travel information before and after your entry into Canada by using ArriveCAN. It only takes minutes to help keep each other safe. Hopefully everything will continue to improve as we lead up to the conference, but be sure and check your home country website to see what requirements may be required for your trip home.

I am looking forward to seeing all of you in the beautiful city of Montreal, Quebec. The dates of the conference are November 9-12, so mark your calendars. Have fun and safe summer!

John Sporing
NARSC Executive Director

Words from the Editors


We are delighted to bring you the latest issue of the North American Regional Science (NARSC) newsletter. In this June 2022 issue of the newsletter, we include a very timely and important interview with Dr. Anna Nagurney about her influential research on supernetworks, current supply chain issues including the pandemic and Russia's invasion of Ukraine, the importance of public outreach, what future research on supply chain networks is needed, and the role of regional scientists in advancing our knowledge around supply chains. We learned a lot and want to thank Anna for taking time out of her busy schedule to answer all our questions.

This issue also contains member spotlights which aims to introduce our membership and show some of the excellent research performed by members from our organization. We would like to thank all of featured members in this issue for taking their time to respond to our questions. We really enjoyed reading their responses and we believe that our readers will as well. Finally, we highlight recent successes by our members including some very impressive grant awards.

If you have ideas or suggestions regarding content or would like to contribute to the newsletter, please do not hesitate to contact us. We hope to see all of you at the NARSC meeting in Montreal in November.

Isabelle Nilsson and Ran Wei
Newsletter Co-Editors

Interview with Anna Nagurney: Supernetworks, Supply Chains, and The Role of Regional Science

After the NARSC annual meeting in Denver last year, a NARSC member suggested to our editorial team that we interview Dr. Anna Nagurney *"profiling the highly influential work that Anna (an RSAI Fellow) has been doing on supply chains and supernetworks for many years and the role (or roles) she is playing now in an advisory capacity for logistics firms, government agencies, and news services. I think it would also be most useful for colleagues in regional science to learn where Anna thinks research on supply chain operations needs to be conducted"*. We contacted Anna shortly after this to hear more about her impactful work, the impact of recent disruptions including the pandemic

and Russia's invasion of Ukraine on supply chain operations, critical areas of future research, and the role of regional scientists in advancing our knowledge around supply chain networks. Please enjoy our interview with Anna below.

For those that may not know you, would you please describe who you are (academic background/past and current positions)?

First, let me express my appreciation for this interview!

I am the Eugene M. Isenberg Chair in Integrative Studies at the Isenberg School of Management at the University of Massachusetts Amherst, which I was appointed to in April 2021. Prior to that, since 1998, I was the John F. Smith Memorial Professor of Operations Management at the Isenberg School, where I started out my academic career as an Assistant Professor. I am also the Director of the Virtual Center for Supernetworks, which I founded in 2001. I hold ScB, AB, ScM and PhD degrees from Brown University in Providence, RI. I have been a Fulbrighter twice (in Austria and Italy); was a Visiting Professor at the School of Business, Economics and Law at the University of Gothenburg in Sweden, and was a Distinguished Guest Visiting Professor at the Royal Institute of Technology (KTH) in Stockholm. I was a Visiting Fellow at All Souls College at Oxford University during the 2016 Trinity Term and a Summer Fellow at the Radcliffe Institute for Advanced Study at Harvard in 2017 and 2018. I have held visiting appointments at MIT and at Brown University and was a Science Fellow at the Radcliffe Institute for Advanced Study at Harvard University in 2005-2006.

What is your connection to regional science (NARSC and RSAI)?

I have served as a Councilor-at-Large of NARSC and was elected an RSAI Fellow and also received the Walter Isard Award so my association with Regional Science has been both long and very rewarding. I might add that Martin Beckman was on my PhD Committee at Brown University, so I have been very lucky to have been influenced by leaders in Regional Science even during my PhD studies. As an undergraduate, I enjoyed wandering through the library stacks and browsing through and reading books that captured my interest. Seeing, for example, books by Karen R. Polenske, showed me that females can write technical books and, after graduating, I was delighted to meet Karen through NARSC activities. I recall how the two of us were the only females invited to speak at a conference in St. Petersburg at which David E. Boyce also spoke. Karen made sure that local female scholars were put on the program, once we arrived there.

I remember fondly many Regional Science conferences in North America, Europe, and even Australia. My research, as well as personal experiences, and, I might add, even friendships, have been enriched through these professional societies and its members and many luminaries (too many to list but I so appreciate them - those still with us and those who have passed away). I will never forget, for example, Walter Isard coming to my seminar at Cornell University, which was hosted by Kieran Donaghy, on April 1, 2009. Isard passed away at age 91 on November 6, 2010.

Could you tell us about your research on supply chains and supernetworks?

My research focuses on network systems from transportation and logistical ones, including supply chains, to financial, economic, social networks and their integration, along with the Internet. Supernetworks are "networks of networks" and supply chains are some of the most fascinating examples of supernetworks. The relevance of supply chains has been dramatically illustrated in the pandemic because of numerous disruptions, which continue now, in various forms, and are

exacerbated because of the war against Ukraine. I study and model complex behaviors on networks (and the interactions among network systems) with a goal of providing frameworks and tools for understanding their structure, performance, and resilience. I have also contributed to the understanding of the Braess paradox in transportation networks and the Internet. My team at the Supernetwork Center has been deeply researching supply chains, including those for perishable products, such as food, blood, and pharmaceuticals, as well as supply chain networks in humanitarian logistics and disaster management. With collaborators, I have advanced methodological tools used in game theory, network theory, equilibrium analysis, and dynamical systems.

I have been honored to be recognized for my research on networks with the Kempe Prize from the University of Umea, the Faculty Award for Women from the US National Science Foundation, the University Medal from the University of Catania in Italy, the 2019 Constantin Caratheodory Prize, and the 2020 Harold Larnder Prize, and being elected a Fellow of the RSAI (Regional Science Association International) as well as INFORMS (Institute for Operations Research and the Management Sciences) and the Network Science Society, among other awards.

We understand that you have been working on many OpEds during the pandemic and now as the war against Ukraine rages. Could you please tell us a little about the work that you have done in this capacity?

I strongly believe that, once a body of research, with supporting publications, has been completed, that one should "get the news out." For quite a few years, I have been writing OpEds, including articles for The Conversation, which then get reprinted in other media outlets. One then often gets invited to speak on radio and TV news programs. Doing such writing and speaking is important (although it can be quite time-consuming). In the pandemic, my public outreach articles, because of my work on supply chains, focused heavily on vaccine distribution issues, supply chain disruptions, shortages of blood, and even the history of the shipping container and what it did for world trade. The latter article in a few weeks had over 330,000 readers, which further demonstrates the fascination that many have with supply chains and logistics because they have personally felt the impacts of disruptions from food products and PPEs to even high technology products because of shortages of computer chips. One of my articles on blood supply chains influenced national policy in the US and that is very gratifying. Because of my connections to Ukraine, I now respond to media inquiries on the negative impacts of the war and even how supply chain education is changing, which I am doing in real-time, as I teach a class on Humanitarian Logistics and Healthcare!

What is your take on the current disruption to the global supply chain network? Obviously, the pandemic played a large role in this, but what are some of the weaknesses of the current global supply chain network that may have made this worse and/or strengths that prevented it from getting even worse?

In the pandemic, we experienced both supply shocks as well as demand shocks and many companies pivoted to address shortcomings, especially those associated with shortages of PPEs, for which there was intense competition. Companies that were agile and adaptive took advantage of electronic commerce, as did many consumers for safety and even convenience reasons. Organizations that supported their workers with enhanced telework sustained or even increased their productivity. Companies and organizations with strong relationships with their partners and suppliers were able to withstand some of the stressors. In the pandemic, we saw the importance of the tools that we have

developed, including those for addressing congestion management, as major ports in the US suffered from inefficiencies. I believe that using a mindset of "just-in-case" for supply chains will continue to be relevant as well as incorporating multiple criteria in decision-making and resource allocation with risk as well as sustainability and timeliness being weighted heavily.

The million (trillion) dollar question, how do we recover from this? What needs to be done to ensure that goods and service flows does not get disrupted to the same extent if we were to face another similar crisis?

The emphasis on cost-reduction and just-in-time clearly showed that we were not adequately prepared when the COVID-19 pandemic struck with even the PPEs in the US National Stockpile, in effect, "perishing" since they had not been replaced in years. I believe that product quality will be a very important feature for consumers and, hence, producers and that we will need to do a lot to mitigate against climate change. I also believe that workers need to be paid wages that they deserve and to have good working conditions so that they can stay healthy, enjoy their work, and be productive. Laborers are critical to product supply chains as well as service supply chains, including those in healthcare. Lessons learned from disaster management can help regions and nations to be better prepared in the next pandemic, with the COVID-19 pandemic being a healthcare disaster not limited to a location or time window, unlike many natural disasters. Supply chains need to be visualized and analyzed as networks and their efficiency/performance quantified, and their components, such as nodes and links, ranked in importance. Stress testing supply chains will continue to be done since valuable information can thus be gathered. Furthermore, restoring peace around the globe, including Ukraine, should be paramount.

What effects will Russia's invasion of Ukraine have on the global supply chain and its recovery?

Ukrainian is my first language and I was born in Canada. My parents were WWII refugees from Ukraine. For several years I have served on the Board of Directors and the International Academic Board of the Kyiv School of Economics (KSE), a private university in Ukraine. After the invasion by Russia of Ukraine on February 24, 2022, I was elected Co-Chair of the Board of Directors of KSE. The leadership and faculty of KSE have done incredible work in the time of war in having online classes; in advising the Ukrainian government; in hosting global thought leaders in speaker series, and also in serving on panels on which they provide updates on the war and its horrific impacts. They have done an outstanding job in public outreach and in speaking to the media to provide information. Several times (and I have personally seen this because of my participation in various meetings and online events), they have had to hurry to shelters as the air raid sirens wail but then they manage to continue. The President of KSE, Tymofiy Mylovanov, is one of the co-authors of "The Blueprint for the Reconstruction of Ukraine." The report highlights the importance of rebuilding critical infrastructure networks and in "building back better" and in investing in human capital. Clearly, the research that we have done at the Supernetwork Center is highly relevant in the recovery and the reconstruction of Ukraine.

Ukraine has been called the "breadbasket of Europe." It is known for its rich soil and for the wheat, barley, corn, and sunflower oil, to start, of the agricultural products that it grows and exports. Many MENA (Middle Eastern and North African) countries depend on Ukraine's agricultural exports with even countries in Europe as well as China benefiting from them. The unlawful, unjust war by Russia against Ukraine, a sovereign nation, has resulted in the blockading of ports, the mining of the Black Sea and of agricultural lands, plus the theft of produce and the destruction of warehouses. I am

reminded of the Holodomor, under Stalin, in which millions of Ukrainians, and others in the USSR, died of hunger and starvation because of government-instituted policies. Farmers in Ukraine now have had challenges in procuring fuel for their machinery and extreme difficulties in getting their products to market. This will lead to a tsunami of hunger and rising food insecurity. Historically, the World Food Programme obtained 50% of its wheat from Ukraine, which will, clearly, not be possible now because of the war. The reduction in needed food supplies will add to the pain and suffering of those in great need. We are already seeing sharply rising commodity prices with supplies of food, energy, and fertilizers disrupted.

It is important to also recognize that Ukraine is the source of about 50% of the globe's neon gas, which is needed to produce semiconductor chips. In addition, Ukraine and Russia are the world's leading producers of metals such as copper, nickel, and iron, plus of palladium and platinum, important raw materials.

Global supply chains, already were highly stressed in the pandemic and, increasingly so, even now, with the zero COVID policy followed by China with major lockdowns of its cities. Russia's war against Ukraine has exacerbated the challenges and the uncertainty, with major issues for global trade as new sources for products need to be identified and even modes of transportation and trade routes. The increase in heightened geopolitical risk is a feature of global supply chains that will be studied and will need to be addressed deeply.

What do you think are some critical areas of research that needs to be conducted on supply chain operations? And what role do regional scientists play in advancing the knowledge around supply chain operations?

Thank you so much for all the highly relevant questions!

In the pandemic, I have been, literally, obsessed with the need to include labor into rigorous models of supply chain networks. With so many workers suffering, many losing their lives, I focused on the development of both optimization and game theory models, which include the availability of labor, under different sets of constraints, labor productivity, wages (both endogenous and exogenous), and even investments in labor, to identify the impacts of various disruptions to supply chains on product flows, product prices, as well as costs and profits of firms. I have also worked on integrating migration flows into supply chain networks. Some of the models explicitly make use of supernetwork constructs and I have been honored for several of the journal articles with awards from Editors.

There are numerous topics surrounding supply chains that need further research and study and that regional scientists can contribute to from the study of the implementation of greater transparency, even with the use of technologies such as blockchain, to the development of cooperative game theory models for addressing issues of climate change and assisting in the development of policies for sustainability, as well as the construction of methodologies for mapping and stress testing supply chains, with the understanding that there are many distinct supply chains, with special characteristics and features that are dependent on the product under consideration. I also believe that, with the number of disasters growing as well as the people affected by them, whether man-made or ``natural," sudden-onset or quick-onset ones, much more needs to be done in terms of supply chains and disaster management. Links and nodes in critical supply chain networks will need to be invested in and the performance of supply chains monitored.

I have often emphasized, and have even written about, the role of regional science and regional scientists in developing the foundations for the modeling, analysis, and solution of supply chain problems. We, better than those in many other relevant disciplines, identified the importance of transportation and the associated costs to interregional and global trade, and that capturing such costs is critical to the rigorous modeling of supply chain networks! In addition, we have intensively studied the impacts of various trade policies from quotas to different types of tariffs in regional science, a topic that resonates now with so many different policy instruments having been applied in the pandemic. We continue to conduct research in this area.

I do believe that regional scientists are very creative and, I might add, courageous, in the types of problems that they tackle. Peace and freedom are essential to our economies and societies. Walter Isard started Regional Science as well as Peace Science. I believe that, in his memory, we should work on their further integration for the benefit of our planet. Isard will be smiling at us from the heavens.

Anything else that you would like our readers to know about yourself, your work, and/or supply chain operations research? Something that we missed?

I sincerely believe that professional societies, such as NARSC and RSAI, are extremely important in community-building and knowledge exchange and help to provide sustenance and hope during the epochal time in history that we are now experiencing with the pandemic and Russia's war against Ukraine. By building bridges across boundaries through education, scholarship, and public outreach, we are making positive progress in helping humanity.

To learn more about Anna's important work and find references to some of the studies that she mentions in her interview, please visit the Supernetwork Center website where you will find a lot of material including some reprints and preprints. You can also follow Anna on Twitter @Supernetworks.

Member Spotlight: Amanda Weinstein

Please tell us about yourself!

I am an Associate Professor in the Department of Economics at the University of Akron. I graduated with a PhD in Agricultural, Environmental, and Development Economics from The Ohio State University. As the C. William Swank Program in Rural-Urban Policy Graduate Research Associate, I conducted research on regional economic growth and policy issues - including one of the first studies to examine the economic impact of shale development on drilling communities with Dr. Mark Partridge. I have consulted for various organizations including the OECD, advising on the economic impacts of alternative energy development on rural communities, and the Ohio Consumers' Counsel, advising on the economic impact of energy policy in Ohio. I have served as