

NEUROSCIENCE

Neuroscience is an interdisciplinary program offering MSc and PhD degrees. The program is run in conjunction with five basic science departments: Anatomy & Neurobiology, Biochemistry & Molecular Biology, Pharmacology, Physiology & Biophysics, and Psychology.

Research laboratories are located in the Life Sciences Centre, the Tupper Medical Building and the Clinical Research Centre. The program is closely linked with the Neuroscience Institute at Dalhousie, which also includes members of the Departments of Anaesthesiology, Medicine, Ophthalmology, Pathology, Pediatrics, Psychiatry, Surgery and Urology. Dr. Alan Fine is Director of the Neuroscience Institute.

PROGRAM OF STUDY

The goals of the Neuroscience Program are to provide the opportunity for students to obtain a broad exposure to the field of Neuroscience in addition to specialized training in the student's specific area of research. The student's supervisory committee is responsible for designing and approving the program of classes that will best meet the student's needs. Normally, the student must take the Principles of Neuroscience (NESC6100) during his or her first year; this replaces some of the departmental requirements for graduate study.

FACULTY ADVISORS

DEPARTMENT OF ANATOMY & NEUROBIOLOGY

Allen, G. V. (PhD, Dalhousie) Stress and the central nervous system: central and peripheral responses to ischemia, pain and neurotrauma.

Brownstone, R. (MD, PhD, Manitoba) Neural control of movement; spinal cord physiology; neuromodulation. (Primary appointment in Neurosurgery)

Baldridge, W. H. (PhD, McMaster) Structure and function of the vertebrate retina, mechanisms of adaptation, Neuronal circuits in mammalian retina.

Clarke, D. (MD, PhD, McGill) Neuronal survival and regeneration following injury in the central nervous system (Primary appointment in Neurosurgery).

Currie, R. W. (PhD, Man.) Heat shock response in the brain.

Darvesh, S. (MD, PhD, UNB) Synthetic chemistry, biochemistry, chemoarchitecture and clinical aspects of Alzheimer's disease and related disorders (Primary appointment in Neurology).

Kablar, B. (MD, U. Zagreb; PhD, U. Zagreb and Pisa) Molecular biology of skeletal muscle and neural development.

Leslie, R. A. (PhD, Cambridge) The neurochemistry of affective disorders; the use of functional in vivo imaging to study CNS disorders.

Marsh, D. (PhD, Alberta) Current research involves investigating the mechanisms of cell death after spinal cord injury and neuroprotection associated with the anti-inflammatory treatments, autonomic control of blood pressure and bladder function.

Mendez, I. M. (MD, PhD, UWO) Neural transplantation in the mammalian CNS; Parkinson's disease and spinal cord injury; Chemical neuroanatomy of the basal ganglia (Primary appointment in Neurosurgery).

Neumann, P. E. (MD, Brown) Genetics of pattern formation in the mammalian CNS.

Rafuse, V. (PhD, Alberta) Peripheral nerve regeneration and neuromuscular development; neural stem cells.

Semba, K. (PhD, Rutgers) Brain mechanisms of sleep and wakefulness and circadian control of sleep; Neurotransmitters, Functional neuroanatomy; Neurophysiology; Behavioral techniques.

Smith, F. M. (PhD, UBC) Electrophysiology, morphology and neuromodulation of peripheral autonomic neurons controlling the cardiovascular system.

Wassersug, R. W. (PhD, Chicago) Physiology, morphology and behaviour of lower vertebrates, particularly amphibians.

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY

Byers, D. M. (PhD, Alta) Activation of microglial cells by LPS and beta-amyloid. Structure and function of the MARCKS family of protein kinase C substrates.

Karten, B. (PhD, University of Graz) Brain cholesterol metabolism, mitochondria and Neurodegenerative disease.

DEPARTMENT OF PHARMACOLOGY
Denovan-Wright, E. (PhD, Dalhousie) Gene expression, Huntington's disease, neurodegeneration.

Downie, J. (PhD, Man.) Central and peripheral nervous system control of visceral function, visceral pain, bladder dysfunction in spinal cord injury.

Hall, R. I. (MD, Dalhousie) The introduction of new drugs into the clinical practice of cardiac anaesthesia, general anaesthesia and intensive care medicine (Primary appointment in Anaesthesiology).

Howlett, S. E. (PhD, Memorial) Membrane ionic currents and contraction in normal heart, and in myocardial ischemia and heart failure.

Hung, O. (MD, Dalhousie) Pharmacokinetics, pharmacodynamics, drug delivery system, liposome-encapsulation opioid and local anaesthetics (Primary appointment in Anaesthesiology).

Kelly, M. (PhD, Southampton) Patch-clamp analysis of autonomic neurons.

Robertson, G. S. (PhD, Dalhousie) Mechanisms of neuronal cell death and survival. (Joint appointment in Psychiatry).

Sawynok, J. (PhD, Queen's) Peripheral, spinal and supraspinal mechanisms of analgesia.

DEPARTMENT OF PHYSIOLOGY & BIOPHYSICS

Barnes, S. (PhD, Berkeley) Retinal neurobiology; ion channel function in synaptic communication; novel neuromodulators and neural messengers.

Chauhan, B. C. (PhD, Wales) Glaucoma, visual psychophysics, imaging, ocular haemodynamics, experimental glaucoma. (Primary appointment in Ophthalmology).

Croll, R. P. (PhD, McGill) Ontogeny and phylogeny of identified neurons; axonal regeneration and sprouting; invertebrate behavioural neuroscience.

Fine, A. (VMD, PhD, Penn) Synaptic function and plasticity; optical methods (confocal, 2-photon fluorescence and high-speed digital microscopy; voltage and ion-sensitive dyes).

Guernsey, D. L. (PhD, U. Hawaii) Positional cloning and analysis of genes involved in brain development. Genetic ophthalmology (Primary appointment in Pathology).

Krueger, S. (PhD, University of Zurich) Development and plasticity of synapses in the nervous system.

Rasmusson, D. D. (PhD, Dalhousie) Plasticity in the somatosensory system; acetylcholine release from cerebral cortex.

Torkkeli, P. H. (PhD, Alberta) Mechanosensory transduction and adaptation. Regulation of excitability by voltage-activated conductances. Peripheral modulation of mechanosensitivity in primary afferent neurons.

Tremblay, F. (PhD, Montreal) Visual electrophysiology, neuroprotection, retinal physiology, electroretinography (ERG), clinical and experimental electrodiagnostics.

Wilkinson, M. (PhD, London) Molecular neuroendocrinology of obesity; molecular mechanisms and neural control of puberty. (Joint appointment in Obstetrics/Gynecology)

DEPARTMENT OF PSYCHOLOGY

Adamo, S. A. (PhD, McGill) Behaviour in cephalopods; how and why parasites and pathogens influence insect behaviour.

Brown, R. E. (PhD, Dalhousie) Development and hormonal control of mammalian social and reproductive behaviour; olfactory learning and ultrasonic communication. Behaviour of transgenic mice. Behavioural pharmacology.

Connolly, J. F. (PhD, London) Neuroimaging (EEG, MEG, fMRI) of speech processing and reading and their development; dyslexia; cognitive assessment using imaging methods in stroke, traumatic brain injury, cerebral palsy.

Duffy, K. R. (PhD, McMaster) Function, organization, and development of the mammalian visual system; impact of sensory experience on neural network development and plasticity.

Eskes, G. A. (PhD, Berkeley) Visuospatial neglect and its rehabilitation; Neuropsychology of memory and reading; Role of the hypothalamus in sleep and temperature rhythms in humans.

Klein, R. M. (PhD, Oregon) Human attention & performance; with an emphasis on how cognitive processes are implemented in the brain; disorders of attention (e.g., neglect; ADHD) and performance (e.g. dyslexia).

Kutcher, S.P. (MD, McMaster) Adolescent psychiatric illness, mood disorders, psychopharmacology (Primary appointment in Psychiatry).

LoLordo, V. (PhD, Pennsylvania) Animal learning and memory, including conditioned changes in flavour preferences and palatability in rats, and olfactory learning in mice.

McGrath, P. J. (PhD, Queen's) Interested in pain in the developing organism from a clinical, social and neuroscience perspective.

McMullen, P. A. (PhD, Waterloo) Visual Cognition; cognitive neuropsychology.

Meinertzhagen, I.A. (PhD, DSc, St. Andrews) Simple invertebrate nervous system; their structure, synaptic organization, morphogenesis, cell lineage, and evolution. Three-dimensional imaging of the *Drosophila* brain and larval ascidian nervous system.

Mitchell, D. E. (PhD, Berkeley) Postnatal anatomical and functional development of the visual system; developmental plasticity in the visual system.

Newman, A. (PhD, University of Oregon) Cognitive Neuroscience, focusing on neuroplasticity and language processing.

Perrot-Sinal, T. (PhD, Western Ontario) The effects of gender and gonadal steroids on adaptive and pathological responses to stress; seasonal plasticity of defensive behaviour and underlying neural substrates.

Phillips, D. P. (PhD, Monash) Auditory perception in normal and hearing-impaired listeners; sensory processes in hearing; central auditory neuroscience.

Rusak, B. (PhD, Berkeley) Neurophysiological and molecular mechanisms of biological rhythms; human rhythm and sleep disorders. (Joint appointment in Psychiatry)

Taylor-Helmick, T. L. (PhD, Dalhousie) Cognition; cognitive neuroscience; attention; motor control: gating of voluntary and reflexive control of orienting, inhibition of attention and motor production.

In addition to the above, over 30 members of clinical departments and divisions in the Faculty of Medicine (Anaesthesiology, Pathology, Ophthalmology, Geriatric Medicine, Neurology, Neurosurgery, Psychiatry, Physical Medicine and Rehabilitation, and Urology) and Engineering (Electrical and Computer Engineering) are involved in neuroscience research.

ADMISSION REQUIREMENTS

Initial applications should be directed to the Registrar. Incoming students must be recommended for acceptance by both the appropriate Departmental Graduate Committee and by the Neuroscience Program Committee, and must have a 4-year (Honours) bachelor's degree with a minimum of two years of above-average performance (i.e., A-average or better) or equivalent. Students with a B.Sc. wishing to do a PhD should be registered initially in the MSc program, but may be considered for transfer into the PhD program after successful completion of the class requirements. Students entering with a strong background in Neuroscience may apply to the Neuroscience Program Committee to have some of the class requirements waived.

FINANCIAL AID

Financial assistance is provided through the student's home department. As this varies across departments, the Fact Sheets for individual departments should be consulted. Possible sources include fellowships from the Canadian Institutes for Health Research (CIHR),

Natural Sciences and Engineering Research Council (NSERC), Nova Scotia Health Research Foundation (NSHRF), research grants held by the student's supervisor and Dalhousie Graduate Awards.

INQUIRIES

Neuroscience Institute

Sir Charles Tupper
Medical Building
Dalhousie University
Halifax, Nova Scotia
Canada, B3H 4H7
Tel: (902) 494-1251
Fax: (902) 494-2050
E-Mail: neuroscience.institute@dal.ca

or

Victor Rafuse, PhD
Neuroscience Graduate Coordinator
Department of Anatomy and Neurobiology

Tupper Medical Building,
Dalhousie University
Halifax, Nova Scotia
Canada, B3H 4H7
Tel: (902) 494-6197
Fax: (902) 494-1212
E-Mail: victor.rafuse@dal.ca

<http://www.neuroscience.dal.ca/>