



Sherman Health Science Research Centre





Architectural Summary

The Sherman Health Science Research Centre Project transformed a decommissioned hockey arena, originally built in 1968, into a highly sophisticated research centre incorporating green building design and construction elements.

Quick Facts

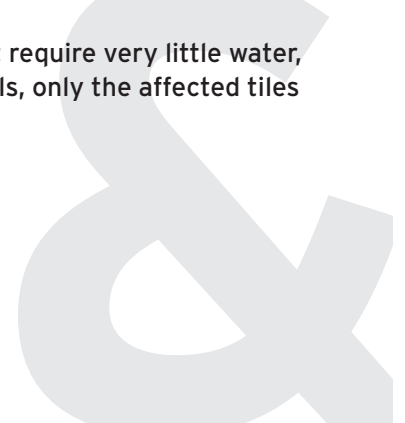
- Project start date: March 2007
- Construction start date: February 2009
- Completion date: December 2009
- Construction budget: \$11,500,000
- Gross Floor Area: 50,000 square feet
- Accommodation for 150 researchers, graduate students, staff and visiting researchers

Building Features

- The original ice arena's external shell was retained while the first floor was gutted and retrofitted for offices and research laboratories.
- The second floor, which adds additional research and office space, is new to the building.
- Materials from the internal demolition that have been reused throughout the structure to add design interest include:
 - The concrete ice pad, which was broken up and used around the perimeter of the building to create a man-made alvar, assists with drainage and storm water management and adds landscape interest. The alvar is used to test robots designed in the Canadian Centre for Field Robotics on the first floor, and for part of the recreational patio.
 - Hardwood from the arena's ceiling was refinished and used in the internal staircases that connect the first and second floors.
- Large windows and skylights were installed to increase the building's natural light, and reduce the need for artificial lighting.
- Energy-efficient light fixtures were also included for evening use.
- Polished concrete flooring maximizes the building's radiant heat and maintains a consistent internal temperature.
- Internal paint that is low in volatile organic compounds was used, limiting the off-gassing of fumes and preserving the building's internal air quality.
- Computer-controlled heating and ventilation equipment continually cycles fresh air into the building and maintains an optimum internal temperature.
- The building's carpet tiles, manufactured using processes that require very little water, make use of recycled materials. In the event of damage or spills, only the affected tiles are removed, preserving the internal air quality.

Collaborative Features

- Indoor street of offices
- Reception area
- Meeting and conference space
- Kitchen and outdoor amenity area

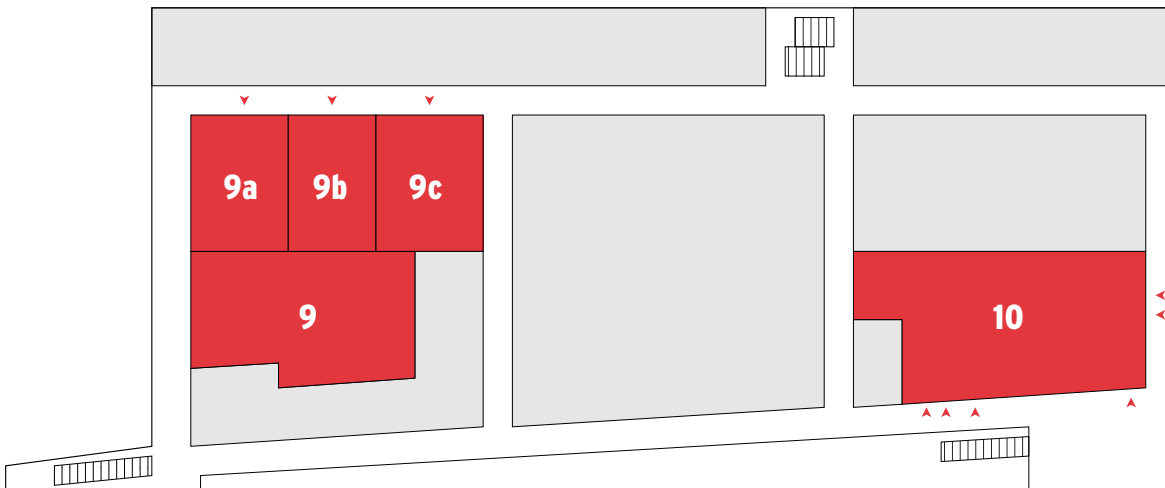


Research Laboratories Floor Map

First Floor



Second Floor



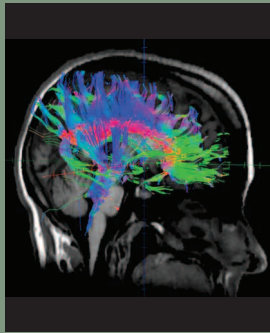
Research Laboratories

1



Neuroimaging Laboratory

Researchers: Professors Keith Schneider, Douglas Crawford, Joseph DeSouza, Kari Hoffmann, Shayna Rosenbaum, Lauren Sergio, Jennifer Steeves, Frances Wilkinson, Hugh Wilson (director of the Centre for Vision Research)

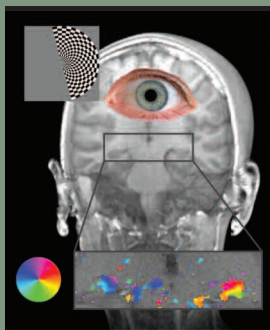


Magnetic resonance imaging (MRI) is a technique that uses radio waves, very strong magnetic fields, and the properties of atomic nuclei to create images of an object. Functional MRI (fMRI) is a technique used to observe the inner workings of the brain. During experiments, researchers take a complete MRI picture of a subject's brain every few seconds. By measuring small blood flow changes over time, researchers observe how brain areas become more or less active while a subject performs a task, makes decisions or reacts to a visual image.

York researchers use fMRI to study the relationship between specific mental functions and activity in certain brain areas. fMRI helps us to understand and map how the brain normally works – such as the areas responsible for speech or vision – and what goes wrong when it does not function properly. If a patient has had a stroke, for example, an fMRI scan can help determine which brain areas are not working properly and predict how this will impact the patient's life.



This fMRI research has many applications to human health, and York researchers are using it to study such areas as dyslexia, migraines, aging, monocular blindness, movement disorders, schizophrenia, multiple sclerosis and traumatic brain injury.



2



Visual and Cognitive Development Project

Professor Scott Adler

The infant-eyetracker equipment allows researchers to observe how infants develop the selective ability to allocate their attention to particular objects, use that attention to anticipate future events and store and retrieve visual information in their long-term memories to form a knowledge base about their world. This research improves our understanding of normal infant development and developmental disorders such as Autism or Attention Deficit Disorder, and is funded by the National Institute of Health.

www.psych.yorku.ca/adler/centre.html

3



Visual Perception and Attention Laboratory

Professors Maz Fallah and Heather Jordan

Researchers in the Visual Perception and Attention Laboratory examine how the brain processes sensory information to give us impression of an integrated visual world, which also provides a basis to understand conditions in which this process fails (e.g., autism and schizophrenia). By recording eye movements via infrared cameras in real time and measuring neuron activity using EEG as participants perform specialized tasks, researchers are determining how we produce our experience of a rich and vibrant world.

www.yorku.ca/vpalab

4



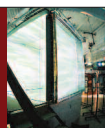
Multisensory Integration Laboratory

Professor Laurence Harris

The Multisensory Integration Laboratory provides facilities to explore the relationship between perception and sensation. For example, the Bodies in the Space Environment experiment studies how astronauts distinguish up from down in weightless or near-weightless environments. Sponsored by the Canadian Space Agency, the study's experiments change the relative direction and even presence of gravity to determine how body cues and vision help humans determine up from down in the real world, in high performance aircraft, and in space. This research will help create safer work environments in space, and may help to improve the performance of pilots and others who work in micro-gravity environments.

www.yorku.ca/harris

5



Virtual Reality Laboratory

Professors Michael Jenkin and Laurence Harris

The Virtual Reality Laboratory's facilities allow researchers to generate and study complex and realistic visual and physical cues. By arranging these cues in different ways, researchers examine fundamental questions in human perception. The Immersive Visual Environment at York (IVY), is Canada's first six-sided immersive (cave) environment. The Moog motion base, a Stewart platform, moves subjects in 3D space. The Tumbled Room is constructed to place gravity and visual cues in conflict while the Tumbling Room, built to explore how motion, gravity and visual cues interact, has been used by NASA to train astronauts to deal with disorientation in space.

vgrserver.cse.yorku.ca

6



Perceptual Neuroscience Laboratory

Professor Jennifer Steeves

The Perceptual Neuroscience Laboratory explores how the brain processes our visual world. How are basic features of a visual image, such as edges, colour and textures, brought together to represent objects, faces and scenes? How does sound integrate with the visual system? How do these systems work normally? What happens when they are disrupted?

We use converging techniques to study the brain and behaviour, including psychophysics, eye movement measurement, functional magnetic resonance imaging (fMRI), fibre tract tracing and transcranial magnetic stimulation (TMS).

www.yorku.ca/steeves

7



Canadian Centre for Field Robotics

Professor Michael Jenkin

The Canadian Centre for Field Robotics provides a national setting for research in robots allowing collaboration between industry and academia on complex outdoor vehicles. It develops and tests robotic vehicles that operate on the ground, in the air and underwater.

For example, KROY, a six-legged underwater robot, can operate autonomously and can also be controlled via an underwater operator control unit. This device allows an operator-diver to effectively and safely communicate with the robot at depth.

vgrserver.cse.yorku.ca

8



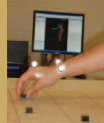
Visual Assessment Laboratory

Professors Frances Wilkinson, Lauren Sergio, Douglas Crawford, Laurence Harris, Denise Henriques, Jennifer Steeves, Hugh Wilson

The Visual Assessment Laboratory provides a common facility to assess basic visual and visual-motor functions, including visual acuity and contrast sensitivity, colour vision, stereovision, eye movements and pupil responses, movements in 3D space and perimetry.

It contributes crucial capacity for research in vision and migraine, recovery from stroke, normal visual and motor aging studies and early-stage Alzheimer's research.

9b



Ergonomics Laboratory – Biomechanics at York

Professor Anne Moore

The Biomechanics at York Ergonomics Laboratory creates healthier workplaces by exploring strategies to reduce the risk of developing musculoskeletal injuries such as carpal tunnel syndrome, muscle strains, sprains or low-back pain. Researchers examine how high forces, awkward posture and high repetition contribute to a worker's risk of injury in a given workspace, with particular focus on the relationship between muscle use and external activity.

10



Body Composition and Health Laboratory

Professor Jennifer L. Kuk

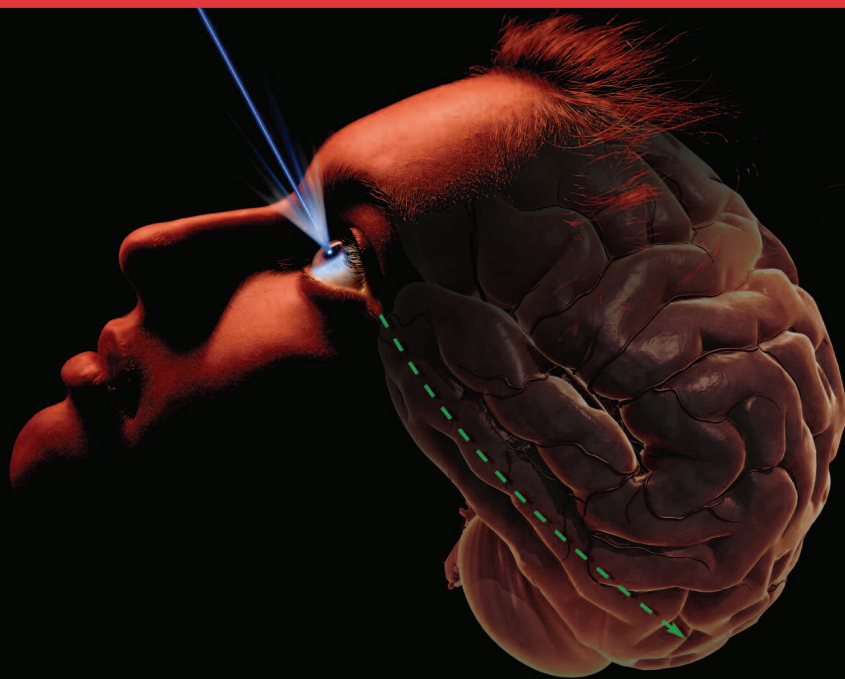
The Body Composition and Health Laboratory conducts epidemiological and clinical studies on obesity, body composition, lifestyle and health. This approach allows researchers to examine potential predictors of health and weight management in adults and children at the population level, and then to test whether these characteristics or behaviours also predict weight loss in clinical weight-loss patients.

Current Research Areas:

- Weight Management in Morbidly Obese Patients
- Project RADICAL: Race/ethnicity and the perception of diabetes and cardiovascular disease risk factors in the context of Canada's lifestyle and obesity guidelines



The Centre for Vision Research



An international leader in human and machine
vision research

www.yorku.ca/cvr

For more information about research at York University, visit
www.yorku.ca/research or contact vpri@yorku.ca