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# The Supernetwork Sentinel

The Newsletter of the Virtual Center for Supernetworks

Fall 2005



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Welcome to the Fall 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, events/activities of special interest, 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 Begins her Radcliffe Institute Fellowship

Anna Nagurney has begun her appointment as a Radcliffe Institute Fellow at the Radcliffe Institute for Advanced Study, Harvard University, Cambridge, Massachusetts. The title of her project is, "Dynamic Networks with Applications: A Unified Theory of Projected Dynamical Systems and Evolutionary Variational Inequalities." International Center Associates Monica-Gabriela Cojocaru of the University of Guelph, Italy and Patrizia Daniele of the University of Catania, Sicily will be joining Anna Nagurney at Harvard University during part of the Spring term in 2006. Dr. Daniele will be a Visiting Scholar at the Division of Engineering and Applied Sciences (DEAS) at Harvard. Cojocaru and Daniele will be collaborating with Nagurney while she is on her sabbatical at Harvard.

<http://www.radcliffe.edu/fellowships/>

## 2005 University of Massachusetts Convocation

On September 16, 2005, the University of Massachusetts at Amherst held its first Fall Convocation. At the Convocation, twelve faculty received the Award for Outstanding Accomplishments in Research and Creative Activity. More information can be found at:

<http://supernet.som.umass.edu/cfoto/convocation2005/convocation2005.html>



Professor Nagurney receiving her award from Chancellor Lombardi with Dean O'Brien of ISOM in the background.

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## National Academy of Sciences Workshop on Statistics of Networks

September 26-27, 2005 Anna Nagurney participated in an invited workshop at the National Academy of Sciences. Her presentation entitled, "Supernetworks: The Why, The How, and Applications." The program is available at: [http://www7.nationalacademies.org/bms/statistics\\_of\\_networks.html](http://www7.nationalacademies.org/bms/statistics_of_networks.html)



## Fall 2005 INFORMS Seminar Series Announced:

The UMass Amherst INFORMS seminar series has now been announced and is available at: <http://supernet.som.umass.edu/informs/speakers.html>

Talks this Fall are on topics ranging from consumer returns, water quality, inventory swaps in banks, communications for disaster management, and a variety of transportation topics.

## Professor Nagurney with newly elected UMass Amherst INFORMS Student Chapter Officers and first seminar speaker, Professor Ana Muriel



## Classical Braess Paper Translated

Professors Dietrich Braess and Anna Nagurney, along with Doctoral Student Center Associate, Tina Wakolbinger, have translated from the German into English the classical Braess (1968) paper. Their translation, "On a Paradox of Traffic Planning," will appear in the November (2005) issue of the journal *Transportation Science*. The translation will be accompanied by a preface written by Professor David Boyce of Northwestern University and Anna Nagurney. The paradox illustrates through an example that an addition of a road can make everyone worse off and has been (re)discovered in the context of communications networks, notably, the Internet.

## INFORMS Sessions of Special Interest

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 San Francisco, California. 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>

These special sessions will take place on Monday morning, November 14, 2005.

Nagurney is very pleased to report that both Bart McGuire and Martin Beckmann will be attending the sessions and are scheduled to speak. Professor McGuire is a Professor Emeritus of the University of California at Berkeley whereas Professor Martin Beckmann is a Professor Emeritus of Brown University. The presenters and their talks are as follows.

### Session 1: 50<sup>th</sup> Anniversary of the Studies in the Economics of Transportation

David Boyce of Northwestern University will speak on "Insights into the Why, How, and When of the Network Equilibrium Model." Michael Florian of the University of Montreal will speak on "Network Equilibrium Models: Varied and Ambitious." Michael Patriksson of Chalmers University of Technology in Sweden will deliver the talk "The Sensitivity of Traffic Equilibria – History and Current Status." Anna Nagurney will present "A Retrospective on Beckmann, McGuire and Winsten's **Studies in the Economics of Transportation**," which is a joint paper with David Boyce and Hani Mahmassani.

## Session 2: 50<sup>th</sup> Anniversary of the Studies in the Economics of Transportation

Don Hearn of the University of Florida will talk on "Recent Results on Congestion Toll Pricing of Traffic Networks." Hani Mahmassani of the Maryland Transportation Initiative at the University of Maryland will speak on "Beyond Equilibrium: User-Adjustment Processes and Day-to-day Dynamics." Tim Roughgarden of Stanford University will deliver the talk, "Quantifying the Worst-Case Inefficiency of Wardrop Equilibria." Martin Beckmann and Bart McGuire will then provide their reflections on their book and the past 50 years.

### Keynote MeshForum Speech

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. The complete talk is now available on audio through IT Conversations:

<http://www.itconversations.com/shows/detail390.html>

### Kudos and Congratulations

Congratulations to Dr. Fuminori Toyasaki, who successfully defended his doctoral dissertation on August 1, 2005, entitled, **A Unified Complex Network Framework for Environmental Decision-Making with Applications to Green Logistics and Electronic Waste Recycling**. Dr. Toyasaki is now a Postdoctoral Research Fellow on the Faculty of Management at McGill University in Montreal, Canada, working on closed loop supply chains.

**Fuminori Toyasaki with some of his committee members and friends after his dissertation defense**

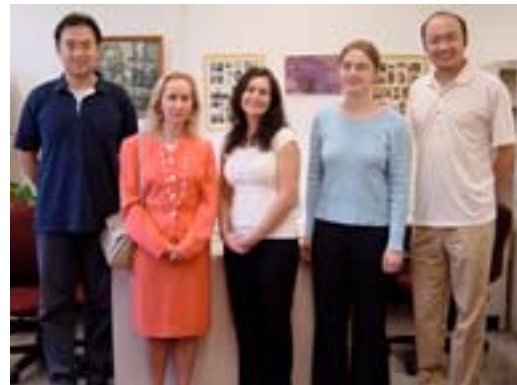


Congratulations to Center Associate, Dr. Jose M. Cruz, whose paper, **International Financial Networks with Intermediation: Modeling, Analysis, and Computations**, co-authored with Anna Nagurney, and published in *Computational Management Science* **1** (2003), 31-58, received the "Best Paper Award" for the year 2004 in the journal. The co-authors are sharing the monetary prize of 500 euros and each was issued a citation.

Congratulations to Doctoral Student Associate, Tina Wakolbinger, who has been selected to participate in the Future Academicians Colloquium to be held prior to the 2005 National INFORMS Meeting in San Francisco, November 13-16, 2005.

### More Center Associate News

Trisha Woolley has matriculated into the doctoral program in Management Science at the Isenberg School of Management and joins the Virtual Center for Supernetworks as a Doctoral Student Associate. Welcome, Trisha!



**New Doctoral Student Center Associate Trisha Woolley (in white and black) with other associates: Qiang "Patrick" Qiang, Tina Wakolbinger, and Zugang "Leo" Liu**

The Center Associates are well-represented on the University of Massachusetts at Amherst INFORMS Student Chapter with Zugang "Leo" Liu being elected President of the Chapter; Qiang "Patrick" Qiang being elected Vice President; Trisha Woolley being elected Secretary, and Tina Wakolbinger (past President) continuing to serve as the seminar series representative. More information on the Chapter's activities can be found at: <http://student.som.umass.edu/informs/>

The Center Director, Anna Nagurney, serves as the Faculty Advisor to this Student Chapter and she wishes to also welcome Deanna Bean Kennedy and Baris Hasdemir, who will be working jointly as web-masters of the Chapter. Both Deanna and Baris have matriculated into

the doctoral program in Management Science at the Isenberg School of Management.

## Center Publications

Copies of these (and other) center articles may be found at:

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

**A Network Equilibrium Framework for Internet Advertising: Models, Qualitative Analysis, and Algorithms**, L. Zhao and A. Nagurney (2005).

**The Evolution and Emergence of Integrated Social and Financial Networks with Electronic Transactions: A Dynamic Supernetwork Theory for the Modeling, Analysis, and Computation of Financial Flows and Relationship Levels**, A. Nagurney, T. Wakolbinger, and L. Zhao, to appear in *Computational Economics* (2006).

**Modeling Generator Power Plant Portfolios and Pollution Taxes in Electric Power Supply Chain Networks: A Transportation Network Equilibrium Transformation**, K. Wu, A. Nagurney, and Z. Liu (2005).

**Knowledge Collaboration Networks: Optimal Collaboration Across Disciplines and Communication Distance**, Q. Qiang and A. Nagurney (2005).

**Transportation Network Equilibrium Reformulations of Electric Power Networks with Computations**, A. Nagurney and Z. Liu (2005).

**Financial Networks with Intermediation and Transportation Network Equilibria: A Supernetwork Equivalence and Reinterpretation of the Equilibrium Conditions with Computations**, Z. Liu and A. Nagurney (2005).

**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, to appear in *Transportation Research E* (2005), 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**, L. Zhao and A. Nagurney (2004), to appear in *Netnomics*.

**Double-Layered Dynamics: A Unified Theory of Projected Dynamical Systems and Evolutionary Variational Inequalities**, M.-J. Cojocaru, 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. Cojocaru, 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.

**Supernetworks: An Introduction to the Concept and its Applications with a Specific Focus on Knowledge Supernetworks**, A. Nagurney and T. Wakolbinger, to appear in the *International Journal of Knowledge, Culture and Change Management* (2005).

## Upcoming Events

Anna Nagurney will be giving a talk on November 9, 2005 at the Radcliffe Institute for Advanced Study at Harvard University. The title of the presentation is: "Dynamic Networks with Applications." She has also been invited to speak at the Kennedy School of Government at Harvard at a too be announced date.

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**Professor Nagurney with Several Students  
and Staff Members of the Isenberg School  
of Management after the UMass Amherst  
2005 Faculty Convocation**

**Professor Nagurney thanks everyone for  
their outstanding support!**