



May 2010 e-newsletter

Our newsletter provides members and friends with regular, concise updates on the key issues and stories related to the Brain Research Centre. If you wish to submit an item for inclusion in the newsletter or have any comments, please email communications@brain.ubc.ca.

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Inaugural Canada Excellence Research Chair appointed to UBC: Up to \$10M towards research in Parkinson's, neurodegenerative disorders in adults and children



The Brain Research Centre, together with CMMT, UBC, VCHRI, and CFRI is pleased to welcome **Matthew Farrer** as its first Canada Excellence Research Chair in Neurogenetics and Translational Neuroscience. Nineteen inaugural chairholders at 13 universities were announced across the country on May 17.

The Canada Excellence Research Chair (CERC) program was established by the federal government in 2008 to help build a critical mass of expertise in strategic areas. For each chair, universities will receive up to \$10 million over seven years to support chairholders and their teams.

Dr. Farrer joins us from the Mayo Clinic in Jacksonville, Florida and will establish research teams and laboratories to study the molecular origins of brain diseases and pioneer new strategies for early detection and improved treatments for Parkinson's disease, and other neurodegenerative disorders in adults and children.

An expert in the field of molecular genetics, Dr. Farrer has made several influential discoveries in neurogenetics and is critically acclaimed for his work on the genetics of Parkinson's disease. He holds a PhD in Human Genetics from Imperial College London and a bachelor's degree in Biochemistry from King's College London in the UK. He was also a postdoctoral fellow in medical and community genetics at St. Mark's National Health Service Trust, UK.

His research has been funded by the U.S. National Institute of Aging, the Pacific Alzheimer's Research Foundation, and the Michael J. Fox Foundation for Parkinson's Research. He is a member of the Michael J. Fox Foundation's Scientific Advisory Board.

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Yu Tian Wang helps shed light on the dynamics of memory



Photo credit: Steve Van Iderstine

Why do we remember? What allows our brains to retain bits of information (while forgetting others) for years and years? Why can we remember things that happened decades ago, but forget whether we left the lights on when we left home this morning?

Yu Tian Wang, together with researchers at McGill University, has made strides toward unravelling one of the most fundamental mysteries in neuroscience - how the brain maintains memories over time.

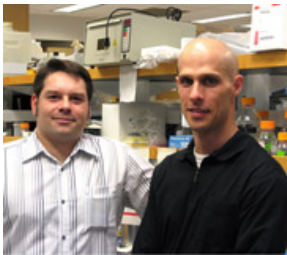
The researchers discovered that the activity of one molecule in the brain plays a key role in allowing the brain to retain memories. The molecule prevents the removal of synaptic receptors in the brain that would, if they were destroyed, lead to memory loss. The results were published in the journal *Nature Neuroscience* on April 11.

The findings enhance our understanding of memory storage and erasure mechanisms and how the perpetuation of long-term memories relies on a dynamic balance between these two processes.

More information is available at www.mcgill.ca/newsroom.

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Stan Floresco and Jeremy Seamans uncover the science behind the “a-ha” moment



Stan Floresco (l) and Jeremy Seamans (r)

We've all had moments where—in the midst of a vexing problem, getting nowhere, with no apparent solution in sight—all of a sudden a light bulb turns on and the solution to the issue just comes to mind.

But what is the science behind that “a-ha” moment? **Jeremy Seamans** and **Stan Floresco** have uncovered just that.

The results were published in the May 13 print issue of the journal *Neuron*.

Learning is governed in part by the prefrontal cortex, which is the area of the brain responsible for planning, behavioural control, expression of personality, and decision-making. It is often thought to be a gradual process where small improvements accumulate over time. However, abrupt jumps in performance—or moments of insight—are also possible, though this has been poorly understood at the cellular level.

The researchers trained rats to perform a simple task: when a light turns on, push the corresponding lever and receive a reward. By measuring the activity of neurons in the prefrontal cortex, Drs. Seamans and Floresco were able to discern a pattern of activity within and between the neurons that was unique to that task. Further, they found the cells to be working together as a network to encode or learn this simple rule.

Once the rats had learned that rule, the researchers changed the task in order to determine the underlying neural dynamics involved in figuring out a new rule. This time, pressing the same lever, regardless of which light came on, delivered a reward.

The researchers discovered that when the rats were required to deduce the new rule through trial and error, the entire prefrontal cortex neural network would abruptly shift to a new pattern of activity, rather than gradually as one might expect. Further, they found the shift in neural activity occurred one or two trials after the rats exhibited the correct behaviour for the task.

"The rats were trying different things, then hit on the correct strategy, realized it was correct, and then encoded the new rule all at once within the prefrontal cortex," says Dr. Seamans, a Canada Research Chair in the Neurobiology of Mental Health and Addiction.

Another interesting result was that the same ensemble of prefrontal cortex neurons encoded two different rules through unique activity states or patterns.

"This finding goes against common beliefs that specific cells within the brain perform specific tasks," says Dr. Floresco. "We showed that virtually all cells in the prefrontal cortex network contributed to encoding all the elements in each task and that the network was able to put together arbitrary types of information in novel ways."

Future research will further explore the information processing abilities of the prefrontal cortex with an aim to apply this understanding to disorders involving compromised prefrontal cortex function, such as schizophrenia,

depression, and attention deficit hyperactivity disorder.

This research was completed in collaboration with Daniel Durstewitz at the University of Heidelberg in Germany. Funding for this work came from the Canadian Institute for Health Research, Natural Sciences and Engineering Research Council, NARSAD, Michael Smith Foundation for Health Research, and the Deutsche Forschungsgemeinschaft.

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Brian Cairns receives Neuropathic Pain Research Award

Brian Cairns recently received a Neuropathic Pain Research Award from Pfizer to develop an animal model of burning mouth syndrome (BMS) for assessment of peripheral GABA-A receptors as an analgesic target. BMS is a chronic intraoral pain condition characterized by burning-like pain commonly experienced on the tongue.

This year there were six recipients from across the country. The awards from Pfizer fund and support Canadian innovation within independent neuropathic pain research in the areas of basic biomedical, clinical, and health sciences.

More information is available at www.pfizer.ca.

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Several members receive UBC research awards



From l-r: Tim Murphy, Stan Floresco, and Michael Hayden

Brain Research Centre members have come out on top with several 2009 UBC research awards.

Tim Murphy and **Stan Floresco** each received a UBC Killam Research Prize in the Senior Science, Applied Science, and Medicine category. This award is given in honour of outstanding research and scholarly contributions.

Rafeef Abugharbieh, **Kiran Soma**, and **Z. Jane Wang** each received a UBC Killam Research Fellowship in the Junior category. These Fellowships support scholars engaged in research projects of broad significance.

Michael Hayden received the Jacob Biely Prize, which is UBC's premier award for research.

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Second Vancouver Brain Bee breaks participation records



"What is the main function of the basal ganglia?"

That was the question that Yesha Ouyang from Fraser Heights Secondary in Surrey, BC correctly answered in the second Vancouver Brain Bee, held on May 1 at the Brain Research Centre, to earn a spot in the National competition later this month at McMaster University.

The event saw more than 20 Metro Vancouver high school students from grades 10, 11, and 12 compete for the title of Vancouver Brain Bee Champion. After studying for weeks from the 64-page Society for Neuroscience "Brain Facts" booklet, students completed a written exam, with the top five students then advancing to the oral elimination rounds.

Styled after a traditional spelling bee – but with a special neuroscience twist – the top five competitors answered questions about memory, sleep, intelligence, emotion, perception, stress, aging, brain-imaging, neurology, neurotransmitters, genetics, and brain disease. Forty five minutes and dozens of questions into the oral elimination rounds, Yesha was declared the winner.

The Vancouver Brain Bee was sponsored by the Brain Research Centre, Let's Talk Science Partnership Program, UBC Faculty of Medicine, and Vancouver Coastal Health Research Institute.

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Upcoming events

Two NCEs—NeuroDevNet and GRAND—are jointly hosting a workshop called **When Virtual Meets Reality**. This workshop will discuss the use of technology for the diagnosis and prevention of brain developmental disorders. Members of the neuroscience community may be interested in the outcomes from this meeting, which will be available in early to mid June at www.neurodevnet.ca/Events/WhenVirtualMeetsReality.aspx.

The **NeuroDevNet Annual Meeting and Brain Development Conference** will take place **June 6–7, 2010** in Montreal. For more information, visit www.neurodevnet.ca/Events/2010BrainDevelopmentConference.aspx.

The **1st Canadian Stroke Congress** will be held **June 7-8, 2010** in Quebec City. For more information, visit www.strokecongress.ca.

The Society for Neuroscience Pacific Northwest Chapters Meeting will be held June 12-13, 2010 in Victoria. For more information, visit <http://imp.uvic.ca/research/pacwest2010.php>.

The **3rd Biennial Brain Development & Learning Conference** will be held **July 16-20, 2010** in Vancouver. For more information, visit www.interprofessional.ubc.ca/bdl.html.

Save the date for the **Research Day on Addictions**, which will take place **September 18, 2010**. More information will available soon!

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Awards

- **Rob Holt** received the Genome BC Award for Scientific Excellence.
- **Janice Eng** was named a finalist in the YWCA Women of Distinction awards in the Health and Active Living Category.
- **Todd Woodward** was the inaugural recipient of the Early in Career Award from the Confederation of University Faculty Associations of BC. Dr. Woodward was honoured for developing an innovative therapy to help people with schizophrenia control their symptoms.
- **Janice Eng** and **Tim O'Connor** each received UBC Faculty of Medicine Awards for Excellence in Mentoring Early Career Faculty. These awards recognize formally identified mentors who exemplify a deep commitment to fostering the professional and personal development of faculty members in the early stages of their careers.
- **Vincent Di Lollo** was awarded a Doctor of Science, *honoris causa* from the University of Lethbridge. He is an international leader in cognitive systems.
- The following trainees are recent VCHRI poster winners:
 - **David McVea (Tim Murphy)** – “Complex patterns of spontaneous cortical activity reflect functional neuronal circuits”
 - **Colin Russell (Thomas Oxland)** – “A dynamic finite element model of the rat cervical spine”
 - **Nga Ting (Colette) Chiu (William Jia)** – “20(s) protopanaxatriol affects the expression of cytochrome P450 3A4”
- **Scott Mackey (Doris Doudet)** received an Outstanding Poster Award at the 20th Annual Rotman Research Institute Conference: The Frontal Lobes, which was held in Toronto in March.

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Awards funding

- The following members were renewed as Canada Research Chairs:
 - **Mark Carpenter** (Physical Activity and Health)
 - **Max Cynader** (Brain Development)
 - **Brian MacVicar** (Neuroscience)
 - **Christian Naus** (Gap Junctions and Disease)
- **Claudia Jacova, Lynn Beattie, and Robin Hsiung** received a CIHR Care Practice in Cognitive Impairment in Aging grant to conduct a randomized controlled trial on the benefits of music therapy for those with moderate Alzheimer disease.
- **Andrei Krassioukov** received funding from the Canada Foundation for Innovation for a project entitled “Translational Autonomic Research Laboratory.”
- **Stephanie Borlgaard** received a CIHR New Investigator Award.

- **Helen Tremlett** received a MS Society of Canada Don Paty Career Development Award renewal.
- **Rafeef Abugharbieh, Ghassan Hamarneh,** and Roger Tam received a competitive Martha Piper research grant to initiate a new international collaboration with the world-renowned NeuroSpin Center at the prestigious French National Institute for Research in Computer Science and Control. The project is called “Unveiling the Mysteries of Brain Networks: Medical Image Fusion and Mathematical Modeling of Anatomy and Function for Computational Analysis of Human Brain Activity and Understanding of Neurological Disease.”
- **William Jia** received a Canadian Cancer Society Operating Grant for a project entitled “Targeted virotherapy for brain tumour.”
- The following faculty and trainees received funding from the MS Society of Canada:
 - **Jacqueline Quandt** – “Anti-inflammatory and neuroprotective effects of TEMPOL in models of multiple sclerosis” (Operating Grant) and “Characterizing the anti-inflammatory and neuroprotective effects of TEMPOL in a model of multiple sclerosis” (Donald Paty Career Development Award)
 - **Helen Tremlett** – “Pregnancy, beta-interferon exposure, and long-term disability in multiple sclerosis” (Donald Paty Career Development Award)
 - **Elaine Kingwell (Helen Tremlett)** – “Survival and predictors of mortality in the British Columbia multiple sclerosis population” (Postdoctoral Fellowship)
 - **Saeed Kalantari (Alex Mackay)** – “Myelin water measurements in multiple sclerosis: The role of water exchange” (Research Studentship)
 - **Jayasree Basivireddy (Jacqueline Quandt)** – “A novel sparc in multiple sclerosis regenerative therapies” (Postdoctoral Fellowship)
 - **Samantha Lloyd-Burton (Jane Roskams)** – “The role of matricellular protein SPARC in the regulation of microglial processes during MS pathogenesis” (Postdoctoral Fellowship)
 - **Ellen Meng-I Lu (Helen Tremlett)** – “Adverse pregnancy-related and birth outcomes in multiple sclerosis” (MSc Studentship)
 - **Joshua Lee (Dessa Sadovnick)** – “Canadian Asians with multiple sclerosis study” (MSc Studentship)
- **Pedro Lourenco (Helen Tremlett)** received funding from the Foundation of the Consortium of MS Centres’ (FCMSC) Summer Research Scholarship Program for Medical Students for a project entitled “Oligoclonal banding in cerebrospinal fluid as a prognostic indicator in patients with MS.”
- **Elaine Kingwell (Helen Tremlett)** received a scholarship from the International Society for Pharmacoepidemiology.
- **Lindsay Nagamatsu**, a doctoral trainee co-supervised by **Todd Handy** and **Teresa Liu-Ambrose**, received a three year NSERC award.
- **Fiona Zeeb** and **Jay Hosking**, graduate students with **Catharine Winstanley**, each received a W.G. Dewhurst Travel Award, which subsidizes attendance of the Canadian College of Neuropsychopharmacology meeting in Ottawa. There are only six awards available each year.
- **Shanshan Zhu (Max Cynader)** received a Savoy Scholarship renewal.
- **Gwenael Labouebe**, a postdoctoral fellow with **Stephanie Borgland**, received a Swiss National Science Foundation Postdoctoral Fellowship.

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Distinctions

- **Tony Phillips** was elected President of the Collegium Internationale Neuro-Psychopharmacologicum, which is a global organization dedicated to neuro-psychopharmacology. It is a membership organization with widespread support from all over the world. Its mission is to encourage and promote the international scientific study, teaching, and application of neuropsychopharmacology.
- This month, **Lawrence Ward** is lecturing on neural synchronization in cognition, attention, consciousness, and the role of the thalamus in human consciousness, at the College de France as a Professeur Etranger Invite hosted by Stanilas Dehaene and Alain Berthoz. This is the first of a series of exchanges between the College de France and the Peter Wall Institute for Advanced Studies at UBC. In the spring next year, Professor Dehaene, who is one of the top European researchers in cognitive neuroscience, will be coming to UBC - Peter Wall Institute for Advanced Studies.
- **Andrei Krassioukov** was featured in the Spring 2010 issue of Solutions Magazine from the Rick Hansen Institute.
- Earlier this year, **Rafeef Abugharbieh** was elevated to senior IEEE member.
- Neuromed Pharmaceuticals, which was founded by **Terry Snutch**, received approval from the FDA for their once-a-day drug to treat moderate to severe pain. While there have been hundreds of university spin-off biotech companies across Canada over the years, Neuromed's FDA approval for the drug "Exalgo"

represents the first instance of an oral drug from a Canadian biotech company being approved.

- Amorfix Life Sciences, Ltd., which was founded by **Neil Cashman**, recently announced the world's first detection of aggregated beta-amyloid in blood using the Alzheimer's diagnostic A4 assay. More information is available at www.amorfix.com.

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Media coverage

February 2010

- **Tony Phillips**, Department of Psychiatry – How to be prepared when disaster strikes (*The Globe & Mail*)

March 2010

- **Kalina Christoff**, Department of Psychology – Of reverie and the wandering mind (*The Globe & Mail*)
- **Fred Mikelberg**, Department of Ophthalmology – Anti-depressants, anti-anxiety medications increase cataract risks (*The Province*)
- **Tom Boyce**, HELP – Stressed out! The powerful biology of stress (*ABC Radio News*)
- **Andrei Krassioukov**, ICORD – Officials want to break a bad athlete habit; Snapping bones can boost performance 15 per cent (*Agence France Presse*)
- **Kalina Christoff**, Psychology – Daydreams and Decision-Making Part II – Decoding Hidden Meanings (*Psychology Today*)
- **Dan Goldowitz**, Department of Medical Genetics – Brainstorming: Canada launches landmark national study on children's brain development (*The National Post*)

April 2010

- **Sterling Clarren**, Department of Pediatrics – FASD: Picture bleaker for adults: expert (*Winnipeg Free Press*)
- **Kalina Christoff**, Department of Psychology – Mind wandering enhances problem solving (*Psychology Today*)
- **Adele Diamond**, Department of Psychiatry – Kids dropping out ... of learning (*The Huffington Post*)

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- **Tony Traboulsee**, Division of Neurology – Canadian trials to examine “liberation procedure” for multiple sclerosis (*Canadian Medical Association Journal*)
- **Jason Barton**, Division of Neurology & Department of Ophthalmology – Scientists debate how we see faces (*The Pittsburgh Post-Gazette*)
- **Andrei Krassioukov**, ICORD – Revealed: how blood pressure boosting could turn murderball into suicide (*Sydney Morning Herald*)
- **Tim Oberlander**, Department of Pediatrics – Effects of TV, drug exposures in early life may be long-lasting (*Bloomberg Businessweek*)
- **Allan Young**, Department of Psychiatry – Medical marijuana: Pot of gold or pipe dream? Despite push to legalize, little known about pot's potential (*The Chicago Tribune*)
- **Adele Diamond**, Department of Psychiatry – Playing games makes your child clever (*Times Online*)
- **Jon Stoessl**, Division of Neurology – Parkinson's drug sends patients on orgy of gambling, shopping and sex (*CTV W5*)
- **Clyde Hertzman**, Human Early Learning Partnership – How poverty shapes the brain: Scientists hope bold new research will help poor kids succeed (*The Globe & Mail*)
- **Tim Oberlander**, Department of Pediatrics – A pregnant question (*Science News*)

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The Brain Research Centre is a partnership between the Vancouver Coastal Health Research Institute and the Faculty of Medicine at UBC.

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