

# TINGTING CUI

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## RESEARCH INTEREST

Supply chain risk management, incentive contract design with incomplete information, design and analysis of optimization algorithms

## EDUCATION

- Ph.D.** *U.C. Berkeley*, Industrial Engineering and Operations Research May 2010 (expected)  
**M.S.** *University of Arizona*, Industrial Engineering July 2005  
**B.S.** *Peking University*, Information Science and Computer Science July 2002

## DISSERTATION

*Robust supply chain design under uncertainty: Reliability, incentives and coordination*  
Advisor: Professor Zuo-Jun (Max) Shen

## RESEARCH EXPERIENCE

**Research Assistant**, U.C. Berkeley 2005-Present

- *Reliable supply network design*, with Max Shen and Yanfeng Ouyang. We aimed at building robust supply networks to efficiently hedge against random facility failure due to disruptions. We formulated the problem as a compact mixed integer program and designed a Lagrangian relaxation algorithm for problem decomposition. We also developed a continuum approximation model that precisely predicts system cost for purpose of sensitivity analysis.
- *Efficient algorithms for the reliable facility location problems*, with Robert Aboolian and Max Shen. We designed, implemented and tested several algorithms using neighborhood search and cutting plane techniques. Our algorithms provide both exact and heuristic solutions for very large problem instances.
- *Optimal contract design for queueing systems with incomplete information*, with Ying-Ju Chen and Max Shen. We studied revenue maximizing contract design for a capacity-constrained queueing system that serves several segments of customers who differ in their sensitivity to delays and their willingness to pay. Novel features of the optimal contracts include probabilistic admission control, randomized priority ranking and strategic idleness.
- *Robustness of optimal auction mechanisms*, with Ying-Ju Chen and Max Shen. We applied the robust optimization approach to classical economic models of auction mechanism design. Using a novel network flow approach, we demonstrated the revenue loss in more robust implementations that relax the common prior assumption used by the Bayesian Nash formulation.
- *Inverse shortest path problems*, with Dorit Hochbaum. Inverse optimization problems arise from the need to estimate key parameter values using limited information on the optimal solutions. We designed algorithms for and analyzed the complexity of the general and special instances of the inverse shortest path problems.

**Research Assistant**, University of Arizona

2004-2005

- *Bi-level programming and Stackelberg games*, with Cole Smith. We study a bi-level bi-linear programming formulation for a Stackelberg game and developed a special branch-and-bound algorithm.

## **TEACHING EXPERIENCE**

**Instructor**, U.C. Berkeley

Spring 2009

- Taught undergraduate core *Service Operations Design and Analysis* (IEOR 151). Designed and prepared the course syllabus, case studies, homework problems and exams, with full administrative responsibility.

**Teaching Assistant**, U.C. Berkeley

Fall 2006 - Fall 2009

- *Cases in Global Innovation* (IEOR 190F). Helped to prepare and lead case discussions.
- *Engineering Design and Analysis* (Engr 10). Led lab and discussion sessions, graded homework and exams.
- *Operations Research I* (IEOR 160). Designed and led discussion sessions, graded exams.

## **AWARDS AND HONORS**

- INFORMS Doctoral Colloquium, Washington, DC, 2008
- IEOR Ph.D. Fellowship, U.C. Berkeley, 2005-2006
- SIE Graduate Fellowship, University of Arizona, 2003-2005
- First Place, National Math Olympiad (high school level), China, 1998

## **ACADEMIC SERVICES**

- Member of INFORMS, MSOM and Women in OR
- Referee for *Operations Research*, *Management Science*, *Naval Research Logistics* and *Networks*
- Chair of invited session (Locational Analysis and Computing), INFORMS Annual Conference 2009 San Diego, CA, and 2007 Seattle, WA

## **PERSONAL INFORMATION**

- Permanent Resident of the U.S., Citizen of China.
- Bilingual (English and Chinese).
- Love traveling, cooking and animals

## **PUBLICATIONS**

T. Cui, Y. Ouyang, and Z.-J.M. Shen, “Reliable Facility Location Design under the Risk of Disruptions”, *Operations Research*, forthcoming.

T. Cui, Y.-J. Chen, and Z.-J.M. Shen, “Optimal Pricing, Scheduling, and Admission Control for Queueing Systems under Information Asymmetry”, submitted to *Operations Research*.

T. Cui and D. Hochbaum, “Complexity of the Shortest Paths Lengths Problems”, *Networks*, forthcoming.

T. Cui, Y.-J. Chen, and Z.-J.M. Shen, “Optimal Mechanism Design: the Revenue and Robustness Trade-off”, in preparation.

R. Aboolian, T. Cui, and Z.-J.M. Shen, “Efficient Algorithms for the Reliable Facility Location Problems”, in preparation.

## **INVITED TALKS**

“Efficient Approaches for the Reliable Facility Location Problems”, INFORMS Annual Meeting, San Diego, CA, Oct 2009.

“Optimal Contract Design for Queueing Systems with Incomplete Information”, INFORMS Annual Meeting, San Diego, CA, Oct 2009.

“Reliable Supply Network Design: The Discrete and Continuous Formulation”, INFORMS Annual Meeting, Washington, DC, Oct 2008.

“Facility Location Design under Uncertainty”, POMS Conference, La Jolla, CA, May 2008.

“An MIP Formulation for the Reliable Facility Location Design Problem”, INFORMS Annual Meeting, Seattle, WA, Nov 2007.

“Supply Chain Coordination with Risk Averse Agent”, INFORMS Annual Meeting, Seattle, WA, Nov 2007.

“Portfolio Selection through Robust and Inverse Optimization”, IEOR Optimization Seminar, U.C. Berkeley, Mar 2007.

“Complexity of the Inverse Shortest Paths Lengths Problems”, INFORMS Annual Meeting, Pittsburgh, PA, Nov 2006.