

# The Supernetwork Sentinel

## Summer 2015

Welcome to the Summer 2015 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 Dr. Radhika Kulkarni's visit to the Isenberg School, on the success of the Dynamics of Disasters conference held in Kalamata, Greece, and on accolades received and upcoming events, as well as other news.



**Dynamics of Disasters conference participants in Kalamata, Greece**

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



**Center Associates Shivani Shukla, Dr. Michelle Li, Sara Saberi, and Professor Min Yu at POMS Conference in Washington DC**

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## Hosting Dr. Radhika Kulkarni of SAS

On March 6, 2015, the UMass Amherst INFORMS Student Chapter, whose President is Michael Prokle of the Department of Mechanical and Engineering at UMass Amherst, had the pleasure of hosting Dr. Radhika Kulkarni, the VP of R&D Analytics at SAS in Cary, North Carolina.

Dr. Kulkarni is both an INFORMS Fellow and a WOMRS (Women in Operations Research and the Management Sciences) Award recipient and one of the highest technical females in her company, which has 11,000 employees. Support for her visit was provided by the INFORMS Speakers Program (thank you), the Department of Operations and Information Management, the Isenberg School, and Professor Anna Nagurney, who has served as the INFORMS Student Chapter Faculty Advisor for over a decade.

Her talk was on **Succeeding with Business Analytics: Key Challenges**.

In her presentation, Dr. Kulkarni spoke of the challenges such as Big Data and the Internet of Things. She spoke of the need for speed in terms of algorithms, which is also calling for high performance computer architectures and greater storage. With sensors interacting, there is a need for time series as well as statistical multivariate methods. She emphasized the "mixing and matching" of different techniques. Do you have the right data, the right process, and the right people, she asked?!



**Dr. Kulkarni after her presentation**

Her talk was videotaped and videostreamed.

She began her day in the Isenberg School of Management with a meeting with students in the Elkins Boardroom.

She also met with a group of students in the Supernetworks Lab.

Dr. Kulkarni's energy, professionalism, and insights into the importance of analytics that she shared with us were greatly appreciated.

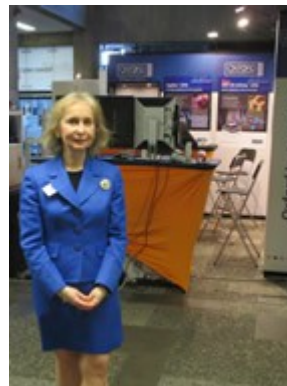


**Dr. Kulkarni in the Supernetworks Lab**

## Center Director Gives Invited Talk in Berlin, Germany

Professor Anna Nagurney gave an invited talk, **Sustainable Supply Chains for Sustainable Cities**, at the [Φ-SOE Fachverband Physik sozio-ökonomischer Systeme \(Physics of Socio-Economic Systems Division\), German Physical Society \(DPG\)](#), Spring Meeting, in Berlin, Germany, March 15-20, 2015. This is Europe's largest physics conference. The venue at the Technical University of Berlin was excellent.

In her presentation, she gave an overview of some of the applications of supply chains that she has investigated with Center Associates from electric power ones to food supply chains and then focused on the work described in a paper of hers just published, with the same title as her talk, in *Environment & Planning B* (2015), **42(1)**, 40-57.



**The Center Director at the DPG conference in Berlin**

She enjoyed her interactions with the physicists Dr. Dirk Helbing and Dr. Luis Bettencourt and enjoyed speaking with Dr. Duncan Watts, the renowned social networks researcher. The Center Director very much appreciated the interdisciplinarity of the invited talks and the many discussions and thanks the organizers of the symposium for the invitation and hospitality.

Her presentation, along with many other Center Associate presentations, can be downloaded from the Supernetwork Center website: <http://supernet.isenberg.umass.edu/visuals.html>

## **Dong "Michelle" Li Successfully Defends Doctoral Dissertation**

On May 4, 2015, Doctoral Student Center Associate Dong "Michelle" Li successfully defended her doctoral dissertation: **Quality Competition in Supply Chain Networks with Applications to Information Asymmetry, Product Differentiation, Outsourcing, and Supplier Selection**. Professor Anna Nagurney was the chair of Michelle's doctoral dissertation committee, which also included Professor Adams Steven, Professor Hari Balasubramanian, and Professor Christian Rojas. Michelle is Professor Anna Nagurney's 18<sup>th</sup> PhD student to receive a doctorate. Her concentration was in Management Science.



**(l-r) Dr. Li, Professors Steven, Balasubramanian, Rojas, and Nagurney after the defense**

After many academic job interviews and several offers, Dr. Li accepted a tenure-track Assistant Professorship at the College of Business at Arkansas State University, where she will be teaching Operations Management and Supply Chain Management courses beginning in the Fall of 2015.

We congratulate Dr. Li and wish her much success in her new academic career!

## **Center Director Visits the University of Gothenburg in Sweden**

Since 2011, the Center Director Professor Anna Nagurney has been a Visiting Professor at the School of Business, Economics and Law at the University of Gothenburg in Sweden, spending about 44 days there each year and working with the Transportation and Logistics group as well as the Finance group. This past May and June she again visited the University of Gothenburg. This

will be her last official visit as a Visiting Professor but the wonderful friendships and collaborations that have been established will continue!



**Professor Nagurney in front of the School of Business, Economics and Law (Handelshögskolan)**

While at the University of Gothenburg, her group hosted a party in her honor and she was regaled with beautiful gifts and mementos of Sweden.



**Enjoying cake with her group in Gothenburg**

Nest year, she will be a Visiting Fellow at All Souls College of Oxford University during the trinity-term in late Spring 2016.

## **Dynamics of Disasters Conference in Greece Attracts Speakers from Many Countries**

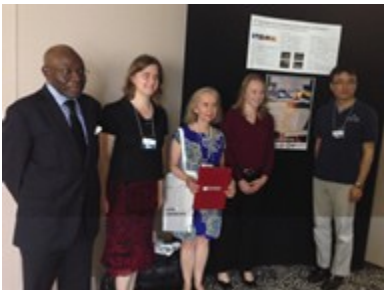
June 29 - July 2, 2015, the International Conference on Dynamics of Disasters took place in Kalamata, Greece. The conference was co-organized by Distinguished University Professor Panos M. Pardalos of the University of Florida and Professor Ilias Kotsireas of Wilfrid Laurier University in Canada. Center Associate Professor Tina Wakolbinger of the Vienna University of Economics and Business in Austria and Center Associate Professor Patrizia Daniele of the University of Catania in Italy were on the program committee of this conference.

This focused conference had paper presenters from Denmark, England, Canada, the US,

Russia, Sweden, Greece, Austria, Turkey, and Romania, which speaks to the timeliness and importance of the conference themes, which appear on [the conference website](#).

The presenters represented different disciplines, including psychology and anthropology, earthquake engineering, and, of course, there was a good contingent of operations researchers and management scientists. This made for very exciting discussions and the presentation of different perspectives. There were also experts in disaster management and emergency preparedness, experts in policy, and transportation.

Below is a photo of the UMass Amherst contingent at this conference along with Professor Adenrele Awotona of UMass Boston. Professor Tina Wakolbinger was Professor Nagurney's PhD student at the Isenberg School as was her husband, Professor Fuminori Toyasaki of York University in Toronto, Canada, who also spoke at the conference. In addition, Jenny Sargeant, a recent graduate from the Operations and Information Management undergraduate program at the Isenberg School, who took Professor Anna Nagurney's course in Humanitarian Logistics and Healthcare last spring, also presented her class project at the conference.



**(l-r) Professors Awotona, Wakolbinger, Nagurney, Jenny Sargeant, and Professor Toyasaki at the conference**



**Professors Aleskerov, Pardalos, Nagurney, Kotsireas, and Balcik at the conference**

Professor Tina Wakolbinger presented the paper, "Outsourcing Humanitarian Logistics Activities to Commercial Logistics Providers," which is joint work with her doctoral student, I.F. Sigala.



**Professor Tina Wakolbinger delivering her paper in Kalamata, Greece**

Center Associate Professor Ladimer S. Nagurney of the College of Engineering, Technology, and Architecture at the University of Hartford also took part in the conference and had a co-authored paper with the Center Director: [A Mean-Variance Disaster Relief Supply Chain Network Model for Risk Reduction with Stochastic Link Costs, Time Targets, and Demand Uncertainty](#).



**The conference banquet**

Special thanks to Isenberg School Dean Dr. Mark A. Fuller for providing support for the conference!

## Kudos and News

On April 3, 2015, the UMass Amherst INFORMS Student Chapter and its Faculty Advisor, Professor Anna Nagurney, hosted a very successful Academic Job Search Panel with panelists: Professor Davit Khachatryan of Babson College, Professor Chaitra Gopalappa of UMass Amherst, and Center Associate Professor Amir H. Masoumi of Manhattan College in NYC. During the Q&A the importance of resume (CV) building was emphasized from the first year of doctoral studies, in terms not just with respect to classwork, but in terms of publications, conference presentations, and, also taking part in UMass Amherst INFORMS Student Chapter activities. Students get to meet and interact with our speakers, hold officer positions, practice their communications skills (soft skills were further emphasized by Dr. Khachatryan), and build up their resumes. Also, this is a very supportive and collegial group.



**(L-r) Professors Masoumi, Gopalappa, and Khachatryan with the Center Director**

The discussions with the panelists continued long after the panel!



**The panelists with some of the audience members**

We congratulate Doctoral Student Center Associate Sara Saberi on her receipt, on April 22, 2015, of the 2014-2015 Outstanding Doctoral Student Researcher Award from the Isenberg School of Management. Sara successfully defended her doctoral dissertation proposal on April 9, 2015. Professor Anna Nagurney is the chair of her dissertation committee. The title of Sara's dissertation is: **Network Game Theory Models of Services and Quality Competition with Applications to Future Internet Architectures and Supply Chains.**



**Sara with her award at the Isenberg School**

We also congratulate Sara on her selection and participation in the POMS Doctoral Colloquium, which took place immediately before the conference in Washington DC, May 8-11, 2015.

Center Associates, Dr. Li, Shivani Shukla, Sara Saberi, and Professor Min Yu were busy

presenting at the POMS Conference, which took place in Washington DC. Copies of their presentations have been posted on the Supernetwork Center website:

<http://supernet.isenberg.umass.edu/visuals.htm>



**Shivani Shukla presenting at POMS**



**Dr. Min Yu and Dong "Michelle" Li at POMS**

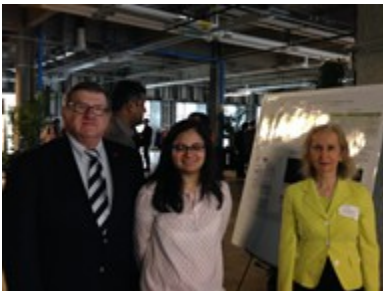
Doctoral Student Center Associates Sara Saberi and Shivani Shukla presented posters at the Spring 2015 NSF Future Internet Architectures (FIA) Principal Investigators (PI) Meeting, which took place at MIT, in Cambridge, MA, June 1-2, 2015. Both Sara and Shivani are being supported, in part, this summer by the NSF grant on which Professor Anna Nagurney is the Co-PI with Professor Tilman Wolf as the PI.

Sara's poster, on joint work with the Center Director and Professor Tilman Wolf, Associate Dean of the College of Engineering at UMass Amherst, was on, "A Network Economic Game Theory Model of a Service-Oriented Internet with Price and Quality Competition in Both Content and Network Provision." Shivani's poster presentation, joint with the Center Director, Professor Ladimer S. Nagurney, and Professor Patrizia Daniele, was on "Game Theoretic Model for Cybersecurity Investments with Nonlinear Budget Constraints."



**(l-r) Shivani Shukla, Professor Tilman Wolf, and Sara Saberi at NSF FIA PI meeting at MIT**

In addition, Doctoral Student Shivani Shukla presented a poster on work with Professors Anna Nagurney and Ladimer S. Nagurney, "Game Theoretic Models for Cybersecurity in Supply Chains and Financial Services Networks," at the UMass Amherst Center for Data Science launch on April 9, 2015.



**Shivani Shukla with Professors Ladimer S. Nagurney and Anna Nagurney at the Data Science Center launch at UMass Amherst**

Plus, on April 24, 2015, Shivani presented the poster, "Game Theoretic Models for Cybersecurity in Supply Chains with Nonlinear Budget Constraints," based on joint work with the Center Director and Professors Ladimer S. Nagurney and Patrizia Daniele, at the Social Science Research beyond the Academy, April 24, 2015. Joining Shivani at the all-day event was Center Associate Dr. Padma Ramanujam of SAS in Cary, North Carolina, who spoke on a PhD Alumni Panel. The goal of the event was to discuss job opportunities in industry and government and to highlight successful UMass Amherst PhD graduates.



**Dr. Padma Ramanujam speaking at UMass**

A big congratulations to Center Associate Professor Qiang "Patrick" Qiang of the Graduate School of Professional Studies at Penn State Malvern on his promotion to Associate Professor with tenure! Professor Qiang is spending the summer conducting research in China.

Professor Patrizia Daniele is the organizer of the stream, **Recent Advances in Dynamics of Variational Inequalities and Equilibrium Problems**, for EURO 2015, Glasgow, Scotland, July 12-15, 2015. The Center Director will present there the paper, "Fashion Supply Chain Network Competition with Ecolabelling," which is joint with Center Associate Professor Min Yu, and Professor Jonas Floden of the University of Gothenburg, in one of her sessions.

Professor Tina Wakolbinger is the organizer of the **Coordination and Cooperation in Humanitarian Supply Chains** stream at the EURO Conference in Glasgow. Professor Amir H. Masoumi of Manhattan College in NYC will present there the paper, "An Integrated Disaster Relief Supply Chain Network Model with Time Targets and Demand Uncertainty," which is joint with the Center Director and Professor Min Yu.

Center Associate Professor Ding Zhang of the School of Business at SUNY Oswego is working on modeling of pandemics. We congratulate him on his latest paper on this topic:

<http://link.springer.com/article/10.1007%2Fs11518-015-5276-y#page-2> He is spending this summer conducting research in China. His teaching was recently featured:

<http://www.oswego.edu/magazine/tag/ding-zhang/>

Congratulations to Professor Min Yu who was interviewed by the *Portland Tribune* for [an article on congestion](#).

Congratulations to Center Associate Professor Dmytro Matsypura of the Business School at the University of Sydney in Australia on his publication, with Kalinowski and Savelsbergh, "Incremental Network Design with Maximum Flows," *European Journal of Operational Research* (2015), **242(1)**, 51-62. Professor Matsypura will be speaking at the *22nd International Symposium on Mathematical Programming ISMP 2015*, Pittsburgh, Pennsylvania, 17th July 2015, on his latest work with Professor Oleg Prokopyev on robust optimization for bushfire fuel management.

Congratulations to Center Associate Professor Jose M. Cruz of the School of Business at the University of Connecticut Storrs. Professor Cruz was honored by the school with the Faculty Service Award. According to [a recent newspaper article on this achievement](#): "He has worked

tirelessly to increase the awareness of the UConn School of Business programs among the community colleges, said the OPIM Department Head Ram Gopal. Also, as Academic Director of the Master's degree program in Business Analytics and Project Management, Cruz has worked exceptionally hard to help graduate students find jobs. Nearly all of those students had successful internship and job placements."

Congratulations to Center Associate Professor June Dong of SUNY Oswego on the selection of her paper with Yanping Wen, "Comparison in User Experience of Online Purchase in America and China," which was presented at SUNY Oswego's Quest 2015 event:  
<http://www.oswego.edu/academics/opportunities/quest/index.html>

Center Associate Dr. Stavros Siokos has left his position as CEO of Sciens Capital Management in London and is now Managing Partner of Astarte Capital Partners, also in London. We wish him much success in his new endeavors!

## Recent Center Publications

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

**Supply Chain Network Competition in Price and Quality with Multiple Manufacturers and freight Service Providers,** A. Nagurney, S. Saberi, S. Shukla, and J. Floden, *Transportation Research E* (2015), **77**, 248-267.

**A Multiproduct Network Economic Model in Financial Services,** A. Nagurney, *Service Science* (2015), **7(1)**, 70-81.

**Design of Sustainable Supply Chains for Sustainable Cities,** A. Nagurney, *Environment & Planning B* (2015), **42(1)**, 40-57.

**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* (2015), **228(1)**, 479-503.

**An Integrated Disaster Relief Supply Chain Network Model with Time Targets and Demand Uncertainty,** A. Nagurney, A.H. Masoumi, and M. Yu, in *Regional Science Matters: Studies Dedicated to Walter Isard*, edited by P. Nijkamp, A. Rose, and K. Kourtit, Springer International Publishing Switzerland (2015), 287-318.

**Fashion Supply Chain Network Competition with Ecolabelling,** A. Nagurney, M. Yu, and J.

Floden, in *Sustainable Fashion Supply Chain Management: From Sourcing to Retailing*, T.-M. Choi and T.C.E. Cheng, Editors, Springer (2015), 61-84.

**A Game Theory Model for a Differentiated Service-Oriented Internet with Duration-Based Contracts,** A. Nagurney, S. Saberi, T. Wolf, and L.S. Nagurney, in *Proceedings of ICS 2015: Operations Research and Computing: Algorithms and Software for Analytics*, B. Borchers, J. P. Brooks, and L. McLay, Editors, INFORMS (2015), 15-29.

**Securing the Sustainability of Global Medical Nuclear Supply Chains Through Economic Cost Recovery, Risk Assessment, and Optimization,** Anna Nagurney, Ladimer S. Nagurney, and Dong Li, *International Journal of Sustainable Transportation* (2015), **9(6)**, 405-418.

**A Game Theory Model of Cybersecurity Investments with Information Asymmetry,** A. Nagurney and L.S. Nagurney, *Netnomics* (2015), in press.

**A Supply Chain Game Theory Framework for Cybersecurity Investments Under Network Vulnerability,** A. Nagurney, L.S. Nagurney, and S. Shukla, in press in *Computation, Cryptography, and Network Security* (2015), N.J. Daras and M.T. Rassias, Editors, Springer, New York.

**A Mean-Variance Disaster Relief Supply Chain Network Model for Risk Reduction with Stochastic Link Costs, Time Targets, and Demand Uncertainty,** A. Nagurney and L.S. Nagurney (2015), presented at the Dynamics of Disasters conference, June 29-July 2, 2015, Kalamata, Greece.

**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), **6(4)**, 229-250.

**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*, V.A. Kalyagin, Th. M. Rassias, and P.M. Pardalos, Editors, Springer International Publishing Switzerland (2014), 239-264.

**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 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*, Th. M. Rassias, C. A. Floudas, and S. Butenko, Editors, 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.

**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.

## **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. Zung "Leo" Liu  
Dr. Amir H. Masoumi  
Dr. Dmytro Matsypura  
Dr. Ladimer S. Nagurney  
Dr. Qiang "Patrick" Qiang  
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Dr. Min Yu  
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Sara Saberi  
Shivani Shukla

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