

Graduate Collaborative Program in Neuroscience

Annual Report 2004-2005

July 1, 2004 to June 30, 2005

This was the 18th year of the Program in Neuroscience. During this period the program continued to grow in size. Dr. Jonathan Dostrovsky remained as director.

Two departments and one faculty were added to the Program this year. This increases the total number of collaborating departments to fifteen and the total number of faculties to five. The new departments are Human Development and Applied Psychology, from the Ontario Institute for Studies in Education of the University of Toronto, and Medical Biophysics from the Faculty of Medicine.

The Program Committee was expanded this year to include a representative from each of the two new departments: Prof. M.D. Lewis from Human Development and Applied Psychology, and Prof. N. Kabani from Medical Biophysics. Prof. W. McIlroy replaced Prof. M. Verrier as the representative of the Department of Rehabilitation Sciences and Prof. J. Peever replaced Prof. D. Lovejoy as the representative of the Department of Zoology. The current members of the committee are listed in **Appendix 1**.

During the past academic year 47 new graduate students were accepted into the program and 15 students graduated. This brought the total of students registered in the program to 145 at the end of the year, as compared to 121 last 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 27 faculty joined the program bringing the total to 179. 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 8 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 2005

Poster Day 2005 took place on Friday, April 22, 2005 in the Stone Lobby of the Medical Sciences Building. Seventy-six posters were presented and 189 people attended.

A symposium entitled “Brain Oscillations: From Neuron to Behaviour” took place on the afternoon of Friday, April 22 as part of the Poster Day. It was very well attended and provoked a lively discussion. Unfortunately the PIN distinguished lecturer scheduled for that day, Dr. Mircea Steriade from the University of Laval, was unable to attend due to illness.

Thirty-five judges (PIN faculty members) participated in the judging of the posters. The 5 winners were: Lorie-Ann Christie, Alison Burgess, Kevin DaSilva, Yudi Wan and Victor Cheng.

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) including their web pages and links on our website, 2) hosting and funding the undergraduate students’ posters at our annual poster day, 3) providing modest funding support for the NAUS meeting.

Brain Bee and Brain Awareness Week

Brain Bee 2005

The Collaborative Program in Neuroscience hosted the 7th annual neuroscience competition for High School students on Friday afternoon, February 18, 2005. Twenty students from 7 different Toronto schools took part in this oral competition modeled after a "spelling bee". The first place winner was **Peter Lu** from the University of Toronto Schools, second prize went to **Ting Zhu** from Earl Haig Secondary School and in third place was **Jamie Duan** also from Earl Haig Secondary School.

The winner of our local contest, Peter Lu, took second place in the 7th International Brain Bee (IBB) competition organized by the University of Maryland in Baltimore on March 18 and 19 where the winners from 50 other local University-sponsored competitions participated. In the 7 year history of the IBB, two 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 members Drs. Karen Davis and Mary Pat McAndrews assisted by PIN graduate students and the program administrator. The PIN 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. We are grateful to the Institute of Neurosciences, Mental Health and Addiction (INMHA / CIHR) for their financial support.

University of Toronto Brain Day 2005

Brain Day is one of the ways in which the University of Toronto participates in Brain Awareness Week, which is sponsored by the International Society for Neuroscience. It is

organized by Dr. Patricia Stewart with financial support from PIN. Brain Day 2005 was held on March 22 when grades five to seven class from Mary, Mother of God Public School in Toronto visited the university to learn about the structure and function of the human central nervous system. The day is hosted by faculty members in the Division of Anatomy, Department of Surgery, and the activities are planned and carried out by volunteer members of NAUS, the Neuroscience Association for Undergraduate Students. This year we were joined by Linda Scott and Willis Czepeila of the Canadian Hearing Society, who taught the students sign language and described the ways in which they accomplish life activities in a silent world.

The students were divided into small supervised groups which rotated through a number of stations where they learned about the anatomy of the human brain and spinal cord, the major senses, taste and smell, touch, vision, and hearing and measured their own muscle power. After lunch, the class listened to a presentation on brain and spinal cord safety presented by Missy and Jill Mandel of Think First. This was followed by an opportunity for the students to build their own "helmet" to protect a raw egg. The helmeted eggs were dropped to the floor by the students to see how effective the various helmet designs were.

Program Funding

The Program was supported during this past year by contributions from the member departments as well as some of the Faculties and University and Hospital based research centres and units as listed below. 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)

University of Toronto Faculties:

Arts and Science

Dentistry

Pharmacy

University Research Centres

Centre for Addiction and Mental Health

University of Toronto Centre for the Study of Pain

Hospital based research units:

Brain and Behaviour Program at the Hospital for Sick Children

Samuel Lunenfeld Research Institute at Mount Sinai Hospital

Wasser Pain Clinic at Mount Sinai Hospital

Toronto Western Research Institute

Krembil Neuroscience Program at Toronto Western Hospital

PIN member Departments

Biochemistry

Dentistry
 Institute of Biomaterials and Biomedical Engineering
 Institute of Medical Science
 Laboratory Medicine and Pathobiology
 Molecular and Medical Genetics
 Pharmaceutical Sciences
 Pharmacology
 Physiology
 Psychology
 Rehabilitation Science
 Speech-Language Pathology
 Zoology

Summary of other services and activities

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.
9. Co-sponsored a meeting on "Principles of Autonomous Neurodynamics" on Friday, August 13th, 2004 in the Medical Sciences Building.
10. Co-sponsored mini-symposium on Giant Synapses on May 10, 2005.
11. Co-sponsored a symposium on Pain on Friday, June 17, 2005 9am – 4pm.

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.
 M. Fehlings, KREMBIL NEURO. CENTRE, UHN
 Z. Jia, PHYSIOLOGY
 N. Kabani, MED. BIOPHYSICS
 M. Lewis, HUM. DEV. & APP. PSY.
 W. McIlroy, REHAB. SCI.
 S. Nag, LAB. MED. PATHOBIOL.
 J. Peever, ZOOLOGY
 J. Roder, MOL. MED. GENETICS

B.J. Sessle, DENTISTRY
 M. Shoichet, INST. BIOMAT. & BIOMED. ENG.
 E. Stanley, CELL. & MOL. BIO. DIV., TWRI
 W. Trimble, BIOCHEMISTRY
 J.W. Wells, PHARMACY
 J.S. Yeomans, PSYCHOLOGY

Appendix 2: Students enrolled in the Program in Neuroscience

1a) Enrolment:

	Applicants	Acceptances	New Enrolment
Master's	33	33	33
Ph.D.	14	14	14
Total	47	47	47

b) Total Enrolment (as of June 30, 2005):

	Part-time	Full-time	Female	Male
Master's	0	70	40	30
Ph.D.	0	75	37	38
Total	0	145	77	68

c) Number of students from each participating department or faculty:

Department or Faculty	Master's	Ph.D.	Total
Biochemistry	0	1	1
Dentistry	2	3	5
Human Development and Applied Psychology	0	0	0
Institute of Biomaterials and Biomedical Engineering	0	0	0
Institute of Medical Science	20	20	40
Laboratory Medicine and Pathobiology	1	6	7
Medical Biophysics	0	0	0
Molecular and Medical Genetics	0	3	3
Pharmaceutical Sciences	1	5	6
Pharmacology	4	5	9
Physiology	26	7	33
Psychology	7	20	27
Rehabilitation Science	7	1	8
Speech-Language Pathology	0	3	3
Zoology	2	1	3

2a) Number of students graduating in 2004-2005:

Master's	Ph.D.	Total
7	8	15

b) Median time to completion (in months):

Master's	Ph.D.
20	52

c) List of Master's and Doctoral Theses of students graduating in 2004-2005:**Master's theses:****Dentistry:**

Student: Paul Shin

Supervisor: James Hu

Thesis Title: "Effect of Muscle Length on Reflex Responses Evoked by Noxious Stimulation of Neck Muscles of the Rat"

IMS:

Student: Sivan Bega

Supervisor: Carol Westall

Thesis Title: "Is Seizure Onset Related To Visual Deficits Seen In Pediatric Epilepsy Patients Exposed To Vigabatrin And Can A Visual Evoked Potential Be Used To Follow Vigabatrin Therapy In This Group?"

Student: Gwyneth Zai

Supervisor: James Kennedy

Thesis Title: "Candidate Genes on Chromosome 6p in Obsessive-Compulsive Disorder and Schizophrenia"

Physiology:

Student: Luigi Gentile

Supervisor: Elise Stanley

Thesis Title: "Voltage-Gated Calcium Channel Kinetics Implicated in the Process of Fast Neurotransmitter Release"

Student: Heather McDonald
Supervisor: Martin Wojtowicz
Thesis Title: "The effects of aging on adult hippocampal neurogenesis in rats"

Student: Orit Zamir
Supervisor: Milton P. Charlton
Thesis Title: "The Effect of Cholesterol Modulation on Synaptic Transmission"

Rehabilitation Science:

Student: Kathryn Sibley
Supervisor: William McIlroy
Thesis Title: "Understanding approaches to optimize sensorimotor and cardiovascular recovery following stroke"

Ph.D. Theses:

IMS:

Student: Danny Cunic
Supervisor: Robert Chen
Thesis Title: "Functional Assessment of the Subthalamic Nucleus"

Student: Karen Gordon
Supervisor: Robert Harrison
Thesis Title: "Central Auditory Activity and Development in Children Who Use Cochlear Implants"

Student: Mani Vessal
Supervisor: W. McIntyre Burnham
Thesis Title: "Seizure Induced Gliogenesis in the Piriform Cortex"

Pharmaceutical Sciences:

Student: Erica Rosemond
Supervisor: David Hampson
Thesis Title: "Molecular pharmacology of the metabotropic glutamate receptors"

Physiology:

Student: Michael Jurkiewicz

Supervisor: Molly Verrier

Thesis Title: "Plasticity of Cortical Sensorimotor Output Maps During Recovery from Cervical Spinal Cord Injury"

Psychology:

Student: Donna Addis

Supervisor: McAndrews, M.P. Moscovitch, M

Thesis Title: "Terms of Engagement. Investigating the engagement of the hippocampus and related structures during autobiographical memory retrieval in healthy individuals and temporal lobe epilepsy patients."

Student: Asaf Gilboa

Supervisor: Morris Moscovitch

Thesis Title: "Neuropsychology of remote and recent autobiographical memory"

Student: Michelle Keightley

Supervisor: Grady, C. Winocur, G.

Thesis Title: "An Investigation of Emotional Processing Ability and Related Brain Activity in Young and Old Adults"

Appendix 3 Program in Neuroscience Faculty

There are currently 179 PIN faculty. Twenty-seven new faculty joined the Program in Neuroscience in 2004-2005. 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

Dentistry:

Hu, James W.

Seltzer, Ze'ev

Sessle, Barry J.

Yu, Xian-Min

Human Development**and Applied Psychology:**

Lewis, Marc

IMS:

Abel, Sharon M.

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 L.
 Picton, Terence W.
 Rovet, Joanne
 Sharpe, James A.
 Steinbach, Martin
 Tannock, Rosemary
 Tator, Charles, H.
 Tymianski, Michael
 Van Der Kooy, Derek
 Westall, Carol
 Young, L. Trevor

**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
 Westaway, David
 Yucel, Yeni

Medical Biophysics:

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.
 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, James W.
 Wells, Peter G.

Physiology:

Charlton, Milton P.
 De Boni, Umberto
 Dostrovsky, Jonathan O.
 Duffin, James
 Feng, Zhong-Ping
 Frankland, Paul
 Hare, Gregory
 Horner, Richard
 Hutchison, William D.

Jia, Zhengping
 Josselyn, Sheena
 Kwan, Hon C.
 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
 Winslow, James L.
 Wojtowicz, J. Martin
 Zhuo, Min

Psychiatry:

Shapiro, Colin

Psychology:

Anderson, Adam K.
 Anderson, Nicole
 Cunningham, William A.
 De Rosa, Eve
 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

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.
 O'Keefe, Bernard M.
 Rochon, Elizabeth
 van Lieshout, Pascal

Zoology:

Boulianne, Gabrielle L.
 Brown, Theodore J.

Brown, Ian R.
 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.

Appendix 4: Distinguished Lecture Series 2004-2005:

1) Charles Tator-Barbara Turnbull Lectureship Series in Spinal Cord Injury

Friday, September 24, 2004 10am – 4pm

10:30am – Keynote Address: **EVA SYKOVA**, Professor, Department of Physiology, Charles University, Prague, Czech Republic

"Repair of spinal cord injury using stem cells and hydrogel implants"

89 Chestnut Residence, Giovanni Room, 2nd Floor

2) Monday, October 18, 2004 4pm

The Fourth Raymond and Beverly Sackler Distinguished Visiting Neuroscientist

DR. MICHAEL E. GREENBERG, Director, Division of Neuroscience, Children's Hospital, Harvard Medical School, Boston

"Signaling Pathways that Regulate Synapse Development & Function"

Medical Sciences Building, Rm 3154

3) Wednesday, December 8, 2004 3:00pm

DR. RALPH GREENSPAN, The Neurosciences Institute, San Diego

"Sleep, Arousal and the Rudiments of Consciousness in Drosophila"

Mount Sinai Hospital, 18th floor auditorium

4) Friday, January 28, 2005 4:00pm

DR. TOMAS PAUS, Professor, Brain & Body Centre, University of Nottingham,

Nottingham, UK and Montreal Neurological Institute, McGill University, Montreal, Canada

"Mapping Brain Maturation and Cognitive Development during Adolescence"

Hospital for Sick Children, Room 1250, Elm Wing

5) Thursday, March 17, 2005 2:00pm

DR. BUD CRAIG, Barrow Neurological Institute, Phoenix Az

"How do you feel? The sense of the physiological condition of the body"

Medical Sciences Building, Rm 3153

6) Tuesday, April 26, 2005 4:00pm

DR. ERIC TAYLOR, Director of the Research Centre, Child and Adolescent Psychiatry,
University of London,
England

"ADHD – Where are the boundaries?"

Hospital for Sick Children, Main Auditorium

7) Monday, May 9, 2005 4:00pm

DR. TOMOYUKI TAKAHASHI, Professor, Dept. of Neurophysiology, Graduate School of
Medicine,

University of Tokyo, Japan

"Roles of presynaptic GTP-binding proteins"

Medical Sciences Building, Rm 3153

8) Thursday, May 26, 2005 2pm

DR. EDWARD ZIFF, Department of Biochemistry, New York University

"Protein Interactions and the Trafficking of AMPA Receptors"

Sidney Smith Hall, 100 St. George St., Rm 2102