



**Western University**  
**DEPARTMENT OF PHYSICS AND ASTRONOMY**

## **PHYSICS & ASTRONOMY COLLOQUIUM**

**Date:** Thursday, 6<sup>th</sup> October 2016  
**Time:** 1:30 p.m.  
**Location:** Physics & Astronomy Seminar Room 100

### **Dr. Louis J. Dubé**

Department of Physics, Engineering Physics and Optics  
Université Laval

### ***“A Network Approach to Complex Systems – complexity made simple, ... but not simpler”***

#### **ABSTRACT**

We will present complex systems through the looking glass of network science, a new field, perhaps only 15 years old, that gather the combined expertise of statistical physics, graph theory and nonlinear dynamics.

The images of connected networks, may they be artificial (the internet, the web, ...) or natural (social groups, feeding hierarchy, ...), are indeed permeating our modern world. After a long gestation period dating back to Leonhard Euler and early empirical social studies by Stanley Milgram, uncovering the “small world effect,” physicists are showing an increasing interest in the search for the universal mechanisms (structure and evolution) that allow a system to express complexity.

After a brief introduction to the science of networks, we will turn to the problem of the dynamics of networks (growth and structural changes) as a proxy for the evolution of complex systems. Whereas research has long focused on why systems as varied as protein networks, co-authorships and stock exchanges all feature some common properties (hierarchy, community structure, scale independence, small world, ...), we will focus on describing how these features emerge from simple principles in an attempt to illuminate their past and to predict their future. Utopia or reality? The story will tell.

**Coffee will be available in the Atrium, 2nd floor, at 1:15 p.m.**

**We look forward to seeing you at the Colloquium! As a courtesy to the speaker and audience, please set your cellphones to “silent” mode. Thanks!**