Western

The Brain and Mind Institute

2016 ANNUAL REPORT

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Western Interdisciplinary Research Building

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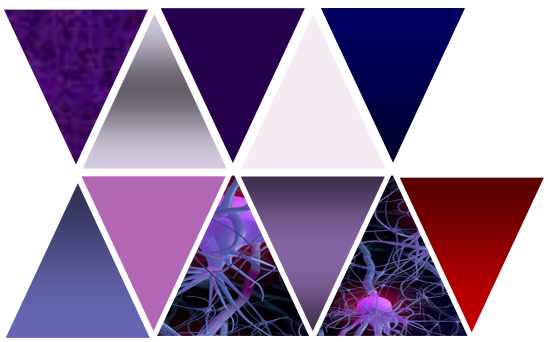
DIRECTOR'S STATEMENT

DR. MELVYN GOODALE

* PhD, FRSC, FRS
* Distinguished University Professor
* Canada Research Chair in Visual Neuroscience
* Director , The Brain and Mind Institute
* Member, CFREF Executive Committee
* Program Co-Director and Ivey Fellow, CIFAR: Azrieli Program in Brain, Mind & Consciousness
* Fellow of the Royal Society of Canada
* Fellow of the Royal Society of London
* Hellmuth Prize for Scientific Achievement



THE BRAIN AND MIND INSTITUTE IS A LEADING CANADIAN HUB FOR RESEARCH IN COGNITIVE NEUROSCIENCE

The BMI is a central and visible flagship for research in cognitive neuroscience at Western – and provides a clear signal to the international research community of Western's commitment to this signature area. But more importantly, it creates an environment that encourages the development of new ideas and research collaborations. The BMI has a highly visible presence internationally, and has been extremely competitive with respect to attracting research funds from both federal and provincial governments, and from international funding agencies.

This past year has been a particularly successful one for us. Western secured $22.5M from the federal government through the highly competitive Post-Secondary Institutions Strategic Investment Fund for the Western Interdisciplinary Research Building, soon to be the BMI's new home. Later in the year, Western was awarded $66M from the Canada First Research Excellence Fund. There is little doubt that the success of our proposal — BrainsCAN — was the direct result of Western's initial investment of $12.5M in the Cluster of Research Excellence in Cognitive Neuroscience and Western Chairs Program in 2014. It's no coincidence that all ten of the PIs on the BrainsCAN grant are members of the BMI.

THE BMI BRINGS RESEARCHERS TOGETHER

The BMI brings together researchers from several Faculties across the University, as well as the Robarts Research Institute, the Rotman Institute of Philosophy, and a number of hospitals across the city of London. The BMI's outstanding record of research has grown directly out of its commitment to collaborative investigation and willingness to absorb ideas from many different disciplines. Our trainees thrive in this environment and have developed a strong *esprit de corps* that is immediately evident at our frequent coffee mornings, journal club meetings, and social events.

The New Year will bring both opportunities as well as challenges as we move into the new building. I am confident, however, that the BMI will continue to flourish and that our standing on the international stage will become even more evident than it is today.

Dr. Melvyn A. Goodale, PhD, FRSC, FRS

BMI STEERING COMMITTEE
2016-2017 MEMBERS

Since 2013, the Brain and Mind Institute has been governed by a Steering Committee that meets on a monthly basis to discuss the development of policies and procedures for the institute, space allocation and the optimization of research resources, the selection of student and postdoctoral awardees, application reviews for BMI membership, and the preparation of the annual report. This committee consists of the BMI Director, six Core Members, and a representative from each of the following constituencies: Associate Members, graduate students, postdoctoral researchers, and administrative/technical staff.

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WELCOME TO COGNITIVE NEUROSCIENCE

OVERVIEW OF COGNITIVE NEUROSCIENCE

The study of the human brain is one of the most rapidly growing scientific enterprises of the 21st Century. The explosion in research linking the neurobiology of the brain to complex human activities is not simply confined to the laboratory and to clinical applications, but has begun to inform fundamental questions about the nature of human consciousness and what it means to be human. Research on the relationship between the human brain and mind even influences our understanding of world economies and the behaviour of the marketplace – and promises to give us new insights into why some children, but not others, fail to flourish in the classroom. Not a day goes by without some sort of brain-related story appearing in major newspapers or other media outlets. Western has been a major contributor to these news headlines. In fact, over the past decade, Western has emerged as a leader in research on the relationship between brain and mind – a field known as ***Cognitive Neuroscience***.

All of this led to the creation of the Brain and Mind Institute (BMI) at Western in 2011.

THE BMI'S MISSION

The mission of the Brain and Mind Institute (the BMI) is to be an internationally recognized centre for the study of Cognitive Neuroscience. Our primary goal is to understand the fundamental brain mechanisms of cognition and behaviour. We strive to achieve this goal by:

- accelerating research and research translation in cognitive neuroscience;
- training highly qualified personnel;
- forging national and international collaborations in cognitive neuroscience; and
- the facilitation of successful grant applications, both within the BMI and with other institutes and research groups at Western and beyond.

The BMI brings together research programs in cognitive neuroscience from across the campus -- programs that are already outstanding – and takes them to the next level by providing unparalleled research and training facilities. Since its inception, the BMI has been immensely productive; we have attracted substantial funding from provincial, federal, and international sources, and have been recognized as a successful research enterprise by both the scientific community and general public.

We look forward to creating even more opportunities to foster research in cognitive neuroscience that is unmatched by any other research institute in the world.

INTEGRATIVE APPROACH

Cognitive neuroscience is an interdisciplinary endeavour that seeks an understanding of how the brain gives rise to mind. A range of disciplines – including psychology, linguistics, neurophysiology, neuroanatomy, artificial intelligence, computational theory, philosophy, economics, and anthropology – are all brought to bear on common problems of mind and brain. The success of future research in this challenging area relies on an integrative approach that bridges these more traditional disciplines.

Western Interdisciplinary Research Building—river side

THE FUTURE

There is little doubt that cognitive neuroscience with its emphasis on how the human mind emerges from the human brain will increasingly come to represent the central focus of all of neuroscience as the 21st Century continues to unfold.

THE COMPOSITION OF THE BMI

One of the major reasons the BMI is successful is its interdisciplinary nature. The members of the BMI come from many different departments and fields. We have representatives from eight faculties and schools at the University of Western Ontario and 14 different departments. Although our fields and departments are diverse, we share a common interest in studying the brain and behaviour and our collaborations have yielded remarkable discoveries and methodological approaches. The BMI, along with the Rotman Institute of Philosophy and BrainsCAN teams, will continue to build on well-established relationships in our new home in the Western Interdisciplinary Research Building, which will become a visible flagship for research in cognitive neuroscience at Western.

In 2016, the faculties, schools, and institutes at Western represented in the BMI include:

- **Arts & Humanities:** Philosophy
- **Education**
- **Engineering:** Electrical and Computer Engineering
- **Health Sciences**: Communication Sciences and Disorders, Kinesiology
- **Ivey Business School**: Marketing
- **Schulich School of Medicine & Dentistry:** Departments of Anatomy & Cell Biology, Clinical Neurological Sciences, Medical Biophysics, Ophthalmology, Physiology & Pharmacology, Psychiatry
- **Science**: Computer Science, Physics & Astronomy
- **Social Science:** Psychology

In addition, we draw a number of our core and associate members from other institutes including:

- **Robarts Research Institute**: Centre for Functional and Metabolic Mapping
- **Hospitals** across the city of London

WHAT WE STUDY

Research at the BMI is focused on cognitive neuroscience – a growing interdisciplinary endeavour aimed at understanding how it is that the brain allows us to perceive the world, make sense of what we see and hear, remember the past and plan for the future, communicate our thoughts to others, choose goals, plan actions and carry those actions out. We are also investigating how the brain allows us to interpret not only our own emotions and intentions but those of others as well – in short how it is that the 3 lbs of wetware inside our skulls creates consciousness and allows us to think.

WHAT WE STUDY cont'd

Much of the research in cognitive neuroscience is directed at understanding what goes wrong when our cognitive abilities are compromised by disease, injury, and addiction – in diseases like Parkinson's, Alzheimer's, stroke, and concussion – and why sometimes cognitive abilities fail to develop properly in development disorders such as autism, dyslexia, and ADHD.

Having so many cognitive neuroscientists under one roof helps foster the kind of day-to-day interaction and interchange of ideas that characterizes successful research enterprises. Postdocs, grad students, and the BMI members themselves meet each other in the hallway and lounge – and new research ideas and collaborations grow naturally out of this coffee culture. In addition, by having many of our research facilities in a single location or close by we can share expensive equipment that might otherwise have to be duplicated if we were spread across the campus. This integrative research model will become even more evident when we move into the new Western Interdisciplinary Research Building.

RESEARCH FACILITIES

Researchers at the Brain and Mind Institute have access to laboratories that house specialized and cutting-edge technology. Some of the technologies and resources at the BMI include:

Magnetic Resonance Imaging (MRI): The Centre for Functional and Metabolic Mapping, which is partnered with the BMI, houses three state-of-the-art brain scanners: a 9.4-Tesla system for studies in small animals, a 7-Tesla system for human and animal research, and a 3-Tesla system that is exclusively for human research. With this equipment, BMI researchers can measure the functional activity and connectivity in the brains of both animals and humans, including newborns.

Transcranial Magnetic Stimulation (TMS): Researchers can investigate the effects of stimulating a local region of the brain in a non-invasive way, and measure how this might affect activity elsewhere in the nervous system or interfere with performance on a specific task.

Measuring Eye and Body Movements: BMI houses sophisticated equipment for tracking eye and limb movements, during activity such as grasping an object, walking, or reading. Researchers can also track eye and hand movements as someone reaches for real objects while in a brain scanner.

Neurobiology of Sleep and Sleep Disorders: The BMI houses a fully-equipped 3-bedroom sleep lab with in-lab 32-channel EEG and polysomnographic systems for recording brain activity and other physiological signals while people are sleeping.

Animal Models of Cognition and Behaviour: Nonhuman primates, mice, rats, and other animals are used as models for the study of complex cognition in humans. Indeed, a number of researchers have parallel programs in humans and animals.

Computing Systems: Brain imaging technologies including EEG and MRI-based techniques yield many terabytes of data each year. The BMI has access to the high performance computing resources that are becoming increasingly necessary to handle these data as well as complex behavioural data.

BMI RESEARCHERS

Advances in cognitive neuroscience require new technology, cross-disciplinary collaboration and innovative methods for measuring the brain and behaviour. Western is home to exceptional researchers who raise the bar for cognitive neuroscience research, including:

- **Physicists**, who develop new brain imaging protocols and equipment;
- **Mathematicians**, who create new analysis methods and computational models of brain function ;
- **Cognitive psychologists**, who construct models of the mind and design tasks that isolate particular mental processes;
- **Physicians** – from neurologists to neonatologists – who explore problems most commonly encountered by patients and integrate our growing knowledge of the brain into clinical practice;
- **Philosophers**, who answer new ethical questions and guide help guide the ontology of this new science;
- **Developmental psychologists**, who investigate how the brain grows and what can go wrong during childhood;
- **Cognitive physiologists** who examine internal mental processes such as memory, perception learning and language;
- **Computer scientists**, who run complex computer systems; and
- **Engineers**, who build laboratory equipment to administer all manner of tasks.

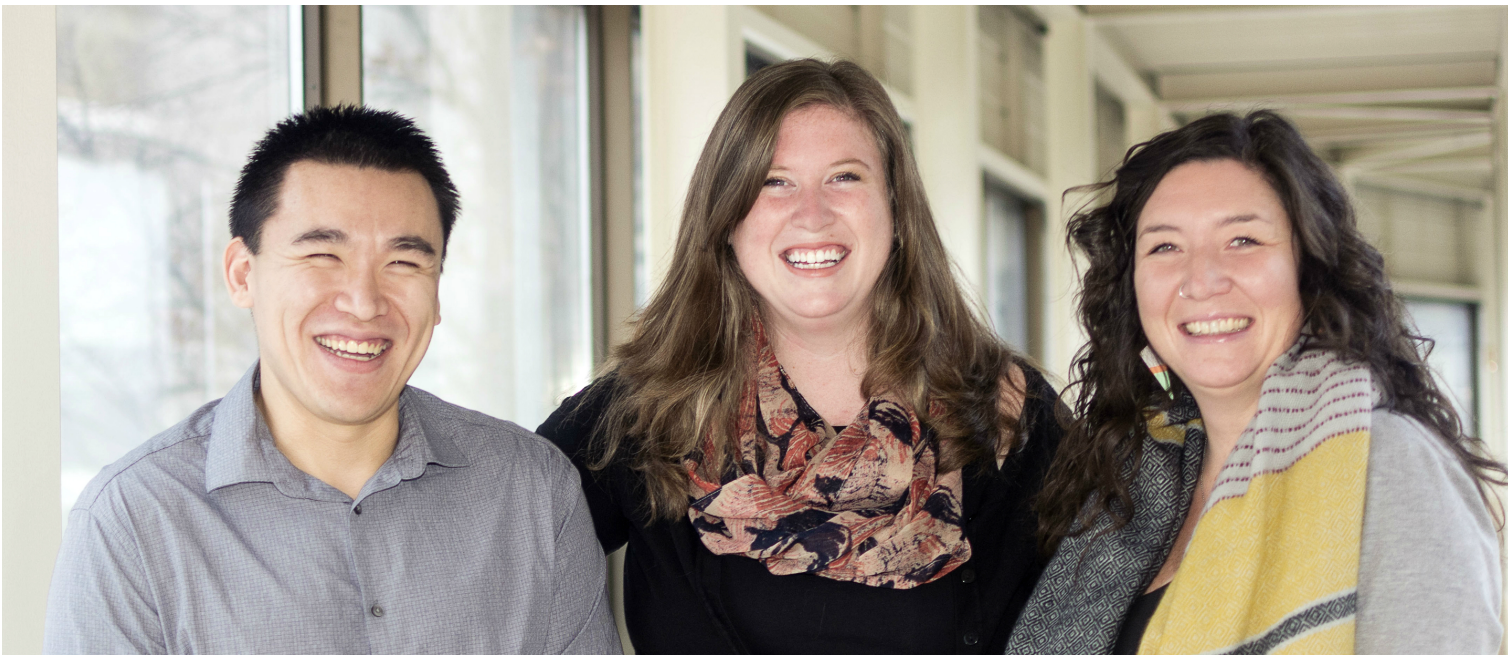
Only by bringing all of these specialities together can the complexities of the brain and mind be better understood.

RESEARCH AND KNOWLEDGE TRANSFER

BMI core members have collectively published more than 3000 peer-reviewed papers during their research careers, with an average of more than 70 papers per investigator. BMI researchers are remarkably collaborative, which has resulted in many papers authored by more than one BMI member. In addition to publishing work in peer-reviewed journals, BMI researchers regularly present their research at leading national and international conferences and are routinely invited to give keynote addresses at such gatherings. All of this ensures BMI research is communicated to others working in this field, including industry and clinical settings.

BMI researchers engage end-users directly. One effective example of this comes from research related to the relationship between brain plasticity and education. BMI researchers who study the neural substrates of arithmetic reasoning and reading, routinely meet with educational practitioners and researchers in Western's Faculty of Education and relevant experts in local school boards to seek advice about particular problems encountered in the schoolroom that can then be investigated in the laboratory. As new findings emerge, researchers meet with curriculum developers in the Ministry of Education and with representatives from companies who design digital tools for education. This iterative cycle, from the classroom to the laboratory and back again, is a highly effective way to enhance evidence-based approaches to education – and ultimately to develop sound educational policy and practice.

Similar approaches are being used to determine how best to teach second languages, critical thinking, and a host of other skills. The interplay between new research in cognitive neuroscience and problems identified by potential end-users is particularly relevant as we move into a digital age where education and the workplace rely increasingly on the Internet, mobile technology, and other digital media tools.



BMI-Donders Exchange Program recipients from left to right: Chao Gu, Kathryn Manning and Molly Henry

TRAINING OPPORTUNITIES

The BMI is committed to training the next generation of researchers in cognitive neuroscience. It has created a number of new initiatives such as the Postdoctoral Fellowship, the International Graduate Student Scholarship and various exchange programs with other institutes worldwide.

The Western Cognitive Neuroscience Postdoctoral Fund program provides up to five annual awards of $25,000 (matched by the supervisor) for each of two years and was created to help attract the best and the brightest young minds to the BMI.

The Western International Graduate Student Scholarship offers research opportunities to international graduate student s wishing to be mentored by BMI PIs.

Lastly, BMI has been developing and participating in various exchange programs, with universities around the world such as Radboud University, the University of Geneva and Monash University. The exchange experience has been invaluable to BMI postdocs and graduate students.

MENTORING AND EDUCATION

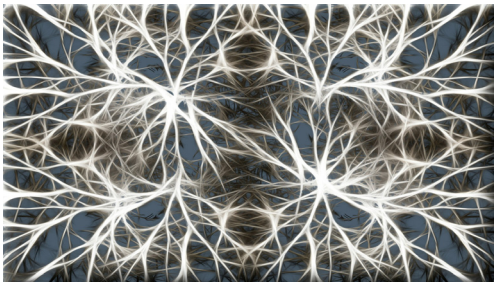
Collectively, BMI researchers supervise more than 120 graduate students and 45 postdoctoral fellows, most of whom hold competitive salary awards, including Vanier Canada Graduate Scholarships and Banting Postdoctoral Fellowships awarded to Western. We have attracted talented graduate students and postdoctoral fellows from leading labs around the world, with backgrounds ranging from cognitive psychology to engineering. Part of the reason we have been successful is that we can provide trainees with access to state-of-the-art facilities for research in cognitive neuroscience, including imaging facilities that rank amongst the very best in the world. In addition to attracting young graduates from institutions across Canada, BMI researchers have recruited top talent from the United States, Australia, Israel, Spain, Albania, the UK, Italy, China, Japan, Taiwan, Lebanon, the Netherlands, and Germany. Our trainees routinely secure positions in leading universities across the globe.

As importantly, we have retained some of the best and the brightest of our trainees from overseas in Canada. Although the BMI is involved in supervision of graduate students across campus, the institute is not formally involved in undergraduate or graduate instruction. Nevertheless, we work closely with the Graduate Program in Neuroscience and other relevant graduate programs to develop new directions for graduate education geared towards trainees in cognitive neuroscience. The institute also works closely with departments across campus to ensure honors students have opportunities to do research at the BMI for their honors thesis. Many of these honors students and undergraduate student volunteers work closely with graduate students and postdoctoral fellows in the BMI.

INTERNATIONAL RESEARCH

International collaborations are key to taking research to the next level. Both collectively and individually, researchers at the BMI have well-established collaborations with researchers in many countries around the world, including the UK, China, Brazil, Australia, Kenya, and many countries in the EU. We have exchange schemes with the Monash Institute for Cognitive and Clinical Neuroscience in Australia, the Donders Institute for Brain, Cognition, and Behaviour in the Netherlands, and the Cognitive Neuroscience Group at the University of Geneva.

The BMI regularly welcomes researchers and trainees from around the world and has sponsored a number of international scientific meetings at Western and elsewhere in Canada.



PARTNERSHIPS AND RESEARCH COLLABORATIONS

The BMI also has excellent relationships with industry partners, including IBM Canada, CISCO, Siemens Canada, and Northern Digital Inc. BMI researchers are developing new approaches to brain analyses, human-machine interfaces, visualization graphics, and other projects that are of significant interest to these companies, and others in the private sector. Indeed, it is worth emphasizing that the range of possible partners who have a stake in issues central to research at the BMI is very large. These include computer hardware and software companies, the entertainment industry, military, professional sports, automakers interested in development of intelligent and crashless cars, hotel chains (for whom sleep is an important commodity), medical equipment, and manufacturers of video games and educational software.

INTERNATIONAL RELATIONSHIPS

The BMI knows that advances in cognitive neuroscience can be accomplished only with strong international relationships and interactions. For this reason, the BMI established an International Scientific Advisory Board to provide an arms-length review of the BMI's progress both in research and training and in establishing productive international collaborations.

"Science is a field which grows continuously with ever expanding frontiers. Further, it is truly international in scope. … Science is a collaborative effort. The combined results of several people working together is often much more effective than could be that of an individual scientist working alone."

John Bardeen 1956 /1972 Nobel Laureate

International Scientific Advisory Board

The BMI has created an International Scientific Advisory Board, comprising some of the leading researchers in the field, to guide the institute in charting future directions for the development of cognitive neuroscience at Western. The following individuals have agreed to serve on this board and met for the first time on September 21, 2015, in concert with our first annual BMI Fall Symposium (held September 20, 2015).

David Burr, PhD
CNR Institute of Neuroscience, Pisa
Department of Psychology
University of Florence Stella Maris Foundation, Pisa, Italy

Alfonso Caramazza, PhD
Daniel and Amy Starch Professor of Psychology Department of Psychology
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John Duncan, PhD
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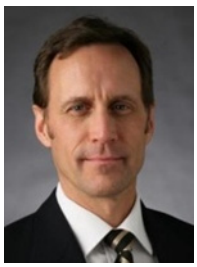

Jeffrey Schall, PhD
E. Bronson Ingram Professor of Neuroscience
Professor of Ophthalmology and Visual Sciences
Director of Center for Integrative Cognition & Cognitive Neuroscience
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Irene Tracey, PhD
Head of Department and Nuffield Chair in Anaesthetic Science
Nuffield Department of Clinical Neurosciences
University of Oxford, United Kingdom

Western The Brain and Mind Institute

BMI CORE MEMBERS IN 2016

LEADING RESEARCHERS IN COGNITIVE NEUROSCIENCE

Faculty members from Western University who are actively engaged in cognitive neuroscience, whether basic or applied, are considered for core membership at the Brain and Mind Institute.

In 2016, there were 34 faculty members from various disciplines across campus, leading research activities at the Institute as Principal Investigators and this membership continues to grow. The research activities they oversee are providing a better understanding of the neural bases of a range of mental abilities and deficits. BMI's Core Members and their teams study areas related to music, cognitive development, perception, emotions — and the list goes on.

For more information on the terms of reference for core members and how to apply for membership at the Brain and Mind Institute, please visit the BMI website at www.uwo.ca/bmi.

DANIEL ANSARI

Lab: Numerical Cognition Laboratory

Dr. Daniel Ansari is a Professor and Canada Research Chair in Developmental Cognitive Neuroscience in the Department of Psychology and the Brain and Mind Institute at the University of Western Ontario in London, Ontario, where he heads the Numerical Cognition Laboratory (www.numericalcognition.org). Daniel and his team explore the developmental trajectory underlying both the typical and atypical development of numerical and mathematical skills, using both behavioral and neuroimaging methods. He has a keen interest in exploring connections between cognitive psychology, neuroscience and education and served as the President of the International Mind, Brain and Education Society (IMBES) from 2014-16.

ROBERT BARTHA

Lab: Bartha Group

Dr. Robert Bartha is the Bank of Montreal Chair in Neuroimaging and a Professor of Medical Biophysics and a Robarts Scientist. Robert's expertise includes high and ultra-high field MRI and MRS methods development in patient populations and in animal models, working at 4T since 1996, 7T since 1999 and 9.4T since 2005. He has an extensive background in short-echo time MR spectroscopy acquisition and quantification and volumetric imaging acquisition and analysis. He has publications and grants with various team members in the areas of Alzheimer's disease, MCI, dementia and epilepsy.

TIM BUSSEY

Lab: TCNLab

Dr. Tim Bussey is a Western Research Chair in Cognitive Neuroscience under Western's Cluster of Research Excellence and a Professor in Physiology and Pharmacology with a joint appointment in Psychiatry. His research in cognition, with Dr. Lisa Saksida, has him asking questions on how the healthy brain does it, what goes wrong in neurodegenerative and neuropsychiatric disease, and identifying targets for therapy. Tim also works on improving preclinical-to-clinical translation.

BLAINE CHRONIK

Lab: Chronik Group

Dr. Blaine Chronik holds an NSERC Industrial Research Chair and heads the Western MR Systems Development Lab and a Professor in Physics. His team investigates mathematical transform algorithms for detection and correction of phase artefact in MRI, non-image-encoding local gradient coils, and MRI System Development. Current projects include work in the areas of field-cycled MRI (fcMRI), specialized gradient coil inserts, peripheral nerve stimulation in the MR environment, and eddy current modeling.

ADAM COHEN

Lab: SocialBrainLab

Dr. Adam Cohen is an Assistant Professor in Psychology. Adam's research focuses on how theory of mind and attention work, develop and interface using behavioural and neuroimaging methods.

BRIAN CORNEIL

Lab: Gaze Control Lab

Dr. Brian Corneil is a Professor in the Physiology and Pharmacology with a joint appointment in Psychology. His team seeks to understand how the brain controls movement. To understand such transformations, eye-head gaze shifts which rapidly change our line of sight are examined. In his lab, they combine neurophysiological and behavioural techniques in both humans and animal models.

JODY CULHAM

Lab: Culham Lab

Dr. Jody Culham is a Professor in the Psychology department and Neuroscience graduate program. Her lab uses neuroimaging (fMRI) and behavioral approaches to investigate how the human brain uses sensory information to perceive the world and guide hand actions such as reaching, grasping and tool use. Jody was one of the first to use brain imaging techniques to discover and characterize human brain areas involved in hand actions. Her approach emphasizes using real-world stimuli (such as real objects instead of pictures) and real actions to better understand brain function under natural conditions, sometimes in contrast to artificial and virtual conditions.

RHODRI CUSACK

Lab: Cusack Lab

Dr. Rhodri Cusack is an Associate Professor in Psychology and Medical Biophysics. His research focuses on behavioural and cognitive neuroscience, auditory and visual attention, memory and imagery and new methods for neuroimaging. The Cusack lab studies the emergence of cognition in the first year following birth. Rhodri's team aims to address the pressing clinical need for better ways to detect when development is progressing abnormally following brain injury, and how to best correct it.

MARK DALEY

Lab: Daley Lab

Dr. Mark Daley is Western's Associate Vice President, Research and an Associate Professor in Computer Science, Biology, and Statistics & Actuarial Science. He is also the SHARCNET Research Chair in Biocomputing and the Chairman of the board of directors for Compute Ontario. Mark specializes in natural computing, computational and mathematical modelling of biological systems, theoretical computer science, high performance computing for biology and mathematics, molecular evolution and algorithmics of music and the visual arts.

JÖRN DIEDRICHSEN

Lab: Motor Control Group

Dr. Jörn Diedrichsen is a Western Research Chair under the Western Cluster of Research Excellence in Cognitive Neuroscience and a Professor in Computer Science. In his motor control group, robotic devices are used to investigate human motor behavior to study how the brain recalibrates well-learned motor skills or acquires new ones. Computational models are then developed to understand the underlying control and learning processes. These insights are used to design fMRI studies to investigate how these processes map onto the brain.

STEFAN EVERLING

Lab: Laboratory for Neural Circuits & Cognitive Control

Dr. Stefan Everling is a Professor in Physiology and Pharmacology with a joint appointment in Psychology. Stefan's research aims to understand how frontal brain areas influence cognitive functions in the primate brain. By better understanding which areas underlie which cognitive functions, he works towards identifying the brain areas that can serve as targets for future treatment of prefrontal strokes and trauma.

MELVYN GOODALE

Lab: Goodale Lab

Dr. Mel Goodale is the Director of the Brain and Mind Institute, the Canada Research Chair in Visual Neuroscience and a Professor in Physiology and Pharmacology with a joint appointment in Psychology. Mel is best known for his work on the functional organization of the visual pathways in the cerebral cortex, and was a pioneer in the study of visuomotor control in neurological patients. His recent research uses functional magnetic resonance imaging (fMRI) to look at the activity in the normal human brain as it performs different kinds of visual tasks. He has also developed virtual-object technology to study the visual information used to program and control grasping movements.

JESSICA GRAHN

Lab: Music and Neuroscience Lab

Dr. Jessica Grahn is an Associate Professor in the Department of Psychology and has established herself as an emerging leader in the field of the neuroscience of music which combines her unique background as a classically trained concert pianist and her training as a neuroscientist. Jessica conducts brain scanning studies examining how different motor areas in the brain respond to musical rhythm. She is also interested in how rhythm and music may be processed in the brains of those who have dysfunction in the brain areas that control movement, as happens in Parkinson's disease.

PAUL GRIBBLE

Lab: Human Sensory Motor Neuroplasticity and Motor Learning

Dr. Paul Gribble is a Professor in Psychology and holds a joint appointment in Physiology and Pharmacology . Paul's research focuses on how the brain controls voluntary movement, and the relationship between neuroplasticity in sensory and motor brain areas and motor skill learning. Despite the significant mechanical complexities of multi-joint limb movement, humans are able to interact with the environment with remarkable ease. Research in the Gribble Lab is focused on understanding how the brain is organized to support motor learning, and how the central nervous system interacts with the complex peripheral neuromuscular plant to control skilled movement.

ELIZABETH HAYDEN

Lab: Personality and Emotion Development Lab

Dr. Elizabeth Hayden is a Professor in the clinical area of Psychology. Her current research looks at characterizing the mechanisms by which temperament confers risk for mood disturbances, taking a perspective informed by developmental processes.

MARC JOANISSE

Lab: LRCN Lab

Dr. Marc Joanisse is a Professor in Psychology and the Neuroscience graduate program. He also holds an appointment as an Affiliated Scientist at Haskins Laboratories in New Haven Connecticut. In the Language, Reading and Cognitive Neuroscience Lab, Marc's research examines the neural underpinnings of first- and second-language learning in children and adults, with a special focus on the interplay between spoken and written language. This includes studying the brain bases of reading ability and disability across the lifespan, using a wide variety of experimental techniques including fMRI, ERP and eye-tracking.

INGRID JOHNSRUDE

Lab: CoNCH Lab

Dr. Ingrid Johnsrude is a Western Research Chair under the Western Cluster of Research Excellence and holds joint Professor appointments in Psychology, and in the School of Communication Sciences and Disorders. In Ingrid's Cognitive Neuroscience of Communication and Hearing (CoNCH) lab, psychophysical and neuroimaging methods such as fMRI and EEG are used to study the neural basis of hearing; particularly how the brains of listeners transform the noisy and variable sounds of everyday conversations into meaningful language. The ultimate goal of this work is to make speech listening easier for people with hearing impairment. The group is also exploring novel functional-imaging based methods for evaluation of subtle brain abnormalities in epilepsy, concussion and other brain disorders.

STEFAN KÖHLER

Lab: Köhler Memory Lab

Dr. Stefan Köhler is a Professor in Psychology. The research in his Memory Lab in Cognitive Neuroscience focuses on the functional and neuroanatomical organization of memory in the human brain. Questions pursued by his lab include how memory systems interact with the visual system, how memory and affect interact, and whether different parts of the brain support memory for different types of information.

STEPHEN LOMBER

Lab: Cerebral Systems Lab

Dr. Stephen Lomber is a Canada Research Chair (Tier I) in Brain Plasticity and Development, and a Professor in Psychology, Physiology and Pharmacology. In addition, Steve holds an appointment as a principal investigator in the National Centre for Audiology in the Faculty of Health Sciences. Steve's lab uses an integrated approach of psychophysics, electrophysiological recording, neuro-anatomical techniques, and functional imaging to examine processing in auditory cortex. Work in the lab examines cortical plasticity in the presence and absence of acoustic input, and following the initiation of auditory processing through the means of cochlear prosthetics.

PENNY MACDONALD

Lab: MacDonald Lab

Dr. Penny MacDonald is a Canada Research Chair (Tier II) in Cognitive Neuroscience and Neuroimaging, as well as a Movement Disorders Neurologist and an Assistant Professor in Clinical Neurological Sciences. She is cross-appointed in Physiology and Pharmacology, and Psychology. Penny's research aims to understand the nature and causes of *cognitive* deficits such as learning, memory, and thinking problems that are increasingly recognized in more than 50% of PD patients. Deficits in cognition disproportionately cause a decline in quality of life for patients with PD, and are a frequent cause of institutionalization. Clarifying these deficits and the changes in brain function that underlie them is therefore critical.

JULIO MARTINEZ-TRUJILLO

Lab: Cognitive Neurophysiology Laboratory

Dr. Julio Martinez-Trujillo is appointed to the position of Provincial Endowed Academic Chair in Autism, Schulich School of Medicine & Dentistry and is a Professor in Psychology and the Neuroscience graduate program. Julio's research aims to understand the mechanisms of cognition and behaviour in the normal brain and during disease, focusing on how the brain transforms visual signals into coordinated behaviour and how this process is influenced by cognitive functions, such as attention and memory.

KEN MCRAE

Lab: McRae Lab

Dr. Ken McRae is Associate Dean Research in the Faculty of Social Science and a Professor in Psychology. With his lab and other colleagues, Ken studies people's knowledge of everyday events, and how people use that knowledge to understand language. Their research uses EEG and eyetracking studies with adults, in combination with neural network modeling. Ken and his colleagues also study language comprehension in individuals with Parkinson disease.

RAVI MENON

Lab: Menon Group

Dr. Ravi Menon is the Director of the Centre for Functional and Metabolic Mapping (CFMM), a Professor in Medical Biophysics, Medical Imaging, Neuroscience, and Psychiatry, and holds an appointment as the Canada Research Chair in Functional and Molecular Imaging. Ravi's research centres around the application of ultra-high field MRI to problems in neuroscience. Towards this end, his group is developing new radio frequency coil hardware to improve the homogeneity of the images in conjunction with software techniques to speed up the image acquisition. Utilizing these advancements, his team are studying the biophysical basis of the functional MRI signal which is used in all modern day cognitive and clinical neuroscience as well as developing MRI methods such as quantitative susceptibility mapping for use in the early diagnosis and monitoring of multiple sclerosis.

PAUL MINDA

Lab: The Categorization Lab

Dr. John Paul Minda is an Associate Professor in Psychology. His innovative research works to answer questions about how and why humans organize information into categories and concepts and how the resulting conceptual structure influences thinking and behaviour. This work extends into research on expert performance, complex learning, and understanding the neuro-cognitive effects of mindfulness meditation practice.

DEREK MITCHELL

Lab: Emotional Cognition Lab

Dr. Derek Mitchell is an Associate Professor in Psychiatry, Anatomy and Cell Biology, and Psychology. Derek's research is principally aimed at providing fundamental knowledge about the functional neuroanatomy behind the experience and control of emotions such as fear, compassion, anxiety, depression, and anger. His group is simultaneously committed to translating this work to address clinical issues. They apply techniques such as neuroimaging and cognitive testing to elucidate the pathophysiology of a range of mental health issues including those that feature difficulties with empathy, mood, fear, and aggression.

J. BRUCE MORTON

Lab: Cognitive Development and Neuroimaging Laboratory

Dr. Bruce Morton serves as an Associate Professor in Psychology and is a faculty member of the graduate programme in Neuroscience. Bruce's research interests concern the development of cognitive control and its association with changes in prefrontal cortex function. One of the foremost challenges for young children is organizing their thoughts and actions in the service of achieving long-term goals. Children find it difficult to defer small immediate rewards in favor of larger future rewards for example, or to switch the focus of their attention from one feature of a stimulus to another. The development of such self-regulatory capacities is an important foundation for later academic, social, and health-related outcomes, and is therefore the focus of many basic and applied research programs.

ADRIAN OWEN

Lab: Owen Lab

Dr. Adrian Owen is the Canada Excellence Research Chair in Cognitive Neuroscience and Imaging and a Professor in Psychology, Anatomy and Cell Biology, Physiology and Pharmacology. His research combines neuroimaging (MRI and EEG), with cognitive studies in brain-injured patients and healthy participants. His team studies patients who have sustained brain injuries that result in disorders of consciousness. They also study patients with neurodegenerative diseases in order to understand more about the causes and consequences of the memory, perception and reasoning problems that many of them experience. Finally, they develop web-based tools for the assessment of cognitive function, both in healthy participants and in patients with disorders of the brain.

DANTE PIROUZ

Lab: Pirouz Lab

Dr. Dante Pirouz is an Assistant Professor of Marketing at the Ivey Business School. Dante is interested in the "dark side" of risky consumer behaviour. She applies both neuroscience and cognitive science tools and theories to examine this important research area.

ANDREW PRUSZYNSKI

Lab: Pruszynski Lab

As Canada Research Chair (Tier II) in Sensorimotor Neuroscience and an Assistant Professor in Physiology and Pharmacology and Psychology, Dr. Andrew Pruszynski studies the neural mechanisms or reaching, grasping and object manipulation. By learning how various parts of the nervous system work together when generating skilled movement of the arm and hand, Andrew's team strive to find better treatments for recovering hand and arm function following peripheral nerve injury, spinal cord injury, and stroke.

LISA SAKSIDA

Lab: TCNLab

Dr. Lisa Saksida is a Tier 1 Canada Research Chair in Translational Cognitive Neuroscience and a Professor in Physiology and Pharmacology with a joint appointment in Psychology. Her research in cognition, with Dr. Tim Bussey, has her asking questions on how the healthy brain carries out cognitive operations, what goes wrong in neurodegenerative and neuropsychiatric disease, and identifying targets for therapy. Lisa also works on improving preclinical-to-clinical translation.

ANDREA SODDU

Lab: Soddu Lab

Dr. Andrea Soddu is an Assistant Professor in Physics, where he investigates spontaneous brain activity using fMRI, global metabolism and structural connectivity using diffusion tensor imaging in patients with disorders of consciousness, hypnosis, anesthesia, tinnitus and dementia.

RYAN STEVENSON

Lab: Stevenson Lab

Dr. Ryan Stevenson was recently hired as an Assistant Professor in Psychology. His lab's research focuses on how visual and auditory perception influence high-order cognitive processing, whether in the autism spectrum or in cochlear implant users.

BRIAN TIMNEY

Lab: Timney Lab

Dr. Brian Timney is a Professor Emeritus in Psychology and recently oversaw the Faculty of Social Science as Dean. There are three areas of research conducted in his lab:

1. The effect of alcohol on vision,
2. The temporal characteristics of human binocular vision, and 3. Comparative studies of vision in horses and camels.

TUTIS VILIS
Lab: Vilis Lab

As Professor Emeritus, Dr. Tutis Vilis explores the function of two important cortical areas—the ventral stream, which specializes in the perception of visual objects and the dorsal stream, which specializes in directing motor actions. He has been a pioneer in the development of on-line teaching modules in physiology and neuroscience.

THE BMI welcomes the following new core members in 2017:

Michael Anderson — *Rotman Institute of Philosophy*
Scott MacDougall-Shackleton — *Psychology and Biology*
Susanne Schmid — *Anatomy and Cell Biology*
David Sherry — *Psychology and Biology*

For more information on the BMI Core Members, including contact information, please visit:
http://www.uwo.ca/bmi/members/core_members.html.

Western The Brain and Mind Institute

BMI ASSOCIATE MEMBERS IN 2016

The BMI also engages with other members of the Western community, including research scientists and principal investigators in clinical departments. For more information on BMI associate members, visit www.uwo.ca/bmi/members/associate_members.html.

Lisa Archibald	Communication Sciences and Disorders
Tim Bayne	Rotman Institute of Philosophy
Janis Cardy	Communication Sciences and Disorders, National Centre for Audiology
Sandrine de Ribaupierre	Clinical Neurological Sciences
Mathias Dietz	School of Communication Sciences & Disorders, National Centre for Audiology
Neil Duggal	Clinical Neurological Sciences
Roy Eagleson	Electrical & Computer Engineering
Elizabeth Finger	Clinical Neurological Sciences
Stuart Fogel	Psychology
Alexander Fraser	Clinical Neurological Sciences, Ophthalmology
Elizabeth Hampson	Psychology
Matthew Heath	Kinesiology
Erin Heerey	Psychology
Kevin Johnston	Psychology, Physiology & Pharmacology
Ali Khan	Medical Biophysics, Medical Imaging, Biomedical Engineering
Angela Mendelovici	Rotman Institute of Philosophy
Lindsay Nagamatsu	Kinesiology
Lena K. Palaniyappan	Psychiatry, Medical Biophysics, Neuroscience
Terry Peters	Medical Imaging, Medical Biophysics, Biomedical Engineering
David Purcell	Communication Sciences & Disorders
Kevin Shoemaker	Kinesiology, Physiology & Pharmacology
Rob Stainton	Rotman Institute of Philosophy
Jackie Sullivan	Rotman Institute of Philosophy
Jennifer Sutton	Psychology, Brescia University College
Chris Viger	Rotman Institute of Philosophy
Charles Weijer	Rotman Institute of Philosophy

New Associate Members in 2017:

Marie Savundranayagam - *School of Health Studies*
Robert Teasell - *Physical Medicine and Rehabilitation*

ADMINISTRATIVE AND TECHNICAL CORE

Florence Lourdes	Administrative Officer
Denise Soanes	Secretary and Receptionist
Haitao Yang	Systems Manager and Software Engineer

BMI HIGHLIGHTS IN 2016

Western The Brain and Mind Institute

Western University received a record-breaking $66 million investment from the Canada First Research Excellence Fund (CFREF) to boost ongoing research in cognitive neuroscience and imaging at Western. This funding will support the BrainsCAN program for the next 7 years in the following areas: (1) Human Cognition and Sensorimotor Control, (2) Rodent Models of Cognition and Behaviour, (3) Non-Human Primate Models of Cognition and Behaviour, (4) Imaging, and (5) Computational Core. The key principal investigators on this historic grant are: Daniel Ansari, Jody Culham, Jörn Diedrichsen, Stefan Everling, Mel Goodale, Ingrid Johnsrude, Ravi Menon, Adrian Owen, Terry Peters and Lisa Saksida.

Western was awarded federal support from the Post-Secondary Institutions Strategic Investment Fund (SIF) to assist with construction costs of the Western Interdisciplinary Research Building (WIRB). A majority of BMI faculty and their teams will be relocating to WIRB by December 2017. In addition to the BMI, this new building will house the Rotman Institute of Philosophy and the BrainsCAN team, strengthening existing research relationships.

Ian Lyons, from Daniel Ansari's Numerical Cognition Lab, was named a 'Rising Star' by the Association for Psychological Science (APS) in 2016. This designation is presented to outstanding psychological scientists in the earliest stages of their research career post-PhD, whose work has already advanced the field and signals great potential.

BMI's Jessica Grahn was named one of 2016's Faculty Scholars at Western University for her work on music-induced movement. The Faculty Scholars Award recognizes significant recent scholarly achievements in teaching or research, with an international presence in their discipline.

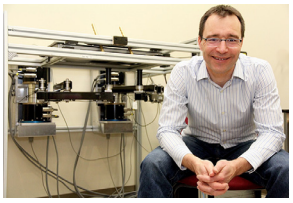
BMI's Andrew Pruszynski was appointed as one of six Canada Research Chairs at Western University. Pruszynski leverages expertise in robotics and neuroscience to understand the basic neural circuitry that underlies healthy and impaired movement – including reaching, grasping and object manipulation.

BMI member, Lorina Naci, received the Postdoctoral Scholar of the Year award from Western University. This award recognizes a Western Postdoctoral Scholar for having shown exceptional commitment and potential as an emerging scientist. The Postdoctoral Scholar of the Year stands out among his/her peers for excellence displayed in research, leadership, service, outreach, and/or teaching.

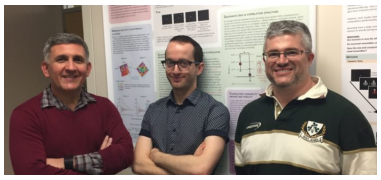
Stefan Everling received the 2016 Faculty Scholar Award at Western University for his work on how frontal brain areas influence cognitive functions, such as simple eye movement. This award recognizes significant achievements in teaching and research. In addition to this award, Everling received the Dean's Award of Excellence for Faculty in Research, in the Schulich School of Medicine and Dentistry.

Stephen Lomber was recognized for his Excellence in Undergraduate Education. At the BMI, Lomber studies how the brain changes after hearing loss, in childhood or adulthood.

Two internationally renowned neuroscientists joined the Brain and Mind Institute in 2016 — Western Research Chair, Tim Bussey and Lisa Saksida. Both researchers specialize in understanding cognition, as well as developing and discovering new techniques for translating data, to help treat patients suffering from neurodegenerative diseases like Alzheimer's and Parkinson's.



As the Western Research Chair for Motor Control and Computational Neuroscience and a member of the Brain and Mind Institute, Jörn Diedrichsen focuses on how the brain produces movement, particularly for the hand, in hopes of unlocking better treatments for stroke victims, spinal cord damage and other motor control disorders. The strength of the university's functional neuroimaging reputation worldwide, swayed his decision to relocate to Western.



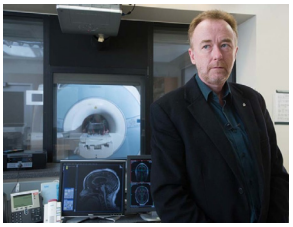
Neuroscientists at Western University have developed a new virtual reality 'toolbox' that can be used to build video games with a unique capacity for teaching and testing both humans and animal models. Julio Martinez-Trujillo, an associate professor in Physiology and Pharmacology, Robarts Research Institute scientist and a BMI core member, along with his collaborators Roberto A. Gulli and Guillaume Doucet from the Cognitive Neurophysiology Laboratory believe a video game could be developed for memory training and testing of senior citizens, suffering from early signs of Alzheimer's disease. Learn more

Western cognitive psychologist John Paul Minda, a Brain and Mind Institute member, is working with San Francisco-based lawyer and author Jenna Cho, to see if there's a relationship between mindfulness meditation and well-being in lawyers. This study on practicing mindfulness and meditation, will hopefully impact the work life for lawyers in a positive way. Learn more

An international research collaboration, led by Western University, developed a new imaging technique that will save hospitals money and more importantly, give some patients a second chance at life. Utilizing functional magnetic resonance imaging (MRI) technology, BMI's Andrea Soddu and his colleagues, have mimicked a diagnostic procedure to measure the resting state of the human brain. This technique will make it possible for doctors and scientists to assess changes in metabolic activity with patients suffering severe brain injuries and disorders of consciousness.

The Canadian Institute for Advanced Research (CIFAR) and Canada's acclaimed chamber ensemble, the Gryphon Trio, teamed up with leading neuroscientists to explore what happens in our brains when we engage with music. This event celebrated the launch of the Azrieli program in CIFAR's Brain, Mind & Consciousness Network, led by Western researchers Adrian Owen and Melvyn Goodale. The group aimed to address the question: What is the biological basis for human consciousness that sets us apart from other species? Learn more

Canada's acclaimed chamber ensemble, Gryphon Trio



BMI's Adrian Owen, Canadian Excellence Research Chair in Cognitive Neuroscience and Imaging at Western University, demonstrated that functional neuroimaging can be used to detect awareness in patients previously thought to be in a vegetative, non-aware state. He provided his expert analysis to award-winning science writer Kate Lunau for her long-form, feature story about the "shocking" recovery of a patient in a vegetative state. Read story

Mel Goodale, Director of the Brain and Mind Institute, showed that there is a way to 'de-blur' visual images without glasses. Goodale and his Australian collaborators found that when one of the two major channels carrying information from the eyes to the brain was de-activated, people could see detailed information, such as fine print, more clearly. Learn more

Six core and two associate members at the Brain and Mind Institute secured NSERC funding. 2016 NSERC Discovery grant recipients were Brian Corneil, Jody Culham, Jörn Diedrichsen, Jessica Grahn, Marc Joanisse, Stephen Lomber, Roy Eagleson and Lindsay Nagamatsu.

The following four BMI core members were recipients of CIHR grants in 2016: Stefan Everling, Ravi Menon and Andrew Pruszynski (Program Leaders for CIHR Foundation Grants), as well as Stefan Köhler/Ali Khan (Lead PIs for a CIHR Project Grant).

BMI's Bruce Morton, was awarded a SSHRC Insight grant in 2016 for his research on the impact of bilingualism and cultural variation on children's self-regulation.

BMI's Postdoctoral Collaborative Research Grant program was launched in the Fall of 2016 to support independent collaborative research by multiple postdoctoral researchers in two or more BMI-affiliated labs. The key objectives of this initiative are to promote postdoctoral networking, independence, and productivity, while increasing collaboration and research innovation across labs and/or faculties. The following three collaborative groups were awarded: (1) Björn Herrmann and Daniel Stolzberg, (2) Liya Ma, Yoshiko Yabe and Jonathan Erez, and (3) Naveed Ejaz, Jeff Weiler and Spencer Arbuckle.

BMI postdoc, Andrew Vo, who works in Penny MacDonald's lab, was the recipient of the following awards in 2016: Parkinson Society Southwestern Ontario Graduate Student Research Award, NSERC Postgraduate Scholarship-Doctoral, and the Western Doctoral Excellence Research Award.

Several BMI Graduate Students received awards in 2016:

Tamara Tavares

Jordan De Kraker and Tamara Tavares—*Alexander Graham Bell Canada Award - CGSD*,
Eva Berlot—*Ontario Trillium Scholarship ,*
Mazen El-Baba—*Alexander Graham Bell Canada Graduate Scholarship - CGSM NSERC*,
Alex Major—*Ontario Graduate Scholarship - MSc*,
Tamara Tavares—*Jonathan & Joshua Memorial Graduate Scholarship - PhD,*
Nole Hiebert—*George W. Stavraky Teaching Scholarship,Graduate Student Teaching Award in Physiology & Pharmacology, and the NSERC Alexander Graham Bell Canadian Graduate Scholarship,* and
Brian Robertson— *4 year scholarship at Western's Schulich School of Medicine*.

Nole Hiebert

Mallory Jackman, who graduated from Western's Neuroscience program in June 2015, won the 2016 Regional Undergraduate Award, an international essay writing competition for undergraduates. Her paper titled, "Conflict processing across development: The progression of response inhibition networks" was judged the highest performing Highly Commended paper from Canada & US in the Psychology category. Jackman's paper was written for the course 'Research in Developmental Cognitive Neuroscience', taught by Dr. J. Bruce Morton, a core member of The Brain and Mind Institute.

The following BMI students in Jessica Grahn's lab received the Highly Commended Entrants of the Undergraduate Awards in 2016: Allison Bell in Life Sciences, Victor Parchment in Philosophy, and Celina Everling and Sarah Schwanz in Psychology.

For more BMI news stories, see

2017 news at **http://www.uwo.ca/bmi/news/bmi_news/index.html**

and previous years at **http://www.uwo.ca/bmi/news/bmi_news/past_news.html**.

GRANTS HELD

BY BMI MEMBERS IN 2016

Funding Source	Core Members	Associate Members	Total *
Alzheimer's Society	200,000	142,609	$342,609
Brain Canada	2,885,000	0	$2,885,000
CERC	10,000,000	0	$10,000,000
CFI IOF	1,298,107	821,607	$2,119,714
CFI LEF	734,749	0	$734,749
CFI NIF	705,911	282,605	$988,516
CFREF (5 Core areas)	**29,987,000	0	$29,987,000
CIFAR	660,000	0	$660,000
CIHR Foundation Scheme	6,499,342	2,274,483	$8,773,825
CIHR Operating	12,501,330	2,424,670	$14,926,000
CIHR Team	0	2,064,675	$2,064,675
CIHR Other	1,322,934	963,700	$2,286,634
CRC	5,700,000	3,300,000	$9,000,000
Federal Economic Development Agency	1,242,000	0	$1,242,000
NSERC CREATE	155,739	0	$155,739
NSERC Discovery	7,204,752	2,230,640	$9,435,392
NSERC RTI	139,655	58,562	$198,217
NSERC Other	1,835,000	0	$1,835,000
OBI	640,836	166,668	$807,504
Ontario Institute for Cancer Research	230,950	0	$230,950
Ontario Ministry of Res. & Innovation	280,000	280,000	$560,000
ORF	6,713,291	697,165	$7,410,456
SSHRC	315,626	171,161	$486,787
Other	17,926,900	3,823,251	$21,750,151
Total	**$109,179,122**	**$19,701,796**	**$128,880,918**

*Total amount over all tenure years of grants held in 2016 at Western University by lead PI .

** The amount disclosed represents a portion of the $66M CFREF Grant, which is distributed to the 5 core areas managed by BMI Core Members.

PUBLICATIONS 2016

BMI CORE MEMBERS IN BOLD

Peer-reviewed Papers

1. Bugden, S. and **Ansari, D.** (2016). Probing the nature of deficits in the 'Approximate Number System' in children with persistent Developmental Dyscalculia. *Developmental Science*, 19, 817-33.

2. Merkley, R. and **Ansari, D.** (2016). Why numerical symbols count in the development of mathematical skills: evidence from brain and behaviour. *Current Opinions in Behavioral Sciences*, 10, 14-20.

3. Alcock, L., **Ansari, D.**, Batchelor, S., Bisson, Marie-J., De Smedt, B., Gilmore, C., Göbel, S., Hannula-Sormunen, M., Hodgen, J., Inglis, M., Jones, I., Mazzocco, M., McNeil, N., Schneider, M., Simms, V. and Weber, K. (2016). Challenges in Mathematical Cognition: A Collaboratively-Derived Research Agenda. *Journal of Numerical Cognition*, 2, 20-41.

4. Vanbinst, K., **Ansari, D.**, Ghesquière, P. and De Smedt, B. (2016). Symbolic numerical magnitude processing is as important to arithmetic as phonological awareness is to reading. *PLoS ONE*, 11(3)e0151045.

5. Matejko, A.A. and **Ansari, D.** (2016). Trajectories of symbolic and nonsymbolic magnitude processing in the first year of formal schooling. *PLoS ONE*, 11(3)e0149863.

6. Leibovich, T. and **Ansari, D.** (2016). The symbol-grounding problem in numerical cognition: a review of theory, evidence and outstanding questions. *Canadian Journal of Experimental Psychology* (Special Section on Numerical Cognition, edited by Jamie Campbell), 70:12-23.

7. Goffin, C. and **Ansari, D.** (2016). Beyond magnitude: Judging ordinality of symbolic number is unrelated to magnitude comparison and independently relates to individual differences in arithmetic. *Cognition*, 150, 68-76.

8. Leibovich, T., Vogel, S.E., Henik, A. and **Ansari, D.** (2016). Asymmetric processing of numerical and non-numerical magnitudes in the brain: an fMRI study. *Journal of Cognitive Neuroscience*, 28, 166-76.

9. Dinomais, M., Celle, S., Duval, G.T., Roche, F., Henni, S., **Bartha, R.**, Beauchet, O. and Annweiler, C. (2016). Anatomic Correlation of the Mini-Mental State Examination: A Voxel-Based Morphometric Study in Older Adults. *PLoS ONE*, Oct 14;11(10):e0162889. DOI: 10.1371/journal.pone.0162889. eCollection PMID: 27741236.

10. Marathe, K., McVicar, N., Li A., Bellyou, M., Meakin, S. and **Bartha, R.** (2016). Topiramate induces acute intracellular acidification in glioblastoma. *The Journal of Neuro-Oncology,* Dec;130(3):465-472. Epub 2016 Sep 9. PMID: 27613534.

11. Goncalves, S., Stevens, T.K., Doyle-Pettypiece, P., **Bartha, R.** and Duggal, N. (2016). N-acetylaspartate in the motor and sensory cortices following functional recovery after surgery for cervical spondylotic myelopathy. *Journal of Neurosurgery: Spine,* Oct;25(4):436-443. Epub 2016 May 13. PMID: 27176111.

12. Bernier, D., **Bartha, R.**, McAllindon, D., Hanstock, C.C., Marchand, Y., Dillen, K.N., Gallant, M., Good, K.P. and Tibbo, P.G. (2016). Illness versus substance use effects on the frontal white matter in early phase schizophrenia: A 4Tesla (1)H-MRS study. *Schizophrenia Research,* Aug;175(1-3):4-11. DOI: 10.1016/j.schres.2016.04.022. Epub 2016 May 6. PMID: 27161760.

13. Harris, R.A., Tindale, L., Lone, A., Singh, O., Macauley, S.L., Stanley, M., Holtzman, D.M., **Bartha, R.** and Cumming, R.C. (2016). Aerobic Glycolysis in the Frontal Cortex Correlates with Memory Performance in Wild-Type Mice But Not the APP/PS1 Mouse Model of Cerebral Amyloidosis. *The Journal of Neuroscience,* Feb 10;36(6):1871-8. DOI: 10.1523/JNEUROSCI.3131-15.2016. PMID: 26865611.

14. Barense, M.D., Warren, J.D., **Bussey, T.J.** and **Saksida, L.M.** (2016). The Temporal Lobes. In M. Husain and J. Schott (Eds.) *Oxford Textbooks in Clinical Neurology: Cognitive Neurology and Dementia* (pp. 39-49). Oxford, UK: Oxford University Press.

15. Cowell, R., **Bussey, T.J.** and **Saksida, L.M.** (2016). Computational and Functional Specialization of Memory. In R. Murphy and R. Honey (Eds.) *The Wiley Handbook on the Cognitive Neuroscience of Learning* (pp. 249-282). West Sussex, UK: John Wiley and Sons Inc.

16. Chin, J.L., Billia, M., Relle, J., Roethke, M. C., Popeneciu, I. V., Kuru, T.H., Hatiboglu, G., Mueller-Wolf, M. B., Motsch, J., Romagnoli, C., Kassam, Z., Harle, C.C., Hafron, J., Nandalur, K.R., **Chronik, B.A.**, Burtnyk, M., Schlemmer, H-P and Pahernik, S. (2016). Magnetic Resonance Imaging-Guided Transurethral Ultrasound Ablation of Prostate Tissue in Patients with Localized Prostate Cancer: A Prospective Phase 1 Clinical Trial. *European Urology,* 70(3):447-455. [DOI: 10.1016/j.eururo.2015.12.029].

17. Walton, D.M., Elliott, J.M., Lee, J., Loh, E., MacDermid, J.C., Schabrun, S., Siqueira, W.L., **Corneil, B.D.**, Aal, B., Birmingham, T., Brown, A., Cooper, L.K., Dickey, J.P., Dixon, S.J., Fraser, D.D., et al. (2016). Research Priorities in the Field of Posttraumatic Pain and Disability: Results of a Transdisciplinary Consensus-Generating Workshop. *Pain Research & Management,* 2016:1859434. PMID 27445598 DOI: 10.1155/2016/1859434.

18. Lehmann, S.J. and **Corneil, B.D.** (2016). Transient Pupil Dilation after Subsaccadic Microstimulation of Primate Frontal Eye Fields. *The Journal of Neuroscience: the Official Journal of the Society For Neuroscience,* 36: 3765-76. PMID 27030761 DOI: 10.1523/JNEUROSCI.4264-15.2016.

19. Rincon-Gonzalez, L., Selen, L.P., Halfwerk, K., Koppen, M., **Corneil, B.D.** and Medendorp, W.P. (2016). Decisions in motion: vestibular contributions to saccadic target selection. *Journal of Neurophysiology,* 2016 Sep 1;116(3):977-85. doi: 10.1152/jn.01071.2015. Epub 2016 Jun 8.

20. Gerhard, T.M., **Culham, J.C.** and Schwarzer, G. (2016). Distinct visual processing of real objects and pictures of those objects in 7- to 9-month-old infants. *Frontiers in Developmental Psychology,* 7, 827. [Gerhard was a co-supervised trainee for CREATE-IRTG international training grant.]

21. Squires, S.D., Macdonald, S.N., **Culham, J.C.** and Snow, J.C. (2016). Priming tool actions: Are real objects more effective primes than pictures? *Experimental Brain Research*, 234(4), 963-976.

22. **Culham, J.C.** (2016). The Left Hand Doesn't Know What the Right Hand Is Doing—or Does It?. *Cell reports,* 17(11), pp.2809-2810.

23. **Culham, J.C.,** Snow, J.C., Gerhard, T.M. and Schwarzer, G., 2016. The treachery of images": Why the brain responds differently to real object than photos. *International Journal of Psychology,* 51, p.1007.

24. Fabbri, S., Stubbs, K.M., **Cusack, R.** and **Culham, J.C.** (2016). Disentangling representations of object and grasp properties in the human brain. *Journal of Neuroscience*, 36(29), 7648-7662.

25. **Cusack, R.**, Ball, G., Smyser, C.D. and Dehaene-Lambertz, G. (2016). A Neural Window on the Emergence of Cognition. *Annals of the New York Academy of Sciences,* 1369(1) 7–23.

26. Erez, J., **Cusack, R.**, Kendall, W. and Barense, M.D. (2016). Conjunctive coding of complex object features in human anterior temporal cortex. *Cerebral Cortex*, 26(5) 2271-82.

27. Mitchell, D.J. and **Cusack, R.** (2016). Semantic and Emotional Content of Imagined Representations in Human Occipitotemporal Cortex. *Scientific Reports,* 6:20232. DOI: 10.1038/srep20232.

28. **Daley, M.**, Dekaban, G., **Bartha, R.**, Brown, A., Stewart, T. C., Doherty, T., Fischer, L., Holmes, J., **Menon, R.S.**, Rupar, C.A., Shoemaker, J.K. and Fraser, D. D. (2016). Metabolomics profiling of concussion in adolescent male hockey players: a novel diagnostic method. *Metabolomics,* 12 (12): 185.

29. Sobotka, J.A., **Daley, M.**, Chandrasekaran, S., Rubin, B.D. and Thompson, G.J. (2016). Structure and function of gene regulatory networks associated with worker sterility in honeybees. *Ecology and Evolution,* n/a--n/a.

30. Thaler, L., Paciocco, J., **Daley, M.**, Lesniak, G.D., Purcell, D.W., Fraser, J.A., Dutton, G.N., Rossit, S., **Goodale, M.A.** and **Culham, J.C.** (2016). A selective impairment of perception of sound motion direction in peripheral space: A case study. *Neuropsychologia,* 80: 79--89.

31. Yokoi, A., Bai, W. and **Diedrichsen, J.** (2016). Restricted transfer of learning between unimanual and bimanual finger sequences. *Journal of Neurophysiology,* published 14 December 2016 DOI: 10.1152/jn.00387.2016.

32. Walther, A., Nilli, H., Ejaz, N., Alink, A., Kriegeskorte, N. and **Diedrichsen, J.** (2016). Reliability of dissimilarity measures for multivariate fMRI pattern analysis. *Neuroimage,* 137: 188-200.

33. Franklin, D. W., Reichenbach, A., Franklin, S. and **Diedrichsen, J.** (2016). Temporal evolution of spatial computations for visuomotor control. *Journal of Neuroscience,* 36(8): 2329-2341.

34. Kriegeskorte, N. and **Diedrichsen, J.** (2016). Inferring brain-computational mechanisms with models of activity measurements. *Philosophical Transactions of the Royal Society B: Biological Sciences,* 2016 Oct 5;371(1705). pii: 20160278. doi: 10.1098/rstb.2016.0278 PMID: 27574316.

35. Westendorff, S., Kaping, D., **Everling, S.** and Womelsdorf, T. (2016). Prefrontal and Anterior Cingulate Cortex Neurons Encode Attentional Targets Even When They Do Not Apparently Bias Behavior. *Journal of Neurophysiology,* 116: 796-811.

36. Vijayraghavan, S., Major, A.J. and **Everling, S.** (2016). Dopamine D1 and D2 receptors make dissociable contributions to dorsolateral prefrontal cortical regulation of rule-guided oculomotor behavior. *Cell Reports,* 16: 805-816.guided.

37. Gilbert, K.M., Gati, J.S., Barker, K., **Everling, S.** and **Menon, R.S.** (2016). Optimized parallel transmit and receive radiofrequency coil for ultrahigh -field MRI of monkeys. *Neuroimage,* 125:153-161.

38. Balcarras, M., Ardid, S., Kaping, D., **Everling, S.** and Womelsdorf, T. (2016). Attentional selection can be predicted by reinforcement learning of task-relevant stimulus features weighted by value-independent stickiness. *Journal of Cognitive Neuroscience,* 28:333-349.

39. Skoblenick, K.S., Womelsdorf, T., and **Everling, S.** (2016). Ketamine alters outcome-related local field potentials in monkey prefrontal cortex. *Cerebral Cortex,* 26: 2743-2752.

40. Gilbert, K.M., Gati, J.S., Barker, K., **Everling, S.** and **Menon, R.S.** (2016). Optimized parallel transmit and receive radiofrequency coil for ultrahigh-field MRI of monkeys. *NeuroImage,* 125:153-61. (January 2016).

41. Arnold, D.H., Williams, J.D., Phipps, N.E. and **Goodale, M.A.** (2016). Sharpening vision by adapting to flicker. *Proceedings of the National Academy of Sciences of the United States of America,* 2016 Nov 1;113(44):12556-12561. Epub 2016 Oct 17. PMID: 27791115.

42. Thaler, L. and **Goodale, M.A.** (2016). Echolocation in humans: an overview. *Wiley Interdisciplinary Reviews: Cognitive Science,* 2016 Nov;7 (6):382-393. DOI: 10.1002/wcs.1408. Epub 2016 Aug 19. Review. PMID: 27538733.

43. Whitwell, R.L. and **Goodale, M.A.** (2016). Real and illusory issues in the illusion debate (Why two things are sometimes better than one): Commentary on Kopiske et al. *Cortex,* 2017 Mar;88:205-209. DOI: 10.1016/j.cortex.2016.06.019. Epub 2016 Jul 9. No abstract available.

44. Wood, D.K., Chouinard, P.A., Major, A.J. and **Goodale M.A.** (2016). Sensitivity to biomechanical limitations during postural decision-making depends on the integrity of posterior superior parietal cortex. *Cortex,* 2016 Jul 15. pii: S0010-9452(16)30194-0. DOI: 10.1016/ j.cortex.2016.07.005. [Epub ahead of print] PMID: 27477623.

45. Crewther, D.P., Crewther, D., Bevan, S., **Goodale, M.A.** and Crewther, S.G. (2016). Greater magnocellular saccadic suppression in high versus low autistic tendency suggests a causal path to local perceptual style. *Royal Society Open Science,* 2015 Dec 16;2(12):150226. DOI: 10.1098/ rsos.150226. eCollection 2015 Dec. PMID: 27019719.

46. Yabe, Y., Dave, H., and **Goodale M.A.** (2016). Temporal distortion in the perception of actions and events. *Cognition,* 158, 1-9.

47. Paulun, V.C., Gegenfurtner, K.R., **Goodale, M.A.** and Fleming, R.W. (2016). Effects of material properties and object orientation on precision grip kinematics. *Experimental Brain Research,* 2016 Aug;234(8):2253-65. DOI: 10.1007/s00221-016-4631-7. Epub 2016 Mar 26. PMID: 27016090.

48. Tang, R., Whitwell, R.L. and **Goodale, M.A.** (2016). Unusual hand postures but not familiar tools show motor equivalence with precision grasping. *Cognition,* 2016 Jun;151:28-36. DOI: 10.1016/j.cognition.2016.02.013. Epub 2016 Mar 3. PMID: 26945228.

49. Whitwell, R.L., Buckingham, G., Enns, J.T., Chouinard, P.A. and **Goodale, M.A.** (2016). Rapid decrement in the effects of the Ponzo display dissociates action and perception. *Psychonomic Bulletin & Review,* 2016 Aug;23(4):1157-63. DOI: 10.3758/s13423-015-0975-4.

50. Buckingham, G., **Goodale, M.A.**, White, J.A. and Westwood, D.A. (2016). Equal-magnitude size-weight illusions experienced within and between object categories. *Journal of Vision,* 2016;16(3):25. DOI: 10.1167/16.3.25. PMID: 26891832.

51. Kogutek, D.L., Holmes, J.D., **Grahn, J.A.**, Lutz, S.G. and Ready, E. (2016). Active Music Therapy in the Treatment of Physical Improvement in Rehabilitation. *Advances in Mind-Body Medicine,* 30(4):14-22.

52. Carter, C.E. and **Grahn, J.A.** (2016). Optimizing music learning: Exploring how blocked and interleaved practice schedules affect advanced performance. *Frontiers in Psychology,* 7:1251.

53. Nichols, E.S. and **Grahn, J.A.** (2016). Neural correlates of audiovisual integration in music reading. *Neuropsychologia,* 91:199-210.

54. Cameron, D.J., Pickett, K.A., Earhart, G.M. and **Grahn, J.A.** (2016). The effect of dopaminergic medication on beat-based auditory timing in Parkinson's disease. *Frontiers in Neurology,* 7:19 DOI: 10.3389/fneur.2016.00019.

55. Weiler, J., Saravanamuttu, J., **Gribble, P.L.** and **Pruszynski, J.A.** (2016). Coordinating long-latency stretch responses across the shoulder, elbow and wrist during goal-directed reaching. *Journal of Neurophysiology,* 116:2236-49.

56. Martin, C.B., Cowell, R.A., **Gribble, P.L.**, Wright, J. and **Köhler, S.** (2016). Distributed category-specific recognition memory signals in human perirhinal cortex. *Hippocampus,* 26, 423-436.

57. Gu, C., Wood, D.K., **Gribble, P.L.** and **Corneil, B.D.** (2016). A Trial-by-Trial Window into Sensorimotor Transformations in the Human Motor Periphery. *Journal of Neuroscience,* 36(31):8273-82.

58. McGregor, H.R., Cashaback, J.G. and **Gribble, P.L.** (2016). Functional Plasticity in Somatosensory Cortex Supports Motor Learning by Observing. *Current Biology,* 26(7):921-927.

59. Wong, J.D., Bobbert, M.F., van Soest, K.A.J., **Gribble, P.L.** and Kistemaker, D.A. (2016). Optimizing the distribution of leg muscles for vertical jumping. *PLoS ONE,* 11(2):e0150019, 2016.

60. Ostry, D.J. and **Gribble, P.L.** (2016). Sensory plasticity in human motor learning. *Trends in Neuroscience,* 39(2):114-123.

61. Kotelnikova, Y., LeMoult, J., Mackrell, S.V., Sheikh, H.I,. Singh, S.M., Joormann, J., Gotlib, I.H. and **Hayden, E.P.** (2016). The Serotonin Transporter Promoter Variant, Stress, and Attentional Biases in Middle Childhood. *Cognition and Emotion,* 101: 371-379. PMID 27956753 DOI: 10.1016/j.paid.2016.06.004.

62. Johnson, V.C., Olino, T.M., Klein, D.N., Dyson, M.W., Bufferd, S.J., Durbin, C.E., Dougherty, L.R. and **Hayden, E.P.** (2016). A Longitudinal Investigation of Predictors of the Association Between Age 3 and Age 6 Behavioural Inhibition. *Journal of Research in Personality,* 63: 51-61. PMID 27765998 DOI: 10.1016/j.jrp.2016.04.008.

63. Johnson, V.C., Kryski, K.R., Sheikh, H.I., Smith, H.J., Singh, S.M. and **Hayden, E.P.** (2016). The serotonin transporter promoter polymorphism moderates the continuity of behavioral inhibition in early childhood. *Development and Psychopathology,* 28: 1103-1116.

64. Mackrell, S.V.M., Kotelnikova, Y., Jordan, P.L. and **Hayden, E.P.** (2016). The role of pubertal development in emerging depression risk in middle childhood. Personality and Individual Differences, 98: 315-319. DOI: 10.1016/j.paid.2016.03.035.

65. Kotelnikova, Y., Olino, T.M., Klein, D.N., Mackrell, S.V.M. and **Hayden, E.P.** (2016). Higher- and lower-order factor analyses of the Temperament in Middle Childhood Questionnaire (TMCQ). *Assessment,* Advance online publication.

66. Kopala-Sibley, D.C., **Hayden, E.P.**, Singh, S.M., Sheikh, H.I., Kryski, K.R. and Klein, D.N. (2016). Gene-environment correlations in the cross-generational transmission of parenting: The moderating role of children's 5-HTTLPR genotype. *Social Development,* Advance online publication.

67. Pagliaccio, D., Luking, K.R., Anokhin, A.P., Gotlib, I.H., **Hayden, E.P.**, Olino, T.M., Peng, C., Proudfit, G.H. and Barch, D.M. (2016). Revising the BIS/BAS to study development: Metric invariance and normative effects of age and sex from childhood through adulthood. *Psychological Assessment,* 4, 429-442.

68. Kotelnikova, Y., Olino, T.M., Klein, D.N., Kryski, K.R. and **Hayden, E.P.** (2016). Higher- and lower-order factor analyses of the Children's Behavior Questionnaire in early and middle childhood. *Psychological Assessment,* 28, 92-108.

69. Nichols, E.S. and **Joanisse, M.F.** (2016). Functional activity and white matter microstructure reveal the independent effects of age of acquisition and proficiency on second-language learning. *NeuroImage,* 143: 15-25.

70. Samson, F. and **Johnsrude, I.S.** (2016). Effects of the constant presence of a target or masker voice on target speech intelligibility. *Journal of the Acoustical Society of America,* 139(3), 1037. PMID:27036241.

71. Herrmann, B., Henry, M.J., **Johnsrude, I.S.** and Obleser, J. (2016). Altered temporal dynamics of neural adaptation in the aging human auditory cortex. *Neurobiology of Aging,* 2016 Sep;45:10-22. doi: 10.1016/j.neurobiolaging.2016.05.006. Epub 2016 May 14. PMID: 27459921.

72. Lee, S.M., Peltsch, A., Kilmade, M., Brien, D.C., Coe, B.C., **Johnsrude, I.S.** and Munoz, D.P. (2016). Neural Correlates of Predictive Saccades. *Journal of Cognitive Neuroscience,* 2016 Aug;28(8):1210-27. doi: 10.1162/jocn_a_00968. Epub 2016 Apr 7. PMID:27054397.

73. Wayne, R.V., Hamilton, C., Jones Huyck, J. and **Johnsrude, I.S.** (2016). Working Memory Training and Speech in Noise Comprehension in Older Adults. *Frontiers in Aging Neuroscience,* 2016 Mar 22;8:49. doi: 10.3389/fnagi.2016.00049. eCollection 2016. PMID: 27047370.

74. Wayne, R.V. and **Johnsrude, I.S.** (2016). Working memory training and speech in noise comprehension in older adults. *Frontiers in Aging Neuroscience,* Mar 22, 8:49. PMID:27047370.

75. Lee, S., Kilmade, M., Peltsch, A., Brien, D., Coe, B., **Johnsrude, I.S.** and Munoz, D.P. (2016). Neural correlates of predictive saccades. *Journal of Cognitive Neuroscience,* PMID:27054397.

76. Fiacconi, C.M., Peter, E. L., Owais, S. and **Köhler, S.** (2016). Knowing by heart: Visceral feedback shapes recognition memory judgments. *Journal of Experimental Psychology: General,* 145, 559-572. (Extensive press coverage, e.g. http://www.medicalnewstoday.com/articles/308849.php).

77. Epp, J.R., Mera, R.S., **Köhler, S.**, Josselyn, S.A. and Frankland, P.W. (2016). Neurogenesis-mediated forgetting minimizes proactive interference. *Nature Communications,* 7, 10838.

78. Meredith, M.A., Clemo, H.R., Corley, S.M., Chabot, N. and **Lomber, S.G.** (2016). Cortical and thalamic connectivity of the auditory anterior ectosylvian cortex of early-deaf cats: Implications for neural mechanisms of crossmodal plasticity. *Hearing Research,* 333: 25–36.

79. Hall, A.J., Butler B.E. and **Lomber, S.G.** (2016). The cat's meow: A high-field fMRI assessment of cortical activity in response to vocalizations and complex auditory stimuli. *NeuroImage,* 127: 44-57. PMID: 26658927.

80. Butler, B.E., Chabot, N. and **Lomber, S.G.** (2016). Quantifying and comparing the pattern of thalamic and cortical projections to the posterior auditory field in hearing and deaf cats. *Journal of Comparative Neurology,* 524: 3042-3063. DOI: 10.1002/cne.24005. PMID: 27019080.

81. Land, R., Baumhoff, P., Tillein, J., **Lomber, S.G.**, Hubka, P. and Kral, A. (2016). Cross-modal plasticity in higher-order auditory cortex of congenitally deaf cats does not limit auditory responsiveness to cochlear implants. *Journal of Neuroscience,* 36: 6175-6185. DOI: 10.1523/JNEUROSCI.0046-16.2016. PMID: 27277796.

82. Peel, T.R., Hafed, Z,M., Dash, S., **Lomber, S,G.** and **Corneil, B.D.** (2016). A Causal Role for the Cortical Frontal Eye Fields in Microsaccade Deployment. *PLoS Biology,* 14: e1002531. PMID 27509130 DOI: 10.1371/journal.pbio.1002531.PMID: 27509130.

83. Johnston, K., **Lomber, S.G.** and **Everling, S.** (2016). Unilateral Deactivation of Macaque Dorsolateral Prefrontal Cortex Induces Biases in Stimulus Selection. *Journal of Neurophysiology,* 115:1468-1476.

84. Wong, C., Wong, G., Pearson, K.G. and **Lomber, S.G.** (2016). Memory-Guided Stumbling Correction in the Hindlimb of Quadrupeds Relies on Parietal Area 5. *Cerebral Cortex,* 2016 Dec 23. doi: 10.1093/cercor/bhw391. [Epub ahead of print]

85. Butler, B.E., Chabot, N. and **Lomber, S.G.** (2016). A quantitative comparison of the hemispheric, areal, and laminar origins of sensory and motor cortical projections to the superior colliculus of the cat. *Journal of Comparative Neurology,* 524: 2623–2642. PMID: 26850989.

86. Clemo, H.R., **Lomber, S.G.** and Meredith, M.A. (2016). Synaptic basis for cross-modal plasticity: Enhanced supragranular dendritic spine density in anterior ectosylvian auditory cortex of the early-deaf cat. *Cerebral Cortex,* 26: 1365-1376. PMID: 25274986.

87. **Lomber, S.G.** and Butler, B.E. (2016). Sensory development: Brief visual deprivation alters audiovisual interactions. *Current Biology,* 26: R1185–1187. DOI: 10.1016/j.cub.2016.10.025. PMID: 27875697.

88. Glizer, D. and **MacDonald, P.A.** (2016). Cognitive Training in Parkinson's Disease: A Review of Studies from 2000 to 2014. *Parkinsons Disease,* 2016 Jan 1; 2016: 9291713.

89. Yang, X.Q., Glizer, D., Vo, A., Seergobin, K.N. and **MacDonald, P.A.** (2016). Pramipexole Increases Go Timeouts but Not No-go Errors in Healthy Volunteers. *Frontiers in Human Neuroscience,* 2016 Oct 18; 10: 523, Senior Responsible Author, DOI: 10.3389/fnhum.2016.00523.

90. Gallant, H., Vo, A., Seergobin, K.N. and **MacDonald, P.A.** (2016). Pramipexole Impairs Stimulus-Response Learning in Healthy Young Adults. *Frontiers in Neuroscience,* 2016 Aug 19; 10: 374, Senior Responsible Author, DOI: 10.3389/fnins.2016.00374.

91. Hampshire, A., Hellyer, P.J., Parkin, B., Hiebert, N., **MacDonald, P.A.**, **Owen A.M.**, Leech, R. and Rowe, J. (2016). Network mechanisms of intentional learning. *Neuroimage,* 2016 Feb 15; 127: 123-34, Coauthor, DOI: 10.1016/j.neuroimage.2015.11.060.

92. Welk, B., McArthur, E., Morrow, S.A., **MacDonald, P.A.**, Hayward, J., Leung, A. and Lum, A. (2016). Association Between Gadolinium Contrast Exposure and the Risk of Parkinsonism. *JAMA,* 2016 Jul 5; 316 (1): 96-8, Coauthor, DOI: 10.1001/jama.2016.8096.

93. Vo, A., Seergobin, K.N., Morrow, S.A. and **MacDonald, P.A.** (2016). Levodopa impairs probabilistic reversal learning in healthy young adults. *Psychopharmacology (Berl),* 2016 Jul 1; 233 (14): 2753-63, Senior Responsible Author, DOI: 10.1007/s00213-016-4322-x.

94. Doucet, G., Gulli, R.A. and **Martinez-Trujillo, J.C.** (2016). Cross-species 3D virtual reality toolbox for visual and cognitive experiments. *Journal of Neuroscience Methods,* 2016 Jun 15, 266:84-93. PMID 27015795 DOI: 10.1016/j.jneumeth.2016.03.009.

95. Bowles, B., Duke, D., Rosenbaum, S., **McRae, K.** and **Köhler, S.** (2016). Impaired assessment of cumulative lifetime familiarity for object concepts after left anterior temporal-lobe resection that includes perirhinal cortex but spares the hippocampus. *Neuropsychologia,* 90, 170-179.

96. Jouravlev, O. and **McRae, K.** (2016). Thematic relatedness production norms for 100 object concepts. *Behavior Research Methods,* 48, 1349-1357.

97. Manning, K.Y., **Menon, R.S.**, Mesterman, R., Gorter, J.W., Switzer, L., Campbell, C. and Fehlings, D. (2016). Neuroplastic sensorimotor resting state network reorganization in children with hemiplegic cerebral palsy treated with constraint-induced movement therapy. *Journal of Child Neurology,* 31(2):220-6. (February 2016).

98. Connell, I.R. and **Menon, R.S.** (2016). General Coupling Matrix Synthesis for Decoupling MRI RF Arrays. *IEEE Trans Med Imaging,* 2016 Oct;35 (10):2229-2242. Epub 2016 Apr 13.

99. Penner, J., Ford, K.A., Taylor, R., Schaefer, B., Théberge, J., Neufeld, R.W.J., Osuch, E.A., **Menon. R.S.**, Rajakumar, N., Allman J.M. and Williamson, P.C. (2016). Medial prefrontal and anterior insular connectivity in early schizophrenia and major depressive disorder: a resting functional MRI evaluation of large-scale brain network models. *Frontiers in Human Neuroscience,* 10:1-14 (March 2016).

100. Ghahremani, M., Hutchison, R.M., **Menon, R.S.** and **Everling, S.** (2016). Frontoparietal functional connectivity in the common marmoset. *Cerebral Cortex,* 2016; 1-17. DOI: 10.1093/cercor/bhw198.

101. Schenk, S., **Minda, J.P.**, Lech, R.K. and Suchan, B. (2016). Out of sight, out of mind: Categorization learning and normal aging. *Neuropsychologia,* 91, 222–233.

102. Rabi, R. R. and **Minda, J.P. (**2016). Category learning in older adulthood: A study of the Shepard, Hovland, and Jenkins (1961) tasks. *Psychology of Aging,* 31, 185–197.

103. Tavares, T.P., Logie, K. and **Mitchell, D.G.V.** (2016). Opposing Effects of Perceptual versus Working Memory Load on Emotional Distraction. *Experimental Brain Research,* 234(10): 2945-2956.

104. Oliver, L.D., Neufeld, R.W.J., Dziobek, I. and **Mitchell, D.G.V.** (2016). Distinguishing the relationship between different aspects of empathic responding as a function of psychopathic, autistic, and anxious traits. *Personality and Individual Differences,* 99: 81-88.

105. Vargas, E.R., **Mitchell, D.G.V.**, Greening, S.G. and Wahl, L.M. (2016). Network analysis of human fMRI data suggests modular restructuring after simulated acquired brain injury. *Medical & Biological Engineering & Computing,* 54(1), pp.235-248.

106. Burhan, A.M., Anazodo, U.C., Chung, J.K., Arena, A., Graff-Guerrero, A. and **Mitchell, D.G.V.** (2016). The Effect of Task-Irrelevant Fearful-Face Distractor on Working Memory Processing in Mild Cognitive Impairment versus Healthy Controls: An Exploratory fMRI Study in Female Participants. *Behavioural Neurology,* Volume 2016 (2016), Article ID 1637392, 13 pages. http://dx.doi.org/10.1155/2016/1637392.

107. Roach, V.A., Fraser, G.M., Kryklywy, J.H., **Mitchell, D.G.V.** and Wilson, T.D. (2016). The eye of the beholder: Can patterns in eye movement reveal aptitudes for spatial reasoning?. Anatomical sciences education, 9(4), pp.357-366.

108. Tomaiuolo, F., Cecchetti, L., Gibson, R.M., Logi, F., **Owen, A.M.**, Malasoma, F., Cozza, S., Pietrini, P. and Ricciardi, E. (2016). Progression from vegetative to minimally conscious state is associated with changes in brain neural response to passive tasks: A longitudinal single-case fMRI study. *Journal of the International Neuropsychological Society,* 22, 1-11.

109. Guldenmund, P., Gantner, I.S., Baquero, K., Das, T., Demertzi, A., Boveroux, P., Bonhomme, V., Vanhaudenhuyse, A., Bruno, M-A., Gosseries, O., Noirhomme, Q. Kirsch, M., Boly, M., **Owen, A.M.**, Laureys, S., Gómez, F. and **Soddu, A.** (2016). Propoful-induced frontal cortex disconnection: a study of resting state networks, total brain connectivity, and mean BOLD signal oscillation frequencies. *Brain Connectivity,* (6) 3: 225-237.

110. Bayne, T., Hohwy, J. and **Owen, A.M.** (2016). Are there levels of consciousness? *Trends of Cognitive Sciences,* 1554, DOI: 10.1016/ j.tics.2016.03.009.

111. Gruszka, A., Bor, D., Barker, R.R., Necka, E. and **Owen, A.M.** (2016). The role of executive processes in working memory deficits in Parkinson's Disease. *Polish Psychological Bulletin,* 47(1), 123-130.

112. Fernández-Espejo, D. and **Owen, A.M.** (2016). Peripheral causes of cognitive motor dissociation in patients with vegetative or minimally conscious state - Letter in Reply. *JAMA Neurology,* DOI:10.1001/jamaneurol.2016.0143.

113. Fallon, S.J., Hampshire, A., Barker, R.A. and **Owen, A.M.** (2016). Learning to be inflexible: enhanced attentional biases in Parkinson's disease. *Cortex,* 82:24-34.

114. Beukema, S., Gonzalez-Lara, L.E., Finoia, P., Kamau, E., Allanson, J., Chennu, S., Gibson, R.M., Pickard, J.D., **Owen, A.M.** and Cruse, D. (2016). A hierarchy of event-related potential markers of auditory processing in disorders of consciousness. *NeuroImage: Clinical,* 12, 359-371.

115. Fiacconi, C.M. and **Owen, A.M.** (2016). Using facial electromyography to detect preserved emotional processing in the vegetative state: A proof-of-principle study. *Clinical Neurophysiology,* 127: 3000-3006.

116. Byram, A.C., Lee, G., **Owen, A.M.**, Ribary, U., Stoessl, A.J., Townson, A. and Illes, J. (2016). Ethical and Clinical Considerations at the Intersection of Functional Neuroimaging and Disorders of Consciousness. *Cambridge Quarterly of Healthcare Ethics,* 25, 613-622.

117. Huntley, J.D., Hampshire, A., Bor, D., **Owen, A.M.** and Howard, R.J. (2016). Adaptive working memory strategy training in early Alzheimer's disease: a randomised controlled trial. *British Journal of Psychiatry,* DOI: 10.1192/bjp.bp.116.182048.

118. Huntley, J.D., Hampshire, A., Bor, D., **Owen, A.M.** and Howard, R.J. (2016). The Importance of sustained attention in early Alzheimer's disease. *International Journal of Geriatric Psychiatry,* DOI: 10.1002/gps.4537.

119. Gibson, R., Chennu, S., Fernández-Espejo, D., Naci, L., **Owen, A.,M.** and Cruse, D. (2016). Somatosensory attention identifies both overt and covert awareness in disorders of consciousness. *Annals of Neurology,* DOI: 10.1002/ana.24726.

120. Fang, Z., Sergeeva, V., Ray, L., Viczko, J., **Owen, A.M.** and Fogel, S. (2016). Sleep spindles and intellectual ability: Epiphenomenon or directly related? *Journal of Cognitive Neuroscience,* 14:1-16.

121. Naci, L., Graham, M., **Owen, A.M.** and Weijer, C. (2016). Covert narrative capacity: A cross-section of the preserved mental life in patients thought to lack consciousness. *Annals of Clinical and Translational Neurology,* DOI: 10.1002/acn3.376.

122. Bayne, T., Hohwy, J. and **Owen, A.M.** (2016). Response to Fazekas and Overgaard: Degrees and Levels. *Trends of Cognitive Sciences,* 2016 Oct;20(10):716-7. doi: 10.1016/j.tics.2016.06.010. Epub 2016 Jul 11.

123. Illes, J., **Owen, A.M.**, Byram, A.C. and MCS Neuroimaging Workgroup. (2016). Operationalizing Neuroimaging for Disorders of Consciousness: The Canadian Context. *Canadian Journal of Neurological Sciences,* 2016 Jul;43(4):578-80. doi: 10.1017/cjn.2015.395. Epub 2016 Feb 4.

124. Jeffrey, J., Whelan, J., **Pirouz, D.M.** and Snowdon, A.W. (2016). Boosting safety behaviour: Descriptive norms encourage child booster seat usage amongst low involvement parents. *Accident Analysis & Prevention,* 92, pp.184-188.

125. Omrani, M., Murnaghan, C., **Pruszynski, J.A.** and Scott, S.H. (2016). Distributed task-specific processing of somatosensory feedback for voluntary motor control. *eLife,* 14;5.

126. **Pruszynski, J.A.**, Johansson, R.S. and Flanagan, J.R. (2016). A rapid tactile-motor reflex automatically guides reaching toward handheld objects. *Current Biology,* 26:788-792.

127. Hemming, E., Lillicrap, T.P., Omrani, M., Herter, T.M., **Pruszynski, J.A.** and Scott, S.H. (2016). Load classified neurons in primary motor cortex predict muscle activation patterns in a reaching task. *Journal of Neurophysiology,* 115: 2021-2031.

128. Nilsson, S.R., Fejgin, K., Gastambide, F., Vogt, M.A., Kent ,B.A., Nielsen, V., Nielsen, J., Gass, P., Robbins, T.W., **Saksida, L.M.**, Stensbøl ,T.B., Tricklebank, M.D., Didriksen, M. and **Bussey, T.J.** (2016). Assessing the cognitive translational potential of a mouse model of the 22q11.2 microdeletion system. *Cerebral Cortex,* 26(10):3991-4003. DOI: 10.1093/cercor/bhw229.

129. Nilsson, S., Celada, P., Fejgin, K., Thelin, J., Nielsen, J., Santana, N., Heath, C., Kent, B., **Saksida, L.M.**, Stensbøl, T., Robbins, T., Bastlund, J., **Bussey, T.J.**, Artigas, F. and Didriksen, M. (2016). A mouse model of the 15q13.3 microdeletion syndrome shows prefrontal neurophysiological dysfunctions and attentional impairment. *Psychopharmacology,* 233(11):2151-2163. DOI: 10.1007/s00213-016-4265-2.

130. Hvoslef-Eide, M., Nilsson, S., **Saksida, L.M.** and **Bussey, T.J.** (2016). Cognitive translation using the rodent touchscreen testing approach. In T. Robbins and B. Sahakian (Eds.) *Current Topics in Behavioral Neurosciences: Translational Neuropsychopharmacology,* (pp.423-447). Springer International Publishing Switzerland.

131. Kent, B.A., Hvoslef-Eide M, **Saksida, L.M.** and **Bussey, T.J.** (2016). The representational-hierarchical view of pattern separation: Not just hippocampus, not just space, not just memory? *Neurobiology of Learning and Memory,* 129:99-106. DOI: 10.1016/j.nlm.2016.01.006.

132. Di Perri, C., Bahri, M.A., Amico, E., Thibaut, A., Heine, L., Antonopoulos, G., Charland-Verville, V., Wannez, S., Gomez, F., Hustinx, R., Tshibanda, L., Demertzi, A., **Soddu, A.** and Laureys, S. (2016). Neural correlates of consciousness in patients who have emerged from a minimally conscious state: a cross-sectional multimodal imaging study. *Lancet Neurology,* S1474-4422(16)00111-3.

133. Guldenmund, P., **Soddu, A.**, Baquero, K,. Vanhaudenhuyse, A., Bruno, M.A., Gosseries, O., Laureys, S. and Gómez,. F. (2016). Brain damage in patients with disorders of consciousness: a voxel-based morphometry study. *Brain Injury,* 30(3):343-52.

134. Riganello, F., Macri, S., Alleva, E., Petrini, C., **Soddu, A.**, Leòn-Carriòn, J. and Dolce, G. (2016). Pain perception in unresponsive wakefulness syndrome may challenge the interruption of artificial nutrition and hydration: neuroethics in action. *Frontiers in Neurology,* 2016, 7:202.

135. Cavaliere, C., Aiello, M., Di Perri, C., Amico, E., Martial, C., Thibaut, A., Laureys, S. and **Soddu, A.** (2016). Functional connectivity substrates for tDCS response in Minimally Conscious State patients. *Frontiers in Cellular Neuroscience,* 2016, 10:257.

136. Bonhomme, V., Vanhaudenhuyse, A., Demertzi, A., Bruno, M.A., Jaquet, O., Bahri, M.A., Plenevaux, A., Boly, M., Boveroux, P., **Soddu, A.**, Brichant, J.F., Maquet, P. and Laureys, S. (2016). Resting state network-specific breakdown of functional connectivity during ketamine alteration of consciousness. *Anesthesiology,* 2016 Nov;125(5):873-888.

137. **Stevenson, R.A.**, Segers, M., Ferber, S., Barense, M.D., Camarata, S. and Wallace, M.T. (2016). Keeping time in the brain: Autism spectrum disorder and audiovisual temporal processing. *Autism Research,* 9(7), 720-738.

138. **Stevenson, R.A.**, Sun, S.Z., Hazlett, N., Cant, J.S., Barense, M.D. and Ferber, S. (2016). Seeing the forest and the trees: Default local processing in individuals with high autistic traits does not come at the expense of global attention. *Journal of Autism and Developmental Disorders,* 1-15.

139. Baum, S.H. and **Stevenson, R.A.** (2016). Early patterns of eye gaze and brain connectivity initiate developmental cascades in visual cognitive function. *Frontiers in Psychology,* 10, 215.

140. Altieri, N., Wenger, M.J., Wallace, M.T. and **Stevenson, R.A.** (2016). Does Number of Perceptions or Cross-Modal Auditory Cueing Influence Audiovisual Processing Speed? *The American Journal of Psychology,* 129(1), 11-21.

141. Krueger-Fister, J., **Stevenson, R.A.**, Barnett, Z.P. and Wallace, M.T. (2016). Multisensory interactions across stimulus effectiveness and temporal synchrony. *Neuropsychologia,* 88, 92-100.

142. Nidiffer, A.R., **Stevenson, R.A.**, Krueger-Fister, J., Barnett, Z.P. and Wallace, M.T. (2016). Multisensory interactions across stimulus effectiveness and spatial location. *Neuropsychologia,* 88, 83-91.

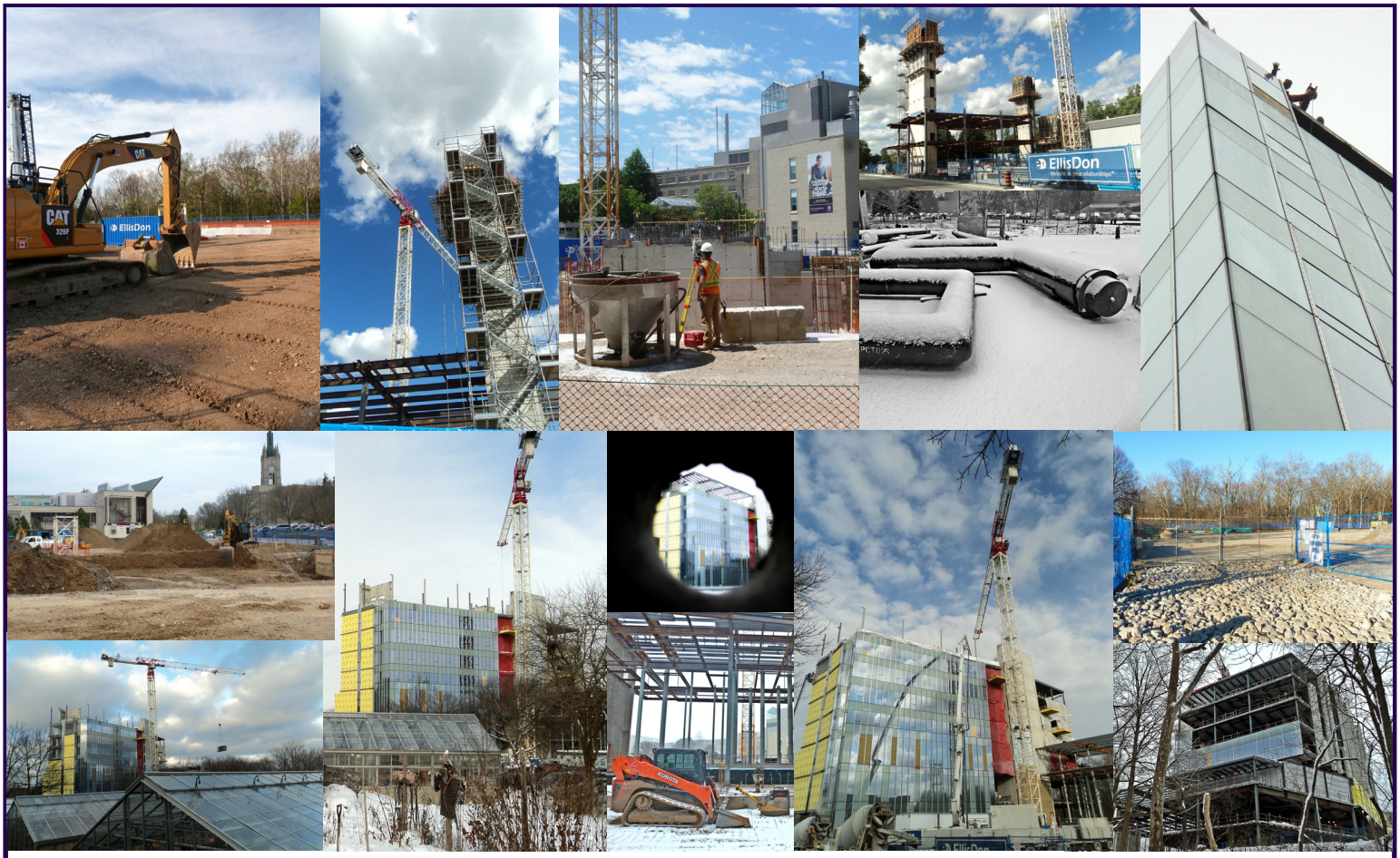
143. Lowe, M. X., **Stevenson, R.A.**, Wilson, K.E., Ouslis, N.E., Barense, M.D., Cant, J.S. and Ferber, S. (2016). *Journal of Experimental Psychology: Human Perception and Performance,* 42(2), 294-301.

144. Mueller, A.S. and **Timney, B.** (2016). Visual Acceleration Perception for Simple and Complex Motion Patterns. *PLoS ONE,* 11(2): e0149413. DOI:10.1371/journal.pone.0149413.

145. Mueller, A.S., González, E.G., McNorgan, C., Steinbach, M.J. and **Timney, B.** (2016). Effects of vertical direction and aperture size on the perception of visual acceleration. *Perception,* 45(6), pp.670-683.

146. **Timney, B.**, Ferreira, M. and Matson, S., 2016. A Signal Detection Analysis of the Effects of Alcohol on Visual Contrast Sensitivity. *Perception,* 45(12), pp.1358-1374.

All peer-reviewed publications listed above were submitted by BMI core members in 2016. Publications and other research details about the associate members can be found at: http://www.uwo.ca/bmi/members/associate_members.html.



Construction of Western Interdisciplinary Research Building in 2016

Cognitive neuroscience is entering an exciting era in which new technologies and ideas are making it possible to study the neural basis of cognition, perception, memory and emotion at the level of networks of interacting neurons, the level at which we believe many of the important operations of the brain take place.

John O'Keefe
The Nobel Prize in Physiology or Medicine 2014

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