

**APPLIED MATHEMATICS SEMINAR**  
Department of Mathematics  
University of West Georgia  
**3:15 PM, TUESDAY, OCTOBER 21, 2008, BOYD 303**

Speaker: Dr. SCOTT GORDON, UWG

Title: **Optimizing Distribution of Power During a Cycling Time Trial**

**Abstract**

A simple mathematical model is used to find the optimal distribution of a cyclist's effort during a time trial. It is shown that maintaining a constant velocity is optimal if the goal is to minimize the time taken to complete the course while fixing amount of work done. However, this is usually impractical on a non-flat course because the cyclist would be unable to maintain the power output required on the climbs. A model for exertion is introduced and used to identify the distribution of power that minimizes time while restricting the cyclist's exertion. It is shown that, for a course with a climb followed by a descent, limits on exertion prevent the cyclist from improving performance by shifting effort towards the climb and away from the descent. It is also shown, however, that significant improvement is possible on a course with several climbs and descents. Lagrange multipliers are used solve the minimization problems.

All are welcome.