CENTRE FOR INTELLIGENT MACHINES (CIM)

Centre de recherche sur les machines intelligentes
www.cim.mcgill.ca

Annual Report 2015

Director
Professor James J. Clark
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Summary

The McGill Centre for Intelligent Machines (CIM) is a multi-disciplinary, inter-departmental, inter-faculty research group formed in 1985 to provide an enriched mentoring and training environment for graduate students studying in the field of robotics and intelligent systems.

For almost 3 decades, CIM has been a pioneering force in cross-disciplinary research. The Centre is primarily located in contiguous space where labs and student offices are shared. CIM’s membership and students have been universally recognized over the years for their highest standards of excellence – exceptional scientific achievements and outstanding contributions to society and industry.

The Centre is comprised of 21 full members from both the Faculties of Engineering and Science -- the Department of Electrical and Computer Engineering, Department of Mechanical Engineering and the School of Computer Science. CIM also has associate members representing a diversity of research collaborations, such as within the Faculty of Medicine -- the Royal Victoria Hospital and the Montreal Neurological Institute.

The Centre is home to a diverse population of researchers: in addition to the 21 full members, at the end of 2015 the centre boasted a complement in excess of 200 graduate students, post-docs and undergraduate students, as well as visiting scholars, research assistants and associates from various disciplines.

<table>
<thead>
<tr>
<th>Ph.D</th>
<th>Masters (Thesis)</th>
<th>Masters (non-thesis)</th>
<th>U/Grads</th>
<th>Post-Docs</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>80</td>
<td>70.5</td>
<td>13</td>
<td>92</td>
<td>12.5</td>
<td>268</td>
</tr>
</tbody>
</table>

*Note: .5 indicates co-supervision of a student

The 2015 calendar year brought a number of noteworthy events for the Centre. These include:

- Addition of a new full member, James Richard Forbes in Mechanical Engineering and three new associate members, Roussos Dimitrakopoulos in Mining Engineering, David Meger in Computer Science and Viacheslav Adamchuk in Bioresource Engineering.
- Awarding of a number of significant honours
- CIM researchers were very productive, having presented their research results and developments in more than 200 publications in major conferences and journals.
Section I – Membership

Full Members

Angeles, Jorge
James McGill Professor, Mechanical Engineering

Arbel, Tal
Associate Professor, Electrical and Computer Engineering

Boulet, Benoit
Associate Professor, William Dawson Scholar, ECE

Caines, Peter
MacDonald Professor, Electrical and Computer Engineering

Clark, James
Professor, Electrical and Computer Engineering

Cooperstock, Jeremy
Associate Professor, Electrical and Computer Engineering

Cortelezzi, Luca
Associate Professor, Mechanical Engineering

Dudek, Gregory
James McGill Professor, Computer Science

Ferrie, Frank
Professor, Electrical and Computer Engineering

Forbes, James
Assistant Professor, Mechanical Engineering

Kovecses, Jozsef
Associate Professor, Mechanical Engineering

Kry, Paul
Associate Professor, Computer Science

Langer, Michael
Associate Professor, Computer Science

Levine, Martin
Professor, Electrical and Computer Engineering

Mahajan, Aditya
Assistant Professor, Electrical and Computer Engineering

Michalska, Hannah
Associate Professor, Electrical and Computer Engineering

Nahon, Meyer
Professor, Mechanical Engineering

Pineau, Joelle
Associate Professor, Computer Science

Sharf, Inna
Professor, Mechanical Engineering

Siddiqi, Kaleem
Professor, Computer Science

Zsombor-Murray, Paul
Associate Professor, Mechanical Engineering
Associate Members

Adamchuk, Viacheslav  Associate Professor, Bioresource Engineering, McGill University
Cecere, Renzo  Associate Professor, Cardiac Surgery (RVH), McGill University
Cheung, Jackie Chi Kit  Assistant Professor, School of Computer Science, McGill University
Collins, Louis  Professor, Neurology & Neurosurgery/Biomedical Engineering
Dimitrakopoulos, Roussos  Professor, Mining Engineering, McGill University
Hamann, Marco  Professor, Math/Informatics, Dresden University of Applied Sciences
Hayward, Vincent  Professor, ISIR, Université Pierre et Marie Curie, Paris France
Husty, Manfred  Professor, Geometry and CAD, University of Innsbruck, Austria
Liu, Xue  Associate Professor, Computer Science, McGill University
Meger, David  Assistant Professor, Computer Science, McGill University
Misra, Arun  Professor, Mechanical Engineering, McGill University
Mongrain, Rosaire  Associate Professor, Mechanical Engineering, McGill University
Musallam, Sam  Associate Professor, CRC chair in Bioengineering, ECE, McGill University
Panangaden, Prakash  Professor, Computer Science, McGill University
Paranjape, Aditya  Assistant Professor, Mechanical Engineering, McGill University
Pike, Bruce  Professor, Faculty of Medicine, University of Calgary
Precup, Doina  Associate Professor, Computer Science, McGill University
New Members

James Richard Forbes (associate to full)

In October 2015, Professor Forbes was promoted to full member from his previous position as associate upon his return to McGill from the University of Michigan. James received his M.A.Sc. and Ph.D. degrees in Aerospace Science and Engineering from the University of Toronto Institute for Aerospace Studies (UTIAS) in 2008 and 2011, respectively. He was awarded the prestigious G.N. Patterson Award for the most outstanding Ph.D. thesis in 2011. He joined McGill as an assistant professor in 2011 before moving to the University of Michigan in 2013. The focus of his research is the dynamics and control of aerospace systems including large flexible space structures, spacecraft, unconventional Mars rovers, and high-altitude balloons.

Roussos Dimitrakopoulos

Professor Dimitrakopoulos became an associate member of CIM in May 2015. He holds a Canada Research Chair in sustainable mineral resource development and optimization under uncertainty. His research interests include developing new modelling technologies for mine planning, design and production scheduling founded upon stochastic modelling, and optimization. He is the director of the COSMO Stochastic Mine Planning Laboratory, which collaborates with many international mining companies.

David Meger

Professor Meger is the newest associate member. Before this appointment as an assistant professor in the School of Computer Science he was already involved with CIM as a postdoctoral researcher in the Mobile Robotics Lab under the supervision of Prof. Greg Dudek. His research interests include computer vision, machine learning and robotics, and his latest project was the development of adaptive gait control for swimming robots such as AQUA. This work was a best paper finalist at ICRA 2015.

Viacheslav Adamchuk

A professor in the department of Bioresource Engineering at McGill’s Macdonald Campus, Professor Adamchuk became an associate member in May 2015. Originally from Ukraine, he received his MS and Ph.D. in Agricultural and Biological Engineering from Purdue University in Indiana. He began teaching at the University of Nebraska-Lincoln and ten years later he came to McGill, while remaining an adjunct there. His research focuses on the development of soil sensing technology to enhance the economic and environmental benefits of precision agriculture.
Visitors

The following researchers were long-term (one month or longer) visitors to CIM, working in the labs of one or more CIM members:

- **Tadasuke Furuya** Japan, Tokyo University of Marine Science & Technology – hosted by Frank Ferrie
- **Fanxiang Zeng** Beijing University of Posts and Telecommunications, China – hosted by Martin Levine
- **Laszlo Gogh** hosted by Jozsef Kovecses
- **Balint Mohacsi** hosted by Jozsef Kovecses
- **Pierre Ablin** École polytechnique Palaiseau - hosted by Kaleem Siddiqi
- **Qiong Zhang** Laval University - hosted by Frank Ferrie
- **Karim Koreitem** University of Toronto - hosted by Gregory Dudek
- **Yanzhe Yang** Mitacs Globalink research intern - hosted by Jeremy Cooperstock
- **Nicola Gallo** Politecnico di Torino, Italy - hosted by Jeremy Cooperstock
- **David Corinaldi** University of Le Marche, Italy - hosted by Jorge Angeles
- **Toby Howison** Bristol University, UK - hosted by Jorge Angeles
- **Yi Xie** Zhejiang University, China - hosted by Martin Levine
- **Cameron Knox** Australia - hosted by Jorge Angeles
- **Yonjun Pan** Spain - hosted by Jozsef Kovecses
- **Yanxiang Fan** National University of Defense Technology, China - hosted by Martin Levine
- **Audrey Durand** Université Laval – Hosted by Joelle Pineau
- **Lorinc Marton** Sapientia University, Transylvania – hosted by Jozsef Kovecses
- **Xian Liu** University of Electronic Science and Technology, China – hosted by Jeremy Cooperstock
Centre Board Members

On December 8, 2015 the Centre board held its first meeting in many years. The attendees of the board meeting were:

Professor James Clark (Centre Director and Chair of the Board)
Professor James Nicell (Dean of the Faculty of Engineering)
Professor Bruce Lennox (Dean of the Faculty of Science)
Professor Doina Precup (Associate Dean, Research, Faculty of Science – VP Research delegate)
Professor Greg Dudek (CIM member)
Professor Frank Ferrie (CIM member)
Dr. Pierre Breton (XL-Cap, external member)
Mr. Jason Taylor (CIM student representative)
Section II – Awards

Professor **Kaleem Siddiqi** was awarded the Fessenden Professorship to support his project on heart wall myofiber modeling by the Faculty of Science.

Professor **Joelle Pineau** was named a William Dawson Scholar in 2015. She was also awarded the Principal’s Prize for Outstanding Emerging Researchers at McGill University in 2015.

Professor **Joelle Pineau** was awarded the 2014-15 Tomlinson award in the associate professor category, while Professor **Paul Kry** won the 2013-14 Tomlinson assistant professor award. Both are professors in the School of Computer Science and full members of CIM. The Tomlinson Scientist awards were established in honour of the interdisciplinary collaborators Ernest Rutherford (Nobel Prize in Chemistry 1908) and Frederick Soddy (Nobel Prize in Chemistry 1921), through the generous endowment of a visionary philanthropist, Dr. Richard Tomlinson. The intention of the award is to recognize and support excellence, to recognize and support scientific leadership, particularly the collaborative leadership of a research agenda, and to provide seed money for emerging research directions, including those of an interdisciplinary nature.

**Emmanuel Piuze** has been awarded the CIPPRS Doctoral Dissertation Award 2015 Honourable Mention for his thesis entitled "The geometry of cardiac myofibers". He is supervised by CIM member Professor **Kaleem Siddiqi**. The Canadian Image Processing and Pattern Recognition Society (CIPPRS) Doctoral Dissertation Award is given annually to the top Ph.D. thesis in the areas covered by the Conference on Computer and Robot Vision (CRV).

On October 5, 2015, the Faculty of Engineering hosted the third annual McGill Engineering Research Showcase. Over 45 graduate students, including several from CIM, presented their work to the McGill community and industry representatives. Five thematic areas were highlighted, demonstrating the breadth of research in the faculty. **Colin Gallacher**, a master's student under the supervision of Prof. **Jozsef Kovecses**, won the best poster award in the Information and Communications Technology research area for Haplet: An Open-Source, Portable and Affordable Haptic Device for Democratizing Haptic Technologies.

**Arash Mohtat** and **Colin Gallagher**, graduate students under the supervision of Prof. **Jozsef Kovecses** tied for first place in the Mathworks Simulink Design Challenge for their Haptic Billiards Game.

Professor **Aditya Mahajan** was the recipient of the George Axelby Outstanding Paper Award awarded by the Control Systems Society, December 2015. This prize is awarded to papers published in the IEEE Transactions on Automatic Control on the basis of originality, potential impact on the theoretical foundations of control, importance and practical significance in applications, and clarity.
Professor **Jeremy Cooperstock** was named the inaugural Farnell Teaching Scholar, awarded by the Faculty of Engineering of McGill on August 4, 2015. This award supports Professor Cooperstock’s work in adopting active- and peer-learning approaches into his Human-Computer Interaction and Artificial Intelligence courses.

Master’s student **Naoto Hieda**, under the supervision of Prof. **Jeremy Cooperstock**, won a weekend project award at Laval Virtual for his project SharedFace2. The International Conference and Exhibition of Virtual Technologies and Uses: Laval Virtual ReVolution was held in Laval, France, in April 2015.

Professor **Tal Arbel** won the IEEE 2015 Conference on Computer Vision and Pattern Recognition (CVPR) Outstanding Reviewer Award, given to best reviewers of papers submitted to the 2015 CVPR Conference (given to approximately 70 out of 1200 reviewers). The prize was awarded by the organizers of the conference, Boston, U.S.A, June 2015. (http://www.pamitc.org/cvpr15/awards.php)

Professor **Arbel** was also the recipient of the second place award for the Longitudinal MS Lesion Segmentation Challenge, held in conjunction with the 2015 International Symposium on Biomedical Imaging (ISBI). This was awarded by the organizers of the workshop (from the National Institute of Health, U.S.A.) at the ISBI conference, New York, U.S.A., April 2015.

Prof. **Arbel** also received a best paper award, with I. J. Gerard, M. Kersten-Oertel, S. Drouin, J. A. Hall, K. Petrecca, **D. De Nigris***, and D. L. Collins. Their paper entitled "Improving Patient Specific Neurosurgical Models with Intraoperative Ultrasound and Augmented Reality Visualizations in a Neuronavigation Environment", was presented in the proceedings of the 4th MICCAI Workshop on Clinical Image-based Procedures: Translational Research in Medical Imaging (CLIP 2015) held in conjunction with the 18th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI ’15), Munich, Germany, Oct. 5, 2015.

The Canadian Image Processing and Pattern Recognition Society (CIPPRS) Doctoral Dissertation Award was awarded to **Zahra Karim-Aghaloo**, a doctoral student under Prof. **Arbel**’s supervision for her thesis entitled: "Hierarchical Adaptive Voxel and Textural Conditional Random Field for Enhanced Pathology Segmentation". This was awarded at the Conference of Computer and Robot Vision, June 2015.

A workshop entitled “Mathematical Cybernetics: Hybrid, Stochastic and Decentralized Systems. An International Workshop in Honour of Professor **Peter E. Caines**" was held at Carleton University, Ottawa. Supported by Carleton University and NSERC.

Professor **Jorge Angeles** was the recipient of the ASME Machine Design Award, August 4, 2015. The Machine Design Award recognizes eminent achievement or distinguished service in the field of machine design which is considered to include application, research, development, or
teaching of machine design. The Machine Design Division (now Design Engineering Division) established the award in 1958.

Prof. Angeles also won the Canadian Congress of Applied Mechanics' Applied Mechanics Award on June 4, 2015.

Prof. Angeles and his student Jérémie Léger were the recipients of “The Best Theoretical Paper” Award at the TrC-IFToMM Symposium on Theory of Machines and Mechanisms in Izmir, Turkey, on June 14-17 for their paper entitled “A Redundancy-resolution Algorithm for Five-degree-of-freedom Tasks via Sequential Quadratic Programming.”

Professor James Forbes was nominated for the “Golden Apple Award” at the University of Michigan. The Golden Apple Award honors those teachers who consistently teach each lecture as if it were their last, and strive not only to disseminate knowledge but to inspire and engage students in its pursuit.

Professor Forbes won a best paper award at the American Control Conference in Chicago, IL for his work with R. J. Caverly entitled “Maintaining Positive Cable Tensions during Operation of a Single Degree of Freedom Flexible Cable-Driven Parallel Manipulator.”

The mobile robotics group presented a paper that was a finalist for the Best Paper Award at ICRA 2015 in Seattle, WA. The paper was entitled “Learning Legged Swimming Gaits from Experience” and was written by Dave Meger, Juan Camilo Gamboa Higuera, Anqi Xu, Philippe Giguere and Gregory Dudek.
Section III – Research Funding

The research carried out in the Centre is funded from a wide range of sources, including the Governments of Canada and Quebec (primarily through NSERC Discovery and Partnership grants and FRQNT grants) as well as industry (through research contracts and contributions to governmental partnership programs). These programs are too numerous to list individually. However, there are some large programs that affect a significant proportion of the researchers in the Centre, and we provide some details on these in the following section.

REPARTI

Regroupement pour l'étude des environnements partagés intelligents répartis

Regroupement REPARTI is a $4M inter-institutional, interdisciplinary collaborative venture comprised of 8 Quebec institutions, 35 members and over 300 students. The McGill node of REPARTI is represented by 13 members from the McGill Centre for Intelligent Machines (CIM). The members of the McGill node collaborate in grants and contracts valued in excess of $5M annually. This FRQNT regroupement is a primary funding source for the McGill Centre for Intelligent machines (CIM).

The institutions participating in REPARTI are: Université Laval (host institution), McGill University, Université de Sherbrooke, École Polytechnique, Université de Montréal, Université du Québec à Chicoutimi and École de technologie supérieure (ÉTS).

Supported by the Quebec government’s Fonds de recherche Nature et technologies (FQRNT), this regroupement stratégique builds on some unique precedents:

(1) The historical and concrete partnership that developed over the past 25 years between prominent researchers in U. Laval and McGill (CIM) as a result of the NSERC National Centres of Excellence program, the interuniversity-industrial consortium IRIS-Precarn, and the FQRNT Réseau QERRAnet.

(2) The long and productive relationship established between the McGill Centre for Intelligent Machines (CIM) and the Quebec government through the former FCAR Centre de recherche programme.

The regroupement REPARTI was successfully renewed in 2013 for 6 years until 2019.
CREATE-MIA

**NSERC Collaborative Research and Training Experience in Medical Image Analysis**

The CREATE-MIA, funded by NSERC, was started in 2012, with the aim of training students for research careers in both academia and industry. The program employs a collaborative and multifaceted approach including:

- experts from academia, industry and/or medicine to oversee a trainee's progress throughout the program
- a selection of advanced courses from different academic departments to provide a comprehensive background in medical imaging
- internships with our industrial partners on company premises to give first-hand real-world industry experience
- participation in events such as seminars, workshops, and a summer school to broaden and enrich their knowledge-base
- participation in SKILLSETS training seminars offered by McGill University to gain professional skills that will be useful when entering the workforce or starting businesses of their own.

The institutions participating in CREATE-MIA are: McGill University (host institution), Université de Sherbrooke, and École de technologie supérieure (ÉTS). Currently, the program supports 16 graduate students, 4 of whom are currently supervised by CIM members.

The director of the CREATE-MIA program is CIM member Kaleem Siddiqi. The program faculty includes CIM member Tal Arbel, CIM associate members Louis Collins, Bruce Pike, and CIM alumni Catherine Laporte (now assistant professor at ÉTS) and Maxime Descoteaux (now an assistant professor at Universite de Sherbrooke).
APC

Automotive Partnership Canada

CIM is home to a three-year, $4.7 million project, funded by the NSERC Automotive Partnership Canada program. The goal of this project is to combine electric motor technology obtained from Quebec-based TM4 Electrodynamical Systems with a multi-speed drive train from Ontario-based Linamar Corporation. This project aims to improve electric vehicle efficiency, speed and driving range without increasing drains on batteries. The research will reduce costs of electric vehicle engines through the development of multi-speed drivetrains that are smaller and lighter than the single-speed drivetrains currently in use.

The McGill APC project was announced in February 2013, and is led by CIM member Professor Benoit Boulet.
NCFRN

NSERC Canadian Field Robotics Network

The NCFRN is a Canada-wide network spanning 8 universities and 14 partner organizations. The network brings together academic, government, and industrial researchers in the area of field robotics, to develop the science and technologies to eventually allow teams of heterogeneous robots (on land, in the air, on the surface of or under water) to work collaboratively in outdoor environments, and to communicate critical information to humans who operate them or use them.

The NCFRN supports the work of 11 researchers from 8 different universities. It connects the academic participants with 10 industrial partners and 4 government agencies to leverage their complementary experience and capabilities. The network investigates fundamental issues in robotics science as well as develops technologies developed addressing particularly Canadian problems such as environmental monitoring and maintenance, border surveillance, cleanup of environmental disasters, and assisting and caring for senior citizens.

The NCFRN primarily provides direct support for students, thereby training highly qualified new researchers, engineers and technicians able to work in robotics-related industry.

The NCFRN network management is hosted by McGill and CIM, with CIM member Greg Dudek serving as scientific director. CIM member Joelle Pineau serves as the leader of the thematic area “Human”. CIM member Inna Sharf is also a research member of the NCFRN.
Section IV – Events

Second Annual Student Research Showcase
On October 6th, 2016 the second annual Student Research Showcase was held in the Zames seminar room. It featured short one-slide presentations in the areas of Robotics, Systems and Control, Human-Computer Interaction, Machine Vision and Medical Image Analysis. Over fifty students participated in the event, and several professors and other students attended as spectators. It was a great opportunity for everyone to learn about the research in other CIM labs and network. This showcase built on the success of last year’s inaugural event and is expected to continue to foster ties in the department for years to come.

Forest Machine Technology Conference Tour
CIM hosted a tour on April 23, 2015 for participants of the Robotics in the Forest Workshop, a local conference organized by FPInnovations. Several labs opened their doors and presented demos to welcome the thirty attendees, including artificial perception, applied dynamics, mobile robotics, reasoning and learning, robotic mechanical systems, and aerospace mechatronics. There was also a demonstration of a simulator produced by CM Labs, an industrial collaborator with CIM. The workshop covered topics as diverse as the technologies used in mines, robotics in manufacturing plants and in the field, aerospace, remote operations, self-learning systems, automation of repetitive tasks and new high-performance sensors now available on the market, and usable, in particular, by overhead or land drones. Many of these subjects are investigated in the labs at CIM so it was a valuable opportunity for students and researchers to interact with industry members from all over the world and learn from each other.

CIM Team Building Event
To mark the end of the semester, the students and professors at the Centre for Intelligent Machines convened in the Zames room for an afternoon of socializing and team building. The event was well attended and participants enjoyed a quiz game that tested their knowledge of CIM history and the field of intelligent systems.

Informal Systems Seminars
Organized by Profs. Aditya Mahajan and Peter Caines every Friday, this seminar series brings together researchers from many universities. Speakers come from all over the world to present on various topics of importance in the field of systems and control, and these events are well attended by faculty and grad students alike.
Seminars at CIM

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Matt Smith</td>
<td>TandemLaunch, Canada</td>
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<tr>
<td>Jerome Le Ny</td>
<td>Ecole Polytechnique de Montréal, Canada</td>
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<tr>
<td>Mihaela Pop</td>
<td>University of Toronto, Canada</td>
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<tr>
<td>Nicola Pedrocchi</td>
<td>National Council of Research, Italy</td>
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<tr>
<td>Farzin Taringoo</td>
<td>University of Melbourne, Australia</td>
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<tr>
<td>Alexis Lussier-Desbiens</td>
<td>University of Sherbrooke, Canada</td>
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<tr>
<td>Andrew D. Lewis</td>
<td>Queen's University, Canada</td>
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<tr>
<td>Mehmet Dogar</td>
<td>MIT CSAIL, USA</td>
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<tr>
<td>Yi Ouyang</td>
<td>University of Michigan, Ann Arbor, USA</td>
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<tr>
<td>Yi Ouyang</td>
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<tr>
<td>Tucker Hermans</td>
<td>Technische Universität Darmstadt, Germany</td>
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<tr>
<td>Yogesh Girdhar</td>
<td>Woods Hole Oceanographic Institution, USA</td>
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<tr>
<td>Yang Cai</td>
<td>McGill University, Canada</td>
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<tr>
<td>Paul Hebert</td>
<td>NASA Jet Propulsion Laboratory, USA</td>
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<tr>
<td>Anca Dragan</td>
<td>Carnegie Mellon University, USA</td>
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<tr>
<td>Vasumathi Raman</td>
<td>California Institute of Technology, USA</td>
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<tr>
<td>Ba Tuong Vo</td>
<td>Curtin University, Perth, Australia</td>
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<tr>
<td>Dave Meger</td>
<td>McGill University, Canada</td>
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<tr>
<td>Nevroz Sen</td>
<td>McGill University, Canada</td>
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<tr>
<td>Hugh Liu</td>
<td>University of Toronto, Canada</td>
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<tr>
<td>J.N. Reddy</td>
<td>Texas A&amp;M University, USA</td>
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<td>Olivier Grisel</td>
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<td>Frédéric Lesage</td>
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<td>Jon Sporring</td>
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<td>Luc Florack</td>
<td>Eindhoven University of Technology, Netherlands</td>
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<tr>
<td>Emmanuel Piuze-Phaneuf</td>
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<td>Tony Jebara</td>
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<td>Leila Pishdad</td>
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<td>Ali Pakniyat</td>
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<td>Giorgio Figliolini</td>
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<td>Frank Rudzicz</td>
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<td>Laurent D. Cohen</td>
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<td>Jalal Arabneydi</td>
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<td>Lynette Jones</td>
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<td>Jia Yuan Yu</td>
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<td>Shuang Gao</td>
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<tr>
<td>Aditya Mahajan, Di Wu,</td>
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<td>Pierre Jordaan</td>
<td>Novartis Pharma, Basel, Switzerland</td>
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<td>Brent Gillespie</td>
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<td>Mohamed K. Helwa</td>
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<tr>
<td>Nevroz Sen</td>
<td>McGill University, Canada</td>
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Section V – Plans for the Coming Year

Some activities that are planned for 2016-17 include:

- Development and submission of a major CFI infrastructure grant ($23M) to support research into autonomous vehicles, field robotics and electric cars. The proposed plan is to construct and equip space in the McConnell courtyard permitting housing and testing of ground vehicles as well as space for flight testing unmanned aerial vehicles.

- Launching of the industrial affiliate program. In collaboration with the Faculty of Engineering, identifying companies with interests related to the Centre activities to become inaugural affiliate members.

- Creating a “Case for Support” in collaboration with the Faculty of Engineering Development and Alumni Relations office to be shared with potential donors to the Centre. Discuss with the Faculty Development Office donation opportunities related to the proposed CFI infrastructure.
Section VI – Industrial Partners

Many of the centre’s research activities are carried out in collaboration with industrial partners. A (partial) list of these partners is given in the following table.

<table>
<thead>
<tr>
<th>Alta Precision Inc.</th>
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Section VII – Publications

(Note: publications listed are those that appeared during the calendar year of 2015. Some publications appear twice due to collaboration between Centre members)

Angeles, Jorge

Articles in refereed publications

Other refereed contributions

McGill Centre for Intelligent Machines (CIM) Annual Report 2015

26
Non-refereed contributions
All other publications, including those from research that you supervised
25. Design and Synthesis of Custom-moulded Earphone Sleeve, Surjit Singh's MEng Project Report (Cosupervisor: Prof. M. Maric, Chemical Engineering)
McGill Centre for Intelligent Machines (CIM) Annual Report 2015
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Arbel, Tal
Articles in refereed publications
26. M. Demirkus*, D. Precup, J. J. Clark and T. Arbel, "Hierarchical Temporal Graphical Model for Head Pose Estimation and Subsequent Attribute Classification in Real-
Papers in refereed conference proceedings
McGill Centre for Intelligent Machines (CIM) Annual Report 2015
28
All other publications, including those from research that you supervised
Brain Images”, Electrical and Computer Engineering, McGill University, Dec. 2015.

**Boulet, Benoit**

**Articles in refereed publications**


**Other refereed contributions**


**McGill Centre for Intelligent Machines (CIM) Annual Report 2015**

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All other publications, including those from research that you supervised


Contributions to industrially relevant research and development


Caines, Peter
Publications in journals

Publications in refereed conference proceedings

Clark, James

Articles in refereed publications

Other refereed contributions

Cooperstock, Jeremy

Articles in refereed publications

Papers in refereed conference proceedings
Non-refereed contributions
All other publications, including those from research that you supervised
Contributions to industrially relevant research and development
76. J. R. Cooperstock and *J. Blum. “Method and system for haptic feedback.” provisional application 62/237,772 (United States) filed, October 2015.

Cortelezzi, Luca

Dudek, Gregory
Conference publications

Ferrie, Frank
Articles in Refereed Journals

Articles in Refereed Conference Publications

Forbes, James Richard
Articles in refereed publications
34
Other refereed contributions

Kovacs, Jozsef
Articles in refereed publications


Other refereed contributions


118. Ghotbi. B., González, F., Kövecses, J., Angeles, J., “Mobility Assessment of


McGill Centre for Intelligent Machines (CIM) Annual Report 2015

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Kry, Paul
Refereed journals
Refereed conference proceedings
url>http://dl.acm.org/citation.cfm?id=2788890.2788910

Langer, Michael
Refereed journal publications
McGill Centre for Intelligent Machines (CIM) Annual Report 2015
38
Refereed conference publications
Invited lectures
140. “Shape from Shading, Highlights, and Mirror Reflections,” International Conference on Perceptual Organization, York University Toronto, June 24, 2015

Levine, Martin
Articles in refereed publications

Mahajan, Aditya
Articles in refereed publications

Other refereed contributions
157. J. Arabneydi* and A. Mahajan, “Reinforcement learning in decentralized stochastic control systems with partial history sharing,” Conference on Reinforcement Learning and Decision Making (RLDM), pp. 193–197, Edmonton, Alberta, Canada, Jun 7–10, 2015. (Selected for oral presentation. Fewer than 15% of accepted submissions were awarded an oral presentation.)

Non-refereed contributions
167. C. Cui*, “On computing optimal thresholds for sequential hypothesis testing,”
MEng Thesis, August 2015.

**Michalska, Hannah**


170. Farkhatdinov, I., Michalska, H, Hayward, V., Berthoz, A., “Gravito-inertial ambiguity during locomotion can be resolved through head stabilization,” 18 pages; Biocybernetics and Biomedical Engineering; https://www.academia.edu/21671713/Gravito-Inertial_Ambiguity_During_Locomotion_Can_Be_Resolved_Through_Head_Stabilization


172. Platkiewicz, J., Michalska, H., Hayward, V., “Probabilistic nonlinear models explain the size-weight, the moon, and other illusions,” 15 pages, Journal of Perception; https://www.academia.edu/21671880/Probabilistic_Nonlinear_Models_Explain_the_Size-Weight_the_Moon_and_Other_Illusions

**Nahon, Meyer**

Articles in refereed publications


Other refereed contributions
All other publications, including those from research that you supervised

Pineau, Joelle
Publications in refereed journals

Publications in refereed conference proceedings
Other publications

**Sharf, Inna**

Articles in refereed publications

Other refereed contributions

Non-refereed contributions

All other publications, including those from research that you supervised
University, 2015.

Contributions to industrially relevant research and development

McGill Centre for Intelligent Machines (CIM) Annual Report 2015
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**Siddiqi, Kaleem**

Publications in refereed journals

Publications in refereed conference proceedings