CENTRE FOR INTELLIGENT MACHINES (CIM)

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

Annual Report 2016

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 over 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 250 graduate students, post-docs and undergraduate students, as well as visiting scholars, research assistants and associates from various disciplines.

<table>
<thead>
<tr>
<th></th>
<th>Ph.D</th>
<th>Master Thesis</th>
<th>Master Non-Thesis</th>
<th>Undergrad</th>
<th>Post doc</th>
<th>Total</th>
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<tbody>
<tr>
<td></td>
<td>77.5</td>
<td>64.5</td>
<td>4</td>
<td>95.5</td>
<td>19.5</td>
<td>261</td>
</tr>
</tbody>
</table>

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

The 2016 calendar year brought a number of noteworthy events for the Centre. These include:

- Promotion of David Meger in Computer Science from associate member to full member. Addition of a new associate member, Derek Nowrouzezahrai in Electrical and Computer Engineering.
- Awarding of a number of significant honours and awards.
- 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**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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</thead>
<tbody>
<tr>
<td>Angeles, Jorge</td>
<td>James McGill Professor, Mechanical Engineering</td>
</tr>
<tr>
<td>Arbel, Tal</td>
<td>Associate Professor, Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Boulet, Benoit</td>
<td>Associate Professor, William Dawson Scholar, ECE</td>
</tr>
<tr>
<td>Caines, Peter</td>
<td>MacDonald Professor, Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Clark, James</td>
<td>Professor, Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Cooperstock, Jeremy</td>
<td>Associate Professor, Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Dudek, Gregory</td>
<td>James McGill Professor, Computer Science</td>
</tr>
<tr>
<td>Ferrie, Frank</td>
<td>Professor, Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Forbes, James Richard</td>
<td>Assistant Professor, Mechanical Engineering</td>
</tr>
<tr>
<td>Koveceses, Jozsef</td>
<td>Associate Professor, Mechanical Engineering</td>
</tr>
<tr>
<td>Kry, Paul</td>
<td>Associate Professor, Computer Science</td>
</tr>
<tr>
<td>Langer, Michael</td>
<td>Associate Professor, Computer Science</td>
</tr>
<tr>
<td>Levine, Martin</td>
<td>Professor, Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Mahajan, Aditya</td>
<td>Assistant Professor, Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Meger, David</td>
<td>Assistant Professor, Computer Science</td>
</tr>
<tr>
<td>Michalska, Hannah</td>
<td>Associate Professor, Electrical and Computer Engineering</td>
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<tr>
<td>Nahon, Meyer</td>
<td>Professor, Mechanical Engineering</td>
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<tr>
<td>Pineau, Joelle</td>
<td>Associate Professor, Computer Science</td>
</tr>
<tr>
<td>Sharf, Inna</td>
<td>Professor, Mechanical Engineering</td>
</tr>
<tr>
<td>Siddiqi, Kaleem</td>
<td>Professor, Computer Science</td>
</tr>
<tr>
<td>Zsombor-Murray, Paul</td>
<td>Associate Professor, Mechanical Engineering</td>
</tr>
</tbody>
</table>
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  
**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  
**Nowrouzezahrai, Derek**  Associate Professor, 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

David Meger (associate to full)

Professor Meger has become a full member of CIM, after spending a year as an associate member. Before this appointment he was already involved with CIM as a postdoctoral researcher in the Mobile Robotics Lab under the supervision of Greg Dudek, who he continues to work closely with. 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.

Derek Nowrouzezahrai (associate)

Prof. Nowrouzezahrai is the newest associate member of CIM, hailing from the department of Electrical and Computer Engineering at McGill. His research interests include light synthesis and estimation to create and manipulate realistic synthetic images. Before coming to McGill, Prof. Nowrouzezahrai was an Assistant Professor in the Department of Computer Science and Operations Research at the University of Montreal. He received his Ph.D and M.Sc. from the University of Toronto and worked as a Post-Doctoral Researcher at Disney Research Zurich. He was also the recipient of the Outstanding Young Computer Science Researcher Prize – 2014 awarded by the Canadian Association of Computer Science.
Visitors

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

Mohamed Amir Sassi  Université du Québec à Chicoutimi – hosted by Jeremy Cooperstock
Jessica Nogueira Dalla-Libera  hosted by Jorge Angeles
Sumeha Kashyap  Indian Institute of Technology, Guwahati – hosted by Jeremy Cooperstock
Yiming Chen  hosted by Frank Ferrie
Xing Wu  hosted by Jorge Angeles
Nicola Gallo  Politecnico di Torino, Italy - hosted by Jeremy Cooperstock
David Corinaldi  University of Le Marche, Italy - hosted by Jorge Angeles
Yi Xie  Zhejiang University, China - hosted by Martin Levine
Cameron Knox  Australia - hosted by Jorge Angeles
Yanjun Pan  Spain - hosted by Jozsef Kovacs
Section II – Awards

Professor James Forbes was awarded the 2016 McGill Association of Mechanical Engineers (MAME) Professor of the Year.


Prof. Kovecses group’s work "Demonstration Toward Open-Source Portable Haptic Displays: An Interactive Physics Demo with the Haplet", was finalist for the Best Demonstration Award at the 2016 IEEE Haptics Symposium, Philadelphia, PA, April 8-11, 2016.

Professor Aditya Mahajan was awarded the 2016 Discovery Accelerator Award, NSERC. Awarded to researchers who have a superior research program that is highly rated in terms of originality and innovation, and who show strong potential to become international leaders within their field. In the 2016 competition, 125 applicants out of 3191 were awarded Discovery Accelerator Supplement.

Jhelum Chakravorty won the 2016 Best Student Paper Award for the paper "Remote-state estimation with packet drop," coauthored with her supervisor Aditya Mahajan at the IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys), 2016. Awarded based on originality, clarity, and potential impact on practical applications or theoretical foundations of estimation and control in networked systems.


Damien Goblot, a master’s student working under the supervision of Prof. Kaleem Siddiqi, won first prize in the “heart failure” category for his poster “Cartan frames for characterizing fiber geometry in pig hearts from diffusion tensor imaging (DTI)” presented at the 2016 Imaging Network Ontario symposium in Toronto. Details are here: http://imno.ca/2016-awards

Professor Joelle Pineau was awarded the David Thompson Award for Excellence in Graduate Teaching & Supervision at McGill.

Professor Paul Kry was the recipient of a Research Gift, distinguished faculty award, from Oculus research, $25000 USD. Letter asks not to publicly acknowledge the gift. Letter received 22 December 2016, and fund opened in 2017.

Professor Paul Kry won the best paper award for artistic robot, awarded at Expressive 2016 in Lisbon, Portugal along with students Brendan Galea, Ehsan Kia and Nicholas Aird.
Professor **Inna Sharf** was named an Excellent Reviewer for the Journal of Guidance, Control, and Dynamics (JGCD) for the period of Oct. 1, 2015 – Sept. 30, 2016.
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
April 2006 to March 31, 2019

Regroupement REPARTI – Phase 2 (April 2013-March 2019) is a $2.6M 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

April 2012 to March 2018

The CREATE-MIA, funded by NSERC, was started in 2012 and ends in March 2018, with the aim of training students for research careers in both academia and industry. The program employs a collaborative and multi-faceted 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 21 graduate students, 11 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 four-year, $4.6 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 Electrodynamic 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 ends in August 2017, and is led by CIM member Professor Benoit Boulet.
CFI

The Centre’s director, in collaboration with fellow CIM members Benoit Boulet, Greg Dudek, Dave Meger, Joelle Pineau, and Inna Sharf, as well as non-CIM members David Lowther (ECE dept.), Geza Joos (ECE dept.), Viacheslav Adamchuck (BioRes dept.), and Loic Boulon (Universite du Quebec a Trois Rivieres), prepared and submitted a large ($17.3M) proposal to the Canadian Foundation for Innovation fund program. The focus of the proposal was the creation of a new space at McGill for carrying out research into field robotics, autonomous ground and air vehicles, and electric vehicle drivetrains and control systems.

The proposal was not funded, however and a revised version will be submitted in the next call for proposals.
NCFRN

NSERC Canadian Field Robotics Network
June 20, 2012 to June 29, 2018

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.

The NCFRN is a 5-year program that started on June 30, 2012 and will end on June 29, 2018.
Section IV – Events

Third Annual Student Research Showcase
On October 19th, 2016, the third 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 wonderful opportunity for everyone to learn about the research in other CIM labs and network. This showcase built on the success of previous years and is expected to continue to foster ties in the department for years to come.

CIM Team Building Event
To mark the end of the semester, the students and professors at the Centre for Intelligent Machines convened in the CIM Zames room for an afternoon of socializing and team building. The event was well attended and participants enjoyed a fun video created by faculty members with a very important message about the use of Centre resources.

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 diverse 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>Seminarist</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Francesco Ticozzi</td>
<td>Università degli Studi di Padova &amp; Dartmouth College</td>
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<tr>
<td>Mark Schubin</td>
<td>Society of Motion-Picture and Television Engineers</td>
</tr>
<tr>
<td>Robert DiRaddo</td>
<td>Simulation and Digital Health Group at NRC</td>
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<tr>
<td>Guillaume Lavoué</td>
<td>INSA de Lyon, France</td>
</tr>
<tr>
<td>Xiaozhe Wang</td>
<td>McGill University, Canada</td>
</tr>
<tr>
<td>Chen Chen</td>
<td>University of California, Berkeley, USA</td>
</tr>
<tr>
<td>Colm Elliot</td>
<td>McGill University, Canada</td>
</tr>
<tr>
<td>Scott McCloskey</td>
<td>Honeywell Labs, USA</td>
</tr>
<tr>
<td>Hamid Krim</td>
<td>North Carolina State University, USA</td>
</tr>
<tr>
<td>Ankur Gupta</td>
<td>University of British Columbia, Canada</td>
</tr>
<tr>
<td>Cedric Langbort</td>
<td>University of Illinois at Urbana-Champaign, USA</td>
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<tr>
<td>Luis Rodrigues</td>
<td>Concordia University, Canada</td>
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<tr>
<td>Nikos Paragios</td>
<td>University of Paris-Saclay, France</td>
</tr>
<tr>
<td>Chinwendu Enyioha</td>
<td>Harvard University, USA</td>
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<tr>
<td>Jean-Charles Bazin</td>
<td>Disney Research Zurich, Switzerland</td>
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<tr>
<td>Jason Pacheco</td>
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<tr>
<td>Nobuyuki Umetani</td>
<td>Autodesk Research, Canada</td>
</tr>
<tr>
<td>Martin Guay</td>
<td>Disney Research Zurich, Switzerland</td>
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<tr>
<td>Roy Featherstone</td>
<td>Australian National University, Australia</td>
</tr>
<tr>
<td>Angelos Georgiou</td>
<td>McGill University, Canada</td>
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<td>Anqi Xu</td>
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<td>Luis Rodrigues</td>
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<td>Ryan James Caverly</td>
<td>University of Michigan, USA</td>
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<tr>
<td>Rabih Salhab</td>
<td>Ecole Polytechnique de Montreal, Canada</td>
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<tr>
<td>David Levanony</td>
<td>Ben Gurion University, Israel</td>
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<tr>
<td>Stephane Blouin</td>
<td>Defence R&amp;D Canada, Canada</td>
</tr>
<tr>
<td>Natasha Devroye</td>
<td>University of Illinois - Chicago, USA</td>
</tr>
<tr>
<td>Morten Fjeld</td>
<td>Chalmers University of Technology, Sweden</td>
</tr>
<tr>
<td>Peter B. Luh</td>
<td>University of Connecticut, USA</td>
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</table>
Section V – Plans for the Coming Year

Some activities that are planned for 2017 include:

- Formation of an advisory board for the Centre. This would complement the Centre’s board, which focuses on administrative and operational matters, and would provide guidance for carrying out the Centre’s research mission.
- Review and updating of the Centre bylaws.
- Institution of a day-long research showcase for students. This will include short 3-minute presentations by graduate student members of CIM as well as a networking event with industrial partners. This event is planned to be held in the Fall.
- Further development of industrial partnerships, particularly in the areas of Artificial Intelligence (AI), Transportation and Smart Cities, and Aerospace.
- 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. This will feed into the expected new funding campaign for the University.
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.

- Alta Precision Inc.
- Astrium SAS
- Bombardier Inc.
- Brisk Synergies
- CAE
- Canadian Space Agency
- Cirque du Soleil
- Clear Path Robotics
- CMLabs
- CMLabs Simulations
- ConsumerReport
- Crosswing
- Digital District
- Disney Research Zurich
- Dreco Energy Services
- Elekta
- Google
- General Motors Canada
- Genetec
- Hewlett-Packard
- HoloLabs Studio Inc.
- Imeka
- Immersion
- Independent Robotics
- Infolytica
- Intelerad
- InterDigital Canada
- IREQ – HydroQuebec
- Irystec
- Kinsol
- Linamar
- Macdonald Dettwiler & Associates
- MDA
- MT4
- National Oilwell Varco
- Neptec
- NeuroRX
- Nokia
- NSPRO
- Nuance
- Object Research Systems
- Open Source Robotics Foundation
- ORS
- Placage Unique Inc.
- Pleaides Inc.
- Pratt and Whitney Canada
- DRDC Suffield
- Revol Technologies Ltd.
- Rogue Research
- SportLogiq
- Synaptive Medical
- TandemLaunch Inc.
- Technospin Inc.
- Telemar
- Thermo FS
- TM4
- True Positive
- Ubisoft
- Vecna
- Wellbore Technologies
Section VII – Publications

(Note: publications listed are those that appeared during the calendar year of 2016)

Angeles, Jorge

Articles in refereed publications


Other refereed contributions


All other publications, including those from research that you supervised


Knowledge translation/dissemination activities

16. "Kinematic Synthesis and Dynamics of Multibody Mechanical Systems", a 24-hour seminar at University of Rome-Tor Vergata, on May 3-12, 2016.

Invited presentations


Arbel, Tal

Articles in refereed publications


Papers in refereed conference proceedings


All other publications, including those from research that you supervised


Boulet, Benoit

Articles in refereed publications


Other refereed contributions


Caines, Peter

Publications in journals


34. N. Sen** and P.E. Caines, ``Mean Field Game Theory with a Partially Observed Major Agent``. {SIAM J. Control and Optimization}, 2016, 54(6). pp 3174-3224 DOI: 10.1137/16M1063010


Refereed Conference Publications


Other refereed contributions

44. 7th Biannual Meeting on System and Control Theory, Queen’s University, Kingston, ON, May 11-13, 2016 Co-authored work with P. E. Caines presented by students: (i) Dena Firoozi*: “ε-Nash Equilibria for Partially Observed Optimal Execution Problem: Mean Field Game Approach

Non-refereed contributions

45. Peter E. Caines, “Mean Field Games Theory and the Control of Large Scale Systems”, Opening Plenary Address (23rd International Symposium on Mathematical Theory of Networks and Systems) (MTNS), 11 July, 2016 (see Invited Presentations below).

Policy papers

46. "Statement Concerning Canadian Energy Policy and Climate Change" addressed to the Prime Minister, Justin Trudeau; also mailed to members of the Liberal and NDP Parties, October, 2016 (6 pages).

Invited presentations

49. Cambridge University, UK, July 2016: Department of Engineering: "Mean Field Game Theory and the Control of Large Scale Systems".

Clark, James

Articles in refereed publications

Other refereed contributions


All other publications, including those from research that you supervised


Cooperstock, Jeremy

Articles in refereed publications


Papers in refereed conference proceedings


All other publications, including those from research that you supervised


Dudek, Gregory

Conference publications


**Ferrie, Frank**

**Articles in Refereed Conference Proceedings**


**Conference Presentations (refereed abstracts)**

Forbes, James Richard

Articles in refereed publications


Kovecses, Jozsef

Articles in refereed publications


94. Gholami, F., Trojan, D., Kövecses, J., Haddad, W. and Gholami, B., “A Microsoft Kinect-Based Point-of-Care Gait Assessment Framework for Multiple Sclerosis Patients”, IEEE Journal of Biomedical and Health Informatics, pp.1-10, published online July 2016, doi:10.1109/JBHI.2016.2593692. McGill published a press release on Aug. 15, 2016 based on the work reported in this paper. This press release has been picked up and covered by various news agencies worldwide. An interview on CTV News was also broadcasted on Aug. 30.


Kry, Paul

Refereed journals

99. Rabbani, M. van de Panne, P. G. Kry, Anticipatory balance control and dimension reduction, Computer Animation and Virtual Worlds, July 2016. DOI: 10.1002/cav.1726

Refereed conference proceedings

100. B. Galea, E. Kia, N. Aird, P. G. Kry, Stippling with aerial robots, Expressive '16 Proceedings of the Joint Symposium on Computational Aesthetics and Sketch Based
Interfaces and Modeling and Non-Photorealistic Animation and Rendering, pp. 125-134, 2016. (best paper award)


Books or book chapters


Other publications

104. M. van de Panne, P. G. Kry], A Conversation with the CHCCS/SCDHM 2016 Achievement Award Winner, Proceedings of Graphics Interface, 3 pages, 2016. DOI 10.20380/GI2016.01

Langer, Michael

Refereed journal publications


Refereed conference publications

107. F. Mannan and M.S. Langer. What is a good model for depth from defocus? 13th Conference on Computer and Robot Vision, Victoria, Canada, June 2016

Conference Presentations

Ahajan, Aditya

Articles in refereed publications


Other refereed contributions

111. J. Chakravorty* and A. Mahajan, “Remote-state estimation with packet drop,” IFAC Workshop on Distributed Estimation and Control in Networked Systems, Tokyo, Japan, Sep 8–9, 2016. (Recipient of the Best Student Paper Award)


114. S. Li, A. Khisti, and A. Mahajan, “Privacy preserving rechargeable battery policies for smart metering systems,” International Zurich Seminar on Communications (IZS), Zurich, Switzerland, March 2–4, 2016.


Non-refereed contributions


All other publications, including those from research that you supervised


Invited presentations


Meger, David

Refereed journal publications


Refereed conference publications

Invited lectures or Presentations

131. Swimming by design and from experience. Research seminar at McGill Bellairs Institute, Barbados: Mobile Robotics Lab ocean field trials, January 2016.
137. Learning to perceive and act. Invited talk: Distall fellow introduction at the NSERC Canadian Field Robotics Network (N CFRN) yearly meeting, June 9 2016. Oral presentation to all network members (approx. 100).
138. Robots that see (and move and learn). Invited talk at the School of Computer Science Robotics Summer Camp, June 27 2016. Oral presentation to student summer camp attendees (approx. 40).
139. Semantic object recognition for robotics. Corporate Lunch and Learn at WRNCH, August 16, 2016. Oral presentation to all company employees (approx. 10).

Conference Presentations

141. Learning to generalize 3d spatial relationships. Oral and poster presentation at the International Conference on Robotics and Automation (ICRA), May 16th 2016. This presentation was given by Jimmy Li, a PhD student that I co-supervise. I was a co-author of the corresponding paper in the conference.
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


Books or Book Chapters


Other publications

35

Invited lectures or Presentations
178. Apr 1 2016. Natural Language Processing: Challenges & Opportunities for Deep Reinforcement Learning. Data Learning and Inference (DALI) meeting. Sestri Levante, Italy.

Conference Presentations
188. “Conditional Computation in Neural Networks for faster models”. ICML Workshop on Abstraction in Reinforcement Learning Workshop. Poster presentation by Emmanuel Bengio (I am a co-author).

**Sharf, Inna**

Articles in refereed publications


Other refereed contributions


Conference papers:


Conference Abstracts:


All other publications, including those from research that you supervised


Contributions to industrially relevant research and development

Invited presentations


Siddiqi, Kaleem

Publications in refereed conference proceedings


Invited lectures or presentations

218. “On the Geometry of Fibrous Composites.” Invited talk at the Institute for Stem Cell Biology and Regenerative Medicine, National Centre for Biological Sciences, Bangalore, India, August 2016.
Conference presentations


222. “Cartan Frames for Characterizing Fiber Geometry in Pig Hearts from Diffusion Tensor Imaging (DTI).” Poster presentation by my Masters student Damien Goblot at the 2016 Imaging Network Ontario symposium in Toronto. I was a co-author on the associated refereed abstract.
Section VIII – Financial Section

2016 CIM Funding Sources

<table>
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<tr>
<th>Collaborative Programs</th>
<th>Start</th>
<th>Finish</th>
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[The financial report is available as a separate document]