

## **RAJAN BATTA**

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Date of Birth: December 15, 1958  
Citizenship: U.S.A.  
Last updated: March 4, 2012

### **Professional Interests**

University administration

Teaching, research and service related to Industrial and Systems Engineering

### **Education**

Doctor of Philosophy in Operations Research (1984)  
Department of Electrical Engineering and Computer Science  
Massachusetts Institute of Technology, Cambridge, Massachusetts

Bachelor of Technology in Mechanical Engineering (1980)  
Department of Mechanical Engineering  
Indian Institute of Technology, New Delhi, India

### **Academic/Administrative Experience**

School of Engineering and Applied Sciences  
Interim Dean: Jan 2012-present  
Acting Dean: April 2011-Dec 2011  
Associate Dean for Graduate Studies: 2006-2011

Department of Industrial and Systems Engineering  
Director of Graduate Studies: 2003-2005  
Chair: 1994-2003  
Interim Chair: 1992-1994  
Professor: 1994-present  
Associate Professor: 1990-1994  
Assistant Professor: 1984-90

## **Awards and Editorial Board Service**

### **Research Awards**

1. Dr. David F. Baker Distinguished Research Award, Institute of Industrial Engineers, 2008  
This is the highest research award available from the Institute of Industrial Engineers
2. SUNY Research Foundation Award for Research and Scholarship, 2007  
This is the highest research and scholarship award available from the Research Foundation of the State University of New York
3. Best paper award from the journal *Military Operations Research*, 2004
4. Sustained Achievement Award, Exceptional Scholar Program, University at Buffalo, 2002

### **Teaching Awards**

1. SUNY Chancellor's Award for Excellence in Teaching, 2007  
This is the highest teaching award available from the State University of New York system

### **Leadership Awards**

1. Faculty in Leadership Fellow, Office of the Provost, University at Buffalo, 2005-06
2. Eminent Engineer Designation, Tau Beta Pi, The Engineering Honor Society, 2008
3. Fellow, Institute of Industrial Engineers, 2006

### **Journal Editorial Board Service**

1. Departmental Editor, *IIE Transactions* (2001-present)
2. Editorial Advisory Board, *Computers and Operations Research* (1997-present)
3. Editorial Advisory Board, *Journal of Enterprise Transformation* (2010-present)
4. Editorial Advisory Board, *Socio-Economic Planning Sciences* (2010-present)

### **Student Awards**

1. Merit Scholarships for all five years of study (1975-80) at the Indian Institute of Technology, Delhi, India
2. Junior and Senior Science Talent Awards, 1972 and 1974, Government of India

## **Professional Service**

### **Service to Institute of Industrial Engineers (IIE)**

- **Senior Vice-President for Publications, Board of Trustees** (April 1, 2008 to March 31, 2011): Task was to manage the publications delivered by IIE. This included strategic planning of publication stream to match the objectives of IIE and participation in other board activities and functions. Helped IIE launch three brand new journals: *IIE Transactions on Healthcare Systems Engineering*; *IIE Transactions on Occupational Ergonomics and Human Factors*; *Journal of Enterprise Transformation*.
- **Chair for IERC for 2006 conference**: Tasks included creation of conference committee, solicitation of a plenary speaker (a first for IERC), solicitation of tutorials, working with committee members to organize invited sessions, coordination with the Solutions conference for overlap day activities, selection of contributed talks among those submitted, assistance in publicity about the conference, reporting to CIEADH regarding conference status, and coordination of review process and creation of the conference proceedings.
- **Departmental Editor for IIE Transactions (Scheduling & Logistics)**: Handle about 6 papers a year for the journal. Handling a paper involves assignment of an appropriate Associate Editor and subsequent coordination of the refereeing process. On completion of the refereeing process and receipt of the AEs recommendation a decision is made on how to proceed (accept, revise, reject).
- **ABET Evaluator**: Have served as an evaluator on five occasions and have received evaluator training on two separate occasions. Tasks included review of the self-study documents, a visit onsite for 3 days, coordination with other team members on school-wide issues, and submission of an evaluation to the team chair.

### **Service to Institute for Operations Research and the Management Sciences (INFORMS)**

- **Served as President for ACORD**, Association of Operations Research Related Department Heads. In this role coordinated the meeting of department heads at the INFORMS conference and created action items relative to helping the society in student recruitment and membership growth in general.
- **Served as a Chair of the FORA committee**. In this role helped create two special interest groups that have since become very active in the society. These are the Junior Faculty Interest Group that serves as a conduit to encourage junior faculty to join and subsequently succeed in the profession, and the Women Interest Group that serves as a similar role for women.

### **Reviewing Service and Service to Journals**

- Serve on the Editorial Board of the following journals: *IIE Transactions* (Scheduling & Logistics); *Computers and Operations Research*; *International Journal of Operational Research*; *Journal of Enterprise Transformation*; *Socio-Economic Planning Sciences*.
- Edited a special issue of *Computers and Operations Research* on OR Applications in the Military and Counter Terrorism.
- Editing a special issue of *Socio-Economic Planning Sciences* on Disaster Planning and Logistics.

## **Major Service at University of Buffalo (SUNY)**

- Acting/Interim Dean—April 2011 to present.
  - Continued strong efforts in the area of development, which includes stewardship of our major donors, engagement with new prospects, and work towards achieving transformational gifts.
  - Successfully obtained from donors \$1.6M of gift money specifically earmarked for faculty start-up.
  - Day-to-day running of the school, including faculty hiring, projects associated with the completion of the new engineering building, and the engineering backfill project.

- Worked with the Dean's Council to continue to craft a vision of growth and sustained quality for the school.
- Continued partnership with the School of Medicine and Biomedical Sciences for the development of our joint Biomedical Engineering department.
- Engaged freshmen in engineering field trips to local companies.
- Successfully obtained funding from National Grid for a residential summer camp for high school freshman and juniors, aimed at encouraging an engineering career.
- Developed a 3 year unit plan development, aimed at a significant expansion of our school (35% growth anticipated in faculty and staff over the next 5 year period).
- Developed 3 E innovation fund proposals, aimed at deepening our interactions with the Schools of Management, Medicine, and Arts and Sciences.
- Started development of a new graduate program in Materials Science and Engineering, in partnership with the College of Arts and Sciences.
- Key player in the development of an Energy Diversification Institute.
- Started partnership with Westminster Charter School.
- Associate Dean for Graduate Studies—January 2006 through April 2011. Several new initiatives have been established. These include: welcoming activities for graduate students to ensure a smooth transition to UB Engineering; three sets of surveys for graduate students to monitor student intent, progress and satisfaction level; a career fair specifically for graduate students; a student ambassador program for fielding questions from prospective students; a poster competition; a workshop for students interested in being faculty members; development of an electronic review system for graduate student applications.
- Faculty in Leadership Fellow for the 2005-06 academic year. Work was with the Vice Provost for Faculty Affairs and focused on various activities in managing university faculty, including tenure and promotion, and mentoring. Helped create a new workshop for department chairs for issues related to managing their faculty effectively and in being effective leaders
- Department Chair for Industrial Engineering for 11 years (2 years as interim). During this period the department transformed itself from being a major generator of UG degrees to being a major generator of MS, M Eng and PhD degrees. Research funding was also substantially increased during this period. A major success was mentoring junior faculty and creation of new leadership in the department.
- Graduate director for 2 years. During this period domestic enrollment for students in the program grew substantially and the number of PhD's graduated also rapidly rose.

## **Teaching/Research Activities**

### **Formal classroom teaching:**

When teaching IE 575, a required graduate course for our operations research students, I focus on the fundamentals of applied probability. The course is challenging and yet very rewarding both for the students and for myself. The material covered is of significant use in other classes that the students take.

When teaching IE 504, a required graduate course for our production systems students, I focus on the specifics of the field of facilities design. Here I heavily use my experiences on industry-sponsored projects. I report back to the class the results of two recent industry projects that I undertook with former students of the class. I also tie in the results of recent research work that has been accomplished by my graduate students into the course.

When teaching IE 678, an elective graduate course for our operations research students, I focus on applications of operations research in the area of urban systems. In this course I challenge the students extensively, both in class and in assigned homework. The material is conceptually difficult but yet it is very much possible to discuss it in an interesting way, which is why I cherish the opportunity each time I teach the course.

### **Interaction with masters and doctoral students:**

I have had the good fortune of advising many graduate students—43 completed masters and 37 completed doctoral students (supervised or co-supervised) over the past 27 years. For me the most challenging part of working with a student for a doctorate or masters is to train them to be an independent researcher and to instill in them the desire for scientific enquiry. I pride myself with my work with graduate students and in the fact the overwhelming majority of my 105 journal papers have been co-authored with former students. Also, the vast majority of these papers are published in the best journals of my field, like ***Operations Research, IIE Transactions, Transportation Science, Networks, Management Science, Computers & Operations Research*** and ***European Journal of Operational Research***.

### **Interaction with graduate students to execute industry-sponsored projects:**

I have worked on many local industry projects (usually 1-2 per year) through The Center for Industrial Effectiveness and some directly through companies. All of these projects have involved the use of graduate students. I have used these opportunities to train graduate students on how to execute a project, i.e. first conceptualize the problem, gather the relevant data, perform the analysis, and finally present results in a coherent presentation. This training—particularly that of project completion within a slated timeframe—has had several benefits. First, it has been excellent practical experience for students who have used it successfully to find a suitable job upon graduation—it is a great conversation piece at an interview. Second, I have taken materials from several of these projects and incorporated them in my IE 504 class—this has a magnifying effect on the impact to students. Third, it has led to several research papers, both directly (write ups of the project in a journal) and indirectly (by identifying inherent theoretical problems in a specific type of industry, leading to proposals to NSF and/or journal papers).

## **News Articles on Research**

### **Airport Security Applications**

My research on the impact of queue length on the integrity of an airport security system is discussed at the following websites:

<http://www.aviation.com/safety/071031-long-security-screening-lines.html>

[http://news.yahoo.com/s/space/20071101/sc\\_space/longlinesdontimpactairportsecurityscreeningquality](http://news.yahoo.com/s/space/20071101/sc_space/longlinesdontimpactairportsecurityscreeningquality)

<http://www.msnbc.msn.com/id/21569234/>

### **Military Applications**

"UB Software to Give U.S. Military a Clearer Picture of 'Theater of War'," [Read more.](#)

"Understanding Battlefield Realities: Software Allows the Military to Track and Predict Movements," [Industrial Engineering](#), March 2004.

"New Software Helps Lift 'Fog and War'," [Read more.](#)

### **Crime Modeling Applications**

"Mathematical Model Joins War on Drugs," [OR/MS Today](#), October 1992, Vol. 19, No. 5.

"Industrial Engineers Develop Model for War on Drugs," [Industrial Engineering](#), September 1992, Vol. 24, No. 4.

"War on Drugs gets Help from Unlikely Source: Math Model Predicts Success," [Crime Control Digest](#), June 22, 1992, Vol. 26, No. 25.

"The Police Department in Buffalo gets Some Ideas About how to Make its Drug-Enforcement Efforts More Efficient," [The Chronicle of Higher Education](#), July 8, 1992, Vol. 38, No. 44.

"Researchers Eye Formula for War on Drug Business," [The Buffalo News](#), June 22, 1992.

"Fighting Drugs with Mathematics," [UB Today](#), Fall 1992.

"Drug War: Researchers Say Common Manufacturing Strategy Could Help," [Narcotics Control Digest](#), September 15, 1993, Vol. 23, No. 19.

Discussion on CBS Radio, Seattle, Washington. "Waging an Optimal War on Drugs," [OR/MS Today](#), October 1993, Vol. 20, No. 5.

## **Consulting Activities**

**The Center for Industrial Effectiveness at University at Buffalo (SUNY):** Work on a regular basis to solve relevant problems in local industry. On average perform 2 projects of this type each year. The most recent projects are with American Coaster (manufactures of coasters), Hydro-air (heater and air conditioning unit manufacturer), Curbell, Inc. (hospital electronic accessory manufacturer), MOD-PAC, Inc. (package printing operation), NFTA (our region's transportation authority), and Quebecor, Inc. (book printing operation). These projects are usually 6-12 weeks long and often consist of two phases. In the first phase there is an assessment offered with specific recommendations on how to move forward. The second phase involves studying one or more specific problems in depth and making recommendations for improvement. The projects vary from those in supply chain (ex: inventory control; production scheduling; forecasting; materials requirement planning) to facilities design (warehouse layout; manufacturing facility layout).

**Georgia-Pacific/Fort James; Atlanta/Chicago:** Served for a period of 3 years as a strategic consultant in the area of supply-chain. Projects that I was associated with included those related to supply-chain integration, and in specific with the translation of a strategic plan for production in factories to the detailed factory schedules needed to support that plan. Another aspect that I was involved in was the development of a simulation model to help plan for spikes in demand due to customer promotions. A third aspect of the work related to asset management in factories as well as opening/closing of distribution centers so as to better meet customer demand.

**Buffalo Wireworks, Inc.; Buffalo:** Worked as a strategic consultant for a period of 8 years to help facilitate a complete business transformation of the company. Over this extensive period of interaction several projects were undertaken. These included time studies of production tasks and the use of these to more accurately price and schedule products. Also, the entire supply chain, from vendors to customers was optimized, first in individual pieces and then across each of these pieces. Finally, a quality initiative was undertaken at the company to encompass quality control in key manufacturing areas as well as statistically-based inspection of incoming and outgoing goods.

**American Stock Exchange; New York City:** Worked as a consultant in the area of queueing models for stock transactions for a period of 3 months. The project involved the use of queueing theory principles to model the working of a stock exchange. This allowed us to capture transaction delays that were likely to occur given a specific computer technology. The sizing of the computational resources needed to handle the demands of the exchange was the specific issue examined.

**Texas Instruments; Houston:** Worked as a consultant in the area of production planning of repairs for a period of 3 months. The entire process was modeled as an optimization problem and this was solved to yield the best assignment of workers to workstations to most efficiently handle the repair process.

**NYNEX Science and Technology; White Plains, New York:** Worked as a consultant in the area of financial engineering to help develop an options trading station for a period of 3 months. The idea of this station was to allow an investor to study the diversification effects in portfolio risk by introducing various stock options into the mix of traditional equities.

## **Journal Publications**

My research philosophy is that of being problem motivated—that is, given a relevant, interesting, real-world application, develop and analyze mathematical models for the related problem. Of particular interest to me is the creation of novel, innovative application areas for Operations Research techniques. My solid Engineering background coupled with an excellent, in-depth knowledge of a broad range of Operations Research techniques give me the tools that are necessary for effectively performing this type of research activity.

### **Overall statistics for published (or accepted) journal papers:**

Total count = 109

Accident Analysis and Prevention: 2

Annals of Operations Research: 5

Computers and Industrial Engineering: 2

Computers and Operations Research: 15

Decision Sciences: 1

European Journal of Operational Research: 17

Geographical Analysis: 2

Human Factors and Ergonomics in Manufacturing: 1

IIE Transactions: 5

Information Systems and Operational Research: 1

Interfaces: 2

International Journal of Mathematics of Operations Research: 1

International Journal of Operational Research: 2

International Journal of Production Research: 4

Journal of Simulation: 1

Management Science: 3

Military Operations Research: 3

Naval Research Logistics: 2

Networks: 4

Networks and Spatial Economics: 2

Risk Analysis: 1

SIAM Journal on Applied Mathematics: 1

Socio-Economic Planning Sciences: 7

Theoretical Issues in Ergonomics Science: 1

Transportation Research C: 1

Transportation Research Record: 1

Transportation Science: 9

Operations Research: 7

OR Insight: 4

OR Letters: 1

**Submitted Journal Papers:**

D. Myers, R. Batta and M. Karwan, "Calculating Flight Time for Unmanned Aerial Vehicles in the Presence of Obstacles and the Incorporation of Flight Dynamics," submitted to *Networks and Spatial Economics*.

Y. Kang, R. Batta and C. Kwon, "Value-at-Risk Model for Hazardous Material Transportation," submitted to *Annals of Operations Research*.

W. Yu and R. Batta, "Search for an Immobile Entity on a Unit Graph: A Mathematical Programming Approach," under revision for *Operations Research*.

G. Galindo and R. Batta, "Prepositioning of Supplies for Hurricanes under Spatial Autocorrelation and Demand Uncertainty," revision submitted to *European Journal of Operational Research*.

G. Galindo and R. Batta, "Review of Recent Developments in OR/MS Research in Disaster Management," revision submitted to *European Journal of Operational Research*.

W. Yu and R. Batta, "Search for a mobile entity on a network: An empirical study," under revision for *European Journal of Operational Research*.

M. Henchey, R. Batta, M. Karwan, A. Crassidis, "A Flight Time Approximation Model for Unmanned Aerial Vehicles: Estimating the Effects of Flight Dynamics and Wind," revision submitted to *Military Operations Research*.

R. Batta, M. Lejeune and S. Prasad, "Public Facility Location Using Dispersion and Population Biases," submitted to *Operations Research*.

### **In Publication Queue:**

Y-H. Lin, R. Batta, P. Rogerson, A. Blatt and M. Flanigan, "Location of Temporary Depots to Facilitate Relief Operations after an Earthquake," to appear in *Socio-Economic Planning Sciences*.

F. Mufalli, R. Batta and R. Nagi, "Simultaneous Sensor Selection and Routing of Unmanned Aerial Vehicles for Complex Mission Plans," to appear in *Computers and Operations Research*.

N. Bednowitz, R. Batta and R. Nagi, "Dispatching and Loitering Policies for Unmanned Aerial Vehicles under Dynamically Arriving Multiple Priority Targets," to appear in *Journal of Simulation*.

J. Wang, Y. Kang, C. Kwon and R. Batta, "Dual Toll Pricing for Hazardous Material Transport with Linear Delay," to appear in *Networks and Spatial Economics*.

### **2012**

X. Nie, G. Parab, R. Batta and L. Lin, "Simulation-Based Selectee Lane Queueing Design for Passenger Checkpoint Screening," *European Journal of Operational Research*, Vol. 219, No. 1, (2012), pp. 146-155.

P. Berglund and R. Batta, "Placement of Warehouse Cross Aisles," *IIE Transactions*, Vol. 44, No. 2, (2012), pp.107-120.

### **2011**

M. Zhang, R. Batta and R. Nagi, "Designing Manufacturing Facility Layouts to Mitigate Congestion," *IIE Transactions*, Vol. 45, No. 4, (2011), pp. 132-145.

Y-H. Lin, R. Batta, P. Rogerson, A. Blatt, M. Flanigan, and K. Lee, "A Logistics Model for Emergency Supply of Critical Items in the Aftermath of a Disaster," *Socio-Economic Planning Sciences*, Vol. 45, No. 4, (2011), pp. 132-145.

### **2010**

M. Flanigan, A. Blatt, M. Russell, R. Batta and K. Lee, "Emergency Response Technology and Integrated Active Transportation System," *Transportation Research Record*, No. 2189,( 2010), pp. 26-36.

E. Tokar Erdermir, R. Batta, P. Rogerson, A. Blatt and M. Flanigan, "Joint Ground/Air EMS Coverage Models," *European Journal of Operational Research*, 2072, (2010), 736-749.

M. A. Akella, E. Delmelle, R. Batta, P. Rogerson and A. Blatt, "Adaptive Cell Tower Location Using Geostatistics," *Geographical Analysis*, 42:3, (2010), 227-244.

### **2009**

S. Huang, R. Batta and R. Nagi, "Simultaneous Siting and Sizing of Distribution Centers in the Plane," *Annals of Operations Research*, 167:1, (2009), 157-170.

X. Nie, R. Batta, C. Drury and L. Lin, "The Impact of Joint Responses of Devices in an Airport Security System," *Risk Analysis*, 29:2, (2009), 298-311.

A. Jotshi and R. Batta, "Search for Two Immobile Entities on a Network," *International Journal of Mathematics of Operations Research*, 1:1/2, (2009), 37-75.

A. Jotshi, Q. Gong and R. Batta, "Dispatching and Routing of Emergency Vehicles in Disaster Mitigation Using Data Fusion," *Socio-Economic Planning Sciences*, 43:1, (2009), 1-24.

X. Nie, R. Batta, C. Drury and L. Lin, "Passenger Grouping with Risk Levels in an Airport Security System," *European Journal of Operational Research*, 194, (2009), 574-584.

A. Sarkar, R. Batta and R. Nagi, "Finding Rectilinear Least Cost Paths in the Presence of Convex Polygonal Congested Regions," *Computers & Operations Research*, 36, 3, (2009), 737-754.

M. Zhang, S. Savas, R. Batta and R. Nagi, "Facility Placement with Sub-Aisle Design in an Existing Layout," *European Journal of Operational Research*, 197, 1 (2009), 154-206.

M. Zhang, R. Batta and R. Nagi, "Modeling of Workflow Congestion and Optimization of Flow Routing in a Manufacturing/Warehouse Facility," *Management Science*. 55, (2009), 267-280.

## **2008**

J. Paul and R. Batta, "Models for Hospital Location and Capacity Allocation for an Area Prone to Natural Disasters," *International Journal of Operational Research* 3, (2008), 473-496.

A. Jotshi and R. Batta, "Search for an Immobile Entity on a Network," *European Journal of Operational Research*, 191, (2008), 347-359.

I. Casas, R. Garrity, D. Mandloi, M. Sunm, J. Weaver, R. Nagi and R. Batta, "A Spatial Decision Support System Combining GIS and OR Tools to Optimize District Boundaries and Bus Routes for a Suburban School District," *OR Insight*, 21, 2, (2008) 3-16.

M. R. Akella, R. Batta, M. Sudit, P. Rogerson and A. Blatt, "Cellular Network Configuration with Co-channel and Adjacent Channel Interference Constraints," *Computers and Operations Research*. 35, (2008), 3738-3757.

E. T. Erdemir, R. Batta, S. Spielman, P. Rogerson, A. Blatt and M. Flanigan, "Evaluating the Performance of Aeromedical Base Locations of New Mexico by Considering Nodal and Path Demand," *Accident Analysis and Prevention*, 40, (2008), 1105-1114.

E. T. Erdemir, R. Batta, S. Spielman, P.A. Rogerson, A. Blatt, M. Flanigan, "Location Coverage Models with Demand Originating from Nodes and Paths: Application to Cellular Network Design," *European Journal of Operational Research*, 190, (2008), 610-632.

## **2007**

X. Nie, R. Batta, C. Drury and L. Lin, "Optimal Placement of Suicide Bomber Detectors," *Military Operations Research*, 12, (2007), 65-78.

I. Casas, A. Malik, E. Delmelle, M. Karwan and R. Batta, "An Automated Network Generation Procedure for Routing of Unmanned Aerial Vehicles (UAVs) in a GIS Environment," *Networks and Spatial Economics*, 7, (2007), 153-176.

C. Marin, C. Drury, R. Batta and L. Lin, "Server Adaptation in an Airport Security System Queue," *OR Insight* 20, (2007), 22-31.

Q. Gong and R. Batta, "Allocation and Reallocation of Ambulances to Casualty Clusters in a Disaster Relief Operation," *IIE Transactions* 39, (2007), 27-39.

H. Kelachankuttu, R. Batta and R. Nagi, "Contour Line Construction for a New Rectangular Facility in an Existing Layout with Rectangular Departments," *European Journal of Operational Research*, 180, 1, (2007), 149-162.

A. Sarkar, R. Batta and R. Nagi, "Placing a Finite Size Facility with a Center Objective on a Rectilinear Plane with Barriers," *European Journal of Operational Research*, 179, 3, (2007), 1160-1176.

S. Naik and R. Batta, "Propogated Delay Estimation and its Use in the Development of an Effective Aircraft Ground Delay Strategy," *International Journal of Operational Research* 12, (2007) 1-25.

V. Akgun, A. Parekh, R. Batta and C. Rump, "Routing of a Hazmat Truck in the Presence of Weather Systems," *Computers & Operations Research*, 34, (2007) 1351-1373.

R. Batta, O. Berman and Q. Wang, "Balancing Staffing and Switching Costs in a Call/Service Center," *European Journal of Operational Research*, 177, (2007) 924-938.

A. Sarac, R. Batta and C. G. Drury, "Extension of the Visual Search Models of Inspection," *Theoretical Issues in Ergonomics Science*, 8, (2007), 531-556.

## **2006**

Q. Gong and R. Batta, "A Queue-Length Cutoff Model for a Preemptive Two Priority M/M/1 System," *SIAM Journal on Applied Mathematics* 67, (2006), 99-115.

L. Babu, L. Lin and R. Batta, "Passenger Grouping Under Constant Threat Probability in an Airport Security System," *European Journal of Operational Research*, 168, (2006), 633-644.

A. Sarac, R. Batta and C. M. Rump, "A Branch-and-Price Approach for Operational Oriented Aircraft Maintenance Routing," *European Journal of Operational Research*, 175, (2006) 1850-1869.

K. Holness, C.G. Drury and R. Batta, "A Systems View of Personnel Assignment Problems," *Human Factors and Ergonomics in Manufacturing* Vol. 16, Number 3, Summer 2006, 285-307.

## **2005**

K. Thyagarajan, R. Batta, M. H. Karwan and R. J. Szczerba, "Planning Dissimilar Routes for Military Units," *Military Operations Research*, 10, 1, (2005), 25-42.

D. J. Patel, R. Batta and R. Nagi, "Clustering Sensors in Wireless *Ad hoc* Networks Operating in a Threat Environments," *Operations Research*, 53, (2005), 432-442.

A. Sarkar, R. Batta and R. Nagi, "Planar Area Location/Layout Problem in the Presence of Generalized Congested Regions with the Rectilinear Distance Metric," *IIE Transactions*, 37, (2005), 35-50.

Q. Wang, R. Batta and R. J. Szczerba, "Sequencing the Processing of Incoming Mail to Match and Outbound Truck Delivery Schedule," *Computers & Operations Research*, 32, 7, (2005) 1777-1791

E. Delmelle, P. Rogerson, M. Akella, R. Batta, A. Blatt and G. Wilson, "A Spatial Model of Received Signal Strength Indicator Values," *Transportation Research C*, 13, (2005), 432-447.

M. R. Akella, R. Batta, E.M. Delmelle, P.A. Rogerson, A. Blatt and G. Wilson, "Base Station Location and Channel Allocation in a Cellular Network with Emergency Coverage Requirements," *European Journal of Operational Research*, 164, 2, (2005), 301-323

S. J. Wang, R. Batta and C. M. Rump, "Stability of a Crime Equilibrium Level," *Socio-Economic Planning Sciences*, 39, 3, (2005), 229-244.

S. Huang, R. Batta and R. Nagi " Distribution Network Design: Selection and Sizing of Congested Connections ", *Naval Research Logistics*, 52, 8, (2005), 701-712.

S. Huang, R. Batta, K. Klamroth and R. Nagi, "k-Connection Location Problem in the Plane," *Annals of Operations Research*, 136, (2005), 193-209.

## **2004**

S. Mishra, R. Batta and R. J. Szczerba, "A Rule-Based Approach for Aircraft Dispatching to Emerging Targets," *Military Operations Research*, 9,3, (2004), 17-30.

A. Sarkar, R. Batta and R. Nagi, "Commentary on Facility Location in the Presence of Congested Regions with the Rectilinear Distance Metric," *Socio-Economic Planning Sciences*, 38, (2004), 291-306.

M. Vamanan, Q. Wang, R. Batta and R. J. Szczerba, "Integration of COTS Software Products ARENA & CPLEX for an Inventory/Logistics Problem," *Computers & Operations Research*, 31, (2004), 533-547.

P. Rogerson, E.M. Delmelle, R. Batta, M.R. Akella, A. Blatt and G. Wilson, "Optimal Sampling Design for Variables with Varying Spatial Importance," *Geographical Analysis*, 36, (2004), 177-194

Q. Wang, R. Batta and C. M. Rump, "A New Class of Facility Location Models with Congestion," *Naval Logistics Research*, 51, (2004), 137-152.

## **2003**

P. Nandikonda, R. Batta and R. Nagi, "Locating a 1-center on a Manhattan Plane with Barriers," *Annals of Operations Research*, 123, (2003), 157-172.

M.R. Akella, C.W. Bang, R. Beutner, E.M. Delmelle, R. Batta, P. Rogerson, A. Blatt and G. Wilson, "Evaluating the Reliability of Automated Collision Notification Systems", *Accident Analysis and Prevention*, 35, 3, (2003), 349-360.

S. Huang, R. Batta and R. Nagi " Variable Capacity Sizing and Selection of Connections in a Facility Layout ", *IIE Transactions*, 35, (2003), 49-59.

Q. Wang, R. Batta, J. Bhadury and C. M. Rump, "The Budget Constrained Location Problem with Opening and Closing of Facilities," *Computers & Operations Research*, 50, (2003), 2047-2069.

## **2002**

S. Savas, R. Batta and R. Nagi, "Finite Size Facility Placement in the Presence of Barriers to Rectilinear Travel," *Operations Research*, 50 (2002), 1018-1031.

Q. Wang, R. Batta and C. M. Rump, "Heuristics for a Facility Location Problem with Stochastic Demand and Immobile Servers," *Annals of Operations Research*, 111, (2002), 17-34.

S.J. D'Amico, S.J. Wang, R. Batta and C.M. Rump, "A Simulated Annealing Approach to Police District Design", *Computers & Operations Research*. 29, 6, (2002), 667-684.

J.H. Jaramillo, J. Bhadury and R. Batta, "On the Use of Genetic Algorithms to Solve Location Problems," *Computers & Operations Research*, 6, (2002), 761-779.

## **2001**

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## **2000**

V. Akgun, E. Erkut and R. Batta, "On Finding Dissimilar Paths," *European Journal of Operational Research*, 121, (2000) 232-246.

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## **1999**

M. Jamil, A. Baveja and R. Batta, "The Stochastic Queue Center Problem," *Computers & Operations Research*, 26, 14, (1999) 1423-1436.

A. Sarac, R. Batta, J. Bhadury and C. M. Rump, "Reconfiguring Police Reporting Districts in the City of Buffalo," *OR Insight*, Vol. 12, Issue 3, July-September 1999, 16-24.

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C. Oboth, R. Batta and M.H. Karwan, "Dynamic Conflict-Free Routing of Automated Guided Vehicles," *International Journal of Production Research*, 37, 9, (1999) 2003-2030.

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## 1997

H. Jin and R. Batta, "Objectives Derived from Viewing Hazmat Shipments as a Sequence of Independent Bernoulli Trials," *Transportation Science*, 31, 3, (1997) 252-261.

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## 1996

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A.V. Naik, A. Baveja, R. Batta and J.P. Caulkins, "Scheduling Crackdowns on Illicit Drug Markets," *European Journal of Operational Research*, 88, 2 (1996) 231-250.

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D. Sun and R. Batta, "Scheduling Larger Job Shops: A Decomposition Approach," *International Journal of Production Research*, 34, 7, (1996) 2019-2033.

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## 1995

R.A. Sivakumar, R. Batta and M.H. Karwan, "A Multiple Route Conditional Risk Model for Transporting Hazardous Materials," *Information Systems and Operational Research*, 33, 1, (1995) 20-33.

D. Sun, L. Lin, and R. Batta, "Cell Formation Using Tabu Search," *Computers & Industrial Engineering*, 28, 3 (1995) 485-494.

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## 1994

R.A. Sivakumar and R. Batta, "The Variance Constrained Shortest Path Problem," *Transportation Science*, 28, 4 (1994) 309-316.

M. Jamil, R. Batta and D.M. Malon, "The Traveling Repairperson Home Base Location Problem," *Transportation Science*, 28, 2, (1994) 141-149.

M. Faraji and R. Batta, "Forming Cells to Eliminate Vehicle Interference and System Locking in an AGVS," *International Journal of Production Research*, 32, 10, (1994) 2219-2242.

Y. Ding, A. Baveja and R. Batta, "Implementing Larson and Sadiq's Location Model Using a Geographic Information System," *Computers & Operations Research*, 21, 4 (1994) 447-454.

### **1993**

R.A. Sivakumar, R. Batta and M.H. Karwan, "A Network Based Model for Transporting Extremely Hazardous Materials," *Operations Research Letters*, 13 (1993) 85-93.

R.A. Sivakumar, R. Batta and K. Tehrani, "Scheduling Repairs at Texas Instruments," *Interfaces*, 23:4 (1993) 68-74.

S.Y. Prasad and R. Batta, "Efficient Facility Locations on a Tree Network Operating as a FIFO M/G/1 Queue," *Networks*, 23 (1993) 597-603.

N.N. Krishnamurthy, R. Batta and M.H. Karwan, "Developing Conflict Free Routes for Automated Guided Vehicles," *Operations Research*, 41 (1993) 1077-1090.

A. Baveja, R. Batta, J. Caulkins and M.H. Karwan, "Modeling the Response of Illicit Drug Markets to Local Enforcement," *Socio-Economic Planning Sciences*, 27 (1993) 73-89.

### **1992**

U.S. Palekar, R. Batta, R.M. Bosch and S. Elhence, "Modeling Uncertainties in Plant Layout Problems," *European Journal of Operational Research*, 63 (1992) 347-359.

### **1991**

L. Lindner-Dutton, R. Batta and M.H. Karwan, "Equitable Sequencing of a Given Set of Hazardous Materials Shipments," *Transportation Science*, 25 (1991) 124-137.

### **1990**

R. Gopalan, K. Kolluri, R. Batta and M.H. Karwan, "Modeling Equity of Risk in the Transportation of Hazardous Materials," *Operations Research*, 38(1990) 961-973.

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R. Batta and N.R. Mannur, "Covering Location Models for Emergency Situations that Require Multiple Response Units," *Management Science*, 36 (1990) 16-23.

### **1989**

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R. Batta and W.V. Huang, "On the Synthesis of Advertising and Relocation Decisions for a Facility," Computers & Industrial Engineering, 16 (1989) 179-187.

R. Batta, A. Ghose and US Palekar, "Locating Facilities on the Manhattan Metric with Arbitrarily Shaped Barriers and Convex Forbidden Regions," Transportation Science, 23 (1989) 26-36.

### **1988**

R. Batta and U.S. Palekar, "Mixed Planar/Network Facility Location Problems," Computers & Operations Research, 15 (1988) 61-67.

R. Batta and S.S. Chiu, "Optimal Obnoxious Paths on a Network: Transportation of Hazardous Materials," Operations Research, 36 (1988) 84-92.

R. Batta, R.C. Larson and A.R. Odoni, "A Single Server Priority Queuing Location Model," Networks, 8 (1988) 87-103.

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R. Batta and L.F. Leifer, "On the Accuracy of Demand Point Solutions to the Planar, Manhattan Metric p Median Problem," Computers & Operations Research, 15 (1988) 253-262.

### **1987**

R. Batta and U.S. Palekar, "Comment on 'Network Median Problems with Continuously Distributed Demand'," Transportation Science, 21 (1987) 217.

R. Batta, "Comment on 'The Dynamics of Plant Layout'," Management Science, 33 (1987) 1065.

### **1986**

M. Brandeau, S.S. Chiu and R. Batta, "Locating 2 Medians on Tree Network With Continuous Link Demands," Annals of Operations Research, 6 (1986) 223-253.

## **Book Chapters**

B. Pfeiffer, R. Batta, K. Klamroth and R. Nagi, "Probabilistic Modeling of UAV Path Planning in the Presence of Threat Zones," accepted for inclusion in Handbook of Military Industrial Engineering, co-edited by D. Badiru and M. Thomas.

M. Helander and R. Batta, "A Discrete Transmission Model for HIV," Modeling the AIDS Epidemic, co-edited by E.H. Kaplan and M.L. Brandeau, Raven Press, NY, 1996.

O. Berman, S.S. Chiu, R.C. Larson, A.R. Odoni, and R. Batta, "Location of Mobile Units in a Stochastic Environment," Discrete Location Theory, co-edited by R. L. Francis and P.B. Mirchandani, John Wiley & Sons, NY, (1990) 503-549.

R. Batta, "Demand Point Approximations for Location Problems," Accuracy of Spatial Databases, co-edited by M. Goodchild and S. Gopal, Taylor and Francis, PA, (1989) 197-207.

W. Yu and R. Batta, "Chinese Postman Problem," to appear in Wiley Encyclopedia of OR/MS.

## **Grant Support**

### **National Science Foundation (regular awards)**

Collaborative Research: Regulating Hazardous Materials Transportation by Multi-Objective Dual Toll Pricing, \$318,362, 2011-2014. R. Batta and C. Kwon are co-PIs. Y. J. Son from University of Arizona is our collaborator and has a separate \$150,000 budget.

Inspection Strategies in Airport Security Systems, \$300,000, 2005-2008. R. Batta, C. Drury and L. Lin are co-PIs. Also got an REU Supplement for \$12,000 and an IREE Supplement for \$15,000.

Congestion in Facilities Location and Layout: Deterministic and Stochastic Models. \$200,000, 2003-2006. R. Batta and R. Nagi are co-PIs. Also got an REU supplement--\$12,000.

Facility Layout (Re)Design Using Planar & Network Location Approaches. \$255,545. 1998--2001. R. Batta and R. Nagi were Co-PIs. Also got an REU Supplement--\$10,000 and International Supplement--\$14,000.

Development and Analysis of Conflict-Free Routing Strategies for Free-Ranging Automated Guided Vehicles, \$109,961, 1992--1994. R. Batta and M.H. Karwan were Co-PIs. Also got an REU Supplement--\$10,000.

### **National Science Foundation (special programs)**

IGERT: Integrated Graduate Education and Research Training in Geographic Information Science. \$4,000,000. 2004-2009. Co-PI with 6 other UB Faculty. D.M. Mark is PI/PD.

IGERT: Integrated Graduate Education and Research Training in Geographic Information Science. \$3,000,000. 1998-2003. Co-PI with 4 other UB Faculty. D.M. Mark is PI/PD.

### **National Institute of Justice (regular award)**

Detection and Prediction of Geographical Changes in Crime Rates. \$221,520. 1999-2001. R. Batta, P. Rogerson and C.M. Rump were co-PIs.

### **National Center for Geographic Information and Analysis**

Research on Aggregation Analysis for Location Problems, NCGIA, \$19,600. June 1995 through May 1996.

Research on Aggregation Analysis for Location Problems, NCGIA, \$9,500, September 1994 through May 1995.

Research on the Modifiable Areal Unit Problem, Aggregation Analysis for Location Problems, and Modeling Trader Behavior. NCGIA, \$8,799, Summer 1994.

Continuation of "Theoretical Analysis of Aggregation Methods in Location-Allocation Models," \$8,058, Summer 1993.

Theoretical Analysis of Aggregation Methods in Location-Allocation Models, \$7,306, Summer 1992.

Integration of the Hypercube Queueing Model for Police Districting into the ARC/INFO GIS, \$7,306, Summer 1991.

Sensitivity Analyses and the Development of Fast and Accurate Algorithms for Locating and Deploying Emergency Facilities in a Congested Environment, \$8,369, Summer 1990.

Demand Point Approximation for Location Problems, \$7,600, Summer 1989.

### **Center for Transportation Injury Research**

Using Advanced Technology for Emergency Response. \$210,000. July 2009 through September 2012.

Delivery of Critical Items in a Prolonged Disaster Response Effort. \$70,000. July 2008 through June 2009. P. Rogerson is a co-PI.

Models for Air Medical Service Base Location. \$40,000. July 2006 through June 2007. P. Rogerson is a co-PI.

Provision of Air Medical Services, and Interpolation of Results from Mobile Sensors. \$87,000. January 2005 through May 2006. P. Rogerson is a co-PI.

Coverage Models in Cellular Communications. \$77,000. September 2003 through August 2004. P. Rogerson was a co-PI.

Data Analysis and Solution Methods for Coverage Models that arise in Cellular Communications. \$70,000. September 2002 through August 2003. P. Rogerson was a co-PI.

Cell Tower Location and Data Analysis Project. \$68,000. September 2001 through August 2002. P. Rogerson was a Co-PI.

ACN/Cell-Phone Coverage Project. \$57,313. September 2000 through August 2001. P. Rogerson was Co-PI.

CTIR Crash Registry and Cell Phone Coverage Analysis for the ACN System. \$67,500. September 1999 through August 2000. P. Rogerson was a Co-PI.

Western New York Baseline Study. \$32,000. October 1998 through August 1999. P. Rogerson was a Co-PI.

Research on Building an Accident Data Base, Developing a Probabilistic Model, and Identifying Geographical "Hot Spots" for the ACN Project, \$28,881. February 1996 through January 1997. P. Rogerson was a co-PI.

### **Lockheed Martin**

Military Mission Planning. \$25,000 grant + \$20,000 gift. 2002.

Supply Chain Optimization. \$25,000 grant + \$14,000 gift. 2001.

Advanced Supply-Chain/Logistics Problems. \$25,000. 2000.

Postal Dispatching Study. \$25,000. 1999.

### **Government**

Optimization Planning and Tactical Intelligent Management of Aerial Sensors (OPTIMAS). \$1,171,247. 2008-2011. M. Karwan is PD. Co-PIs: R.Batta, J. Crassidis, R. Nagi, M. Sudit, T. Jasinski, P. Deignan, C. Barsalou, PM: M.Moskal. Funded by Office of Naval Research.

Redistricting and School Bus Route Optimization for Sweet Home School District: A GIS Approach. \$10,095. 2006. I. Casas is PD. R. Batta and R. Nagi are co-PIs. Funded by the Sweet Home School District, Amherst, New York.

Information Fusion Applied in an Earthquake Disaster Setting. \$2,500,000. 2000-2005. P. Scott is PD. J. Llinas, L. Lin, K. Kesavadas, and A. Bisantz are co-PIs. Funded by Air Force Office of Scientific Research.

Innovative Fusion Capabilities: Tracking, Networking and Visualization. \$553,564. 2004. T. Singh and R. Nagi are co-PDs, K. Kesavadas and B. Jayaraman are co-PIs. Funded by Rosettex Technology and Ventures Group (NIMA/NGA).

The Design of Police Patrol Operations in the City of Buffalo. \$22,300. 1997-1998. C. Rump was a Co-PI.

Buffalo Police Department, Optimal Allocation of Police Cars in the City of Buffalo. \$5,000. 1997. C. Rump was a co-PI.

### **United Airlines**

Irregular Operations Optimization. \$50,000.

### **Industry**

Routing and Dispatching Software Development for the Center for Transportation Excellence. \$45,579. 2007. Funded as a sub-contract through CUBRC.

Computer Based Order Combination Method. \$6,662. 2007. Funded by American Coaster Company.

Layout Efficiency Analysis. \$11,000. 2007. Funded by Niagara Transformer.

Layout and Analysis of Assembly Packaging Area. \$14,000. 2006. Funded by Hydro-Air Components.

Warehouse Layout Study. \$16,923. 2006. Funded by Curbell, Inc. R. Nagi is a co-PI.

Manufacturing Layout Study. \$16,923. 2006. Funded by Curbell, Inc. R. Nagi is a co-PI.

Optimization of Roll and Sheet Sizes. \$14,478. 2005. Funded by MOD-PAC, Inc.

Improvement of Store Room Operations and Inventory Management, Phase-I. \$35,882. 2005. Funded by NFTA. L. Lin was a co-PI.

Distributed Mobile Fusion. \$50,000. 2001. R. Nagi was a co-PI. Funded by Boeing.

Support for Scheduling Software. \$8,500. 2001. L. Lin was a co-PI. Funded by Quebecor Printing.

Operations Analysis and Plant Layout/Facility Redesign Studies. 2001. \$9,943. R. Nagi was a co-PI. Funded by Ferro Electronics, Inc.

Assessment of Operation Efficiency/Layout Design and Development of a Computerized Production Scheduling System in Cylinder Manufacturing Operations. \$25,000. 2000. L. Lin was a co-PI. Funded by Quebecor Printing.

IE-Related Projects at Buffalo Wireworks, Buffalo Wireworks, Inc., \$60,000. 1991-1996.

Capacity Planning and Detailed Scheduling, Clearing Niagara, \$23,500. 1995. L. Lin was a co-PI.

The Development of Vehicle Routes for Overnight Parcel Deliveries, Federal Express Corporation, \$16,500. 1989-1990.

Protective Closures, Inc., Plant Layout. \$6,591. 1997.

Diversified Manufacturing, Inc., GRIT project, Process Improvement-Assessment with Implementation. \$19,166. 1996-1997. C.G. Drury was a co-PI.

Materials Management and Plant Layout Analysis, Harrison Radiator, \$25,000. 1988-1989.

Methods Study for Various Tasks Involved in the Overhauling Procedure of New York City Cars in Blasdell, New York, General Electric Co., \$13,524. 1987.

Data Collection, Relationship Analysis and Personnel Training for a Critical Path Method (CPM) Procedure for Overhauling New York City Cars in Blasdell, New York, General Electric Co., \$9,223. 1986.

## **Completed Doctoral Dissertations (Supervised or Co-Supervised)**

Yingying Kang; graduated 5/11. Dissertation title: "Value-at-Risk Models for Hazardous Material Transportation." Co-advisor was C. Kwon. Job Placement: Analyst, Southern Pacific Railroad Company, Atlanta, GA.

Frank Muffali; graduated 4/11. Dissertation title: "Simultaneous Sensor Selection and Routing of Unmanned Aerial Vehicles for Complex Mission Plans." Co-advisor was R. Nagi. Job Placement: Analyst, Praxair, Inc., Tonawanda, NY.

Wanyan Yu; graduated 2/11. Dissertation title: "Search for an Entity on a Network." Job Placement: Analyst, Bloomberg Financial Services, Inc., New York.

Yen-Hung Lin; graduated 8/10. Dissertation title: "Delivery of Critical Items in a Disaster Relief Operation: Centralized and Distributed Supply Strategies." Co-advisor was P. Rogerson. Job Placement: Postdoctoral Research Fellow, Department of Industrial Engineering, University of Arkansas.

Amruth Sivalenka; graduated 5/10. Dissertation title: "Pricing and Expiration Management in Apartment Industry." Job Placement: Vice President, Rainmaker Group, Atlanta.

Elif Tokar-Erdermir; graduated 10/08. Dissertation title: "Location-covering models: Nodal and path demand, multiple-type facilities, unavailability of servers." Co-advisor was P. Rogerson. Job Placement: Postdoctoral Associate, Department of Mechanical Engineering, University of Minnesota.

Justin T. Yates; graduated 8/08. Dissertation title: "Network-based Risk Mitigation and Resource Evaluation in the Transportation of Hazardous Materials and Terrorist Threat." Co-advisor was M. Karwan. Job Placement: Assistant Professor, Department of Industrial and Systems Engineering, Texas A&M University.

Xiaofeng Nie; graduated 7/08. Dissertation title: "Optimization and Resource Allocation Models in an Aviation Security System." Job Placement: Postdoctoral Associate, School of Business, McGill University.

Min Zhang; graduated 11/07. Dissertation title: "Designing the Layout and Routing of a Manufacturing Facility to Mitigate Workflow Congestion." Co-advisor was R. Nagi. Job placement: Operations Research Analyst, AVIS-Budget Rent-a-Car, New York, New York.

Jomon Paul; graduated 8/06. Dissertation title: "Study of Effects of Facility Damage on Hospital Capacity Estimates and Location-Allocation Planning for Management of Natural Disasters." Co-advisor was L. Lin. Job placement: Visiting Assistant Professor, Kennesaw State University, Georgia.

Arun Jotshi; graduated 8/06. Dissertation title: "Search for an Immobile Entity on a Network." Job placement: Operations Research Analyst, AT&T Corporation, Morristown, New Jersey.

Abhay Joshi; graduated 2/06. Dissertation title: "Optimization Approaches to Network Topology Design for Dynamic Distributed Wireless Sensing in a Hostile Environment." Co-advisor was R. Nagi. Job Placement: Operations Research Analyst, Curbell Inc., Orchard Park, New York.

Jayasankar Neelakantan; graduated 9/05. Dissertation title: "Strategies for Clearance-Markdown Optimization in the Retail Industry." Co-advisor was A. Gosavi. Job Placement: Visiting Assistant Professor, Kennesaw State University, Georgia.

Qiang Gong; graduated 9/05. Dissertation title: "Responding to Casualties in a Disaster Relief Operation: Initial Ambulance Allocation and Reallocation, and Switching of Casualty Priorities." Job Placement: Operations Research Analyst, United Airlines, Chicago, Illinois.

Mohan R. Akella; graduated 2/05. Dissertation title: "Base Station Location and Channel Allocation Problems in Cellular Network Design." Job Placement: Operations Research Analyst, Trilogy, Inc., Bangalore, India.

Simin Huang, graduated 9/04. Dissertation title: "The Connection/Location Problem and its Application to Supply Chain Design." Co-advisor was R. Nagi. Job Placement: Postdoctoral Associate, School of Business, University of Toronto.

Avijit Sarkar; graduated 9/04. Dissertation title: "Finite-Size Facility Placement in the Presence of Generalized Congested Regions." Co-advisor was R. Nagi. Job Placement: Visiting Assistant Professor, University of Toledo.

William J. Frank; graduated 9/01. Dissertation title: "On Investigating the Effect of Temporal Link Parameters on Hazmat Route Selection." Job Placement: Postdoctoral Associate, CMIF Lab, University at Buffalo (SUNY).

Vedat Akgun; graduated 2/01. Dissertation title: "Routing Hazardous Materials in the Presence of Weather Systems." Co-advisor was C. Rump. Job Placement: Senior System Analyst, Emery Worldwide Airways.

Abdul Sarac; graduated 2/01. Dissertation title: "Daily Operational Aircraft Maintenance Routing Problem." Co-advisor was C. Rump. Job Placement: Operations Research Analyst, United Airlines, Chicago, Illinois.

Shouu-Jiun Wang; graduated 9/00. Dissertation title: "Optimal Police Enforcement Allocation - A Socio-Economic Model of Criminal Geographic Displacement." C. Rump was a co-advisor. Job placement: First USA Bank, Wilmington, Delaware.

Selcuk Savas; graduated 9/00. Dissertation title: "A Spatial Modeling Perspective to Problems in Facilities Design." R. Nagi was a co-advisor. Job Placement: Assistant Professor, Koc University, Istanbul, Turkey.

Qian Wang; graduated 9/00. Dissertation title: "Discrete Facility Location Design with Stochastic Customers and Immobile Servers." Co-advisor was C. Rump. Job Placement: Senior Operations Research Specialist, Synquest, Inc., Washington, D.C.

Christopher Oboth; graduated 2/97. Dissertation title: "Conflict-Free Routing of Automated Guided Vehicles: A Simulation Study." M. Karwan was a co-advisor. Job Placement: Lecturer, Makerere University, Uganda.

Peiwu Zhao; graduated 6/96. Dissertation title: "Analysis of Aggregation Effects in Location Problems." Job Placement: OR Analyst, ESRI Corporation, San Bernardino, California.

Ramprasad T. Narasimhan; graduated 1/96. Dissertation title: "Conflict-Free Routing and Scheduling of Automated Guided Vehicles." M. Karwan was a co-advisor. Job Placement: Analyst, Corporate Research, United Airlines, Chicago, Illinois.

Linda Chattin; graduated 9/94. Dissertation title: "Maximizing Expected Coverage Using State Sensitive Dispatch Assignments." Job Placement: Lecturer, Department of Industrial Engineering, State University of New York at Buffalo.

Alok Baveja; graduated 9/93. Dissertation title: "Crackdowns on Drug Markets." M. Karwan was a co-advisor. Job Placement: Assistant Professor, Department of Management Science, Rutgers, Camden, New Jersey.

Thomas D. Hill; graduated 9/93. Dissertation title: "Equity Constrained Preventive Police Patrolling." Job Placement: Lecturer, Dept. of Ind. Engg., SUNY at Buffalo.

Honghua Jin; graduated 9/93. Dissertation title: "Routing of Hazardous Materials: A Probabilistic Perspective." M. Karwan was a co-advisor. Job Placement: Systems Analyst, U.S. Steel Corporation, Gary, Indiana.

Dake Sun; graduated 9/93. Dissertation title: "Dynamic Job Shop Scheduling: An Integrated Approach." Li Lin was a co-advisor. Job Placement: OR Analyst, AVIS Rent-a-Car, New York, New York.

Raj A. Sivakumar; graduated 9/92. Dissertation title: "Transportation of Hazardous Materials: A New Modeling Perspective." M. Karwan was a co-advisor. Job Placement: Senior Analyst, Corporate Research, United Airlines, Chicago, Illinois.

Mary Helander; graduated 9/92. Dissertation title: "A Discrete Framework for Modeling and Analyzing HIV Transmission Dynamics." Job Placement: Assistant Professor, Department of Industrial Engineering and Information Systems, Northeastern University, Boston, Massachusetts.

Mamnoon Jamil; graduated 6/91. Dissertation title: "The 1-Center Problem with Queueing." Job Placement: Assistant Professor, Department of Management Science, Rutgers, Camden, New Jersey.

Robert F. Dell; graduated 9/90. Dissertation title: "Development of Equitable Vehicle Routes for Overnight Parcel Deliveries." M. Karwan was a co-advisor. Job Placement: Assistant Professor, Department of Operations Research, Naval Postgraduate School, Monterey, California.

Nirup N. Krishnamurthy; graduated 9/90. Dissertation title: "Modeling Blocking in Automated Guided Vehicle Systems." M. Karwan was a co-advisor. Job Placement: Analyst, Corporate Research, United Airlines, Chicago, Illinois.

Wilfred V. Huang; graduated 2/87. Dissertation title: "The Effects of Special Cost Functions and Promotion in Locational Decisions." Job Placement: Assistant Professor, Division of Industrial Engineering, Alfred University, Alfred, New York.

## **Completed Master's Theses (Supervised or co-Supervised)**

Tejswaroop Geetla, graduated 04/11. Thesis title: “Air Marshall Scheduling to Meet a Game Theoretic Solution.”

Chien-Chi Peng, graduated 03/11. Thesis title: “Optimizing the Layout of a Grocery/Convenience Store to Maximize Revenue from Impulse Items.”

Gautam Pranab, graduated 01/11. Thesis title: “Simulation-Based Selectee Lane Queueing Design for Passenger Checkpoint Screening.”

Shrideep Shadale, graduated 12/08. Thesis title: “Optimal Grocery Store Layout to Maximize Impulsive Item Revenue.”

Partibhan Thalayan, graduated 8/08. Thesis title: “Comparative Study of Item Storage Policies, Vehicle Routing Strategies and Warehouse Layouts Under Congestion.” R. Nagi was a co-advisor.

Esra Cosar, graduated 9/05. Thesis title: “Performance Evaluation of a Mathematical Programming Based Clustering Algorithm for a Wireless *Ad hoc* Network Operating in a Threat Environment.” R. Nagi was a co-advisor.

Viral Garach, graduated 2/05. Thesis title: “Enforcing Equity by Route Selection in Hazardous Materials Transportation.”

Amit Malik, graduated 9/04. Thesis title: “Routing of Unmanned Aerial Vehicles (UAVs) to Reduce the Possibility of Detection.” M. Karwan was a co-advisor.

Sameer Naik, graduated 9/04. Thesis title: “Delay Estimation and its Impact on the Aircraft Ground Holding Problem.”

Karen S. Holness, graduated 6/04. Thesis title: “A Case Study in Personnel Assignment.” C. Drury was a co-advisor.

Amit Parekh, graduated 9/03. Thesis title: “Dynamic Shortest Path Algorithms for Routing of a Hazmat Truck in the Presence of Weather Systems.” C. Rump was a co-advisor.

Nishant Mishra, graduated 9/03. Thesis title: “Capacity and Non-Steady State Generalizations to the Dynamic MEXCLP Model for Distributed Sensing Networks.” R. Nagi was a co-advisor.

Karthik Tyagarajan, graduated 9/03. Thesis title: “Routing Aircraft to Minimize the Chance of Detection During Mission Ingress.” M. Karwan was a co-advisor.

Seethal Mishra, graduated 6/03. Thesis title: “A Rule Based Approach for Handling Time Critical Targets in a Dynamic Battlefield Environment.”

Lazar Babu, graduated 6/03. Thesis title: “Airport Security System Design.” L. Lin was a co-advisor.

Hari Kettalachu, graduated 6/03. Thesis title: “Contour Line Construction for a New Rectangular Facility in an Existing Layout with Rectangular Departments.” R. Nagi was a co-advisor.

Dipeshkumar J. Patel, graduated 2/03. Thesis title: “Clustering Sensors in Wireless *Ad hoc* Networks Using a Dynamic Expected Coverage Model.” R. Nagi was a co-advisor.

Mohan Akella, graduated 2/03. Thesis title: "Base Station Location and Channel Allocation in a Cellular Network with Emergency Coverage Requirements."

Geetika Rana, graduated 9/02. Thesis title: "Optimizing Inventory Levels and Order Fulfillment Strategies in a Supply Chain."

Avijit Sarkar, graduated 6/02. Thesis title: "Study of Rectilinear Least Cost Travel (Path and Entry/Exit) through Convex Polygonal Congested Regions." Rakesh Nagi was a co-advisor.

H-C. Su, graduated 6/02. Thesis title: "A Queueing Model of Airline Passenger Demand Spill and Recapture for Revenue Management." C. Rump was a co-advisor.

Feng Gao, graduated 6/02. Thesis title: "A Constrained Transportation Model for Optimizing Crackdowns on Illicit Drug Markets." C. Rump was a co-advisor.

Goutham Ekollu, graduated 9/01. Thesis title: "Three Tier Flight Attendant Recovery Model During Airline Disruptions." C. Rump was a co-advisor.

Mayur Vamanan, graduated 2/01. Thesis title: "A Heuristic for Optimal Order Fulfillment in an (s,S) Inventory System with Stochastic Customer Demands."

Pavan Kumar Nandikonda, graduated 9/00. Thesis title: "1-Center Facility Placement in a Rectilinear Plane with Barriers." R. Nagi was a co-advisor.

Mohamed H. Badr; graduated 9/98. Thesis title: "Dyanmic Facility Location with Time Varying Demands." J. Bhadury was a co-advisor.

Jorge H. Jaramillo; graduated 9/98. Thesis title: "Genetic Algorithms for Location Problems." J. Bhadury was a co-advisor.

Steven J. D'Amico; graduated 9/97. Thesis title: "Allocation of Police Patrol Cars in the City of Buffalo." C. Rump was a co-advisor.

Abdulkadar Sarac; graduated 6/97. Thesis title: "One Dimensional Systematic Search with Finite Defect Length." C. Drury was a co-advisor.

Colleen Eagen; graduated 2/96. Thesis title: "Practical Hazardous Materials Routing Under Insurance Parameters."

Amitabh Bansal; graduated 9/94. Thesis title: "Analysis of Error due to Aggregation of Demand in Location Problems."

Pradeep Bandla; graduated 6/94. Thesis title: "Aircraft Route Selection for Effective Maintenance Repairs."

Gautham Vemuganti; graduated 2/93. Thesis title: "A Hardware Simulation of an AGV System." L. Lin was a co-advisor.

George Martin; graduated 6/92. Thesis title: "Police Patrol Routing."

Mojgan Faraji; graduated 2/90. Thesis title: "A New Dispatching Control Policy that Eliminates Blocking in an Existing Multi-Vehicle Automatic Guided Vehicle System (AGVS) by forming Cells--A Simulation Study."

Raj A. Sivakumar; graduated 9/89. Thesis title: "Modeling Wind Effects in the Transportation of Liquefied Gas Hazardous Materials."

V. A. Viswanathan; graduated 9/89. Thesis title: "Demand Point Approximations for the Planar, Euclidean Metric, p-Median Problem, With and Without Barriers to Travel."

Yolanda M. Carson; graduated 9/88. Thesis title: "Locating an Ambulance on the State University of New York at Buffalo Amherst Campus."

Sharad Elhence; graduated 9/88. Thesis title: "Modeling Uncertainties in Plant Layout Problems."

Krishna S. Kolluri; graduated 9/88. Thesis title: "Multiple Routing for Equity of Risk in the Transportation of Hazardous Materials." M. Karwan was a co-advisor.

Heidi J. Wild; graduated 6/88. Thesis title: "Optimization of a Deterministic Conveyor System."

Ram Gopalan; graduated 9/87. Thesis title: "Modeling the Equity of Risk in the Transportation of Hazardous Materials." M. Karwan was a co-advisor.

June M. Squilla; graduated 6/86. Thesis title: "Relaxing the Independence Assumption of a Maximal Covering Location Problem."