



# The Supernetwork Sentinel

## Spring 2023

Welcome to the Spring 2023 edition of **The Supernetwork Sentinel**, the newsletter of the Virtual Center for Supernetworks at the Isenberg School of Management, UMass Amherst. We are now publishing this newsletter in Fall and Spring 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 share with our readers and supporters the achievements of the Center Director and Center Associates as well as Center activities. As always, we include Kudos and News and a list of our recent Center publications.



**KSE President Mylovanov with Center Director and Professor Ina Ganguli**

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**PanOptiC Conference at the University of Florida**

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## Labor and Supply Chain Networks Book is Published

We are delighted to report that the book, **Labor and Supply Chain Networks**, authored by the Center Director was published by Springer in January 2023. The book consists of 12 chapters, an acknowledgment and preface as well as an appendix and is available in both hard copy and online versions. [UMass Amherst had nice coverage of the publication of the book.](#)



### The Center Director with Springer Editor Matt Amboy at POMS in Orlando

Professor Anna Nagurney was delighted to have the book displayed at the Springer booth both at the PanOptiC Conference in Gainesville, Florida, March 10-11, 2023 and at the POMS Conference in Orlando, Florida, May 21-25, 2023.

## KSE President and Rector Visit UMass Amherst



The outstanding partnership between the Kyiv School of Economics (KSE) and UMass Amherst is going strong with 15 Virtual Scholars in Ukraine being supported by the partnership and placed with Faculty Hosts at UMass Amherst. 9 of the Scholars are working with Isenberg School faculty and Professor Anna Nagurney is working with 4 of them.

On February 22, 2023, we had the great honor of hosting the President of KSE Tymofii Mylovanov at UMass Amherst.

This visit was extremely meaningful since, in wartime, UMass Amherst had signed a series of memoranda with the Kyiv School of Economics with [UMass Amherst releasing this press release on the partnership.](#)

The visit was planned with great attention to detail by the International Programs Office, under the leadership of the Vice Provost for Global Affairs, Kalpen Trivedi. Special thanks go to his Executive Assistant, Kim Stender, for finalizing an itinerary that included Vice Provost Kalpen Trivedi, Provost Tricia Serio, Emeritus Provost John McCarthy, Isenberg Dean Anne P. Massey, the Dean of the School of Social and Behavioral Sciences Karl Rethemeyer, and the Interim Dean of the College of Natural Sciences Nate Whitaker! [UMass Amherst released this article on his visit](#) and the timing could not have been better because the day after UMass was closed due to inclement weather!



### Collage of Photos from the Visit of President Mylovanov

There were multiple brainstorming sessions that took place with faculty and additional administrators. The conversations were moving and very inspiring. All the Virtual Scholars remain in Ukraine and the Faculty Hosts are working in collaboration with them on multiple fascinating projects, many of which are also relevant to the recovery and reconstruction of Ukraine. This support also shows the Scholars that they are not alone. The research collaborations have already generated papers as well conference presentations! It is important to note that the Virtual Scholars include faculty from KSE, from the Ukrainian Catholic University in Lviv, the National University of the Kyiv Mohyla Academy, Volodymyr East Ukrainian National University, the National Academy of Sciences of Ukraine, and even an advisor to the Ukrainian government.

And, on May 3, 2023, to mark the 1 year anniversary of the partnership, the Rector of KSE Tymofii Brik visited UMass Amherst. That day we hosted a symposium with the Virtual Scholars

and Faculty Hosts and Rector Brik delivered an outstanding seminar on *Resilience of Ukrainian Universities and Communities During the War*.

Below is a collage of photos from the visit of Rector Brik.



[Additional information on the partnership and the Virtual Scholars plus their Faculty Hosts at the Isenberg School can be found here.](#)

## PanOptiC Conference in Honor of Professor Panos M. Pardalos

On March 10 and 11, 2023 the conference in honor of Professor Panos M. Pardalos took place at the University of Florida, Gainesville. It was a focused conference with conferees convening to honor Professor Pardalos, who is now Emeritus.

It was extra special since it was the first conference that Doctoral Student Center Associate Dana Hassani took part in. The Center Director presented the paper that they had co-authored with KSE colleagues Professor Oleg Nivievskiy and Dr. Pavlo Martyshev. We are thrilled that the paper, **Exchange Rates and Multicommodity International Trade: Insights from Spatial Price Equilibrium Modeling with Policy Instruments via Variational Inequalities**, has now been published in the *Journal of Global Optimization* (2023), online.

Many of Professor Pardalos's former PhD students showed up to honor him. He has chaired over 60 PhD dissertations! The banquet had a special video tribute that was constructed by Texas A&M Professor Sergiy Butenko and [it can be viewed here.](#)

Professor Anna Nagurney, along with Professors Kotsireas and Pardalos, and Professor Stefan Pickl, is organizing the Dynamics of Disasters conference, which will take place in Athens, Greece July 3-6, 2023.



The Center Director with Dana Hassani at the PanOptic Conference



(l-r) Center Director, Professors Illias S. Kotsireas, Panos Pardalos, and Springer Editor Elizabeth Loew

## Center Associates Present at POMS in Orlando

The POMS conference took place May 21-25, 2023 in Orlando, Florida. It was great to be back in person. The previous in person such conference took place in 2019! The COVID-19 pandemic has caused so many disruptions and so much suffering.

Speaking at the conference were Center Associate Deniz Besik of the University of Richmond and Center Associate Min Yu of the University of Portland. Professor Besik also took part in the Emerging Scholars Program at POMS.

At the conference, Professor Besik presented the paper, **Competitive Sustainable Agricultural Supply Chain Network Model with Environmental and Social Sustainability Considerations**, which is co-authored with Center Associates Sara Saberi of WPI, Pritha Dutta of Pace University, and Rodrigo Mercado Fernandez of Tecnológico de Monterrey.

And Professor Min Yu presented the paper, **A Multiperiod Competitive Supply Chain**



**Framework with Environmental Policies and Investments in Sustainable Operations**, co-authored with Center Associates Jose M. Cruz of the University of Connecticut, Dong "Michelle" Li of Babson College, and Amir H. Masoumi of Manhattan College.



**Center Director and Professor Min Yu on the right after a session in Orlando**



**With Professor Deniz Besik at POMS**

## **Immigration Analytics Conference at WPI**

### **How often have you experienced a standing ovation at the end of a conference?**

The Center Director had, for the first time, such an experience on June 2, 2023, at the outstanding Innovations in Immigration Analytics Conference at the Worcester Polytechnic Institute (WPI) in Worcester, Massachusetts. Kudos to the conference organizers: Dr. Geri Dimas (who will be an Assistant Professor at Bryant University, starting this Fall), and WPI Professors Andrew Trapp and Daniel Reichman.

The program, [which can be viewed here](#), brought together faculty, practitioners, as well as students, who are very much engaged in issues of migration and immigration.

The format, consisting of individual presentations, lightning talks, as well as a panel, was excellent, and with coffee breaks and a delicious buffet lunch provided. And there were no registration fees!

The conference opened up with remarks by the WPI Provost Winston "Wole" Soboyejo, who set the stage for the importance of the issues and challenges that we discussed at the conference including: refugee resettlement, dynamic migrant flows and operational responses, matching refugees to employment opportunities, strategic border resource deployment challenges, and even the modeling of US immigration courts using discrete-event simulation.

Professor Anna Nagurney's presentation was entitled, **Refugee Migration Networks with Regulations**, and [it has been posted on the Supernetwork Center site at the Isenberg School of Management, UMass Amherst](#). The presentation was based on a paper published in the *Journal of Global Optimization* and was co-authored by Center Associates Patrizia Daniele of the University of Catania and Professor Ladimer S. Nagurney of the University of Hartford.



**Collage of Photos from the Innovations in Immigration Analytics Conference at WPI**

It was terrific to meet conferees with the passion and focus to address one of the greatest challenges of our time with 103 million people around the world having been forced to leave their homes. The Center Director was deeply touched to hear, time and time again, Ukraine mentioned at this conference and the impacts of Russia's war on it, including by Dean Debora Jackson of the WPI Business School in her brilliant closing remarks. Research matters and making it accessible to organizations, nonprofits, and governments can create positive change and truly benefit humanity.

## **Upcoming Conferences**

It is fabulous to see the energy of Center Associates! This summer there will be many conferences at which they will be heavily engaged and presenting.

As mentioned earlier, the Dynamics of Disasters (DOD) conference will take place in-person in Athens, Greece, July 3-6, 2023. Professor Anna

Nagurney is again co-organizing this conference, which is the 6<sup>th</sup> such conference. The conference this year will have 6 outstanding Plenary Speakers.

We are delighted that Teresa Farmaki will be the first plenary speaker. She is the Co-Founder of Astarte Capital with Center Associate Stavros Siokos! Registrants are coming from many countries and include both academics and practitioners.

Sixth International Conference on Dynamics of Disasters  
July 3–6 2023, Athens, Greece

#### Plenary Speakers

The climate crisis and the role of natural capital investments towards a net-zero economy  
Teresa Farmaki  
Astarte Capital Partners



Prescriptive analytics and control towers: A new dimension of managerial decision making in the age of reinforcement and machine learning  
Stefan Fiedler  
Universität der Bundeswehr



Supply chains and critical infrastructure: A nexus of opportunities and vulnerabilities  
George Karagiannis  
Resilience First



Disaster scenarios with discrete sequences: Using combinatorics for enhanced disaster preparedness  
Dimitris E. Simos  
SBA Research, Austria



Cosmic storms and human catastrophe mitigation: Predicting space weather  
Xenophon Mousas  
University of Athens



From "demographic bomb" to "silver tsunami": Navigating global population shifts  
Alexandra Tagaki  
Harokopio University



[Information on the conference including the program can be found here.](#)

At the DOD conference, the Center Director will present the paper, **Multicommodity International Agricultural Trade Network Equilibrium: Competition for Limited Production and Transportation Capacity Under Disaster Scenarios with Implications for Food Security**, co-authored with Doctoral Student Center Associate Dana Hassani and KSE colleagues Professor Oleg Nivievskiy and Dr. Pavlo Martyshev.

Also, Professor Anna Nagurney will fly from Europe after the Dynamics of Disasters conference to deliver a keynote speech at the IFORS Conference in Santiago, Chile, which takes place July 10-14, 2023. The title of her keynote is: **Agricultural Supply Chain Networks: From Trade to Resilience and How OR Can Help.** [Information on the IFORS conference, which is a triennial conference is here.](#)

Several Center Associates will be speaking at the POMS Conference in Rennes, France in July 2023. Center Associate Sara Saberi of WPI is on the Scientific Committee of this conference. Professor Deniz Besik and Jose M. Cruz will present papers – the latter on work with Center Associate Dong "Michelle" Li.

## Kudos and News

Welcome to new Center Associate Gabriella Colajanni! Dr. Colajanni received her PhD from the University of Catania and is now a Research

Fellow there. Her dissertation advisor was Center Associate Professor Patrizia Daniele. Congratulations to both of them on the publication of the paper, **A Three-Stage Stochastic Optimization Model Integrating 5G Technology and UAVs for Disaster Management**, with the Center Director, Center Associate Ladimer S. Nagurney of the University of Hartford, and Daniel Sciacca in the *Journal of Global Optimization* (2023), **86**, 741-780.

Congratulations to Center Associate Zugang "Leo" Liu for being promoted to Full Professor at Penn State Hazleton! Also, congratulations to Professor Liu on his publication with Center Associates Sara Saberi of WPI and Deniz Besik, **Strategic Decision for Capacity Portfolio in Supply Chain Network Considering Emission Permit Price and Demand Uncertainty**, *Journal of Cleaner Production* (2022), **374**, 133797.

Congratulations to Center Associate Shivani Shukla who has been promoted to Associate Professor with tenure at the School of Management at the University of San Francisco! She is also the Program Director, Business Analytics Major and Minor, there.

Congratulations to Center Associate Sara Saberi on her receipt of the Norton Assistant Professorship. According to WPI, "this Chair was created by Norton Company in 1988 for a professor in Manufacturing Engineering or a related field to support a junior faculty member who has shown distinction and potential to be a leader in their field."

We would like to congratulate Center Associate Stavros Siokos for the outstanding Fifty Faces podcast, **Innovation, Impact and Lighting the Spark**, and for his amazing work with Astarte Capital Partners! Also, congratulations to Dr. Siokos for being a speaker at [the Delphi Economic Forum, April 26-29, 2023 in Athens, Greece.](#)

Congratulations to Center Associate Pritha Dutta! She is leaving Pace University and joining Willamette University on Oregon as an Assistant Professor of Management.

Center Associate Amir H. Masoumi of Manhattan College spent part of his spring 2023 sabbatical as a Visiting Scholar in the Computer Science Department at Cal State LA.

Our expertise on various supply chains including agricultural ones and impacts of global events from the COVID-19 pandemic to Russia's war on Ukraine continues to be sought. [Please visit the Center website to read about some of our interviews with the media.](#)

Congratulations to Center Associate Tina Wakolbinger of the Vienna University of Economics and Business for the paper, **Supply Chain Preparedness: How Operational Settings, Product and Disaster Characteristics Affect Humanitarian Responses**, available online in *Production and Operations Management* (2023). The paper is co-authored with Dr. Jonas Stumpf and Professor Maria Besiou. Together they also published the paper, **Assessing the Value of Supply Chain Management in the Humanitarian Context – An Evidence-Based Research Approach**, in the *Journal of Humanitarian Logistics and Supply Chain Management* (2023), **13(1)**, 1-9. [Excellent coverage of the latter paper can be found here.](#)

Professor Tina Wakolbinger is co-editing a [special issue of the journal Sustainability: Analytics and Modeling](#) with Professor Burcu Balci on **Sustainability and Humanitarian Operations**.

Congratulations to Center Associate Dmytro Matsypura of the University of Sydney on the publication of his paper, **Finding the Most Degree-Central Walks and Paths in a Graph: Exact and Heuristic Approaches**, in the *European Journal of Operational Research* (2023), **308(3)**, 1021-1036. Both he and the Center Director will take part in the IFORS Conference in Santiago, Chile in July 2023.

Congratulations to Center Associates Deniz Besik of the University of Richmond and Pritha Dutta, formerly of Pace University, on the publication of their paper with the Center Director, **An Integrated Multitiered Supply Chain Network Model of Competing Agricultural Firms and Processing Firms: The Case of Fresh Produce and Quality**, *European Journal of Operational Research* (2023), **307(1)**, 364-381.

Congratulations to Center Associate Trisha D. Anderson of Texas Wesleyan University on the publication of her paper, **Leveraging the Balanced Scorecard for Online MBA Program Development: A Holistic Approach**, in the *Journal of Higher Education Theory and Practice* (2023), **31(7)**.

Congratulations to Center Associate Qiang "Patrick" Qiang for being in charge of the Finance Program at Penn State Great Valley and [for the nice new coverage of one of his initiatives.](#)

Congratulations to Doctoral Student Center Associate Dana Hassani on the acceptance of his first journal article, **Exchange Rates and Multicommodity International Trade: Insights from Spatial Price Equilibrium Modeling with Policy Instruments via**

**Variational Inequalities!** The paper is co-authored with KSE colleagues Professor Oleg Nivievskiy and Dr. Pavlo Martyshev and the Center Director and is available on the *Journal of Global Optimization* website. Dr. Martyshev is a Virtual Scholar through the UMass Amherst -KSE partnership.

## Recent Center Publications

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

**Exchange Rates and Multicommodity International Trade: Insights from Spatial Price Equilibrium Modeling with Policy Instruments via Variational Inequalities**, A. Nagurney, D. Hassani, O. Nivievskiy, and P. Martyshev, *Journal of Global Optimization* (2023), online.

**A Three-Stage Stochastic Optimization Model integrating 5G Technology and UAVs for Disaster Management**, G. Colajanni, P. Daniele, A. Nagurney, L.S. Nagurney, and D. Sciacca, *Journal of Global Optimization* (2023), **86**, 741-780.

**International Migrant Flows: Coalition Formation Among Countries and Social Welfare**, M. Passacantando, F. Raciti, and A. Nagurney, *EURO Journal on Computational Optimization* (2023), **11**, 100062.

**An Integrated Multitiered Supply Chain Network Model of Competing Agricultural Firms and Processing Firms: The Case of Fresh Produce and Quality**, D. Besik, A. Nagurney, and P. Dutta, *European Journal of Operational Research* (2023), **307(1)**, 364-381.

**A Bandwidth Auction Mechanism to Enable Affordable Internet Access**, L.A. Marentes, S. Cabrales, T. Wolf, A. Nagurney, and Y. Donoso, *Netnomics* (2022), **22**, 283-316.

**Supply Chain Networks, Wages, and Labor Productivity: Insights from Lagrange Analysis and Computations**, A. Nagurney, *Journal of Global Optimization* (2022), **83**, 615-638.

**Resilience of Supply Chain Networks to Labor Disruptions**, A. Nagurney and A. Ermagun, *Resilience Findings* (2022), June 16.

**Modeling of Covid-19 Trade Measures on Essential Products: A Multiproduct, Multicountry Spatial Price Equilibrium Framework**, A. Nagurney, M. Salarpour, and J. Dong, *International Transactions in Operational Research* (2022), **29(1)**, 226-258.

**Attracting International Migrant Labor: Investment Optimization to Alleviate Supply Chain Labor Shortages**, A. Nagurney, *Operations Research Perspectives* (2022), **9**, 100233.

**Defense Critical Supply Chain Networks and Risk Management with the Inclusion of Labor: Dynamics and Quantification of Performance and the Ranking of Nodes and Links**, A. Nagurney (2022), accepted in: *Handbook for Management of Threats, Security and Defense, Resilience and Optimal Strategies*, K. Balomenos, A. Fytopoulos, and P.M. Pardalos, Editors, Springer Nature.

**Optimization of Investments in Labor Productivity in Supply Chain Networks**, A. Nagurney, *International Transactions in Operational Research* (2022), **29(4)**, 2116-2144.

**Spatial Price Equilibrium Networks with Flow-Dependent Arc Multipliers**, A. Nagurney and D. Besik, *Optimization Letters* (2022), **26**, 2483–2500.

**A Multiperiod Supply Chain Network Optimization Model with Investments in Labor Productivity in an Era of COVID-19 and Climate Change**, A. Nagurney, *Operations Research Forum* (2021), **2**, 68.

**Game Theory and the COVID-19 Pandemic**, A. Nagurney, *INFORMS Tutorials in Operations Research* (2021).

**Supply Chain Game Theory Network Modeling under Labor Constraints: Applications to the Covid- 19 Pandemic**, A. Nagurney, *European Journal of Operational Research* (2021), **293(3)**, 880-891.

**Probabilistic Assessment of Transport Network Vulnerability with Equilibrium Flows**, Y. Jiang, Y. Wang, W.Y. Szeto, A.H.F. Chow, and A. Nagurney, *International Journal of Sustainable Transportation* (2021), **15(7)**, 512-523.

**A Multicountry, Multicommodity Stochastic Game Theory Network Model of Competition for Medical Supplies Inspired by the Covid-19 Pandemic**, M. Salarpour and A. Nagurney, *International Journal of Production Economics* (2021), **235**, 108074.

**A Multiclass, Multiproduct Covid-19 Convalescent Plasma Donor Equilibrium Model**, A. Nagurney and P. Dutta, *Operations Research Forum* (2021), **2**, 31.

**A System-Optimization Model for Multiclass Human Migration with Migration Costs and Regulations Inspired by the Covid-19**

**Pandemic**, G. Cappello, P. Daniele, and A. Nagurney, *Minimax Theory and Applications* (2021), **6(2)**, 281-294.

**Human Migration Networks and Policy Interventions: Bringing Population Distributions in Line with System-Optimization**, A. Nagurney, P. Daniele, and G. Cappello, *International Transactions in Operational Research* (2021), **28(1)**, 5-26.

**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 (2021), in: *Nonlinear Analysis and Global Optimization*, T.M. Rassias and P.M. Pardalos, Editors, Springer Nature Switzerland AG, 331-356.

**Perishable Food Supply Chain Networks with Labor in the Covid-19 Pandemic**, A. Nagurney (2021), in: *Dynamics of Disasters – Impact, Risk, Resilience, and Solutions*, I.S. Kotsireas, A. Nagurney, P.M. Pardalos, and A. Tsokas, Editors, Springer International Publishing Switzerland, pp 173-193.

**Capacitated Human Migration Networks and Subsidization**, A. Nagurney, P. Daniele, and G. Cappello (2021), in: *Dynamics of Disasters – Impact, Risk, Resilience, and Solutions*, I.S. Kotsireas, A. Nagurney, P.M. Pardalos, and A. Tsokas, Editors, Springer International Publishing Switzerland, pp 195-217.

**International Human Migration Networks Under Regulations**, A. Nagurney and P. Daniele, *European Journal of Operational Research* (2021), **291(3)**, 894-905.

**Optimization of Supply Chain Networks with Inclusion of Labor: Applications to COVID-19 Pandemic Disruptions**, A. Nagurney, *International Journal of Production Economics* (2021), **235**, 108080.

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