# COLLOQUIUM
# UNIVERSITY OF PITTSBURGH
# FRIDAY, NOVEMBER 30, 2OO7

704 THACKERAY HALL

4:00 P.M.


## PROFESSOR JONATHAN RUBIN

**DEPARTMENT OF MATHEMATICS**

**UNIVERSITY OF PITTSBURGH**


### IT'S ALL IN YOUR HEAD:
### THE GENERATIOIN OF RESPIRATORY RHYTHMS


**ABSTRACT:** Breathing is essential for mammalian survival, driving gas exchange in a way that adapts rapidly to changes in metabolic demand as well as more gradually to aging, disease, and other physiological variations. Experiments have revealed the existence of a neuronal control system, in the mammalian brain stem, that maintains a stable respiratory rhythm and likely underlies the critical adaptability of respiration. The mechanisms through which this system operates, however, remain under intense experimental investigation. In this talk, I will discuss the mathematical analysis of ordinary differential equation models related to this system. In particular, I will focus on the role of coupling in promoting rhythmicity and on how synchrony can arise despite heterogeneity in the cells involved. This talk will assume no neuroscience background.


**Refreshments served at 3:30 p.m.**
**in the Math Dept. COMMON ROOM, Thackeray 705**