone attending the 2016 Innovation Nation Conference and Robotics Competition.

As Premier, I believe that science, technology and innovation have multiple benefits — from helping ensure our quality of life to solving global problems. They are also vital to building a strong economy and generating jobs. I commend the Centre for Surgical Invention and Innovation for bringing together thinkers and problem-solvers from Canadian universities, colleges and high schools to participate in this competition.

Ontario is on the cutting edge of discoveries and creating the jobs of tomorrow because we support a climate that fosters scientific excellence, attracts world renowned researchers and ignites fruitful collaborations between government, academia and industry. Our government remains committed to — among other initiatives — maintaining and strengthening the Ontario Research Fund, Ontario's flagship research program, and continuing to foster a culture of innovation within the province.

I am excited to hear about the possible applications of robotics in health care, aeronautics and other fields. My colleagues and I look forward to working with Ontario's centres of innovation so that we can continue to deliver the high-quality care and services that people of this province so richly deserve.

Please accept my best wishes for a most inspiring event.

Kathleen Wynne

PREMIER OF ONTARIO

A Message from the Honourable Reza Moridi, Minister of Research and Innovation

Welcome to everyone attending the 2016 Innovation Nation Conference and Robotics and Innovation Competition, hosted by the Centre for Surgical Invention and Innovation (CSii).

Ontario is at a pivotal stage in the advancement of a new, innovation-focused economy. The global competition for capital, talent and customers is forcing us to sharpen our competitive edge as we move toward a future of long-term, sustainable economic and social prosperity. That means making strategic investments focusing on initiative, education and the skills of our talented people.

Our government is creating the workforce of tomorrow by supporting our world-class leading-edge research institutions. We are also focusing on building and strengthening an entrepreneurial ecosystem that will accelerate the start, growth and success of Ontario companies. In addition, we are building a stronger returns-based risk capital industry by supporting angel investor networks, investing in seed-stage start-ups - including those founded by youth - and partnering with the private sector in venture capital funds.

One of our main priorities continues to be focusing on the future by supporting our intelligent and innovative young people. Our Youth Jobs Strategy programs are targeted at the next generation of entrepreneurs and innovative companies - ensuring that they have every opportunity to bring knowledge to the marketplace, start their own businesses or get good jobs.

I look forward to meeting some of the best and brightest innovation leaders in Canadian science, the arts and technology at this year's conference. I am especially excited about the Innovation Nation Robotics Competition, where young people will have an opportunity to showcase their vision of the future.

I encourage all participants to take full advantage of this opportunity to exchange ideas, collaborate in new ways and push the boundaries of creativity. Please accept my warm best wishes for an exciting and productive conference.

Reza Moridi MINISTER

A Message from the Honourable Fred Eisenberger, Mayor of the City of Hamilton

Along with my Council Colleagues and the City of Hamilton, gives me great pleasure to welcome you to the City of Hamilton for the 2016 Innovation Nation Conference.

We are pleased to welcome visitors for this conference and robotic competition, where you will have the opportunity to listen to keynotes from top innovators who are leaders in their field and network with peers in business, science, engineering and arts.

I hope you will find some time to explore the city. We are proud of our cultural attractions, heritage buildings and vibrant downtown boasting a wide range of culinary experiences and a focus on the arts.

On behalf of City Council and the City of Hamilton, welcome and I wish you an informative and enjoyable stay.

Yours Sincerely,

Fred Eisenberger

MAYOR OF HAMILTON



Reza Moridi



Fred Eisenberger

[conference speakers |

DATE: SUNDAY, MAY 29, 2016

LOCATION: LIUNA STATION – GRAND CENTRAL BALLROOM

7:00 am ROBOTIC TEAMS SET UP – Continental Ballroom
SPONSORS / EXHIBITORS – Grand Central Ballroom

7:30 am REGISTRATION OPEN – Main Lobby

8:30 am Opening Remarks: **Dr. Mehran Anvari**, CEO and Scientific Director
Centre for Surgical Invention and Innovation (CSii)

CONFERENCE SPEAKERS

8:35 am **Tony Thoma**, Dean of Engineering, Mohawk College
Topic: Additive Manufacturing (3D printing)
Advances in Health Care _____ 12

9:00 am **Daniel McInnis**, Mechanical Engineering Student, University of Toronto
Schulich Leaders Scholar and Young Entrepreneur
Topic: Knowing Less Means Knowing More: A Story
of Youth Entrepreneurship and Innovation _____ 14

9:25 am **Carolyn McGregor**, Canadian Research Chair in Health Informatics,
University of Ontario Institute of Technology (UOIT)
Topic: Disruptive Innovation for New Approaches
to Personalized Medicine using Big Data from
Babies to First Responders and Astronauts _____ 16

9:50 am **Chris Robson**, Mechanical Lead, Experimental Albertan1, Cube Satellite
Topic: Reaching for Space:
AlbertaSat and the Ex-Alta 1 Satellite _____ 18

CONFERENCE AGENDA

- 10:15 am **Richard McDonald**, Distinguished Engineer, IBM
Topic: Dr. Watson Will See You Now _____ **20**
- 10:45 am REFRESHMENT BREAK — Grand Central Ballroom
- 11:00 am **Ruslan Salakhutdinov**,
Canada Research Chair in Statistical Machine Learning
Google Scholar, Assistant Professor, University of Toronto
Topic: Recent Advances in Deep Learning _____ **22**
- 11:30 am **Cameron Piron**, President and Co-Founder, Synaptive Medical
Topic: Innovations in Point of Care Imaging
and Intervention _____ **24**
- 11:55 am **Sylvain Laporte**, President, Canadian Space Agency
Topic: Bringing Space Down to Earth _____ **26**
- 12:20 pm **Kirk Costello**, NASA International Space Station, Deputy Chief Scientist
Topic: Engines for Innovation on the
Exploration Frontier: Bringing the Promises
of Science in Space Down to Earth _____ **28**
- 12:45 pm **Catherine Coleman**, American Astronaut
Topic: A World Apart: Working and Thriving on the
ISS and the Lessons We Bring Back to Earth _____ **30**
- 1:10 pm LUNCH — Grand Central Ballroom
- 2:00 pm **ROBOTICS COMPETITION BEGINS**
Continental Ballroom and Main Lobby — Agenda Continued on Page 34



Tony Thoma

Dean of Engineering, Mohawk College

Tony's experience includes senior-level positions in the industry including: VP, Operations at Matalco, Inc., Global Technical Director at Wescast Industries, Process Engineer at Norton Advanced Ceramics and Melt Supervisor at Canron.

As part of his role at Mohawk College, Tony has facilitated the development of Applied Research in the areas of Health IT, Energy Systems and now Additive Manufacturing. Tony is a licensed Professional Engineer (PEO), a member of the Board of Trustees of St. Joseph's Healthcare Hamilton, and has served as a member of the Ontario Independent Electricity System Operator (IESO) Stakeholder Advisory Committee. Tony has also recently served as chair for the steering committee for the City of Hamilton's Citizens Jury for the upcoming LRT initiative.

Tony has an MBA from the University of Western Ontario, an Honours BBA from Brock University, and a B.Sc. in Metallurgy and Materials Science from McMaster University.



Daniel McInnis

Mechanical Engineering Student, University of Toronto,
Schulich Leaders Scholar and Youth Entrepreneur

Daniel McInnis just finished his first year of mechanical engineering at the University of Toronto. He is passionate about innovation and entrepreneurship, and that goes back to his days in high school. While juggling school, different extra-curricular activities and sports, he came up with a couple of interesting ideas in the sports helmet and prosthetic limb industries. What started as just science fair projects, led to starting a business, patenting his technology, working to craft a licensing deal with manufacturers and actually producing a prosthetic limb for a young boy in his hometown of Ottawa. Driven by the idea that technology can be used to change lives, he is working hard to continue raising the bar on what he and his ideas have to offer.



Dr. CAROLYN McGREGOR

Dr. Carolyn McGregor

Canadian Research Chair in Health Informatics, University of Ontario Institute of Technology (UOIT)

Dr. Carolyn McGregor is the Canada Research Chair in Health Informatics based at the University of Ontario Institute of Technology. Dr. McGregor has led pioneering research in Big Data analytics, real-time event stream processing, temporal data stream data mining, business process modelling and cloud computing. She now progresses this research within the context of critical care medicine, mental health, astronaut health and military and civilian tactical training.

Professor McGregor has a track record of leadership in Health Informatics across, research, teaching, university governance and service to the profession. She is an international leading researcher in the area of critical care health informatics and in particular neonatal health informatics for which she has been researching for over 15 years. She has been awarded over \$10 million in research, consultancy and infrastructure funding and has led multiple large research programs including a multi-million dollar First of A Kind (FOAK) research program with IBM. She has over 100 refereed publications, has been awarded 1 patent and filed 2 others and has established two startup companies resulting from her research. She has extensive research collaborations in Canada, China, USA, Russia, Australia and Ireland.

In 2014 she was awarded membership in the Order of Australia for her significant service to science and innovation through health care information systems. In 2015 she was awarded the Advance Global Australian award for Technology Innovation, an award for Australian diaspora. In 2016 she serves as Chair of the IEEE Life Sciences Technical Community.

She received her bachelor of applied science in computer science honours degree, and her PhD degree in computer science from the University of Technology, Sydney.



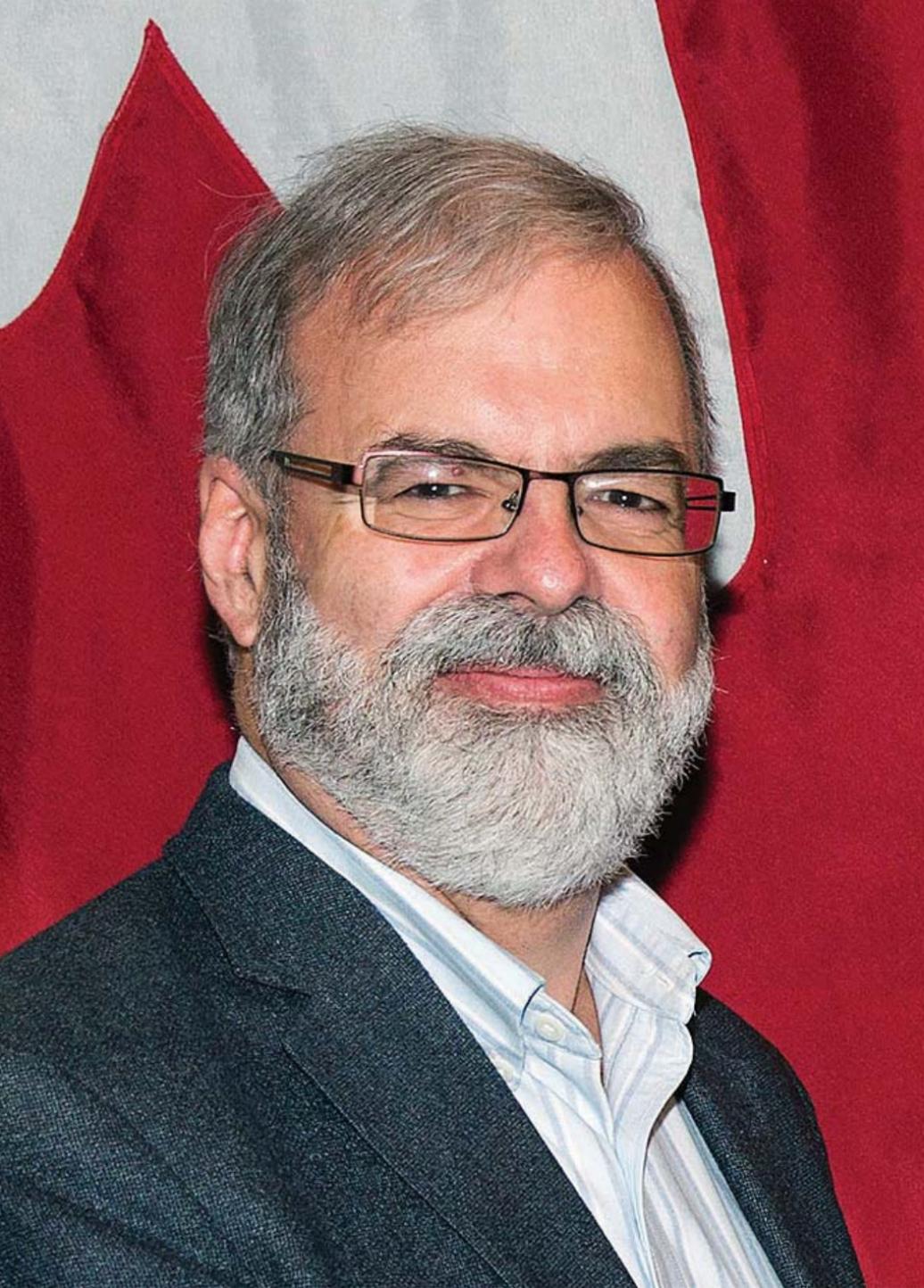
Chris Robson

Mechanical Lead, Experimental Albertan1 Cube Satellite

Chris Robson is a 5th year Mechanical Engineering Co-Op student at the University of Alberta, he was the Project Manager of the Ex-Alta 1 Satellite project (designed and created by the AlbertaSat Student Group) for two years and is currently the Mechanical Lead for the Ex-Alta 1 Satellite.

Ex-Alta 1 is a 3U CubeSat flying with the QB50 mission to study the lower thermosphere and will become Alberta's first satellite. Ex-Alta 1 hosts a Langmuir probe package, a U of A designed digital fluxgate magnetometer, a Teledyne dosimeter and a student designed on board computer. Ex-Alta 1 flies to the ISS in July for deployment with NanoRacks.

Chris's future plans include Graduate studies in Mechanical Engineering with a focus on spacecraft technology, working in the space industry as an engineer and creating a satellite startup company for Earth observation from a CubeSat platform.



RICHARD McDONALD

Richard McDonald

Distinguished Engineer

International Business Machines Corporation (IBM)

Richard McDonald is an IBM Distinguished Engineer with 34 years of IT experience. He spent the first half of his career in the IBM Toronto Laboratory developing products for clients.

Today, he is the CTO for IBM North America Technical Sales. He designs innovative solutions for some of IBM's largest clients to help them address business and IT challenges and opportunities. Over the years, he has developed methods for helping clients identify innovation opportunities within IT. His technical expertise centers on telco, mobile computing and Internet of Things solutions. He sits on the Scientific Advisory Council for the Southern Ontario Smarter Computing Innovation Platform (SOSCIP) – a consortium of universities, government and IBM to advance research in key areas.

In his spare time, he motorcycles and plays in a jazz band. Each spring he participates as a judge at FIRST Robotics and FIRST Lego League events.



RUSLAN SALAKHUTDINOV

Ruslan Salakhutdinov

Canadian Research Chair in Statistical Machine Learning, Google Scholar, Assistant Professor, University of Toronto

Ruslan Salakhutdinov received his PhD in computer science from the University of Toronto in 2009. After spending two post-doctoral years at the Massachusetts Institute of Technology Artificial Intelligence Lab, he joined the University of Toronto as an Assistant Professor in the Departments of Statistics and Computer Science.

In 2016 he moved to the Machine Learning Department at Carnegie Mellon University as an Associate Professor. His primary interests lie in artificial intelligence, machine learning, deep learning, and large-scale optimization. His main research goal is to understand the computational and statistical principles required for discovering structure in large amounts of data. He is an action editor of the Journal of Machine Learning Research and served on the senior programme committee of several learning conferences including NIPS and ICML. He is an Alfred P. Sloan Research Fellow, Microsoft Research Faculty Fellow, Canada Research Chair in Statistical Machine Learning, a recipient of the Early Researcher Award, Connaught New Researcher Award, Google Faculty Award, and is a Senior Fellow of the Canadian Institute for Advanced Research.



Cameron Piron

President and Co-Founder, Synaptive Medical

Cameron Piron is an industry-recognized leader and innovator in the field of image guided surgery. Prior to co-founding Synaptive Medical, Cameron was the President and co-founder of Sentinelle Medical, a company that developed and manufactured advanced MRI-based breast imaging technologies that grew to over 200 employees and \$20M+ revenues before it was acquired by Hologic, Inc. in 2010. Cameron studied systems design engineering at the University of Waterloo, followed by graduate degree at the University of Toronto in medical biophysics. Cameron has received a number of prestigious awards, including R&D Magazine's Innovator of the Year – the first Canadian ever to win – and the Premier's Catalyst Award for Best Young Innovator, both in 2008. In 2009, he also received an Alumni Achievement medal from the University of Waterloo for his innovative leadership of Sentinelle Medical in the research and manufacture of leading-edge MRI technologies that allow physicians to diagnose breast cancer and other medical conditions more quickly and accurately. He was also named one of Canada's Top 40 Under 40™ in 2009, a list established by Caldwell Partners to celebrate the achievements of young Canadians in the private, public and not-for-profit sectors.



Sylvain Laporte

President, Canadian Space Agency

Sylvain Laporte was appointed President of the Canadian Space Agency in March 2015. Prior to this appointment, he was Chief Executive Officer of the Canadian Intellectual Property Office (CIPO), Commissioner of Patents, Registrar of Trade-Marks since 2011.

Previously, he held the position of Executive Director, Industrial Technologies Office (ITO) at Industry Canada where he was responsible for managing financial contribution programs in research and development for the aerospace, defence, security and space industries. Sylvain joined Industry Canada in March 2007 as the Chief Informatics Officer (CIO).

Before joining the public service, he worked for Canada Post Corporation in various sectors, such as marketing, retail, logistics and information technology. Sylvain gained extensive experience as an Aerospace Engineer over the course of his 20 year career with the Canadian Forces. He held various positions in such fields as engineering, maintenance, and human resources management. Sylvain earned a Bachelors degree in computer science from Collège Militaire Royal de Saint-Jean, and a Masters degree in computer engineering from the Royal Military College in Kingston.



Dr. Kirt Costello

NASA International Space Station, Deputy Chief Scientist

Dr. Kirt Costello is the NASA International Space Station (ISS) Deputy Chief Scientist. In this position he works with the ISS Chief Scientist, ISS Program Manager and Research Integration Office manager to advise on the objectives and priorities of science being prepared to fly to the space station and to communicate those objectives to the public. Prior to joining the ISS Program, Dr. Costello was a Mission Operations manager, an International Space Station Training Lead, and a power and thermal systems instructor. Dr. Costello led the crew and mission training for the ISS 12A.1 and 1J assembly missions. Dr. Kirt Costello completed a PhD in Space Physics and Astronomy at Rice University in 1998 where his research was focused on the application of artificial intelligence to the prediction of solar wind transport and the global response to space weather disturbances.



Catherine (Cady) Coleman

American Astronaut

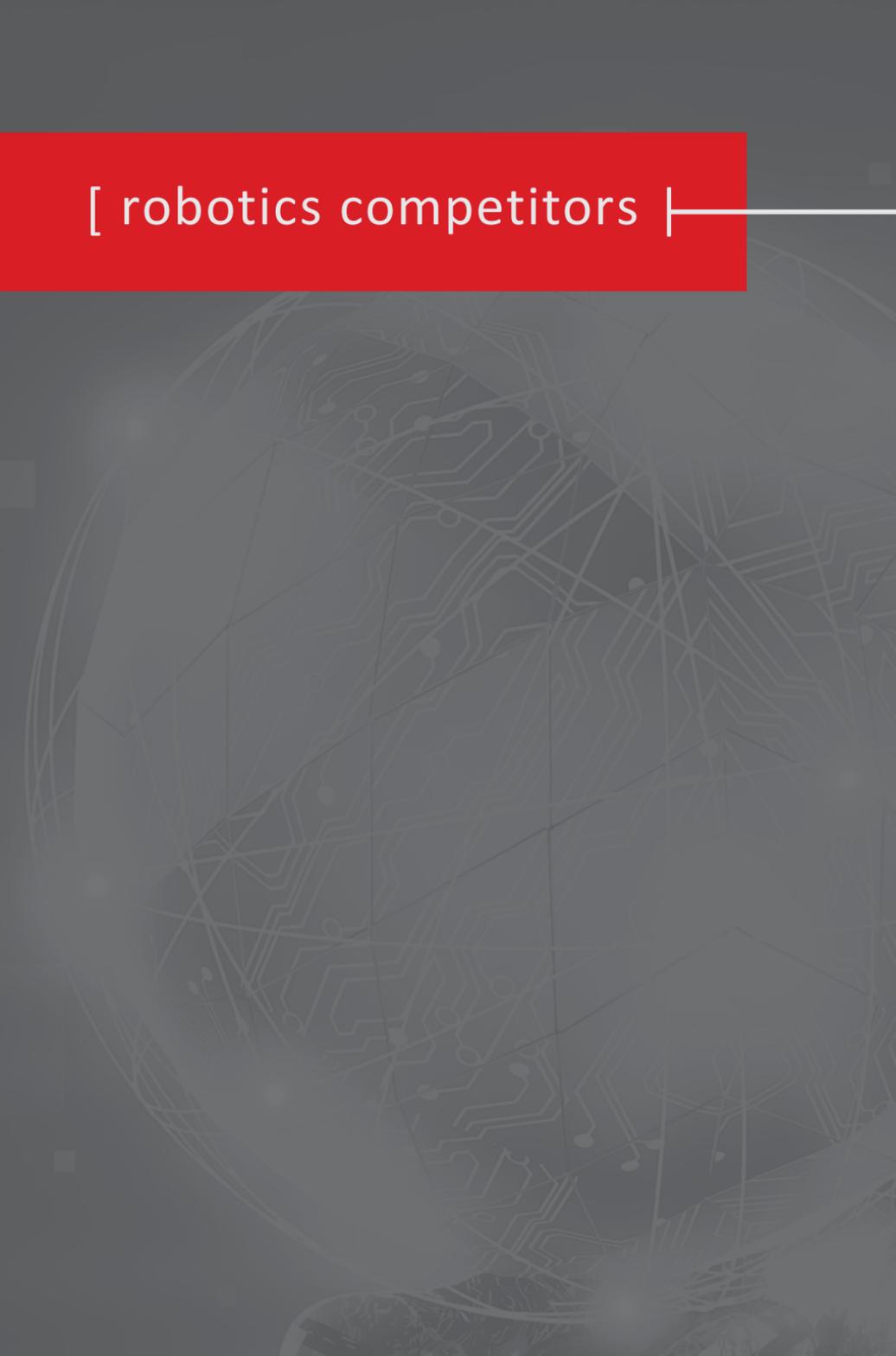
Cady Coleman is a NASA Astronaut with over 180 days in space, accumulated over two Space Shuttle missions and a six-month expedition to the International Space Station (ISS). She launched and landed aboard the Russian Soyuz spacecraft, and she acted as the lead robotics and science officer during her tenure aboard the ISS, performing the second-ever free flyer robotic capture from the ISS.

After returning from space, Coleman integrated supply ship operations for NASA's newest commercial partners, SpaceX and Orbital.

Presently, she works for NASA's Chief Technologist managing innovation programs and creative public private partnerships.

She graduated from MIT with a B.S. in Chemistry and then from the University of Massachusetts with a PhD in Polymer Science and Engineering. She was commissioned in 1983 as a second lieutenant and served in the US Air Force for 26 years.

[robotics competitors |



COMPETITION AGENDA

Continued from Conference Speakers Agenda on Page 11

UNIVERSITY COMPETITOR

2:00 pm **X-Drive**
Manual to Power Wheel Chair Conversion Kit
McMaster University, Hamilton, ON _____ **34**

HIGH SCHOOL COMPETITORS

2:30 pm **KaST Robotics**
Cost Efficient, Open Source 3D Printing
with dual extrusion
John Polanyi Collegiate, Toronto, ON _____ **35**

2:45 pm **Bayview Robotics – Leaf Collector**
Bayview Secondary School, Richmond Hill, ON _____ **36**

3:00 pm **Solis Auxilium**
A Device that Automatically Flips the Car Visor to
Block the Sun, So You Do Not Get Distracted
John Polanyi Collegiate Institute, Toronto, ON _____ **37**

3:15 pm **Hillfield Strathallan College**
Vex Robotics Competition – Shoots Balls
Hillfield Strathallan College, Hamilton, ON _____ **38**

3:30 pm **Brain Computer Interface**
Evolutionary New Prosthetics
Reads Neurons Patterns and Determines the Thought
of the User
Glendale Secondary School, Hamilton, ON _____ **39**

3:45 pm Award Presentation by Judges

X-DRIVE

McMASTER UNIVERSITY, HAMILTON, ON



Team

ALEX SHORTT

BADRI SRINIVASAN

LUKAS PEREZ

Dr. ISHWAR SINGH [Faculty Representative]

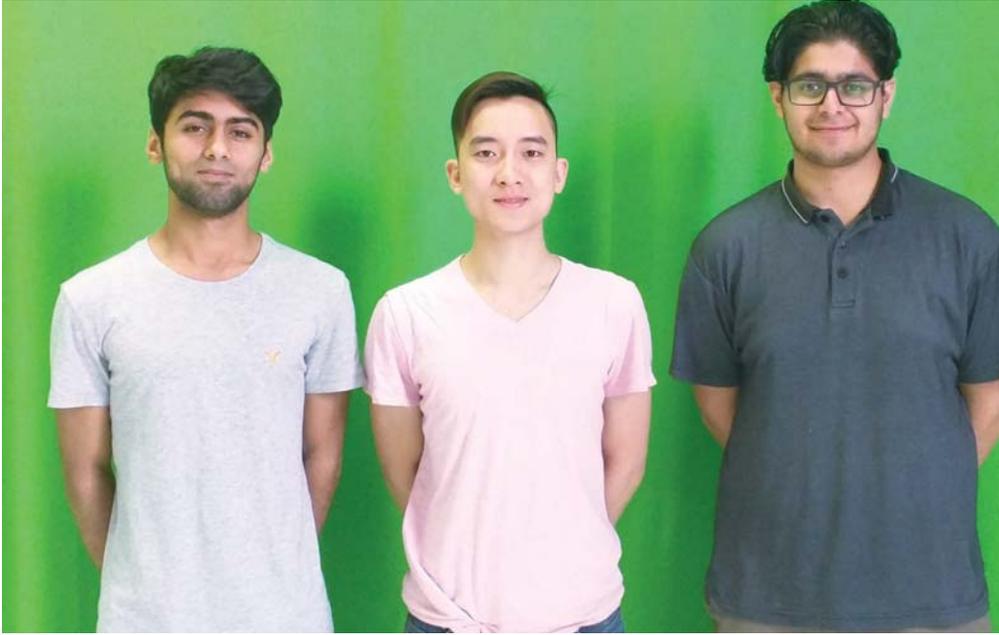
Robot Description

Manual to Power Wheel Chair Conversion Kit



KaST ROBOTICS

JOHN POLANYI COLLEGIATE, TORONTO, ON



Team

SHAHZAIB ASHER

KAMRAN TAYYAB

THINH HO

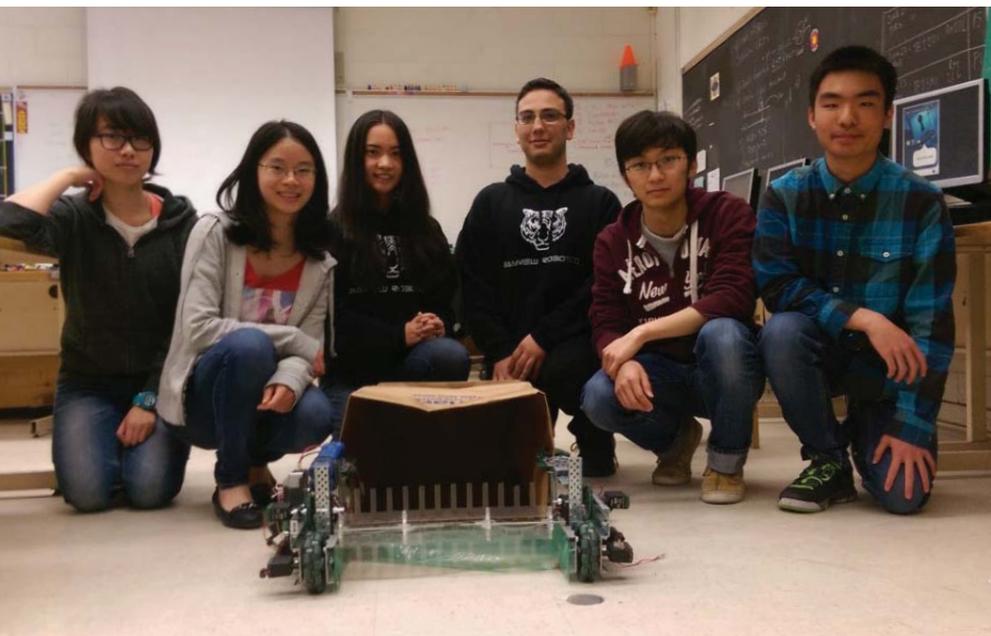
VERNON KEE [Faculty Representative]

Robot Description

The Formulator 3D printer was developed by expanding the frame, adding a larger base, and a second extruder, to the Makeblock Constructor. Our printer, which cost approximately \$1000 to make, has comparable quality in printing as a professional, \$25000 printer, and also much more expansion capability. Due to the modular design, and open source Arduino platform, we are able to very cheaply upgrade any part of our printer.

BAYVIEW ROBOTICS

BAYVIEW SECONDARY SCHOOL, RICHMOND HILL, ON



Team

JOYCE LI

DOROTHY YANG

HASSAN MAHDI

KEVIN WEN

GABRIEL NEMETH [Faculty Representative]

ANAS MAHDI

EMILY LIN

HILLARY FUNG

SATOSHI BABA

ANSON CHAN

GEMMA ZHANG

JOYCE LI

Robot Description

Leaf Collector

SOLIS AUXILIUM

JOHN POLANYI COLLEGIATE INSTITUTE, TORONTO, ON



Team

WATHANED EAN

WILLIAM TORRANCE

OLIN MORENZ

DERRICK YU

JOSHUA KIM

OWEN REID

VERNON KEE [Faculty Representative]

Robot Description

The Solis Auxilium is a device intended to aid all drivers with their visibility by automatically sensing the light of the sun, and then automatically rotating the sun visor to block the sun. People have to manually adjust their sun visor, distracting them and taking a hand off the wheel as focus on the sun visor rather than the road, possibly leading to dangerous situations. With this device, people will no longer have to worry about the sun blinding them, as the Solis Auxilium will adjust the sun visor for them.

HILLFIELD STRATHALLAN COLLEGE

HILLFIELD STRATHALLAN COLLEGE, HAMILTON, ON



Team

GRACE THOMPSON
BROOKE DOLNY
CAMERON McRAE
LIAM SAMMUT
CHRIS DiMARINOE
[Faculty Representative]

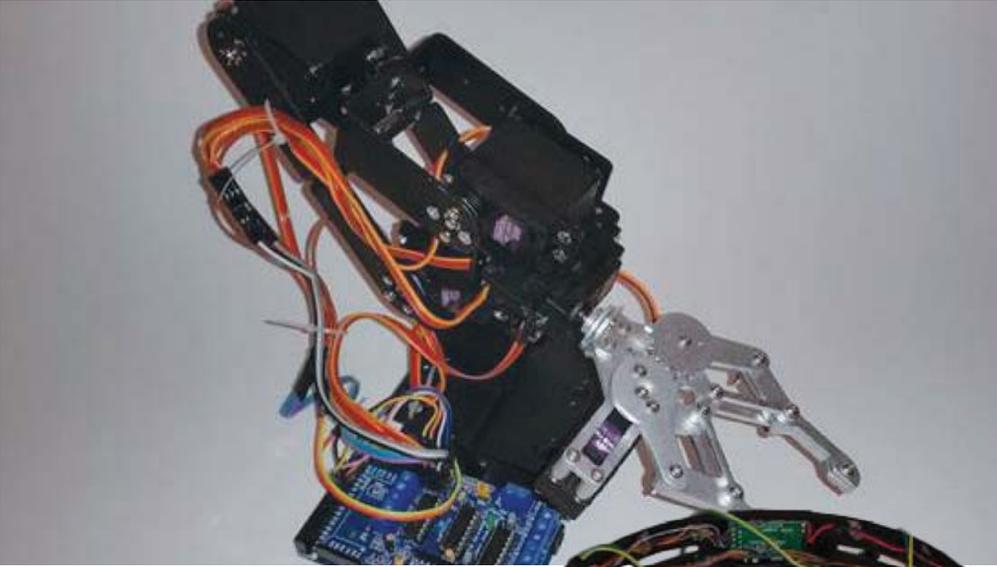
Robot Description

Vex Robotics Competition - Shoots Balls



BRAIN COMPUTER INTERFACE EVOLUTIONARY NEW PROSTHETICS

GLENDALE SECONDARY SCHOOL, HAMILTON, ON



Team AHMED IBRAHIMO
LAWRIE COOK
[Faculty Representative]

Robot Description

Reads neuron patterns and determines the thought of the user.



PLATINUM SPONSOR



International Business Machines Corporation (IBM)

At IBM, we believe that Innovation is the fundamental ingredient to the continued success of any country, province and organization, public or private. Better said, innovation is the engine that drives progress. IBM has long strived to be a leader in the invention, development and manufacture of the industry's most advanced information technologies, including computer systems, software, storage systems and microelectronics. As a matter of fact, IBM has and continues to lead the world in the innovation of computing technology solution, and for the past 22 years running, has led the world in creating new patents. In Canada, last year, IBM invested in excess of \$465 million in Canadian research activity and is continually in the TOP 10 private investors in Canadian R&D.

Importantly, IBM approaches innovation from the standpoint of 'collaboration', building bridges so that talents can work directly with other talents, providing them with the industry leading technology, so that 'innovation' can rapidly move out of the laboratories and into live implementation, commercialization, and then exporting it onto the world economic stage.

As background, IBM was first incorporated in New York State in 1911 as the Computing-Tabulating- recording Company (C-T-R). Believe it or not, the C- T- R company, now IBM, initially sold a wide variety of machines including coffee grinders, and meat slicers, and it provided business services like census tabulation with punched card equipment.

The company later rebranded itself to International Business Machines Corporation in 1924 to better describe the company's present and future business activities. Today the company refers to itself as IBM and provides a wide variety of technology, products, and services to business customers throughout the world.

While technology has seen quite unbelievable change in those 100+ years, the mission, vision, and values of the IBM corporation have been the same since the company was incorporated in 1911. In 2003, more than 319,000 global IBM employees (IBMers) participated in a 72-hour "Values Jam," which redefined the values that guide IBM in the development and delivery of its technology,

business products and services. The Values that were designed from the consensus of the IBMers are:

- || *Dedication to every client's success*
- || *Innovation that matters, for our company and for the world*
- || *Trust and personal responsibility in all relationships"*

Learn more at ibm.com/ca-en/

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Ethicon

From creating the first sutures, to revolutionizing surgery with minimally invasive procedures, Ethicon has made significant contributions to surgery for more than 80 years. Our continuing dedication to shape the future of surgery is built on our commitment to help address the world's most pressing health care issues, and improve and save more lives.

Through Ethicon's surgical technologies and solutions including sutures, staplers, energy devices, trocars and hemostats, and our commitment to treat serious medical conditions like obesity and cancer worldwide, we deliver innovation to make a life-changing impact.

Learn more at ethicon.com

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LiUNA!

Labourers' International Union of North America (LIUNA)

The Labourers' International Union of North America (LiUNA) Local 837 represents 4,000 hard working men and women across Greater Hamilton-Burlington-Niagara primarily in the construction sector. LiUNA not only puts the needs of its members and their families first, but places great emphasis on the needs of the community as well. The leaders of LiUNA are committed to public causes with special emphasis on social programs, healthcare and innovation. LiUNA applauds the leading edge research and innovation provided by the Centre for Surgical Invention and Innovation (CSii) and the compassion and commitment of Dr. Mehran Anvari and his team at CSii.

Learn more at liuna.ca

SILVER SPONSORS



MacDonald Dettwiler and Associates Ltd. (MDA)

MDA is a world leader in the development, delivery, and operations of advanced space robotics and automated systems, enabling human spaceflight, space exploration and on-orbit servicing missions. From design, development, and deployment to ongoing operations, logistics, and sustaining engineering, the MDA has an unrivalled heritage in mission-critical space missions.

Our space-based robotic and automation solutions continue to advance the boundaries of space exploration, from sensors and vision systems for orbital rendezvous and proximity operations, to robotic arms and mechanisms aboard the International Space Station and unmanned robotics and planetary science instruments carried on international missions to Mars.

The Company's extensive suite of expertise and skills include mission operations planning, analysis, training, real-time engineering support and execution, for assets in orbital or planetary environments.

Learn more at
mdacorporation.com/corporate



Stryker

Stryker is one of the world's leading medical technology companies and together with our customers, we are driven to make healthcare better. The Company offers a diverse array of innovative medical technologies, including reconstructive, medical and surgical, and neurotechnology and spine products to help people lead more active and more satisfying lives. Stryker products and services are available in over 100 countries around the world.

Stryker pushes the frontiers of medical research with uncompromising clinical integrity and innovative technologies to improve the lives of patients around the world. The key to our success is based on our close relationships with our customers, which help us to understand how we can best assist them and their patients. As a trusted partner,

we work directly with thousands of healthcare providers to provide the tools they need and to build best practices into everything we do.

Stryker Canada was incorporated in 1990 with the responsibility of providing products and services that add value to the efforts of medical professionals and aid in the delivery of quality health care to Canadians. With Canadian headquarters in Hamilton, Ontario, Stryker Canada is made up of an energetic and committed team of employees who support customers across the country. A nation-wide network of clinically focused sales professionals is dedicated to serving surgical specialists and a wide range of patient care providers.

Learn more at stryker.com

SILVER SPONSORS



McMaster University Department of Surgery

Committed to integrating innovative clinical care, world-leading research and outstanding educational resources, the Department of Surgery aspires to continue to be a leading Department in academic surgery nationally and internationally.

Learn more at
fhs.mcmaster.ca/surgery/



Centre for Minimal Access Surgery (CMAS)

The Centre for Minimal Access Surgery continues to improve and increase the scope of clinical care available to Canadians. Already setting standards for laparoscopy in gastro-intestinal, urology and gynecology surgery, CMAS doctors are forging ahead and performing leading edge laparoscopic surgeries in orthopedics, cardiac, plastics and thoracic.

CMAS is continually incorporating the latest technology into improving and expanding our role in providing modern, safe and effective laparoscopic surgery to our patients, and into teaching and mentoring for surgeons in North America and around the world. CMAS, located at St. Joseph's Healthcare Hamilton, ON, has successfully trained over 9,000 surgeons, fellows and residents in the last 15 years.

Learn more at cmas.ca

BRONZE SPONSORS



Hamilton

City of Hamilton

Hello and welcome to our city!

Hamilton, with a population of over 500,000, is one of Canada's major cities and is one of Ontario's most economically diverse.

Our sectors of focus include: advanced manufacturing, agriculture/food processing, creative industries, clean-technology, Hamilton innovation, life sciences and transportation/goods movement.

Site Selection Magazine based in Atlanta, GA named Hamilton the 'Top Investment City in Canada', and the Calgary-based Real Estate Investment Network ranked Hamilton the 'Top Location For Investment in Ontario' in 2012 and 2013. Hamilton has also been ranked as a 'Top North American City' by FDI Magazine (a publication of the world-famous Financial Times) for its quality of life.

With an educated workforce, stunning natural amenities, and a diverse, resilient economy, Hamilton is a prime choice for future economic opportunity.

Quite simply, it's time to invest in Hamilton.

Learn more at investinhamilton.ca



McMaster Innovation Park (MIP)

McMaster plans to transform vacant brownfields and warehouses into a premiere research park, building on the University's existing reputation as a research centre of excellence. The McMaster Innovation Park will house laboratory, office, teaching, training, and conference facilities, in support of research and development in a number of key industrial areas: advanced manufacturing and materials, nanotechnology, bio-technology, and other areas in which McMaster University has recognized research strengths.

These facilities will accelerate the commercialization of research into new and marketable products and services, and create new companies that will provide high-paying, highly skilled jobs in Hamilton.

Learn more at mcmasterinnovationpark.ca

BRONZE SPONSORS



Mohawk College

Mohawk College's diverse program offerings are available at the apprenticeship, continuing education, diploma and collaborative degree level, allowing students to optimize their education. Cooperative education programs give students real-world experience, preparing them for successful careers in their field.

Learn more at mohawkcollege.ca

MEDIA SPONSOR + EXHIBITOR



The Hamilton Spectator

The Hamilton Spectator is one of Canada's most historic and award-winning newspapers, with a daily circulation in excess of 100,000 and more than 400 employees. The Spectator- part of the Torstar group of media companies – also publishes a portfolio of related print and digital products including The Free Press, a weekly free distribution publication reaching more than 90,000 homes and thespec.com, the dominant online local news site in Hamilton.

Learn more at thespec.com

McKeil Marine

Established in 1956, McKeil Marine has grown from a tug-and-tow operator to one of Canada's foremost marine services providers, delivering turnkey solutions that support customer success in a wide range of transportation and project challenges throughout the Great Lakes, St. Lawrence River, East Coast and Canadian Arctic.

Recognized as marine innovators, McKeil's short sea shipping services provide an alternate to traditional cargo movement methods. Our collaborative approach to problem solving and can-do attitude have led to industry acclaim and media recognition for our work on a wide array of projects, including the Hebron Gravity Based Structure in NL, the Deception Bay Mining Site Temporary Dock in Nunavut, and Vale Processing Plant in Long Harbour, NL.

As we celebrate our 60th year, McKeil Marine is delighted to participate in Innovation Nation and share our passion for developing the next innovative solution.

Learn more at mckeil.com



Innovation Nation



For information visit:
www.innovation-nation.ca