

The Supernetwork Sentinel

Summer 2018

Welcome to the Summer 2018 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 numerous accomplishments and activities and a new book that is in press.

As always, we include a list of our recent Center publications.

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Celebrating with Dr. Shivani Shukla and Dr. Michael Prokle after the UMass Amherst Graduate Graduation Ceremonies



The Center Director with INFORMS colleagues at the Analytics Conference



Lunch with Dr. Les Servi of MITRE

Inside

Center Director Keynotes Two International Conferences

Center Associates Prominent at Many Conferences

***New Dynamics of Disasters* Book in Press**

Hosting Speakers and Giving Seminars

Kudos and News

Recent Center Publications

Center Director Keynotes Two International Conferences

The Center Director delivered two keynote talks at conferences this spring: at the VINEPA 2018 Conference in Reggio Calabria, Italy, March 8-9, 2018 and at the 18th Swiss Transport Research Conference (STRC), Monte Verite Ascona, Switzerland, May 16-18, 2018. One of the chairs of the outstanding VINEPA conference was Center Associate Professor Patrizia Daniele of the University of Catania in Italy.

The title of Professor Anna Nagurney's keynote talk at VINEPA was: **Game Theory Models of Cybercrime and Cybersecurity Investments Under Network Vulnerability**. The venue of the conference was a historic castle.



(l-r) Dr. Gabriela Colojanni, Professors Laura Scrimali, Sofia Giuffre, Patrizia Daniele, and Anna Nagurney



The VINEPA Conferees at the Top of the Castle in Reggio Calabria

The Center Director thanks the organizers of VINEPA 2018 for the excellent scientific talks and organization of the conference as well as for the delicious food, extraordinary ambience, and attention to detail!

The title of her STRC keynote was: **Perishable Product Supply Chain Networks: The Role**

of Transportation. Professor Anna Nagurney extends her thanks to Professor Kay Axhausen of ETH Zurich for being such an outstanding host. Her visit to Switzerland included time at ETH Zurich, and travel by train from Zurich (and back) to Ascona. The conference included outstanding discussions on the latest transportation trends and innovations as well as numerous social events.



View from STRC Site in Switzerland



Group Photo of STRC Conferees in Switzerland

Center Associates Prominent at Many Conferences

Center Associate Professor Patrizia Daniele of the University of Catania has been heavily involved in organizing future conferences. She is the Co-director of the International Workshop: [Variational Analysis and Applications \(VARANA 2018\)](#), Erice, Italy, August 28-September 5, 2018, together with H. Attouch, G. Buttazzo, and A. Maugeri; the Chair of the Program Committee of the International Conference on [Optimization and Decision Science \(ODS2018\)](#), Taormina, Italy, September 10- 3, 2018, and a Member of the Program Committee of the [8th International Conference on Operations](#)

[Research and Enterprise Systems \(ICORES\)](#), Prague, Czech Republic, February 19-21, 2019.

Doctoral Student Center Associates Pritha Dutta and Deniz Besik spoke at the NEDSI Conference in Providence, Rhode Island, which was held April 12-14, 2018. Deniz spoke on ***Dynamics of Quality as a Strategic Variable in Complex Food Supply Chain Network Competition***, which is joint work with the Center Director and Center Associate Professor Min Yu of the University of Portland. Pritha spoke on: ***Supply Chain Network Competition Among Blood Service Organizations: A Generalized Nash Equilibrium Network Framework***, which was co-authored with the Center Director.



(l-r) Deniz Besik and Pritha Dutta at NEDSI

The NEDSI papers will also be presented at the CORS Conference in Halifax, Nova Scotia, June 4-7, 2018. Pritha has been accepted into the CHOW event there which is a workshop focusing on healthcare, so congratulations are in order.

The Center Director was delighted to be selected to speak at the INFORMS Analytics Conference in Baltimore, Maryland, April 15-17, 2019. The title of her one hour talk was: **Predictive and Prescriptive Models of Cybercrime and Cybersecurity Investments Under Network Vulnerability**. This conference has a very rigorous selection system and convenes practitioners and academicians to discuss their latest research on topics of wide interest. [Her presentation slides can be downloaded here](#). In her presentation she discussed research conducted with Center Associates Professor Shivani Shukla of the University of San Francisco, Professor Patrizia Daniele of the University of Catania in Italy, and Professor Ladimer S. Nagurney of the University of Hartford.



The Center Director speaking at the INFORMS Analytics Conference

The 29th POMS Annual Conference which was held in Houston, Texas, May 4-7, 2018, was a great venue for the gathering of several Supernetwork Center Associates. In particular, presenting there were: Center Associate Professor Tina Wakolbinger of the Vienna University of Economics and Business, Center Associate Professor Zugang Liu of Pennsylvania State University Hazleton, and Professor Sara Saberi of the Foisie School of Business at WPI.



Dinner get-together at POMS in Houston

At the POMS conference in Houston, Professor Sara Saberi also conducted a workshop on **Blockchain Technology and Sustainable Supply Chains: Understanding the Barriers**, joint with her colleague, Professor Joe Sarkis. The workshop received funding from an APICS grant recently awarded to both Saberi and Sarkis.

Professor Tina Wakolbinger is on the Scientific Committee of the EURO HOPE conference to be held in Leuven, Belgium, September 13-14, 2018.

Center Associate Professor Patrick Qiang of Penn State University Great Valley is on the 2018 INFORMS Conference Service Science (CSS2018) Program Committee. This conference will be held on November 3, 2018 in Phoenix, Arizona, just prior to the Annual INFORMS Conference there.

Center Associates will be busy presenting their research at the EURO Conference in Valencia, Spain, July 8-11, 2018. In particular, Center Associates Professor Tina Wakolbinger, Professor Patrizia Daniele, and Jose M. Cruz of the School of Business at the University of Connecticut, will be speaking on their research conducted with collaborators, including Center Associate Professor Sara Saberi and the Center Director.

New Dynamics of Disasters Book in Press

We are thrilled to announce that the book: **Dynamics of Disasters: Algorithmic Approaches and Applications**, co-edited by Professors Ilias S. Kotsireas of Wilfrid Laurier University, Anna Nagurney, and Panos M. Pardalos of the University of Florida is now in press with Springer International Publishing Switzerland. This volume is a collection of papers presented at the 3rd Dynamics of Disasters conference held in Kalamata, Greece, July 5-9, 2017 at which several Center Associates had presentations, along with invited contributions. All the papers were refereed.

This edited volume contains papers on such timely topics as evacuation networks, disaster communications, freight service provision post disasters, cash funds transfers for victims of disasters, as well as game theory for the integration of financial funds and logistical flows, among other topics. Contributors to this volume include researchers from the US and Canada, from Italy and Austria, as well as from Russia and Greece.



A Group Photo of the Dynamics of Disasters Conferencees in Kalamata, Greece

We are very pleased to have the following contributions in this volume, with authors/co-authors including Center Associates: **A Variational Equilibrium Network Framework for Humanitarian Organizations in Disaster Relief: Effective Product Delivery Under**

Competition for Financial Funds, by A. Nagurney, P. Daniele, E. Alvarez Flores, and V. Caruso; **A Multitiered Supply Chain Network Equilibrium Model for Disaster Relief with Capacitated Freight Service Provision**, by A. Nagurney, and **Advances in Disaster Communications: Broadband Systems for First Responders**, by Center Associate Professor L.S. Nagurney of the University of Hartford.

This is the second Dynamics of Disasters volume co-edited by Kotsireas, Nagurney, and Pardalos, with the first one published by Springer in 2016, and based on the Dynamics of Disasters conference, which took place in 2015, also in Kalamata, Greece.

Hosting Speakers and Giving Seminars

It was an incredibly exciting and busy spring semester! We hosted five speakers in our UMass Amherst INFORMS Speaker Series. Professor Hari Balasubramanian of the Department of Mechanical and Industrial Engineering at UMass Amherst spoke on February 9. Professor Balasubramanian is an expert on healthcare. His talk: **Care Coordination for Complex, High-Utilizing Patients: The Camden Coalition Experience** was brilliant.



UMass Amherst INFORMS Student Chapter President and Doctoral Student Center Associate Deniz Besik introducing Professor Balasubramanian

Then, on February 23, 2017, we were thrilled that Professor Jim Orlin of the Sloan School at MIT was the guest speaker. Professor Orlin is internationally recognized for his work on networks and is an INFORMS Fellow. His talk was titled: **The Shortest Cycle Problem and Related Graph Theory and Algorithms**.



Professor Jim Orlin with audience members after his talk

On March 23, 2018, we welcomed Dr. Les Servi of Mitre Corp. Dr. Servi is an INFORMS Fellow and one of the most active INFORMS members. His outstanding talk was on: **Robust Mission Network Analysis**.



Dr. Les Servi after his presentation at the Isenberg School



Dr. Burcu Balcik with Doctoral Student Center Associates Mojtaba Salarpour, Deniz Besik, and Pritha Dutta in the Supernetwork Lab

On March 30, 2018, we hosted the talk and visit of Professor Burcu Balcik who is renowned for her work on humanitarian logistics. She spoke on: **Site Selection and Route Planning for**

Post-Disaster Rapid Needs Assessment Operations.

Dr. Davit Khachatryan, an Isenberg PhD alum in Management Science, who has worked at PWC and is now at Babson College, closed out our Speaker Series on April 20, 2018. His talk: **Uncovering Insight from Patent Data using Text Mining**, was fascinating and very educational.

The Center Director has served as the Faculty Advisor to the award-winning UMass Amherst INFORMS Student Chapter sine 2004 and commends the student officers and members for their exceptional work ethic, camaraderie, and contributions. More on the chapter, including its initiative on interviews of speakers on youtube can be found on [the chapter website](#).



Enjoying lunch after Professor Khachatryan's lecture

Interspersed with hosting these excellent speakers, the Center Director was also busy giving invited seminars. On February 16, 2018, the Center Director had the pleasure of speaking at the Foisie School of Business at the Worcester Polytechnic Institute (WPI), and was invited by Center Associate Professor Sara Saberi, who is a professor there. The title of her talk was: **Game Theory Network Models for Disaster Relief**.



Lunch after the Center Director's talk at WPI

Professor Anna Nagurney also gave an invited seminar at the University of Wisconsin, Madison on April 6, 2018.



(l-r) Assistant Dean Laura Albert and the Center Director after her talk in Madison

March 13-14, 2018, Professor Anna Nagurney had the honor and pleasure of delivering a Masterclass on Network Equilibrium at STORi, a doctoral program in Operations Research, at Lancaster University in England. [Her lectures and class readings can be downloaded here.](#) She is grateful to Professor Kevin Glazebrook for this wonderful experience and also thanks Professors Graham Rand, Kostas Zografos, and Matthias Ehrgott for the warmth and hospitality extended to her. She especially enjoyed meeting the doctoral students!



The Center Director with the students in her Masterclass in England

The Center Director will be back at Lancaster University in September to deliver two plenary talks, at the Inaugural OR Society Early Career Researcher Workshop and at OR60 – the 60th OR Society's Conference!

Kudos and News

Congratulations to Center Associate Dr. Stavros Siokos! He is the managing partner of the London-based Astarte Capital Partners, the firm

he co-founded in 2015. His firm has launched a program to finance education for underprivileged youth. [An outstanding interview with him can be accessed here.](#)

Congratulations to Center Associate Professor Min Yu! She has received tenure and was promoted to Associate Professor at the Pamplin School of Business at the University of Portland in Oregon! This is a wonderful achievement and we are very happy for her!

Congratulations to Center Associate Professor Dong "Michelle" Li. After three years in at the College of Business at Arkansas State University, she has moved to a tenure track Assistant Professorship position at Babson College in Wellesley, Massachusetts. Babson is considered the top entrepreneurship educational institution in the US and we wish her well.

Congratulations to Center Associate Professor Zungang Liu! He has been named the coordinator of an exciting new degree program in project and supply chain management at Penn State University. [A press release detailing this terrific initiative can be accessed here.](#)

Congratulations to Center Associate Professor Patrick Qiang! He was part of a delegation from Penn State that visited five Chinese universities over a period of 11 days to build relationships and discuss future opportunities in business and education. [Penn State issued this nice press release on this special exchange.](#)



(l-r) Professors Shukla, Masoumi, and Ibrahim

Congratulations to Center Associate Professor Amir H. Masoumi of The O'Malley School of Business at Manhattan College in New York. He was the chair of the organizing committee of the 2018 Business Analytics Competition held at his college in May. Also, congrats to Center Associate Professor Shivani Shukla of the University of San Francisco. The team that she co-advised received the 3rd poster award at the competition! Taking part in the competition was a team advised by Professor Ameera Ibrahim of

St. Mary's College in California. Dr. Ibrahim is also an Isenberg School PhD alumna in Management Science.

Center Associate Professor Shivani Shukla returned to UMass Amherst to take part in the PhD robing ceremony at the Isenberg School of Management and also to march in the UMass Amherst Graduate Graduation Ceremony, which took place at the Mullins Center.



Photo of Isenberg School PhD recipients and their advisors after the robing ceremony



The hooding of Dr. Shivani Shukla

Congratulations to Doctoral Student Center Associate Pritha Dutta on the acceptance of her paper, **Competition for Blood Donations**, co-authored with the Center Director, in the journal *Omega*!

Also, congratulations to Center Associate Professor Min Yu and Doctoral Student Center Associate Deniz Besik on the publication of their paper, **Dynamics of Quality as a Strategic Variable in Complex Food Supply Chain Network Competition: The Case of Fresh Produce**, in the journal *Chaos* (2018). This paper was an *Editor's Pick* in the journal and was featured on the journal website's homepage. It was also co-authored by the Center Director.

Congratulations to Center Associate Professor Patrizia Daniele of the University of Catania! Her paper: **Cybersecurity Investments with**

Nonlinear Budget Constraints and Conservation Laws: Variational Equilibrium, Marginal Expected Utilities, and Lagrange Multipliers, G. Colajanni, P. Daniele, S. Giuffre, and A. Nagurney, was published in *International Transactions in Operational Research* (2018), **25(5)**, 1443-1463.

Congratulations to Center Associate Professor Dmytro Matsypura of the University of Sydney School of Business in Australia on the publication of his papers: D. Matsypura, O. Prokopyev, and A. Zahar, **Wildfire Fuel Management: Network-based Models and Optimization of Prescribed Burning**, *European Journal of Operational Research* (2018), **264(2)**, 774-96 and D. Matsypura, R. Thompson, and A. Vasnev, **Optimal Selection of Expert Forecasts with Integer Programming**, *Omega* (2018), **78**, 165-175.

Congratulations to Center Associate Professor Jose M. Cruz on his article, with H.C.B. Lee and R. Shankar, **Corporate Social Responsibility (CSR) Issues in Supply Chain Competition: Should Greenwashing Be Regulated**, in press in *Decision Sciences* (2018). Congratulations also to Professor Cruz and to Professor Sara Saberi on the publication of the paper: **A Competitive Multiperiod Supply Chain Network Model with Freight Carriers and Green Technology Investment Option**, S. Saberi, J.M. Cruz, J. Sarkis, and A. Nagurney, *European Journal of Operational Research* (2018), **266(3)**, 934-949.

Congratulations to Center Associate Professor Trisha Anderson of Texas Wesleyan University of the publication of her paper, **In-Store Customer Experience and Customer Emotional State in the Retail Industry**, co-authored with G. Ogruk and A.S. Nacass and published in the *Journal of Research for Consumers* (2018), **32**, 110-141.

Center Associate Professor Ding Zhang of the School of Business at SUNY Oswego has been granted a sabbatical for Spring 2018.

Congratulations to Doctoral Student Center Associates Deniz Besik and Mojtaba Salarpour who were recognized for their exemplary service as Officers of the UMass Amherst INFORMS Student Chapter at the end of the semester party at the Isenberg School of Management.

The Center Director Professor Anna Nagurney will be a Fellow at the Radcliffe Institute for Advanced Study at Harvard University this summer. She has been selected as the Omega Rho Distinguished Plenary Speaker and will deliver this award lecture at the INFORMS Annual Conference to be held in Phoenix, Arizona, November 4-7, 2018. [Previous](#)

[awardees have included Deans at Wharton and MIT and several Nobel laureates.](#)



(l-r) Center Director, Mojtaba Salarpour, Deniz Besik, and other Chapter Officers Recognized at the End of the Semester Party with Award Certificates

Recent Center Publications

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

Competition for Blood Donations, A. Nagurney and P. Dutta, *Omega* (2018), in press.

Dynamics of Quality as a Strategic Variable in Complex Food Supply Chain Network Competition: The Case of Fresh Produce, A. Nagurney, D. Besik, and M. Yu, *Chaos* 28: (2018), 043124.

A Competitive Multiperiod Supply Chain Network Model with Freight Carriers and Green Technology Investment Option, S. Saberi, J.M. Cruz, J. Sarkis, and A. Nagurney, *European Journal of Operational Research* (2018), **266(3)**, 934-949.

Cybersecurity Investments with Nonlinear Budget Constraints and Conservation Laws: Variational Equilibrium, Marginal Expected Utilities, and Lagrange Multipliers, G. Colajanni, P. Daniele, S. Giuffre, and A. Nagurney, *International Transactions in Operational Research* (2018), **25(5)**, 1443-1463.

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Preface to Volume: *Dynamics of Disasters: Algorithmic Approaches and Applications*, in press in *Dynamics of Disasters: Algorithmic*

Approaches and Applications, I.S. Kotsireas, P.M. Pardalos, and A. Nagurney, Editors, Springer International Publishing Switzerland (2018).

A Variational Equilibrium Network Framework for Humanitarian Organizations in Disaster Relief: Effective Product Delivery Under Competition for Financial Funds, A. Nagurney, P. Daniele, E. Alvarez Flores, and V. Caruso, in press in *Dynamics of Disasters: Algorithmic Approaches and Applications*, I.S. Kotsireas, P.M. Pardalos, and A. Nagurney, Editors, Springer International Publishing Switzerland (2018).

A Multitiered Supply Chain Network Equilibrium Model for Disaster Relief with Capacitated Freight Service Provision, A. Nagurney, in press in *Dynamics of Disasters: Algorithmic Approaches and Applications*, I.S. Kotsireas, P.M. Pardalos, and A. Nagurney, Editors, Springer International Publishing Switzerland (2018).

Advances in Disaster Communications: Broadband Systems for First Responders, L.S. Nagurney, in press in *Dynamics of Disasters: Algorithmic Approaches and Applications*, I.S. Kotsireas, P.M. Pardalos, and A. Nagurney, Editors, Springer International Publishing Switzerland (2018).

Hospital Competition in Prices and Quality: A Variational Inequality Framework, A. Nagurney and K. Li, *Operations Research for Health Care* (2017), **15**, 91-101.

Quality in Competitive Fresh Produce Supply Chains with Application to Farmers' Markets, A. Nagurney and D. Besik, *Socio-Economic Planning Sciences* (2017), **60**, 62-76.

Mergers and Acquisitions in Blood Banking Systems: A Supply Chain Network Approach, A.H. Masoumi, M. Yu, and A. Nagurney, *International Journal of Production Economics* (2017), **193**, 406-421.

Supply Chain Network Capacity Competition and Outsourcing: A Variational Equilibrium Framework, A. Nagurney, M. Yu, and D. Besik, *Journal of Global Optimization* (2017), **69(1)**, 231-254.

Multifirm Models of Cybersecurity Investment Competition vs. Cooperation and Network Vulnerability, A. Nagurney and S. Shukla, *European Journal of Operational Research* (2017), **260(2)**, 588-600.

Cybersecurity Investments with Nonlinear Budget Constraints: Analysis of the Marginal Expected Utilities, P. Daniele, A. Maugeri, and A. Nagurney, in *Operations Research, Engineering, and Cyber Security:*

Trends in Applied Mathematics and Technology, N.J. Daras and Th.-M. Rassias. Eds., Springer (2017), 117-134.

A Supply Chain Network Game Theory Model of Cybersecurity Investments with Nonlinear Budget Constraints, A. Nagurney, P. Daniele, and S. Shukla, *Annals of Operations Research* (2017), **248(1)**, 405-427.

Supply Chain Performance Assessment and Supplier and Component Importance Identification in a General Competitive Multitiered Supply Chain Network Model, D. Li and A. Nagurney (2017), *Journal of Global Optimization*, **67(1)**, 223-250.

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Physical Proof of the Occurrence of the Braess Paradox in Electrical Circuits, L.S. Nagurney and A. Nagurney, *EPL (Europhysics Letters)* (2016), 28004.

Introduction to the Volume: Dynamics of Disasters: Key Concepts, Models, Algorithms, and Insights, I.S. Kotsireas, A. Nagurney, and P.M. Pardalos, Springer International Publishing Switzerland (2016) i-xi.

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A Layered Protocol Architecture for Scalable Innovation and Identification of Network Economic Synergies in the Internet of Things, T. Wolf and A. Nagurney, , *Proceedings of the 2016 IEEE First International Conference on Internet-of-Things Design and Implementation (IoTDI)*, pp 141 – 151.

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, in *Dynamics of Disasters: Key Concepts, Models, Algorithms, and Insights*, I.S. Kotsireas, A. Nagurney, and P.M. Pardalos, Editors, Springer International Publishing Switzerland (2016), 231-255.

Towards Pricing Mechanisms for delay Tolerant Services, L. Marentes, T. Wolf, A. Nagurney, and Y. Donoso, *International Journal*

of Computers Communications & Control (2016), **11(1)**, 77-89.

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

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