Centre for Intelligent Machines

Annual Report 2020

CIM CENTRE FOR INTELLIGENT MACHINES

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Message from the Director

For the better part of four decades, members of the CIM community have contributed to many impressive achievements across a diversity of academic communities, building a shared history we all continue to be proud part of. In the wake of 2020, a year that unexpectedly plunged our society into challenges of a truly unique magnitude, I was touched to see CIM members supporting each other's well-being, and this whilst contributing to the scientific challenges laid forth by COVID-19.

In approaching the new academic year, I am cautiously optimistic that a return to campus life -- and, of course, to CIM -- will further strengthen our academic community. In a celebration of community, staff will renew their efforts at building and delivering a new set of group-oriented events: coffee and snack breaks, research and collaborative brainstorming workshops, team-building events and socials. Our goal here is to provide regular and frequent opportunities to see each other and engage in old fashioned discussions: a collective Zoom detox of sorts.

I am happy to announce that the new academic year brings with it the onboarding of many new Associate and Full members to our team, each bringing a unique perspective that I'm excited to see flourish in our Centre.

Building atop the momentum of the development and deployment of our newly-branded CIM website, which included a modern rethinking of our Centre's logo, we also kicked-off our regular digital newsletter series. These e-mail updates ground our many accomplishments and impact, both within and outside of the academy, and serve to highlight the many ways the Centre's members continue to change the world for the better.

Benefiting from a growing collaboration between the Centre and our University Advancement team, CIM's Industrial Liaison Program was successfully accredited in 2020 and will be signing on its first few members in the near future. In addition to increasing the Centre's autonomy, the ILP will usher in a new way of engaging in successful industrial research collaborations for our members and their HQP. I wait in eager anticipation of its deployment and look forward to reporting on its success thereafter.

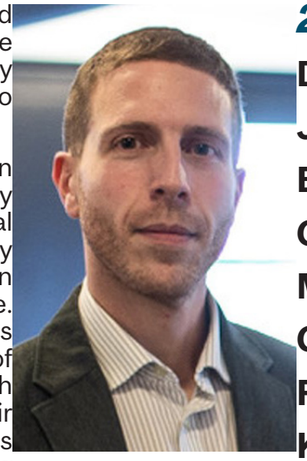
Of course, none of the aforementioned advances would have been possible without the collaboration of our member and the hard work and dedication of our CIM staff. As many of you know, Jan Binder -- our long-time head of IT -- has been on medical leave for the better part of the past 18 months. CIM staff have rallied together to continue to provide a high level of support and to service our community in his absence (and through the added fog of COVID). This year will continue to see an evolution in the ways in which we can better serve our community's evolving needs.

I express my heartfelt thanks to the entirety of the CIM community and I very much look forward to seeing you all soon.

Centre Governance

Day-to-day operation of the Centre's activities, management of its finances, allocation of space and other resources, are carried out by the Centre's Director, assisted by the Centre support staff.

The Centre is advised by the Centre's Board, which meets yearly to review the Centre's activities and budget, and to provide guidance on strategic planning.



2020 Board Members

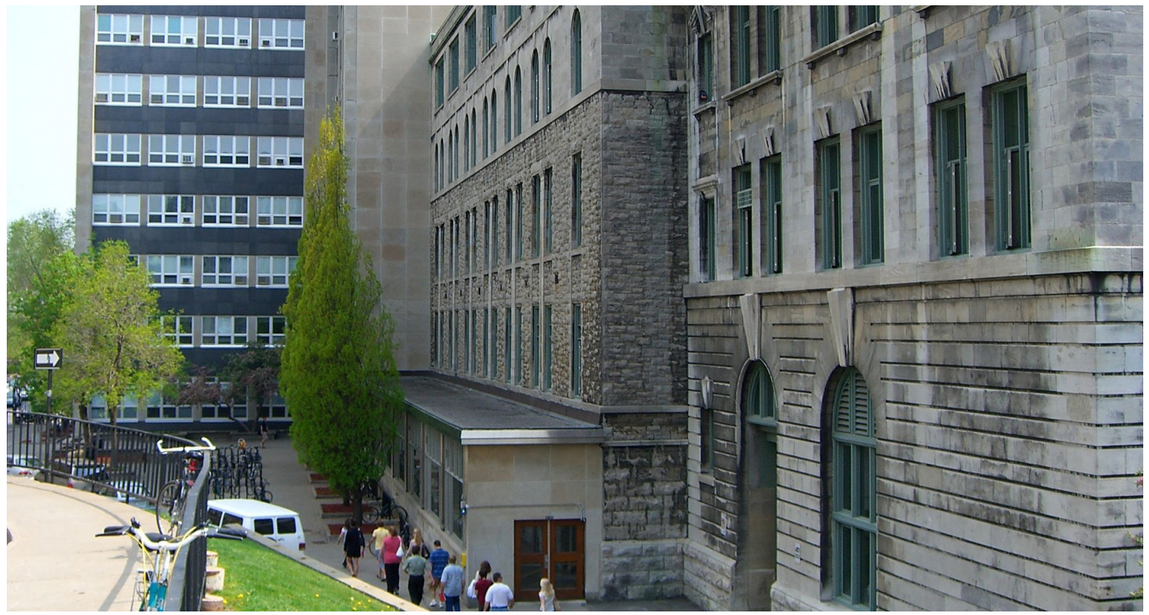
Derek Nowrouzezahrai — Centre Director, Board Chair
James Nicell — Dean, Faculty of Engineering
Bruce Lennox — Dean, Faculty of Science
Christopher Manfredi — Provost & Vice Principal, Academic
Martha Crago — Vice Principal, Research and Innovation
Gregory Dudek — Centre Member
Frank Ferrie — Centre Member
Kaleem Siddiqi — Alternate Centre Member
Pierre Breton — External Member, Executive Vice President, KWI Polymers
Mohamad Afsari — Graduate Student

Support Staff

Marlene Gray — CIM Manager
Jan Binder — Systems Manager (on leave)
Nick Wilson —Systems Administrator
Chelsea Rogers —Communications Associate

Overview of Centre

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



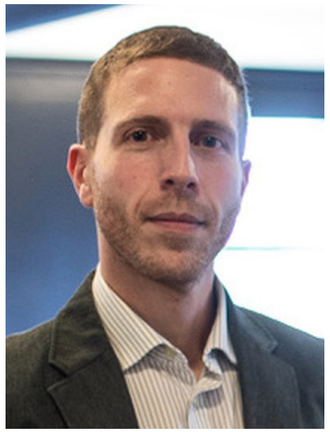
For more than three decades, CIM has been a pioneering force in cross-disciplinary research. The Centre is primarily located in contiguous space where labs and student offices are shared. CIM's membership and students have been universally recognized over the years for their highest standards of excellence — exceptional scientific achievements and outstanding contributions to society and industry. Intelligent systems and machines are capable of adapting their behaviour by sensing and interpreting their environment, making decisions and plans, and then carrying out those plans using physical actions.

The members of CIM seek to advance the state of knowledge in such domains as — robotics, artificial intelligence, computer vision, medical imaging, haptics, systems and control, computer animation and machine and reinforcement learning.

The Centre is comprised of 22 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 22 full members, at the end of 2020 the centre boasted a complement more than 300 graduate students, post-docs and undergraduate students, as well as visiting scholars, research assistants and associates from various disciplines.

Full Members



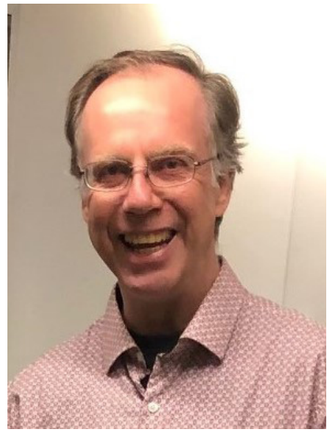
Derek Nowrouzezahrai
Associate Professor, Centre Director
Electrical and Computer Engineering
Computer Graphics

Jorge Angeles
Professor
Mechanical Engineering
Robotics and Mechanisms

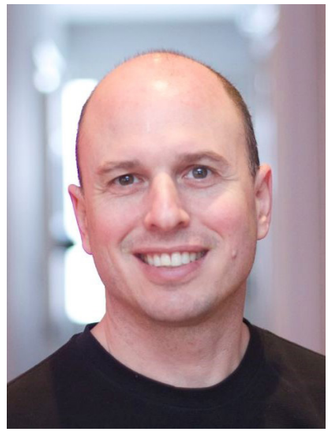
Tal Arbel
Professor
Electrical and Computer Engineering
Computer Vision and Medical Image Analysis

Benoit Boulet
Associate Professor
Electrical and Computer Engineering
Systems and Control

Peter Caines
Macdonald Professor
Electrical and Computer Engineering
Systems and Control



James Clark
Professor
Electrical and Computer Engineering
Computer Vision



Jeremy Cooperstock
Professor
Electrical and Computer Engineering
Human-Computer Interaction

Gregory Dudek
James McGill Professor
School of Computer Science
Robotics and Computer Vision

Frank Ferrie
Professor
Electrical and Computer Engineering
Computer Vision

Jozsef Kovecses
Associate Professor
Mechanical Engineering
Robotics and Aerospace Systems

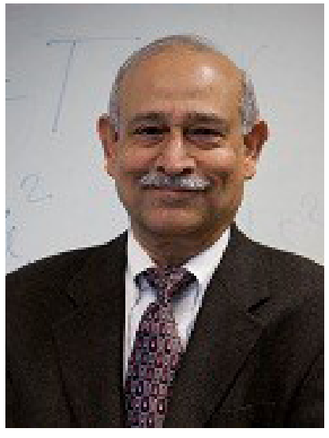
Paul Kry
Associate Professor
School of Computer Science
Computer Graphics

Michael Langer
Associate Professor
School of Computer Science
Computer Vision

Martin Levine
Professor
Electrical and Computer Engineering
Computer Vision

Aditya Mahajan
Associate Professor
Electrical and Computer Engineering
Systems and Control

David Meger
Assistant Professor
School of Computer Science
Robotics and Computer Vision



Arun Misra
Professor
Mechanical Engineering
Dynamics and Control

Hannah Michalska
Associate Professor
Mechanical Engineering
Systems and Control

Meyer Nahon
Professor
Department Chair
Mechanical Engineering
Robotics and Aerospace Systems

Joelle Pineau
Associate Professor
School of Computer Science
Machine Learning

Inna Sharf
Professor
Mechanical Engineering
Robotics and Aersopace Systems

Kaleem Siddiqi
Professor
School of Computer Science
Computer Vision and Medical Image Analysis

Paul Zsombor-Murray
Associate Professor (Post-Retirement)
Mechanical Engineering
Robotics and Mechanisms

Associate Members

Adamchuk, Viacheslav – Associate Professor, Bioresource Engineering, McGill University
Armandfard, Narges – Assistant Professor, Electrical & Computer 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, Biomedical Engineering, McGill University
Dimitrakopoulos, Roussos – Professor, Mining Engineering, McGill University
Forbes, James Richard – Assistant Professor, Mechanical Engineering, McGill University
Gross, Warren – Professor and Chair, Electrical & Computer 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, School of Computer Science, McGill University
Mongrain, Rosaire – Associate Professor, Mechanical Engineering, McGill University
Panangaden, Prakash – Professor, School of Computer Science, McGill University
Pike, Bruce – Professor, Faculty of Medicine, University of Calgary
Precup, Doina – Associate Professor, School of Computer Science, McGill University

CIM is pleased to welcome three new associate members!

Hsiu-Chin Lin

School of Computer Science & Department of Electrical and Computer Engineering

Prof. Hsiu-Chin Lin is joining CIM as an Associate member. Her research is in the fields of robotics and machine learning for motor control. Prof. Lin's research interests focus on enabling robots to assist humans in everyday activities by studying motion-based control, optimization, and robot motion especially for robot arms and quadruped robots.

AJung Moon

Department of Electrical and Computer Engineering

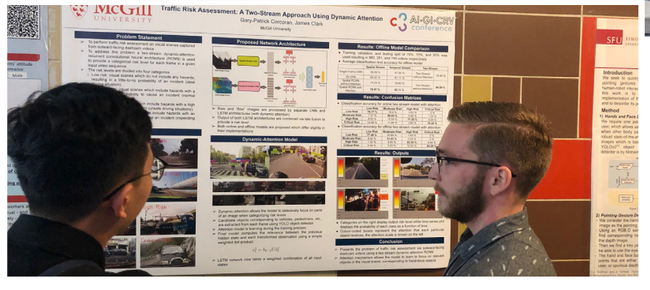
Prof. AJung Moon is the director of the McGill Responsible Autonomy & Intelligent System Ethics (RAISE) lab and is joining CIM as an Associate member. Prof. Moon investigates how robots and AI systems influence the way people move, behave, and make decisions in order to inform how autonomous intelligent systems can be designed and deployed more responsibly.

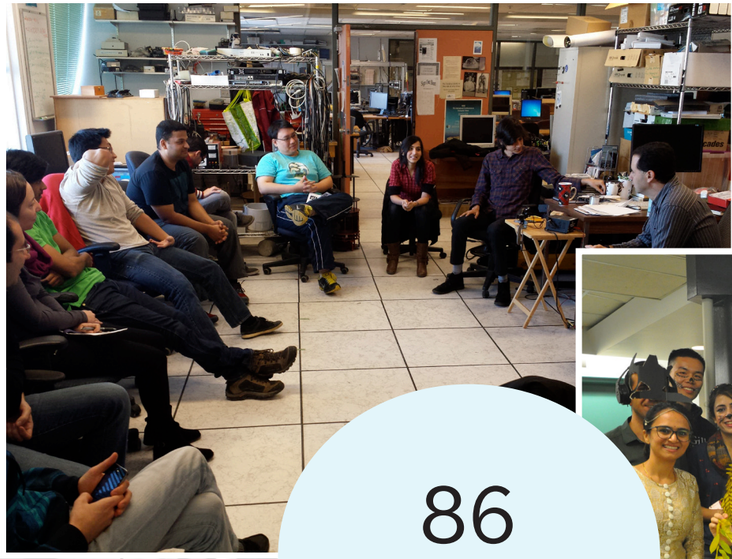
Audrey Sedal

Department of Mechanical Engineering

Prof. Audrey Sedal is joining CIM as an Associate member. She specializes in soft robotics and embodied intelligence. Prof. Sedal has worked on the development of auxetic materials that can be used in the design of soft robots. Her research uses first principles-based and data-driven models to predict behaviours and develop robots that can provide useful help to humans.

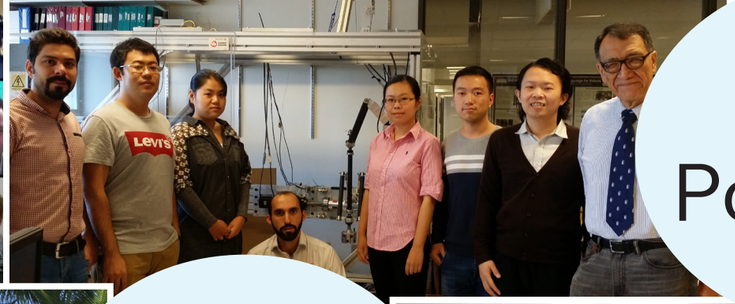
Students





86
Ph.D.s

82
Undergrads



19
Postdocs

85
Masters

Seminars

Name	University	Location	Title
Ryad Benosman	University of Pittsburgh Medical Center , Carnegie Mellon University and Sorbonne Universitas	USA	What is Neuromorphic Event-based Computation and Why it is the future of AI?
Louis Collins	McGill University	Canada	Image guided neurosurgery at the MNI
Laurent Dinh	Google Brain	Canada	A RAD approach to deep mixture models
Ahmed Farooq	Tampere Unit for Computer-Human Interaction (TAUCHI), Tampere University, Finland and Purdue University, Indiana	USA	Analyzing Haptic Feedback: "Haptic Mediation"
Francois Hogan	Samsung Research AI Center, Montreal	Canada	Towards Reactive Manipulation Skills
Maxime Laborde	McGill University	Canada	Systems of Evolution Equations Coupled Through Optimal Transport and Application to Urban Planning
Archana Venkataraman	Neural Systems Analysis Laboratory, Johns Hopkins University	USA	Generative-Deep Hybrid Models to Decipher Brain Functionality
Vassili N. Kolokoltsov	Department of Statistics , University of Warwick	England	Quantum Mean Field Games: Part 1 & Part 2

Daniel Lacker	Industrial Engineering & Operations Research, Columbia University	USA	A case study on stochastic games on large graphs in mean field and sparse regimes
Abhishek Gupta	Electrical and Computer Engineering, The Ohio State University	USA	Stochastic Recursive Algorithms: A Markov Chain Perspective
Yurii Averboukh	Krasovskii Institute of Mathematics and Mechanics & HSE	Russia	Control Theory Viewpoint to the Finite State Mean Field Games
Utsav Sadana	Department of Decision Sciences , HEC Montreal	Canada	Open-loop Nash Equilibria in Nonzero-sum Differential Games with Impulse Controls
Dileep Kalathil	Department of Electrical and Computer Engineering, Texas A&M University	USA	Reinforcement Learning with Robustness and Safety Guarantees
Fabio Pasqualetti	Department of Mechanical Engineering , University of California, Riverside	USA	Synchronization Patterns in Networks of Kuramoto Oscillators for the Analysis and Control of Dynamic Functional Connectivity
Minyi Huang	School of Mathematics and Statistics , Carleton University	Canada	Linear-Quadratic Mean Field Games with a Major Player: Nash Certainty Equivalence versus Master Equations
David Métivier	École Polytechnique	France	Mean Field Control and Disorder for Efficient Mixing of Energy Loads
Archana Venkataraman	John Hopkins University	USA	Deep Learning for Multimodal and Dynamic Functional Neuroimaging
Mehdi Salimi	McMaster University	Canada	Winning strategy for pursuers in pursuit-evasion differential games
Kevin Church	McGill University	Canada	Floquet Theory, Invariant Manifolds and Control with Impulsive Delay Differential Equations
William Hamilton	McGill University	Canada	Graph Representation Learning: Recent Advances and Open Challenges
Dena Firoozi	HEC Montréal	Canada	Belief Estimation by Agents in Major-Minor LQG Mean Field Games
Ozgen Karaer	Middle East Technical University	Turkey	Supplier development in a multi-tier supply chain
Shuang Gao	McGill University	Canada	Subspace Decompositions in Graphon Control and Graphon Mean Field Games

Awards

Tal Arbel is awarded a Canada CIFAR AI Chair. as an associate faculty member of MILA. This appointment is awarded by the Canada CIFAR AI Chairs Program and is worth $500,000, starting on January 1, 2020 and lasting until January 1, 2025. The award provides $50,000 per year in research funding (of which $10,000 is allocated for covering teaching relief of one course per year) and $50,000 per year in salary award.

Prof. Arbel started new journal in 2020, the Journal on Machine Learning for Biomedical Image Analysis (MELBA) for which she also serves as Editor-in-Chief. MELBA is the first journal to formally bridge the gap between the machine learning and biomedical imaging communities.

Peter Caines was featured in the IEEE Control Systems Society Magazine in December, 2020 with a Feature Portrait and Interview entitled “People in Control: PEC”.

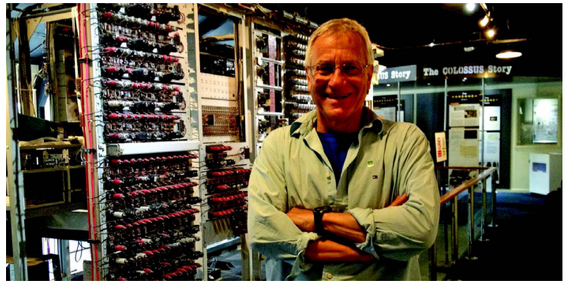
The Ph.D. thesis of Prof. Jozsef Kovecses’ student Albert Peiret won the Lagrange Award of the International Federation for the Promotion of Mechanism and Machine Science (IFToMM) in 2020. The award was established in 2017 by Springer and the IFToMM Technical Committee for Multibody Dynamics with the aim of recognizing the outstanding achievements of a young researcher (under 35 years old) at the early stage of their scientific career.

Aditya Mahajan is a main PI for a $1.5 million grant for the DND IDEaS Micro-Net on Adaptive Interaction and Behavior for Human-Automation Teaming.

Prof. Mahajan was a keynote Speaker speaker Conference on Control, Dynamic Systems, and Robotics (CDSR) and gave invited talks at University of Michigan, Cambridge University, and Adobe Research. He is also an Associate Editor for Mathematics of Control, Signals, and Systems (Springer Journal).

David Meger received a best paper at the RSS Workshop on Self-Supervised Robot Learning for his work entitled “Self-Supervised, Goal-Conditioned Policies for Navigation in Unstructured Environments”, written in collaboration with CIM member Gregory Dudek and members of the Mobile Robotics Lab.

Meyer Nahon has a Google Scholar h-index



Peter Caines in Dec 2020 IEEE magazine

of 40, total citations >5000 which is among the highest in the Department of Mechanical Engineering.

Derek Nowrouzezahrai won a Best Paper Award (runner up) for “An Efficient Transport Estimator for Complex Layered Materials” by Gamboa, L. E., Gruson, A. and Nowrouzezahrai, D. published in the Computer Graphics Forum Journal, 39(2): 363–371 (2020) and presented at the ACM Eurographics Annual Conference. (September 2020).

Prof. Nowrouzezahrai also received a spotlight paper presentation invitation for “Regularized Inverse Reinforcement Learning” by Jeon, W., Su, C., Barde, P., Doan, T., Nowrouzezahrai, D. and Pineau J. published in the 9th International Conference on Learning Representations, ICLR 2021, Virtual, USA, 2021.

Prof. Nowrouzezahrai is the first full-time tenure-track faculty member from the Faculty of Engineering to be appointed as a Core Academic Faculty member in the Quebec Institute for Artificial Intelligence (Mila). His research program and NSERC/Ubisoft Industrial Research Chair collaborations were featured on the McGill website and the website of the Vice-Principal’s Office for Research and Innovation.

Joelle Pineau was renewed for a second term as a William Dawson Scholar chair, which recognizes a scholar developing into an outstanding and original researcher of world-class caliber who is poised to become a leader in his or her field.

Kaleem Siddiqi was awarded an NSERC Discovery Accelerator Supplement for his work on “Diffusion and Geometry in Biological Tissue”. This award is valued at $40,000 per year for 3 years and he is the Principal investigator. This is his second DAS.

Associate Awards

James Forbes is the winner of the Carrie M. Derick Award for Graduate Supervision and Teaching, awarded in April 2020. This award acknowledges outstanding contributions to promoting graduate student excellence through supervision and teaching by a faculty member who has been supervising for 10 years or less.

Warren Gross is a Louis-Ho Faculty Scholar in Technological Innovation, 2018-present.

Prof. Gross’ graduate student, Furkan Ercan, won 3rd place at the Quebec Engineering Competition for his poster and presentation entitled “Energy-Efficient Polar Decoders for 5G and Beyond”.

Jackie Cheung received an Outstanding reviewer award at the Annual meeting of the Association for Computer Linguistics (ACL) in 2020.

Prof. Cheung won the Best Poster Award, awarded at the We Robot 2020 Conference, Sept. 25, 2020 which included a prize of $500.00 CAD.

Professor Cheung was awarded the Peter Silvester Faculty Research Award in Electrical and Computer Engineering, McGill University on Apr. 6, 2020 ($2,500.00 CAD).

Prakash Panangaden was selected as Fellow of the Association for Computing Machinery – the most prestigious distinction for members of the ACM, which is the premier professional body for computer science.

Best paper award won by the MRL group

AI Quebec

The Innovate series features organizations who have contributed to the technological and social development of industries in different areas. The most recent edition featuring Artificial intelligence in Quebec included a feature on the Centre for Intelligent Machines.The book is published by Global Village Ventures and edited by Quebec's Chief Innovation Officer, Luc Sirois.

CIM proves that it is an integral part of the AI ecosystem in Quebec, as we have established research partnerships with many of the companies, institutions and universities features in the publication. Over the years, Quebec has become a hub for Artificial intelligence research and CIM counts itself as a significant contributor to this progress.

New Branding

In 2020, CIM underwent a rebranding initiative which included the development of a new logo and the migration of the web portal to the McGill WMS platform. This change took place in order to provide a modern look and feel to CIM's online presence. The new website features updated profiles on our members, information on the labs and research facilities at CIM, and information on how prospective students and industrial partners can get involved and work with CIM.

The Centre for Intelligent Machines has been a driving force in research on intelligent systems since 1985. A new logo was developed in 2020 to illustrate this intersection of brain and machine. The sleek design brings a modern sense of style to CIM's brand.

Industrial Partnerships

The Industrial Affiliates Program provides companies with access to students for recruiting purposes as well as a way to keep up-to-date on the exciting research going on in the Centre. Industry partners are invited to CIM's Student Research Showcase events and a CV bank is being developed to facilitate the recruitment of students.

The following companies are among those who have partnered with CIM as industrial affiliates or have collaborated with CIM researchers on research projects or contracts.

REPARTI

The regroupement REPARTI - Systèmes cyberphysiques et intelligence machine matérialisée (Cyberphysical Systems and Embedded Machine Intelligence) Systèmes cyberphysiques et intelligence machine matérialisée (Cyberphysical Systems and Embedded Machine Intelligence) (April 2019 - March 2025) is a $2.9M inter-institutional, interdisciplinary collaborative venture comprised of six Quebec institutions, 50 members and over 400 students and post-doctoral researchers. The McGill node of REPARTI is represented by 17 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.

The institutions participating in REPARTI are: Université Laval (host institution), McGill University, Université de Sherbrooke, École Polytechnique, Université de Montréal, 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:

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.

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 has been renewed twice, in 2013 and 2019, to continue a long tradition of excellence in research.

Funding Sources

NSERC CRSNG

An important source of funding is the Natural Sciences and Engineering Research Council of Canada (NSERC). This federal funding includes a wide variety of programs such as Discovery Grants, Engage Grants, Collaborative Research and Development Grants among others. Some programs include industrial contracts which allow researchers to work with companies to solve existing problems or innovate to create new technologies.

Provincial programs also play in important role. In addition to funding REPARTI, the Fonds de recherche du Québec – Nature et technologies (FRQNT) also provides funding to individual CIM members for their research activities. Several members are part of other Regroupement Strategiques including GERAD and CIRMMT, which gather researchers from many institutions to further common research goals within certain thematic areas.

Fonds de recherche Nature et technologies
Québec

MITACS

MITACS is an innovative program that pairs companies with students seeking research experience. It provides funding for projects that enable companies to hire post-secondary students who gain real-world experience and help solve industry challenges.

NCRN RCRC
NSERC Canadian Robotics Network
Réseau canadien de robotique du CRSNG

The NSERC Canadian Robotics Network (NCRN) is a Canada-wide network which 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 NCRN network management is hosted by McGill and CIM, with CIM member Greg Dudek serving as scientific director. CIM members Inna Sharf and David Meger are also part of the NCRN.

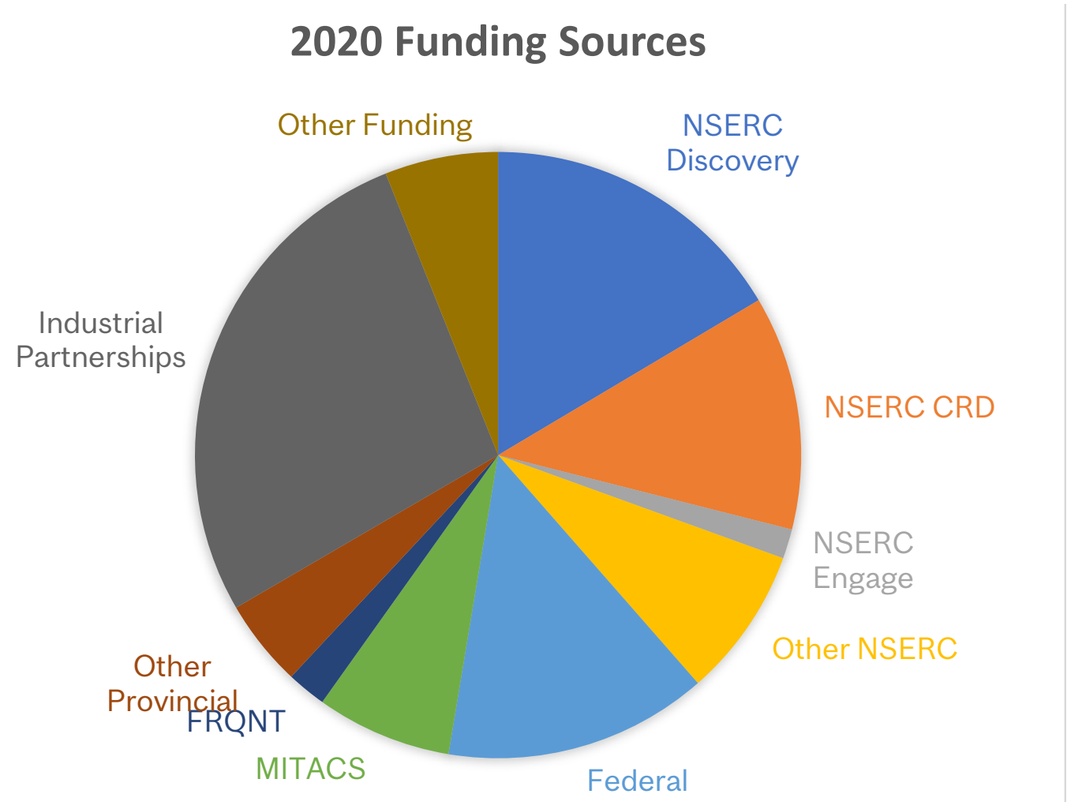
Funding

CIM receives funding from a variety of sources including federal and provincial grants as well as industrial grants and research contracts. A significant part of funding comes from the Natural Sciences and Engineering Research Coundil (NSERC) which includes Discovery Grants, Engage Grants, Collaborative Research and Development grants and Industrial Research Chairs. Provincial funding comes from the Fonds de Recherche du Quebec - Nature et Technologies (FRQNT) and other agencies.

CIM has formed research parntership with numerious companies who support research projects through grants, research contracts and partnerships with federal and provincial agencies. As a result, CIM is able to carry out cutting-edge research that advances scientific knowledge and creates the technologies of the future.

Grant Sources	Total Funds	2020 Amount
NSERC Discovery	$4,777,480	$955,980
NSERC CRD	$2,114,173	$725,265
NSERC Engage	$103,999	$91,499
Other NSERC	$1,965,944	$465,944
Federal	$1,092,626	$817,033
MITACS	$665,000	$420,000
FRQNT	$343,070	$122,023
Other Provincial	$584,881	$270,507
Industrial Partnerships	$5,023,090	$1,587,937
Other Funding	$1,017,072	$351,115
Total	**$17,687,335**	**$5,807,302**

Infrastructure Funds	Total Funds	2020 Amount
REPARTI	$2,880,000	$158,000
NCRN	$8,727,000	$87,270



Publications

Arbel, Tal

L. Maier-Hein, A. Reinke, M. Kozubek, A. L. Martel, T. Arbel, M. Eisenmann, A. Hanbury, P. Jannin, H. Muller, S. Onogur, J. Saez-Rodriguez, B. van Ginneken, A. Kopp-Schneider and B. A. Landman, “BIAS: Transparent reporting of biomedical image analysis challenges”, Medical Image Analysis, Volume 66, pp. 101796, August 2020.

T. Nair, D. Precup, D.L. Arnold and T. Arbel, “Exploring Uncertainty Measures in Deep Networks for Multiple Sclerosis Lesion Detection and Segmentation”, Medical Image Analysis, MICCAI 2018 Special Issue, Volume 59, January 2020. https://doi.org/10.1016/j.media.2019.101557

N. Mohammadi-Sepahvand, D.L. Arnold and T. Arbel, “CNN Detection of New and Enlarging Multiple Sclerosis Lesions from Longitudinal MRI using Subtraction Images”, the IEEE 17th International Symposium on Biomedical Imaging (ISBI 2020), Iowa City, USA, April 2020, pp. 27-130. https://ieeexplore.ieee.org/document/9098554

R. Mehta* A. Filos, Y. Gal, T. Arbel, “Uncertainty Evaluation Metrics for Brain Tumour Segmentation”, Medical Imaging with Deep Learning (MIDL) 2020. https://arxiv.org/pdf/2005.14262.pdf

Boulet, Benoit

A. El Fathi, R.E. Kearney, E. Palisaitis, B. Boulet, A. Haidar, A Model-Based Insulin Dose Optimization Algorithm for People with Type 1 Diabetes on Multiple Daily Injections Therapy. IEEE Transactions on Biomedical Engineering, doi: 10.1109/TBME.2020.3023555, 2020.

S. Seal, B. Boulet, V.R. Dehkordi, Centralized model predictive control strategy for thermal comfort and residential energy management. Energy, Vol. 212, 2020, doi: 10.1016/j.energy.2020.118456, 2020

R. Toukhtarian, M. Darabi, S. Hatzikiriakos, H. Atsbha, B. Boulet, Parameter identification of transport PDE/nonlinear ODE cascade model for polymer extrusion with varying die gap. The Canadian Journal of Chemical Engineering, doi: 10.1002/cjce.23910, 2020.

H. Zhang, D. Wu, B. Boulet, “A Review of Recent Advances on Reinforcement Learning for Smart Home Energy Management”. IEEE Electric Power and Energy Conference, Edmonton, AB, Canada, 2020, doi: 10.1109/EPEC48502.2020.9320042.

X. Huang, D. Wu, B. Boulet, “Ensemble Learning for Charging Load Forecasting of Electric Vehicle Charging Stations”. IEEE Electric Power and Energy Conference, Edmonton, AB, Canada, 2020, doi: 10.1109/EPEC48502.2020.9319916.

Q. Dang, D. Wu, B. Boulet, “Community Microgrid Energy Storage Sizing Considering EV Fleet Batteries as Supplemental Resource”. IEEE Electric Power and Energy Conference, Edmonton, AB, Canada, 2020, doi: 10.1109/EPEC48502.2020.9320089

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Surprisal-Triggered Conditional Computation with Neural Networks. Lugosch, L.; Nowrouzezahrai, D.; and Meyer, B. H. CoRR, abs/2006.01659. 2020.

Adversarial Soft Advantage Fitting: Imitation Learning without Policy Optimization. Barde, P.; Roy, J.; Jeon, W.; Pineau, J.; Pal, C. J.; and Nowrouzezahrai, D. CoRR, abs/2006.13258. 2020.

A Weakly Supervised Consistency-based Learning Method for COVID-19 Segmentation in CT Images. Laradji, I. H.; Rodríguez, P.; Mañas, O.; Lensink, K.; Law, M.; Kurzman, L.; Parker, W.; Vázquez, D.; and Nowrouzezahrai, D. CoRR, abs/2007.02180. 2020.

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Overfit Neural Networks as a Compact Shape Representation. Davies, T.; Nowrouzezahrai, D.; and Jacobson, A. CoRR, abs/2009.09808. 2020.

Regularized Inverse Reinforcement Learning. Jeon, W.; Su, C.; Barde, P.; Doan, T.; Nowrouzezahrai, D.; and Pineau, J. CoRR, abs/2010.03691. 2020.

Affinity LCFCN: Learning to Segment Fish with Weak Supervision. Laradji, I. H.; Saleh, A.; Rodríguez, P.; Nowrouzezahrai, D.; Azghadi, M. R.; and Vázquez, D. CoRR, abs/2011.03149. 2020.

Neural Geometric Level of Detail: Real-time Rendering with Implicit 3D Shapes. Takikawa, T.; Litalien, J.; Yin, K.; Kreis, K.; Loop, C.; Nowrouzezahrai, D.; Jacobson, A.; McGuire, M.; and Fidler, S. CoRR, abs/2101.10994. 2021.

Pineau, Joelle

Benjamin Haibe-Kains, George Alexandru Adam, Ahmed Hosny, Farnoosh Khodakarami, MAQC Board, Levi Waldron, Bo Wang, Chris McIntosh, Anshul Kundaje, Casey S Greene, Michael M Hoffman, Jeffrey T Leek, Wolfgang Huber, Alvis Brazma, Joelle Pineau, Robert Tibshirani, Trevor Hastie, John Ioannidis, John Quackenbush, Hugo JWL Aerts. The importance of transparency and reproducibility in artificial intelligence research. Nature. 2020.

Nathan Peifer-Smadja, Redwan Maatoug, François-Xavier Lescure, Eric D'Ortenzio, Joelle Pineau and Jean-Rémi King. Machine Learning for COVID-19 needs global collaboration and data-sharing. Nature Machine Intelligence. 2020.

Vincenzo Forgetta, Julyan Keller-Baruch, Marie Forest, Audrey Durand, Sahir Bhatnagar, John P Kemp, Maria Nethander, Daniel Evans, John A Morris, Douglas P Kiel, Fernando Rivadeneira, Helena Johansson, Nicholas C Harvey, Dan Mellström, Magnus Karlsson, Cyrus Cooper, David M Evans, Robert Clarke, John A Kanis, Eric Orwoll, Eugene V McCloskey, Claes Ohlsson, Joelle Pineau, William D Leslie, Celia MT Greenwood, J Brent Richards. Development of a polygenic risk score to improve screening for fracture risk: A genetic risk prediction study. PLoS medicine 17 (7). 2020.

Ximeng Mao, Joelle Pineau, Roy Keyes, Shirin A Enger. RapidBrachyDL: Rapid Radiation Dose Calculations in Brachytherapy via Deep Learning. International Journal of Radiation Oncology Biology Physics. 2020

Peter Henderson, Jieru Hu, Joshua Romoff, Emma Brunskill, Dan Jurafsky, Joelle Pineau. Towards the Systematic Reporting of the Energy and Carbon Footprints of Machine Learning. JMLR. 21(248), pp.1–43.

Koustuv Sinha, Joelle Pineau, Jessica Forde, Rosemary Nan Ke, Hugo Laorchelle. Neurips 2019 Reproducibility Challenge. A special issue of the journal ReScience C 6(2). 2020.

Clare Lyle, Amy Zhang, Angelos Filos, Shagun Sodhani, Marta Kwiatkowska, Yarin Gal, Doina Precup, Joelle Pineau. Invariant Causal Prediction for Block MDPs. ICML 2020.

Harsh Satija, Philip Amortila, Joelle Pineau. Constrained Markov Decision Processes via Backward Value Functions. ICML 2020.

Lucas Caccia, Eugene Belilovsky, Massimo Caccia, Joelle Pineau. Online Learned Continual Compression with Adaptive Quantization Module. ICML 2020.

Emmanuel Bengio, Joelle Pineau, Doina Precup. Interference and Generalization in Temporal Difference Learning. Submitted and accepted to ICML 2020.

Maxime Wabartha, Audrey Durand, Vincent François-Lavet, Joelle Pineau. Handling Black Swan Events in Deep Learning with Diversely Extrapolated Neural Networks. IJCAI 2020.

Ahmed Touati, Amy Zhang, Joelle Pineau, Pascal Vincent. Stable Policy Optimization via Off-Policy Divergence Regularization. UAI 2020.

Koustuv Sinha, Prasanna Parthasarathi, Jasmine Wang, Ryan Lowe, William L Hamilton, Joelle Pineau. Learning an Unreferenced Metric for Online Dialogue Evaluation. ACL 2020.

Ge Yang, Amy Zhang, Ari Morcos, Joelle Pineau, Pieter Abbeel, Roberto Calandra. Plan2Vec: Unsupervised Representation Learning by Latent Plans. Learning for Dynamics and Control (L4DC) 2020.

Iulian Vlad Serban, Varun Gupta, Ekaterina Kochmar, Dung D Vu, Robert Belfer, Joelle Pineau, Aaron Courville, Laurent Charlin, Yoshua Bengio. A Large-Scale, Open-Domain, Mixed-Interface Dialogue-Based ITS for STEM. AIED 2020.

Ekaterina Kochmar, Dung D Vu, Robert Belfer, Varun Gupta, Iulian V Serban, Joelle Pineau. Automated Personalized Feedback Improves Learning Gains in an Intelligent Tutoring System. AIED 2020.

R.Y. (David) Tao, Vincent Francois-Lavet, Joelle Pineau. Novelty Search in Representational Space for Sample Efficient Exploration. NeurIPS 2020. Oral presentation (1% of submissions).

Paul Barde, Julien Roy, Wonseok Jeon, Joelle Pineau, Chris Pal, Derek Nowrouzezahrai. Adversarial Soft Advantage Fitting: Imitation

Learning without Policy Optimization. NeurIPS 2020. Spotlight presentation (4% of submissions).

Sharf, Inna

Botta, E.M., C. Miles and I. Sharf, "Simulation and tension control of a tether-actuated closing mechanism for net-based capture of space," Acta Astronautica, Vol. 174, pp. 347-358, 2020.

Jorgensen, M.K. and I. Sharf, "Optimal planning for a multiple space debris removal mission using high-accuracy low-thrust transfers," Acta Astronautica, Vol. 172, pp. 56-69, 2020.

Hu, Y., Sharf, I. and L. Chen, "Three-spacecraft autonomous orbit determination and observability analysis with inertial angles-only measurements," Acta Astronautica, Vol. 170, pp. 106-121, 2020.

Sagnières, L.B.M., Sharf, I. and F. Deleflie, "Simulation of long-term rotational dynamics of large space debris: A TOPEX/Poseidon case study," Advances in Space Research, Vol. 65(4), pp. 1182-1195, 2020.

Eskandarpour, A. and I. Sharf, "A constrained error-based MPC for path following of quadrotor with stability analysis," Nonlinear Dynamics, Vol. 99(2), pp. 899-918, 2020

Wehbeh, J., Rahman, S. and Sharf, I., "Distributed model predictive control for UAVs collaborative payload transport," IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2020, Virtual, Oct. 25-Nov. 25, 2020.

Rezaei-Shoshtari, S., Meger, D. and Sharf, I., "Learning the latent space of robot dynamics for cutting interaction inference," IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2020, Virtual, Oct. 25-Nov. 25, 2020.

Tin, F.E., Borowczyk, A., Sharf, I. and M. Nahon, "Turn Decision-Making for Improved Autonomous Thermalling of Unmanned Aerial Gliders," 2020 International Conference on Unmanned Aircraft Systems, ICUAS 2020, Virtual, Sept. 1-4, 9213839, pp. 1368-1375, 2020.

Jothiraj, W., Sharf, I., Nahon, M., "Control allocation of bidirectional thrust quadrotor subject to actuator constraints," 2020 International Conference on Unmanned Aircraft Systems, ICUAS 2020, Virtual, Sept. 1-4, 8798234, pp. 932-938, 2020.

H. Song and I. Sharf, "Time Optimal Motion Planning with ZMP Stability Constraint for Timber Manipulation," Proc. IEEE International Conference on Robotics and Automation, ICRA2020, Virtual, May 31-Aug. 31, pp. 4934-4940, 2020.

Tin, F.E., Sharf, I. and M. Nahon, "Guidance of unmanned aerial gliders for wildfire surveillance," 2020 International Conference on Unmanned Aircraft Systems, AIAA Scitech 2020 Forum, Orlando, Jan. 6-10, Vol. 1 PartF, 2020.

Siddiqi, Kaleem

Balasubramanian, L., Zuzarte-Luís, V., Syed, T., Mullick, D., Deb, S., Ranga-Prasad, H., Meissner, J., Almeida, A., Furstenhaupt, T., Siddiqi, K. and Prudêncio, M., 2020. Association of Plasmodium berghei With the Apical Domain of Hepatocytes Is Necessary for the Parasite's Liver Stage Development. Frontiers in cellular and infection microbiology, 9, p.451.

Arnab Mondal, Pratheeksha Nair and Kaleem Siddiqi. Group Equiv- ariant Deep Reinforcement Learning. In ICML Workshop on Inductive Biases, Invariances and Generalization in RL, July 2020.

Chu Wang, Babak Samari, Vladimir Kim, Siddhartha Chaudhuri and Kaleem Siddiqi. Affinity Graph Supervision for Visual Recognition. In International Conference on Computer Vision and Pattern Recognition (CVPR, Seattle, CA), June 2020.

Charles-Olivier Dufresne Camaro, Morteza Rezanejad, Stavros Tsogkas, Kaleem Siddiqi and Sven Dickinson. Appearance Shock Grammar for Fast Medial Axis Extraction from Real Images. In International Conference on Computer Vision and Pattern Recognition (CVPR, Seattle, CA), June 2020.

Invited Talks

Arbel, Tal

International Progressive MS Alliance Global Webcast: “Speeding Life-Changing Treatments for Progressive MS”, Online Interview, November 2020.

Invited keynote speaker, “Modelling and Propagating Uncertainties in Machine Learning for Medical Images of Patients with Neurological Diseases”, NeurIPS Europe Meetup on Bayesian Deep Learning, Workshop held in conjunction with the 34th Conference on Neural Information Processing Systems, Virtual Conference, Dec. 2020.

Invited keynote speaker, “Modelling and Propagating Uncertainties in Machine Learning for Medical Image of Patients with Neurological Diseases”, 11th Israel Machine Vision Conference (IMVC), Virtual conference, October 2020.

Invited keynote speaker, “Modelling and Propagating Uncertainties in Machine Learning for Medical Images: Lesion and Tumour Detection, Segmentation, Synthesis and Prediction of Future Disease Evolution”, 42nd edition of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC’20), Virtual conference, July 2020. Honorarium of $1500 USD.

Invited keynote speaker, “Modelling and Propagating Uncertainties in Machine Learning for Medical Images of Patients with Neurological Diseases”, 2020 Organization of Human Brain Mapping Annual Meeting (OHBM) Symposium”, Virtual conference, June 2020.

Invited speaker, “Modelling and Propagating Uncertainties in Machine Learning for Medical Images: Lesion and Tumour Detection, Segmentation, Synthesis and Prediction of Future Disease Evolution”, Vanderbilt Institute for Surgery and Engineering (VISE), Seminar Series, Virtual Seminar and Visit, October 2020. Honorarium of $250 USD.

Invited speaker, “Machine Learning for Medical Image Analysis: Towards Precision Medicine”, MILA AI and Health Event: “The Revolution is now: AI in the Healthcare Industry”. Virtual Seminar and Round Table, October 2020.

2020 IEEE/CVF Computer Society Conference on Computer Vision and Pattern Recognition (CVPR) “Workshop on Medical Computer Vision”, RSIP CVPR Daily Magazine, https://www.rsipvision.com/CVPR2020-Wednesday/14/

2020 Conference on Medical Imaging with Deep Learning (MIDL), Special Issue of RSIP, Interview with PCs, https://rsipvision.com/MIDL2020/

2020 IEEE/CVF Computer Society Conference on Computer Vision and Pattern Recognition (CVPR) “Workshop on Medical Computer Vision”, RSIP Best of CVPR 2020, https://www.rsipvision.com/ComputerVisionNews-2020July/30/, pp. 30-31.

Boulet, Benoit

SERI Montreal video presentation on transport electrification and our work on electric vehicles at the Intelligent Automation Lab.

Caines, Peter

GERAD Montreal «Un chercheur du GERAD parle..» 10th February, 2020

Worcester Polytechnic Institute, “Graphon Mean Field Games: A Dynamical Equilibrium Theory for a Networked World”. Worcester, Mass. 6th March, 2020

IPAM: Institute of Pure and Applied Mathematics, UCLA, “Graphon Mean Field Games” 7th May, 2020

Rutgers University, Department of Management Science and Information Systems, “An Optimal Execution Problem in Finance Targeting Market Trading Speed: a Mean Field Game Formulation”, 12th November, 2020

Clark, James

Talk at the UBC Lab for Computational Intelligence, January 2020.

Cooperstock, Jeremy

Touch and feel when it isn’t real: Integrating haptics into the XR experience”, InterDigital Scientific Seminar series, December 4, 2020.

“Taking Haptics Out of the Lab and Into the Wild”, Introduction to Haptics for Next Generation XR. International Conference on Intelligent Robots and Systems Tutorial Session, October 29, 2020.

“From flight simulators to the passenger experience: what can we learn from pilot-training tools to improve airline customer service”, AIST–NRC Collaboration Meeting on Improving Client-Agent Interaction, January 17, 2020.

Dudek, Gregory

Acted as invited speaker and/or moderator of multiple international robotics workshops and meetings (all held virtually) including:

the World Symposium on AI,

the Robotics Debates sponsored by the Robotics and Automation Society,

the IFRR Robotics Global Colloquia,

Samsung AI boot camp, Current progress in Applied Reinforcement Learning

Invited panelist, NeurIPS workshop in AI for Climate Change

Invited seminar, Singapore University of Technology and Design (SUTD)

Invited speaker and panelist, Visual Learning and Reasoning for Robotic Manipulation

Kry, Paul

Invited Speaker, Huawei visual computing research group, Physics-based computer animation and its applications for virtual humans, 6/9/2020

Mahajan, Aditya

Approximate Planning and Learning for Partially Observed Systems, Keynote

Presentation, Conference on Control, Dynamic Systems, and Robotics, Nov 2020.

Approximate Planning and Learning for Partially Observed Systems, Departmental Seminar, University of Michigan, Ann Arbor, USA, Dec 2020

Approximate Planning and Learning for Partially Observed Systems, Departmental Seminar, University of Cambridge, Oxford, UK, Nov 2020

Approximate Planning and Learning for Partially Observed Systems, Mila, Montreal, Feb 2020

Meger, David

Feb 28th, 2020: University of Pennsylvania General Robotics, Sensing and Perception (GRASP) Lab Seminar Series.

Nowrouzezahrai, Derek

The Shared Foundations of Deep Learning and Computer Graphics. Invited Researcher Tea Talk at NVIDIA Research. July 2020.

The Shared Foundations of Deep Learning and Computer Graphics. Invited Keynote Talk at Huawei Research Academic Symposium. November 2020.

Pineau, Joelle

February 7 2020: Keynote for AAAI workshop on Reproducibility.

July 16 2020: Keynote for International Conference on Distributed and Event-based Systems

July 21 2020: Keynote for IEEE Engineering in Medicine and Biology Society (EMBC).

August 2020: Keynote for Deep Learning Day @ KDD conference.

September 25 2020: Invited talk for MiCHAMP seminar series at University of Michigan.

October 28 2020: Invited talk for TechAid event.

December 2020: Invited talk for NeurIPS 2020 workshop "The pre-registration experiment".

Siddiqi, Kaleem

invited speaker

"Helicoids in the Heart", November 2020, Dept. of Bionengineering, McGill University, 2020-21 Seminar series. https://www.mcgill.ca/bioengineering/seminar-series-2020-21

(ii) contributed presentations

Group Equivariant Deep Reinforcement Learning. Presentation by Arnab Mondal at ICML Workshop on Inductive Biases, Invariances and Generalization in RL, July 2020.

Graph Supervision for Visual Recognition. Poster presentation (online) by Chu Wang at International Conference on Computer Vision and Pattern Recognition (CVPR, Seattle, CA), June 2020.

Appearance Shock Grammar for Fast Medial Axis Extraction from Real Images. Poster presentation (online) by Charles-Olivier Camaro at International Conference on Computer Vision and Pattern Recognition (CVPR, Seattle, CA), June 2020.

Associate Publications

Adamchuk, Viacheslav

A Yari, L Gilbert, CA Madramootoo, SA Woods, VI Adamchuk. “Optimum irrigation strategy to maximize yield and quality of potato: A case study in southern Alberta, Canada”, Irrigation and Drainage, 2020.

Y Zhang, W Ji, DD Saurette, TH Easher, H Li, Z Shi, VI Adamchuk, “Three-dimensional digital soil mapping of multiple soil properties at a field-scale using regression kriging, Geoderma 366, 114253, 2020

Y Fu, P Taneja, S Lin, W Ji, V Adamchuk, P Daggupati, A Biswas. “Predicting soil organic matter from cellular phone images under varying soil moisture”. Geoderma 361, 114020, 2020.

PAD Carlson, VI Adamchuk, B Kvezereli, C Madramootoo. “Development of an integrated sensor system for automated on-the-spot measurement of physical soil properties”. 2020 ASABE Annual International Virtual Meeting.

RM Buelvas, VI Adamchuk, B De Leener, G Mangeat. “Development of a Semi-Automated In-Situ Soil Sensor using Vis-NIR spectroscopy”. 2020 ASABE Annual International Virtual Meeting.

NI Adamchuk-Chala, VO Yatsenko, MM Baranovskij, JV Bojko. “Determination of soil heterogeneity by precision farming methods”, Ukrainian Journal of Ecology 10 (6), 42-47, 2020.

M Leclerc, V Adamchuk, J Park. “Development of Willow Tree Yield-Mapping Technology”. Sensors 20 (9), 2650, 2020.

Armanfard, Narges

M Komeili, N Armanfard, D Hatzinakos, Multiview Feature Selection for Single-view Classification, IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2020

IS Chang, S Mak, N Armanfard, J Boger, SL Grace, A Arcelus, C Chessex, A. Mihailidis, Quantification of Resting-State Ballistocardiogram Difference Between Clinical and Non-Clinical Populations for Ambient Monitoring of Heart Failure, IEEE Journal of Translational Engineering in Health and Medicine (JTEHM), 2020

Cecere, Renzo

Toufic Azar, Stewart McLennan , Michael Walsh , Jorge Angeles , Jozsef Kövecses , Tabitha Jaramillo , Rosaire Mongrain , Renzo Cecere “Dynamic Left Atrioventricular Phantom Test Bed Emulating Mitral Valve Motion”, J. Med. Devices. Sep 2020, 14(3): 031001 (8 pages), 27 Apr 2020

Khan K, Yu B, Kiwan C, Shalal Y, Filimon S, Cipro M, Shum-Tim D, Cecere R, Schwertani A. The Role of Wnt/β-Catenin Pathway Mediators in Aortic Valve Stenosis. Front Cell Dev Biol. 2020 Sep 10;8:862. doi: 10.3389/fcell.2020.00862. PMID: 33015048; PMCID: PMC7513845.

Kostova R, Cecere R, Thut G, Uhlhaas PJ. Targeting cognition in schizophrenia through transcranial direct current stimulation: A systematic review and perspective. Schizophr Res. 2020 Jun;220:300-310. doi: 10.1016/j.schres.2020.03.002. Epub 2020 Mar 21. PMID: 32204971.

Conson M, Cecere R, Baiano C, De Bellis F, Forgione G, Zappullo I, Trojano L. Implicit Motor Imagery and the Lateral Occipitotemporal Cortex: Hints for Tailoring Non-Invasive Brain Stimulation. Int J Environ Res Public Health. 2020 Aug 12;17(16):5851. doi: 10.3390/ijerph17165851. PMID: 32806702; PMCID: PMC7459529.

Zappullo I, Trojano L, Cecere R, Raimo G, Positano M, Conson M. Switching between the Forest and the Trees: The Contribution of Global to Local Switching to Spatial Constructional Abilities in Typically Developing Children. Brain Sci. 2020 Dec 9;10(12):955. doi: 10.3390/brainsci10120955. PMID: 33317055; PMCID: PMC7764214.

K. Khan, G. Makhoul, B. Yu, G. Jalani, I. Derish, A. Rutman, M. Cerruti, A. Schwertani, R. Cecere, “AMNIOTIC STROMAL STEM CELL-LOADED CHITOSAN AND HYALURONIC ACID MEDIATES CARDIAC REPAIR VIA PARACRINE MEDIATORS IN RAT INFARCTED HEARTS”, Canadian Journal of Cardiology, Volume 36, Issue 10, Supplement, 2020, Page S58, ISSN 0828-282X, https://doi.org/10.1016/j.cjca.2020.07.121.

I. Derish, K. Khan, B. Yu, R. Cecere, “ANGIOGENIC EFFECT OF AMNIOTIC MESENCHYMAL STEM CELL SPHEROID-DERIVED SECRETOME AS A CELL-FREE THERAPY IN CARDIAC REPAIR,” Canadian Journal of Cardiology, Volume 36, Issue 10, Supplement, 2020, Pages S58-S59, ISSN 0828-282X, https://doi.org/10.1016/j.cjca.2020.07.122.

Cheung, Jackie

Kushal Arora, Aishik Chakraborty and Jackie C.K. Cheung. Accepted for publication. Learning Lexical Subspaces in a Distributional Vector Space. Transactions of the Association for Computational Linguistics, 15 pages. Presented at the 2020 Annual Conference of the Association for Computational Linguistics (ACL 2020).

Ali Emami, Kaheer Suleman, Adam Trischler and Jackie Chi Kit Cheung. 2020. An Analysis of Dataset Overlap on Winograd-Style Tasks. In Proceedings of the 28th International Conference on Computational Linguistics. Held online.

Jingyi He, KC Tsiolis, Kian Kenyon-Dean and Jackie Chi Kit Cheung. 2020. Learning Efficient Task-Specific Meta-Embeddings with Word Prisms. In Proceedings of the 28th International Conference on Computational Linguistics. Held online.

Abhilasha Ravichander, Eduard Hovy, Kaheer Suleman, Adam Trischler and Jackie Chi Kit Cheung. 2020. On The Systematicity of Probing Contextualized Word Representations. In Proceedings of the 9th Joint Conference on Lexical and Computational Semantics. Held online.

Yue Dong, Shuohang Wang, Zhe Gan, Yu Cheng, Jackie Chi Kit Cheung and Jingjing Liu. 2020. Multi-Fact Correction in Abstractive Text Summarization. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing, pages 9320–9331. Held online.

Clément Jumel, Annie Louis and Jackie Chi Kit Cheung. 2020. TESA: A Task in Entity Semantic Aggregation for Abstractive Summarization. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing, pages 8031–8050. Held online.

Jiapeng Wu, *Meng Cao, Jackie Chi Kit Cheung and William L. Hamilton. 2020. TeMP: Temporal Message Passing for Temporal Knowledge Graph Completion. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing, pages 5730–5746. Held online.

Meng Cao, Yue Dong, Jiapeng Wu and Jackie Chi Kit Cheung. 2020. Factual Error Correction for Abstractive Summarization Models. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing, pages 6251–6258. Held online.

Kian Kenyon-Dean, Edward Newell and Jackie Chi Kit Cheung. 2020. Deconstructing word embedding algorithms. In Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing, pages 8479–8484. Held online.

Peng Xu, Jackie Chi Kit Cheung, Yanshuai Cao. 2020. On Variational Learning of Controllable Representations for Text without Supervision. In Proceedings of the Thirty-seventh International Conference on Machine Learning, pages 10082 – 10091. Held online.

Manuel Sage, Pietro Cruciata, Raed Abdo, Jackie Chi Kit Cheung, Yaoyao Fiona Zhao. 2020. Investigating the Influence of Selected Linguistic Features on Authorship Attribution using German News Articles. In Proceedings of the 5th SwissText & 16th KONVENS Joint Conference 2020. Held online.

Collins, Louis

M Dadar, S Mahmoud, M Zhernovaia, S Narayanan, L Collins, DL Arnold, “Evolution of diffusely abnormal white matter and its relationship to progression in primary progressive ms” MULTIPLE SCLEROSIS JOURNAL 26 (3_ SUPPL), 391-391, 2020

M Dadar, S Mahmoud, M Zhernovaia, S Narayanan, L Collins, DL Arnold, “Different temporal evolution of diffusely abnormal white matter volumes in relapsing remitting and secondary progressive ms” MULTIPLE SCLEROSIS JOURNAL 26 (3_ SUPPL), 387-388, 2020

Manera, A.L., Dadar, M., Collins, L. and Ducharme, S. (2020), Ventricular anteroposterior ratio is the most reliable feature to differentiate bvFTD from healthy controls and other dementias. Alzheimer’s Dement., 16: e041076. https://doi.org/10.1002/alz.041076

Acosta, H, Kantojärvi, K, Tuulari, JJ, et al. Sex-specific association between infant caudate volumes and a polygenic risk score for major depressive disorder. J Neurosci Res. 2020; 98: 2529– 2540. https://doi.org/10.1002/jnr.24722

Gueziri HE, Yan CXB, Collins DL. Open-source software for ultrasound-based guidance in spinal fusion surgery. Ultrasound Med Biol. 2020 Dec;46(12):3353-3368. doi: 10.1016/j.ultrasmedbio.2020.08.005. Epub 2020 Sep 6. PMID: 32907772.

Winkler-Schwartz A, Yilmaz R, Tran DH, Gueziri HE, Ying B, Tuznik M, Fonov V, Collins L, Rudko DA, Li J, Debergue P, Pazos V, Del Maestro R. Creating a Comprehensive Research Platform for Surgical Technique and Operative Outcome in Primary Brain Tumor Neurosurgery. World Neurosurg. 2020 Dec;144:e62-e71. doi: 10.1016/j.wneu.2020.07.209. Epub 2020 Aug 3. PMID: 32758649.

H Acosta, K Kantojärvi, N Hashempour, J Pelto, N M Scheinin, S J Lehtola, J D Lewis, V S Fonov, D L Collins, A Evans, R Parkkola, T Lähdesmäki, J Saunavaara, L Karlsson, H Merisaari, T Paunio, H Karlsson, J J Tuulari, Partial Support for an Interaction Between a Polygenic Risk Score for Major Depressive Disorder and Prenatal Maternal Depressive Symptoms on Infant Right Amygdalar Volumes, *Cerebral Cortex*, Volume 30, Issue 12, December 2020, Pages 6121–6134, https://doi.org/10.1093/cercor/bhaa158

Cruz ALF, Chen C, Sanford R, et al. Multimodal neuroimaging markers of variation in cognitive ability in older HIV+ men. bioRxiv; 2020. DOI: 10.1101/2020.11.26.399592.

Dadar M, Fereshtehnejad SM, Zeighami Y, Dagher A, Postuma RB, Collins DL. Reply To: Cerebral Vasomotor Reactivity in Parkinson’s Disease: A Missing Link between Dysautonomia, White Matter Lesions, and Cognitive Decline? Mov Disord Clin Pract. 2020 Oct 1;7(8):996-998. doi: 10.1002/mdc3.13073. PMID: 33163575; PMCID: PMC7604642.

Houssem-Eddine Gueziri, Carlo Santaguida, D. Louis Collins, The state-of-the-art in ultrasound-guided spine interventions, Medical Image Analysis, Volume 65, 2020, 101769, ISSN 1361-8415, https://doi.org/10.1016/j.media.2020.101769.

Dadar M, Fereshtehnejad SM, Zeighami Y, Dagher A, Postuma RB, Collins DL. White Matter Hyperintensities Mediate Impact of Dysautonomia on Cognition in Parkinson’s Disease. Mov Disord Clin Pract. 2020 Jul 18;7(6):639-647. doi: 10.1002/mdc3.13003. PMID: 32775509; PMCID: PMC7396867.

Manera, A.L., Dadar, M., Fonov, V. *et al.* CerebrA, registration and manual label correction of Mindboggle-101 atlas for MNI-ICBM152 template. *Sci Data* **7,** 237 (2020). https://doi.org/10.1038/s41597-020-0557-9

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Zheng Wen, Doina Precup, Morteza Ibrahimi, Andre Barreto, Benjamin Van Roy and Satinder Singh, On Efficiency in Hierarchical Reinforcement Learning. NEURIPS 2020 (2020-01-01)

Veronica Chelu, Doina Precup and Hado P. van Hasselt, Forethought and Hindsight in Credit Assignment. NEURIPS 2020 (2020-01-01)

Martin Klissarov and Doina Precup, Reward Propagation Using Graph Convolutional Networks. NEURIPS 2020 (2020-01-01)

Tanya Nair, Doina Precup, Douglas L. Arnold and Tal Arbel, Exploring uncertainty measures in deep networks for Multiple sclerosis lesion detection and segmentation. Medical Image Analysis (2020-01-01) [Also on International Conference on Medical Image Computing and Computer-Assisted Intervention (2018-09-16)]

Arthur Guez, Fabio Viola, Theophane Weber, Lars Buesing, Steven Kapturowski, Doina Precup, David Silver and Nicolas Heess, Value-driven Hindsight Modelling. NEURIPS 2020 (2020-01-01)

Scott Fujimoto, David Meger and Doina Precup, An Equivalence between Loss Functions and Non-Uniform Sampling in Experience Replay NEURIPS 2020 (2020-01-01)

Sedal, Audrey

A Sedal, A Wineman, "Force reversal and energy dissipation in composite tubes through nonlinear viscoelasticity of component materials". Proceedings of the Royal Society A 476 (2241), 20200299, 2020

A Sedal, AH Memar, T Liu, Y Mengüç, N Corson, "Design of deployable soft robots through plastic deformation of kirigami structures", IEEE Robotics and Automation Letters 5 (2), 2272-2279, 2020

A Sedal, "Continuum Mechanical Models for Design and Characterization of Soft Robots", 2020

Associate Invited Talks

Armanfard, Narges

"Leveraging RGBD data for human activity recognition", SanctuaryAI, Canada.

"Improved Deep Embedding Clustering with Deep Fuzzy Supervision", Ericsson, Canada.

"Artificial Intelligence for Mechanical Properties Prediction", Algoma Steel, Canada.

"Artificial intelligence for improving vehicle maintenance", Trimac Transportation, Canada.

Cheung, Jackie

"Overcoming Dataset Biases in Automatic Summarization". Microsoft Research, Montreal, October 20, 2020, Held virtually, Invited

"Exploiting and Overcoming Dataset Biases in Natural Language Processing". University of Alberta, Edmonton, Alberta, July 27, 2020, Held virtually, Invited

"From Discourse Structure to Semantics in Automatic Summarization". International Workshop on Semantic Evaluation (SemEval 2020), Held virtually, Invited keynote.

Dimitrakopoulos, Roussos

Short course: "New Digital Technologies and Risk Management in Strategic Mine Planning: Smart mining complexes and mineral value chains under uncertain metal supply and market demand" - SME 2020 Annual Conference & Expo, Phoenix, AZ, Feb 22-23, 2020.

"Smart Industrial Mining Complexes – Mineral Value Chains, Present and Future: New Digital Technologies, Artificial Intelligence and Self-Learning, Advances and Challenges" - CIM Conference, Virtual, May 6, 2020.

Forbes, James

"Gaussian Variational Inference for Batch Nonlinear State Estimation Applied to Robot Navigation," "Meet a GERAD Researcher! Seminar, GERAD, May 6, 2020.

"Gaussian Variational Inference for Batch Nonlinear State Estimation Applied to Robot Navigation," Robot Learning Seminar Series, March 20, 2020.

"Wind-Velocity Estimation for Enhanced UAV Path Planning and Control," Ingenuity Labs Research Institute Lecture Series, Queen's University, February 12, 2020.

Gross, Warren

"Tentative: Stochastic Computing for Signal Processing and Machine Learning," Design, Automation and Test in Europe Conference (DATE 2020), Grenoble, France, March 13, 2020.

"Stochastic Computing for Machine Learning towards an Intelligent Edge," MITHarvard Communications Information Networks Circuits and Signals (CINCS) / Hamilton Institute Seminar, October 7, 2020.

"Stochastic Computing for Machine Learning towards an Intelligent Edge," MILA - Quebec AI Institute, Montreal, QC, April 15, 2020.

"Stochastic Computing for Machine Learning," Edge Intelligence Workshop, Montreal, QC, March 2-3, 2020.

Lin, Hsiu-Chin

Computer Science Colloquium Series, McGill University. September 2020.

Mobile Robotics group, McGill University. February 2020.

Liu, Xiu

VIP RoundTable, "The Future of Mobility", Host and speaker, Samsung Research America, Mountain View, CA. , August 14, 2020.

Panel, "AI for Good", in Nordic Future Mobility Summit 2020, Stanford University, Stanford, CA. January 16th, 2020.

Mongrain, Rosaire

Workshop on Engineering Design Teaching, (with Prof M Driscoll), "Capstone Design Projects for Emerging and Growing Fields", CEEA/ACEG Canadian Engineering Education Association, Montreal, June 2020. (Event canceled due to COVID 19) (6 hours)

Mini-Symposium co-Chairman (with Prof M Driscoll), "Design of Medical Technologies and Digital Health: From Models to Patient Outcomes", M2D2021, Funchal, Portugal 2020. *Event postponed to 2021

Moon, AJung

Moon, A. (Panelist), Cantwell-Smith, B. (Panelist), Rees, T. (Panelist), Boussemart, Y. (Panelist), McEvoy, F.(Panelist). Panel: "What does it take for humans to trust AI?". World Summit AI 2020, Montreal, Canada. March 2020.

Moon, A. (Moderator), Croteau, F.(Panelist), Mont, G. (Panelist), Havens, J.(Panelist), Casovan. A. (Panelist). "Implementing an Ethical Framework". World Summit AI 2020, Montreal, Canada. March 2020.

Müller, V. (Speaker), Moon, A., (Discussant), Simon, J. (Discussant). "Is it Time for Robot Rights?" by Vincent Müller, Montreal, Canada. January 2020.

"Building a resilient technological society, together". Invent the Future: AI Scholars Program, Virtual, Canada. July 2020.

"How to build a resilient technological society (with interactive robots)", Forum in Ethics, Law, and Society, Sonoma State University, United States. November 2020.

Lin, C., Moon, A. "Using Open Source Licensing to Regulate the Assembly of LAWS: A Preliminary Analysis", IEEE Symposium on Technology and Society. November 2020.

"Ethical human-robot interaction", ICRA 2020 Against Robot Dystopias Workshop. Virtual. June 2020.

"Let it be resolved that... Robots designed for personal or household use have failed because of fundamental misunderstandings of Human-Robot Interaction (HRI)", ICRA 2020 Debates on the Future of Robotics Research Workshop, Virtual. June 2020.

Panangaden, Prakash

UC Riverside Applied Category Theory Seminar. April 2020

Perimeter Institute Workshop on Categorical Probability and Statistics. June 2020.

MIT Applied Category Theory Seminar. September 2020.

Precup, Doina

Keynote Lecture: "Building Knowledge for AI Agents with Reinforcement Learning", ICCP 2020. September 3rd, 2020.

Associate Funding

	Total CIM Associate	Total 2020
MITACS	$301,667	$234,167
NSERC	$9,189,541	$2,260,820
Other Federal	$3,407,450	$700,660
FRQNT	$313,034	$146,179
Industry/Other	$4,495,285	$1,250,155
Total	**$17,706,977**	**$4,591,981**

Centre for Intelligent Machines
McGill University
3480 University Street
Montreal, Quebec
H3A 0E9