



# Transportation Seminar Series

*Friday, August 31, 2007*  
*4 - 5 p.m. in 240 Bechtel Engineering Center*

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## **Approximation Algorithms for Orienteering and Deadline-TSP**

**Abstract:** Consider a delivery-person charged with delivering items to each of various locations. Every item has an expiration date, and is useful only if it can be delivered to its destination before this date. The natural goal for the delivery-person is to maximize the number (or the weighted value) of items delivered by their deadlines. Note that if all deadlines are equal, this reduces to the well-known Orienteering problem. A slightly more general problem adds release times as well as deadlines, and is known as Vehicle Routing with Time Windows.

This talk will present the first provable approximation algorithms for the general metric versions of the problems described, all of which are NP-Complete. The main results include a 3-approximation for an extension of the Orienteering problem called "point-to-point orienteering" which allows us to specify both a starting and ending location. We apply this approximation to obtain an  $O(\log n)$  approximation to deadline-TSP and Vehicle Routing with Time Windows, and to obtain a bicriterion result of  $O(\log 1/\epsilon)$  on the cost while exceeding deadlines by a potential  $1+\epsilon$  factor.

These results are joint work with Nikhil Bansal (IBM Research), Avrim Blum (CMU), and Shuchi Chawla (U. Wisconsin); the paper first appeared in the 2004 Symposium on Theory of Computing.

**Bio:** Adam Meyerson received his PhD from Stanford University in 2002, under the supervision of Prof. Serge Plotkin. After a one-year postdoctoral appointment with the Aladdin Project at Carnegie-Mellon University, he joined the faculty of UCLA in 2003. His research interests include approximation algorithms, online algorithms, and applications of game theory in computer science.

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