

**SPECIAL**

# **PHYSICAL MATHEMATICS SEMINAR**

## **Nonlinear Peristaltic Waves: Feeding the Hungry Python**

**DAISUKE TAKAGI**

University of Cambridge

**ABSTRACT:**

Biological ducts convey contents like food in the digestive system by peristaltic action, propagating waves of muscular contraction and relaxation. The motion is studied theoretically by considering a force of sinusoidal form moving along an elastic tube containing a viscous fluid, a Bingham plastic, and a rigid body. Analytic solutions for the tube deformation and the internal flow are presented at small and large forcing amplitudes with numerical solutions showing the transition between the two limits. The results reveal how large meals are swallowed by the python.

**TUESDAY, FEBRUARY 23, 2010**

**2:30 PM**

**Building 2, Room 105**

*Refreshments at 3:30 PM in Building 2, Room 290  
(Math Department - Common Room)*



**Massachusetts Institute of Technology**

Department of Mathematics  
Cambridge, MA 02139