Welcome to the Fall 2016 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 report on a new book, the impact of research at the Supernetwork Center, as well as the upcoming INFORMS conference. As always, we also include a list of our recent Center publications.

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Dynamics of Disasters Book Out Soon

The book: Dynamics of Disasters: Key Concepts, Models, Algorithms, and Insights, co-edited by Professor Ilias S. Kotsireas of Wilfrid Laurier University in Canada, Professor Anna Nagurney, and Professor Panos M. Pardalos of the University of Florida, will be published soon by Springer International Publishing Switzerland.

The volume consists of a preface, written by the co-editors, as well as 18 refereed book chapters. The volume is an outgrowth of the conference Dynamics of Disasters, held in Kalamata, Greece, June 29-July 2, 2016. Contributors to the volume include speakers at the conference as well as invited contributors.

The book chapters cover topics such as network criticality and network complexity for assessment of critical infrastructure during disasters, evacuation modeling and betweenness centrality, tornado detection, selective routing for post-disaster needs assessment, the donation collections routing problem, collaborative incident planning, current earthquake and fire preparedness plans, and experiences with the Ebola crisis.

The Center Director’s paper in the volume is: Freight Service Provision for Disaster Relief: A Competitive Network Model with Computations. In addition, the paper of hers, co-authored with Center Associate Professor Ladimer S. Nagurney of the University of Hartford, also appears therein: A Mean-Variance Disaster Relief Supply Chain Network Model for Risk Reduction with Stochastic Link Costs, Time Targets, and Demand Uncertainty.

The volume contains contributions from academics and practitioners, including several contributions from practitioners from the United Nations.

The Center Director thanks all the contributors as well as the reviewers of the book chapters for their efforts. She also acknowledges her co-editors for assistance with the organization of the conference and the editing of the volume and acknowledges the support of All Souls College at the University of Oxford, where she was a Visiting Fellow during the 2015-2016 Trinity term, a period of time during which many of the chapters were finalized.

More information on the book is available on the publisher’s webpage.

Center Director Featured in STEM Gems Book

Professor Anna Nagurney is one of 44 females in STEM (Science, Technology, Engineering, Mathematics) featured in a new book, STEM Gems, authored by Stephanie Espy. The book was published in June 2016. Nagurney appears in the Mathematics section and is described as a Network Systems Mathematician. The book was written by Espy to inspire young women to pursue careers in STEM. Professor Nagurney was interviewed for the book and two photographers visited the Isenberg School of Management to photograph her in the Supernetworks Lab.

The Center Director with the STEM Gems book and with her niece and daughter, both of whom received college degrees in STEM fields.
The inspiring role models in Mathematics in the STEM Gems book

(l-r) Center Associate Professor Dong "Michelle" Li, the Center Director, and Doctoral Student Center Associate Deniz Besik with STEM Gems Book


Supernetwork Center Research Making a Difference

What is truly special about the Supernetwork Center Team is the synergy that results from collaboration on many important research topics. Some research themes that resonate with Associates and to which they have been making consistent contributions include: supply chains and sustainability, corporate social responsibility and environmental decision-making, cybersecurity, perishable product supply chains including food and fresh produce ones, Future Internet Architectures, Internet for the poor and underserved, financial networks (and their integration with supply chains and social networks), freight service provision, and, of course, humanitarian logistics and disaster relief, and blood and pharmaceutical supply chains, as well as greater and deeper understanding of the Braess Paradox.

Evidence of the impact of the work includes scientific citations of published research, also the h-index and i-index of Center Associates, according to Google Scholar, and invitations to speak at prestigious venues, and to serve on prize committees, as external examiners of doctoral dissertations, members of various professional organizational boards and editorial boards. Of course, a variety of recognitions for research awards and teaching awards also speak to the impact of the Supernetwork Center Associates.

The research on supernetworks in all of its richness has been cited in scholarly publications, in doctoral dissertation as well as in more practitioner-oriented publications and studies. In addition, the receipt of grants serves as another metric of respect for the work being conducted at the Center.

Also, an element that sets the research apart is the view of networks (and supply chains) as systems and, hence, the need to capture the complexity of them and the behavior of associated decision-makers must make use of the state-of-the art methodologies. The Center Associates not only provide insights through their work through mathematical models but also utilize algorithms to solve problems that aspire to bring greater understanding of network systems whether in the form of complex transportation networks, multiterried supply chains, and even the Internet, and often the interactions between/among such networks. The work done at the Supercomputer Center is heavily oriented towards Operations Research / Management Science but the citations demonstrate impact on diverse fields from physics and engineering to even sociology, biology, and food processing.

Center Associates collaborate face to face and across the miles both virtually and in person. Essential to the success of the Center is the education of doctoral students.

Center Associates Prominent at INFORMS National Conference

The Annual National INFORMS (Institute for Operations Research and the Management Sciences) Conference takes place this year in Nashville, Tennessee, November 13-16, 2016. Supernetwork Center Associates will be presenting many papers at this conference.

The Center Director has organized a session on Novel Applications of Network Optimization in which Center Associate Professor Dong "Michelle" Li of Arkansas State University will present their paper, A General Multitiered Supply Chain Network Model of Quality Competition with Suppliers. This paper was published in the International Journal of Production Economics in 2015. Also, in the same session Center Associate Professor Zugang "Leo" Liu of Pennsylvania State University Hazleton with present a paper, joint with J. Wang: Supply Chain Network Equilibrium with Strategic Financial Hedging Using Futures Contracts.
In addition, Center Associate Professor Ding Zhang, of SUNY Oswego, will present the paper: A Time-space Network Model for Medical Resources Allocation in an Epidemic Outbreak in the session. Concluding the session will be the talk given by the Center Director on joint work with E. Alvarez Flores and C. Soylu, A Generalized Nash Equilibrium Network Model for Post-disaster Humanitarian Relief. This paper appears as the lead article in the journal Transportation Research E in the November 2016 issue.

Center Associate Professor Sara Saberi of Worcester Polytechnic Institute will be chairing a session on Service Science and will present the paper, coauthored with the Center Director and T. Wolf: A Network Economic Game Theory Model of a Service-oriented Internet with price and Quality Competition in Both Content and Network Provision. This paper was published in the INFORMS journal Service Science in 2014.

Also, Doctoral Student Center Associate Shivani Shukla will present in the session: Optimization in Cyber Defense organized by Dr. Les Servi of MITRE Corp. She will speak on joint work with the Center Director and with Center Associate Professor Patrizia Daniele of the University of Catania in Italy. The title of their paper is: A Supply Chain Network Game Theory Model of Cybersecurity Investments with Nonlinear Budget Constraints. This paper is now in press in the journal Annals of Operations Research.

Joining us at the INFORMS conference will be doctoral student Luis Andres Marentes from Bogota, Colombia, whose dissertation committee Professor Anna Nagurney is on. He will present the paper, Reducing the Internet Adoption Gap Between Rich and Poor Through Auction Mechanisms. This is joint work with Y. Donoso, T. Wolf, and Professor Anna Nagurney.

Center Associate Professor Dmytro Matsypura from the University of Sydney in Australia will have two presentations at the INFORMS conference: Using Critical Component Detection in Graphs for Wildfire Fuel Management and Solution Approaches to Network Design Problems with Decision Dependent Uncertainty, joint with N. Richmond, and P. Krokhmal.

Center Associate Amir H. Masoumi of Manhattan College will present a joint paper with Center Associate Professor Min Yu of the University of Portland: Analysis of Blood Banking Operations at the Time of Low Demand.

Center Associate Jose Cruz of the University of Connecticut organized a session for the INFORMS conference on Sustainable and Responsible Supply Chain Management in which he and Center Associate Professor Trisha Anderson of Texas Wesleyan University will each speak. Professor Cruz’s talk is on: Social Responsibility Investments: Financial Networks Analysis. Professor Anderson’s talk is on: Corporate Environmental and Social Responsibility in Supply Chains: Exploring Actions and Performance.

Kudos and News

The Center Director will receive a Volunteer Service Award at the Distinguished level from INFORMS at the Annual Conference in Nashville, Tennessee, November 13-16, 2016. This is the first time that such an award is being given by INFORMS. She is also serving on the INFORMS Computing Society student paper prize committee for 3 years and the winner for this round will be announced at the Nashville conference.

The Center Director, along with Professors Fuad Aleskerov, Ilias Kotsireas, and Panos M. Pardalos, is co-organizing the 3rd International Conference on Dynamics of Disasters, which will take place in Kalamata, Greece, July 5-9, 2017. More information on the conference can be found at: http://www.caspt.com/DOD2017/

Center Associate Professor Patrizia Daniele of the University of Catania and Center Associate Professor Tina Wakolbinger of the Vienna University of Economics and Business are serving on the conference program committee.

Center Associate Professor Patrizia Daniele was a co-organizer of the workshop: Variational Inequalities, Nash Equilibrium Problems and Applications in Catania, October 6-7, 2016. Congratulations to Professor Daniele on her paper, The Financial Equilibrium Problem with a Markowitz-type Memory Term and Adaptive Constraints, accepted for publication.
in the *Journal of Optimization Theory and Applications*.

Center Associate Professor Tina Wakolbinger is a
guest co-editor of a special issue of the journal
*Flexible Service and Manufacturing* focusing on
*Sustainable Urban Transport*, More info is
available here. She serves as the VP of Awards
at the POM College of Humanitarian Operations
and Crisis Management and is a member of the
Board of the Euro Working Group on
Humanitarian Operations.

Congratulations to Center Associate Professor
Jose Cruz of the University of Connecticut on his
grant: The Effects of Global Supply Chains
Barriers to Trade between United States and
European Union from the University of
Connecticut School of Business Dean’s
Globalization Fund.

Congratulations to Center Associate Professor
Patrick Qiang of the Pennsylvania State
University Malvern on the acceptance of his
paper, *A Closed-Loop Supply Chain
Equilibrium Model with Random and Price-
Sensitive Demand and Return*, with Y.
Hamdouch and K. Ghoudi, in *Networks and
Spatial Economics*.

The Center Director will deliver a plenary talk:
*Game Theory Models of Cybercrime and
Cybersecurity Investments Under Network
Vulnerability*, at the SecGames conference to
be held in New York City, November 2-4, 2016.
She is also an invited speaker at the Risk,
Resilience and Robustness of Dynamic Supply
Networks: Bridging Mathematical Models and
Practice conference to be held in Edinburgh,

Professor Nagurney was one of about 20 judges
from academia and industry who evaluated the
projects and chose the winners for over $5000 in
prizes.

Center Associate Dr. Stavros Siokos, Managing
Partner of ASTARTE Capital Partners in London,
England, hosted a delegation from the Isenberg
School of Management, including Associate Dean
Tom Moliterno, for dinner at the Royal
Automobile Club on September 13, 2016. Siokos
is involved in the Isenberg alumni network in
Europe.

Professor Ladimer S. Nagurney
who successfully defended her dissertation:
*Network Game Theory Models of Services
and Quality Competition with Applications
to Future Internet Architectures and
Supply Chains*, on August 12, 2016, in
Management Science at the Isenberg School of Management. Professor Anna Nagurney was the chair of her dissertation committee. She is now an Assistant Professor at the Foisie School of Business at Worcester Polytechnic Institute in Massachusetts.

Sara Saberi after her dissertation defense with her committee members at the Isenberg School

Doctoral Student Center Associate Shivani Shukla took part in a panel organized by the UMass Amherst INFORMS Student Chapter on: How to be a sane and successful grad student: From managing coursework to job talks, on October 14, 2016, at the Isenberg School of Management. Shivani is a past President of the student chapter.

(l-r) Michael Prokle, Shivani Shukla, Zana Cranmer

Shivani will be defending her doctoral dissertation proposal: Game Theory for Security Investments in Cyber and Supply Chain Networks, on October 31, 2016. The Center Director is chair of her dissertation committee. Congratulations to Shivani on her selection to take part in the INFORMS doctoral colloquium, which takes place prior to the INFORMS Annual Conference in Nashville, Tennessee, November 13-16, 2016.

Congratulations to Doctoral Student Center Associate Deniz Besik who successfully passed her core exam on August 5, 2016. Deniz has been conducting research on fresh produce supply chains and quality management. Congratulations also to Deniz on the acceptance of her paper, Quality in Competitive Fresh Produce Supply Chains with Application to Farmers’ Markets, joint with the Center Director, for presentation at the 2017 INFORMS Computing Conference, which will be held January 13-17, in Austin, Texas.

Deniz Besik with her core exam committee members

Also, congratulations to Deniz on her election as Treasurer of the UMass Amherst INFORMS Student Chapter, whose President this year is Pritha Dutta. Supernetwork Center Doctoral Student Center Associates have a long record of service for this chapter, beginning back in 2004, under the leadership of Tina Wakolbinger, who is now a Full Professor!

More information on this award-winning student chapter can be found on its website.

Of particular note this Fall semester is that the chapter held a service event, in which many of its officers and members volunteered at the Amherst Survival Center. Upcoming events this Fall include a Tune-Up for the INFORMS conference, which has become a chapter tradition and provides a great venue for the doctoral students to practice their conference presentations, as well as hosting several speakers.

This year’s UMass Amherst INFORMS Student Chapter Officers
Recent Center Publications

Please see our center articles at: http://supernet.isenberg.umass.edu/dart.html


The Center Director and Center Associates thanks you for your support!

The Center Director
Dr. Anna Nagurney
John F. Smith Memorial Professor

Center Associates
Dr. Trisha Anderson
Dr. Jose M. Cruz
Dr. Patrizia Daniele
Dr. June Dong
Dr. Ke "Grace" Ke
Dr. Dong "Michelle" Li
Dr. Zugang "Leo" Liu
Dr. Amir H. Masoumi
Dr. Dmytro Matsypura
Dr. Ladimer S. Nagurney
Dr. Qiang "Patrick" Qiang
Dr. Padma Ramanujam
Dr. Sara Saberi
Dr. Stavros Siokos
Dr. Tina Wakolbinger
Dr. Min Yu
Dr. Ding Zhang
Dr. Lan Zhao

Doctoral Students
Deniz Besik
Shivani Shukla

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If you would like to be put on our email list, contact: supernet@isenberg.umass.edu