

# The Supernetwork Sentinel

## Summer 2020

Welcome to the Summer 2020 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. This newsletter is the first since the Covid-19 pandemic was declared. In it, we report on our related research and media attention and the accomplishments of Center Associates during this challenging time. As always, we include a list of our recent Center publications.



**Dr. Deniz Besik and the Center Director while social distancing in front of the Isenberg School Business Innovation Hub**

Anna Nagurny  
 John F. Smith Memorial Professor  
 Director – Virtual Center for Supernetworks  
<http://supernet.isenberg.umass.edu>

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**Deniz Besik with her PhD Committee members**

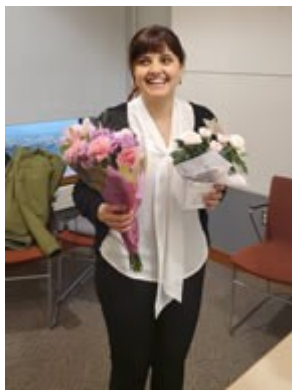
## Celebrating Deniz Besik's PhD

On March 6, 2020, Deniz Besik successfully defended her doctoral dissertation at the Isenberg School of Management with the title, **Essays on Competitive Perishable Food Supply Chain Networks: From the Impacts of Tariffs and Quotas to Integration of Quality**. Professor Anna Nagurney was the Chair of her dissertation committee, which included Professors Hari Balasubramanian and Ana Muriel of the Department of Mechanical and Industrial Engineering at UMass Amherst, and Professor Priyank Arora of the Department of Operations and Information Management at the Isenberg School. [The abstract of her dissertation, along with additional information can be accessed here.](#)

The audience that came to her defense, which was on a Friday afternoon, jammed the room. Even Center Associate Professor Pritha Dutta of Pace University in New York City came to support her.



**Deniz Besik with committee members and some friends after her defense at the Isenberg School**



**Deniz Besik with flowers after her defense**

After the defense, Professor Anna Nagurney hosted a dinner in Deniz's honor at Judie's in downtown Amherst. This was the last social event before the World Health Organization declared the Covid-19 pandemic on March 11, 2020, and our world and lives were transformed.



**Celebration dinner at Judie's**

On May 7, 2020, a virtual robing ceremony took place to honor the Isenberg School students being awarded their PhDs. [A writeup on her and the other PhD degree recipients appears on the Isenberg School website.](#)

Dr. Deniz Besik published a remarkable 6 journal articles while she was a PhD student at the Isenberg School. Her concentration was Management Science.

Dr. Deniz Besik will continue as a Center Associate. We wish her all the best in her new role as an Assistant Professor at the Robins School of Business at the University of Richmond in Virginia.

## Covid-19 Pandemic Research

Given the international composition of the Center Associates, as well as their global connections and interests, it was becoming apparent that the novel coronavirus in early January 2020, emanating from Wuhan, China, was very serious. The Center Director was officially on sabbatical in Spring 2020, and was looking forward to numerous speaking engagements not only in the US but also in Canada, Sweden, Italy, and Spain. With the declaration of the pandemic by the World Health Organization on March 11, 2020, all such travel was suspended. Center Associates, where able, redirected their efforts to research which was synergistic with what they had already been working on, including supply chain disruptions whether in food supply chains or healthcare, as an example.

On March 12, Professor Anna Nagurney published the article, [How Coronavirus is Upsetting the Blood Supply Chain](#), in *The Conversation*, which became the most read article in that online publication written by any UMass Amherst author in the past 12 months. [The article was cited in a policy brief on blood to the US Assistant Secretary for Health, on the first page, which was signed by 22 US Attorneys General.](#)

The article was followed by an invited article by Professor Anna Nagurney in *INFORMS Analytics*, [The COVID-19 Pandemic and the Stressed Blood Supply Chain](#). Subsequently, her work was featured in *OR/MS Today* in an article, *Coronavirus Chronicles*, written by Harrison Schramm.

Some of the relevant to the pandemic research conducted by Center Associates includes the paper, [Competition for Medical Supplies Under Stochastic Demand in the Covid-19 Pandemic: A Generalized Nash Equilibrium Framework](#). Anna Nagurney, Mojtaba Salarpour, June Dong, and Pritha Dutta, to appear in: *Nonlinear Analysis and Global Optimization*, T.M. Rassias, and P.M. Pardalos, Editors, Springer Nature Switzerland AG, 2020, [Perishable Food Supply Chain Networks with Labor in the Covid-19 Pandemic](#) Anna Nagurney, accepted for publication in: *Dynamics of Disasters - Impact, Risk, Resilience, and Solutions*, I.S. Kotsireas, A. Nagurney, and P.M. Pardalos, Editors, Springer International Publishing Switzerland, 2020, and [A Stochastic Disaster Relief Game Theory Network Model](#), Anna Nagurney, Mojtaba Salarpour, June Dong, and Ladimer S. Nagurney, *SN Operations Research Forum* **1, 10** (2020).

Mojtaba Salarpour is a Doctoral Student Center Associate. Center Associate June Dong is a Professor at SUNY Oswego and Center Associate Ladimer S. Nagurney is a Professor at the University of Hartford.

The Center Director has also co-authored several papers on human migration and refugees with Center Associate Professor Patrizia Daniele of the University of Catania in Italy and her PhD student, Giorgia Cappello.

Additional papers with Center Associates are presently under review. [For the full list of recent papers that have been accepted or published, see the Supernetwork Center website.](#)

## INFORMS Webinar and AMS Podcast

On June 12, 2020, Professor Anna Nagurney had the pleasure of delivering the webinar: **Blood, Sweat, & PPEs: Rescuing Perishable Product Supply Chains & Impacting Policy through Analytics**. She was invited to give this webinar by the Practice Section of INFORMS and it was the inaugural webinar in a new series.

The goal of the webinar series is to bring awareness of the value of applying analytics to real-world problems. The series is organized by Dr. Patricia Neri of Bayer Crop Science and Dr. Carrie Beam of the University of Arkansas.



Dr. Neri and Dr. Beam introducing the Center Director



The Center Director before her INFORMS webinar

[The slides in her webinar have been posted.](#)

[The webinar has now been posted and is available for viewing.](#)

Professor Anna Nagurney was also invited to record a podcast by the American Mathematical Society (AMS) and was interviewed by Michael Breen. [The podcast can be listened to here.](#)

## Media Attention

The research conducted at the Supernetwork Center, because of its timeliness and relevance in the pandemic has attracted media attention.

The Center Director was featured on the UMass Amherst homepage for several months in the article, [COVID-19 and the Supply Chain](#). This article was followed by a feature [on the Isenberg School website](#) and another article, [Isenberg Professor Shares Supply Chain Expertise During Pandemic](#). The latter article has a list of media outlets that had interviewed Professor Anna Nagurney. Professor Anna Nagurney was interviewed by the print media, including *USA Today*, *Morning Consult*, and *The Verge*; spoke on various radio talk shows, and also was an invited guest on an NBC TV News program in Boston. She continues to respond to media requests.

## Kudos and News

A measure of the professional esteem that a scholar enjoys with peers is appointments to journal editorial boards. Supernetwork Center Associates have the honor of serving on multiple boards. Supernetwork Center Associate Professor Tina Wakolbinger of the Vienna University of Economics and Business in Austria is a Co-Editor of the *Central European Journal of Operational Research* and is a Senior Editor of *Production and Operations Management*. She is also on the Editorial Board of the *International Transactions in Operational Research*. Center Associate Professor Dmytro Matsypura of the University of Sydney in Australia is an Associate Editor of *Omega*. Center Associate Professor Sara Saberi of WPI is on the Editorial Advisory Board of *Transportation Research E*. The Center Director Professor Anna Nagurney recently stepped down from the Editorial Boards of the *Annals of Operations Research* and *Transportation Research E*. She continues to serve on multiple other journal Editorial Boards, including the *Journal of Global Optimization*, *Optimization Letters*, and the *International Transactions in Operational Research*. She was recently appointed to the Editorial Board of the *International Journal of Production Economics*.

Congratulations to Center Associate Professor Amir H. Masoumi of Manhattan College on his promotion to Associate Professor with tenure!

Congratulations to Center Associate Professor Sara Saberi on the acceptance of her paper, **Blockchain Technology and the Sustainable Supply Chain: Theoretically Exploring Adoption Barriers**, in the *International Journal of Production Economics*.

Congratulations to Center Associate Professor Patrick Qiang of Penn State Great Valley for the publication of his co-authored paper, **The Trade Network Structure of the "One Belt and One Road" and Its Environmental Effects**, in *Sustainability* in 2020. He is serving on the Program Committee of ICSS2020: 2020 INFORMS Conference on Service Science, which will be held virtually in December 2020.

Congratulations to Center Associates Professor Trisha Anderson of Texas Wesleyan University, Professor Zugang Liu of Penn State University Hazleton, and Professor Jose M. Cruz of the University of Connecticut on the publication of their paper, **Social and Environmental Sustainability: An Empirical Analysis of Supply Chain Profitability and the Recession**, with a co-author, in *Operations and Supply Chain Management* (2020).

Center Associate Professor Dong "Michelle" Li of Babson College [was quoted in an article in Poets and Quants](#) about one of her students.

The Center Director continues to serve on the International Academic Advisory board of the Kyiv School of Economics in Ukraine. Unlike in 2019, when she was able to attend the board meeting in Kyiv in September, in the pandemic, all meetings have now become virtual.

## Recent Center Publications

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

**Competition for Medical Supplies Under Stochastic Demand in the Covid-19 Pandemic: A Generalized Nash Equilibrium Framework**, A. Nagurney, M. Salarpour, J. Dong, and P. Dutta (2020), to appear in: *Nonlinear Analysis and Global Optimization*, T.M. Rassias and P.M. Pardalos, Editors, Springer Nature Switzerland AG.

**Refugee Migration Networks and Regulations: A Multiclass, Multipath Variational Inequality Framework**, A. Nagurney, P. Daniele, and L.S. Nagurney (2020), in press in the *Journal of Global Optimization*.

**Perishable Food Supply Chain Networks with Labor in the Covid-19 Pandemic**, A. Nagurney (2020), to appear in: *Dynamics of Disasters – Impact, Risk, Resilience, and Solutions*, I.S. Kotsireas, A. Nagurney, and P.M. Pardalos, Editors, Springer International Publishing Switzerland.



**Capacitated Human Migration Networks and Subsidization**, A. Nagurney, P. Daniele, and G. Cappello (2020), to appear in: *Dynamics of Disasters – Impact, Risk, Resilience, and Solutions*, I.S. Kotsireas, A. Nagurney, and P.M. Pardalos, Editors, Springer International Publishing Switzerland.

**A Stochastic Disaster Relief Game Theory Network Model**, A. Nagurney, M. Salarpour, J. Dong, and L.S. Nagurney, *SN Operations Research Forum* (2020), **1(10)**.

**Quantifying Supply Chain Network Synergy for Humanitarian Organizations**, A. Nagurney and Q. Qiang, *IBM Journal of Research and Development* (2020), **64(1/2)**, pp 12:1-12:16.

**International Human Migration Networks Under Regulations**, A. Nagurney and P. Daniele (2020), in press in the *European Journal of Operational Research*.

**Human Migration Networks and Policy Interventions: Bringing Population Distributions in Line with System Optimization**, A. Nagurney, P. Daniele, and G. Cappello (2020), in press in the *International Transactions in Operational Research*.

**Networks in Economics and Finance in Networks and Beyond: A Half Century Retrospective**, A. Nagurney, in press in *Networks* (2019).

**Multitiered Blood Supply Chain Network Competition: Linking Blood Service Organizations, Hospitals, and Payers**, P. Dutta and A. Nagurney, *Operations Research for Health Care* (2019), **23**, 100230.

**In Memoriam: Martin Beckmann (1924-2017)**, D. Boyce and A. Nagurney, *Transportation Science* (2019), **53(6)**, 1798-1799.

**Strict Quotas or Tariffs? Implications for Product Quality and Consumer Welfare in Differentiated Product Supply Chains**, A. Nagurney, D. Besik, and D. Li, *Transportation Research E* (2019), **29**, 136-161.

**Global Supply Chain Networks and Tariff Rate Quotas: Equilibrium Analysis with Applications to Agricultural Products**, A. Nagurney, D. Besik, and L.S. Nagurney, *Journal of Global Optimization* (2019), **75**, 439-460.

**An Integrated Financial and Logistical Game Theory Model for Humanitarian Organizations with Purchasing Costs, Multiple Freight Service Providers, and Budget, Capacity, and Demand Constraints**, A. Nagurney, M. Salarpour, and P. Daniele,

*International Journal of Production Economics* (2019), **212**, 212-226.

**Supply Chain Network Competition Among Blood Service Organizations: A Generalized Nash Equilibrium Framework**, A. Nagurney and P. Dutta, *Annals of Operations Research* (2019), **275(2)**, 551-586.

**Competition for Blood Donations**, A. Nagurney and P. Dutta, *Omega* (2019), **212**, 103-114.

**Tariffs and Quotas in World Trade: A Unified Variational Inequality Framework**, A. Nagurney, D. Besik, and J. Dong, *European Journal of Operational Research* (2019), **275(1)**, 347-360.

**How to Increase the Impact of Disaster Relief: A Study of Transportation Rates, Framework Agreements and Product Distribution**, T. Gossler, T. Wakolbinger, A. Nagurney, and P. Daniele, *European Journal of Operational Research* (2019), **274(1)**, 126-141.

**A Game Theory Model for Freight Service Provision Security Investments for High-Value Cargo**, A. Nagurney, S. Shukla, L. S. Nagurney, and S. Saberi, *Economics of Transportation* (2018), **16**, 21-28.

**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.

**Consumer Learning of Product Quality with Time Delay: Insights from Spatial Price Equilibrium Models with Differentiated Products**, D. Li, A. Nagurney, and M. Yu, *Omega* (2018), **18**, 150-168.

**The Center Director**

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John F. Smith Memorial Professor

**Center Associates**

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Dr. Deniz Besik  
Dr. Jose M. Cruz  
Dr. Patrizia Daniele  
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