

The Supernetwork Sentinel

Fall 2014

Welcome to the Fall 2014 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. The newsletter's 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 a workshop, international conferences, awards and accolades, upcoming events, and other news.

As always, we also include a list of our recent Center publications. We thank you for your support.

Anna Nagurney
 John F. Smith Memorial Professor
 Director – Virtual Center for Supernetworks
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Professor Anna Nagurney with Center Associate Professor Patrizia Daniele after Nagurney's lecture at the University of Catania, Italy



Center Director with Professors Daniele and Toyasaki at conference in Taormina, Italy

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Center Director Co-organizes Cybersecurity Risk Workshop at MIT

On September 19, 2014, the Center Director, along with two colleagues from the Isenberg School of Management, Professors Mila Sherman and Senary Solak, and Professor Wayne Burleson of the College of Engineering at UMass Amherst, organized the Workshop, *Cybersecurity Risk Analysis for Enterprise Security*. The workshop took place at the Sloan School of Management at MIT in Cambridge, Massachusetts. The team had been awarded a \$40,000 grant from the Advanced Cyber Security Center (ACSC) to put on the workshop. http://supernet.isenberg.umass.edu/visuals/ACSC_Workshop_program.pdf.

This project was a follow-on to an earlier project awarded to this team from ACSC under its Prime the Pump program. Professor Anna Nagurney delivered the talk, *Network Science and Economics*, [which can be downloaded, in its entirety, here](#).



Participants at the Cybersecurity Workshop

Along with colleague, Professor Solak, the Center Director also moderated the panel: Modeling and Optimization: Better Decision-Making for Cybersecurity.

We thank the ACSC for funding this very stimulating and valuable workshop!

Center Associates Shine at International Conferences

It was a very busy summer conference season with Center Associates presenting at international venues. Center Associate Professor Patrizia Daniele of the University of Catania organized a minisymposium for the [18th European Conference on Mathematics in Industry: ECMI 2014](#), Taormina, Italy, which took place, June 9-13. The minisymposium was on **Recent Advances on Equilibrium Problems with Applications to Networks**. At this symposium, she presented a recently published paper in the *European Journal of Operational Research*: **A Variational Inequality Formulation of Equilibrium Models for End-of-Life Products with Nonlinear Constraints**. with Center Associate Professor Tina Wakolbinger of the Vienna University of Economics and Business in Austria and with Professor Fuminori Toyasaki of York University in Toronto, Canada.



(L-r) Professors Daniele, Raciti, Toyasaki, L.S. Nagurney, and A. Nagurney in Taormina

Professor Anna Nagurney presented her paper, **Supply Chain Network Competition in Time-Sensitive Markets**, co-authored with Center Associates Min Yu of the University of Portland and Ladimer S. Nagurney of the University of Hartford, and with Professor Jonas Floden of the University of Gothenburg. In addition, Professor Toyasaki presented a paper in the same session, co-authored with Professor Tina Wakolbinger, her doctoral student, Thomas Nowak, and the Center Director: **When and for Whom Would E-Waste be a Treasure Trove? Insights from a Network Equilibrium Model of E-Waste Flows**. We are excited to report that this paper, written by three generations of scholars, has been published in the *International Journal of production Economics*. Both Professor Wakolbinger and Professor Toyasaki were Professor Anna Nagurney's doctoral students at the Isenberg School of Management.



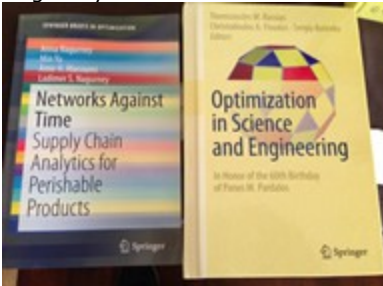
Center Associate Professor Dmytro Matsypura with the Center Director in Greece

After the Taormina Conference, Professors Anna and Ladimer Nagurney flew to Greece, where they took part in the Conference on Optimization, Control and Applications in the Information Age in Honor of the 60th Birthday of Professor Panos M. Pardalos, June 15-20, 2014, in beautiful Chalkidiki. Also, in attendance, as a speaker, was Center Associate Professor Dmytro Matsypura of the University of Sydney in Australia. The Center Director and Professor Matsypura were on the Organizing Committee of this conference. His presentation was: **A Robust Optimisation Approach to Bushfire Fuel Management**, co-authored by Professor Oleg Prokopyev of the University of Pittsburgh.



Professor Panos M. Pardalos with the Center Director in Greece

Professor Anna Nagurney presented the paper, **Supply Chain Network Competition in Time-Sensitive Markets**, co-authored with Center Associates Professors Min Yu and Ladimer Nagurney and Professor Jonas Floden.



Our book with the Pardalos volume

Center Associates Professors Patrizia Daniele and Jose M. Cruz of the University of Connecticut took part in [The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications](#), July 7-11, 2014 Madrid, Spain.



Professors Daniele and Cruz in Madrid

Professor Tina Wakolbinger, Christian Burkart, Professor Fuminori Toyasaki, and Thomas Nowak took part in the [20th Conference of the International Federation of Operational Research Societies](#), July 13-18, 2014, Barcelona, Spain.



Center Director Receives Medal from the University of Catania

On June 13, 2014, the Center Director was hosted by Professor Patrizia Daniele at the University of Catania in Italy where she delivered the invited seminar, [Equilibria and Dynamics of Supply Chain Network Competition with Information Asymmetry in Quality and Minimum Quality Standards](#), which is joint work with Doctoral Student Center Associate Dong "Michelle" Li. After her seminar she was presented with the University Medal for her contributions to network modeling and mentorship of operations researchers. She was presented with the medal by Professor Mulone, the Head of the Department of Mathematics and Computer Science at the University of Catania.



(l-r) Professor Mulone, the Center Director, and Professor Patrizia Daniele

UMass Amherst INFORMS Student Chapter to Celebrate 10th Anniversary

On Friday, October 3, 2014, the award-winning UMass Amherst INFORMS Student Chapter will be celebrating its 10th Anniversary. The celebration will take place at the Isenberg School of Management in Room 210 from 4:30-6:30PM. Professor Anna Nagurney has served as the Faculty Advisor of this student chapter for the past decade. During this period the chapter has received 7 national awards from its parent society INFORMS (Institute for Operations Research and the Management Sciences).

Many Center Associates have served as Chapter Officers, with its first President being Dr. Tina Wakolbinger. Both she as well as Center Associates Professor Patrick Qiang of Penn State University Malvern and Professor Amir H. Masoumi of Manhattan College have been recognized with the Judith B. Liebman Award of INFORMS for their outstanding service with the chapter.

At the celebration there will be a slide show of activities and events hosted by the chapter over the past decade as well as video testimonials. There will also be international cuisine and great camaraderie and conversation.

We will report on this event in our Winter 2015 newsletter.

Kudos and News

Doctoral Student Center Associates Sara Saberi and Shivani Shukla successfully passed their doctoral comprehensive exams on July 11, 2014. We congratulate them on this achievement! Both are doctoral students in Management Science at the Isenberg School of Management. Shivani served as the President of the UMass Amherst INFORMS Student Chapter last year and did an outstanding job leading the Chapter. Sara was

the Chapter Treasurer last year and is serving again this year in that capacity.

Doctoral Student Center Associate Dong "Michelle" Li had a very successful summer in research. The paper, **A Supply Chain Network Game Theory Model with Product Differentiation, Outsourcing of Production and Distribution, and Quality and Price Competition**, A. Nagurney and D. Li, *Annals of Operations Research* (2014), is now in press, and several others that she co-authored have now appeared – see Recent Center Publications below.

Congrats to Center Associate Professor Qiang "Patrick" Qiang of Penn State University Malvern. [He is the track chair for International Business for the 2015 NEDSI Conference to be held in Cambridge, MA in March.](#) Congratulations also to Professor Qiang on his publications: **The Closed-loop Supply Chain Network with Competition and Design for Remanufactureability**, *Journal of Cleaner Production*, in press, and Q. Qiang, Z. Huang, K. Ke, and Y. Yang. **Overview of Supply Chain Risk Management and the Current Issues of Closed-loop Supply Chain in China**, invited paper for the special issue on "Business Continuity and Risk Management in China" in the *International Journal of Business Continuity and Risk Management*. Ke Ke is also a Center Associate and based at Central Washington University.

Congratulations to Center Associate Professor Zugang "Leo" Liu on being appointed to the Editorial Board of the journal [Decision Support Systems](#)! Professor Liu achieved tenure this past summer and a promotion at Penn State University Hazleton. He has also been appointed Associate Editor of the [International Journal of Decision Science](#).

The INFORMS Annual Meeting, which takes place in San Francisco, California, November 9-12, 2014 this year will be a great reunion and meeting place for many Center Associates! The Center Director organized an invited session: Supply Chain Network Competition: Advances in Models, Methods, and Applications, at which Doctoral Student Dong "Michelle" Li will present the talk, co-authored with the Center Director: **Supply Chain Network Competition with Information Asymmetry in Quality and Minimum Quality Standards**. Professor Patrick Qiang will speak on: **The Closed-loop Supply Chain Network with Competition and Design for Remanufactureability**. Center Associate Professor Min Yu of the University of Portland in Oregon will present a paper with the Center Director and Professor Jonas Floden: **Supply Chain Network Sustainability under Competition and Frequencies of Economic Activities**. Also, Center Associate Professor June Dong of SUNY Oswego will also present in

the session. She will speak on work with Jun Ma: **Supply Chain Supernetwork Model with Supplier Risk Diversification.**

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Also, Doctoral Student Center Associate Sara Saberi will present at INFORMS the paper, [A Network Economic Model of a Service-Oriented Internet with Choices and Quality Competition](#), co-authored with Doctoral Student Center Associate Dong "Michelle" Li, the Center Director, and Professor Tilman Wolf. This paper is based on research supported by the National Science Foundation through the grant: Network Innovation Through Choice awarded to UMass Amherst and for which Professor Wolf is the PI and Professor Anna Nagurney is the Co-PI. This project is part of the Future Internet Architecture (FIA) program at NSF. The goal is to introduce an economy plane into the Internet, which we are calling ChoiceNet.

Center Associate Professor Dmytro Matsypura will travel from the University of Sydney in Australia to the conference.

The Center Director spent almost 2 months in Europe in May and June and, in addition to speaking at conferences, was based at the School of Business, Economics and Law where she holds a Visiting Professorship of Operations Management. She thanks her hosts there for their wonderful hospitality!



The view from Professor Anna Nagurney's office at the University of Gothenburg

This past academic year and summer the Center helped to host a visiting doctoral student from Colombia, who was working, in part, on the NSF project, Mr. Luis Andres Marentes. Along with Luis Andres, we did some fascinating research on last mile issues surrounding the Internet in rural and/or impoverished areas.



(l-r) Shivani Shukla, Sara Saberi, Michelle Li, Thiago Teixeira, and Luis Andres Marentes, on a get-together before his departure

Recent Center Publications

Please see our center articles at:

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

Supply Chain Network Competition in Time-Sensitive Markets, A. Nagurney, M. Yu, J. Floden, and L. S. Nagurney, *Transportation Research E* (2014), **70**, 112-127.

A Cournot-Nash-Bertrand Game Theory Model of a Service-Oriented Internet with Price and Quality Competition Among Network Transport Providers, A. Nagurney and T. Wolf, *Computational Management Science* (2014), **11(4)**, 475-502.

Spatial Price Equilibrium with Information Asymmetry in Quality and Minimum Quality Standards, A. Nagurney, D. Li, and L.S. Nagurney, *International Journal of Production Economics* (2014), **158**, 300-313.

A Dynamic Network Economic Model of a Service-Oriented Internet with Price and Quality Competition, A. Nagurney, D. Li, S. Saberi, and T. Wolf, in *Network Models in Economics and Finance*, edited by V.A. Kalyagin, Th. M. Rassias, and P.M. Pardalos, Springer International Publishing Switzerland (2014), 239-264.

A Supply Chain Network Game Theory Model with Product Differentiation, Outsourcing of Production and Distribution, and Quality and Price Competition, A. Nagurney and D. Li, *Annals of Operations Research* (2014), in press.

Equilibria and Dynamics of Supply Chain Network Competition with Information Asymmetry in Quality and Minimum Quality Standards, A. Nagurney and D. Li,

Computational Management Science (2014).
11(3), 285-315.

A Dynamic Network Oligopoly Model with Transportation Costs, Product Differentiation, and Quality Competition, A. Nagurney and D. Li, *Computational Economics* (2014), **44(2)**, 201-229.

A Network Economic Game Theory Model of a Service-Oriented Internet with Price and Quality Competition in Both Content and Network Provision, S. Saberi, A. Nagurney, and T. Wolf, *Service Science* (2014), in press.

A Supply Chain Network Game Theoretic Framework for Time-Based Competition with Transportation Costs and Product Differentiation, A. Nagurney and M. Yu, in *Optimization in Science and Engineering - In Honor of the 60th Birthday of Panos M. Pardalos*, edited by Th. M. Rassias, C. A. Floudas, and S. Butenko,, Springer, New York, (2014), 381-400.

When and for Whom Would E-Waste be a Treasure Trove: Insights from a Network Equilibrium Model of E-Waste Flows, T. Wakolbinger, F. Toyasaki, T. Nowak, and A. Nagurney, *International Journal of Production Economics* (2014), **154**, 263-273.

Fashion Supply Chain Network Competition with Ecolabelling, A. Nagurney, M. Yu, and J. Floden, in press in *Sustainable Fashion Supply Chain Management: From Sourcing to Retailing*, T.-M. Choi and T.C.E. Cheng, Editors, Springer, 2014.

ChoiceNet: Toward an Economy Plane for the Internet, T. Wolf, J. Griffioen, K. Calvert, R. Dutta, G. Rouskas, I. Baldin, and A. Nagurney, *Computer Communication Review* **44(3)**, July 2014.

An Integrated Disaster Relief Supply Chain Network Model with Time Targets and Demand Uncertainty, A. Nagurney, A.H. Masoumi, and M. Yu. in press in *Regional Science Matters: Studies Dedicated to Walter Isard*, edited by P. Nijkamp, A. Rose, and K. Kourtis, Springer, Heidelberg, Germany (2014).

Supply Chain Network Sustainability Under Competition and Frequencies of Activities from Production to Distribution, A. Nagurney, M. Yu, and J. Floden, *Computational Management Science* (2013), **10(4)**, 397-422.

Supply Chain Networks with Global Outsourcing and Quick-Response Production Under Demand and Cost

Uncertainty, Z. Liu and A. Nagurney, *Annals of Operations Research* (2013), **208(1)**, 251-289.

Pharmaceutical Supply Chain Networks with Outsourcing Under Price and Quality Competition, A. Nagurney, D. Li, and L.S. Nagurney, *International Transactions in Operational Research* (2013), **20(6)**, 859-888.

Design of Sustainable Supply Chains for Sustainable Cities, A. Nagurney, *Environment & Planning B* (2013), in press.

A Network Economic Game Theory Model of a Service-Oriented Internet with Choices and Quality Competition, A. Nagurney, D. Li, T. Wolf, and S. Saberi, *Netnomics* (2013), **14(1-2)**, 1-25.

Supply Chains and Transportation Networks, A. Nagurney, *Handbook of Regional Science* (2014), M. Fischer and P. Nijkamp, Editors, Springer, Berlin, Germany, pp 787-810.
Financial Networks, A. Nagurney, *Computational Management Science* (2013), **10(2-3)**, 77-80.

Competitive Food Supply Chain Networks with Application to Fresh Produce, M. Yu and A. Nagurney, *European Journal of Operational Research* (2013), **224(2)**, 273-282.

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

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