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# The Supernetwork Sentinel

## The Newsletter of the Virtual Center for Supernetworks

Summer 2005



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Welcome to the Summer 2005 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 include news items, reports from our travels far and wide, noteworthy recognitions, as well as information regarding center activities. We also have a list of our recent publications.

Anna Nagurney  
John F. Smith Memorial Professor  
Director – Virtual Center for Supernetworks  
<http://supernet.som.umass.edu>

### Center Director to Take Sabbatical

Anna Nagurney will be on sabbatical the 2005 – 2006 academic year. She has been appointed a Radcliffe Institute Fellow at the Radcliffe Institute for Advanced Study, Harvard University, Cambridge, Massachusetts. While in residence at the Radcliffe Institute, Anna will be researching new theoretical and computational paradigms for dynamic network modeling and analysis with applications ranging from congested urban transportation networks and the Internet to social networks. She also plans to write a book.



**Professor Nagurney in Auckland, New Zealand as an invited speaker at a Transportation Workshop April, 2005**

### Celebrating Students

Undergraduate Center Associate Maxfield Raynolds was one of 14 UMass Leaders of the 21<sup>st</sup> Century, recognized by Chancellor John Lombardi on May 22, 2005 at the undergraduate commencement ceremonies. Maxfield graduated with a degree in Operations Management and was also very active in UMass theatrical productions. Maxfield follows in the footsteps of former Associates Christina Calvaneso and Stephen Davis who received 21<sup>st</sup> Century Leaders Awards in 2003 and 2004, respectively.

Dr. Ke Grace Ke received her PhD diploma in graduate commencement ceremonies on May 21, 2005. Professor Anna Nagurney was her dissertation chair. Dr. Ke for the past year has been on the faculty of the School of Business at the University of Arkansas at Monticello as an Assistant Professor. Dr. Ke has enjoyed her first year as a professor very much! Also, Doctoral Center Associate Zugang "Leo" Liu received his Master's degree in Engineering at the graduate commencement.



**Dr. Ke, Professor Nagurney, and Zugang Liu at a graduation party in their honor**

The achievements of the Center Associates have also been recognized by the media; <http://supernet.som.umass.edu/media/media.htm>

Congratulations to the Class of '05 Center Associates and many thanks for your outstanding contributions!

**Inside  
Travels Far and Wide  
Kudos and Congratulations  
More Center Associate News  
Center Publications  
Upcoming Events**

## Travels Far and Wide

These past few months the Center Director and Associates have been unusually active in disseminating research results and have traveled far and wide. Below we highlight some of the activities and also include photos from the various conferences, seminars, mini-symposia, and even from a colloquy! With much research being conducted in virtual teams, connecting with fellow colleagues, researchers, and many friends still involves face-to-face time and, inevitably, travel via different modes of transportation. We have flown numerous miles and have traveled by bus and car to connect with old friends and colleagues and to meet new ones. The adventures and experiences have been intellectually, personally, and professionally rewarding.

Anna Nagurney and Tina Wakolbinger presented their paper, **Dynamic Supernetworks for the Integration of Social Networks and Supply Chains with Electronic Commerce: Modeling and Analysis of Buyer-Seller Relationships with Computations**, at the Ninth INFORMS Computing Conference in Annapolis, Maryland, held January 5-7, 2005. The paper was published in *Netnomics* 6 (2004), 153-185.



**Tina Wakolbinger with Professors Georgia Perakis, Ozlem Ergun, and Anna Nagurney**

On February 24, 2005, Anna Nagurney presented the paper, **Double-Layered Dynamics: A Unified Theory of Projected Dynamical Systems and Variational Inequalities**, co-authored with Center Associates Patrizia Daniele and Monica-Gabriela Cojocaru, at the Transportation Center of Northwestern University in Evanston, Illinois.

**Professors Pablo Durango-Cohen and David Boyce – Hosts of Nagurney at Northwestern**



On March 15, 2005, Anna Nagurney delivered a Special Seminar at her alma mater, Brown University in Providence, Rhode Island, in the Division of Engineering, entitled **Supernetworks: Decision-Making in the 21<sup>st</sup> Century**. She had the opportunity to meet with various faculty members including some she had as an undergraduate there.



**Professor Nagurney with Professor Barrett Hazeltine of the Division of Engineering at Brown University**

April 19-22, 2005, Anna Nagurney was an invited speaker at the Workshop on Mathematical Models for Optimizing Transportation Services, at the University of Auckland, New Zealand. She delivered the paper, **On the Relationship Between Supply Chain and Transportation Network Equilibria: A Supernetwork Equivalence with Computations**. The paper has been accepted for publication in *Transportation Research E*. The trip back to the US took several days due to airplane trouble and she was overnighted in Minneapolis.



**Group Photo of the Auckland Workshop Participants**

Nagurney was a keynote speaker at MeshForum, May 1-3, 2005, in Chicago, Illinois. The forum was organized by Shannon Clark and brought technorati together to discuss fascinating current topics surrounding networks. Nagurney gave the opening talk entitled **Networks – The Science Spanning Disciplines**. Bloggers documented the various talks and discussions.

May 9-11, 2005, Nagurney took part in the NSF-sponsored Workshop on Network Science, Nonlinear Science, and Infrastructure Systems, organized by Dr. Terry Friesz, at the Penn State University in University Park, Pennsylvania. She presented the paper she also delivered in Auckland, New Zealand.



**NSF Workshop Participants at Penn State**

May 15-19, 2005, Nagurney and Center Associates Cojocar and Daniele took part in the Eighth SIAM Conference on Optimization in Stockholm, Sweden. Nagurney had organized a minisymposium on **Projected Dynamical Systems and Evolutionary Variational Inequalities with Applications** that included three co-authored papers of theirs, stemming from their Rockefeller Foundation Bellagio Team Research Residency in March 2004 and the collaboration that followed. In addition, Professor William Sandholm from the Department of Economics at the University of Wisconsin, Madison, also presented a co-authored paper at the minisymposium.



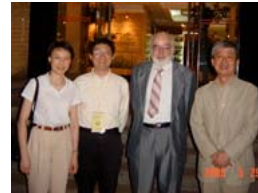
**Professors Cojocar, Sandholm, Daniele, and Nagurney in Stockholm**

**Some Transportation Colloquy Participants in Rensellaerville, New York**



Nagurney traveled by bus (and was then picked up by a limo) to Albany to take part in the "On the Coming Transformation of Travel" Colloquy in Rensellaerville, New York, June 1-3, 2005. The colloquy was organized by the Federal Highway Administration, the Volpe National Transportation Center in Cambridge, and the New York Metropolitan Planning Organization. The colloquy involved several days of intense brainstorming and discussions on the future of travel. Various reports will be forthcoming.

Center Associates Ding Zhang and June Dong presented two papers, co-authored with Anna Nagurney, including **A Network Economic Model for Supply Chain versus Supply Chain Competition** at the 2<sup>nd</sup> International Workshop at Shanghai, Tongji University, Shanghai, China.



**Professors June Dong, Ding Zhang, Siegfried Schaible, and Masao Fukushima in Shanghai, China**

**Kudos and Congratulations**

Center Associate Dr. Ding Zhang of SUNY Oswego received the President's Award for Scholarly and Creative Activity this past April. He was recognized for his contributions to the study of dynamic networks, supply chains, and competitive equilibrium problems. He has also been promoted to the rank of Full Professor. Congratulations to Professor Zhang!

Center Associate Dr. Jose Cruz was selected to participate in the INFORMS 2005 Young Researcher Roundtable held in Palm Spring, California, April 17-19, 2005. He was one of 40 young researchers selected from an international pool to meet with representatives from major corporations and government to discuss major research topics in operations research and management science. Dr. Cruz has completed his first year as an Assistant Professor in the School of Business at the University of Connecticut. He has been busy teaching Operations Management at the undergraduate and MBA levels.

International Center Associate Dr. Patrizia Daniele was promoted to Associate Professor. Congratulations!

Doctoral Associate Tina Wakolbinger was awarded a travel grant to fund her travel to the Austrian Scientists and Scholars in North America (ASCINA) 2005 Conference in Vienna, Austria, which took place at the Academy of Sciences, April 27-29, 2005. She presented the paper, **Quantifying the Difficult to Quantify: Measuring the Value of Relationships in Decision-Making through Social Network Integration**. Tina's research is supported by a grant from the National Science Foundation awarded to Professor Anna Nagurney.

## More Center Associate News

The report of the 3<sup>rd</sup> NSF-ENG Cyberinfrastructure Workshop – Research Opportunities in Cyberengineering and Cyberinfrastructure, which took place April 22-23, 2004, at Drexel University, Philadelphia, PA., is now available. Professor Nagurney was an invited participant in the workshop and is identified in the report.

Center Associate Ding Zhang is spending the summer at Fudan University in Shanghai, China working on a large supply chain/supernetwork project with Dr. Daoli Zhu and sponsored by the Chinese Science Foundation.

International Center Associates Monica-Gabriela Cojocararu of the University of Guelph, Italy and Patrizia Daniele of the University of Catania, Sicily will be joining Anna Nagurney at Harvard University during the Spring term in 2006. Dr. Daniele will be a Visiting Scholar at the Division of Engineering and Applied Sciences (DEAS) at Harvard. Cojocararu and Daniele will be collaborating with Nagurney while she is on her sabbatical at Harvard.

Professor Cojocararu has received a major computing grant from the Canadian Foundation for Innovation.

Center Associate Dr. Ladimer Nagurney is involved in a research project this summer funded by Dyno-Nobel. Also, he and six of his University of Hartford Colleagues received \$1,000,000 from the Connecticut Center for Advanced Technology as part of a \$20,426,920 grant from the Department of Air Force to form the the National Aerospace Leadership Initiative Consortium.

Center Associate Fuminori Toyasaki will be joining the Faculty of Management at McGill University in Montreal, Quebec, Canada as a post-doctoral research fellow, beginning September 2005. He will be involved in the research program there on closed-loop supply chains.

Additional conference and workshop information is available at: <http://supernet.som.umass.edu>

## Center Publications

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

**Multitiered Supply Chain Networks: Multicriteria Decision-Making and Uncertainty**, J. Dong, D. Zhang, H. Yan, and A.

Nagurney, *Annals of Operations Research* **135** (2005), 155-178.

**Reverse Supply Chain Management and Electronic Waste Recycling: A Multitiered Network Equilibrium Framework for E-Cycling**, A. Nagurney and F. Toyasaki, *Transportation Research E* **41** (2005), 1-28.

**Supply Chain Networks, Electronic Commerce, and Supply Side and Demand Side Risk**, J. Cruz, J. Dong, and D. Zhang, *European Journal of Operational Research* **164** (2005), 120-142.

**On the Relationship Between Supply Chain and Transportation Network Equilibria: A Supernetwork Equivalence with Computations**, A. Nagurney, to appear in *Transportation Research E* (2005).

**Global Supply Chain Network Dynamics with Multicriteria Decision-Making under Risk and Uncertainty**, A. Nagurney and D. Matsypura (2004), to appear in *Transportation Research E*, special issue on Global Logistics.

**A Network Modeling Approach for the Optimization of Internet-Based Advertising Strategies and Pricing with a Quantitative Explanation of Two Paradoxes**, A. Nagurney and L. Zhao (2004), to appear in *Netnomics*.

**Double-Layered Dynamics: A Unified Theory of Projected Dynamical Systems and Evolutionary Variational Inequalities**, M.-J. Cojocararu, P. Daniele, and A. Nagurney (2004), to appear in *European Journal of Operational Research*.

**Supernetworks**, A. Nagurney, Invited Chapter for **Handbook of Optimization in Telecommunications**, P. M. Pardalos and M. G. C. Resende, Editors, Springer, Berlin, Germany (2005), in press.

**A Supply Chain Network Perspective for Electric Power Generation, Supply, Transmission, and Consumption**, A. Nagurney and D. Matsypura, to appear in **Advances in Computational Economics, Finance and Management Science**, E. J. Kontoghiorghes and C. Gatu, Editors, Springer, Berlin, Germany (2005).

**Statics and Dynamics of Global Supply Chain Networks with Environmental Decision-Making**, A. Nagurney, J. Cruz, and F. Toyasaki, **Pareto Optimality, Game Theory and Equilibria**, A. Migdalas, P. M. Pardalos, and L. Pitsoulis, Editors, Springer, Berlin, Germany (2005), in press.

**Projected Dynamical Systems, Evolutionary Variational Inequalities, Applications, and a Computational Procedure**, M.-G. Cojocararu, P.



Daniele, and A. Nagurney, **Pareto Optimality, Game Theory and Equilibria**, A. Migdalas, P. M. Pardalos, and L. Pitsoulis, Editors, Springer, Berlin, Germany (2005), in press.

**A Network Economic Model for Supply Chain versus Supply Chain Competition**, Ding Zhang, to appear in *Omega* (2005).

**Financial Networks**, A. Nagurney, Invited Chapter for **Handbook of Financial Engineering**, C. Zopounidis, M. Doumpos, and P. M. Pardalos, Editors, Springer, Berlin, Germany, submitted (2005).

**Dynamics of Electric Power Supply Chain Networks under Risk and Uncertainty**, A. Nagurney and D. Matsypura (2005).

**Supernetworks: An Introduction to the Concept and its Applications with a Specific Focus on Knowledge Supernetworks**, A. Nagurney and T. Wakolbinger, submitted (2004).

## Upcoming Events

Anna Nagurney, with the help of David Boyce, has organized two sessions marking the 50<sup>th</sup> anniversary of the publication of the book, **Studies in the Economics of Transportation**, for the INFORMS National Meeting, November 13-16, 2005, in New Orleans, LA. The authors of the book are: M. Beckmann, C. B. McGuire, and C. B. Winsten and the book was published by Yale University Press in 1956. More information on the conference can be found at: <http://www.informs.org/Conf/NO2005/index.htm>

The sessions are invited sessions and are organized under the auspices of the Transportation Science and Logistics Section of INFORMS.

The Center Director is deeply saddened to report that C. B. Winsten passed away on May 28, 2005.

Doctoral Student Associate Fuminori Toyasaki will be defending his doctoral dissertation in August. Professor John Stranlund of the Department of Resource Economics, Professor June Dong of SUNY Oswego, and Dr. Frank Southworth of Oak Ridge National Labs are his committee members; Anna Nagurney is Fuminori's doctoral committee chair. More information will be posted at: <http://www.isenberg.umass.edu/>

The INFORMS Student Chapter of UMASS Amherst is gearing up for another exciting year and has already begun organizing its Fall 2005

seminar series. Confirmed speakers include: Professors Clara Fang, Aura Ganz, Mike Knodler, Ana Muriel, and David Reckhow.

More information will follow in the Fall Supernetwork Sentinel. Please visit the chapter site at: <http://student.som.umass.edu/informs/>

**Lou Wigdor, Dean OBrien, Undergraduate Dean Dennis Hanno celebrating with students at the INFORMS Student Chapter end-of-year party at the Isenberg School**



INFORMS (The Institute for Operations Research and the Management Sciences) has informed the UMass Amherst Student Chapter that it will be featured in the publication *Math Horizons* in the Fall. Congratulations to all involved!

Anna Nagurney, who also serves as the Faculty Advisor of this INFORMS student chapter, would like to thank all the Isenberg School of Management administrators, faculty, and staff who have helped to support the chapter throughout the year. Special thanks go to Dean Tom OBrien, Associate Dean Jane Miller, Undergraduate Dean Dennis Hanno, Professor Nelson Lacey, Chair of the Department of Finance and Operations Management, and to Ms. Ellen Pekar, Ms. Irene Benoit, Ms. Lynda Vassallo, and Ms. Ann Lankarge. The Chapter and Anna Nagurney also acknowledge the support of Mr. Lou Wigdor, the Isenberg School of Management Communications Director, and Ms. Cari Carpenter, the Director of MBA Admissions and Career Management.

Anna Nagurney has donated the monetary award from her College Outstanding Research Award for 2004-2005 from the Isenberg School of Management (ISOM) to support the UMASS Amherst INFORMS Student Chapter Speaker Series and for undergraduate scholarships.



**Isenberg School of Management Awards Banquet – May 5, 2005**

**Virtual Center for Supernetworks  
Eugene M. Isenberg School of Management  
University of Massachusetts at Amherst**

**Center Director**

Dr. Anna Nagurney  
John F. Smith Memorial Professor

**Associates**

Dr. Monica Cojocaru  
Dr. Jose Cruz  
Dr. Patrizia Daniele  
Dr. June Dong  
Dr. Ke Grace Ke  
Dr. Ladimer Nagurney  
Dr. Padma Ramanujam  
Dr. Stavros Siokos  
Dr. Ding Zhang

**Doctoral Students**

Zugang "Leo" Liu  
Qiang "Patrick" Qiang  
Fuminori Toyasaki  
Tina Wakolbinger

**Center Website:**

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

If you would like to be put on our email list,  
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**Thank you for your support!**

**Students Celebrating their Graduations at  
Party Hosted by Professor Nagurney**

