



The Virtual Center for Supernetworks



Supernetworks for Optimal Decision-Making and Improving the Global Quality of Life

The Supernetwork Sentinel

Spring 2022

Welcome to the Spring 2022 edition of **The Supernetwork Sentinel**, the newsletter of the Virtual Center for Supernetworks at the Isenberg School of Management, UMass Amherst. With this newsletter, we transition from publishing three newsletters a year to two newsletters in Fall and Spring editions. This structure conforms with the semesters of the academic year. 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 major achievements of the Center Director and Center Associates during this very challenging time in history. As always, we include a list of our recent Center publications.



The Center Director responds to media requests

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Paper Co-Authored by Center Associates Most Influential on Networks in Journal's 25 Year History

Academics work very hard on their research and enjoy seeing their work published. One also hopes that one's work is appreciated and recognized and, in academia, getting cited and also doing impactful research are deeply rewarding.

We'd like to first congratulate all the Editors of the journal *Transportation Research E: Logistics and Transportation Review* on the significant milestone - its 25th anniversary.

The Center Director was delighted to see a [25 year retrospective on the publications in this journal published recently](#) by the two Co-Editors, Professors T-M. Choi and Qiang Meng, with Dr. Shukai Chen. The paper, "[A Supply Chain Network Equilibrium Model](#)," which she co-authored with Center Associates Professors June Dong and Ding Zhang of SUNY Oswego, was the top cited paper in "network modeling."



We also very much appreciate what the authors of the retrospective wrote in the following: "Another noticeable feature is that, although the universities in the United States may not publish a very high number of papers, their research work can be very impactful and attract lots of citations, e.g., the University of Maryland and the University of Massachusetts Amherst." Thanks for this. We work as a team at the

Virtual Center for Supernetworks and it is wonderful to see this substantive recognition of our work.

Congratulations are in order to all those whose research has been recognized in this 25 year retrospective! The Center Director also thanks the authors of the retrospective for their thorough analysis and very interesting highlights of the contributions in the journal over the past quarter century. We look forward to many more important findings in the next 25 years in logistics and transportation, disciplinary topics that have never been more important than they are now!

Center Director Elected Co-Chair of the Board of Directors of the Kyiv School of Economics

On February 24, 2022, Russia launched a major invasion on Ukraine, which has resulted in thousands of lives lost, millions of Ukrainians displaced, and great suffering plus economic and other losses. For the past several years, the Center Director, Professor Anna Nagurney, has had the honor of serving on the Board of Directors and on the International Academic Board of the Kyiv School of Economics (KSE) in Ukraine. She serves with academics and top practitioners including Professor Roger Myerson, a Nobel laureate in Economics, and John Ed Herbst, the former US Ambassador to Ukraine. Since this war began, she was elected one of four Co-Chairs of the Board of Directors. This has involved her in additional important decision-making, many meetings during this extremely challenging period in history for Ukraine and the free world, and additional activities and advocacy.



As part of the additional advocacy and support, she became part of a Task Force at UMass Amherst to work on supporting displaced scholars from Ukraine. We are pleased to report that UMass Amherst has signed several Memoranda of Understanding with KSE, which will support Virtual Scholars as well as students through an exchange program (one directional, for now). Professor Anna Nagurney thanks the Director of the UMass Amherst International Programs Office – Dr. Kalpen Trivedi for his great

support throughout this process. She is also very grateful to the Provost, the Deans, and the faculty who worked hard to make this significant partnership a reality. We look forward at the Virtual Center for Supernetworks in hosting scholars from Ukraine!

During wartime, KSE has continue to offer classes online, and has organized an outstanding speaker series of global thought leaders. Some events have even taken place in person. In addition, several of the faculty have advised the Ukrainian government and have also prepared studies that have attracted major media attention. Their expertise and commentary are widely sought by many news agencies and journalists. Congratulations to the Leadership Team of KSE, its faculty, staff, and, of course, also to its students – some of whom have joined the defense forces. Others, sadly, have lost their lives in this horrific war taking place on the continent of Europe. Special thanks are extended to the President of KSE – Professor Tymofiy Mylovanov and to its Rector – Professor Tymofii Brik.

Expertise on Supply Chains Continues to Draw Media Attention

In previous editions of this newsletter in the pandemic, we reported on the coverage that our work has had in the media. We believe that informing the public is an honor and it is important to share research that can be applied in practice and that can have a positive impact by informing decision-makers and policy makers. We continue to write OpEd articles, Letters to the Editor, and respond to requests for interviews from radio and TV news producers, as well as from journalists writing for the print media.

Shortages of various products continue as do increases in prices for food and fuel, as well as a variety of supply chain disruptions. Now, we are especially busy, drawing on our expertise on war-related matters surrounding Ukraine and the free world, from disruptions to agricultural supply chains to even cybersecurity concerns.

[The Isenberg School of Management kindly produced this article on some of the outreach activities and coverage in the media.](#)

The Center Director, since the war began in late February 2022, has been interviewed by, among others: *The Associated Press*, *The New York Times*, *The Boston Globe*, *DW*, *The Bulletin of Atomic Scientists*, *Masslive.com*, *Inbound Logistics*, *FreightWaves*, *CNBC*, and *NECN*.



The Center Director on The Sam Shephard News Show on CNBC

Many thanks to the media outlets for the invitations and for the opportunities to speak out.

Congratulations to Dr. Mojtaba Salarpour

In an academic's life, one of the many joys is seeing one's students achieve milestones. On March 28, 2022, Mojtaba Salarpour, Professor Anna Nagurney's 23rd PhD student, successfully defended his doctoral dissertation in Management Science at the Isenberg School, with the title: "Essays on Supply Chain Economic Networks for Disaster Management Inspired by the Covid-19 Pandemic." [The abstract of his dissertation can be viewed here.](#) The committee members were: Professor Priyak Arora of the Isenberg School and Professors Hari Balasubramanian and Chaitra Gopalappa of the College of Engineering at UMass Amherst.



Award ceremony at INFORMS

Mojtaba served for two years as the President of the [UMass Amherst INFORMS Student Chapter](#) (1 1/2 of those in the pandemic). Under his leadership, the chapter received two national

awards from INFORMS because of its activities. Below is a photo taken at the Phoenix National INFORMS Meeting in 2021, at which the Chapter was honored with its latest award.

Mojtaba also taught required two different courses at the Isenberg School and has experience teaching in both face to face and in online formats. He clearly, is the "full academic package" with talents in research and scholarship, teaching, as well as service.

We are delighted that he will be joining the faculty of Texas A&M Commerce as an Assistant Professor, in the tenure track, in the Fall of 2022.



Dr. Mojtaba Salarpour with his dissertation committee members after his successful dissertation defense



The Isenberg School of Management PhD robing ceremony in May 2022

Upcoming Conferences and Keynotes

More and more conferences in this pandemic are now taking place in person, whereas some remain virtual and others are in hybrid format. Center Associates will be giving multiple talks at the INFORMS Annual Meeting, which will take place in person in October 2022 in Indianapolis. Center Associate Professor Shivani Shukla of the University of San Francisco will present on cybersecurity at the second INFORMS Conference on Security in late August in Arlington, VA.

The Center Director will keynote the CIIO Conference in Bogota, Colombia, August 4-5, 2022, as well as the International Conference on Optimization and Decision Science in Florence, Italy, August 30-September 2, 2022. Her keynote talk in Florence will take place in a museum. She is also looking forward to seeing Center Associate Professor Patrizia Daniele of the University of Catania there!



Kudos and News

Congratulations to Center Associate Professor Ke "Grace" Ke of Central Washington University on her promotion to Full Professor!

The Center Director took part in an Expert-a-Thon on April 29, 2022, to raise Emergency Funds for Displaced Scholars from Ukraine, organized by the Shevchenko Scientific Society. Her presentation was entitled, **Supernetworks and Ukraine**, [and can be viewed here](#). She is now serving on a Selection Committee to evaluate the applications from displaced scholars in Ukraine for fellowships from the Shevchenko Scientific Society. The selected Fellows will be featured on this society's webpages.

Congratulations to Center Associate Professor Tina Wakolbinger on the publication of her paper with L. Novoszel, **Meta-analysis of Supply Chain Disruption Research**, in *Operations Research Forum* (2022), **3(1)**, 1-25. Professor Wakolbinger is now co-editing a special issue of the journal *Sustainability Analytics and Modeling* on **Sustainability and Humanitarian Operations**. She is also the Co-Editor of the new Springer book, **Supply Chain Resilience: Insights from Theory and Practice**, published in 2022.

Congratulations to Center Associate Professor Patrizia Daniele of the University of Catania on the publication of her co-authored paper, **On the Provision of Services With UAVs in Disaster Scenarios: A Two-Stage Stochastic Approach** (2022), *Operations Research Forum*, **3**, 18.

Congratulations to Center Associate Professor Deniz Besik of the University of Richmond for the acceptance of her paper, co-authored with the Center Director, **Spatial Price Equilibrium Networks with Flow-Dependent Arc Multipliers**, in *Optimization Letters*.

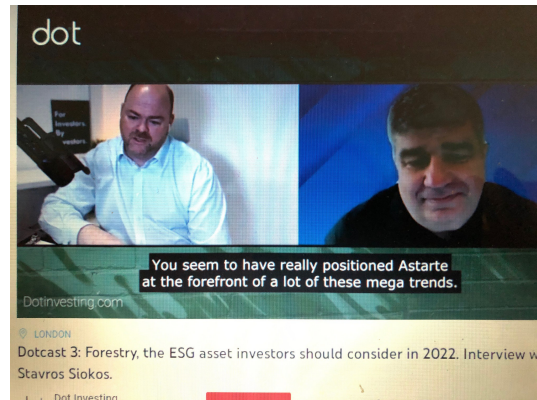
Congratulations to Center Associates: Professor Min Yu of the University of Portland, Professor Jose M. Cruz of the University of Connecticut, Professor Dong Li of Babson College, and Professor Amir H. Masoumi of Manhattan College on the publication of their paper, **A Multiperiod Competitive Supply Chain Framework with Environmental Policies and Investments in Sustainable Operations**, in the *European Journal of Operational Research* (2022), **300(1)**, 112-123. Congratulations also to Professors Li and Cruz on the publication of their paper, **Multiperiod Supply Chain Network Dynamics Under Investment in Sustainability, Externality Cost, and Consumers' Willingness to Pay**, in the *International Journal of Production Economics* (2022), **247**, 108441.

Congratulations to Center Associates Professor June Dong of SUNY Oswego and Professor Mojtaba Salapour of Texas A&M Commerce on the publication of their paper with the Center Director, **Modeling of Covid-19 Trade Measures on Essential Products: A Multiproduct, Multicountry Spatial Price Equilibrium Framework**, in the *International Transactions in Operational Research* (2022), **29(1)**, 226-258.

During this painful period in world history with Russia's unprovoked war on the sovereign nation of Ukraine, we continue to write, to speak out, and to respond to interview requests from the media. Center Associate Professor Dmytro Matsypura of the University of Sydney, who was born in Ukraine, [was interviewed by the BBC](#). He was [also interviewed by the New Delhi Times](#).

Congrats to Professor Dmytro Matsypura on [the wonderful interview published in the INFORMS publication OR/MS Tomorrow](#). He was interviewed by the former Editor, Jessica Leung, who was his first PhD student, and is now an Assistant Professor at Monash University. The topic of the interview was the academic job market in the COVID-19 pandemic.

Congratulations to Center Associate Dr. Stavros Siokos, the Managing Partner and Co-Founder at Astarte Capital Partners for all the accolades that he is receiving for his work and that of his team on ESG investing. Below is a photo of an interview with him on Forestry and ESG Investing [with the interview available for viewing on Youtube](#).



The Center Director is chairing the inaugural Stella Dafermos Award committee of the Transportation Science & Logistics Society of INFORMS.

Center Associate Professor Ladimer S. Nagurney of the University of Hartford presented a guest lecture on **Disaster Communications** on April 26, 2022 in the Center Director's course on Humanitarian Logistics and Healthcare at the Isenberg School of Management. In the lecture, he even highlighted the important role of communications in Ukraine's defense against the Russians in the war.



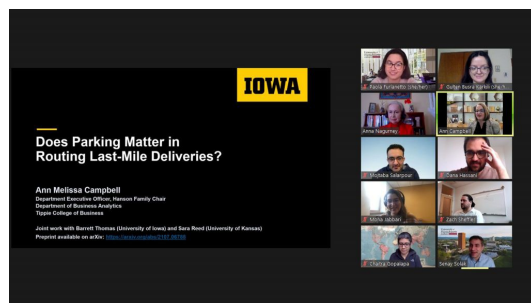
Professor Ladimer S. Nagurney delivering his guest lecture

We welcome Dana Hassani, who joined the PhD Program in Management Science at the Isenberg School of Management in the winter of 2022. He will be working with Professor Anna Nagurney.

Dana has already become a very active member of the UMass Amherst INFORMS Student Chapter, which Professor Anna Nagurney has served as the Faculty Advisor for since 2004. A fascinating fact – it was founded with the support of Tina Wakolbinger, who was then a PhD student at the Isenberg School, and was Professor Nagurney's PhD student. In the spring of 2022, we had the honor of hosting in our UMass Amherst INFORMS Speaker Series: Professor Ann Campbell of the University of Iowa, Professor Tinglong Dai of the Johns Hopkins University, Professor Desternie Nock of Carnegie Mellon University (a UMass Amherst alumna), and Jack Levis, formerly of UPS! We thank these outstanding speakers! More information on this Student Chapter can be [found on its website](#).



Isenberg School Graduate Programs celebration



Professor Ann Campbell speaking in our Speaker Series

On June 16, 2022, Professor Anna Nagurney was honored to present an invited talk at the National Vaccine Advisory Committee (NVAC) meeting, which took place in Washington DC. The title of her presentation was: **Supply Chain Networks, Labor, and Resilience**. [Her slidedeck can be downloaded from the Supernetwork Center site.](#)

The Center Director and the Center Associates wish our supporters a peaceful and productive summer!



Celebrating with Dr. Mojtaba Salarpour

Recent Center Publications

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

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), in press.

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.

The Braess Paradox, A. Nagurney and L.S. Nagurney, *International Encyclopedia of Transportation* (2021), Chapter 10760, R. Vickerman, Editor, Elsevier.

A Stochastic Disaster Relief Game Theory Network Model, A. Nagurney, M. Salarpour, J. Dong, and L.S. Nagurney, *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.

Refugee Migration Networks and Regulations: A Multiclass, Multipath Variational Inequality Framework, A. Nagurney, P. Daniele, and L.S. Nagurney, *Journal of Global Optimization* (2020), **78**, 627-649.

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