

# **Title: The Mystery of the Missing Lower Bound**

## **Prof. Joseph Horton**

Abstract:

Consider almost any NP-hard problem, for example the Travelling Salesman Problem (TSP). Given a set of cities and the costs to travel between any pair of them, what is the least costly tour that goes thru every city once only, and returns to the starting city?

The fastest algorithm I know to solve TSP with minimum cost requires exponential time. I know of no non-trivial lower bound on the length of time to solve it or any other NP-hard problem. Why is there such a big difference between the upper and lower bounds on how long it takes to solve such problems?

This talk will discuss the difficulty of finding lower bounds on the time it takes to computational problems. Several well-known problems, algorithms and lower bounds will be presented.

This talk is suitable for undergraduates. Graduate students and professors are also encouraged to attend.

### **short Bio.**

Joe Horton grew up in Winnipeg. After attending the University of Manitoba, and York University, he received his PhD from the University of Waterloo in 1971 at the age of 24. He joined Computer Science at UNB Fredericton in 1981, and retired last year. He has published many papers in the fields of Combinatorics, Graph Theory, Computational Geometry, Algorithm Development, and Automated Reasoning. His work is cited in many other fields, including Topology, Biology, Structural Engineering. His most recent interests are Complexity Theory, Artificial Life, and the evolution of simulated consciousness.

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