

# Guangming Zhang

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## Research

*My main research interests lie in optimization and logistics. My current research applies optimization methods to study strategies for improving goods movement in distribution networks. My dissertation examines operational choices and other means of flexibility in freight transportation.*

## Education

### NORTHWESTERN UNIVERSITY

Ph.D. program (2007 expected), Industrial Engineering and Management Science,  
Major Field: Transportation and Logistics  
Minor Fields: Optimization, Decision and Risk Analysis  
GPA: 3.9/4  
Dissertation Title: *Operational Flexibility in Drayage Vehicle Routing*  
Committee: Karen Smilowitz (Chair), Mark Daskin, Alan Erera, Robert Fourer

### BOWLING GREEN STATE UNIVERSITY

M.S. (2003) Applied Statistics and Operations Research  
GPA: 3.8/4

### BEIJING UNIVERSITY OF AERONAUTICS AND ASTRONAUTICS (BUAA), CHINA

M.S.E. (2001) Computer Science and Engineering  
GPA: 3.6/4 Avg. Grade: 85/100  
*Dissertation: QoS Supporting IP over ATM in NS2*  
B.S.E. (1998) Computer Science and Engineering  
GPA: 3.7/4 Avg. Grade: 88/100  
*Thesis: CS-T Telecom Distribution Management System*

## Publications and Submitted Papers

G. Zhang, K. Smilowitz and A. Erera, "Dynamic Drayage Vehicle Routing Problem," *Working Paper*, Northwestern University, 2006.

K. Smilowitz and G. Zhang, "The Multiple Choice Elementary Constrained Shortest Path Problem," *Submitted for Publication*, 2006.

P. Francis, G. Zhang and K. Smilowitz, "Improved Modeling and Solution Methods for the Multi-Resource Routing Problem," To appear in *European Journal of Operational Research*, 2006.

G. Zhang and C. Xia, "Campus Network QoS Model on NS2," *Computer Engineering and Applications (Chinese)*, Vol. 37(20), 58-59, 2001.

C. Xia, G. Zhang and W. Li, "QoS Supporting IP over ATM in NS2," *In Proceedings of CIC/CSCWD'2000*, 178-181, 2000.

## Presentation

G. Zhang, K. Smilowitz and P. Francis. Improved Modeling and Solution Methods for the Multi-Resource Routing Problem. *INFORMS Annual Meeting*, Denver, CO. Oct 2004.

G. Zhang and K. Smilowitz. Dynamic Routing and Scheduling in Drayage Operations. *INFORMS Annual Meeting*, Pittsburgh, PA. Nov 2006.

## Research Experience

### NORTHWESTERN UNIVERSITY

#### Graduate Research Assistant (Dec 2003 - Present)

- Developed modeling and solution method improvements for the vehicle routing problem in intermodal drayage operations, referred as Multi-Resource Routing Problem (MRRP) with flexible tasks. Designed and implemented computational tests to validate the improvement method. (Faculty supervisor: Karen Smilowitz)
- Defined and analyzed one variation of the shortest path problem, in which nodes are separated into subsets and a feasible path through the network may contain at most one node from each subset. This problem arises as a subproblem in the column generation solution method for MRRP. (Faculty supervisor: Karen Smilowitz)
- Studied the dynamic nature of task requests in drayage operations, where about 60% of task requests are known before the day of operation and the remaining 40% become known over the day. Explored methods for modeling and solving the dynamic routing problems. (Faculty supervisor: Karen Smilowitz)

### BEIJING UNIVERSITY OF AERONAUTICS AND ASTRONAUTICS

#### Graduate Student Researcher (Dec 1999 – Mar 2001)

- Designed and implemented a campus networking model supporting IP over ATM in the NS2 simulator to obtain better performance of packet delivery. (Faculty supervisor: Chunhe Xia)

## Teaching Experience

### NORTHWESTERN UNIVERSITY

#### Graduate Teaching Assistant

- IE313: **Deterministic Models & Optimization**: Coached students in office hours in operations research concept and algorithms; Graded homework. Faculty: Robert Fourer (Winter 2006)
- IE202: **Probability**: Instructed probability theory and its applications, including Monte Carlo simulation. Faculty: Gordon Hazen (Winter 2005)
- IE325: **Engineering Entrepreneurship**: Helped students understand the entrepreneurial process from an engineering perspective: Idea generation, planning, financing, marketing, leading, growing, and harvesting. Revised startup business plans by students. Faculty: Mark Werwath (Fall 2004)

### BOWLING GREEN STATE UNIVERSITY

#### Graduate Teaching Assistant

- OR380: **Introduction to Management Science**: Assisted undergraduate students to understand mathematical modeling in management science. Graded homework and quizzes. Faculty: Danny Myers (Spring 2002)
- MBA601: **Quantitative Analysis for Managers**: Helped students to use various quantitative approaches for mathematical modeling and solving business problems. Faculty: Madhu Rao (Spring 2003)

## Work Experience

### ENTERPRISE OPTIMIZATION, UNITED AIRLINES, CHICAGO, IL

#### Research & Development Intern (June 2006 – Nov 2006)

- Developed models & solution methods for the aircraft routing problem, collaborated with the Airline Scheduling clients to generate aircraft schedules to meet maintenance criteria.
- Designed & implemented a new method to handle station-specific gate capacity restrictions as well as overnight restrictions in the international fleet assignment model.

### SIEMENS LIMITED CHINA, BEIJING, CHINA

#### System Engineer (Mar 2001 – July 2001)

- Designed and implemented the handover procedure with system integration module in TD-SCDMA, developed the major solution & the new standard of Chinese 3G mobile networks.
- Led group to design and operate black box tests using K1297 Protocol Testers.

### BEIJING UNIVERSITY OF AERONAUTICS AND ASTRONAUTICS

#### Network Information Center Consultant and Administrator (Sep 2000 – Mar 2001)

- Web and Internet Consultant with demonstrated comprehensive knowledge in all facets of web design, internet and application implementation.
- The integration and maintenance of BUAA's public website and the network equipments in Network Information Center.

#### Management Information System Designer & Software Developer (Aug 1997 – Jul 1999)

- Designed & implemented the Campus Intelligent Card Systems of BUAA for food services, used by 20,000 people per day.

### DEPT. OF GUILIN TOURISM, GUILIN, CHINA

### DEPT. OF COMPUTER SCIENCE AND ENGINEERING, BUAA, BEIJING, CHINA

#### Tourism Information Project Director and Team Leader (Aug 1999 – Aug 2000)

- Developed Web Information Systems and Tourism E-commerce Systems at [www.guilin.com.cn](http://www.guilin.com.cn), based on the local area network of the Guilin tourism department.

## Honors:

Northwestern University Transportation Center, Dissertation Year Fellowship, 2006 – 2007

2006 INFORMS Future Practitioner Doctoral Colloquium, Pittsburgh, PA, Nov 2006

Outstanding Graduate Student, BUAA, 1999

Excellence Prize of the FengRu Student Science & Technique Composer Competition, BUAA, 1997

First Prize of Academic Excellence Scholarship, BUAA, 1994

## Professional Activities:

Member, Institute for Operations Research and the Management Sciences (INFORMS)

Member, Society for Industrial and Applied Mathematics (SIAM)

## Skills:

AMPL, SAS, Minitab, Matlab, Lindo, Cplex Callable Libraries, ProModel, Knitro

C/C++, JAVA, JavaScript, SQL, ASP, Perl, CGI, Tcl/Tk

Microsoft Developing Tools (VC++, VB, InterDev), Photoshop

Integration of Management Information Systems with Applications and E-commerce Solutions

Client/Server Model development and RDBMS database applications