**WEDNESDAY OCT 16**

# DYNAMICAL SYSTEMS, STATISTICAL MECHANICS AND THE BRAIN

## DR. LAI-SANG YOUNG

HENRY & LUCY MOSES PROFESSOR OF SCIENCE

PROFESSOR OF MATHEMATICS AND NEURAL SCIENCE

COURANT INSTITUTE OF MATHEMATICAL SCIENCES NEW YORK UNIVERSITY

Professor Young's research interests include dynamical systems, ergodic theory, chaos theory, probability theory, statistical mechanics, and neuroscience.

Professor Young received her PhD from Berkeley in 1978. She became a Sloan Fellow in 1985 and a Guggenheim Fellow in 1993. Professor Young received the Ruth Lyttle Sattler Prize from the American Mathematical Society in 1993 and was elected as a fellow of the American Academy of Arts and Sciences in 2004. In 2018, she was an invited plenary speaker at the International Congress of Mathematicians.

## Applied Math Distinguished Lecture

*The cerebral cortex is a thin layer of neural tissue in the mammalian brain. It plays key roles in sensory processing, thought, memory, and other conscious behaviors.*

In this talk, I would like to propose a mathematical idealization of a part of the cerebral cortex, depicting it as a structured network of interacting neurons. It is an attempt to conceptualize cortical dynamics, and to do so in a way that is consistent with neuroanatomy and physiology. Local circuits will be studied as dynamical systems, while individual layers of different cortical areas will be treated borrowing ideas from nonequilibrium statistical mechanics. I will try to convey the flavor of the dynamics on the neuronal level, and use a biologically-constrained, computational model of the monkey visual cortex to illustrate activity on a larger scale as cortex responds in real time to certain visual stimuli.

**WHEN**

October 16, 2019
2:30 p.m.

**WHERE**

MC 5501

Reception will follow in MC 5501.

**UNIVERSITY OF WATERLOO** | FACULTY OF MATHEMATICS
**Department of Applied Mathematics**