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# The Supernetwork Sentinel

The Newsletter of the Virtual Center for Supernetworks

Summer 2010



Welcome to the Summer 2010 edition of **The Supernetwork Sentinel**, the newsletter of the Virtual Center for Supernetworks at the Isenberg School of Management, UMass Amherst. **The Supernetwork Sentinel** is published in Fall, Winter, and Summer editions. Its purpose is to keep you informed of events, activities, and successes of the Virtual Center for Supernetworks, the Center Associates, and the Supernetworks Laboratory for Computation and Visualization. In this newsletter, we highlight recent research accolades received by Center Associates and recognize the success of the Speaker Series. In addition, we share news about past and upcoming events. As always, we include a list of our recent publications.

We wish everyone a productive and pleasant Summer!

Anna Nagurney  
John F. Smith Memorial Professor  
Director – Virtual Center for Supernetworks  
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**Professor Patrick Qiang and Professor Anna Nagurney deliver an invited tutorial on their book, *Fragile Networks: Identifying Vulnerabilities and Synergies in an Uncertain World*, at the SBP 2010 Conference held at NIH in March**



**Invited Speakers at the Social Theory and Social Computing Workshop in Hawaii**

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**(l-r) Professors Anna Nagurney, Dimitris Bertsimas of the Sloan School at MIT, and Dmytro Matsypura after Bertsimas' talk at the Isenberg School**

## Center Associates Excel in Network Research from Transportation to Supply Chains

Center Associate Professor Patrick Qiang of the Pennsylvania State University at Malvern received the 2009 Charles V. Wootan Award in transportation planning and policy in Washington DC on January 9, 2010. Dr. Qiang received his PhD in Business Administration with a concentration in Management Science in May 2009. Professor Anna Nagurney was the dissertation committee chair.



**Dr. Patrick Qiang with the Charles V. Wootan Award in Washington DC**

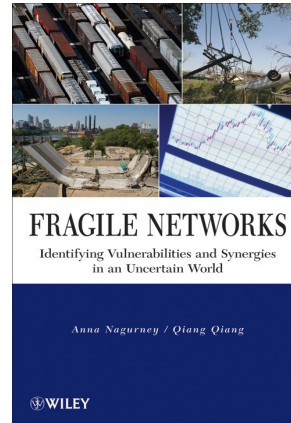
Dr. Qiang's award-winning doctoral dissertation was: **Network Efficiency / Performance Measurement with Vulnerability and Robustness Analysis with Application to Critical Infrastructure.**

Dr. Qiang was honored with the \$2,000 award at the Council of University Transportation Centers (CUTC) banquet. The CUTC was founded in 1979 by major transportation research centers and institutes in the United States. It serves as a forum for the universities and centers to interact with government and industry. Its members number over 70 of the nation's premier university-based transportation research and education programs.

We congratulate Dr. Qiang on this national dissertation award!

The *Library Journal* reported that **Fragile Networks: Identifying Vulnerabilities and Synergies in an Uncertain World**, co-authored by Professors Anna Nagurney and Patrick Qiang, and published by John Wiley & Sons in 2009, ranks 20<sup>th</sup> on its best seller lists in the category, Engineering and Technology. The rankings cover July 2009-April 2010.

Professors Nagurney and Qiang delivered one of four invited tutorials on the topic of their book at the 2010 International Conference on Social Computing, Behavioral Modeling & Prediction, held at the National Institutes of Health (NIH) March 29-April 1, 2010 in Bethesda, Maryland.



Their audience consisted of academics, consultants, and government employees, as well as researchers, representing disciplines from computer science and applied mathematics to computational economics, medicine, and physics.

On January, 2010, on the occasion of the visit of Professor Martin Beckmann to Northwestern University, a one-day symposium took place on topics related to his seminal work on transportation network equilibrium and efficiency theory.



**Professor David E. Boyce acknowledging Professors Hani S. Mahmassani and Martin Beckmann at the symposium**

The Symposium brought together several leading academic researchers to address some of the implications of Beckmann's contributions and unsolved problems. One focus of the discussion was the design of transportation and similar networks (communication, electric power, the Internet). Although network design has been explored formally and informally over the past 60 years, operational design methods have yet to be regularly applied in the planning of large-scale transportation systems by public agencies or private firms. A second focus of the symposium concerned decision-making about the pricing, expansion, operation or maintenance of such public and private systems. [The program, along with invited presentations, is available here.](#)

Professor Nagurney's invited talk was: **Supply Chain Network Design Under Profit Maximization and Oligopolistic Competition.**

Center Associate Professor June Dong of the School of Business at SUNY Oswego, together with two other faculty, with expertise in risk management and organizational behavior, respectively, conducted a unique collaboration with students on the crisis in Haiti following the earthquake that devastated the country on January 12, 2010, and the subsequent humanitarian relief response to the disaster. Students from their classes were involved in role playing exercises and their presentations were featured in the university's annual Quest Day that took place on April 21, 2010. There was [extensive media coverage](#) of this unique educational experience on an extremely critical topic.

Professor Dong is spending the majority of the summer conducting research in China and is also working on exploring the possibility of organizing a conference there on supernetworks.

### **Professor Anna Nagurney Speaks at Workshop in Hawaii**

Professor Anna Nagurney delivered the talk, **Network Design: From the Physical World to Virtual Worlds**, at the Social Theory and Social Computing: Steps to Integration Workshop that took place in Honolulu, Hawaii, May 22-23, 2010. The workshop brought together researchers and a few practitioners from complementary fields, ranging from computer science and operations research / management science to economics, sociology, and political science, who are interested in social processes and the underlying dynamics. The venue was the Hyatt Waikiki hotel below.



**The conference hotel venue**

The presenters' talk slides have now been posted, along with additional photos, on the workshop website and [can be found here](#). This workshop was sponsored by the Air Force

Office of Scientific Research (AFOSR). Dr. Terry Lyons, the cognizant program officer, along with the University of Hawaii workshop organizer, Dr. Sun-ki Chai, should be commended for the success of the workshop.

### **The Spring 2010 UMass Amherst INFORMS Speaker Series a Big Success**

The Spring 2010 UMass Amherst INFORMS Speaker Series was a big success; please see: <http://supernet.som.umass.edu/informs/speakernew.html>. This Speaker Series is organized by the UMass Amherst Student Chapter of INFORMS (The Institute for Operations Research and the Management Sciences). Professor Anna Nagurney serves as the Faculty Advisor to the chapter and its Speaker Series. Funding is provided by the John F. Smith Memorial Fund, with additional support from the Isenberg School of Management and its Department of Finance and Operations Management plus INFORMS. This semester marked the twelfth semester of the continuous operation of this series.



**Professor Mangaliso continuing the discussions at lunch following his lecture**

The Spring 2010 lineup began with a presentation on February 19, 2010 by Professor Mzamo Mangaliso of the Isenberg School. Professor Mangaliso spoke on scientific innovation and research and shared with us his personal experiences in South Africa as the President of South Africa's counterpart of the US National Science Foundation.

On March 5, 2010, we hosted Mr. Richard Brooks of ISO - New England, who spoke to a standing room only audience on the development of the smart grid.



**Mr. Brooks at the lunch following his talk**

On March 26, 2010, Professor Dmytro Matsypura of the University of Sydney in Australia discussed his latest research on the combinatorial optimization of options spreads. His talk brought an elegant network approach to this most difficult problem.

On April 2, 2010, Professor Sheldon Jacobson of the University of Illinois shared with us his research on pediatric vaccines, their pricing and stockpiling issues. Professor Jacobson's visit was co-sponsored by the INFORMS Speakers Bureau. For more information on INFORMS, please [click here](#).



**Professor Jacobson after his seminar presentation**

Professor Dimitris Bertsimas of the Sloan School at MIT spoke on April 23, 2010. He is a member of the National Academy of Engineering and has garnered numerous awards for his research. His talk was co-hosted by the Finance Seminar Series at the Isenberg School. Professor Bertsimas' talk on multistage optimization and robust optimization was outstanding and it was a great honor and pleasure to be able to host him.



**(l-r) Professors Solak, Gumus, and Nagurney with Amir Masoumi, Min Yu, and Christopher Burn**

On April 30, 2010, Professor Mehmet Gumus of McGill University in Montreal, Canada presented his research on supply disruptions and the selection of optimal suppliers. Professor Solak of the Isenberg School helped in the hosting of Professor Gumus and we very much appreciate his assistance in this regard. Professor Gumus' lecture and the discussions that followed were a wonderful ending to a terrific semester of invited

talks. We thank all our speakers in the Spring 2010 Speaker Series for their outstanding presentations that informed us all!

Special thanks go to Doctoral Student Center Associate Amir Masoumi for serving as the Speaker Series Coordinator for 2009-2010. His attention to detail and professionalism are to be commended. Also, special thanks go to Doctoral Student Center Associate Min Yu for serving as the President of the UMass Amherst INFORMS Student Chapter this past year.

For additional information on the student chapter and its activities click here:

[The UMass Amherst INFORMS Student Chapter](#)

## Hosting a Visiting Scholar from Australia

The Center hosted Dr. Dmytro Matsypura as a Visiting Scholar from March until mid-May, 2010. Dr. Matsypura received his PhD in Business Administration, with a concentration in Management Science, from UMass Amherst in 2006 and was recently awarded tenure at the University of Sydney, where he is on the Faculty of Economics and Business in the Discipline of Operations Management and Econometrics. During his sabbatical at the Isenberg School, Dr. Matsypura delivered the talk, **Combinatorial Analysis of Option Spreads**, in the Spring 2010 Speaker Series in Operations Research / Management Science, gave an invited seminar at the School of Business at the University of Connecticut Storrs, visited a collaborator at Columbia University, and interacted with faculty and doctoral students at the Isenberg School.



**Dr. Jose M. Cruz visits the Supernetworks Lab to welcome Dr. Dmytro Matsypura**

## Kudos and News

Congratulations to Center Associate Professor Jose M. Cruz of the School of Business at the University of Connecticut in Storrs! Professor Cruz received the School of Business undergraduate teaching award for the year.

Center Associate Professor Tina Wakolbinger of the Fogelman College of Business and Economics at the University of Memphis was a Member of the 2010 INFORMS Southern Regional Conference Organizing Committee, Huntsville, Alabama, April 5-7. She received the Fogelman Award from her Dean, Dr. Rajiv Grover, for the paper, co-authored with Center Associate Professor Jose M. Cruz, **Multiperiod Effects of Corporate Social Responsibility on Supply Chain Networks, Transaction Costs, Emissions, and Risk**, which was published in the *International Journal of Production Economics* (2008), **116**.

Professor Wakolbinger presented the paper, **Alternative Supply Chain Management Strategies for New Product Diffusion: An ABMS Approach**, with colleagues, Professors Amini, Racer, and Nejad, at the International Workshop on Agent Based Simulation of Diffusion Processes at the University of Vienna, Austria, April 8-9, 2010.

She also presented the paper, **The Impact of Funding Systems on Humanitarian Operations**, with Professor Fuminori Toyasaki of York University, at the 21<sup>st</sup> Annual POMS Conference in Vancouver, Canada, May 7-10, 2010.

Congratulations to Center Associate Professor Patrizia Daniele of the University of Catania! Her paper, **Evolutionary Variational Inequalities and Applications to Complex Dynamic Multi-Level Models**, has been accepted for publication in *Transportation Research E*. Professor Daniele has organized a session for the Euro XXIV Conference, which will take place in Lisbon, Portugal, July 11-14, 2010. Center Associate Jose M. Cruz will also be speaking in her session.



**Doctoral Student Min Yu with Professor Nagurney at MIT**

Congratulations are in order to Doctoral Student Center Associate, Min Yu, who had her first paper accepted for publication. The paper, **Supply Chain Network Design for Critical Needs with Outsourcing**, A. Nagurney, M. Yu, and Q. Qiang, (2010), will appear in *Papers in*

*Regional Science*. Min Yu accompanied Professor Anna Nagurney to the NetSci2010 Conference, which took place at the Media Lab at MIT, May 12-14, 2010, where this paper was presented. At the conference, they had a chance to speak with Professor Barabasi of Northeastern University and Professor Alex "Sandy" Pentland of MIT, who were the organizers of this conference. They also met with Professor Rae Zimmerman of NYU and spoke with Professor Asu Ozdaglar of MIT.

Congratulations to Center Associate Professor Trisha Woolley of Texas Wesleyan University. She received her PhD in Business Administration from UMass Amherst in 2010 and her dissertation was entitled: **Sustainable Supply Chains: Multicriteria Decision-Making and Policy Analysis for the Environment**. Dr. Woolley's concentration was in Management Science. She is an Assistant Professor at the School of Business there.

Kudos to Center Associate Ke "Grace" Ke of the School of Business at Central Washington University. Her paper, **Graphical Models based Hierarchical Probabilistic Community Discovery in Large-Scale Social Networks**, H. Zhang, K. Ke, W. Li, and X. Wang, has been accepted in the *International Journal of Data Mining, Modelling and Management*. In addition, her paper, **Achieving Mass Customization through Trust-Driven Information Sharing: A Supplier's Perspective**, K. Liao, Z. Ma, J. Lee and K. Ke, will appear in the *Management Research Review*.

Center Associate Professor Zugang "Leo" Liu is conducting research on various aspects of supply chains. He completed his second year as an Assistant Professor in the Department of Business and Economics at Pennsylvania State University in Hazleton. Recently, he completed a paper with Professor Anna Nagurney: **Supply Chain Outsourcing Under Exchange Rate Risk and Competition**. He continues to collaborate with several Center Associates.

Center Associate Professor Ladimer S. Nagurney's paper, **Sustainable Supply Chain Network Design: A Multicriteria Perspective**, co-authored with Professor Anna Nagurney, will be presented at the ALIO-INFORMS conference, June 6-9, 2010, in Buenos Aires, Argentina. Professor Ladimer S. Nagurney is in the Department of Electrical and Computer Engineering at the University of Hartford. This paper was written when he was on sabbatical leave at the NSF Engineering Research Center CASA at UMass Amherst.

Center Associate Professor Patrick Qiang will be presenting the paper, **System-Optimized Transportation Network with Disruption Hedging Investment**, at the 2010 IEEE International Conference on Advanced

Management Science (IEEE ICAMS 2010) in Chengdu, China, July 9 to 11. While in China, he will also take part in the Supernetworks Seminar being organized by Professor June Dong at the University of Shanghai for Science and Technology.

Professor Anna Nagurney has organized a session in the stream: **Supply Chains, Transportation and Networks**, for the upcoming Computational Management Science conference that will take place in Vienna, Austria, July 28-30, 2010. Center Associates Patrizia Daniele of the University of Catania in Italy and Professor Tina Wakolbinger will be speaking in the session. Professor Nagurney will also be giving a keynote lecture at this conference, entitled: **Supply Chain Networks: Challenges and Opportunities from Analysis to Design**.

In addition, Professor Anna Nagurney will be giving an invited tutorial, **Fragile Networks: Identifying Vulnerabilities and Synergies in an Uncertain Age**, at the upcoming international ALIO-INFORMS conference in Buenos Aires, Argentina, July 6-9, 2010 and will be on a panel there sponsored by WOMRS (Women in Operations Research and the Management Sciences) on international collaborations.

August 2-4, 2010, Professor Anna Nagurney will be taking part in the Yalta Optimization Conference in Ukraine, with the theme **Network Science**.

For information on these and other upcoming conferences, please [click on this link](#).

The Center Director and Center Associates welcome Dr. Dmytro Matsypura of the University of Sydney in Australia as a new Center Associate! We congratulate him on his publication, **A Computational Study of Margining Portfolios of Options by Two Approaches**, co-authored with E. G. Coffman Jr. and V. G. Timkovsky, in the Springer book series, *Communications in Computer and Information Science* (2010), **54**, 325-332.

The UMass Amherst INFORMS Student Chapter celebrated the end of another great semester of activities with a party held on May 4, 2010. At the party, the chapter officers were recognized for their outstanding service this past year with framed certificates. Next Fall, several new doctoral students in Management Science will be matriculating, including Nathan Kollett, who will be working with Professor Anna Nagurney as a Doctoral Student Center Associate.



**Chapter Officers with their Awards (l-r) Ronrapee Leelawong, Amir Masoumi, Farbod Farhadi, Guven Ince, and Min Yu**

## Recent Center Publications

Copies of these (and other) center articles are at: <http://supernet.som.umass.edu/dart.html>

**Multiproduct Supply Chain Horizontal Network Integration: Models, Theory, and Computational Results**, A. Nagurney, T. Woolley, and Q. Qiang, *International Transactions in Operational Research* (2010), **17**, 333-349.

**Supply Chain Network Design Under Profit Maximization and Oligopolistic Competition**, A. Nagurney, *Transportation Research E* (2010), **46**, 281-294.

**Environmental Impact Assessment of Transportation Networks with Degradable Links in an Era of Climate Change**, A. Nagurney, Q. Qiang, and L. S. Nagurney, *International Journal of Sustainable Transportation* (2010), **4**, 154-171.

**Environmental and Cost Synergy in Supply Chain Network Integration in Mergers and Acquisitions**, A. Nagurney and T. Woolley, in *Sustainable Energy and Transportation Systems, Proceedings of the 19<sup>th</sup> International Conference on Multiple Criteria Decision Making, Lecture Notes in Economics and Mathematical Systems* (2010), M. Ehrgott, B. Naujoks, T. Stewart, and J. Wallenius, Editors, Springer, Berlin, Germany, pp. 51-78.

**A Knowledge Collaboration Network Model Across Disciplines**, A. Nagurney and Q. Qiang, in *Advances in Social Computing, Proceedings of the 2010 International Conference on Social Computing, Behavioral Modeling, & Prediction, Lecture Notes in Computer Science 6007* (2010), S.-K. Chai, J. J., Salerno, and P. L. Mabry, Editors, Springer, pp. 138-148.

**Supply Chain Network Design for Critical Needs with Outsourcing**, A. Nagurney, M. Yu,

and Q. Qiang, (2010), to appear in *Papers in Regional Science*.

**Sustainable Supply Chain Network Design: A Multicriteria Perspective**, A. Nagurney and L. S. Nagurney (2010), *International Journal of Sustainable Engineering*, in press.

**An Integrated Framework for the Design of Optimal Web Banners**, L. Hai, L. Zhao, and A. Nagurney, *Netnomics* (2010), in press.

**Formulation and Analysis of Horizontal Mergers Among Oligopolistic Firms with Insights into the Merger Paradox: A Supply Chain Network Perspective**, A. Nagurney, *Computational Management Science* (2010), in press.

**Fragile Networks: Identifying Vulnerabilities and Synergies in an Uncertain Age**, A. Nagurney and Q. Qiang (2010), to appear in the *International Transactions in Operational Research*.

**Optimal Supply Chain Network Design and Redesign at Minimal Total Cost and Demand Satisfaction**, A. Nagurney (2009), to appear in the *International Journal of Production Economics*.



**Congratulations to the 2010 Graduates of the Isenberg School!**

## **The Center Director and the Center Associates thank you for your support!**

### **Center Director**

Dr. Anna Nagurney  
John F. Smith Memorial Professor

### **Center Associates**

Dr. Jose M. Cruz  
Dr. Patrizia Daniele  
Dr. June Dong  
Dr. Ke "Grace" Ke  
Dr. Zegang "Leo" Liu  
Dr. Dmytro Matsypura  
Dr. Ladimer S. Nagurney  
Dr. Qiang "Patrick" Qiang  
Dr. Padma Ramanujam  
Dr. Stavros Siokos  
Dr. Tina Wakolbinger  
Dr. Trisha Woolley  
Dr. Ding Zhang  
Dr. Lan Zhao

### **Doctoral Students**

Amir Masoumi  
Min Yu

### **Center Website:**

<http://supernet.som.umass.edu>

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