

Graduate Collaborative Program in Neuroscience

Annual Report 2006-2007

July 1, 2006 to June 30, 2007

This was the 20th year of the Program in Neuroscience. During this period the program continued to grow in size. Dr. Jonathan Dostrovsky remained as director.

There was one change to the Program Committee this year. Prof. K. Zabjek replaced Prof. W. McIlroy as the representative of the Department of Rehabilitation Sciences. The current members of the committee are listed in **Appendix 1**.

During the past academic year 53 new graduate students were accepted into the program and 33 students graduated. This brought the total number of students registered in the program to 168 at the end of the year. Further details regarding the students in the program (gender, breakdown by degree and department, and list of students who graduated) are provided in Appendix 2. During this year an additional 8 faculty joined the program bringing the total to 184. A listing of the current faculty members by primary graduate department is provided in Appendix 3. Additional details are available on the program website at: www.utoronto.ca/neurosci.

Distinguished Lecture Series

The program organized 9 lectures in the Program in Neuroscience distinguished lecture series this year and these are listed in **Appendix 4**. Many of these were co-sponsored with member departments and institutes. One of the lectures was funded by the endowed Raymond and Beverly Sackler Distinguished Visiting Neuroscientist fund. All students in the program are required to attend at least 75% of these lectures (attendance is monitored).

PIN Poster Day 2007

The Program in Neuroscience Poster Day 2007 took place on Friday, April 20, 2007 in the Stone Lobby of the Medical Sciences Building. There were 54 posters presented and 159 registrants. Dr. Doug Munoz from the Centre for Neuroscience Studies at Queen's University gave an excellent talk to a large audience.

Twenty-seven judges (PIN faculty members) participated in the judging of the posters. The 4 winners were: David Kideckel, Viviane Labrie, Sarah Harrison and Nevena Simic.

OCGS review

The director with the help of the program administrator, Pat Reed, prepared and submitted to SGS the OCGS periodic appraisal brief. Each collaborative program must be reviewed and approved by OCGS every seven years. As part of this process the Memorandum of Agreement had to be updated and signed by each of the member departments. The outcome of the appraisal will not be known until the Fall of 2007.

Support of the Undergraduate Neuroscience Program.

PIN continued to support the undergraduate neuroscience program as well as the Neuroscience Association of Undergraduate Students (NAUS) by 1) hosting and funding the undergraduate students' posters at our annual poster day, and 2) providing modest funding support for the NAUS meeting.

Brain Bee and Brain Awareness Week

Brain Bee 2007

The Collaborative Program in Neuroscience (PIN) hosted the 9th annual neuroscience competition for High School students on Tuesday afternoon, February 13, 2007. Twenty-four students from 9 different Toronto schools took part in this oral competition modeled after a "spelling bee". The first place winner was **Carol Cui** from the University of Toronto Schools. Second place went to **Jeremy Zung**, also from the University of Toronto Schools, and in third place was **Ling Sang** from Earl Haig Secondary School.

The winner of our local contest, Carol Cui, took fourth place in the 9th International Brain Bee (IBB) competition organized by the University of Maryland in Baltimore on March 16 and 17 where 26 winners from other local University-sponsored competitions participated. In the 9 year history of the IBB, three U of T brain bee winners also won first place in the IBB.

The U of T competition is organized by Professor Jonathan Dostrovsky, director of PIN with the help of PIN faculty members Drs. Karen Davis, Mary Pat McAndrews and Evelyn Lambe. Many thanks go to PIN graduate students Maha Adamo (Psychology), Josh Bell (IMS), Javeria Hashmi (IMS), Dina Lafoyiannis (IMS), Keri Taylor (IMS), Chris Tsang (Biochemistry) and Adelaide Yiu (IMS) for assisting with the Bee. Special thanks to Maha Adamo, Josh Bell and Javeria Hashmi for giving presentations on their research. These student presentations organized by Dr. McAndrews were the highlight of the day. The presentations provided the high school students with an excellent overview of the many types of research being done by PIN graduate students. Also, thanks to Dee Ballyk for giving the students a tour of the Anatomy Museum. We are also grateful to the Institute of Neurosciences, Mental Health and Addiction (INMHA/CIHR) for their financial support.

Program Funding

The Program was supported during this past year by contributions from the member departments as well as from the UTCN. In addition, the annual Raymond and Beverly Sackler Distinguished Visiting Neuroscientist at the University of Toronto lecture was funded by an endowment from Beverly and Raymond Sackler, and the Brain Awareness Week activities sponsored by PIN were supported in part by funds from the Institute of Neurosciences, Mental Health and Addiction (INMHA / CIHR)

Summary of other services and activities provided by PIN

1. Prepare and distribute monthly calendar of neuroscience seminars at U of T.
2. Prepare and distribute monthly newsletter.
3. Maintain website.
4. Maintain a list of all neuroscience courses and courses with neuroscience content at UofT.
5. Maintain membership in the Association of Neuroscience Departments and Programs.
6. Respond to phone, email and written requests for information about neuroscience at U of T.
7. Provide certificates of completion for graduating students.
8. Advertise jobs and requests for jobs.

Appendix 1: List of committee members

J.O. Dostrovsky, PHYSIOLOGY (Dir.)
W.M. Burnham, PHARMACOLOGY
P. Carlen, INST. MED. SCIENCE
L.F.De Nil, SPEECH LANG. PATHOL.
Z. Jia, PHYSIOLOGY
N. Kabani, MED. BIOPHYSICS
M. Lewis, HUM. DEV. & APP. PSY.
S. Nag, LAB. MED. PATHOBIOL.
J. Peever, CELL & SYSTEMS BIOLOGY
J. Roder, MOL. MED. GENETICS
B.J. Sessle, DENTISTRY
M. Shoichet, INST. BIOMAT. & BIOMED. ENG.
W. Trimble, BIOCHEMISTRY
J.W. Wells, PHARMACY
J.S. Yeomans, PSYCHOLOGY
K. Zabjek, REHAB. SCI.

Appendix 2: Students enrolled in the Program in Neuroscience

1a) Enrolment:

	Applicants	Acceptances	New Enrolment
Master's	38	38	38
Ph.D.	15	15	15
Total	53	53	53

b) Total Enrolment (as of June 30, 2007):

	Part-time	Full-time	Female	Male
Master's	1	64	40	21
Ph.D.	0	103	56	51
Total	1	167	96	72

c) Number of students from each participating department or faculty: (new registration numbers are recorded in brackets)

Department or Faculty	Master's	Ph.D.	Total
Biochemistry	0	0	0
Cell and Systems Biology	2	3	5
Dentistry	0	2	2
Human Development and Applied Psychology	0	2	2
Institute of Biomaterials and Biomedical Engineering	0	1	1
Institute of Medical Science	18 (10)	27 (6)	45 (16)
Laboratory Medicine and Pathobiology	1	6	7
Medical Biophysics	1 (1)	0	1 (1)
Molecular and Medical Genetics	0	3	3
Pharmaceutical Sciences	1 (1)	6 (1)	7 (2)
Pharmacology	3 (3)	9	12 (3)
Physiology	28 (15)	16 (1)	44 (16)
Psychology	4 (4)	24 (6)	28 (10)
Rehabilitation Science	6 (3)	2	8 (3)
Speech-Language Pathology	1 (1)	2 (1)	3 (2)

2a) Number of students graduating in 2006-2007:

Master's	Ph.D.	Total
23	10	33

b) Median time to completion (in months):

Master's	Ph.D.
20	66

c) List of Master's and Doctoral Theses of students graduating in 2006-2007:**Master's theses:****Cell & Systems Biology:**

Student: Saba Mir
 Supervisor: John Peever
 Thesis Title: "Noradrenergic Modulation of Airway-Related Muscle Activity Across the Sleep-Wake Cycle"

Dentistry:

Student: Glad Bejat
 Supervisor: Barry Sessle
 Thesis Title: "Sensory modulation of rat licking behaviour"

IMS:

Student: Ryan Brydges
 Supervisor: Adam Dubrowski
 Thesis Title: "Sensorimotor integration: Prehensile movements in conditions of visuo-proprioceptive conflict"

Student: Erin Chan
 Supervisor: Richard Horner
 Thesis Title: "Endogenous Noradrenergic Drive Modulates Respiratory Muscle Activity Across Sleep-Wake States"

Student: Ava Elahipanah
 Supervisor: Bruce Christensen
 Thesis Title: "Mechanisms of Visual Search Impairment among Patients with Schizophrenia"

Student: Natalia Fedianina
 Supervisor: Michael Salter
 Thesis Title: "Effect of Src activation on NMDA receptors containing different NR2 subunits"

Student: Constantina Lafoyiannis
Supervisor: Joanne Rovet
Thesis Title: "Chromatic VEPs in Offspring of Women with Thyroid Disease in Pregnancy"

Student: Jennie Yum
Supervisor: Michael Tymianski
Thesis Title: "Role of the PDZ-binding motif of TRPM7 in mediating calcium-dependent cellular degeneration induced by chemical anoxia"

Physiology:

Student: Ji Yeon Jenni Chung
Supervisor: Dianne Broussard
Thesis Title: "Consolidation of Motor Memory in the Vestibulo-ocular Reflex"

Student: Guillaume Ducharme
Supervisor: Lyanne Schlichter
Thesis Title: "The Small Conductance Swelling-Activated Chloride Channel in Primary Rat Microglia: Biophysical Characterization and Its Contribution to Volume Regulation and Phagocytosis"

Student: Anya McLaren
Supervisor: Gregory Hare
Thesis Title: "Increased Expression of Hypoxia Inducible Factor-1 α (HIF-1 α) and Neuronal Nitric Oxide Synthase (nNOS) in the Cerebral Cortex of Anemic Rats"

Student: Nam Phan
Supervisor: Linda Mills
Thesis Title: "Stress Induced Modulation of Mitochondrial Protein Import in PC12 Cells: The Role of Tom20"

Student: Zarko Todorovski
Supervisor: Zhengping Jia
Thesis Title: "LIMK1 and CREB Regulation of Late-LTP and Long-Term Memory"

Psychology:

Student: Andreea Diaconescu
Supervisor: Randy McIntosh
Thesis Title: "Brain mechanisms of sensorimotor learning: "What" and "where" neural

processes support sensorimotor integration in intramodal and crossmodal cueing paradigms"

Student: Amanda Kesek
Supervisor: P. Zelazo/W. Cunningham
Thesis Title: "The Development of Evaluative Processing in Children"

Student: May Parada
Supervisor: Ashley Monks
Thesis Title: "Feminine Sexual Behaviour in Female Testicular Feminization Mutation (Tfm) Carrier Sprague-Dawley Rats"

Student: Jordan Poppenk
Supervisor: M. Moscovitch/R. McIntosh
Thesis Title: "What kinds of novel information are remembered well? The novelty effect and its neural mechanisms"

Student: Lily Riggs
Supervisor: Adam Anderson
Thesis Title: "A direct comparison of memory encoding and retrieval using magnetoencephalography"

Student: Nevena Simic
Supervisor: Joanne Rovet
Thesis Title: "Thyroid Hormone Deficiency Due to Preterm Birth May Hinder the Development of Colour Vision"

Student: Marie St-Laurent
Supervisor: M.P. McAndrews/M. Moscovitch
Thesis Title: "Experiential Details, and Not Temporal Specificity, Determines Autobiographical Memory in Patients with Unilateral Temporal Lobe Epilepsy or Excisions"

Rehabilitation Science:

Student: Diana Frasca
Supervisor: Robin Green
Thesis Title: "The Effects of Mentally Effortful Processing on Cognitive Performance in Healthy Elderly People"

Student: Martha McCall
Supervisor: Deirdre Dawson

Thesis Title: "A Modified Constraint Induced Movement Therapy Program with the Geriatric Sub Acute Stroke Population"

Ph.D. Theses:

Biochemistry:

Student: Chris Tsang

Supervisor: William Trimble

Thesis Title: "SEPTIN GTPases in the Central Nervous System: An investigation into axon specification, formation and function"

Dentistry:

Student: Jindong Xu

Supervisor: Xian-Min Yu

Thesis Title: "The Role of C-Terminal Src Kinase (Csk) in the Regulation of N-Methyl-D-Aspartate Receptors"

IMS:

Student: Anne-Claude Bedard

Supervisor: Rosemary Tannock

Thesis Title: "Impact of Methylphenidate on Working Memory in Children with Attention-Deficit Hyperactivity Disorder"

Student: Pearl Behl

Supervisor: Sandra Black

Thesis Title: "Differential Long-Term Cognitive, and Functional Effects of Cholinesterase Inhibitors in Alzheimer's Disease"

Student: David Seminowicz

Supervisor: Karen Davis

Thesis Title: "Functional MRI Studies of Pain and Cognition Interactions"

Laboratory Medicine and Pathobiology:

Student: Rick Bagshaw

Supervisor: Don Mahuran

Thesis Title: "Lysosomal Membrane Proteomics: Characterizing Novel Proteins and Functions of the Lysosome"

Physiology:

Student: Adrian Fawcett
Supervisor: William Hutchison
Thesis Title: "The Role of Human Subthalamic Nucleus in Saccade Control"

Psychology:

Student: Michalakis Michael
Supervisor: N. William Milgram
Thesis Title: "Hippocampal Regulation of Intraprefrontal Plasticity in the Freely Moving Rat"

Student: Eva-Maria Svoboda
Supervisor: Brian Levine
Thesis Title: "The functional neuroanatomy of autobiographical memory"

Student: Debbie Talmi
Supervisor: Morris Moscovitch
Thesis Title: "The Role of Attention and Organization in Emotional Memory Enhancement"

Appendix 3 Program in Neuroscience Faculty

There are currently 184 PIN faculty. Eight new faculty joined the Program in Neuroscience in 2006-2007. The faculty are listed below according to their department of primary appointment. Some faculty have cross appointments with one or more other graduate departments.

Biochemistry:

Callahan, John W.
Gurd, James W.
Lingwood, Clifford
MacLennan, David H.
Moscarello, Mario A.
Reed, Jutta K.
Trimble, William S.

Biomaterials and

Biomedical Engineering:

Bardakjian, Berj
Chau, Tom
Popovic, Milos
Shoichet, Molly
Wong, Willy

Cell and Systems

Biology:

Aarts, Michelle
Boulianne, Gabrielle L.
Brown, Ian R.
Brown, Theodore J.
Buck, Les
Chang, Belinda S.W.
Fullard, James H.
Lange, Angela B.
Lovejoy, David A.
Mrosovsky, Nicholas
Orchard, Ian
Peever, John
Roots, Betty I.
Stephenson, Richard
Stewart, Bryan
Tropepe, Vince
Woodin, Melanie A.

Dentistry:

Hu, James W.
Seltzer, Ze'ev
Sessle, Barry J.
Yu, Xian-Min

Human Development and Applied Psychology:

Lewis, Marc

IMS:

Abel, Sharon M.
Baker, Andrew
Banwell, Brenda
Black, Sandra E.
Broussard, Dianne M.
Brown, Gregory M.
Carlen, Peter L.
Chen, Robert
Christensen, Bruce
Davis, Karen D.
Dennis, Maureen
deVeber, Gabrielle
Diamant, Nicholas E.
Dubrowski, Adam
Eubanks, James
Fehlings, Michael G.
Harrison, Robert V.
Hwang, Paul A.
Kennedy, James
Kennedy, Sidney H.
Lozano, Andres M.
Lu, Wei-Yang
Maki, Brian E.
Mikulis, David
Moldofsky, Harvey

Morshead, Cindi M.
Mount, Howard
Perez Velazquez, Jose
Luis
Picton, Terence W.
Rovet, Joanne
Sandor, Paul
Sharpe, James A.
Steinbach, Martin
Tannock, Rosemary
Tator, Charles, H.
Taylor, Margot
Tymianski, Michael
Van Der Kooy, Derek
Westall, Carol

Laboratory Medicine and Pathobiology:

Aubert, Isabelle
Bergeron, Catherine
Boggs, Joan M.
Bremner, Rod
Johnston, Miles
Mahuran, Don J.
McLaurin, JoAnne
Nag, Sukriti
Robertson, Janice
Schmitt-Ulms, Gerold
Yucel, Yeni

Medical Biophysics:

Fraser, Paul
Graham, Simon
Henkelman, R. Mark
Kabani, Noor
Wong, Shun

**Molecular and
Medical Genetics:**

Cordes, Sabine P.
Culotti, Joseph G.
Kaplan, David R.
Miller, Freda D.
Roder, John
Zhen, Mei

Pharmacology:

Burnham, W. McIntyre
George, Susan R.
Grupp, Larry A.
Hampson, David R.
Le Foll, Bernard
Mitchell, Jane
Nobrega, Jose
Pace-Asciak, Cecil R.
Sellers, Edward M.
Snead, O. Carter
Warsh, Jerry J.

Pharmacy:

Busto, Usua E.
Henderson, Jeffrey
O'Brien, Peter J.
Pennefather, Peter S.
Wells, Peter G.
Wells, James W.

Physiology:

Belsham, Denise
Charlton, Milton P.
Dostrovsky, Jonathan O.
Duffin, James
Feng, Zhong-Ping
Frankland, Paul
Hare, Gregory
Horner, Richard

Hutchison, William D.
Jia, Zhengping
Josselyn, Sheena
Kwan, Hon C.
Lambe, Evelyn K.
MacDonald, John F.
MacKay, William A.
Matthews, Stephen G.
Mills, Linda R.
Monnier, Philippe Patrick
Norwich, Kenneth H.
Orser, Beverley
Percy, Maire
Salter, Michael W.
Schlichter, Lyanne C.
Skinner, Frances K.
Stanley, Elise
Sugita, Shuzo
Tweed, Douglas
Wan, Qi
Wang, Lu-Yang
Wojtowicz, J. Martin

Psychiatry:

Shapiro, Colin

Psychology:

Anderson, Nicole
Anderson, Adam K.
De Rosa, Eve
Erb, Suzanne
Ferber, Susanne
Fleming, Alison S.
Fletcher, Paul J.
Gerlai, Robert
Grady, Cheryl L.
Ivy, Gwendolyn O.
Kennedy, John M.
Levine, Brian

McAndrews, Mary P.
McIntosh, Anthony
Randal
Milgram, N. William
Monks, Douglas Ashley
Moscovitch, Morris
Niemeier, Matthias
O'Craven, Kathleen
Petit, Ted L.
Ralph, Martin R.
Regan, David
Saint-Cyr, Jean A.
Shettleworth, Sara J.
Smith, Mary Lou
Stuss, Donald
Tulving, Endel
Vaccarino, Franco J.
Yeomans, John S.
Zelazo, Philip

Rehabilitation Science:

Dawson, Deirdre
Green, Robin
McIlroy, William
Polatajko, Helene J.
Verrier, Molly

**Speech-Language
Pathology:**

Bressmann, Tim
De Nil, Luc F.
Johnson, Carla J.
Martino, Rosemary
Rochon, Elizabeth
van Lieshout, Pascal

Appendix 4: Distinguished Lecture Series 2006-2007:

1) Wednesday, September 13, 2006 3pm

ERIN SCHUMAN, Ph.D., HHMI & Division of Biology, Caltech

"Protein Synthesis and Degradation at the Synapse"

18th Floor Auditorium, Mt. Sinai Hospital

Co-sponsored by the Samuel Lunenfeld Research Institute (SLRI) at Mt. Sinai Hospital

2) Monday, September 18, 2006 4pm

CARLA J. SHATZ, Ph.D., Chair, Department of Neurobiology, Harvard Medical School

"Immune genes and brain waves in brain wiring during development"

Medical Sciences Building, Rm 3154

Program in Neuroscience - Vision Science Research Program Distinguished Lecturer

3) The Sixth Sackler Distinguished Visiting Neuroscientist

Thursday, October 26, 2006 4pm

JACK FELDMAN, PhD, Department of Neurobiology, UCLA School of Medicine

"Looking for inspiration: New perspectives on the generation of respiratory rhythm"

Medical Sciences Building, Rm 3154

4) Thursday, December 7, 2006 4pm

JEROME SIEGEL, Department of Psychiatry, University of California at Los Angeles

"Pathology and physiology of the hypocretin system"

Medical Sciences Building, Rm 3153

5) Wednesday, December 13, 2006 3pm

DAVID SWEATT, Department of Neuroscience, Baylor College of Medicine, Houston, Texas

"Epigenetic Mechanisms in Memory Formation"

Mount Sinai Hospital, 18th Floor Auditorium

6) Monday, January 22, 2007 4pm

ANDREA VOLTERRA, Director, Département de Biologie Cellulaire et de Morphologie (DBCM), Faculté de Biologie et de Médecine, Université de Lausanne, Switzerland

"Glutamate exocytosis from astrocytes: role in synaptic functions and alterations in brain pathologies"

Pharmacy Building, 144 College St., Rm B250

7) Wednesday, April 4, 2007 4pm

MICHAEL YOUNG, The Rockefeller University, New York, NY

"A PER/TIM interval timer for Drosophila's circadian clock"

Tanz Neuroscience Building, Rm 6

8) Friday, April 20, 2007 2pm

PIN Poster Day Speaker

DOUG MUNOZ, Centre for Neuroscience Studies, Queen's University

"Combining eye movements with neurophysiology, neuroimaging, and behavioural assessment to investigate brain function and dysfunction"

Medical Sciences Building, Rm 2172

9) Thursday, April 26, 2007 4pm

GYORGY BUZSAKI, Center for Molecular and Behavioral
Neuroscience, Rutgers University

"Oscillatory organization of internally generated cell assembly sequences"
Medical Sciences Building, Rm 2172