

## CURRICULUM VITA (October 29, 2022)

### Anna Nagurney

Eugene M. Isenberg Chair in Integrative Studies  
 Department of Operations and Information Management  
 Isenberg School of Management  
 University of Massachusetts  
 Amherst, MA 01003  
 (413) 545-5635

### Education

**Ph.D., Brown University**, June, 1983, in Applied Mathematics specializing in Operations Research, Thesis Title - Stability, Sensitivity Analysis, and the Computation of Competitive Network Equilibria, Thesis Advisor - Stella Dafermos

**Sc.M., Brown University**, 1980, in Applied Mathematics

**A.B., Brown University**, 1977, in Russian Language and Literature, magna cum laude

**Sc.B., Brown University**, 1977, in Applied Mathematics, magna cum laude

### Academic, Administrative, Advisory, and Professional Appointments

**Director - Virtual Center for Supernetworks and the Supernetworks Laboratory for Computation and Visualization**, November, 2001 - present; <http://supernet.isenberg.umass.edu>

**Doctoral Program Coordinator in Management Science**, 2000-2011; 2018 - present

**Eugene M. Isenberg Chair in Integrative Studies** - Isenberg School of Management, April, 2021 - present

**John F. Smith Memorial Professor** – Isenberg School of Management, August, 1998 – April, 2021

**Professor (tenured)**, 1991-1998, **Associate Professor (tenured)**, 1987-1991, **Assistant Professor**, 1983-1987

#### Distinguished and Visiting Appointments:

**Kyiv School of Economics, Kyiv, Ukraine:**  
**Co-Chair Board of Directors**, March 2022-present  
**Board of Directors**, 2020 -  
**International Academic Board**, 2018-present

**Harvard University:**  
**Summer Fellow, Radcliffe Institute for Advanced Study**, 2017, 2018

**Oxford University, Oxford, England:**  
**Visiting Fellow All Souls College**, Trinity Term, 2015-2016

**University of Gothenburg, Sweden:**  
**Visiting Professor of Operations Management, School of Business, Economics and Law**, 2012, 2013, 2014, and 2015

**Vienna University of Economics and Business, Vienna, Austria:**  
**Guest Professor**, March 11-13, 2013

**Harvard University, Cambridge, Massachusetts:**  
**Instructor – Office of Continuing Executive Education**, 2009  
**World Bank, Washington, DC:**  
**Consultant**, 2008

**Rockefeller Foundation Bellagio Center, Lake Como, Italy:**  
**Conference Organizer** - Humanitarian Logistics: Networks for Africa, May 5-9, 2008

**University of Catania, Italy:**  
**Fulbright Senior Specialist in Business Administration** - March 5-19, 2008

**Harvard University, Cambridge, Massachusetts:**  
**Science Fellow** - Radcliffe Institute for Advanced Study, September 2005 - June 2006

**Rockefeller Foundation Bellagio Center, Lake Como, Italy:**  
**Leader - Research Team Residency**, March 2004

**University of Innsbruck, Innsbruck, Austria:**  
**Fulbright/University of Innsbruck Distinguished Faculty Chair in Economics** – SOWI Business School, March - July 2002

**Royal Institute of Technology (KTH), Stockholm, Sweden:**  
**Visiting Professor** - Division of Transportation and Location Analysis, June - August 2001 and June - August 1999

**Royal Institute of Technology (KTH), Stockholm, Sweden:**  
**Distinguished KTH Guest Professor** - Division of Optimization and Systems Theory and Division of Regional Planning, June 1996-December 1996

**Clemson University, Clemson, South Carolina:**  
**Distinguished Lecturer** - Department of Mathematical Sciences, March 23-27, 1992

**Brown University, Providence, Rhode Island:**  
**Visiting Scholar** - Division of Applied Mathematics, January 1992-August 1992

**Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts:**  
**Visiting Scholar** - Management Science Area - Alfred P. Sloan School of Management, September 1989 - September 1990

**Visiting Associate Professor** - MIT Transportation Systems Division, Department of Civil Engineering, and Operations Research Center, September 1988 - August 1989

**University of Minnesota, Minneapolis, Minnesota:**  
**Visitor** - Institute for Mathematics and its Applications, June 1984

#### **Industrial Experience:**

**Senior Systems Analyst - Aquidneck Data Corporation**, Newport, Rhode Island, August 1979 - September 1980

**Programmer/Analyst - Systems Consultants, Inc.**, Newport, Rhode Island, August 1977 - August 1979

## Awards and Honors

- **2022 Certificate of Recognition for Outstanding Achievement in Research Productivity from 2019 through 2021.** Isenberg School of Management.
- **2021 Eugene M. Isenberg Chair in Integrative Studies** - this is the highest chaired professorship one can achieve at the Isenberg School of Management.
- **2021 Editor's Choice Article**, given by the Editor of the *International Transactions in Operational Research*. The paper, thus recognized is: Optimization of investments in labor productivity in supply chain networks (A. Nagurney).
- **2021 Editors' Choice Award**, given by the Editors of the *European Journal of Operational Research* in recognition of an outstanding contribution to the quality of the Journal. The paper thus recognized is: Supply chain game theory network modeling under labor constraints: Applications to the Covid-19 pandemic (A. Nagurney).
- **2020 Harold Larnder Prize**, awarded annually by the Canadian Operational Research Society to an individual who has achieved international distinction in operational research.
- **2019 Constantin Caratheodory Prize of the International Society of Global Optimization**, awarded at WCGO 2019, July 8-10, in Metz, France. This is a biannual award.
- **Network Science Society Fellow, elected in 2019**, for sustained contributions to network science, including the formulation, analysis, and computation of solutions to engineered network systems, from congested urban transportation to supply chains, under varied decision-making behaviors.
- **Summer Fellow, Radcliffe Institute for Advanced Study, Harvard University, 2017, 2018**
- **2018 Editor's Choice Award**, given by the Editor of the *International Transactions in Operational Research (ITOR)* for ITOR's leading articles, handpicked by the Editor. The paper thus recognized is: 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)
- **2016 INFORMS Volunteer Service Award for Distinguished Service**, given at the INFORMS Annual Meeting, November 13-16, 2016, Nashville, Tennessee
- **2016 Les Plumes Des Achats, The Procurement Authors Awards**, nomination of my book: **Competing on Supply Chain Quality: A Network Economics Perspective** (with D. Li)
- **Visiting Fellow**, All Souls College, Oxford University, Oxford, England, 2015-2016 Trinity term
- **Recognized Paper**, Competitive food supply chain networks with application to fresh produce, Min Yu and Anna Nagurney, *European Journal of Operational Research* (2013), 224(2), 273-282, selected as one of two papers for presentation by the Editors of the *European Journal of Operational Research* that were published in the past three years in a special session *Meet the Editors* at the 28<sup>th</sup> European Operational Research Conference (EURO 2016) in Poznan, Poland, July 3-6, 2016.
- **Exceptional Merit Award**, University of Massachusetts Amherst, 2015 and 2012

- **University Medal awarded by the University of Catania, Italy on June 13, 2014, for contributions to network modeling and applications and for support of operations researchers**
- **Notable Computing Article Published in 2013 – ACM Computing Reviews – for paper, “A network economic game theory model of a service-oriented Internet with choices and quality competition,” with D. Li, T. Wolf, and S. Saberi, *Netnomics* (2013), 14(1-2), 1-25. Awarded in the Computer Applications category**
- **INFORMS (Institute for Operations Research and the Management Sciences) Fellow, elected in 2013, for outstanding lifetime achievement in operations research and the management sciences**
- **Phi Kappa Phi Honor Society, University of Massachusetts Amherst, April 14, 2013**
- **2012 Walter Isard Award in recognition of distinguished scholarly achievements in the field of Regional Science, presented at the 59<sup>th</sup> Annual North American Meetings of the Regional Science Association International, November 10, 2012 in Ottawa, Canada**
- **Spotlight Scholar, University of Massachusetts Amherst 2012**
- **2011-2012 Research Excellence Award, Isenberg School of Management, University of Massachusetts Amherst**
- **Certificate of Appreciation, 65th Public Affairs Operations Center, Massachusetts Army National Guard, from Lt. Col. James Sahady, February 28, 2012**
- **Certificate in Appreciation of Outstanding Service from INFORMS for the INFORMS Northeastern Conference, University of Massachusetts Amherst, May 7, 2011**
- **The Jane F. Garvey Transportation Leadership Award from the Institute of Transportation Engineers, UMass Amherst Student Chapter, 2011**
- **The Ernst & Young Inclusive Excellence Award for Accounting and Business School Faculty 2010 Honor for outstanding example in promoting diversity and inclusiveness**
- **Stellar Scholar in Production and Operations Management, based on the h-index, in study published online in the *Journal of Operations Management*, 2008; tied for 9<sup>th</sup> place with six other scholars, based on citations since 1985 and on records of faculty publications at 225 American schools of business**
- **Certificate of Appreciation from INFORMS for serving as the Committee Chair for the 2009 WORMS Award**
- **Faculty Advisor to the UMass Amherst INFORMS Student Chapter, the chapter received the 2015, 2008, and 2006 Annual Summa Cum Laude Award; the 2020, 2017, 2012, 2011, 2010, 2009, and 2007 Magna Cum Laude Award, the 2021, 2020, 2018, 2016, and 2014 Cum Laude Award from INFORMS, and an Honorable Mention in 2022**
- **Fulbright Senior Specialist Award in Business Administration, Department of Mathematics and Computer Sciences, University of Catania, Italy, March 5-19, 2008**
- **RSAI (Regional Science Association International) Fellow, awarded at the North American RSAI Meeting, Savannah, Georgia, November 8-11, 2007**

- **2007 Award for the Advancement of Women in Operations Research / Management Science (WORMS)**, awarded at the INFORMS (Institute for Operations Research and the Management Sciences) Annual Meeting, Seattle, Washington, November 4-7, 2007
- **Radcliffe Institute Science Fellow**, Radcliffe Institute for Advanced Study, Harvard University, Cambridge, Massachusetts, 2005-2006
- **Moving Spirit Award**, INFORMS (Institute for Operations Research and the Management Sciences), November 15, 2005, San Francisco, California
- **Award for Outstanding Accomplishments in Research and Creative Activity**, University of Massachusetts Amherst, September 16, 2005
- **College Outstanding Research Award**, Isenberg School of Management, University of Massachusetts Amherst, 2004 - 2005
- **The Rockefeller Foundation Bellagio Center Research Team Residency Fellowship** (with Patrizia Daniele and Monica-Gabriela Cojocaru), Lake Como, Italy, Project: Dynamics of Complex Networks in an Environment of Risk and Uncertainty: Theoretical Foundations and Applications to Global Supply Chain and International Financial Networks, March 2004
- **2004 Best Paper Award** for the paper, "International financial networks with intermediation: Modeling, analysis, and computations," with J. M. Cruz, *Computational Management Science* (2003), 1, 31-58
- **Named Intellectual Leader in Regional Science**, *Papers in Regional Science*, January, 2004, based on citations to published articles
- **AT&T Faculty Fellowship in Industrial Ecology**, 2002
- **Fulbright/University of Innsbruck Distinguished Faculty Chair in Economics**, Innsbruck, Austria, 2001-2002
- **AT&T Faculty Fellowship in Industrial Ecology**, 2001
- **Chancellor's Medal**, University of Massachusetts Amherst, 2000
- **Distinguished Faculty Lecturer**, University of Massachusetts Amherst, 1999 - 2000
- **Eisenhower Faculty Fellowship**, National Highway Institute, 1999
- **John F. Smith Memorial Professorship**, Isenberg School of Management, University of Massachusetts Amherst, 1998
- **Distinguished Chaired Visiting Professorship at the Royal Institute of Technology (KTH)**, Stockholm, Sweden, 1996
- **Beta Gamma Sigma**, University of Massachusetts Amherst, 1993
- **Science Feature**, featured in the magazine, March 13, 1992, in *Women in Science*
- **Faculty Award for Women, National Science Foundation**, 1991; \$250,000
- **Omega Rho**, University of Massachusetts Amherst, 1991
- **University Faculty Fellowship**, University of Massachusetts Amherst, 1989

- **Certificate of Achievement Award**, 1989 IBM Supercomputing Competition
- **National Science Foundation Visiting Professorship for Women**, 1988-MIT, Cambridge, Massachusetts, 9/88-8/89; \$138,000
- **National Council of Women of the United States, Inc., 1987 Young Achiever's Award**, May 4, 1987, New York
- **International Kempe Prize in honor of Tord Palander**, Umea University, Umea, Sweden, 1986
- **Management Research Excellence Award**, School of Management, University of Massachusetts Amherst, 1985
- **Society of Sigma Xi**, 1982
- **National Slavic Honor Society**, 1975
- **Phi Beta Kappa**, 1975

### **Plenary, Endowed, Honorific Lectures and Commencement Speeches**

- Competitive equilibrium problems, variational inequalities, and regional science, Erik Kempe Prize Lecture, University of Umea, Umea, Sweden, October 11, 1986.
- Recent results for variational inequalities, Optimization Days, Montreal, Quebec, May 12-14, 1993.
- Parallel computing for economic and financial modeling, Massively Parallel Seminars, Free University, Amsterdam, The Netherlands, November 12, 1993.
- Networks for fun and profit, Distinguished Faculty Lecture, University of Massachusetts Amherst, April 5, 2000.
- International financial networks, Stockholm Optimization Days, Stockholm, Sweden, June 26-27, 2000.
- Financial networks, Computational Methods in Decision Making and Finance, Neuchatel, Switzerland, August 16, 2000.
- Parallel computation and finance, Parallel Matrix Algorithms and Applications, Neuchatel, Switzerland, August 17-19, 2000.
- Faculty commencement address, Undergraduate commencement, Isenberg School of Management, University of Massachusetts Amherst, May 24, 2003.
- Networks – the science spanning disciplines, Mesh Forum, Connecting Networks, Chicago, Illinois, May 1-4, 2005.
- Equilibria, supernetworks, and evolutionary variational inequalities, 44<sup>th</sup> Workshop on Variational Analysis and Partial Differential Equations, Erice, Sicily, July 5-14, 2006.
- Supernetworks: Management Science for the 21<sup>st</sup> Century, International Management Science Forum, Shanghai, China, August 18-19, 2006.

- Operations research and the captivating study of networks and complex decision-making, Brown Symposium for Undergraduates in the Mathematical Sciences (SUMS), Brown University, Providence, Rhode Island, March 3, 2007.
- Multicriteria decision-making for the environment: Sustainability and vulnerability analysis of critical infrastructure systems from transportation networks to electric power supply chains, the 19<sup>th</sup> Conference on Multicriteria Decision Making, Auckland, New Zealand, January 7-10, 2008.
- Transportation network equilibrium – the formalism for networks today from the Internet to electric power supply chains and financial networks: What the world should learn from regional scientists, the 55<sup>th</sup> Annual North American Meetings of the Regional Science Association International, Brooklyn, New York, November 19-22, 2008.
- Synergies and vulnerabilities of supply chain networks in a global economy: What we can learn from half a century of advances in transportation, Kleber-Gery lecture, St. Olaf College, Northfield, Minnesota, April 16, 2009.
- To merge or not to merge: Multimarket supply chain network oligopolies, coalitions, and the merger paradox, NET2009: Evolution and Complexity, Rome, Italy, May 28-30, 2009.
- Traffic panel, World Science Festival, New York City, June 10-14, 2009.
- Speaker at Invited Workshop, "Social Science and Social Computing: Steps to Integration;" title of presentation: Network design: From the physical world to virtual worlds, Honolulu, Hawaii, May 22-23, 2010.
- Supply chain networks: Challenges and opportunities from analysis to design, Computational Management Science 2010, Vienna, Austria, July 28-30, 2010.
- Fragile networks: Identifying vulnerabilities and synergies in an uncertain world, Yalta Optimization Conference 2010: "Network Science," Yalta, Ukraine, August 2-4, 2010.
- Supernetworks: Opportunities and challenges for decision-making in the 21<sup>st</sup> century, PAKDD 2011: The 15<sup>th</sup> Pacific-Asia Conference on Knowledge Discovery and Data Mining. May 24-27, 2011, Shengzen, China, delivered via videotape.
- Supernetworks in healthcare and humanitarian operations, 2011 IEEE Conference on Supernetworks and System Management, Shanghai, China, May 29-30, 2011, delivered by Min Yu.
- Sustainability: Methodology with some applications, Engineering and Renewable Energy Opening Workshop, SAMSI Program on Uncertainty Quantification, Research Triangle Park, North Carolina, September 19-21, 2011.
- Grand challenges and opportunities in supply chain network analysis and design, NetGCooP 2011, International Conference on Network Games, Control and Optimization, Paris, France, October 12-14, 2011.
- Design of sustainable supply chains for sustainable cities, COMPLEX-City Workshop, sponsored by the Royal Netherlands Academy of Arts and Sciences, Amsterdam, The Netherlands, December 5-6, 2011; emailed presentation.
- Life as a network, Commencement / Diploma speech given to Master's degree recipients, School of Business, Economics and Law, University of Gothenburg, Gothenburg, Sweden, June 14, 2012.
- Grand challenges and opportunities in supply chain networks: From analysis to design, Keynote talk in the Oklahoma University Presidential Dream Course, "Understanding and Engineering Systems," Norman, Oklahoma, April 1, 2013, plus public lecture – title:

Assessing the performance and vulnerability of networks from transportation to the Internet, financial networks, and supply chains: Which nodes and links really matter? Oklahoma University, Norman, Oklahoma, April 1, 2013.

- Transport and traffic, panelist, *The New York Times* EnergyforTomorrow Conference, NYC, April 25, 2013.
- On great leadership, Commencement / Diploma speech to be given to Master's degree recipients, School of Business, Economics and Law, University of Gothenburg, Gothenburg, Sweden, June 12, 2013.
- Network economics and the Internet, Network Models in Economics and Finance, Athens, Greece, June 13-15, 2013.
- Networks against time: From food to pharma, Workshop 2013, ETH Risk Center: Vulnerability and Resilience of Supply Chains, Switzerland, September 12-13, 2013.
- The traffic circle of life, TEDx UMass Amherst, Professor Speaker Showcase, Isenberg School of Management, November 25, 2013.
- Envisioning a future Internet: The network economics of ChoiceNet, 2013 Network Frontier Workshop, Northwestern University, Evanston, Illinois, December 4-6, 2013.
- Our outstanding UMass Amherst students, Phi Kappa Phi Induction Ceremony, UMass Amherst, April 6, 2014.
- Sustainable supply chain networks for sustainable cities, 7th Session of the International Seminars on Planetary Emergencies Energy, Cities, and the Control of Complex Systems, Erice, Italy, May 11-15, 2014.
- Equilibria and dynamics of supply chain network competition with information asymmetry in quality and minimum quality standards (work with D. Li), presented at the University of Catania, Italy, June 13, 2014. Awarded the University Medal after the lecture.
- Design of sustainable supply chains for sustainable cities, DPG Spring Meeting, Physics of Socio-Economic Systems Division, Berlin, Germany, March 15-20, 2015.
- Sustainable supply chain networks for sustainable cities, Congreso Internacional Industria y Organizaciones, Bogota, Colombia, August 4-6, 2015.
- Supply chain networks against time: From food to pharma, Distinguished Guest Lecturer, Yale Institute for Network Science (YINS), Yale University, New Haven, Connecticut, February 17, 2016.
- Predictive and prescriptive models of cybercrime and cybersecurity investments under network vulnerability, Analytics Day, University of Waterloo, Canada, April 15, 2016.
- Game theory models of cybercrime and cybersecurity investments under network vulnerability, GameSec2016, Conference on Decision and Game Theory in Security, New York, NY, November 2-4, 2016.
- Supply chain performance assessment and supplier and component importance identification in a general competitive multitiered supply chain network model, Risk, Resilience and Robustness of Dynamic Supply Networks: Bridging Mathematical Models and Practice, Edinburgh, Scotland, January 11-13, 2017; prepared but not given.
- A scientific approach to financial supernetworks, International Expert Panel, sponsored by the UNODC, March 2, 2017.

- Blood supply chains: Challenges for the industry and how operations research can help, 2017 International Conference on Operations Research – Annual Conference of the German Operations Research Society, Berlin, Germany, September 6-8, 2017.
- Game theory models of cybercrime and cybersecurity investments under network vulnerability, to be given at VINEPA 2018, Variational Inequalities, Nash Equilibrium Problems and Applications, Reggio Calabria, Italy, March 8-9, 2018.
- Perishable product supply chain networks: The role of transportation, 18<sup>th</sup> Swiss Transport Research Conference (STRC2018), Monte Verita, Ascona, Switzerland, May 16-18, 2018.
- Network journeys: For the love of Operational Research, Inaugural OR Society Early Career Researcher (ECR) Workshop, Lancaster, England, September 9-10, 2018.
- Operations research: The transfORMative Discipline for the 21<sup>st</sup> Century, OR Society 60th Anniversary Conference (OR60), Lancaster, England, September 11-13, 2018.
- Sustainable supply chain networks for sustainable cities, Workshop on Smart Cities Analytics: Optimizing Energy, Transportation, and Telecommunications, Ivey Business School, University of Western Ontario, Canada, October 12, 2018.
- Networks to save the world: OR in Action, Omega Rho Distinguished Lecturer, INFORMS, Phoenix, Arizona, November 4-7, 2018.
- The era of supernetworks, Congreso Futuro, Santiago, Chile, January 15, 2019 and Women in science: A personal journey, Congreso Futuro, Valparaiso, Chile, January 17, 2019.
- Supply chain networks against time: From food to pharma, Optimization Days, MORSC Anniversary, May 15, 2019
- Tariffs and quotas in global trade: What networks, game theory, and variational inequalities reveal, 6<sup>th</sup> World Congress on Global Optimization, Metz, France, July 8-10, 2019.
- Tariffs and quotas in global trade: What networks, game theory, and variational inequalities reveal, VI Congreso Internacional Industria, Organizaciones y Logística, Cartagena, Colombia, August 22-23, 2019.
- Operations Research: The TransfORMative Discipline for the 21st Century, VIII Congreso de la Sociedad Mexicana de Investigación de Operaciones (CSMIO 2019), Mexico City, Mexico, October 16-18, 2019.
- Optimization of food supply chain networks: Why quality, trade instrument, and labor all matter, Amazon Consumer Science Summit (virtual), September 28- October 1, 2020.
- Novel supply chain network models inspired by the COVID-19 pandemic - From optimization to game theory. Harold Larnder Prize Plenary Talk, CORS Conference (virtual), June 7-10, 2021.
- Game theory and variational inequalities: From transportation and supply chains to financial networks and the Internet . Critical Infrastructure Network Security (CINS) Workshop, ACM Sigmetrics (virtual), June 14, 2021.
- Labor and supply chain networks: Insights from models inspired by the COVID-19 pandemic. Modeling and Optimization: Theory and Applications (MOPTA) (virtual), Lehigh University, Pennsylvania, August 2-4, 2021; also delivered at the International Conference on Network Games, Control and Optimisation (NETGCOOP) (virtual), September 22-24, 2021.
- Supply chain networks, labor, and resilience. International Congress Industry and Organization (virtual), Bogota, Colombia, August 4-5, 2022.

- Labor and supply chain networks: It's all about people. International Conference on Optimization and Decision Science. Firenze, Italy, August 30-September 2, 2022.
- Human migration networks: How Operations Research can assist with refugees and supply chain labor shortages, IFORS Distinguished Lecture. To be given at CLAIO 2022, Buenos Aires, Argentina, December 12-15, 2022.
- Agricultural supply chain networks: From trade to resilience and how OR can help. To be given at the IFORS conference, Santiago, Chile, July 10-14, 2023.

## Grants

2015-2017 **National Science Foundation Grant** – Co-PI – EAGER: Collaborative Research: Enabling Economic Policies in Software-Defined Internet Exchange Points: \$149, 992; renewed until September 2018.

2011-2015 **National Science Foundation Grant** – Co-PI – NeTS: Large: Collaborative Research: Network Innovation Through Choice: UMass Amherst portion -- \$909,794 out of \$2,720,446 grant total award through 2014. \$100,000 supplement awarded in 2014 to UMass Amherst.

2014 - **Advanced Cyber Security Center** -- Co-PI - Cybersecurity Risk Analysis for Enterprise Security, \$40,000.

2012 - **Advanced Cyber Security Center** -- Co-PI - Cybersecurity Risk Analysis and Security Investment Optimization; \$75,000.

2008 **Institute for International Education Grant** - to support travel for several conferees to the Rockefeller Foundation Bellagio Center Conference on Humanitarian Logistics: Networks for Africa on Lake Como, Italy, May 5-9, 2008.

2008 **Rockefeller Foundation Bellagio Study and Conference Center Grant** - to host conference on "Humanitarian Logistics: Networks for Africa," on Lake Como, Italy, May 5-9, 2008.

2008 **Fulbright Senior Specialist in Business Administration** - to conduct a workshop, present lectures, and overview programs and educational materials on the theme - Complex Networks and Vulnerability Analysis: From Innovations in Theory to Education and Practice. The site is the University of Catania in Italy, March 5-19, 2008.

2000-2007 **National Science Foundation Grant** – Decentralized Decision-Making in Complex Network Systems; \$711,125. Supplement received through the Management of Knowledge Intensive Dynamic Systems Program (MKIDS): Knowledge Supernetworks: The Modeling and Management of the Dynamics of Complex Business Processes Under Risk and Uncertainty.

2006 **Radcliffe Institute for Advanced Study Educational Programs** - Exploratory Seminar on Dynamic Networks: Behavior, Optimization and Design, with David Parkes of Harvard University, \$12,000.

2004 **Grant for Professional Development in Teaching**, Center for Teaching, University of Massachusetts at Amherst – Web-Based Computation and Visualization Tools for Transportation and Logistics; \$3,000

2004 **Professional Development Support**; \$2,885 as part of PMYR, University of Massachusetts Amherst.

2002 **AT&T Faculty Fellowship in Industrial Ecology** – Renewal of 2001 AT&T award; \$25,000.

2002 **National Science Foundation Grant** – Decentralized Decision-Making in Complex Network Systems; \$11,250 REU supplement.

2001 **AT&T Faculty Fellowship in Industrial Ecology** – Supernetworks and the Environment: Foundations and a Virtual Center; \$25,000.

2000 **National Science Foundation Grant** – Co-PI – Enterprise-wide Simulation and Analytical Modeling of Comprehensive Freight Movements; \$140,000 (1 year), \$6,000 REU supplement in 2001.

2000 **National Science Foundation Grant** – U.S.-Sweden Collaborative Research: Sustainable Transportation and Land Use in the Information Society; \$28,515 (3 year project).

1996 **GE Fund Grant**; \$850,000, Research Associate, awarded to Department of Chemical Engineering.

1991 **National Science Foundation Faculty Award for Women**, New Directions in Variational Inequalities for Equilibrium Modeling and Computations; \$250,000; \$50,000 per year for 5 years.

1990 **United States Department of Agriculture - Economic Research Service**; \$15,000, Federal Agricultural Credit Programs and Financial Markets: A General Equilibrium Application.

1990 **School of Management Summer Research Grant**, University of Massachusetts Amherst; \$5,000.

1988 **National Science Foundation VPW Grant**; \$138,000+, Parallel and Serial Algorithms for Large-Scale Nonlinear Network Flow Problems.

1987 **National Science Foundation Supercomputer Grant** – Alternative Algorithms for the Computation of Dynamic Equilibria.

1984-87 **School of Management Summer Research Grant**, University of Massachusetts Amherst; \$1,500.

1986 **Cornell Center for Theory and Simulation, the Production Supercomputer Facility**, Large-Scale Computations of Competitive Equilibrium Problems.

1985 **Faculty Research Grant**, University of Massachusetts Amherst, An Abstract Network Framework for the Study of the Firm; \$2,130.

1983 **Faculty Research Grant**, University of Massachusetts Amherst, Sensitivity Analysis in the Combined Network Spatial Price Equilibrium Problem, \$2,073.

## Books

**Network Economics: A Variational Inequality Approach**, Advances in Computational Economics, vol. 1, Kluwer Academic Publishers, Boston, Massachusetts, 1993; second revised edition, vol. 10, Dordrecht, The Netherlands, 1999.

**Advances in Equilibrium Modeling, Analysis and Computation**, Annals of Operations Research, vol. 44, guest editor, J. C. Baltzer, A. G. Scientific Publishing Company, Switzerland, 1993.

**Projected Dynamical Systems and Variational Inequalities with Applications** (with D. Zhang), Kluwer Academic Publishers, Boston, Massachusetts, 1996.

**Financial Networks: Statics and Dynamics** (with S. Siokos), Springer-Verlag, Heidelberg, Germany, 1997.

**Environmental Networks: A Framework for Economic Decision-Making and Policy Analysis** (with K. K. Dhandu and P. Ramanujam), Edward Elgar Publishing, Cheltenham, England, 1999.

**Sustainable Transportation Networks**, Edward Elgar Publishing, Cheltenham, England, 2000.

**Supernetworks: Decision-Making for the Information Age** (with J. Dong), Edward Elgar Publishing, Cheltenham, England, 2002.

**Innovations in Financial and Economic Networks**, editor, Edward Elgar Publishing, Cheltenham, England, 2003.

**Supply Chain Network Economics: Dynamics of Prices, Flows, and Profits**, Edward Elgar Publishing, Cheltenham, England, 2006.

**Fragile Networks: Identifying Vulnerabilities and Synergies in an Uncertain World** (with Q. Qiang), John Wiley & Sons, New York, 2009.

**Networks Against Time: Supply Chain Analytics for Perishable Products** (with M. Yu, A. H. Masoumi, and L. S. Nagurney), Springer Science+Business Media, New York, NY, 2013.

**Competing on Supply Chain Quality: A Network Economics Perspective** (with D. Li), Springer, International Publishing Switzerland, 2016.

**Dynamics of Disasters: Key Concepts, Models, Algorithms, and Insights** (edited with I.S. Kotsireas and P.M. Pardalos), Springer International Publishing Switzerland, 2016.

**Dynamics of Disasters: Algorithmic Approaches and Applications**, (edited with I.S. Kotsireas and P.M. Pardalos), Springer International Publishing Switzerland, 2018.

**Dynamics of Disasters: Impact, Risk, Resilience, and Solutions**, I.S. Kotsireas, A. Nagurney, P.M. Pardalos, and A. Tsokas, Editors, Springer Nature Switzerland AG, 2021.

**Labor and Supply Chain Networks**, A. Nagurney, in production, Springer.

## Book Chapters

A general dynamic spatial price equilibrium model with gains and losses, **Advances in Spatial Theory and Dynamics**, vol. 20, A.E. Andersson, D.F. Batten, B. Johansson, P. Nijkamp, editors, North-Holland, Amsterdam, The Netherlands, 1989, 223-240. The application of variational inequality theory to the study of spatial equilibrium and disequilibrium, **Readings in Econometric Theory and Practice: Volume in Honor of George Judge**, Contributions to Economic Analysis Series, vol. 209, W.E. Griffiths, H. Lutkepold, M.E. Bock, Editors, North-Holland, Amsterdam, The Netherlands, 1992, 327-355.

A Splitting Equilibration Algorithm for the computation of large-scale constrained matrix problems: theoretical analysis and applications (with A. Eydeland), **Computational Economics and Econometrics** vol. 22, H. Amman, D. Belsley, and L. Pau, Editors, Kluwer Academic Publishers, Boston, Massachusetts, 1992, 65-105.

Human migration networks with class transformations (with J. Pan and L. Zhao), **Structure and Change in the Space Economy**, T.R. Lakshmanan and P. Nijkamp, Editors, Springer-Verlag, Berlin, Germany, 1992, 239-258.

Variational inequalities for the computation of financial equilibria in the presence of taxes and price controls (with J. Dong), **Computational Techniques in Economics and Econometrics**, Advances in

Computational Economics, vol. 3, D.A. Belsley, Editor, Kluwer Academic Publishers, Boston, Massachusetts, 1993, 189-205.

A network framework for general economic equilibrium (with L. Zhao), **Network Optimization Problems: Algorithms, Complexity, and Applications**, D.Z. Du and P.M. Pardalos, Editors, World Scientific Press, Singapore, 1993, 363-386.

The modeling and computation of generalized goal programming problems (with S. Thore and J. Pan), **New Directions in Computational Economics**, Advances in Computational Economics, vol. 4, W.W. Cooper and A. B. Whinston, Editors, Kluwer Academic Publishers, Boston, Massachusetts, 1994, 95-120.

Formulation and computation of general financial equilibrium with transaction costs (with J. Dong), **Advances in Mathematical Programming and Financial Planning**, vol. 4, K. Lawrence, J.B. Guerard Jr., G.P. Reeves, Editors, JAI Press, Greenwich, Connecticut, 1995, 3-24.

Spatial price equilibrium models with discriminatory ad valorem tariffs: Formulation and comparative computation using variational inequalities (with C.F. Nicholson and P.M. Bishop), **Recent Advances in Spatial Equilibrium Modelling: Methodology and Applications**, J.C.J.M. van den Berg, P. Nijkamp, and P. Rietveld, Editors, Springer - Verlag, Berlin, Germany, 1995, 179-200.

Parallel computation, **Handbook of Computational Economics**, D. Kendrick, J. Rust, H.M. Amman, editors, North-Holland, Amsterdam, The Netherlands, 1996, 331-400.

Parallel computation of economic equilibria, **Applications on Advanced Computer Architectures**, G. Astfalk, Editor, SIAM, Philadelphia, Pennsylvania, 1996, 265-276.

Parallel computation of variational inequalities and projected dynamical systems with applications, **Parallel Computing in Optimization**, S. Migdalas, P.M. Pardalos, and S. Storoy, Editors, Kluwer Academic Publishers, Dordrecht, The Netherlands, 1997, 343-411.

Projected dynamical systems for international financial policy modeling and computation (with S. Siokos), **Computational Approaches to Economic Problems**, H. Amman, B. Rustem, and A. Whinston, Editors, Dordrecht, The Netherlands, 1997, 175-191.

Massively parallel computation of dynamic traffic networks modeled as projected dynamical systems (with D. Zhang), **Network Optimization**, Lecture Notes in Economics and Mathematical Systems, vol. 450, P.M. Pardalos, D.W. Hearn, W.W. Hager, Editors, Springer-Verlag, Berlin, Germany, 1997, 374-396.

Dynamics of international financial networks: modeling, stability analysis, and computation (with S. Siokos), **Knowledge and Networks in a Dynamic Economy**, M.J. Beckmann, B. Johansson, F. Snickers, and R. Thord, Editors, Springer-Verlag, Berlin, Germany, 1998, 119-150.

Female doctorates in science and engineering: challenges and opportunities in academia on the cusp of the new millennium, **Science, Technology and Society: University Leadership Today and for the Twenty-first Century**, Ingmar Grethe, Editorial Chairman, KTH, Stockholm, Sweden, 1998, 259-276.

Introduction to projected dynamical systems for traffic network equilibrium problems (with D. Zhang), **Network Infrastructure and the Urban Environment**, L. Lundqvist, L.G. Mattsson, T.J. Kim, Editors, Springer-Verlag, Berlin, Germany, 1998, 125-156.

Network equilibria and disequilibria (with D. Zhang), **Equilibrium and Advanced Transportation Modeling**, P. Marcotte and S. Nguyen, Editors, Kluwer Academic Publishers, Boston, MA, 1998, 201-243.

Supply chain networks with multicriteria decision makers (with J. Dong and D. Zhang), **Transportation and Traffic Theory in the 21<sup>st</sup> Century**, M.A.P. Taylor, Editor, Pergamon, Amsterdam, The Netherlands, 2002, 179-196.

Pollution permits and spatial price networks, **Transportation and Network Analysis: Current Trends**, M. Gendreau and P. Marcotte, Editors, Kluwer Academic Publishers, Dordrecht, The Netherlands, 2002, 199-220.

Traffic network equilibrium and the environment: A multicriteria decision-making perspective (with J. Dong and P.L. Mokhtarian), **Computational Methods in Decision-Making, Economics and Finance**, E.J. Kontogiorghes, B. Rustem, and S. Siokos, Editors, Kluwer Academic Publishers, Dordrecht, The Netherlands, 2002, 501-523.

Multicriteria spatial price networks: Statics and dynamics (with J. Dong and D. Zhang), in **Equilibrium Problems and Variational Models**, P. Daniele, A. Maugeri, and F. Giannessi, Editors, Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003, 299-321.

International financial networks with electronic transactions (with J. Cruz), **Innovations in Financial and Economic Networks**, A. Nagurney, Editor, Edward Elgar Publishing, Cheltenham, England, 2003, 135-167.

A supply chain network economy: Modeling and qualitative analysis (with D. Zhang and J. Dong), **Innovations in Financial and Economic Networks**, A. Nagurney, Editor, Edward Elgar Publishing, Cheltenham, England, 2003, 195-211.

Financial and economic networks: An overview, **Innovations in Financial and Economic Networks**, A Nagurney, Editor, Edward Elgar Publishing, Cheltenham, England, 2003, 1-26.

Supply chain supernetworks with random demands (with J. Dong and D. Zhang), **Urban and Regional Transportation Modelling: Essays in Honor of David E. Boyce**, D.-H Lee, Editor, Edward Elgar Publishing, Cheltenham, England, 2004, 289-313.

Supernetworks: Paradoxes, challenges, and new opportunities, **Transforming Enterprise**, W.H. Dutton, B. Kahin, R. O'Callaghan, and A.W. Wyckoff, Editors, MIT Press, Cambridge, Massachusetts, 2004, 229-254.

Spatial equilibration in transport networks, **Handbook of Transport Geography and Spatial Systems**, D.A. Hensher, K.J. Button, K.E. Haynes, and P.R. Stopher, Editors, Elsevier, Amsterdam, The Netherlands, 2004, 583-608.

The co-evolution and emergence of integrated international financial networks and social networks: Theory, analysis, and computations (with J.M. Cruz and T. Wakolbinger), to appear in **Globalization and Regional Economic Modeling**, R.J. Cooper, K.P. Donaghy, and G.J.D. Hewings, Editors, Springer, Berlin, Germany, 2006.

Supernetworks, invited chapter for **Handbook of Optimization in Telecommunications**, P. M. Pardalos and M.G.C. Resende, Editors, Springer, New York, 2006, 1073-1119.

A supply chain network perspective for electric power generation, supply, transmission, and consumption, **Optimisation, Econometric and Financial Analysis**, E.J. Kontogiorghes and C. Gatu, Editors, Springer, Berlin, Germany, 2006, 3-27.

Global supply chain networks and risk management: A multi-agent framework (with J. M. Cruz and J. Dong), **Multi-agent Based Supply Chain Management**, B. Chaib-draa and J. Muller, Editors, Springer, New York, 2006, 103-134.

Dynamics of global supply chain supernetworks in a new era of risk and uncertainty (with D. Matsypura), **Towards Better Performing Transport Networks**, B. Jourquin, P. Rietveld, and K. Westin, Editors, Routledge, England, 2006, 211-235.

Financial networks, invited chapter for **Handbook of Financial Engineering**, C. Zopounidis, M. Doumpos, and P.M. Pardalos, Editors, Springer, Berlin, Germany, submitted, 2005.

An evolutionary variational inequality formulation of supply chain networks with time-varying demands (with Z. Liu), **Network Science, Nonlinear Science and Infrastructure Systems**, T.L. Friesz, editor, Springer, Berlin, Germany, 2007, 267-302.

Projected dynamical systems, evolutionary variational inequalities, applications, and a computational procedure (with M.-G. Cojocaru and P. Daniele), **Pareto Optimality, Game Theory and Equilibria**, A. Chinchuluun, A. Migdalas, P.M. Pardalos, and L. Pitsoulis, Editors, Springer, Berlin, Germany, 2008, 387-406.

Statics and dynamics of global supply chain networks with environmental decision-making (with J. Cruz and F. Toyasaki), **Pareto Optimality, Game Theory and Equilibria**, A. Chinchuluun, A. Migdalas, P. M. Pardalos, and L. Pitsoulis, Editors, Springer, Berlin, Germany, 2008, 803-836.

Identification of critical nodes and links in financial networks with intermediation and electronic transactions (with Q. Qiang), **Computational Methods in Financial Engineering**, E.J. Kontoghiorghes, B. Rustem, and P. Winker, Editors, Springer, Berlin, Germany, 2008, 273-297.

Networks in finance, **Handbook on Information Technology and Finance II**, D. Seese, C. Weinhardt, and F. Schlotzman, Editors, Springer, Berlin, Germany, 2008, 383-420.

Spatially differentiated trade of permits for multipollutant electric power supply chains (with T. Woolley and J.K. Stranlund), **Optimization in the Energy Industry**, K. Kallrath, P.M. Pardalos, S. Rebennack, and M. Scheidt, Editors, Springer, Berlin, Germany, 2009, 277-296.

Network economics, **Handbook of Computational Econometrics**, D. Belsley, and E.J. Kontoghiorghes, Editors, John Wiley & Sons, 2009, 429-486.

Modeling of supply chain risk under disruptions with performance measurement and robustness analysis (with Q. Qiang and J. Dong), **Managing Supply Chain Risk and Vulnerability: Tools and Methods for Supply Chain Decision Makers**, T. Wu and J. Blackhurst, Editors, Springer, London, England, 2009, 91-111.

Environmental and cost synergy in supply chain network integration in mergers and acquisitions (with T. Woolley), **Sustainable Energy and Transportation Systems, Proceedings of the 19<sup>th</sup> International Conference on Multiple Criteria Decision Making, Lecture Notes in Economics and Mathematical Systems**, M. Ehrgott, B. Naujoks, T. Stewart, and J. Wallenius, Editors, Springer, Berlin, Germany, vol. 634, 2010, 51-78.

Fashion supply chain management through cost and time minimization from a network perspective (with M. Yu), **Fashion Supply Chain Management: Industry and Business Analysis**, T.-M. Choi, Editor, IGI Global, Hershey, Pennsylvania, 2011, 1-20.

Supply chain network design of a sustainable blood banking system (with A. H. Masoumi), **Sustainable Supply Chains: Models, Methods and Public Policy Implications**, T. Boone, V. Jayaraman, and R. Ganeshan, Editors, Springer, London, England, 2012, 49-72.

Supply chains and transportation networks, **Handbook of Regional Science**, M.M. Fischer and P. Nijkamp, Editors, Springer, Berlin, Germany, 2014, 787-810.

A supply chain network game theoretic framework for time-based competition with transportation

costs and product differentiation (with M. Yu), **Optimization in Science and Engineering, in honor of the 60<sup>th</sup> Birthday of Panos Pardalos**, T.M. Rassias, C. A. Floudas, and S. Butenko, Editors, Springer, New York, 2014, 381-400.

A dynamic network economic model of a service-oriented Internet with price and quality competition, (with D. Li, S. Saberi, and T. Wolf), **Network Models in Economics and Finance**, V.A. Kalyagin, P.M. Pardalos, and T.M. Rassias, Editors, Springer International Publishing Switzerland, 2014, 239-264.

Fashion supply chain network competition with ecolabelling (with M. Yu and J. Floden), **Sustainable Fashion Supply Chain Management: From Sourcing to Retailing**, T.-M. Choi and T.C.E Cheng, Editors, Springer, 2015, 61-84.

An integrated disaster relief supply chain network model with time targets and demand uncertainty (with A.H. Masoumi and M. Yu), **Regional Science Matters: Studies Dedicated to Walter Isard**, P. Nijkamp, A. Rose, and K. Kourtit, Editors, Springer International Publishing Switzerland, 2015, 287-318.

A supply chain game theory framework for cybersecurity investments under network vulnerability (with L.S. Nagurney and S. Shukla), **Computation, Cryptography and Network Security**, N. Daras and M.Th. Rassias, Editors, Springer International Publishing Switzerland, 2015, 381-398.

A mean-variance disaster relief supply chain network model for risk reduction with stochastic link costs, time targets, and demand uncertainty (with L.S. Nagurney), **Dynamics of Disasters: Key Concepts, Models, Algorithms, and Insights**, I. Kotsireas, A. Nagurney, and P.M. Pardalos, Editors, Springer International Publishing Switzerland, 2016, 231-255.

Freight service provision for disaster relief: A competitive network model with computations, **Dynamics of Disasters: Key Concepts, Models, Algorithms, and Insight**, I.S. Kotsireas, A. Nagurney, and P.M. Pardalos, Editors, Springer International Publishing Switzerland, 2016, 207-229.

Introduction to the volume: **Dynamics of Disasters: Key Concepts, Models, Algorithms, and Insight**, I.S. Kotsireas, A. Nagurney, and P.M. Pardalos, Editors, Springer International Publishing Switzerland, 2016, i-xi.

Cybersecurity investments with nonlinear budget constraints: Analysis of the marginal expected utilities (with P. Daniele and A. Maugeri), **Operations Research, Engineering and Cyber Security: Trends in Applied Mathematics and Technology**, T.M. Rassias and N.J. Daras, Editors, Springer International Publishing Switzerland, 2017, 117-134.

Preface to the volume: **Dynamics of Disasters: Algorithmic Approaches and Applications**, I.S. Kotsireas, A. Nagurney, and P.M. Pardalos, Editors, Springer International Publishing Switzerland, 2018, v-viii.

A variational equilibrium network framework for humanitarian organizations in disaster relief: Effective product delivery under competition for financial funds (with P. Daniele, E. Alvarez Flores, and V. Carusa), **Dynamics of Disasters: Algorithmic Approaches and Applications**, I.S. Kotsireas, A. Nagurney, and P.M. Pardalos, Editors, Springer International Publishing Switzerland, 2018, 109-133.

A multitiered supply chain network equilibrium model for disaster relief with capacitated freight service provision, **Dynamics of Disasters: Algorithmic Approaches and Applications**, I.S. Kotsireas, A. Nagurney, and P.M. Pardalos, Editors, Springer International Publishing Switzerland, 2018, 85-108.

Capacitated human migration networks and subsidization (with P. Daniele and G. Cappello), **Dynamics of Disasters - Impact, Risk, Resilience, and Solutions**, I.S. Kotsireas, A. Nagurney, P.M. Pardalos, and A. Tsokas, Editors, Springer Nature Switzerland AG, 2021, 195-217.

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

Competition for medical supplies under stochastic demand in the Covid-19 pandemic: A Generalized Nash Equilibrium framework (with M. Salarpour, J. Dong, and P. Dutta), **Nonlinear Analysis and Global Optimization**, T.M. Rassias, and P.M. Pardalos, Editors, Springer Nature Switzerland AG, 2021, 331-356.

Game theory and the COVID-19 pandemic, **Emerging Optimization Methods and Modeling Techniques with Applications**, *INFORMS Tutorials in Operations Research*, J. Carlsson, Editor, 2021, 83-130.

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. Accepted for: **Handbook for Management of Threats, Security and Defense, Resilience and Optimal Strategies**, K. Balomenos, A. Fytopoulos, and P.M. Pardalos, Editors, Springer Nature.

### Edited Journal Special Issues

Co-Editor (with S. Dafermos) — *Transportation Science* issue on Network Equilibrium, vol. 26, no. 1, 1992.

*International Journal of Supercomputer Applications*, special issue on Computational Economics, vol. 7, no. 3, 1993.

*Computational Economics*, special issue on Computational Finance, vol. 7, no. 4, 1994.

*Computational Economics*, special issue on Computational Finance, joint with M. Gilli, 1995.

*Parallel Computing*, special issue on Economics, Finance and Decision-Making, with B. Rustem and E. Kontoghiorghes, vol. 26, No. 5, 2000.

*Computational Economics*, special issue on Finance and Variational Inequalities, vol.17, no. 1, 2001.

*Computational Management Science*, special issue on Financial Networks, vol. 10, no. 2-3, 2013.

*Operations Research Forum*, special issue on Dynamics of Disasters, Co-Editor, in preparation (several papers in this volume have already been published online).

*EURO Journal on Computational Optimization*, Co-Editor, in preparation. Special issue is on Advances in Nonlinear Optimization and Equilibrium Problems and based on papers presented at the Optimization and Decision Science Conference in Firenze, Italy in 2022.

### Journal Publications

1. Sensitivity analysis for the general spatial economic equilibrium problem (with S. Dafermos) (1984), *Operations Research*, 32, 1069-1086.
2. Comparative tests of multimodal traffic equilibrium methods (1984), *Transportation Research B*, 18, 469-485.
3. Sensitivity analysis for the general asymmetric network equilibrium problem (with S. Dafermos) (1984), *Mathematical Programming*, 28, 174-184.

4. On some traffic equilibrium theory paradoxes (with S. Dafermos) (1984), *Transportation Research B*, 18, 101-110.
5. A network formulation of market equilibrium problems and variational inequalities (with S. Dafermos) (1984), *Operations Research Letters*, 3, 247-250.
6. Computational comparisons of algorithms for general asymmetric traffic problems with fixed and elastic demands (1986), *Transportation Research B*, 20, 78-84.
7. An algorithm for the single commodity spatial price equilibrium problem (1986), *Regional Science and Urban Economics*, 16, 573-588.
8. Computational comparisons of spatial price equilibrium methods (1987), *Journal of Regional Science*, 27, 55-76.
9. Oligopolistic and competitive behavior of spatially separated markets (with S. Dafermos) (1987), *Regional Science and Urban Economics*, 17, 245-254.
10. An algorithm for the classical spatial price equilibrium problem (1987), *Operations Research Letters*, 6, 93-98.
11. Competitive equilibrium problems, variational inequalities, and regional science, Erik Kempe Prize Lecture (1987), *Journal of Regional Science*, 27, 503-514.
12. An equilibration scheme for the traffic assignment problem with elastic demands (1988), *Transportation Research B*, 22, 73-79.
13. Algorithms for oligopolistic market equilibrium problems (1988), *Regional Science and Urban Economics*, 18, 425-445.
14. A general, dynamic spatial price equilibrium model: formulation, solution, and computational results (with J. Aronson) (1988), *Journal of Computational and Applied Mathematics*, 22, 339-357.
15. An algorithm for the solution of a quadratic programming problem with application to constrained matrix and spatial price equilibrium problems (1989), *Environment and Planning A*, 21, 99-114.
16. Parallel and serial variational inequality decomposition algorithms for multicommodity market equilibrium problems (with D. S. Kim) (1989), *The International Journal of Supercomputer Applications*, 3, 34-59.
17. A general equilibrium model of interregional monetary flows (with C. Moore) (1989), *Environment and Planning A*, 397-404.
18. Supply and demand equilibration algorithms for a class of market equilibrium problems (with S. Dafermos) (1989), *Transportation Science*, 23, 118-124.
19. Import and export equilibration algorithms for the net import spatial price equilibrium problem (1989), *Journal of Cost Analysis*, 7, 73-88.
20. Reply to "The Expanding Equilibrium Algorithm - further evidence" (1989), *Journal of Cost Analysis*, 7, 93-102.
21. A general dynamic spatial price network equilibrium model with gains and losses (with J. Aronson) (1989), *Networks*, 19, 751-769.
22. The formulation and solution of large-scale multicommodity equilibrium problems over space and

- time (1989), *European Journal of Operations Research*, 42, 166-177.
23. The integer linear complementarity problem (with P. M. Pardalos) (1990), *International Journal of Computer Mathematics*, 31, 205-214.
  24. Migration equilibrium and variational inequalities (1989), *Economics Letters*, 31, 109-112.
  25. Progressive equilibration algorithms: the case of linear transaction costs (with A. Eydeland) (1989), *Computer Science in Economics and Management*, 2, 197-219.
  26. A network model of migration equilibrium with movement costs (1990), *Mathematical and Computer Modelling*, 13, 79-88.
  27. Serial and parallel equilibration of large-scale constrained matrix problems with application to the social and economic sciences (with D. S. Kim and A. Robinson) (1990), *The International Journal of Supercomputer Applications*, 4.1, 49-71.
  28. Parallel computation of large-scale nonlinear network problems in the social and economic sciences (with D. S. Kim) (1990), *Supercomputer*, 40, 50-56.
  29. Disequilibrium and variational inequalities (with L. Zhao) (1990), *Journal of Computational and Applied Mathematics*, 33, 181-198.
  30. A network equilibrium formulation of market disequilibrium and variational inequalities (with L. Zhao) (1991), *Networks*, 21, 109-132.
  31. Parallel computation of large-scale dynamic market network equilibria via time period decomposition (with D. S. Kim) (1991), *Mathematical and Computer Modelling*, 15, 55-67.
  32. Equilibrium modeling, analysis, and computation: the contributions of Stella Dafermos (1991) *Operations Research*, 39, 9-12.
  33. Human migration networks (with J. Pan and L. Zhao) (1992), *European Journal of Operational Research*, 59, 262-274.
  34. A parallel network equilibration algorithm for a class of constrained matrix problems (with A. Eydeland), (1992), *Transportation Science*, 26, 59-68.
  35. Algorithms for quadratic constrained matrix problems (with A. Robinson) (1992), *Mathematical and Computer Modelling*, 16, 53-65.
  36. A network model and algorithm for the analysis and estimation of financial flow of funds (with M. Hughes) (1992), *Computer Science in Economics and Management*, 5, 23-39.
  37. Financial flow of funds networks (with M. Hughes) (1992), *Networks*, 22, 145-161.
  38. Generalized goal programming and variational inequalities (with S. Thore and J. Pan) (1992), *Operations Research Letters*, 12, 217-226.
  39. The formulation and computation of general financial equilibrium (with J. Dong and M. Hughes) (1992), *Optimization*, 26, 339-354.
  40. A stochastic, dynamic airline network equilibrium model (with F. Soumis) (1993), *Operations Research*, 4, 721-730.
  41. Networks and variational inequalities in the formulation and computation of market disequilibria: the case of direct demand functions (with L. Zhao) (1993), *Transportation Science*, 27, 4-15.

42. Massively parallel implementation of the Splitting Equilibration Algorithm (with D.S. Kim) (1993), *Computer Science in Economics and Management*, 6, 151-161.
43. Dynamical systems and variational inequalities (with P. Dupuis) (1993), *Annals of Operations Research*, 44, 9-42.
44. Variational inequalities in the analysis and computation of multi-sector, multi-instrument financial equilibria (1994), *Journal of Economic Dynamics and Control*, 18, 161-184.
45. Using Markov chains to model human migration in a network equilibrium framework (with J. Pan) (1994), *Mathematical and Computer Modeling*, 19, 31-39.
46. A dynamical systems approach for network oligopolies and variational inequalities (with P. Dupuis and D. Zhang) (1994), *Annals of Regional Science*, 28, 263-283.
47. On the stability of projected dynamical systems (with D. Zhang) (1995), *Journal of Optimization Theory and its Applications*, 85, 97-124.
48. Massively parallel computation of spatial price equilibrium problems as dynamical systems (with T. Takayama and D. Zhang) (1995), *Journal of Economic Dynamics and Control*, 19, 3-37.
49. Projected dynamical systems modeling and computation of spatial network equilibria (with T. Takayama and D. Zhang) (1995), *Networks*, 26, 69-85.
50. Command and control for congestion pricing of general multimodal transportation networks (with P. Ramanujam) (1995), *Scientia Iranica*, 2, 185-195.
51. Transportation network policy modeling with goal targets and generalized penalty functions (with P. Ramanujam) (1996), *Transportation Science*, 30, 3-13.
52. Stability of spatial price equilibrium modeled as a projected dynamical system (with D. Zhang) (1996), *Journal of Economic Dynamics and Control*, 20, 43-63.
53. Spatial market models with goal targets (with S. Thore and J. Pan) (1996), *Operations Research*, 44, 393-406.
54. Stability analysis of an adjustment process for oligopolistic market equilibrium modeled as a projected dynamical system (with D. Zhang) (1996), *Optimization*, 36, 263-285.
55. Massively parallel computation of large-scale spatial price equilibrium models with discriminatory ad valorem tariffs (with C. F. Nicholson and P. M. Bishop) (1996), *Annals of Operations Research*, 68, 281-300.
56. A projected dynamical systems model of general financial equilibrium with stability analysis (with J. Dong and D. Zhang) (1996), *Mathematical and Computer Modelling*, 24, 35-44.
57. Network decomposition of general financial equilibria with transaction costs (with J. Dong) (1996), *Networks*, 28, 107-116.
58. A variational inequality approach for marketable pollution permits (with K. Dhanda) (1996), *Computational Economics*, 9, 363-384.
59. General financial equilibrium modelling with policy interventions and transaction costs (with J. Dong) (1996), *Computational Economics*, 9, 3-17.

60. On the local and global stability of a travel route choice adjustment process (with D. Zhang) (1996), *Transportation Research B*, 30, 245-262.
61. A general multiproduct, multipollutant market pollution permit model: A variational inequality approach (with K. K. Dhanda and J. Stranlund) (1997), *Energy Economics*, 19, 57-76.
62. Variational inequalities for international general financial equilibrium modeling and computation (with S. Siokos) (1997), *Mathematical and Computer Modelling*, 25, 31-49.
63. Formulation, stability, and computation of traffic network equilibria as projected dynamical systems (with D. Zhang) (1997), *Journal of Optimization Theory and its Applications*, 93, 417-444.
64. Projected dynamical systems in the formulation, stability analysis and computation of fixed demand traffic network equilibria (with D. Zhang) (1997), *Transportation Science*, 31, 147-158.
65. Variational inequalities for marketable pollution permits with technological investment opportunities: the case of oligopolistic markets (with K. K. Dhanda) (1997), *Mathematical and Computer Modeling*, 26, 1-25.
66. A massively parallel implementation of a discrete-time algorithm for the computation of dynamic elastic demand and traffic problems modeled as projected dynamical systems (with D. Zhang) (1998), *Journal of Economic Dynamics and Control*, 22, 1467-1485.
67. Network modeling of international financial equilibria with hedging: statics and dynamics (with S. Siokos) (1998), *Annals of Operations Research*, 82, 139-160.
68. A multimodal traffic network equilibrium model with emission pollution permits: compliance versus noncompliance (with P. Ramanujam and K. K. Dhanda) (1998), *Transportation Research D*, 3, 349-374.
69. Marketable pollution permits in oligopolistic markets with transaction costs (with K. K. Dhanda) (2000), *Operations Research*, 48, 424-435.
70. Dynamic multi-sector, multi-instrument financial networks with futures: modeling and computation (with S. Siokos) (1999), *Networks*, 33, 93-108.
71. Noncompliant oligopolistic firms and marketable pollution permits: statics and dynamics (with K. K. Dhanda) (2000), *Annals of Operations Research*, 95, 285-312.
72. Economic equilibrium and financial networks (1999), *Mathematical and Computer Modelling*, 30, 1-6.
73. Alternative pollution permit systems for transportation networks based on origin/destination pairs and paths (1999), *Transportation Research D*, 5, 37-58
74. Congested urban transportation networks and emission paradoxes (2000), *Transportation Research D*, 5, 145-151.
75. A multiclass, multicriteria traffic network equilibrium model (2000), *Mathematical and Computer Modelling*, 32, 393-411.
76. Dynamics of a transportation pollution permit system with stability analyses and computation (with D. Zhang) (2001), *Transportation Research D*, 6, 243-268.
77. Paradoxes in networks with zero emission links: Implications for telecommunications versus transportation (with J. Dong) (2001), *Transportation Research D*, 6, 283-296.

78. On the equivalence between stationary link flow patterns and traffic network equilibria (with D. Zhang and J. H. Wu) (2001), *Transportation Research B*, 35, 731-748.
79. Bicriteria decision making and financial equilibrium: A variational inequality perspective (with J. Dong) (2001), *Computational Economics*, 17, 29-42.
80. Financial networks and optimally sized portfolios (with J. Dong) (2001), *Computational Economics*, 17, 5-27.
81. Finance and variational inequalities (2001), *Quantitative Finance*, 1, 309-317.
82. Financial networks with intermediation (with K. Ke) (2001), *Quantitative Finance*, 1, 441-451.
83. Teleshopping versus shopping: A multicriteria network equilibrium framework (with J. Dong and P. L. Mokhtarian) (2001), *Mathematical and Computer Modelling*, 34, 783-798.
84. A multiclass, multicriteria traffic network equilibrium model with elastic demand (with J. Dong) (2002), *Transportation Research B*, 36, 445-469.
85. Urban location and transportation in the Information Age: A multiclass, multicriteria network equilibrium perspective (with J. Dong) (2002), *Environment & Planning B*, 29, 53-74.
86. Spatial economic networks with multicriteria producers and consumers: Statics and dynamics (with J. Dong and D. Zhang) (2002), *Annals of Regional Science*, 36, 79-105.
87. Multicriteria network equilibrium modeling with variable weights for decision-making in the Information Age with applications to telecommuting and teleshopping (with J. Dong and P. L. Mokhtarian) (2002), *Journal of Economic Dynamics and Control*, 26, 1629-1650.
88. A supply chain network equilibrium model (with J. Dong and D. Zhang) (2002), *Transportation Research E*, 38, 281-303.
89. Dynamics of supply chains: A multilevel (logistical/informational/ financial) network perspective (with K. Ke, J. Cruz, K. Hancock, and F. Southworth) (2002), *Environment & Planning B*, 29, 795-818.
90. Supply chain networks and electronic commerce: A theoretical perspective (with J. Loo, J. Dong, and D. Zhang) (2002), *Netnomics*, 4, 187-220.
91. Recent advances in Network Economics (2002), *Networks*, 41, 68-72.
92. Supply chain supernetworks and environmental criteria (with F. Toyasaki) (2003), *Transportation Research D*, 8, 185-213.
93. Dynamics of global supply chain supernetworks (with J. Cruz and D. Matsypura) (2003), *Mathematical and Computer Modelling*, 37, 963-983.
94. Financial networks with electronic transactions: Modeling, analysis, and computations (with K. Ke) (2003), *Quantitative Finance*, 3, 71-87.
95. A space-time network for telecommuting versus commuting decision-making (with J. Dong and P.L. Mokhtarian) (2003), *Papers in Regional Science*, 82, 451-473.
96. A supply chain network equilibrium model with random demands (with J. Dong and D. Zhang) (2004), *European Journal of Operational Research*, 156, 194-212.
97. International financial networks with intermediation: Modeling, analysis, and computations (with J.

- Cruz) (2003), *Computational Management Science*, 1, 31-58.
98. Dynamics of international financial networks with risk management (with J. Cruz) (2004), *Quantitative Finance*, 4, 276-291.
  99. Dynamic supernetworks for the integration of social networks and supply chains with electronic commerce: Modeling and analysis of buyer-seller relationships with computations (with T. Wakolbinger) (2004), *Netnomics*, 6, 153-185.
  100. Management of knowledge intensive systems as supernetworks: Modeling, analysis, computations, and applications (with J. Dong) (2005), *Mathematical and Computer Modelling*, 42, 397-417.
  101. Reverse supply chain management and electronic waste recycling: A multitiered network equilibrium framework for e-cycling (with F. Toyasaki) (2005), *Transportation Research E*, 41, 1-28.
  102. Supply chain networks, electronic commerce, and supply side and demand side risk (with J. Cruz, J. Dong, and D. Zhang) (2005), *European Journal of Operational Research*, 164, 120-142.
  103. Multitiered supply chain networks: Multicriteria decision-making and uncertainty (with J. Dong, D. Zhang, and H. Yan) (2005), *Annals of Operations Research*, 135, 155-178.
  104. A retrospective on Beckmann, McGuire, and Winsten's Studies in the Economics of Transportation (with D. Boyce and H. S. Mahmassani) (2005), *Papers in Regional Science*, 84, 85-103.
  105. Projected dynamical systems and evolutionary variational inequalities via Hilbert spaces with applications (with M.-G. Cojocaru and P. Daniele) (2005), *Journal of Optimization Theory and Applications*, 27, 1-15.
  106. Global supply chain network dynamics with multicriteria decision-making under risk and uncertainty (with D. Matsypura) (2005), *Transportation Research E*, 41, 585-612.
  107. Supernetworks: An introduction to the concept and its applications with a specific focus on knowledge supernetworks (with T. Wakolbinger) (2005), *International Journal of Knowledge, Culture and Change Management*, 4, 1523-1530.
  108. Preface to "On a paradox of traffic planning" (with D. Boyce) (2005), *Transportation Science*, 39, 443-445.
  109. "On a paradox of traffic planning," translation of the (1968) original D. Braess paper from German to English (with D. Braess and T. Wakolbinger) (2005), *Transportation Science*, 39, 446-450.
  110. A network modeling approach for the optimization of Internet-based advertising strategies and pricing with a quantitative explanation of two paradoxes (with L. Zhao) (2005), *Netnomics*, 7, 97-114.
  111. On the relationship between supply chain and transportation network equilibria: A supernetwork equivalence with computations (2006), *Transportation Research E*, 42, 293-316.
  112. Financial networks with intermediation: Risk management with variable weights (with K. Ke) (2006), *European Journal of Operational Research*, 172, 40-63.
  113. In memoriam: C. Bartlett McGuire (1925-2006), Christopher B. Winsten (1923-2005) (with David Boyce) (2006), *Transportation Science*, 40, 1-2.

114. The evolution and emergence of integrated social and financial networks with electronic transactions: A dynamic supernetwork theory for the modeling, analysis, and computation of financial flows and relationship levels (with T. Wakolbinger and L. Zhao) (2006), *Computational Economics*, 27, 353-393.
115. Evolution variational inequalities and projected dynamical systems with application to human migration (with J. Pan) (2006), *Mathematical and Computer Modelling*, 43, 646-657.
116. Modeling generator power plant portfolios and pollution taxes in electric power supply chain networks: A transportation network equilibrium transformation (with K. Wu, Z. Liu, and J. K. Stranlund) (2006), *Transportation Research D*, 11, 171-190.
117. Optimal endogenous carbon taxes for electric power supply chains with power plants (with Z. Liu and T. Woolley) (2006), *Mathematical and Computer Modelling*, 44, 899-916.
118. Financial engineering of the integration of global supply chain networks and social networks with risk management (with J. M. Cruz and T. Wakolbinger) (2006), *Naval Research Logistics*, 53, 674-696.
119. Double-layered dynamics: A unified theory of projected dynamical systems and evolutionary variational inequalities (with M.-G. Cojocar and P. Daniele) (2006), *European Journal of Operational Research*, 175, 494-507.
120. Sustainable supply chain networks and transportation (with Z. Liu and T. Woolley) (2007), *International Journal of Sustainable Transportation*, 1, 29-51.
121. Modeling of electric power supply chain networks with fuel suppliers via variational inequalities (with D. Matsypura and Z. Liu) (2007), *International Journal of Emerging Power Systems*, vol. 8, iss. 1, Article 5.
122. Financial networks with intermediation and transportation network equilibria: A supernetwork equivalence and reinterpretation of the equilibrium conditions with computations (with Z. Liu) (2007), *Computational Management Science*, 4, 243-281.
123. Dynamic electric power supply chains and transportation networks: an evolutionary variational inequality formulation (with Z. Liu, M.-G. Cojocar, and P. Daniele) (2007), *Transportation Research E*, 43, 624-646.
124. A network efficiency measure for congested networks (with Q. Qiang), (2007), *Europhysics Letters*, 79, 38005, p1-p5.
125. The Internet, evolutionary variational inequalities, and the time-dependent Braess paradox (with D. Parkes and P. Daniele) (2007), *Computational Management Science*, 4, 355-375.
126. Robustness of transportation networks subject to degradable links (with Q. Qiang) (2007), *Europhysics Letters*, 80, 68001, pp 1-6.
127. A unified network performance measure with importance identification and the ranking of network components (with Q. Qiang) (2008), *Optimization Letters*, 2, 127-142.
128. A network equilibrium framework for Internet advertising: Models, qualitative analysis, and algorithms (with L. Zhao) (2008), *European Journal of Operational Research*, 187, 456-472.
129. An efficiency measure for dynamic networks with application to the Internet and vulnerability analysis (with Q. Qiang) (2008), *Netnomics*, 9, 1-20.
130. A network efficiency measure with application to critical infrastructure networks (with Q. Qiang)

- (2008), *Journal of Global Optimization*, 40, 261-275.
131. A system-optimization perspective for supply chain network integration: The horizontal merger case (2009), *Transportation Research E*, 45, 1-15.
  132. A relative total cost index for the evaluation of transportation network robustness in the presence of degradable links and alternative travel behavior (with Q. Qiang) (2009), *International Transactions in Operational Research*, 16, 46-67.
  133. An integrated electric power supply chain and fuel market network framework: Theoretical modeling with empirical analysis for New England (with Z. Liu) (2009), *Naval Research Logistics*, 56, 600-624.
  134. Environmental impact assessment of transportation networks with degradable links in an era of climate change (with Q. Qiang and L. S. Nagurney) (2010), *International Journal of Sustainable Transportation*, 4, 154-171.
  135. An integrated framework for the design of optimal web banners (with L. Hai and Lan Zhao) (2010), *Netnomics*, 11, 69-83.
  136. Multiproduct supply chain horizontal network integration: Models, theory, and computational results (with T. Woolley and Q. Qiang) (2010), *International Transactions in Operational Research*, 17, 333-349.
  137. Supply chain network design under profit maximization and oligopolistic competition (2010), *Transportation Research E*, 46, 281-294.
  138. Optimal supply chain network design and redesign at minimal total cost and with demand satisfaction (2010), *International Journal of Production Economics*, 128, 200-208.
  139. Sustainable supply chain network design: A multicriteria perspective (with L. S. Nagurney) (2010), *International Journal of Sustainable Engineering*, 3, 189-197.
  140. The negation of the Braess paradox as demand increases: The wisdom of crowds in transportation networks (2010), *Europhysics Letters*, 91, 48002, p1-p5.
  141. Formulation and analysis of horizontal mergers among oligopolistic firms with insights into the merger paradox: A supply chain network perspective. *Computational Management Science* (2010), 7(4), 377-406.
  142. Supply chain outsourcing under exchange rate risk and competition (with Z. Liu) (2011), *Omega*, 39, 539-549.
  143. Supply chain network design for critical needs with outsourcing (with M. Yu and Q. Qiang) (2011), *Papers in Regional Science*, 90, 123-142.
  144. Supernetworks: The science of complexity (2011), *Journal of University of Shanghai for Science and Technology*, 33, 205-228.
  145. Risk reduction and cost synergy in mergers and acquisitions via supply chain network integration (with Z. Liu) (2011), *Journal of Financial Decision Making*, 7(2), 1-18.
  146. Fragile networks: identifying vulnerabilities and synergies in an uncertain age (with Q. Qiang) (2012), *International Transactions in Operational Research*, 19, 123-160.
  147. Dynamics and equilibria of ecological predator-prey networks as nature's supply chains (with L. S. Nagurney) (2012), *Transportation Research E*, 48, 89-99.

148. Sustainable fashion supply chain management under oligopolistic competition and brand differentiation (with M. Yu) (2012), *International Journal of Production Economics*, 135, 532-540.
149. A bi-criteria indicator to assess supply chain network performance for critical needs under capacity and demand disruptions (with Q. Qiang) (2012), *Transportation Research A*, 46, 801-812 – special issue on Network Vulnerability in Large-Scale Transport Networks.
150. Multiperiod competitive supply chain networks with inventorying and a transportation network equilibrium reformulation (with Z. Liu) (2012), *Optimization and Engineering*, 13(2), 471-503.
151. Supply chain network operations management of a blood banking system with cost and risk minimization (with A. Masoumi and M. Yu) (2012), *Computational Management Science*, 9(2), 205-231
152. A supply chain generalized network oligopoly model for pharmaceuticals under brand differentiation and perishability (with A. Masoumi and M. Yu) (2012), *Transportation Research*, 48, 762-780.
153. A game theoretical approach to the vertical coexistence of small and big fish (with C. Mullon) (2012), *Ecological Modelling*, 240, 41-48.
154. Medical nuclear supply chain design: A tractable network model and computational approach (with L. S. Nagurney) (2012), *International Journal of Production Economics*, 140(2), 865-874.
155. Supply chain networks with global outsourcing and quick-response production under demand and cost uncertainty (with Z. Liu) (2013), *Annals of Operations Research*, 208(1), 251-281..
156. Competitive food supply chain networks with application to fresh produce (with M. Yu) (2013), *European Journal of Operational Research*, 224(2), 273-282.
157. Financial networks (2013), *Computational Management Science*, 10(2-3), 77-80.
158. A dynamic network oligopoly model with transportation costs, product differentiation, and quality competition (with D. Li) (2014), *Computational Economics*, 44(2), 201-229.
159. A network economic game theory model of a service-oriented Internet with choices and quality competition (with D. Li, T. Wolf, and S. Saberi) (2013), *Netnomics*, 14(1-2), 1-25.
160. Pharmaceutical supply chain networks with outsourcing under price and quality competition (with D. Li and L. S. Nagurney) (2013), *International Transactions in Operational Research* 20(6), 859-888.
161. Supply chain network sustainability under competition and frequencies of activities from production to distribution (with M. Yu and J. Floden) (2013), *Computational Management Science*, 10(4), 397-422.
162. Equilibria and dynamics of supply chain network competition with information asymmetry in quality and minimum quality standards (with D. Li) (2014), *Computational Management Science*, 11(3), 285-315.
163. When and for whom would e-waste be a treasure trove? Insights from a network equilibrium model of e-waste flows (with T. Wakolbinger, F. Toyasaki, and T. Nowak) (2014), *International Journal of Production Economics*, 154, 263-273.

164. ChoiceNet: Toward an economy plane for the Internet. (with T. Wolf, J. Griffioen, K. Calvert, R. Dutta, G. Rouskas, and I. Baldin) (2014), *ACM SIGCOMM Computer Communication Review*, 44(3), 58-65.
165. Supply chain network competition in time-sensitive markets (with M. Yu, J. Floden, and L.S. Nagurney) (2014), *Transportation Research E*, 70, 112-127.
166. A Cournot-Nash-Bertrand game theory model of a service-oriented Internet with price and quality competition among network transport providers (with T. Wolf) (2014), *Computational Management Science*, 11(4), 475-502.
167. Spatial price equilibrium with information asymmetry in quality and minimum quality standards (with D. Li and L. S. Nagurney) (2014), *International Journal of Production Economics*, 158, 300-313.
168. A network economic game theory model of a service-oriented Internet with price and quality competition in both content and network provision (with S. Saberi and T. Wolf) (2014), *Service Science*, 6(4), 1-24.
169. Overcoming economic challenges of Internet operators in low income regions through a delay tolerant architecture with mechanic backhauls (with L. Marentes, T. Wolf, Y. Donoso, and H. Castro) (2014), *Netnomics*, 10(3), 183-213.
170. Securing the sustainability of global medical nuclear supply chains through economic cost recovery, risk management, and optimization (with L.S. Nagurney and D. Li) (2015), *International Journal of Sustainable Transportation*, 9(6), 405-418.
171. Design of sustainable supply chains for sustainable cities (2015), *Environment & Planning B*, 42(1), 40-57.
172. A supply chain network game theory model with product differentiation, outsourcing of production and distribution, and quality and price competition (with D. Li) (2015), *Annals of Operations Research*, 228(1), 479-503.
173. A multiproduct network economic model of cybercrime in financial services (2015), *Service Science*, 7(1), 70-81.
174. Supply chain network competition in price and quality with multiple manufacturers and freight service providers (with S. Saberi, S. Shukla, and J. Floden) (2015), *Transportation Research E*, 77, 248-267.
175. A game theory model of cybersecurity investments with information asymmetry (with L.S. Nagurney) (2015), *Netnomics*, 16(1-2), 127-148.
176. A general multitiered supply chain network model of quality competition with suppliers (with D. Li) (2015), *International Journal of Production Economics*, 170, 336-356.
177. Towards pricing mechanisms for delay tolerant services (with L. Marentes, T. Wolf, and Y. Donoso) (2016), *International Journal of Computers Communication & Control*, 11(1), 47-59.
178. A Generalized Nash Equilibrium network model for post-disaster humanitarian relief (with E. Alvarez Flores and C. Soylyu) (2016), *Transportation Research E*, 95, 1-18.
179. Physical proof of the occurrence of the Braess Paradox in electrical circuits (2016), *EPL (Europhysics Letters)*, 115, 28004.

180. Supply chain performance assessment and supplier and component importance identification in a general competitive multitiered supply chain network model (with D. Li) (2017), *Journal of Global Optimization*, 67(1), 223-250.
181. A supply chain network game theory model of cybersecurity investments with nonlinear budget constraints (with P. Daniele and S. Shukla) (2017), *Annals of Operations Research*, 248(1), 405-427.
182. Multifirm models of cybersecurity investments competition vs. cooperation and network vulnerability (with S. Shukla) (2017), *European Journal of Operational Research*, 260(2), 588-600.
183. Supply chain network capacity competition with outsourcing: A variational equilibrium framework (with D. Besik and M. Yu) (2017), *Journal of Global Optimization*, 69(1), 231-254.
184. Mergers and acquisitions in blood banking systems: A supply chain network approach (with A.H. Masoumi and M. Yu) (2017), *International Journal of Production Economics*, 193, 406-421.
185. Quality in competitive fresh produce supply chains with application to farmers' markets (with D. Besik) (2017), *Socio-Economic Planning Sciences*, 60, 62-76.
186. Hospital competition in prices and quality: A variational inequality framework (with K. Li) (2017), *Operations Research for Health Care*, 15, 91-101.
187. A competitive multiperiod supply chain network model with freight carriers and green technology investment option (with S. Saberi, J.M. Cruz, and J. Sarkis) (2018), *European Journal of Operational Research*, 266(3), 934-949.
188. Consumer learning of product quality with time delay: Insights from spatial price equilibrium models with differentiated products (with D. Li and M. Yu) (2018), *Omega*, 18, 150-168.
189. Cybersecurity investments with nonlinear budget constraints and conservation laws: Variational equilibrium, marginal expected utilities, and Lagrange multipliers (with P. Daniele, G. Colajanni, and Sofia Giuffre) (2018), *International Transactions in Operational Research*, 25(5), 1443-1464.
190. Dynamics of quality as a strategic variable in complex food supply chain network competition: The case of fresh produce (with D. Besik and M. Yu) (2018), *Chaos* 28, 043124.
191. A game theory model for freight service provision security investments for high-value cargo (with S. Shukla, L.S. Nagurney, and S. Saberi) (2018), *Economics of Transportation*, 16, 21-28.
192. How to increase the impact of disaster relief: a study of transportation rates, framework agreements and product distribution (with T. Gossler, T. Wakolbinger, and P. Daniele) (2019), *European Journal of Operational Research*, 274(1), 126-141.
193. Competition for blood donations: A Nash Equilibrium network framework (with P. Dutta) (2019), *Omega*, 212, 103-114.
194. Supply chain network competition among blood service organizations: A Generalized Nash Equilibrium framework (with P. Dutta) (2019), *Annals of Operations Research*, 275(2), 551-586.
195. Tariffs and quotas in world trade: A unified variational inequality framework (with D. Besik and M. Yu) (2019), *European Journal of Operational Research*, 275(1), 347-360.
196. An integrated financial and logistical game theory model for humanitarian organizations with purchasing costs, multiple freight service providers, and budget, capacity, and demand constraints (with M. Salarpour and P. Daniele) (2019), *International Journal of Production Economics*, 212, 212-226.

197. Global supply chain networks and tariff rate quotas: Equilibrium analysis with application to agricultural products (with D. Besik and L.S. Nagurney) (2019), *Journal of Global Optimization*, 75, 439-460.
198. Strict quotas or tariffs? Implications for product quality and consumer welfare in differentiated product supply chains (with D. Besik and D. Li) (2019), *Transportation Research E*, 29, 136-161.
199. In memoriam: Martin Beckmann (1924-2017) (with D. Boyce) (2019), *Transportation Science*, 53(6), 1798-1799.
200. Multitiered blood supply chain network competition: Linking blood service organizations, hospitals, and payers (with P. Dutta) (2019), *Operations Research for Health Care*, 23, 100230.
201. Quantifying supply chain network synergy for humanitarian organizations (with Q. Qiang) (2020), *IBM Journal of Research and Development*, 64(1/2), 12:1-12:16.
202. A stochastic disaster relief game theory network model (with M. Salarpour, J. Dong, and L.S. Nagurney) (2020), *Operations Research Forum* 1, 10.
203. Refugee migration networks and regulations: A multiclass, multipath variational inequality framework (with P. Daniele and L.S. Nagurney) (2020), *Journal of Global Optimization* 78, 627-649.
204. Human migration networks and policy interventions: Bringing population distributions in line with system-optimization (with P. Daniele and G. Cappello) (2021), *International Transactions in Operational Research*, 28(1), 5-26.
205. Networks in economics and finance in *Networks* and beyond: A half century retrospective (2021), *Networks*, 77(1), 50-65.
206. International human migration networks under regulations (with P. Daniele) (2021), *European Journal of Operational Research*, 291(3), 894-905.
207. Probabilistic assessment of transport network vulnerability with equilibrium flows (with Y. Jiang, Y. Wang, W.Y. Szeto, and A.H.F. Chow) (2021), *International Journal of Sustainable Transportation*, 15(7), 512-523.
208. A system-optimization model for multiclass human migration with migration costs and regulations inspired by the Covid-19 pandemic (with G. Cappello and P. Daniele) (2021), *Minimax Theory and Applications*, 6(2), 281-294.
209. Supply chain game theory network modeling under labor constraints: Applications to the Covid-19 pandemic (2021), *European Journal of Operational Research*, 293(3), 880-891.
210. Optimization of supply chain networks with inclusion of labor: Applications to Covid-19 pandemic disruptions (2021), *International Journal of Production Economics*, 235, 108080.
211. A multicountry, multicommodity stochastic game theory network model of competition for medical supplies inspired by the Covid-19 pandemic (with M. Salarpour) (2021), *International Journal of Production Economics*, 235, 108074.
212. A multiclass, multiproduct Covid-19 convalescent plasma donor equilibrium model (with P. Dutta) (2021), *Operations Research Forum*, 2, 31.
213. A multiperiod supply chain network optimization model with investments in labor productivity enhancements in an era of COVID-19 and climate change (2021), *Operations Research Forum*, 2, 68.

214. Spatial price equilibrium, perishable products, and trade policies in the Covid-19 pandemic (2022), *Montes Taurus Journal of Pure and Applied Mathematics*, Special Issue dedicated to Professor Themistocles M. Rassias on the occasion of his 70<sup>th</sup> birthday, 4(3), 9-24.
215. Attracting international migrant labor: Investment optimization to alleviate supply chain labor shortages (2022), *Operations Research Perspectives*, 9, 100233.
216. Modeling of Covid-19 trade measures on essential products: A multiproduct, multicountry spatial price equilibrium framework (with M. Salarpour) (2022), *International Transactions in Operational Research*, 29(1), 226-258.
217. Optimization of investments in labor productivity in supply chain networks (2022), *International Transactions in Operational Research*, 29(4), 2116-2144.
218. Supply chain networks, wages, and labor productivity: Insights from Lagrange analysis and computations (2022), *Journal of Global Optimization*, 83, 615-638.
219. Resilience of supply chain networks to labor disruptions (with A. Ermagun) (2022), *Resilience Findings*, June 16.
220. A bandwidth auction mechanism to enable affordable Internet access (with L.A. Marentes, S. Cabrales, T. Wolf, and Y. Donoso) (2022), *Netnomics*, 22, 283-316.
221. Spatial price equilibrium networks with flow-dependent arc multipliers (with D. Besik) (2022), *Optimization Letters*, 26, 2483-2500.
222. An integrated multitiered supply chain network model of competing agricultural firms and processing firms (with D. Besik and P. Dutta) (2022), online in the *European Journal of Operational Research*.
223. A three-stage stochastic optimization model integrating 5G technology and UAVs for disaster management (with G. Colajanni, P. Daniele, L.S. Nagurney, and D. Sciacca) (2022), revised and resubmitted.

### Invited and Refereed Encyclopedia Articles

- Traffic network equilibrium, **Encyclopedia of Optimization**, vol. v, C. A. Floudas and P. M. Pardalos, editors, Kluwer Academic Publishers, Dordrecht, The Netherlands (2001), pp. 464-469.
- Spatial price equilibrium, **Encyclopedia of Optimization**, vol. v, C. A. Floudas and P. M. Pardalos, editors, Kluwer Academic Publishers, Dordrecht, The Netherlands (2001), pp. 245-250.
- Oligopolistic market equilibrium, **Encyclopedia of Optimization**, vol. v, C. A. Floudas and P. M. Pardalos, editors, Kluwer Academic Publishers, Dordrecht, The Netherlands (2001), pp. 119-122.
- Walrasian price equilibrium, **Encyclopedia of Optimization**, vol. v, C. A. Floudas and P. M. Pardalos, editors, Kluwer Academic Publishers, Dordrecht, The Netherlands (2001), pp. 541-544.
- Financial equilibrium, **Encyclopedia of Optimization**, vol. ii, C. A. Floudas and P. M. Pardalos, editors, Kluwer Academic Publishers, Dordrecht, The Netherlands (2001), pp. 125-130
- Equilibrium networks, **Encyclopedia of Optimization**, vol. ii, C. A. Floudas and P. M. Pardalos, editors, Kluwer Academic Publishers, Dordrecht, The Netherlands (2001), pp. 19-23.
- Dynamic traffic networks, **Encyclopedia of Optimization**, vol. ii, C. A. Floudas and P. M. Pardalos, editors, Kluwer Academic Publishers, Dordrecht, The Netherlands (2001), pp. 533-539.

Variational inequalities: Formulation, **Encyclopedia of Optimization**, vol. v, C. A. Floudas and P. M. Pardalos, editors, Kluwer Academic Publishers, Dordrecht, The Netherlands (2001), pp. 491-498.

Variational inequalities: Geometric interpretation, existence, **Encyclopedia of Optimization**, vol. v, C. A. Floudas and P. M. Pardalos, editors, Kluwer Academic Publishers, Dordrecht, The Netherlands (2001), pp. 502-505.

Variational inequalities: Projected dynamical system, **Encyclopedia of Optimization**, vol. v, C. A. Floudas and P. M. Pardalos, editors, Kluwer Academic Publishers, Dordrecht, The Netherlands (2001), pp. 505-510.

Financial optimization, **Encyclopedia of Applied Optimization**, P.M. Pardalos and M. G. C. Resende, editors, Oxford University Press, Oxford, England (2001).

Networks, **Encyclopedia of Science, Technology, and Ethics**, Macmillan Reference, USA, 2005.

Mathematical models of transportation and networks, **Mathematical Models in Economics, Encyclopedia of Life Support Systems**, (EOLSS), W.-B. Zhang, editor, UNESCO, 2007.

The Braess Paradox (with L.S. Nagurney), **The International Encyclopedia of Transportation**, R. Vickers, Editor, Elsevier, (2021), pp. 601-607.

Supply chains and transportation networks, Handbook of Regional Science, second and extended edition, M.M. Fischer and P. Nijkamp, Editors, Springer, Berlin, Germany, 2021, pp. 277-300.

## Refereed Proceedings

Optimal routing in multi-platform naval task force operations, **Proceedings of the M.I.T./O.N.R. Workshop on C<sup>3</sup> Problems** (1979).

Stability and sensitivity analysis for the general network equilibrium - travel choice model (with S. Dafermos) (1984), in **Proceedings of the Ninth International Symposium on Transportation and Traffic Theory**, edited by J. Volmuller and R. Hamerslag, Utrecht, The Netherlands, pp. 217-232.

Equilibration operators for the solution of constrained matrix problems, (with A. Robinson), **XXVII European Congress of the Regional Science Associations Proceedings**, Regional Development Institute, Pantios Graduate School of Political Science, Athens, Greece, 1987.

Equilibria and disequilibria in spatial markets with direct demand functions (with L. Zhao), in **Selected Proceedings of the Fifth World Conference on Transport Research** 1989, Yokohama, Japan, pp. D505-520.

Computation of large-scale constrained matrix problems: the Splitting Equilibration Algorithm (with A. Eydeland and D. S. Kim), **Proceedings of Supercomputing '90**, New York, NY, November 12-16, 1990.

Simulation of dynamic adjustment processes for network equilibrium problems using electronic circuit analysis software (with L. S. Nagurney), **Proceedings 1992 IEEE Systems, Man, and Cybernetics Conference**, Chicago, Illinois, pp. 848-852.

Computation in the curriculum, **Conference on Graduate Programs in the Applied Mathematical Sciences II**, 1993, Clemson University, Clemson, SC, pp. 83-85.

A supply chain network perspective for electric power generation, supply, transmission, and consumption (with D. Matsypura) (2004), **Proceedings of the International Conference in Computing, Communications and Control Technologies**, Austin, Texas, Volume VI, pp. 127-134.

A knowledge collaboration network model across disciplines (with Q. Qiang), **Advances in Social Computing, Proceedings of the 2010 International Conference on Social Computing, Behavioral Modeling, and Prediction, Lecture Notes in Computer Science**, LNCS 6007, S.-K. Chai, J. Salerno, and P. L. Mabry, Editors, Springer, Berlin, Germany, pp. 138-148.

Spatial price equilibrium and food webs: The economics of predator-prey networks (with L. S. Nagurney), **Proceedings of the 2011 IEEE Conference on Supernetworks and System Management**, F.-Y. Xu and J. Dong, Editors, IEEE Press, Beijing, China, pp 1-6.

Choice as a principle in network architecture (with T. Wolf, J. Griffioen, K. Calvert, R. Duuta, G. Rouskas, and I. Baldine), **Proceedings of ACM SIGCOMM 2012**, Helsinki, Finland, August 13-17, 2012.

ChoiceNet: Network innovation through choice (with G. N. Rouskas, I. Baldine, K. Calvert, R. Dutta, J. Griffioen, and T. Wolf), **Proceedings of the 17th Conference on Optical Network Design and Modeling (ONDM 2013)**, Brest, France, April 16-19, 2013.

The cyber-physical marketplace: A framework for large-scale horizontal integration in distributed cyber-physical systems (with T. Wolf and M. Zink), **Proceedings of The Third International Workshop on Cyber-Physical Networking Systems**, Philadelphia, PA, July 8-11, 2013.

A game theory model for a differentiated service-oriented Internet with duration-based contracts (with S. Saberi, T. Wolf, and L. S. Nagurney), **Proceedings of the 2015 INFORMS Conference on Computing, Operations Research and Computing: Algorithms and Software for Analytics**, B. Borchers, J. P. Brooks, and L. McLay, Editors, Richmond, VA, January 11-13, 2015, pp 15-29.

A layered protocol architecture for scalable innovation and identification of network economic synergies in the Internet of Things (with T. Wolf), **Proceedings of the 1<sup>st</sup> IEEE International Conference on Internet of Things Design and Implementation**, Berlin, Germany, April 4-8, 2016.

Enhancing interdomain transport via economic software-defined exchange points (with T. Wolf, J. Griffioen, and K. Calvert), **Proceedings of the International Conference on Computing, Networking and Communications (ICNC 2019)**, Honolulu, Hawaii, February 18-21, 2019.

A vision for a spot market of interdomain connectivity (with K.L. Calvert, J. Griffioen, and T. Wolf), invited paper, **Proceedings of the IEEE International Conference in Distributed Computing Systems (ICCS 2019)**, Dallas, Texas, July 7-10, 2019.

## Proceedings (Electronic)

A transportation network efficiency measure that captures flows, behavior, and costs with applications to network component importance identification and vulnerability (with Q. Qiang) (2007), **Proceedings of the 2007 POMS Meeting**, Dallas, Texas, May 3-7.

Multiproduct humanitarian healthcare supply chains: A network modeling and computational framework (with M. Yu and Q. Qiang ) (2012), **Proceedings of the 2012 POMS Meeting**, Chicago, Illinois, April 20-23.

## Invited Essays

Large-scale competitive equilibrium problems: models and algorithms (1987), *Forefronts*, vol. 2, no. 9, Cornell University, pp. 3-5.

Nonlinear networks in the social and economic sciences (1990), *Forefronts*, vol. 5, no. 12, Cornell University pp. 3-7.

Parallel computation of economic equilibria, January, 1992, *SIAM News*.

Women academics and adventures overseas, (with M. Wiecek), *OR/MS Today*, August 1997, Lionheart Publishing Co., Atlanta, GA.

A flight into the future, *OR/MS Today*, April, 1998, Lionheart Publishing Co., Atlanta, GA, pp. 36.

Navigating the Network Economy, *OR/MS Today*, June, 2000, Lionheart Publishing Co., Atlanta, GA, pp. 74-75.

Experiences from a Research Team Residency at the Rockefeller Foundation's Bellagio Center (with P. Daniele and M.-G. Cojocaru), appears in the *Association for Women in Mathematics Newsletter*, 2004.

Getting there from here: The route to sustainable transportation is paved with knowledge and creativity, *UMASS Magazine*, Spring, 2006.

A year as a Science Fellow at the Radcliffe Institute for Advanced Study at Harvard, *OR/MS Today*, August 2006, Lionheart Publishing Co., Atlanta, GA, pp. 30-32.

Supernetworks: The origins, some applications, and possibilities, *INFORMS Computing Society (ICS) Newsletter*, Fall 2007.

The INFORMS Speakers Program (with T. Lowe), *OR/MS Today*, August 2011.

Supply chain networks: In the end, it's all about people, *OR/MS Today*, February 2021, INFORMS.

How do I build a professional network with the help of INFORMS? *OR/MS Today*, August 2021, INFORMS.

In the end, it's all about people. *OR/MS Today*, February 2021.

Operations Research for the recovery and reconstruction of Ukraine. *OR/MS Today*, October 2022.

## Book Reviews

**Parallel and Distributed Computation**, D. P. Bertsekas and J. Tsitsiklis, Prentice Hall, Englewood Cliffs, New Jersey, 1989, *International Journal of Supercomputer Applications* (1989), vol. 4, 73-74.

**Chaos and Socio-Spatial Dynamics**, D. S. Dendrinos and M. Sonis, Springer-Verlag, Berlin, Germany, 1990, *Journal of Regional Science* (1991).

**Nonlinear Economic Dynamics**, T. Puu, Springer-Verlag, Berlin, Germany, 1993, *Journal of Regional Science* (1993).

**Journey of Women in Science and Engineering**, S. A. Ambrose, K. L. Dunkle, B. B. Lazarus, I. Nair, D. A. Haskus, 1997, *Science Book and Films* (1997).

**Attractors, Bifurcations, & Chaos**, second edition, T. Puu, Springer, 2003, *Journal of Regional Science* 44 (2004).

**Transport Developments and Innovations in an Evolving World**, M. Beuthe, V. Himanen, A. Reggiani, and L. Zamparini, editors, Springer, 2004, *Papers in Regional Science* (2005), 84, 521-526.

**Handbook of Global Logistics: Transportation in International Supply Chains**. J.H. Bookbinder, editor, Springer, 2013, *European Journal of Operational Research* (2015), 247(2), 682-683.

### Articles in the Press

Sunday column on UMASS sees problems and potential. Letter to the Editor, *Sunday Republican*, May 22, 2001, p. A12.

Valley center for visiting researchers proposed, Op Ed page, *Sunday Republican*, August 19, 2001, p. B3.

New attention to the science of networks, Letter to the Editor, *Chronicle of Higher Education*, March 28, 2003.

It's now time to back the state university, Letter to the Editor, *Daily Hampshire Gazette*, May 22, 2003.

Blackout is reminder of world's connectivity, Letter to the Editor, *Springfield Republican*, August 19, 2003.

Commentary on the Big Blackout, August 2003, *The Supernetwork Sentinel*, Fall 2003.

Planners of new bridge should consider the Braess Paradox, Letter to the Editor, *Daily Hampshire Gazette*, November 15, 2003.

Supernetworks: The paradigm for critical infrastructure and the supernetworked economy, *The Supernetwork Sentinel*, Winter 2004.

Experiences from an (Operations) Research Team Residency at the Rockefeller Foundation's Bellagio Center, Letter from Abroad (with P. Daniele and M.-G. Cojocaru), *OR/MS Today*, April 2004, p. 18.

Supernetworks: An introduction to the concept and its applications with a specific focus on knowledge supernetworks (with T. Wakolbinger), *The Supernetwork Sentinel*, Fall 2004.

Teaching engineers about humans and technology, Letter to the Editor, *Chronicle of Higher Education*, September 3, 2004.

UMass research aids homeland security work, Letter to the Editor, *Daily Hampshire Gazette*, October 22, 2004.

Enhancing research through e-science, Letter to the Editor, *Chronicle of Higher Education*, February 4, 2005.

Member profile, *INFORMS Computing Society Newsletter*, 2005.

In need of transportation? Take a seat on the bus, Letter to the Editor, *Springfield Republican*, May 21, 2006.

Meeting the region's energy needs, Invited Opinion Piece, *Daily Hampshire Gazette*, November 8, 2006.

UMass makes its mark in academics, athletics, Letter to the Editor, *Springfield Republican*, December 12, 2006.

The importance of research, Letter to the Editor, *Chronicle of Higher Education*, February 2, 2007.

Making investments in the state's infrastructure, Letter to the Editor, *Daily Hampshire Gazette*, April 14, 2007.

UMass should act more like a family unit, OpEd, *Sunday Republican*, June 3, 2007.

What a wonderful (MIT) world, Letter to the Editor, *ORMS Today*, August, 2007.

Low turnout in the HOV lane, Letter to the Editor, *Boston Globe*, November 5, 2007.

A new roadmap for transit planning, OpEd, *Daily Hampshire Gazette*, June 16, 2008.

Biking in Paris, Letter to the Editor, *New York Times*, July 8, 2008.

Join the queue, Letter to the Editor, *The Economist*, September 25, 2008.

Coach Cal still fond of days at UMass, Letter to the Editor, *Springfield Republican*, November 19, 2008.

Coach Cal, Letter to the Editor, *Daily Hampshire Gazette*, November 19, 2008.

Financial networks, contagion, and the present economic crisis (with Q. Qiang), *The Supernetwork Sentinel*, Winter 2009.

How to make science class interesting – experiment, Letter to the Editor, *New York Times*, January 19, 2009.

Remembering a life of enduring relevance, Letter to the Editor, *Chronicle of Higher Education*, March 13, 2009.

Fragile Networks: Prioritizing investments in the ties that bind and really matter, *The Supernetwork Sentinel*, Fall 2009.

When a critical link is lost, Letter to the Editor, *The Boston Globe*, November 8, 2009.

Viewpoint: Passage of American Medical isotope Act of 2011 will help ensure U.S. nuclear medicine supply chain, with Ladimer S. Nagurney, *Sunday Republican*, July 10, 2011.

Designing transportation infrastructure to include the human element, Resources for the Future, Invited Commentary, November 18, 2011.

Bradley plans boon for academics, letter to the Editor, *Springfield Republican*, July 25, 2013.

Community experts enhance disaster management education as guest lecturers at the Isenberg School of Management at UMass Amherst, Guest Editorial, Masslive.com, March 24, 2014.

Net neutrality – past , present – future: What it means to us, with L.S. Nagurney, Guest Commentary, Masslive.com, November 17, 2014.

Why we are stronger together, with L.S. Nagurney, *Daily Hampshire Gazette*, June 27, 2016.

Uncertainty in blood supply chains creating challenges for industry, *The Conversation*, January 9, 2017; reprinted in *The San Francisco Chronicle*, *Salon*, and other publications.

How disaster relief efforts could be improved with game theory, *The Conversation*, March 9, 2017; reprinted in *phys.org*, *NewsOK*, and *Homeland Security Newswire*, among other outlets.

FirstNet for emergency communications: 6 questions answered, with L.S. Nagurney, *The Conversation*, August 16, 2017; reprinted in *GovTech*, *San Francisco Chronicle*, and other outlets.

Response to natural disasters like Harvey could be helped with game theory, *The Conversation*, August 28, 2017; reprinted in the *Chicago Tribune* and other outlets.

How game theory could help ensure you will get blood when you need it, *The Conversation*, February 9, 2018; reprinted in multiple outlets including *Public Radio International*.

Residents thankful for help after tree fell on house, with L. Nagurney, Letter to the Editor, *Daily Hampshire Gazette*, March 7, 2019.

Dave Madsen was a credit to the profession, Letter to the Editor, *Masslive.com*, July 31, 2019.

We need to support healthcare professionals as we prepare for coronavirus. *Republican* and *masslive.com*, February 27, 2020.

How coronavirus is upsetting the blood supply chain. *The Conversation*, March 12, 2020. This article was reprinted in multiple venues including *Salon.com*.

The COVID-19 pandemic and the stressed blood supply chain. *INFORMS Analytics Coronavirus Chronicles*, March 24, 2020.

The raging competition for medical supplies is not a game, but game theory can help. *The Conversation*, August 4, 2020. Reprinted in *Government Executive* and other media outlets.

Keeping coronavirus vaccines at subzero temperatures during distribution will be hard, but likely key to ending pandemic, *The Conversation*, September 18, 2020. Reprinted in *Daily Beast* and other media outlets.

Vaccine delays reveal unexpected weak link in supply chains: A shortage of workers, *The Conversation*, January 8, 2021. Reprinted in many media outlets.

Where are the vaccines? Letter to the Editor, *Daily Hampshire Gazette*, February 27, 2021.

Today's global economy runs on standardized shipping containers, as the Ever Given fiasco illustrates, *The Conversation*, April 5, 2021. Reprinted on multiple news websites.

Global shortage of shipping containers highlights their importance in getting goods to Amazon warehouses, store shelves and your door in time for Christmas, *The Conversation*, September 21, 2021. Reprinted by Fast Company. By October 21, 2021, this article had over 315,000 readers.

Got \$1.2T to invest inroads and other infrastructure? Here's how to figure out how to spend it wisely, *The Conversation*, November 15, 2021. Reprinted on multiple news websites.

Heading into the third year of the pandemic, the US blood supply is at a 10-year low, *The Conversation*, February 3, 2022. Reprinted in *The Daily Beast* and other news websites.

Ukraine will need 'Marshall Plan' to address human toll of war. *Chicago Sun Times*, April 5, 2022.

Russia now commits genocide (with L.S. Nagurney), Letter to the Editor, *Springfield Republican* and *masslive.com*, April 7, 2022.

Grateful to McGovern (with L.S. Nagurney), Letter to the Editor, *Daily Hampshire Gazette*, May 9, 2022.

Ukraine's students, Letter to the Editor, *The New York Times*, August 15, 2022.

## Press Interviews

UMass Amherst gets grant from AT&T to study 'supernetworks', *Mass High Tech*, February 25, 2002.

Researchers "Network" at Virtual Center, *OR/MS Today*, February, 2002.

Fulbright Scholar Story: see <http://supernet.som.umass.edu> under "Fulbright"

UMass professor gets AT&T Fellowship, *Mass High Tech*, January 27, 2003.

Isolation is the key, *Daily Hampshire Gazette*, August 16, 2003.

Professor receives grant, *The Massachusetts Daily Collegian*, November 21, 2003.

Supernetworks lab chief is super-driven, *Mass High Tech*, December 15, 2003.

After the blackout: Supernetwork models to the rescue, *Commonwealth*, January 2004.

Interview on the new UMass INFORMS student chapter and its Operations Research / Management Science seminar series by the UMass Office of Public Information, October 2004.

New border rules call for shift in logistics strategy, *Mexico Watch*, vol. 7, no. 12, December 1, 2001, p. 6.

Interviewed by Denise Dubie in *NetworkWorld*, April 9, 2007, "Network measurement tool shines spotlight on weakest links," also appeared in *Computerworld*, *LinuxWorld*, and several international editions of *NetworkWorld*.

Interviewed by Gopal Ratnam, July 10, 2007 for the article, "Bloomberg pushes for New York congestion-pricing plan (Update 1)," [bloomberg.com](http://bloomberg.com)

Interviewed by Lily Ladewig for article, "Profiles in mentoring," Mellon Mutual Mentoring Initiative, Office of Faculty Development, UMass Amherst; appears on the website.

Interviewed by Linda Baker in the *Scientific American* for the article, "Detours by design," February 2009.

Interviewed by Megan Talkington for the *Discover* magazine blog, as part of the World Science Festival Traffic panel, NYC, June 12, 2009.

Interviewed by Barry List, Communications Director of INFORMS for a Science of Better podcast on *Fragile Networks*, October 13, 2009.

Interviewed by Mike Breen of the American Mathematical Society for Mathematical Moments on Mathematics and Supply Chains podcast, May 11, 2011.

Interviewed by Mary Catherine O'Connor for smartplanet on congestion pricing in Gothenburg, Sweden, June 7, 2013.

Interviewed by Kirk Johnson of *The New York Times* for article on failure of new bridge from Portland to Vancouver, Washington, July 11, 2013.

Interviewed by Mark Huffman for cardhub.com for "Ask the experts: Should American Airlines US Airways merger be blocked," November 14, 2013.

Interviewed by Linda Genborg of the *Goteborg Daily* in Sweden for the article "Gothenburg has become my second home," November 20, 2013.

Interviewed by Paul Sisson of the *San-Diego Union-Tribune* for the article, "A vital supply chain," June 7, 2014.

Interviewed by Jeff Outhit of the *Waterloo Region Record* in Canada for the article, "Cyber ransoms are 'fastest growing threat' expert warns," June 8, 2016.

Interviewed by Kevin Delsh of *TechTalks* for the article, "Why Verizon's 5G Home may have killed the need for net neutrality rules," September 21, 2018.

Profiled in article, "Powerful, pragmatic pioneers," by Kara Tucker, in *ORMS Today*, February 2019.

Interviewed by Henry Schwan for article, "Expert suggestion decision to close blood programs are linked to economics," in *MetroWest Daily News*, November 14, 2019.

Interviewed by Laura Miller for feature article, "COVID-19 and the Supply Chain" on March 13, 2020, posted on the UMass Amherst homepage . Reprinted on phys.org

Interviewed by Yusra Mura for article, "Collateral deaths from pandemic begin to take toll on health systems," *Morning Consult*, April 3, 2020.

Interviewed by Mike Breen for the American Mathematical Society podcast on Covid-19 and its effect on supply chains, April 13, 2020.

Interviewed by Krista Carrothers for feature article, "Faculty research: Blood supply chain article influences public policy," posted on the Isenberg School homepage, April 24, 2020.

Interviewed by Jessica Guynn for article, "Looking for Pampers and Huggies? Diapers and wipes return to store shelves as COVID-19 shortages ease," *USA Today*, April 27, 2020.

Interviewed by Nicole Wetsman for article, "The algorithms big companies use to manage their supply chains don't work during pandemics," *The Verge*, April 27, 2020.

Interviewed by Sam Bloch for article, "Meat companies refuse to get specific about Covid-19 caseloads, record exports during height of pandemic," *The Counter*, July 27, 2020.

Interviewed by Kim Severson for article, "7 ways the pandemic has changed how we shop for food," *The New York Times*, September 9, 2020.

Interviewed by Lori Hinnant for article, "Vaccine storage issues could leave 3B people without access," *Associated Press*, October 19, 2020.

Interviewed by Andy Rosen for article, "COVID cases are rising and winter is coming. Should shoppers expect another wave of grocery shortages?" *The Boston Globe*, October 19, 2020.

Interviewed by Jared S. Hopkins for article, "Covid-19 vaccines to be stored secretly under tight security," *The Wall Street Journal*, October 21, 2020.

Interviewed by Katie Surma for article, "Chicago-area grocers stock up to ward off shortages as Covid-19 cases rise," *Chicago Tribune*, October 23, 2020.

Interviewed by Jared S. Hopkins for article, "Covid-19 vaccines could depend on the strength of this vial," *The Wall Street Journal*, November 13, 2020.

Interviewed by Karen Pallarito for article, "This is why the COVID-19 vaccine will take longer than you think," *Livestrong.com*, November 14, 2020.

Interviewed by Michael Goldstein for article, "COVID-19 vaccines are here; Are airlines ready to transport them?" *Forbes*, November 17, 2020.

Interviewed by Jeff Reinke for article, "Vaccine poses immense, unprecedented distribution challenges," *Manufacturing.Net*, November 19, 2020.

Interviewed by Charlie Slack for article, "5 ways to strengthen your supply chains," Bank of America website, November 23, 2020.

Interviewed by Jessica Guynn for article, "Don't count on finding toilet paper on your next run to Target or Walmart: COVID-19 panic buying is on a roll again," *USA Today*, November 23, 2020.

Interviewed by Karen Pallarito for article, "This is why the Covid-19 vaccine is going to take longer than you think," *Livestrong.com*, December 3, 2020.

Interviewed by Michael Goldstein for article, "UPS, freight companies love newest version of Boeing's plane, the 7478F," *Forbes*, December 22, 2020.

Interviewed by Jefferson Graham for article, "The year in food: Online delivery changed how we eat in 2020," *USA Today*, December 22, 2020.

Interviewed by Michael Goldstein for article, "Travel can't recover until US solves last-mile vaccination problem," *Forbes*, January 20, 2021.

Interviewed by Emma Ockerman for article, "You might end up getting your COVID vaccine from a dentist or veterinarian," *Vice*, January 21, 2021.

Interviewed by William J. Kole for article, "Pandemic help wanted: Fast food managers, road race experts," *Associated Press*, January 29, 2021.

Interviewed for FreightWaves, What The Truck, "Is gas the new toilet paper?" May 12, 2021.

Interviewed by Kris Mamula for article, "Which is it? Gov. Wolf, Health Department differ on vaccination numbers," *Pittsburgh Post-Gazette*, May 12, 2021.

Interviewed by Joseph Bednar for article, "The Economic Factors Affecting Supply, And What They Mean For Businesses," *BusinessWest*, May 26, 2021.

Interviewed by Claire Kowalick for article, "Continued supply-chain issues may impact back-to-school shopping," *Wichita Falls Time Record News*, July 27, 2021.

Interviewed by Jesse Bunch for article, "Grim outlook for gravestone manufacturers amid supply chain squeeze," *Pittsburgh Post-Gazette*, November 28, 2021.

Interviewed by Jacqui Fatka for article, "President focusing on food supply chains," *National Hog Farmer*, November 30, 2022.

Interviewed by Pan Demetrakakes for article, "2022 food and beverage industry outlook," cover story, *Food Processing Magazine*, January, 2022.

Interviewed for *Greenville SC News* article, "The supply chain is eating up random items at Greenville grocery stores, here's why," January 28, 2022.

Interviewed by Jim Kinney for article, "'I fear a cultural genocide'; Ukrainians in western Mass. watch, worry and help," *Masslive.com*, February 28, 2022.

Interviewed for the *Associated Press* article, "Economic dangers from Russia's invasion ripple across globe," March 2, 2022. This article has been reprinted on numerous new websites globally.

Interviewed for the *Associated Press* article, "Russia was in world's 'breadbasket' threatens food supply," March 6, 2022. This article has been reprinted on numerous new websites globally.

Interviewed for *The New York Times* article, "No Ikea shelves, no Levis: The retail exodus from Russia is on," March 9, 2022. Article also reprinted in *The Boston Globe*.

Interviewed for *The New York Times* article, "Russian sanctions snarl shipping even as pandemic pressure eases," March 12, 2022.

Interviewed by Bengali and Vietnamese journalists on the war on Ukraine, February and March 2022.

Interviewed for the *Observer* article, "How the global food shortage helps US farmers," April 12, 2022. Interviewed by Susan D'Agostino for *Bulletin of Atomic Scientists* article, "Global hunger crisis looms as war in Ukraine sends food prices soaring," April 12, 2022.

Interviewed for NARSC newsletter on: Supernetworks, supply chains, and the role of regional science, June 2022 issue.

Interviewed by Linda Carroll for *Observer* article, "There's a tampon shortage, everything from drought to war in Ukraine is to blame," June 15, 2022.

Interviewed by Paul Wiseman for the *Associated Press* article, "How did Russia-Ukraine war trigger a food crisis?" June 18, 2022. Article reprinted on many media sites.

Interviewed for the *AA News Broadcasting System* article, "Ukraine scrambles to store grain as Russian export blockage kicks in," June 23, 2022.

Interviewed by Karen Kroll for the *Inbound Logistics* article, "POPQUIZ: Supply chain educators answer pressing questions," June 2022, pages 66-69.

Interviewed for DW article, "Ukraine struggles to get its wheat to the world," July 11, 2022.

Interviewed for UMass Amherst press release, "UMass Amherst establishes partnership with Ukraine's Kyiv School of Economics." Republished in *BusinessWest*, July 22, 2022.

Interviewed by Brendan Rivers for the *JaxT DY* article, "JEA ready for peak hurricane season despite supply chain challenges," August 24, 2022.

“

## **TV and Video Interviews**

Lappas Show - "Your State University" segment, November 30, 2003; Channel 40 Springfield and Channel 56 Boston.

PBS Production "America Revealed" segment on Transportation and the Braess paradox, shot on Broadway, NYC, March 15, 2011; video available online.

WGBY 57 – interviewed by Carrie Saldo for “Connecting Point,” April 11, 2012.

NBC Boston – interviewed by Leslie Gados, 'Farmer's Time to Shine': Meat Shortages Drive Consumers to Buy Local, May 5, 2020.

INFORMS – interviewed by Glenn Wegryn, as part of first virtual INFORMS conference, due to the pandemic; posted on youtube: <https://www.youtube.com/watch?v=s50bnNrBTqk>

NBC Dallas - interviewed by Larry Collins on “COVID-19 vaccine distribution, shipping present challenges;” available at: <https://www.youtube.com/watch?v=s50bnNrBTqk>

NBC Boston – interviewed by Ryan Kath on “Intense Efforts to Secure COVID Vaccine, Keep It Off the Black Market;” available at: <https://www.nbc.com/news/coronavirus/intense-efforts-to-secure-covid-vaccine-keep-it-off-the-black-market/2259469/>

NBC Boston – interviewed by Michael Rosenfield on “‘Unforgivable’: Experts Respond to Spoilage of COVID Vaccines at VA Medical Center;” available at: <https://www.nbc.com/news/coronavirus/unforgivable-experts-respond-to-spoilage-of-covid-vaccines-at-va-medical-center/2285380/>

Boston 25 News – interviewed by Ted Daniel for, “25 Investigates: As COVID-19 vaccines remain in short supply, MA providers wasted thousands of doses;” available at: <https://www.boston25news.com/news/health/25-investigates-covid-19-vaccines-remain-short-supply-ma-providers-wasted-thousands-doses/D6Q3IO7LKJHR7AXN5WR7EZNDTY/>

Interviewed by Dr. Anand Subramanian for his video series Subject to: which features conversations with operations researchers, April 16, 2021; available at: <https://www.youtube.com/watch?v=fa29HSIAR0o>

Interview for Freightways TV – What the Truck!?! , May 12, 2021 – segment on Game Theory; available at: <https://twitter.com/TimothyDooner/status/1393013047158001664>

Interview for KMBC, Kansas City, MO, June 4, 2021 on “Supply and Demand Issues in the Pandemic;” available at: <https://www.kmbc.com/article/expert-says-the-covid-19-pandemic-highlighted-supply-and-demand-issues-in-us/36636395>

Interview for WWLP, Springfield, MA, June 10, 2021 on Cybersecurity.

Interviewed by Boston 25 News for Investigative Report, “Congestion in MA could exceed pre-pandemic levels,” September 6, 2021; available at: <https://www.boston25news.com/news/25-investigates-congestion-ma-could-exceed-pre-pandemic-levels/RMPBJOWEBNCU7NKU3F3FIP3U3Q/>

Interviewed by Western Mass News for, “Pandemic shortages and shipping delays impacting back-to-school shopping,” September 7, 2021; available at: [https://www.westernmassnews.com/news/pandemic-shortages-and-shipping-delays-impacting-back-to-school-shopping/article\\_66edaf22-1040-11ec-bd93-9f682461391f.html?utm\\_medium=social&utm\\_source=twitter&utm\\_campaign=user-share](https://www.westernmassnews.com/news/pandemic-shortages-and-shipping-delays-impacting-back-to-school-shopping/article_66edaf22-1040-11ec-bd93-9f682461391f.html?utm_medium=social&utm_source=twitter&utm_campaign=user-share)

Interviewed for Boston25 News, “Supply chain backlog affecting holiday shopping for local small businesses,” November 12, 2021; available at: <https://www.boston25news.com/news/health/supply-chain-backlog-affecting-holiday-shopping-local-small-businesses/T7DPUBR2DREWPGMVMIF6NFMSW4/>

Interviewed by WSOC TV, Charlotte, NC, “Trouble in Toyland: Tips to navigate soaring toy costs this holiday season,” November 18, 2021; available at: <https://www.wsoc.com/news/local/trouble-toyland-tips-navigate-soaring-toy-costs-this-holiday-season/DNQYLPUXPFHOFPP7FQOGXXC6SQ/>

Interviewed for NBC10 Boston, "Sick calls amid COVID surge exacerbate labor shortage," December 31, 2021.

Interviewed by Oscar Magain for NECN, "What to know about insurance coverage for at-home COVID tests, January 12, 2022; available at: <https://www.necn.com/news/coronavirus/what-to-know-about-insurance-coverage-for-at-home-covid-tests/2650805/>

Interviewed by Western Mass News, "Getting answers: Supply chain problems," February 17, 2022.

Interviewed by WWLP, "Concerns over cyber attacks amid Ukraine Russia crisis, February 23, 2022.

Interviewed for INFORMS webinar: How supply chain disruptions are impacting our food security and creating food insecurity (with Professor Tim Lowe), April 13, 2022; available at: <https://www.youtube.com/watch?v=ycEXiuPchvg>

Shevchenko Scientific Society expert-a-thon on Ukraine, April 29, 2022. Spoke on Supernetworks and Ukraine. Recording available at: <https://www.youtube.com/watch?v=NGJDO40j93E>

Interviewed for Canada Tonight on Global food prices hit record high in March following invasion of Ukraine, April 11, 2022.

Interviewed for The News with Shepard Smith on "Supply chain disruptions cause ongoing shortages nationwide," CNBC, July 1, 2022.

Interviewed by Paris Dunford for Western Mass News on effects of Hurricane Ian on supply chains on September 29, 2022. Interview to air on September 30, 2022.

## **Radio Interviews and Podcasts**

WAMC (NPR) New England News - National Grid expanding its northeastern reach, Dan Bobkoff, February 28, 2006.

WNYC (NPR) The Brian Lehrer Show – Traffic jam, June 11, 2009.

WFCR interview on "Wisdom of Crowds," September 15, 2010.

Interview for the Italian radio show Moebius on the Braess paradox and presentation at the AAAS 2011 meeting in Washington DC. Interview conducted by Federico Pedrocchi and aired February 27, 2011.

Interview with Karen Brown of New England Public Radio on January 20, 2017 on blood supply chains and uncertainty in the industry.

Interview with Matt Townsend for his show on July 26, 2017 on investing in transportation and communications infrastructure in the US.

Interview with Angela Kokott for Calgary Today on August 30, 2017, on natural disasters ... game theory.

Interview with Terry Gilberg for Think! America on November 11, 2017, on disaster relief.

Interview with Karen Brown of New England Public Radio on January 25, 2018 on 'critical' blood shortage comes down to weather, flu and supply chain.

Interview with Donald Morrison of KNX1070 Radio from Los Angeles on diaper supply chain issues in the pandemic on April 27, 2020.

Interview with Mick Kjar of Farm Talk, Fargo, North Dakota, on 'Supply chain management under the microscope,' May 7, 2020.

Interview with Jeff Angelo on Iheart radio, Des Moines, Iowa, on 'The Covid-19 vaccine cold chain,' September 25, 2020.

Interview with David Williams and John Driscoll for CareTalk podcast, "How will the Covid vaccine get to me?" October 9, 2020.

Interview with Alan Yu for WHYH The Pulse in Philadelphia on the vaccine cold chain, November 6, 2020.

Interview with Scott Tong for Marketplace on "Vaccine delivery across the country faces complex supply chain challenges." December 10, 2020.

Interview with Ashley Kilgore for the INFORMS Resoundingly Different podcast: Shining a light on the COVID-19 vaccine distribution. January 15, 2021.

Interview with Marielle Segarra for Marketplace, Corporations offer to help with vaccine rollout. January 22, 2021.

Interview with Jenna Midura for Isenberg School Hub Chats podcast: "Anna Nagurney & the pandemic," February 19, 2021.

Interview with Scott Tong for Marketplace on "Vaccine supply chain bottlenecks eased, drugmakers tell Congress," February 23, 2021.

Interview for What The Truck - TV and podcast, May 12, 2021.

Interview for All Sides with Anna Fisher, WOSU, Columbus, Ohio, June 8, 2021. on "Effects of a Stressed Global Supply Chain;" available at:  
<https://news.wosu.org/show/all-sides-with-ann-fisher/2021-06-08/effects-of-a-stressed-global-supply-chain>

Interview for KNX 1070 Los Angeles, CA, June 10, 2021 on "Starbucks ingredients shortage leaves people without their favorite extras;" available at:  
<https://omny.fm/shows/knxam-on-demand/starbucks-ingredients-shortage-leaves-people-witho>

Interviewed by Nancy Marshall-Genzer, for Marketplace, on, "Many companies face a stockpiling dilemma in a pandemic-influenced inventory world," July 7, 2021; available at:  
[https://supernet.isenberg.umass.edu/audio/mp\\_20210707\\_seg\\_PM\\_Stockpiling\\_Returns\\_64.mp3](https://supernet.isenberg.umass.edu/audio/mp_20210707_seg_PM_Stockpiling_Returns_64.mp3)

Interviewed by Phillip Adams on Late Night Live, Australian Broadcasting Corporation on "The great container shortage," September 27, 2021.

Interviewed by What The Truck!?! on supply chain education, October 4, 2021. Also available on Freightwaves TV.

Interviewed by Arnie Arnesen for her podcast, November 18, 2021; available at:  
[https://supernet.isenberg.umass.edu/audio/attituearniearnesen\\_20211118.mp3](https://supernet.isenberg.umass.edu/audio/attituearniearnesen_20211118.mp3)

Interviewed by INFORMS for audio: Supply chain expert Anna Nagurney on food shortages, the holiday season and the nation's supply chain crisis, November 23, 2021; available at:  
[https://supernet.isenberg.umass.edu/audio/Anna\\_Nagurney-INFORMS-11232021.mp3](https://supernet.isenberg.umass.edu/audio/Anna_Nagurney-INFORMS-11232021.mp3)

Interviewed for "Supply chain disruptions transform education," L.I.N.K. Podcast, December 16, 2021.

Interviewed by John Moore for his show "Moore in the Morning" on "how Russia's invasion of Ukraine (Europe's bread basket) could cause shortages, higher prices, and possibly even a famine across three continents. CFRB NewsTalk 1010, Toronto, Ontario, March 7, 2022; available at: [https://supernet.isenberg.umass.edu/audio/AnnaNagurney\\_with\\_JohnMoore-03022022.mp3](https://supernet.isenberg.umass.edu/audio/AnnaNagurney_with_JohnMoore-03022022.mp3)

Interviewed by INFORMS for audio: Providing support to Ukraine: Humanitarian aid and food supply chain support, March 15, 2022; available at: <https://www.informs.org/About-INFORMS/News-Room/Additional-Media-Materials/New-Audio-for-Media-Use-Anna-Nagurney-a-Data-Scientist-with-Ties-to-Ukraine-on-Providing-Humanitarian-and-Food-Supply-Chain-Support-to-the-Area>

Interviewed by John Batchelor for his "Eye on the World" nationally syndicated radio show for segment, "The Kyiv School of Economics is open for business," March 14, 2022; available at: <https://www.informs.org/About-INFORMS/News-Room/Additional-Media-Materials/New-Audio-for-Media-Use-Anna-Nagurney-a-Data-Scientist-with-Ties-to-Ukraine-on-Providing-Humanitarian-and-Food-Supply-Chain-Support-to-the-Area>

Interviewed for the Arlene Bynon Show in Toronto, Canada, on war against Ukraine and rising food prices and food insecurity, May 26, 2022.

Interviewed by Savannah Maher for Marketplace on, "Global production of wheat, corn declining, increasing hunger risk, July 12, 2022.

## Technical Reports

A communication model, Systems Consultants, Inc., December, 1978.

On the utilization of computer-aided decisions for submarine transit planning and communications (with M. T. Silva), Naval Underwater Systems Center, December, 1978.

The advantages of the transit dynamic programming model with respect to computerization, Systems Consultants, Inc., December, 1978.

A method for determining the susceptibility of a submarine communications network, Systems Consultants, Inc., January, 1979.

Decision-making in an uncertain environment - the application of Markovian Decision Theory to multi-stage submarine C<sup>3</sup> operations, Systems Consultants, Inc., June, 1979.

Analytical modeling design document of the Hughes IR & D bus, Aquidneck Data Corporation, August, 1980

Analytical modeling design document of the HXDP bus, Aquidneck Data Corporation, September, 1980.

Computer programs for multimodal traffic equilibrium problem with elastic demands, University of Massachusetts Amherst, 1984.

Sensitivity analysis for market equilibrium problems, Institute for Mathematics and its Applications, University of Minnesota, preprint series #97, 1984

On some market equilibrium theory paradoxes 1984, Institute for Mathematics and its Applications, University of Minnesota, preprint series #96, 1984.

A network framework for the study of the multiproduct, multifactor firm, University of Massachusetts Amherst, 1984.

Isomorphism between spatial price and traffic network equilibrium models (with S. Dafermos), Lefschetz Center for Dynamical Systems, Brown University, LCDS #85-17, 1985.

Equilibration operators for the solution of constrained matrix problems (with A. Robinson), Operations Research Center, MIT, Cambridge, MA OR 222-90, 1990.

Parallel computation of large-scale dynamic market network equilibria via time period decomposition (with D. S. Kim), Operations Research Center, MIT, Cambridge, MA, OR 221-90, 1990.

A Splitting Equilibration Algorithm for the computation of large-scale constrained matrix problems, theoretical analysis and applications (with A. Eydeland), Operations Research Center, MIT, Cambridge, MA, OR 223-90, 1990.

Research opportunities in computational economics, Report of the NSF Workshop on Research Opportunities in Computational Economics, Department of Economics, University of Texas, Austin, Report R-91, D. Kendrick, editor, 1991.

Dynamical systems and variational inequalities, Lefschetz Center for Dynamical Systems, Brown University, LCDS #92-11, 1992.

### **Papers Presented at Conferences**

Comparative tests of multimodal traffic equilibrium methods (with S. Dafermos) ORSA/TIMS National Meeting, May 14-16, 1984, San Francisco, CA.

Sensitivity analysis for a production model, ORSA/TIMS National Meeting, May 14-16, 1984, San Francisco, CA.

Stability and sensitivity analysis for the general network equilibrium-travel choice model (with S. Dafermos), Ninth International Symposium on Transportation and Traffic Theory, July 11-13, 1984, Delft, The Netherlands.

A network formulation for market equilibrium problems and variational inequalities (with S. Dafermos), ORSA/TIMS National Meeting, November 25-28, 1984, Dallas, TX.

Isomorphism between spatial price equilibrium and traffic network equilibrium models (with S. Dafermos), Regional Science National Meeting, November 8-11, 1984, Denver, CO.

Computational methods for variational inequalities with application to transportation, ORSA/TIMS National Meeting, April 29-May 1, 1985, Boston, MA.

An abstract network formulation of oligopolistic market equilibrium (with S. Dafermos), ORSA/TIMS National Meeting, April 29-May 1, 1985, Boston, MA.

Computational comparisons of spatial price equilibrium methods, 12<sup>th</sup> International Symposium of Mathematical Programming, August 5-9, 1985, Cambridge, MA.

Oligopolistic and competitive behavior of spatially separated markets (with S. Dafermos), 5<sup>th</sup> World Congress of the Economics Society, August 17-24, 1985, MIT, Cambridge, MA.

A game theoretic formulation of spatial price equilibrium, ORSA/TIMS National Meeting, November 4-6, 1985, Atlanta, GA.

Algorithms for the solution of oligopolistic market equilibrium problems, ORSA/TIMS National Meeting, April 14-16, 1986, Los Angeles, CA.

Algorithms for oligopolistic market equilibrium problems, TIMS XXVIII, July 21-25, 1986, Gold Coast, Australia.

A general dynamic spatial price equilibrium model: formulation, solution, and computational results (with J. Aronson), ORSA/TIMS National Meeting, October 27-29, 1986, Miami, FL., also presented at the National RSA, November 4-6, 1986, Columbus, Ohio.

Equilibrium operators for the solution of constrained matrix problems, European Congress in Regional Science, August 25-28, 1987, Athens, Greece.

Competitive equilibrium problems and variational inequalities, CISER Conference on "Innovations in Social Science Computing," November 11-13, 1987, Cornell U., Ithaca, N.Y.

An algorithm for the solution of the spatial price equilibrium problem, ORSA/TIMS National Meeting, October 25-28, 1987, St. Louis, MO.

Equilibrium operators for the solution of constrained matrix problems, ORSA/TIMS National Meeting, October 25-28, 1987, St. Louis, MO.

An algorithm for the solution of some quadratic programming problems with application to constrained matrix and spatial price equilibrium problems, Regional Science National Meeting, November 6-8, 1987, Baltimore, MD.

Parallel algorithms for market equilibrium problems, Third SIAM Conference on Parallel Processing for Scientific Computing, December 1-4, 1987, Los Angeles, CA.

A network equilibration algorithm for the estimation of economic and accounting matrices, ORSA/TIMS National Meeting, April 25-27, 1988, Washington, DC.

Equilibration algorithms for classical spatial price equilibrium problems, Optimization Days, May 2-4, 1988, HEC, Montreal, Canada.

On the solution of large-scale nonlinear network flow problems via equilibration, The International Management Science Conference, July 6-9, 1988, Paris, France.

The composition of large-scale equilibrium problems using parallel and serial decomposition, International Mathematical Programming Symposium, August 28-September 2, 1988, Tokyo, Japan.

Supply and demand equilibration algorithms for a class of market equilibrium problems, ORSA/TIMS National Meeting, October 23-26, 1988, Denver, CO.

Parallel and serial variational inequality decomposition algorithms for multicommodity market equilibrium problems, National RSA Meeting, Toronto, Ontario, November 11-13, 1988, also presented at the Third SIAM Conference on Optimization, Boston, MA, April 3-5, 1989.

The analysis of progressive equilibration algorithms (joint with A. Eydeland), Third SIAM Conference on Optimization, Boston, MA, April 3-5, 1989.

Disequilibrium and variational inequalities, Optimization Days, May 4-5, 1989, Montreal, Canada.

Equilibria and disequilibria in spatial markets with direct demand functions (with L. Zhao), 5<sup>th</sup> World Conference on Transport Research, July 10-14, 1989, Yokohama, Japan.

Disequilibria and variational inequalities (with L. Zhao), ORSA/TIMS National Meeting, October 16-18, 1989, NY, NY.

Parallel and serial network equilibration algorithms for the computation of large-scale constrained matrix problems, National RSA Meeting, November 10-12, 1989, Santa Barbara, CA.

Price rigidities in equilibrium markets and variational inequalities, ORSA/TIMS National Meeting, May 7-9, 1990, Las Vegas, Nevada.

A general dynamic spatial price network equilibrium model with gains and losses (with J. Aronson), ORSA/TIMS National Meeting, May 7-9, 1990, Las Vegas, Nevada.

A splitting equilibration algorithm for the computation of large-scale constrained matrix problems (with A. Eydeland), annual meeting of the Society for Dynamics and Control, June 28-30, 1990, St. Paul, Minnesota.

Disequilibrium and equilibrium problems: a variational inequality approach (with L. Zhao), ORSA/TIMS National Meeting, October 29-31, 1990, Philadelphia, Pennsylvania.

Variational inequalities and equilibrium programming, ORSA/TIMS National Meeting, October 29-31, 1990, Philadelphia, Pennsylvania.

Human migration networks (with J. Pan and L. Zhao), North American Meetings RSAI, November 9-11, 1990, Boston, MA.

Massively parallel algorithms for the computation of spatial price equilibria (with D. S. Kim and A. Eydeland), North American Meetings RSAI, November 9-11, 1990, Boston, MA.

Network equilibrium models, applications, and computations, North American Meetings RSAI, November 9-11, 1990, Boston, MA.

Computation of large scale constrained matrix problem: the Splitting Equilibration Algorithm (with A. Eydeland and D. S. Kim), Supercomputing '90, November 12-15, 1990, NY, NY.

Human migration networks with class transformations (with J. Pan and L. Zhao). Festschrift in honor of Martin Beckmann, WRSA meeting, February 24-27, 1991, Monterey, CA.

Parallel computation of large-scale dynamic market network equilibria via time period decomposition (with D.S. Kim), ORSA/TIMS National Meeting, May 6-8, 1991, Nashville, Tennessee.

A stochastic, dynamic airline network equilibrium model (with F. Soumis), TRISTANI, Montreal, Quebec, June 8-11, 1991.

A network model and algorithm for the analysis and estimation of financial flow of funds (with M. Hughes), the Meetings of the Society for Economic Dynamics and Control, Capri, Italy, June 18-20, 1991.

A massively parallel algorithm for the computation of economic equilibria (with D. S. Kim), the International Conference on Industrial and Applied Mathematics, Washington, DC, July 8-12, 1991.

The formulation and computation of a policy model for U.S. credit reform (with M. Hughes), the International Conference on Industrial and Applied Mathematics, Washington, DC, July 8-12, 1991.

The formulation and computation of generalized goal programming problems (with S. Thore and J. Pan), 14<sup>th</sup> International Mathematical Programming Symposium, Amsterdam, the Netherlands, August, 1991.

Formulation and computation of general financial equilibrium (with Q. Dong and M. Hughes), Second Waterloo CGE Modeling Conference, Waterloo, Canada, October 25-26, 1991.

Parallel computation of network equilibria (with D.S. Kim), ORSA/TIMS Anaheim Meeting, November 3-6, 1991.

Human migration networks (with J. Pan and L. Zhao), ORSA/TIMS Anaheim Meeting, November, 3-6, 1991.

Formulation and computation of financial equilibrium (with M. Hughes), ORSA/TIMS Anaheim Meeting, November 3-6, 1991.

Parallel decomposition of dynamic market network equilibria (with D.S. Kim), ORSA/TIMS Anaheim Meeting, November 3-6, 1991.

Massively parallel implementation of the Splitting Equilibration Algorithm, Conference on Computer Science/Operations Research Interfaces, Williamsburg, VA, January, 1992.

Formulation and computation of general financial equilibrium (with J. Dong and M. Hughes), ORSA/TIMS Orlando Meeting, April 26-29, 1992.

Generalized goal programming and variational inequalities. Conference on Computational Economics, Austin, Texas, May 17-19, 1992.

Parallel computation of financial equilibrium problems and variational inequalities (with J. Dong). Meetings of the Society for Economic Dynamics and Control, Montreal, Quebec, June 10-12, 1992.

Parallel implementation of the Splitting Equilibration Algorithm for the computation of constrained matrix and spatial price equilibrium problems (with D.S. Kim), Meetings of the Society for Economic Dynamics and Control, Montreal, Quebec, June 10-12, 1992.

Modeling transportation goal and targets in economic markets via variational inequalities (with S. Thore and J. Pan), World Conference on Transport Research, Lyons, France, June 30-July 3, 1992.

Computable general financial equilibrium with policy interventions (with J. Dong), Third CGE Modeling Conference, Waterloo, Ontario, October 24-25, 1992.

Massively parallel computation of spatial price equilibria, ORSA/TIMS San Francisco Meeting, November 2-4, 1992.

Parallel computation of financial equilibria, ORSA/TIMS San Francisco Meeting, November 2-4, 1992.

Networks and general financial equilibrium (with J. Dong), North American Meeting of RSAI, Chicago, Illinois, November 13-15, 1992.

Recent results for variational inequalities; plenary lecture, Optimization Days, Montreal, Quebec, May 12-14, 1993.

Dynamical systems and variational inequalities (with P. Dupuis), ORSA/TIMS Chicago Meeting, May 16-19, 1993.

Parallel computation of spatial price equilibria and variational inequalities, ORSA/TIMS Chicago Meeting, May 16-19, 1993.

Towards massively parallel computation of variational inequalities as dynamical systems, Society for Economic Dynamics and Control Meeting, June 22-25, 1993, Napflio, Greece.

Massively parallel computation of dynamical models and variational inequalities (with P. Dupuis), ORSA/TIMS Phoenix Meeting, October 31-November 3, 1993.

General financial equilibrium with transaction costs: variational inequality approach (with J. Dong), ORSA/TIMS Phoenix Meeting, October 31-November 3, 1993.

Massively parallel computation of network equilibria as solution to dynamical systems, ORSA/TIMS Boston Meeting, April 24-27, 1994.

A multi-stage network equilibrium model of migration (with J. Pan), ORSA/TIMS Boston Meeting, April 24-27, 1994.

Formulations and computation of general financial equilibrium with transaction costs (with J. Dong), IFACS Workshop on Computational Method in Economics and Finance, Amsterdam, The Netherlands, June 8-10, 1994.

Formulation and computation of imperfect market general financial equilibrium: Variational inequality approach (with J. Dong), ORSA/TIMS Detroit Meeting, October 23-26, 1994.

Spatial price equilibrium models with discriminatory ad valorem tariffs: formulation and computation with variational inequalities (with C.F. Nicholson and P.M. Bishop) presented at the American Agricultural Economics Association Annual Meeting, San Diego, CA, August 8-10, 1994.

Spatial price equilibrium models with discriminatory ad valorem tariffs: formulation and comparative computation using variational inequalities (with C.F. Nicholson and P.M. Bishop) IFACS Workshop on Computational Methods in Economics and Finance, Amsterdam, The Netherlands, June 8-10, 1994.

Massively parallel computation of portfolio optimization problems, IFACS Workshop on Computational Methods in Economics and Finance, Amsterdam, The Netherlands, June 8-10, 1994.

On the stability of projected dynamical systems (with D. Zhang), SIAM Annual Meeting, San Diego, California, July 25-29, 1994.

Formulation analysis, and computation of network equilibrium problems as projected dynamical systems (with D. Zhang), Network Infrastructure and the Urban Environment: Recent Advances in Land-Use/Transportation Modeling, Stockholm, Sweden, August 18-20, 1994.

On the stability of projected dynamical systems (with D. Zhang), ORSA/TIMS National Meeting, Detroit, Michigan, October 23-26, 1994.

Stability of an adjustment process for oligopolistic market equilibrium modeled as a projected dynamical system (with D. Zhang), INFORMS National Meeting, Los Angeles, California, May, 1995.

A projected dynamical systems model of general financial equilibrium with stability analysis (with J. Dong and D. Zhang), INFORMS National Meeting, Los Angeles, California, May 1995.

International general financial equilibrium modeling and computation with variational inequalities (with S. Siokos), International Conference on Computational Economics and Finance, Austin, Texas, May 21-24, 1995; Society for Economic Dynamics and Control Meeting, Barcelona, Spain, July 3-5, 1995.

A variational inequality approach for marketable pollution permits (with K. K. Dhanda), presented at the IFORS First Joint International Symposium on Energy Models for Policy and Planning, London, England, July 18-20, 1995.

General international financial equilibrium modeling and computation with variational inequalities (with S. Siokos), INFORMS National Meeting, New Orleans, Louisiana, October 29-November 1, 1995.

Variational inequalities for environmental policy modeling of pollution permits (with K. K. Dhanda), INFORMS National Meeting, New Orleans, Louisiana, October 29-November 1, 1995.

Using variational inequalities to solve spatial price equilibrium models with ad valorem tariffs and activity analysis (with C. Nichols and P. Bishop), INFORMS National Meeting, New Orleans, Louisiana, October 29-November 1, 1995.

Projected dynamical systems modeling and computation of spatial network equilibria (with D. Zhang and T. Takayama), INFORMS National Meeting, New Orleans, Louisiana, October 29-November 1, 1995.

On the local and global stability of a route choice adjustment process (with D. Zhang), INFORMS National Meeting, New Orleans, Louisiana, October 29-November 1, 1995.

Massively parallel computation of dynamic traffic network equilibria as projected dynamical systems (with D. Zhang), Conference on Network Optimization, Gainesville, Florida, February 12-14, 1996.

Modeling of international financial equilibrium (with S. Siokos), Eastern Economics Association Meeting, Boston, Massachusetts, March 15-17, 1996.

Formulation and computation of international general financial equilibria and variational inequalities (with S. Siokos), American Mathematical Society Meeting, April 14, 1996, NY, NY.

Massively parallel computation of dynamic traffic network equilibria modeled as projected dynamical systems (with D. Zhang), Second International Conference on Computing in Economics and Finance, Geneva, Switzerland, June 26-28, 1996.

Variational inequalities for international financial equilibrium modeling and computation (with S. Siokos), Second International Conference on Computing in Economics and Finance, Geneva, Switzerland, June 26-28, 1996.

Dynamic multi-sector, multi-instrument financial networks with futures (with S. Siokos), Stockholm Optimization Days, June 24-25, 1996.

Network equilibria and disequilibria (with D. Zhang), 25th Anniversary of CRT, Universite' de Montre'al, Montre'al, Quebec, Canada, October 10-11, 1996.

Projected dynamical systems modeling and computation of international financial equilibria (with S. Siokos), INFORMS National Meeting, San Diego, California, May 4-7, 1997.

Network modeling of international financial equilibria with hedging: statics and dynamics (with S. Siokos), Third International Conference on Computation in Economics and Finance, Stanford University, Stanford, California, June 30-July 2, 1997.

Static and dynamic modeling of international financial equilibrium with hedging (with S. Siokos), International Mathematical Programming Symposium, Lausanne, Switzerland, August 24-29, 1997.

Parallel computation of dynamic elastic and fixed demand traffic network problems (with D. Zhang), INFORMS National Meeting, Dallas, Texas, October 26-29, 1997.

On the equivalence between stationary link flow patterns and traffic network equilibria (with D. Zhang and J. H. Wu), INFORMS National Meeting, Montreal, Quebec, Canada, April 26-29, 1998.

International financial networks (with S. Siokos), INFORMS National Meeting, Montreal, Quebec, Canada, April 26-29, 1998.

Dynamic financial networks with futures (with S. Siokos), INFORMS National Meeting, Montreal, Quebec, Canada, April 26-29, 1998.

Noncompliant oligopolistic firms and marketable pollution permits: statics and dynamics: the case of oligopolistic markets (with K. K. Dhanda), INFORMS National Meeting, Montreal, Quebec, Canada, April 26-29, 1998.

Modeling financial equilibria with benchmark tracking (with S. Siokos), CEFES98, Cambridge, England, June 29- July 1, 1998.

On the equivalence between stationary link flow patterns and traffic network equilibria (with D. Zhang and J. H. Wu), INFORMS National Meeting, Seattle, Washington, October 25-28, 1998.

Marketable pollution permits in multiproduct, multipollutant oligopolistic markets with transaction costs (with K. K. Dhanda), INFORMS National Meeting, Seattle, Washington, October 25-28, 1998.

Marketable pollution permits and transportation networks, Social Change and Sustainable Transport, Berkeley, California, March 10-13, 1999; also presented at Optimization Days, Montreal, Canada, May 10-12, 1999.

Financial networks and optimally sized portfolios (with J. Dong), CIFE, NY, March 28-30, 1999.

Variational inequalities for marketable pollution permits with technological investment opportunities: Case of oligopolistic markets (with K.K. Dhanda), INFORMS National Meeting, May 2-5, 1999.

Sustainable transportation networks and pollution permits, INFORMS National Meeting, Philadelphia, PA, November 7-10, 1999.

A multiclass, multicriteria traffic network equilibrium model with elastic demand, INFORMS National Meeting, Salt Lake City, Utah, May, 7-10, 2000.

Paradoxes in networks with zero emission links: Implications for telecommunications versus transportation (with J. Dong), INFORMS National Meeting, San Antonio, Texas, November 5-8, 2000.

Dynamics of a transportation pollution permit system with stability analysis and computations (with D. Zhang), INFORMS National Meeting, San Antonio, Texas, November 5-8, 2000.

Integrated multicriteria network equilibrium models for commuting versus telecommuting (with J. Dong and P. L. Mokhtarian), Regional Science Association International Meeting, Chicago, Illinois, November 9-11, 2000.

Multicriteria network equilibrium modeling for the Information Age (with J. Dong and D. Zhang), INFORMS National Meeting, Miami Beach, Florida, November 4-7, 2001.

A space-time network for telecommuting versus commuting decision-making (with J. Dong and P. L. Mokhtarian), INFORMS National Meeting, Miami Beach, Florida, November 4-7, 2001.

Supply chain networks with competition (with J. Dong and D. Zhang), INFORMS National Meeting, Miami, Florida, November 4-7, 2001.

A supernetwork model for commuting versus telecommuting (with J. Dong), the 6<sup>th</sup> Conference of Hong Kong Society for Transportation Studies: Transportation Planning and Management in the 21<sup>st</sup> Century, Hong Kong, December 2001.

Supply chain networks with electronic commerce (with J. Dong and D. Zhang), Computing in Economics and Finance, Aix en Provence, France, June 27-29, 2002.

A supernetwork framework for the dynamics of financial networks with intermediation (with K. Ke), Computing in Economics and Finance, Aix en Provence, France, June 27-29, 2002.

Supply chain networks with multicriteria decision-makers (with J. Dong and D. Zhang), 15<sup>th</sup> International Symposium on Transportation and Traffic Theory, Adelaide, Australia, July 16-18, 2002.

Supply chain supernetworks and environmental criteria (with F. Toyasaki), INFORMS National Meeting, San Jose, California, November 17-20, 2002.

Supernetworks, the environment, and sustainability (with J. Cruz, T. Fuminori, and D. Matsypura), Managing Massachusetts Environment for the New Millennium, Worcester MA, November 15, 2000.

Financial networks with electronic transactions: Modeling, analysis, and computation (with K. Ke), INFORMS National Meeting, San Jose, California, November 17-20, 2002; also presented at the Fifth International Conference on Electronic Commerce Research (ICECR-5) meeting in Montreal, Canada, October 23-27, 2002.

Dynamics of global supply chain supernetworks (with J. Cruz and D. Matsypura), Eight INFORMS Computing Society Conference, Chandler, Arizona, January 8-10, 2003.

International financial networks with intermediation: Modeling, analysis and computations (with J. Cruz), Eight INFORMS Computing Society Conference, Chandler, Arizona, January 8-10, 2003.

Supernetworks: Paradoxes, challenges and new opportunities, First International Conference on the Economic and Social Implications of Information Technology, Washington, DC, January 27-28, 2003.

International financial networks with intermediation and electronic transactions (with J. Cruz), Modeling, Optimizations and Risk Management in Finance, Gainesville, Florida, March 5-7, 2003.

Dynamics of global supply chain supernetworks (with J. Cruz and D. Matsypura), Nectar Conference, Umea, Sweden, June 13-15, 2003.

Reverse supply chain management and electronic waste recycling: A multitiered network equilibrium framework for e-cycling (with F. Toyasaki), INFORMS National Meeting, Atlanta, GA, October 19-22, 2003.

International financial networks with electronic transactions (with J. Cruz), INFORMS National Meeting, Atlanta, GA, October 19-22, 2003.

Supply chain supernetworks with random demands (with J. Dong and D. Zhang), 50<sup>th</sup> Regional Science Association International Meeting, Philadelphia, PA, November 20-22, 2003.

Influence of Beckmann, McGuire, and Winsten's, **Studies in the Economics of Transportation**, 50<sup>th</sup> Regional Science Association International Meeting, Philadelphia, PA, November 20-22, 2003.

A supply chain network perspective for electric power generation, supply, transmission, and consumption (with D. Matsypura), CORS/INFORMS International Meeting, Banff, Alberta, Canada, May 16-19, 2004; and The International Conference on Computing, Communication and Control Technologies: CCCT '04, Austin, Texas, August 14-17, 2004.

Supply chain supernetworks with random demands (with J. Dong and D. Zhang), 2<sup>nd</sup> World Conference on POM, April 30-May 3, 2004, Cancun, Mexico.

A supply chain network economy: Cooperation vs. competition (with J. Dong and D. Zhang), 2<sup>nd</sup> World Conference on POM, April 30-May 3, 2004, Cancun, Mexico.

Statics and dynamics of global supply chain networks with environmental decision-making (with J. Cruz and F. Toyasaki), CORS/INFORMS International Meeting, Banff, Alberta, Canada, May 16-19, 2004 and The 9<sup>th</sup> Workshop on Economics and Heterogeneous Interacting Agents, Kyoto University, Kyoto, Japan, May 27-29, 2004.

Projected dynamical systems and evolutionary variational inequalities with application to dynamic traffic (with M.-G. Cojocaru and P. Daniele), The Canadian Mathematical Society Summer 2004 Meeting, Dalhousie University, Halifax, Nova Scotia, June 13-15, 2004; also presented at the INFORMS National Meeting, Denver, Colorado, October 24-27, 2004.

Financial networks with intermediation: Risk management with variable weights (with K. Ke) presented at the INFORMS National Meeting, Denver, Colorado, October 24-27, 2004.

The co-evolution and emergence of integrated international financial networks and social networks: Theory, analysis, and computations (with J. M. Cruz and T. Wakolbinger), the First POMS College Conference at Columbia University, December 3-4, 2004.

Dynamic supernetworks for the integration of social networks and supply chains with electronic commerce: Modeling and analysis of buyer-seller relationships with computations (with T. Wakolbinger), Ninth INFORMS Computing Conference, Annapolis, Maryland, January 5-7, 2005.

Financial engineering of the integration of global supply chain networks and social networks with risk management (with T. Wakolbinger and J. M. Cruz), POMS Operations Management Frontiers: Winds of Change Conference, Chicago, Illinois, April 29-May 2, 2005.

Networks – the science spanning disciplines, keynote speech, MeshForum, Chicago, Illinois, May 1-3, 2005.

Projected dynamical systems and evolutionary (time-dependent) variational inequalities via Hilbert spaces with applications (with M.-G. Cojocaru and P. Daniele), SIAM Conference on Optimization, Stockholm, Sweden, May 15-19, 2005.

Double-layered dynamics: A unified theory of projected dynamical systems and evolutionary variational inequalities (with M.-G. Cojocaru and P. Daniele), SIAM Conference on Optimization, Stockholm, Sweden, May 15-19, 2005.

Projected dynamical systems and applications (with M.-G. Cojocaru and P. Daniele), SIAM Conference on Optimization, Stockholm, Sweden, May 15-19, 2005.

A network economic model for supply chain versus supply chain competition (with J. Dong and D. Zhang), 2<sup>nd</sup> International Workshop for Optimization at Shanghai, Tongji University, Shanghai, China, May 28-30, 2005.

A network modeling approach for the optimization of Internet-based advertising strategies and pricing with a quantitative explanation of two paradoxes (with L. Zhao), IFORS Conference, Hawaii, July 11-15, 2005.

A retrospective on Beckmann, McGuire and Winsten's **Studies in the Economics of Transportation** (with D. Boyce and H. S. Mahmassani), INFORMS National Meeting, San Francisco, California, November 13-16, 2005.

The evolution and emergence of integrated social and financial networks (with T. Wakolbinger and L. Zhao), INFORMS National Meeting, San Francisco, California, November 13-16, 2005.

Dynamic supply chains, transportation network equilibria, and evolutionary variational inequalities (with Z. Liu), Fifth Annual Florida Supply Chain and Logistics Conference, Gainesville, Florida, February 25-26, 2006; also presented at the Seventeenth Annual POMS Conference, Boston, Massachusetts, April 28-May 1, 2006.

Modeling generator power plant portfolios and pollution taxes in electric power supply chain networks: A transportation network equilibrium transformation (with K. Wu, Z. Liu, and J. K. Stranlund), Seventeenth Annual POMS Conference, Boston, Massachusetts, April 28-May 1, 2006.

Global supply chain dynamics with multicriteria decision-makers under risk and uncertainty (with D. Matsypura), Seventeenth Annual POMS Conference, Boston, Massachusetts, April 28-May 1, 2006.

Optimal endogenous carbon taxes for electric power supply chains with power plants (with Z. Liu and T. Woolley), Computing in Economics and Finance Conference, Limassol, Cyprus, June 22-24, 2006.

Equilibria, supernetworks, and evolutionary variational inequalities (with Z. Liu), Computing in Economics and Finance Conference, Limassol, Cyprus, June 22-24, 2006.

A network equilibrium framework for Internet advertising: Models, qualitative analysis, and algorithms (with L. Zhao), IFORS Conference, Hong Kong, June 25-28, 2006.

Static and dynamic transportation network equilibrium reformulations of electric power supply chain networks with known demands (with Z. Liu, M.-G. Cojocaru, and P. Daniele), 21<sup>st</sup> European Conference on Operations Research, Reykjavik, Iceland, July 2-5, 2006.

Optimal endogenous carbon taxes for electric power supply chains with power plants (with Z. Liu and T. Woolley), INFORMS Annual Meeting, Pittsburgh, PA, November 5-8, 2006.

Financial engineering of the integration of global supply chain networks and social networks with risk management (with J. M. Cruz and T. Wakolbinger), INFORMS Annual Meeting, Pittsburgh, PA, November 5-8, 2006.

Financial networks with intermediation and transportation network equilibria: A supernetwork equivalence and reinterpretation of the equilibrium conditions with computations (with Z. Liu), INFORMS Annual Meeting, Pittsburgh, PA, November 5-8, 2006.

Dynamic electric power supply chains and transportation networks: an evolutionary variational inequality formulation (with Z. Liu, M.-G. Cojocaru, and P. Daniele), INFORMS Annual Meeting, Pittsburgh, PA, November 5-8, 2006.

Spatially differentiated trade of permits for multipollutant electric power supply chains (with T. Woolley and J. K. Stranlund), INFORMS Annual Meeting, Pittsburgh, PA, November 5-8, 2006; also presented at the 7<sup>th</sup> Meeting in Game Theory and Practice Dedicated to Energy, Environment, and Natural Resources, Montreal, Canada, May 28-30, 2007, and at the INFORMS International Puerto Rico Conference, July 8-11, 2007.

Modeling of electric power supply chain networks with fuel suppliers via variational inequalities (with D. Matsypura and Z. Liu), International Association of Energy Economics Conference, Wellington, New Zealand, February 18-21, 2007.

A unified network performance measure with importance identification and the ranking of network components (with Q. Qiang), 4<sup>th</sup> International Computational Management Science Conference, Geneva, Switzerland, April 20-22, 2007.

A transportation network efficiency measure that captures flows, behavior, and costs with applications to network component importance identification and vulnerability (with Q. Qiang), 2007 POMS Meeting, Dallas, Texas, May 3-7, 2007; also presented at the 2007 Computing in Economics and Finance (CEF) Conference, Montreal, Canada, June 14-16, 2007, and at the World Conference in Transport Research (WCTR), Berkeley, California, June 24-28, 2007.

Sustainable supply chain networks and transportation (with Z. Liu and T. Woolley), 2007 POMS Meeting, Dallas, Texas, May 3-7.

Multiperiod competitive supply chain networks with inventorying and a transportation network equilibrium reformulation (with Z. Liu), 2007 POMS Meeting, Dallas, Texas, May 3-7, 2007.

An efficiency measure for dynamic networks with application to the Internet and vulnerability analysis (with Q. Qiang), 2007 Computing in Economics and Finance (CEF) Conference, Montreal, Canada, June 14-16, 2007.

A unified network efficiency/performance measure (with Q. Qiang), INFORMS International Puerto Rico Conference, July 8-11, 2007.

An efficiency measure for dynamic networks with application to the Internet and vulnerability analysis (with Q. Qiang), INFORMS National Meeting, Seattle, Washington, November 4-7, 2007 and the North American RSAI Meeting, Savannah, Georgia, November 8-11, 2007.

Dynamic modeling of the Internet via evolutionary variational inequalities with vulnerability analysis, Microeconomics Dynamics Mini-conference, Caltech, Pasadena, CA, May 23-25, 2008.

Environmental impact assessment of transportation networks with degradable links in an era of climate change (with Q. Qiang and L. Nagurney), Third International Conference on Financing Transport Infrastructure, Paris, France, June 19-20, 2008; also presented at the INFORMS National Meeting, Washington, DC, October 12-15, 2008.

An integrated electric power supply chain and fuel market network framework: Theoretical modeling with empirical analysis for New England (with Z. Liu), 14<sup>th</sup> Conference on Computing in Economics and Finance, Paris, France, June 26-28, 2008; also presented at the INFORMS National Meeting, Washington, DC, October 12-15, 2008.

A relative total cost index for the evaluation of transportation network robustness (with Q. Qiang), INFORMS National Meeting, Washington, DC, October 12-15, 2008.

Supply chain network models for humanitarian logistics: Identifying synergies and vulnerabilities (with Q. Qiang and T. Woolley), INFORMS National Meeting, Washington, DC, October 12-15, 2008.

Environmental and cost synergy in supply chain network integration (with T. Woolley), INFORMS National Meeting, Washington, DC, October 12-15, 2008.

Evolutionary variational inequalities and the Internet (with D. Parkes and P. Daniele), 20<sup>th</sup> International Symposium on Mathematical Programming, Chicago, Illinois, August 23-28, 2009.

Modeling of supply chain risk under disruptions with performance measurement and robustness analysis (with Q. Qiang and J. Dong), 20<sup>th</sup> International Symposium on Mathematical Programming, Chicago, Illinois, August 23-28, 2009.

Formulation and analysis of horizontal mergers among oligopolistic firms with insights into the merger paradox, 20<sup>th</sup> International Symposium on Mathematical Programming, Chicago, Illinois, August 23-28, 2009.

An integrated electric power supply chain and fuel market network framework: Theoretical modeling with empirical analysis for New England (with Z. Liu), 20<sup>th</sup> International Symposium on Mathematical Programming, Chicago, Illinois, August 23-28, 2009.

Formulation of mergers among oligopolistic firms with insights into the merger paradox, INFORMS National Meeting, San Diego, California, October 11-14, 2009.

A knowledge collaboration network model across disciplines, 2010 International Conference on Social Computing, Behavioral Modeling & Prediction, National Institutes of Health, Bethesda, Maryland, March 29-April 1, 2010.

Supply chain network design for critical needs with outsourcing (with M. Yu and Q. Qiang), NetSci2010, Cambridge, Massachusetts, May 12-14, 2010.

Sustainable supply chain networks design: A multicriteria perspective (with L. S. Nagurney), ALIO -INFORMS Joint International Meeting, Buenos Aires, Argentina, June 6-9, 2010.

Supply chain network design for critical needs with outsourcing (with M. Yu and Q. Qiang),, Computational Management Science 2010, Vienna, Austria, July 28-30, 2010.

Environmental and cost synergy in supply chain network integration in mergers and acquisitions (with T. Anderson), INFORMS National Meeting, Austin, Texas, November 7-10, 2010.

A bi-criteria measure to assess supply chain network performance for critical needs under capacity and

demand disruptions (with Q. Qiang), INFORMS National Meeting, Austin, Texas, November 7-10, 2010, also presented at the First INFORMS Northeastern Regional Conference, University of Massachusetts Amherst May 6-7, 2011.

Supply chain network design for critical needs with outsourcing (with M. Yu and Q. Qiang), INFORMS National Meeting, Austin, Texas, November 7-10, 2010.

Supply chain network design under profit maximization and oligopolistic competition, INFORMS National Meeting, Austin, Texas, November 7-10, 2010.

Supply chain networks operations management of a blood banking system with cost and risk management (with A. Masoumi and M. Yu), 2011 POMS Meeting, Reno, Nevada, April 29-May 2, 2011 and at the First INFORMS Northeastern Regional Conference, University of Massachusetts Amherst, May 6-7, 2011.

Multiproduct supply chain network design with applications to healthcare (with M. Yu and Q. Qiang), 2011 POMS Meeting, Reno, Nevada, April 29-May 2, 2011 and the First INFORMS Northeastern Regional Conference, University of Massachusetts Amherst, May 6-7, 2011.

Supply chain outsourcing under exchange rate risk and competition (with Z. Liu), the First INFORMS Northeastern Regional Conference, University of Massachusetts Amherst, May 6-7, 2011.

Risk reduction and cost synergy in mergers and acquisitions via supply chain network integration (with Z. Liu), the First INFORMS Northeastern Regional Conference, University of Massachusetts Amherst, May 6-7, 2011.

Fashion supply chain management through cost and time minimization from a network perspective (with M. Yu), the First INFORMS Northeastern Regional Conference, University of Massachusetts Amherst, May 6-7, 2011.

Medical nuclear supply chain design: A tractable network model and computational procedure (with L. S. Nagurney), Seventh Conference on Integrated Risk Management in Operations and Global Supply Chains, McGill University, Montreal, Canada, July 31-August 1, 2011.

Dynamics and equilibria of ecological predator-prey networks as nature's supply chains (with L. S. Nagurney), 58<sup>th</sup> Annual North American Meetings of the Regional Science Association International, Miami, Florida, November 9-12, 2011.

Medical nuclear supply chain design: A tractable network model and computational approach (with L. S. Nagurney), 58<sup>th</sup> Annual North American Meetings of the Regional Science Association International, Miami, Florida, November 9-12, 2011.

A bi-criteria measure to assess supply chain network performance for critical needs under capacity and demand disruptions (with Q. Qiang), INFORMS National Meeting, Charlotte, North Carolina, November 13-16, 2011.

Supply chain network design of a sustainable blood banking system (with A. H. Masoumi), INFORMS National Meeting, Charlotte, North Carolina, November 13-16, 2011.

Supply chains with global outsourcing and quick-response production under demand and cost uncertainty (with Z. Liu), INFORMS National Meeting, Charlotte, North Carolina, November 13-16, 2011.

Sustainable fashion supply chain management under oligopolistic competition & brand differentiation (with M. Yu), INFORMS National Meeting, Charlotte, North Carolina, November 13-16, 2011.

A network model and computational approach for the Molybdenum 99 supply chain for nuclear

medicine (with L. S. Nagurney), Fall Joint Meeting of the New England Sections of the American Physical Society, the American Association of Physics Teachers, and the Society of Physics Students, Amherst, MA, November 19, 2011.

Supply chain network design of a sustainable blood banking system (with A. H. Masoumi), POMS Conference, Chicago, Illinois, April 20-23, 2012.

A supply chain network oligopoly model for pharmaceuticals under brand differentiation and perishability (with A. H. Masoumi and M. Yu), POMS Conference, Chicago, Illinois, April 20-23, 2012; also presented at the INFORMS National Meeting, Phoenix, Arizona, October 14-17, 2012.

The influence of technical, market and legislative factors of e-waste flows (with F. Toyasaki, T. Wakolbinger, and T. Nowak), POMS Conference, Chicago, Illinois, April 20-23, 2012.

Multiproduct humanitarian healthcare supply chains: A network modeling and computational framework (with M. Yu and Q. Qiang), POMS Conference, Chicago, Illinois, April 20-23, 2012; also presented at the INFORMS National Meeting, Phoenix, Arizona, October 14-17, 2012.

The influence of technical, market and legislative factors of e-waste flows (with F. Toyasaki, T. Wakolbinger, and T. Nowak), The 9<sup>th</sup> AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, Florida, July 1-5, 2012.

Choice as a principle in network architecture (with Tilman Wolf, Jim Griffioen, Ken Calvert, Rudra Dutta, George Rouskas, and Ilia Baldine), ACM SIGCOMM 2012, Helsinki, Finland, August 13-17, 2012.

Securing the sustainability of global medical nuclear supply chains through economic recovery, risk management, and optimization (with L. S. Nagurney and D. Li), INFORMS National Meeting, Phoenix, Arizona, October 14-17, 2012.

Supply chain networks with global outsourcing and quick-response production under demand and cost uncertainty (with Z. Liu), INFORMS National Meeting, Phoenix, Arizona, October 14-17, 2012; also presented at the 2012 DSI Annual Meeting, San Francisco, California, November 17-20, 2012.

A dynamic network oligopoly model with transportation costs, product differentiation, and quality competition (with D. Li), INFORMS National Meeting, Phoenix, Arizona, October 14-17, 2012; also presented at the 59<sup>th</sup> Annual North American Meetings of the Regional Science Association International, Ottawa, Canada, November 7-10, 2012.

A supply chain network game theoretic framework for time-based competition with transportation costs and product differentiation (with M. Yu), 10<sup>th</sup> International Computational Management Science Conference, Montreal, Canada, May 1-3, 2013.

A Cournot-Nash-Bertrand game theory model of a service-oriented Internet with price and quality competition among network transport providers (with T. Wolf), 10<sup>th</sup> International Computational Management Science Conference, Montreal, Canada, May 1-3, 2013.

Securing the sustainability of global medical nuclear supply chains through economic recovery, risk management, and optimization (with L. S. Nagurney and D. Li), POMS Conference, Denver, CO, May 3-6, 2013.

Pharmaceutical supply chain networks with outsourcing under price and quality competition (with D. Li and L. S. Nagurney), POMS Conference, Denver, CO, May 3-6, 2013; also presented at the INFORMS National Meeting, Minneapolis, Minnesota, October 6-9, 2013 and at the 60<sup>th</sup> Annual North American Meetings of the Regional Science Association International, Atlanta, Georgia, November 13-16, 2013.

Network economics of cyber crime with applications to financial service organizations (with W. Burleson, M. Sherman, S. Solak, and C. Misra), INFORMS National Meeting, Minneapolis, Minnesota, October 6-9, 2013.

Competitive food supply chain networks with application to fresh produce (with M. Yu), INFORMS National Meeting, Minneapolis, Minnesota, October 6-9, 2013; also presented at the POMS 25<sup>th</sup> Annual Conference, Atlanta, Georgia, May 9-12, 2014.

An integrated disaster relief supply chain network model with time targets and demand uncertainty (with A. H. Masoumi and M. Yu), INFORMS National Meeting, Minneapolis, Minnesota, October 6-9, 2013; also presented at the 60<sup>th</sup> Annual North American Meetings of the Regional Science Association International, Atlanta, Georgia, November 13-16, 2013, at the POMS 25<sup>th</sup> Annual Conference, Atlanta, Georgia, May 9-12, 2014, and at Humanitarian Technology: Science, Systems and Global Impact 2014, Boston, Massachusetts, May 13-15, 2014.

Equilibria and dynamics of supply chain network competition with information asymmetry in quality and minimum quality standards (with D. Li), Learning and Intelligent Optimization Conference: Lion 8, Gainesville, Florida, February 16-21, 2014; also presented at the POMS 25<sup>th</sup> Annual Conference, Atlanta, Georgia, May 9-12, 2014.

Cybersecurity and financial services, INFORMS Conference on Business Analytics & Operations research, Boston, MA, March 30-April 1, 2014.

A network economic game theory model of a service-oriented Internet with price and quality competition in both content and network provision (with S. Saberi and T. Wolf), POMS 25<sup>th</sup> Annual Conference, Atlanta, Georgia, May 9-12, 2014.

Supply chain network competition in time-sensitive markets (with M. Yu, J. Floden, and L.S. Nagurney), 18th European Conference on Mathematics for Industry, Taormina, Italy, June 9-13, 2014; also presented at the Conference on Optimization, Control and Applications in the Information Age - in honor of the 60th Birthday of Professor Panos M. Pardalos, Chalkidiki, Greece, June 15-20, 2014.

When and for whom e-waste be a treasure trove? Insights from a network equilibrium model of e-waste flows (with F. Toyasaki, T. Wakolbinger, and T. Nowak), 18th European Conference on Mathematics for Industry, Taormina, Italy, June 9-13, 2014; also presented at the 20<sup>th</sup> IFORS Conference, Barcelona, Spain, July 13-18, 2014.

A network economic model of a service-oriented Internet with choices and quality competition (with S. Saberi, D. Li, and T. Wolf), INFORMS Annual Conference, San Francisco, California, November 9-12, 2014.

Supply chain network competition with information asymmetry in quality and minimum quality standards (with D. Li), INFORMS Annual Conference, San Francisco, California, November 9-12, 2014.

Supply chain network sustainability under competition and frequencies of economic activities (with M. Yu and J. Floden), INFORMS Annual Conference, San Francisco, California, November 9-12, 2014.

A game theory model for a differentiated service-oriented Internet with duration-based contracts (with S. Saberi, T. Wolf, and L.S. Nagurney), INFORMS Computing Society Conference, Richmond, VA, January 11-13, 2015.

Supply chain performance assessment and supplier and component importance identification in a general competitive multitiered supply chain network model. World Congress on Global Optimization, Gainesville, Florida, February 22-25, 2015; also presented at INFORMS Annual Meeting, Philadelphia, Pennsylvania, November 1-4, 2015.

Fashion supply chain network competition with ecolabelling (with M. Yu and J. Floden), POMS Conference, Washington DC, May 8-11, 2015.

Supply chain network competition in price and quality with multiple manufacturers and freight service providers (with S. Saberi, S. Shukla, and J. Floden), POMS Conference, Washington DC, May 8-11, 2015; also presented at INFORMS Annual Meeting, Philadelphia, Pennsylvania, November 1-4, 2015.

A supply chain network game theory model with outsourcing and quality and price competition (with D. Li), POMS Conference, Washington DC, May 8-11, 2015.

A mean-variance disaster relief supply chain network model for risk reduction with stochastic link costs, time targets, and demand uncertainty (with L.S. Nagurney), 2<sup>nd</sup> International Conference on Dynamics of Disasters, Kalamata, Greece, June 29-July 2, 2015.

An integrated disaster relief supply chain network model with time targets and demand uncertainty (with A.H. Masoumi and M. Yu), 27<sup>th</sup> European Conference on Operational Research (EURO15), Glasgow, Scotland, July 12-15, 2015.

Fashion supply chain network competition with ecolabelling (with M. Yu and J. Floden), 27<sup>th</sup> European Conference on Operational Research (EURO15), Glasgow, Scotland, July 12-15, 2015; also presented at INFORMS Annual Meeting, Philadelphia, Pennsylvania, November 1-4, 2015.

The application of supernetworks to critical infrastructure from transportation to electric power, American Council of Engineering Companies (ACEC) Conference, Boston, Massachusetts, October 16, 2015.

A supply chain game theory framework for cybersecurity investments under network vulnerability (with L.S. Nagurney and S. Shukla), INFORMS Annual Meeting, Philadelphia, Pennsylvania, November 1-4, 2015.

Fashion supply chain network competition with ecolabelling (with M. Yu and J. Floden), INFORMS Annual Meeting, Philadelphia, Pennsylvania, November 1-4, 2015.

Supply chain performance assessment and supplier and component importance identification in a general competitive multitiered supply chain network model (with D. Li), INFORMS Annual Meeting, Philadelphia, Pennsylvania, November 1-4, 2015.

Supply chain network competition in price and quality with multiple manufacturers and freight service providers (with S. Saberi, S. Shukla, and J. Floden), INFORMS Annual Meeting, Philadelphia, Pennsylvania, November 1-4, 2015.

A layered protocol architecture for scalable innovation and identification of network economic synergies in the Internet of Things (with T. Wolf), 1<sup>st</sup> IEEE International Conference on Internet of Things Design and Implementation, April 4-8, 2016.

New England Security Day, Harvard University, Cambridge, Massachusetts, April 28, 2016.

A supply chain game theory framework for cybersecurity investments under network vulnerability (with L.S. Nagurney and S. Shukla), POMS Annual Conference, May 6-9, 2016.

Competitive food supply chain networks with application to fresh produce (with M. Yu), 28<sup>th</sup> European Conference on Operational Research, July 3-6, 2016.

Physical proof of the occurrence of the Braess Paradox in electrical circuits (with L.S. Nagurney), 28<sup>th</sup> European Conference on Operational Research, July 3-6, 2016.

A supply chain network game theory model of cybersecurity investments with nonlinear budget constraints (with P. Daniele, and S. Shukla), 28<sup>th</sup> European Conference on Operational Research, July 3-6, 2016.

Freight service provision for disaster relief: A competitive network model with computations, 28<sup>th</sup> European Conference on Operational Research, July 3-6, 2016.

A supply chain network game theory model of cybersecurity investments with nonlinear budget constraints (with P. Daniele, and S. Shukla), INFORMS Annual Meeting, Nashville, Tennessee, November 13-16, 2016.

A Generalized Nash Equilibrium network model for post-disaster humanitarian relief (with E. Alvarez Flores and C. Soyly), INFORMS Annual Meeting, Nashville, Tennessee, November 13-16, 2016.

A network economic game theory model of a service-oriented Internet with price and quality competition in both content and network provision (with S. Saberi and T. Wolf), INFORMS Annual Meeting, Nashville, Tennessee, November 13-16, 2016.

A general multitiered supply chain network model of quality competition with suppliers (with D. Li), INFORMS Annual Meeting, Nashville, Tennessee, November 13-16, 2016.

Reducing the Internet adoption gap between rich and poor through auction mechanisms (with S. Cabrales, L.A. Marentes, Y. Donoso, and T. Wolf), INFORMS Annual Meeting, Nashville, Tennessee, November 13-16, 2016.

Quality in competitive fresh produce supply chains with application to farmers' markets (with D. Besik), INFORMS Computing Society Conference, Austin, Texas, January 15-17, 2017; to be presented at the INFORMS Annual Meeting, Phoenix, Arizona, November 4-7, 2018.

Supply chain network capacity competition with outsourcing: A variational equilibrium framework (with D. Besik and M. Yu), POMS Conference, Seattle, WA, May 5-8, 2017.

Consumer learning of product quality with time delay: Insights from spatial price equilibrium models with differentiated products (with D. Li and M. Yu), POMS Conference, Seattle, WA, May 5-8, 2017.

A competitive multiperiod supply chain network model with freight carriers and green technology investment option (with S. Saberi, J. Sarkis, and J.M. Cruz), MSOM Conference, UNC Kenan-Flagler Business School, Chapel Hill, North Carolina, June 20-21, 2017.

A Generalized Nash Equilibrium model for post-disaster humanitarian relief, EURO Hope conference, Vienna University of Economics and Business, Austria, June 29-30, 2017.

A multitiered supply chain network equilibrium model for disaster relief with capacitated freight service provision, 3<sup>rd</sup> International Conference on Dynamics of Disasters, Kalamata, Greece, July 5-9, 2017.

A variational equilibrium network framework for humanitarian organizations in disaster relief: Effective product delivery under competition for financial funds (with P. Daniele, E. Alvarez Flores, and V. Caruso), 3<sup>rd</sup> International Conference on Dynamics of Disasters, Kalamata, Greece, July 5-9, 2017.

A game theory model for freight service provision security investments for high-value cargo (with S. Shukla, L.S. Nagurney, and S. Saberi), 21<sup>st</sup> IFORS Conference, Quebec City, Canada, July 17-21, 2017.

Mergers and acquisitions in blood banking systems: A supply chain network approach (with A.H. Masoumi and M. Yu), 21<sup>st</sup> IFORS Conference, Quebec City, Canada, July 17-21, 2017.

A cybersecurity investment supply chain game theory model (with P. Daniele and A. Maugeri), International Conference on Optimization and Decision Science, Sorrento, Italy, September 4-7, 2017.

Competition for blood donations: A Nash Equilibrium network framework (with P. Dutta), INFORMS Annual Meeting, Houston, Texas, October 22-25, 2017.

A competitive multiperiod supply chain network model with freight carriers and green technology investment option (with S. Saberi, J. Sarkis, and J.M. Cruz), INFORMS Annual Meeting, Houston, Texas, October 22-25, 2017; also presented at EURO 2018, 29<sup>th</sup> European Conference on Operational Research, Valencia, Spain, July 8-11, 2018.

Consumer learning of product quality with time delay: Insights from spatial price equilibrium models with differentiated products (with D. Li and M. Yu), INFORMS Annual Meeting, Houston, Texas, October 22-25, 2017.

A variational equilibrium network framework for humanitarian organizations in disaster relief: Effective product delivery under competition for financial funds (with P. Daniele, E. Alvarez Flores, and V. Caruso), INFORMS Annual Meeting, Houston, Texas, October 22-25, 2017; also presented at EURO 2018, 29<sup>th</sup> European Conference on Operational Research, Valencia, Spain, July 8-11, 2018.

Supply chain network capacity competition with outsourcing: A variational equilibrium framework (with D. Besik and M. Yu), INFORMS Annual Meeting, Houston, Texas, October 22-25, 2017.

Mergers and acquisitions in blood banking systems: A supply chain network approach (with A.H. Masoumi and M. Yu), INFORMS Annual Meeting, Houston, Texas, October 22-25, 2017.

Multifirm models of cybersecurity investment competition vs. cooperation and network vulnerability (with S. Shukla), INFORMS Annual Meeting, Houston, Texas, October 22-25, 2017; also presented at the INFORMS Annual Meeting, Seattle, Washington, October 20-23, 2019.

Predictive and prescriptive models of cybercrime and cybersecurity investments under network vulnerability, INFORMS Analytics Conference, Baltimore, MD, April 15-17, 2018.

A study of transportation rates, framework agreements and product distribution (with T. Gossler, T. Wakolbinger, and P. Daniele), POMS Annual Conference, Houston, Texas, May 4-7, 2018; also presented at EURO 2018, 29<sup>th</sup> European Conference on Operational Research, Valencia, Spain, July 8-11, 2018.

Supply chain network competition among blood service organizations: A Generalized Nash Equilibrium framework (with P. Dutta), NEDSI, Providence, RI, April 12-14, 2018; also presented at the 60<sup>th</sup> CORS Conference, Halifax, Nova Scotia, June 4-6, 2018 and at the INFORMS Annual Meeting, Phoenix, Arizona, November 4-7, 2018.

Dynamics of quality as a strategic variable in complex food supply chain network competition: The case of fresh produce (with D. Besik and M. Yu), NEDSI, Providence, RI, April 12-14, 2018; also presented at the 60<sup>th</sup> CORS Conference, Halifax, Nova Scotia, June 4-6, 2018 and at the INFORMS Annual Meeting, Phoenix, Arizona, November 4-7, 2018.

A supply chain network game theory model of cybersecurity investments with nonlinear budget constraints (with P. Daniele and S. Shukla), INFORMS Annual Meeting, Phoenix, Arizona, November 4-7, 2018.

Competition for blood donations (with P. Dutta), POMS Conference, Washington, DC, May 2-6, 2019.

An integrated financial and logistical game theory model for humanitarian organizations with purchasing costs, multiple freight service providers, and budget, capacity, and demand constraints (with M. Salarpour and P. Daniele), POMS Conference, Washington, DC, May 2-6, 2019; also presented at the 4<sup>th</sup> International Conference on Dynamics of Disasters, Kalamata, Greece, July 1-5, 2019 and at the INFORMS Annual Meeting, Seattle, Washington, October 20-23, 2019.

Global supply chain networks and tariff rate quotas: Equilibrium analysis with application to agricultural products (with D. Besik and L.S. Nagurney), POMS Conference, Washington, DC, May 2-6, 2019; also presented at EURO Dublin, Ireland, June 23-26, 2019.

Strict quotas or tariffs? Implications for product quality and consumer welfare in differentiated product supply chains (with D. Besik and D. Li), INFORMS Annual Meeting, Seattle, Washington, October 20-23, 2019.

Novel supply chain network models inspired by the Covid-19 pandemic: From optimization to game theory. INFORMS Chicago Regional Analytics Conference (virtual), September 24-25, 2020.

Networks in finance in *Networks* and beyond: A half century retrospective. INFORMS Annual Meeting (virtual), November 7-13, 2020.

Competition for medical supplies under stochastic demand in the Covid-19 pandemic: A Generalized Nash Equilibrium framework (with M. Salarpour, J. Dong, and P. Dutta), INFORMS Annual Meeting (virtual), November 7-13, 2020; also presented at POMS 31<sup>st</sup> Annual Conference (virtual), May 1-5, 2021.

Global supply chain networks and tariff rate quotas: Equilibrium analysis with applications to agricultural products (with D. Besik and L.S. Nagurney), INFORMS Annual Meeting (virtual), November 7-13, 2020; also presented at Decision Sciences Institute (DSI) 51st Annual Conference (virtual), November 21-23, 2020.

A stochastic disaster relief game theory network model (with M. Salarpour, J. Dong, and L.S. Nagurney), INFORMS Annual Meeting (virtual), November 7-13, 2020.

A multicountry, multicommodity stochastic game theory network model of competition for medical supplies inspired by the Covid-19 pandemic (with M. Salarpour), Northeast Decision Sciences Institute (NEDSI) 50th Annual Conference, March 26-27, 2021 (virtual); also presented at the 31<sup>th</sup> European Conference on Operational research, Athens, Greece, July 11-14, 2021 virtually and at the 5<sup>th</sup> International Conference on Dynamics of Disasters, July 15-18, 2021 (virtual) and at the INFORMS Healthcare Conference, July 21-23, 2021.

Competition for medical supplies under stochastic demand in the Covid-19 pandemic: A Generalized Nash Equilibrium Framework (with M. Salarpour, J. Dong, and P. Dutta), POMS Annual Conference, April 30-May 5, 2021 (virtual).

International human migration networks with regulations (with P. Daniele), 8<sup>th</sup> International Symposium on Transport Network Reliability, June 16-18, 2021 (virtual).

OR and COVID-19: From research to policy (Making an Impact Lightning Talk), 31<sup>th</sup> European Conference on Operational research, Athens, Greece, July 11-14, 2021, presented virtually.

A multiclass, multiproduct Covid-19 convalescent plasma donot equilibrium model (with P. Dutta), 5<sup>th</sup> International Conference on Dynamics of Disasters, July 15-18, 2021 (virtual); also presented at the INFORMS Healthcare Conference, July 21-23, 2021.

An integrated multitiered supply chain network model of competing agricultural firms and processing firms (with D. Besik and P. Dutta), 5<sup>th</sup> International Conference on Dynamics of Disasters, July 15-18, 2021 (virtual); also presented at the INFORMS Annual Meeting, October 24-27, 2021.

Refugee migration networks and regulations: A multiclass, multipath variational inequality framework (with P. Daniele and L.S. Nagurney), INFORMS Annual Meeting, October 24-27, 2021.

Modeling of Covid-19 trade measures on essential products: A multiproduct, multicountry spatial price equilibrium framework (with M. Salarpour and J. Dong), INFORMS Annual Meeting, October 24-27, 2021.

Supply chain networks, wages, and labor productivity: Insights from Lagrange analysis and computations, POMS 32<sup>nd</sup> Annual Conference, April 21-25, 2022.

Modeling of COVID-19 trade measures on essential products: A multiproduct, multicountry spatial price equilibrium framework (with M. Salarpour and J. Dong), POMS 32<sup>nd</sup> Annual Conference, April 21-25, 2022.

An integrated multitiered supply chain network model of competing agricultural firms and processing firms (with D. Besik and P. Dutta), POMS 32<sup>nd</sup> Annual Conference, April 21-25, 2022; also presented at the INFORMS Annual Meeting, Indianapolis, Indiana, October 16-19, 2022.

A multicountry, multicommodity stochastic game theory network model for medical supplies inspired by the Covid-19 pandemic (with M. Salarpour), INFORMS Annual Meeting, Indianapolis, Indiana, October 16-19, 2022.

Attracting international migrant labor" Investment optimization to alleviate supply chain labor shortages, INFORMS Annual Meeting, Indianapolis, Indiana, October 16-19, 2022.

### **Conference Organizing/Steering/Program Committees**

1997 International Meeting of the Society for Computational Economics, Stanford U., Stanford, CA, June, 1997.

TRISTAN III, San Juan, Puerto Rico, June, 1998.

1998 International Meeting of the Society for Computational Economics, Computing in Economics and Finance Cambridge, England, June 29-July 1, 1998.

1999 International Meeting of the Society for Computational Economics, Computing in Economics and Finance, Boston College, Chestnut Hill, MA, June 24-26, 1999.

2002 Computing in Economics and Finance, Aix en Provence, France, June 27-29, 2002.

Computational Management Science, Chania, Greece, May 27-30, 2003.

2003 Computing in Economics and Finance, Seattle, WA, July 11-13, 2003.

2004 Computing in Economics and Finance, Amsterdam, The Netherlands, July 8-10, 2004.

2<sup>nd</sup> International Conference on Computational Management Science, Gainesville, Florida, March 31-April 3, 2005.

2005 Computing in Economic and Finance, Washington, DC, June 23-25, 2005.

3<sup>rd</sup> International Conference on Computational Management Science, Amsterdam, The Netherlands, May 17-19, 2006.

2006 Computing in Economics and Finance, Limassol, Cyprus, June 22-24, 2006.

4<sup>th</sup> International Conference on Computational Management Science, Geneva, Switzerland, April 20-22, 2007.

2008 Computing in Economics and Finance, Paris, France, June 26-28, 2008.

2011 International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction, University of Maryland, College Park, March 29-31, 2011.

First INFORMS Northeastern Regional Conference, UMass Amherst, May 6-7, 2011.

2011 IEEE Conference on Supernetworks and System Management, Honorary Co-chair, Shanghai, China, May 29-30, 2011.

2012 International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction, University of Maryland, College Park, April 2-5, 2012.

4<sup>th</sup> Workshop on Complex Networks, CompleNet 2013, Berlin, Germany, March 13-15, 2013.

10<sup>th</sup> International Conference on Computational Management Science, Montreal, Canada, May 1-3, 2013.

2<sup>nd</sup> International Conference on Dynamics of Disasters, Kalamata, Greece, June 29-July 2, 2015.

3<sup>rd</sup> International Conference on Dynamics of Disasters, Kalamata, Greece, July 5-9, 2017.

4<sup>th</sup> International Conference on Dynamics of Disasters, Kalamata, Greece, July 1-5, 2019.

5<sup>th</sup> International Conference on Dynamics of Disasters, Kalamata, Greece, July 15-18, 2021 (virtual).

6<sup>th</sup> International Conference on Dynamics of Disasters, Athens, Greece, July 3-6, 2023.

### **Symposium Organizer**

Dynamics of Disasters: Harnessing the Science of Networks to Save Lives, AAAS Annual Meeting, Boston, Massachusetts, February 17, 2013.

### **Workshop/Conference Organizer:**

International Workshop on Computational Management Science, Economics, Finance and Engineering, Limassol, Cyprus, March 28-30, 2003.

MKIDS Mini-Workshop, Supernetworks Laboratory for Computation and Visualization, Isenberg School of Management, University of Massachusetts, Amherst, September 10, 2003.

Supernetworks for the Management of Knowledge Intensive Dynamic Systems, with Tina Wakolbinger, The Fourth International Conference on Knowledge, Culture and Change in Organizations, University of Greenwich, London, United Kingdom, August 3-6, 2004.

Dynamic Networks: Behavior, Optimization and Design, an Exploratory Seminar, with David Parkes, Radcliffe Institute for Advanced Study, Harvard University, Cambridge, Massachusetts, October 20-21, 2006.

Complex Networks - Equilibrium and Vulnerability Analysis with Applications, with Patrizia Daniele, part of Fulbright Senior Specialist Award in Business Administration to Anna Nagurney, Department of Mathematics and Computer Sciences, University of Catania, Italy, March 10-12, 2008.

Humanitarian Logistics: Networks for Africa, Rockefeller Foundation Bellagio Center Conference, Lake Como, Italy, May 5-9, 2008.

Workshop on Cybersecurity Risk Analysis for Enterprise Security, Sloan School of Management, MIT, Cambridge, MA, September 19, 2014.

### **Chairperson/Organizer Invited Sessions and Clusters**

Session: Computation of large-scale equilibria, ORSA/TIMS St. Louis Meeting, October 25-28, 1997

Session: Equilibrium models and algorithms, ORSA/TIMS NYC Meeting, October 16-18, 1989.

Session: Network equilibrium models, algorithms, and applications, ORSA/TIMS Las Vegas Meeting, May 1990.

Session: Advances in equilibrium theory, modeling and applications, ORSA/TIMS Philadelphia Meeting, October 29-31, 1990.

Session: Memorial session in honor of Stella Dafermos, National RSAI Meeting, Boston, November 9-11, 1990.

Session: Variational inequalities in regional science, National RSAI Meeting, Boston, November 9-11, 1990.

Session: Supercomputing and parallel processing I and II, ORSA/TIMS Nashville Meeting, May 6-8, 1991.

Session: Equilibrium analysis and computation, ORSA/TIMS Anaheim Meeting, November 5-7, 1991.

Session: Financial networks, ORSA/TIMS Orlando Meeting, April 27-29, 1992.

Session: Computation of economic equilibria, ORSA/TIMS San Francisco, November 6-9, 1992.

Session: Advances in variational inequality modeling and applications, ORSA/TIMS Chicago Meeting, May 16-19, 1993.

Session: High performance computing in economics and econometrics, Society for Economic Dynamics and Control Meeting, Nafplio, Greece, June 22-25, 1993.

Session: Computational finance I and II, IFACS workshop on computational methods in economics and finance, Amsterdam, The Netherlands, June 8-10, 1994.

Session: Supercomputing applications in economics, IFACS workshop on computational methods in economics, and finance, Amsterdam, The Netherlands, June 8-10, 1994.

Session: New directions in computational economics and finance, INFORMS National Meeting, New Orleans, Louisiana, October 29-November 1, 1995.

Session: Dynamics and equilibria, Computing in Economics and Finance, Geneva, June 26-28, 1996.

Session: Tools for international finance, Computing in Economics and Finance, Geneva, June 26-28, 1996.

Session: Computation of economic equilibria, INFORMS San Diego Meeting, May 4-7, 1997.

Session: Parallel computation and transportation applications, INFORMS Dallas Meeting, October 26-29, 1997.

Session: Variational inequalities and projected dynamical systems with applications, INFORMS National Meeting, Montreal, Canada, April 26-29, 1998.

Session: Variational inequalities and finance, CEFES98, Cambridge, England, June 29-July 1, 1998.

Session: Sustainable transportation networks, INFORMS National Meeting, San Antonio, Texas, November 5-8, 2000.

Sessions: Network economics I and II, Computing in Economics and Finance, Aix en Provence, France, June 27-29, 2002.

Session: Innovations in financial and economic networks, INFORMS National Meeting, Atlanta, Georgia, October 19-22, 2003.

Session: Reverse logistics and the environment, INFORMS National Meeting, Atlanta, Georgia, October 19-22, 2003.

Session: Critical infrastructure networks, CORS/INFORMS International Meeting, Banff, Alberta, Canada, May 16-19, 2004.

Session: New models and tools for energy and environmental decision-making, CORS/INFORMS International Meeting, Banff, Alberta, Canada, May 16-19, 2004.

Session: Minisymposium on projected dynamical systems and evolutionary variational inequalities with applications, Eight Conference on Optimization, Stockholm, Sweden, May 15-19, 2005.

Sessions I and II: 50<sup>th</sup> Anniversary of **Studies in the Economics of Transportation**, INFORMS National Meeting, San Francisco, California, November 13-16, 2005.

Session: Supply chains and the environment, INFORMS International Puerto Rico, Puerto Rico, July 8-11, 2007.

Session: Transportation and climate change, INFORMS National Meeting, Washington, DC, October 12-15, 2008.

Session: Transportation network vulnerability and performance assessment, INFORMS National Meeting, Washington, DC, October 12-15, 2008.

Session: Game theory and variational inequalities, 20<sup>th</sup> International Symposium on Mathematical Programming, Chicago, Illinois, August 23-28, 2009.

Session: Supply chains, transportation and networks, Computational Management Science 2010, Vienna, Austria, July 28-30, 2010.

Cluster: Networks, First INFORMS Northeastern Regional Conference, University of Massachusetts Amherst, May 6-7, 2011.

Session: Network vulnerability and performance assessment, First INFORMS Northeast Regional Conference, University of Massachusetts Amherst, May 6-7, 2011.

Session: In Honor of Professor David E. Boyce -- His 50th NARSC Conference -- His scholarship and mentorship, 60<sup>th</sup> Annual North American Meetings of the Regional Science Association International, Atlanta, Georgia, November 13-16, 2013.

Session: Supply chain network competition: Advances in models, methods, and applications, INFORMS Annual Meeting, San Francisco, California, November 9-12, 2014.

Session: Novel applications of network optimization, INFORMS Annual Meeting, Nashville, Tennessee, November 13-16, 2016.

Session: Networks and supply chains, INFORMS Annual Meeting, Houston, Texas, October 22-25, 2017.

Session: Innovations in supply chain network models and applications, EURO Conference, Dublin, Ireland, June 23-26, 2019.

### **Invited Government Talk**

Supply chain networks, labor, and resilience, National vaccine Advisory Committee (NVAC), June 14-16, 2022.

### **Invited Seminar Presentations**

Stability, sensitivity analysis, and the computation of competitive network equilibria, presented at the IE/OR Department, University of Massachusetts Amherst, October 1984.

A network formulation of market equilibrium problems and variational inequalities with some sensitivity analysis results, presented at the Institute of Mathematics and its Applications, University of Minnesota, Minneapolis, Minnesota, June 1984.

Competitive equilibrium problems and variational inequalities, presented at the Applied Math Center, University of Massachusetts, Amherst, Massachusetts, March 1985.

A general, dynamic spatial price equilibrium model with gains and losses, presented at the Department of Mathematics, Royal Institute of Technology, Stockholm, Sweden, October 1986.

A general, dynamic network spatial price equilibrium model with gains and losses, The Technological Institute, Departments of Civil Engineering and Regional and Urban Planning, Northwestern University, Evanston, Illinois, April 10, 1987.

Equilibration algorithms for constrained matrix and spatial price equilibrium problems, Departments of Civil Engineering, Regional Science, and Supercomputer Center, University of Illinois, Urbana, Illinois, August 5, 1987.

Competitive equilibrium problems and variational inequalities, IE/OR Department, University of Massachusetts Amherst, November 18, 1987.

Equilibrium problems and variational inequalities, presented at the OR Seminar, University of Delaware, Newark, Delaware, March 3, 1988.

Networks and variational inequalities in the analysis of competitive markets with policy interventions, presented at the Operations Research Center Seminar Series, MIT, Cambridge, Massachusetts, October 12, 1989.

Serial and parallel equilibration of large-scale constrained matrix problems presented at the Optimization Group Seminars Series, Department of Mathematics, Linkoping University, Linkoping, Sweden, October 27, 1989.

Transportation network equilibrium and related applications presented at the Optimization Group Seminar Series, Department of Mathematics, Linkoping University, Linkoping, Sweden, October 30, 1989.

Traffic network equilibrium, presented at the Urban and Regional Economics Seminar Series, Department of Economics, Harvard University, Cambridge, Massachusetts, November 7, 1989.

Networks and variational inequalities in the analysis of competitive markets with policy interventions, Operations Research Seminar Series, Graduate School of Industrial Administration, Carnegie-Mellon University, Pittsburgh, Pennsylvania, December 12, 1989.

Traffic network equilibrium and related applications, presented at the Economic Institute, Erasmus University, Rotterdam, The Netherlands, January 19, 1990.

Variational inequalities and networks in the formulation and computation of large-scale market disequilibrium problems, Microeconomic Theory Seminar, joint with RUTCOR, Rutgers University, New Brunswick, New Jersey, February 20, 1990.

Networks and variational inequalities in the analysis of competitive markets, Applied Math Seminar, University of Massachusetts Amherst, October 2, 1990.

A Splitting Equilibration Algorithm for the computation of large-scale constrained matrix problems, Geography Department, University of Illinois at Urbana-Champaign, January 25, 1991 (also presented at the Krannert Graduate School of Management, Purdue University, West Lafayette, Indiana, February 1, 1991).

Parallel computation of large-scale dynamic market network equilibria via time period decomposition, Urban Transportation Center and University Computing Center, University of Illinois at Chicago, March 8, 1991 (also presented at Worcester Polytechnic Institute, School of Management and Mathematical Sciences Department, Worcester, Massachusetts, March 22, 1991).

Competitive networks and variational inequalities - from transportation to finance, Distinguished Theory Center Lecture, Cornell University, Ithaca, New York, April 30, 1991.

Generalized goal programming and variational inequalities, Centre de Recherche sur les Transports, Université de Montreal, Montreal, Quebec, Canada, October 10, 1991.

Variational inequalities and parallel computation - from transportation to finance. Distinguished Lecturer Colloquium, Department of Mathematical Sciences, Clemson University, Clemson, South Carolina, March 24, 1992.

General financial equilibrium and variational inequalities, Department of Mathematical Sciences, Clemson University, Clemson, South Carolina, March 25, 1992.

Human migration networks, Department of Mathematical Sciences, Clemson University, Clemson, South Carolina, March 26, 1992.

Variational inequalities and parallel computation, Special Applied Math Seminar, Division of Applied Mathematics, Brown University, Providence, Rhode Island, April 22, 1992.

Large-scale computation in management science, Department of Chemical Engineering, University of Massachusetts Amherst, April 30, 1992.

Recent advances in dynamical systems and variational inequalities with application to economics, Helsinki School of Economics, Helsinki, Finland, March 18, 1993.

Projected dynamical systems and variational inequalities: from transportation to finance, Divisions of Systems Theory and Optimization and Regional Planning Seminar series, Royal Institute of Technology, Stockholm, Sweden, October, 1996, also presented at the University of Copenhagen, Denmark, November, 1996.

Variational inequalities and dynamical systems: from transportation to finance, Mathematics Seminar, Department of Mathematics and Statistics, University of Massachusetts Amherst, March 11, 1997.

Networks as links between operations research and other disciplines, presented at the Operations Research Seminar Series at MIT, November 18, 1999.

Networks for fun and profit, Math-Physics-Technical Section of the Shevchenko Scientific Society, New York, May 20, 2000.

Teleshopping versus shopping: A multicriteria network equilibrium framework, Department of Civil and Environmental Engineering, University of Massachusetts Amherst, October 13, 2000.

Complex network systems: Decision-making in the Information Age, United Technologies Research Center, Hartford, Connecticut, January 17, 2001.

Multicriteria network equilibrium modeling for decision-making in the Information Age with applications to teleshopping and telecommuting, Electrical, Computer, and Systems Engineering Department, Rensselaer Polytechnic Institute, Troy, New York, December 5, 2001.

Network economics: An overview and challenges, John F. Kennedy Institute, Free University, Berlin, Germany, June 6, 2002.

Supernetworks and multicriteria decision-making with applications to telecommuting and teleshopping, ETH, Zurich, Switzerland, June 13, 2002.

Supernetworks: Decision-making for the 21<sup>st</sup> century, Department of Mechanical and Industrial Engineering, University of Massachusetts Amherst, November 10, 2003; also presented at the Department of Industrial and Systems Engineering, Virginia Polytechnic University and State University, Blacksburg, VA, February 12, 2004.

Supernetworks: Decision-making for the 21<sup>st</sup> century, IE Colloquium, Department of Industrial Engineering, University of Wisconsin, Madison, February 27, 2004.

Supernetworks, evolutionary variational inequalities, and projected dynamical systems, joint with P. Daniele and M.-G. Cojocaru, The Bellagio Center Seminar Series, Rockefeller Foundation, Bellagio, Italy, March 19, 2004.

Supernetworks: Decision-making for the 21<sup>st</sup> century, Deans' Council Meeting, University of Massachusetts Amherst, May 4, 2004.

Invited seminar, Supernetworks: Decision-making for the 21<sup>st</sup> century, University of Pittsburgh, Pittsburgh, PA, November 11, 2004.

Social networks: New paradigms for modeling, applications, computations, and visualization (with T. Wakolbinger), Fall 2004 UMASS Amherst Operations Research / Management Science Seminar Series, November 19, 2004.

Double-layered dynamics: A unified theory of projected dynamical systems and evolutionary variational inequalities, Transportation Center seminar, Northwestern University, Evanston, Illinois, February 24, 2005.

Supernetworks: Decision-making in the 21<sup>st</sup> century, Division of Engineering Special Seminar, Brown University, Providence, Rhode Island, March 15, 2005.

Dynamic networks with applications, Radcliffe Institute for Advanced Study, Harvard University, Cambridge, Massachusetts, November 9, 2005.

The evolution and integration of social and financial networks with supply chains, Cambridge Colloquium on Complexity and Social Networks, Kennedy School of Government, Harvard University, Cambridge, Massachusetts, December 12, 2005.

Dynamic networks: Recent results and applications, Distinguished Industrial Engineering and Operations Research and Decision, Risk, and Operations Seminar Series, Columbia University, New York, September 19, 2006.

Transportation science and the dynamics of critical infrastructure networks, Department of Civil and Environmental Engineering - Transportation Program, University of Massachusetts Amherst, December 7, 2006.

Multi-agent network models, dynamics and applications to vulnerability analysis, The Agent-Based Modeling Seminar Series, Department of Urban Studies and Planning, MIT, Cambridge, Massachusetts, April 4, 2007.

Critical infrastructure networks and supernetworks: New tools for dynamics, network efficiency measurement, and vulnerability identification, Systems Engineering Seminar, Imperial College, London, United Kingdom, April 24, 2007.

Transportation science and the dynamics of critical infrastructure networks with applications to performance measurement and vulnerability analysis, The Warren Lecture, Department of Civil Engineering, University of Minnesota, Minneapolis, October 5, 2007.

Vulnerability analysis of complex networks from transportation networks to the Internet and electric power supply chains, Fulbright Senior Specialist Lecture, Department of Mathematics and Computer Sciences, University of Catania, Italy, March 10, 2008.

Equilibrium modeling and vulnerability analysis of complex network systems: Which nodes and links really matter? Center for Women in Mathematics, Smith College, Northampton, MA, September 23, 2008.

To merge or not to merge: Multimarket supply chain network oligopolies, coalitions, and the merger paradox, Fogelman College of Business and Economics, University of Memphis, Memphis, Tennessee, October 30, 2008.

Synergies and vulnerabilities of supply chain networks in a global economy, Distinguished Lecture,

Fogelman College of Business and Economics, University of Memphis, Tennessee, October 31, 2008; also presented at the INFORMS Dallas/Forth Worth Chapter, Texas, February, 2009; at the Vienna University of Business and Economics, Vienna, Austria, March 10, 2009, and at Cornell University, Ithaca, New York, April 1, 2009.

Synergies and vulnerabilities of supply chain networks in a global economy: What we can learn from half a century of advances in transportation, Institute of Transportation Studies, University of California Davis, May 1, 2009; presented via videconference.

Supply chain networks: challenges and opportunities from analysis to design, INFORMS Boston Chapter, November 23, 2010.

Supply chain networks: challenges and opportunities from analysis to design, Department of Management Sciences, Faculty of Engineering, University of Waterloo, Canada, April 11, 2011.

Perishable product supply chains in health care: Models, analysis, and computations, Management Science Research Seminar, McGill University, Montreal, Quebec, Canada, October 28, 2011.

International collaborations – Introduction – University of Gothenburg, Sweden, March 10, 2012.

Grand challenges and opportunities in supply chain network analysis to design, Logistics Seminar, School of Business, Economics and Law, University of Gothenburg, Sweden, March 14, 2012.

Financial networks and disruption management, Finance Seminar, School of Business, Economics and Law, University of Gothenburg, Sweden, March 16, 2012.

Perishable product supply chains in health care: Models, analysis, and computations, Mathematics department, Chalmers University of Technology, Gothenburg, Sweden, March 20, 2012.

Perishable product supply chains in health care: Models, analysis, and computations, Department of Transport Science, Royal Institute of Technology (KTH), Stockholm, Sweden, June 18, 2012.

Grand challenges and opportunities in supply chain networks: from analysis to design, Computational Social Science Initiative Seminar Series, University of Massachusetts Amherst, February 15, 2013.

Perishable Product Supply Chains in Healthcare: Models, Analysis, and Computations, Vienna University of Economics and Business, Vienna, Austria, March 12, 2013.

Networks against time: From food to pharma, Seminar at the School of Graduate Professional Studies, Penn State University, Great Valley Campus, Malvern, Pennsylvania, April 16, 2013.

Networks against time: From food to pharma, INFORMS/Dow Chemical Seminar at Texas A&M, College Station, Texas, October 25, 2013. also presented at the Raytheon MTN Symposium, Tewksbury, Massachusetts, October 9, 2013.

Game theory and cybercrime, UMass Amherst Introductory Lectures in Security and Privacy, November 24, 2015; also presented December 2, 2015 at the UMass Amherst Cyber Security Faculty Lecture Series.

Supply chain networks against time: From food to pharma, Civil and Environmental Engineering Seminar Series, MIT, Cambridge, Massachusetts, December 9, 2015.

Supply chain networks against time: From food to pharma,, Praxair Seminar Series, Industrial and Systems Engineering, University of Buffalo, Amherst, New York, March 11, 2016.

From cybercrime in financial services to cybersecurity investments and network vulnerability, Mitre Corp., New Bedford, Massachusetts, March 14, 2016.

Predictive and prescriptive models of cybercrime and cybersecurity investment and network vulnerability, Heinz College, Carnegie Mellon University, Pittsburgh, Pennsylvania, April 4, 2016.

Supply chain networks against time: From food to pharma, Centre for Transport Studies, Imperial College, London, England, June 9, 2016.

Disaster relief supply chains: Network models, algorithm, and case studies, Department of Management Science, Lancaster University, Lancaster, England, June 28, 2016.

Game theory network models for disaster relief and blood supply chains, Radcliffe Institute for Advanced Study, Harvard University, Cambridge, Massachusetts, June 21, 2017.

Predictive and prescriptive models of cybercrime and cybersecurity investments under network vulnerability, Culverhouse College of Commerce, University of Alabama, Tuscaloosa, Alabama, November 17, 2017.

Game theory network models for disaster relief, Foise School of Business, WPI, Worcester, Massachusetts, February 16, 2018.

Game theory network models for disaster relief, Industrial and Systems Engineering Colloquium, University of Wisconsin Madison, April 6, 2018.

Game theory network models for disaster relief, Industrial and Operations Engineering, University of Michigan, Ann Arbor, October 5, 2018.

Game theory network models for disaster relief, Industrial and Systems Engineering Department, RPI, Troy, NY, March 29, 2019.

Networks to save the world: Operations Research in action, Escuela Naval de Cadetes "Almirante Padilla" Cartagena, Colombia, August 21, 2019.

Game theory network models for disaster relief, USC Center for Artificial Intelligence in Society (CAIS) (virtual), October 7, 2020.

Novel supply chain network models inspired by the COVID-19 pandemic - From optimization to game theory (virtual), Operations Research for COVID-19 Seminar Series, Center for Accelerating Operational Efficiency (CAOE), Arizona State University, March 11, 2021.

Food supply chain networks in the pandemic: Why quality, trade instruments, and labor all matter (virtual). ISE Seminar, University of Buffalo, April 2, 2021.

Supply chain networks and labor: Models, algorithms and insights in the pandemic (virtual). Department of Civil and Environmental Engineering, Imperial College, London, England, September 29, 2021.

Supply chain game theory network models for disaster relief (virtual). United States Naval Academy, Annapolis, MD, November 17, 2021.

Labor and supply chain networks. Montreal Operations Research Student Chapter (virtual), April 6, 2022; also presented at Financial Computing and Analytics Group, University College London, United Kingdom (virtual), June 1, 2022.

Supply chain networks, labor, and resilience (virtual). ISE Department, University of Illinois, Urbana, October 28, 2022.

### **Invited Conclave**

Operations, supply chains and COVID-19: From research to policy. Conclave: Technological interventions for operations and supply chains during COVID-19, Jaipuria Institute of Management, Noida, India, September 22, 2021 (virtual).

### **Invited Webinar**

Blood, sweat, and PPEs: Rescuing perishable product supply chains and impacting policy through analytics. Inaugural INFORMS Practice Webinar, June 12, 2020.

## **Invited Tutorials**

Variational inequalities in network equilibrium analysis and computation (with S. Dafermos), ORSA/TIMS National Meeting, Vancouver, British Columbia, Canada, May 8-10, 1989.

Projected dynamical systems and network equilibrium problems, the Canadian Operations Research Society Meeting, Calgary, Canada, May 24, 1995.

Fragile networks: identifying vulnerabilities and synergies in an uncertain world (with Q. Qiang), 2010 International Conference on Social Computing, Behavioral Modeling & Prediction, National Institutes of Health, Bethesda, Maryland, March 29-April 1, 2010.

Fragile networks: identifying vulnerabilities and synergies in an uncertain age, ALIO – INFORMS Joint International Meeting, Buenos Aires, Argentina, June 6-9, 2010.

Game theory and variational inequalities: From transportation and supply chains to financial networks and the Internet. EURO Conference, Dublin, Ireland, June 23-26, 2019.

Game theory and the COVID-19 pandemic. INFORMS Tutorial in Operations Research; Annual INFORMS Meeting, Anaheim, California, October 24-27, 2021.

## **Invited Workshop Papers and Presentations**

The role of optimal routing in multiplatform naval task force operations, presented at the second MIT/ONR Workshop on Communication and Decision Problems Motivated by Naval C<sup>3</sup> Systems, Naval Postgraduate School, Monterey, California, July 1979.

Dynamic models of spatial price equilibrium with computational results, presented at the European Summer Institute in Regional Science at the University of Umea, Umea, Sweden, June 1986.

Computational comparisons of spatial price equilibrium methods, presented at the European Summer Institute in Regional Science at the University of Umea, Umea, Sweden, June 1986.

Modeling and algorithmic development in competitive equilibrium problems, Wellesley College, Wellesley, Massachusetts, July 1986.

Overview of algorithms and models for competitive equilibrium problems, Cornell University, Ithaca, New York, August 1986.

A general, dynamic spatial price network equilibrium model with gains and losses, presented at the NATO Advanced Research Workshop in Mathematical Programming, Bergen, Norway, June, 1987.

Network decomposition schemes for the solution of the constrained matrix problem (with A. Robinson), presented at the NATO Advanced Research Workshop in Mathematical Programming, Bergen, Norway, June, 1987.

Variational inequalities and the computation of large-scale equilibria, presented at the Applied General Equilibrium Workshop, Stanford, California, March 11-12, 1988.

Equilibrium programming and variational inequalities with application to economics, IBM Europe University Supercomputing Summer Institute, Oberlech, Austria, August 1-5, 1988.

Disequilibrium, networks, and variational inequalities, Seminar on Transportation Networks and Regional Development, Institute of Socio-Economic Problems, Academy of Sciences, USSR, Leningrad, May 23-26, 1989.

Spatial markets with rigid prices, networks, and variational inequalities, presented at the Interfaces Between Microeconomic Theory and Operations Research Workshop, Brussels, Belgium, January 15-16, 1990.

Advanced computer architectures and general financial equilibrium, IBM Europe Summer Institute, Oberlech, Austria, July 26-30, 1992.

A dynamical systems approach for network oligopolies and variational inequalities, Mallacoota Seminar on the Network Economy, Mallacoota, Australia, December 1992.

Supply chain networks and electronic commerce, STELLA ICT, Innovation, and Transport Workshop, NSF, Arlington, VA, January 15-17, 2002.

Knowledge supernetworks: The modeling and management of the dynamics of complex business processes under risk and uncertainty, joint with J. Dong, NSF MKIDS Workshop, Arlington, VA, September 10-11, 2002.

Supernetworks: Decision-making in the new era, NSF/DOD MKIDS Workshop, Baltimore, MD, September 15-17, 2003.

Management of knowledge intensive systems as supernetworks: Modeling, Analysis, Computations, and Applications, joint with J. Dong, NSF/DOD MKIDS Workshop, Baltimore, MD, September 15-17, 2003.

Dynamics of global supply chain supernetworks in a new era of risk and uncertainty, joint with D. Matsypura, STELLA Workshop, National Science Foundation, Arlington, VA, January 15-16, 2004.

Dynamic supernetworks for the co-evolution and emergence of integrated social and economic networks: Modeling, analysis, computations, visualization and applications, joint with J. Dong and T. Wakolbinger, MKIDS '04 Conference, September 20-22, 2004.

On the relationship between supply chain and transportation network equilibria: A supernetwork equivalence with computations, Workshop on Mathematical Models for Optimizing Transportation Services, University of Auckland, New Zealand, April 19-22, 2005.

On the relationship between supply chain and transportation network equilibria: A supernetwork equivalence with computations, NSF-sponsored Workshop on Network Science, Nonlinear Science, and Infrastructure Systems, Penn State University, University Park, PA, May 9-11, 2005.

Dynamic networks: Recent results and applications, Radcliffe Institute for Advanced Study Exploratory Seminar, Radcliffe Institute, Harvard University, Cambridge, MA, October 20-21, 2006.

Environmental and cost synergy in supply chain network integration in mergers and acquisitions, joint with T. Woolley, Fulbright Senior Specialist Workshop, Complex Networks -- Equilibrium and Vulnerability Analysis with Applications, University of Catania, Italy, March 12, 2008.

To merge or not to merge: Multimarket supply chain network oligopolies, coalitions, and the merger paradox, Workshop on Frontiers in Game Theory and Networked Control Systems, MIT, Cambridge, MA, October 10-12, 2008.

Network design – From the physical world to virtual worlds, Workshop on Social Theory and Social Computing: Steps to Integration, Honolulu, Hawaii, May 22-23, 2010.

Nordlog PhD Workshop, Reflections of an experienced researcher presenting and publishing quantitative research studies, School of Business, Economics and Law, University of Gothenburg, Sweden, June 3, 2013.

Networks against time: From food to pharma, Raytheon MTN Symposium, Tewksbury, Massachusetts, October 9, 2013.

A dynamic network oligopoly model with transportation costs, product differentiation, and quality competition (with D. Li), Raytheon MTN Symposium, Tewksbury, Massachusetts, October 9, 2013.

Network science and economics, Cybersecurity Risk Analysis for Enterprises, MIT Sloan School of Management, Cambridge, MA, September 19, 2014.

Labor and supply chain networks: insights from models inspired by the COVID-19 pandemic, Managing Disaster Risk: A Way to Sustainability, Nepal German Academic Association (virtual), November 21-22, 2021.

### **Invited Symposium Presentations**

Supply chain network design under profit maximization and oligopolistic competition, Symposium on Transportation Network design and Economics, Transportation Center, Northwestern University, Evanston, Illinois, January 29, 2010.

User-optimized and system-optimized travel behavior, Mathematics and Collective Behavior Symposium, AAAS Annual Meeting, Washington, DC, February 17-21, 2011.

### **Poster Presentations**

Supernetworks: the why, the how, and applications, Statistics on Networks Workshop, National Academy of Sciences, Washington, DC, September 26-27, 2005.

An efficiency measure for dynamic networks with application to the Internet and vulnerability analysis, with Q. Qiang, SIAM Conference on Optimization, Boston, MA, May 10-13, 2008.

An integrated electric power supply chain and fuel market network framework: Theoretical modeling with empirical analysis for New England, with Z. Liu, SIAM Conference on Optimization, Boston, MA, May 10-13, 2008.

Environmental and cost synergy in supply chain network integration in mergers and acquisitions, with T. Woolley, SIAM Conference on Optimization, Boston, MA, May 10-13, 2008.

Game theoretic models for cybersecurity in supply chains and financial services networks, with L.S. Nagurney and S. Shukla, UMass Center for Data Science Launch, April 9, 2015.

Game theoretic model for cybersecurity in supply chains with nonlinear budget constraints, with L.S. Nagurney, P. Daniele, and S. Shukla, Social Science research Beyond the Academy, April 24, 2015. Also presented at the Spring 2015 NSF Future Internet Architectures PI Meeting, MIT, Cambridge, Massachusetts, June 1-2, 2015.

A network economic game theoretic model of a service-oriented Internet with price and quality competition in both content and network provision, with S. Saberi and T. Wolf, Spring 2015 NSF Future Internet Architectures PI Meeting, MIT, Cambridge, Massachusetts, June 1-2, 2015.

Game theoretic model for cybersecurity with nonlinear budget constraints, with L.S. Nagurney, P. Daniele, and S. Shukla, New England Security Day, UMass Amherst, September 17, 2015; also presented by S. Shukla at the AFA Cyber 15 Workshop, UMass Lowell, September 22, 2015. This poster was awarded First Prize at the workshop.

### **Invited Workshop and Institute Attendance**

Workshop on the Application and Solution of Economic Equilibrium Models, Center for Economic Policy Research, Stanford University, June 25-27, 1984.

European Advanced Summer Institute of CERUM, Umea, Sweden, June 9-28, 1986.

NSF Workshop on "Improving the Breadth of the Research Community in Operations Research," Wellesley, Massachusetts, July 8-11, 1986.

1986 Supercomputer Summer Institute at Cornell University, Ithaca, New York, July 28-August 15.

NATO Advanced Research Workshop "Algorithms and Problem Formulations in Mathematical Programming," Chr. Michelsen Institute in Bergen, Norway, June 15-19, 1987.

Symposium on Parallel Optimization, University of Wisconsin, Madison, August 10-12, 1987.

1990 Connection Machine Summer Institute, NPAC, Syracuse, New York, July.

1993 Supercomputer Workshop, NCSA, University of Illinois at Urbana-Champaign, August.

NSF Workshop on Connecting Research and Policy in the Digital Economy, Arlington, Virginia, January 29, 2003.

National Academy of Science Workshop on Statistics of Networks, Washington, DC, September 26-27, 2005.

7th Session of the International Seminars on Planetary Emergencies Energy, Cities, and the Control of Complex Systems, Erice, Italy, May 11-15, 2014.

NSF Workshop on Disrupting Illicit Supply Chains, Austin, Texas, May 5-6, 2017.

Minority Issues Forum Workshop, INFORMS, Indianapolis, Indiana, October 14, 2022.

### **Invited Colloquy Participant**

On the Coming Transformation of Travel, Rensselaerville, New York, June 1-3, 2005.

### **Invited Panels**

Opportunities and prospects for using supercomputers in regional science, Regional Science Association National Meeting, November 6-8, 1987, Baltimore, Maryland.

Prospects and opportunities for large-scale computing, CISER conference on "Innovations in Social Science Computing," November 11-13, 1987, Cornell University, Ithaca, New York.

Computing for land use and transportation analysis, Advanced Computing for the Social Sciences, April 10-12, 1990, Williamsburg, Virginia.

A fresh look at computational testing, National ORSA/TIMS Meeting, May 7-9, 1990, Las Vegas, Nevada.

Computation in the curriculum, Conference on Graduate Programs in the Applied Mathematical Sciences II, Clemson University, Clemson, South Carolina, April 16-18, 1993.

Parallel & Supercomputing, INFORMS National Meeting, Dallas, Texas, October 26-29, 1997.

A retrospective on the Beckmann, McGuire, and Winsten (1956) book, Studies in the Economics of Transportation, 50<sup>th</sup> Regional Science Association International Meeting, November 20-22, 2003.

3<sup>rd</sup> NSF-ENG Cyberinfrastructure Workshop – Research Opportunities in Cyberengineering and Cyberinfrastructure, Drexel University, Philadelphia, Pennsylvania, April 22-23, 2004.

Panel on Writing, Radcliffe Institute for Advanced Study, Harvard University, Cambridge, Massachusetts, December 13, 2005.

Women in Science Panel, sponsored by the Massachusetts Association for Women in Science, UMass RL&D, CPPA, the Virtual Center for Supernetworks, with support from the UMass Amherst INFORMS Student Chapter, and NEAGAP, UMass, Amherst, April 17, 2007; gave a presentation entitled, "What professional societies can do from the top down."

Panelist -- Mind the Gap! Career Summit for Women & Technology, Amherst, MA, September 27, 2007.

Panelist -- Dual Careers -- Challenges and Creative Solutions, INFORMS National Meeting, Seattle, Washington, November 4-7, 2007.

Panelist – Traffic: From Insects to Interstates, World Science Festival, NYC, June 12, 2009.

Panelist - International collaborations, WORMS panel, ALIO-INFORMS Conference, Buenos Aires, Argentina, June 6-9, 2010.

Panelist – Social Networking and Operations Research, INFORMS National Meeting, November 7-10, 2010.

Panelist – Work and Life Balance, INFORMS National Meeting, November 7-10, Austin, Texas, 2010.

Panelist – Financial Networks, Measuring System Risk, University of Chicago and the Federal Reserve Bank of Chicago, December 15-16, 2010.

Panelist – Disaster Recovery and Mitigation Planning and Resilience, 90<sup>th</sup> Transportation Research Board Meeting, Washington, DC, January 23-27, 2011.

Panelist – Research in Academia and Industry, First INFORMS Northeastern Regional Conference, University of Massachusetts Amherst, May 6-7, 2011.

Panelist – Leaders Give Professional Advice to Women and Men, INFORMS National Meeting, Charlotte, North Carolina, November 13-16, 2011.

Panelist – Becoming an O.R./Analytics Newsmaker, INFORMS National Meeting, Charlotte, North Carolina, November 13-16, 2011.

Panelist - Forward Looking, 2012 Future Urban Transport Symposium, Urban Freight for Livable Cities, Gothenburg, Sweden, October 15-17, 2012.

Panelist – Faculty Teaching Panel, Department of Mechanical and Industrial Engineering, UMass Amherst, April 28, 2014.

Panelist – Building Your Brand, Isenberg Women in Business Conference, Isenberg School of Management, UMass Amherst, February 7, 2015.

Panelist – *Forecasting Urban Travel* book launch at Northwestern University, Evanston, Illinois, November 22, 2015.

Panelist – JFIG Panel Discussion: Advising PhD Students, INFORMS Annual Meeting, Phoenix, Arizona, November 4-7, 2018.

Panelist – Women in OR panel, EURO Dublin, Ireland, June 24, 2019.

Panelist – Making an Impact panel, EURO Dublin, Ireland, June 25, 2019.

Panelist - Real-World Optimisation Models: Successes and Pitfalls, Virtual panel in honor of Dr. Ailsa Land's receipt of the Beale Medal, hosted by The OR Society, February 25, 2021.

Panelist – INFORMS Advocacy, INFORMS Annual Meeting, Indianapolis, Indiana, October 19, 2023.

### **Invited Forum Participant**

Innovation Forum – Operational Process Improvement in a Changing Manufacturing Supply Chain, Precision Manufacturing Regional Alliance Project, Isenberg School of Management, University of Massachusetts Amherst, February 12, 2010.

### **Invited Undergraduate Lecture**

Operations research and the captivating study of networks and complex decision-making, part of the Fulbright Senior Specialist Award to Anna Nagurney, in Patrizia Daniele's undergraduate Optimization course, Department of Mathematics and Computer Sciences, University of Catania, Italy, March 13, 2008.

### **Invited Graduate Lecture**

Financial networks, given in Professor Taylan Mavruk's finance course at the School of Business, Economics and Law at the University of Gothenburg, Sweden, March 12, 2012.

### **Lecture Series Organizer**

1988-1989 Distinguished Women in Operations Research and Engineering Lecture Series, MIT, Cambridge, MA.

### **Faculty Advisor -- Lecture Series**

UMASS Amherst Operations Research / Management Science Speaker Series organized by the INFORMS Student Chapter, 2004 - present. This lecture series hosted, through Spring 2018, over 90 speakers. It continues to host about 3 to 4 speakers per semester as well as a panel or two.

The Chapter was awarded the Summa Cum Laude Award from INFORMS on November 6, 2007 at the INFORMS Annual Meeting in Seattle, Washington and the Magna Cum Laude Award from INFORMS on October 14, 2008 at the INFORMS Annual Meeting in Washington, DC. The chapter received the Summa Cum Laude Award from INFORMS on October 13, 2009 at the INFORMS Annual Meeting in San Diego, California. It received the Magna Cum Laude Award from INFORMS on November 9, 2010 at the INFORMS Annual Meeting in Austin, Texas, at the 2011 INFORMS Annual Meeting in Charlotte, North Carolina, at the 2012 INFORMS Annual Meeting in Phoenix, Arizona, and at the 2013 INFORMS Annual Meeting in Minneapolis, Minnesota, as well as at the 2017 INFORMS Annual Meeting in Houston, Texas. The chapter received the Cum Laude Award at the 2014 INFORMS Annual Meeting in San Francisco, California, at the 2016 INFORMS Annual Meeting in Nashville, Tennessee, on November 13, 2016, and at the 2018 INFORMS Annual Meeting in Phoenix, Arizona, and at the Anaheim Meeting on October 25, 2021. It received the Summa Cum Laude Award at the 2015 INFORMS Annual Meeting in Philadelphia, Pennsylvania. It received an Honorable Mention at the 2022 INFORMS Annual Meeting in Indianapolis.

### **Membership in Professional Societies**

Society of Industrial and Applied Mathematicians  
 American Mathematical Society  
 Institute for Operations Research and the Management Sciences (INFORMS)  
 Transportation & Logistics Society of INFORMS  
 The New York Academy of Sciences  
 Regional Science Association International  
 Society for Computational Economics  
 Network Science Society

## University (and Other) Teaching Experience

### Teaching at the University of Massachusetts Amherst:

CHEM E 445: Chemical Process Design (with M. Malone)  
 FOMGT 341: Transportation and Logistics – now OIM413  
 FOMGT 348: Advanced Operations Management  
 FOMGT 353: Management Science  
 FOMGT 456: Management Science Applications  
 SCH-MGT 597LG: Humanitarian Logistics and Healthcare  
 SOM 632: Introduction to Computers and Information Systems  
 SOM 751: Introduction to Management Science  
 SOM 821: Management Science I  
 SOM 822: Management Science II  
 SOM 823: Mathematical Programming  
 SOM 825: Management Science Doctoral Seminar  
 SOM 825X: Advanced Mathematical Programming  
 SOM 895: Decision Support Systems

### Teaching at the Massachusetts Institute of Technology:

1.207 Transportation Network Equilibrium Analysis, Spring, 1989.

### Teaching at the Summer University of Southern Stockholm (Sweden)

Short Course-Network Economics, August, 1994.

### Teaching at the Royal Institute of Technology (KTH, Sweden)

Variational Inequalities and Projected Dynamical Systems, Fall, 1996.

### Teaching at Cornell University:

Variational Inequalities and Equilibrium Programming, Supercomputer Summer Institute Workshop, 1998.

### Teaching at the University of Innsbruck (Austria):

Network Economics, March-June, 2002  
 Financial Networks, March-June, 2002  
 Sustainable Transportation, March-June, 2002.

### Teaching at the World Bank, Washington, DC:

Network Economics, June, 2008.

### Teaching at Harvard University:

Portfolio Optimization, July, 2009.

### Teaching at the School of Business, Economics and Law, University of Gothenburg, Sweden:

Operations Management and Supply Chain Network Theory, October 2, 2012.

### Teaching at the Vienna University of Economics and Business, Vienna, Austria:

Humanitarian Logistics and Healthcare, March 11-13, 2013.

### Teaching at Lancaster University, Lancaster, England:

Masterclass on Network Equilibrium, March 13-14, 2018.

## Chair Ph.D. Dissertations

**Dae-Shik Kim**, Title: Parallel computation of large-scale network equilibria and variational inequalities, School of Management, University of Massachusetts Amherst, 1992.

**June Dong**, Title: Formulation and computation of general financial equilibrium: variational inequality approach, School of Management, University of Massachusetts Amherst, 1994.

**Ding Zhang**, Title: Projected dynamical systems: Stability analysis and computation with applications to transportation and economic systems, Department of Industrial Engineering and Operations Research, University of Massachusetts Amherst, 1996.

**Kanwalroop Dhanda**, Title: Environmental policy modeling and computation: A variational inequality approach, School of Management, University of Massachusetts Amherst, 1997.

**Stavros Siokos**, Title: International multi-sector, multi-instrument financial modeling and computation: Statics and dynamics, Department of Industrial Engineering and Operations Research, University of Massachusetts Amherst, 1998.

**Padma Ramanujam**, Title: Transportation network policy modeling for congestion and pollution control: A variational inequality approach, School of Management, University of Massachusetts, Amherst, 1999. (Thesis was awarded the 1999 Transportation Science Section of INFORMS Dissertation Prize.)

**Jose M. Cruz**, Title: International financial networks and global supply chains: A unified framework for decision-making, optimization, and risk management, Isenberg School of Management, University of Massachusetts Amherst, 2004.

**Ke Ke**, Title: Statics and dynamics of complex network systems: Supply chain analysis and financial networks with intermediation, Isenberg School of Management, University of Massachusetts Amherst, 2004.

**Fuminori Toyasaki**, Title: A unified complex network framework for environmental decision-making with applications to green logistics and electronic waste recycling, Isenberg School of Management, University of Massachusetts Amherst, 2005.

**Dmytro Matsypura**, Title: Dynamics of global supply chain and electric power networks: models, pricing analysis, and computations, Isenberg School of Management, University of Massachusetts Amherst, 2006.

**Tina Wakolbinger**, Title: A dynamic theory for the integration of social and economic networks with applications to supply chain and financial networks, Isenberg School of Management, University of Massachusetts, Amherst, 2007.

**Zugang Liu**, Title: Transportation and dynamic networks: Models, theory, and applications to supply chains, electric power and financial networks, Isenberg School of Management, University of Massachusetts Amherst, 2008.

**Qiang Qiang**, Title: Network efficiency/performance measurement with vulnerability and robustness analysis with application to critical infrastructure, Isenberg School of Management, University of Massachusetts Amherst, 2009. (Thesis was awarded the Charles V. Wootan Award by the Council of University Transportation Centers for the best dissertation in transportation planning and policy based on a national competition.)

**Trisha Woolley**, Title: Sustainable supply chains: Multicriteria decision-making and policy analysis for the environment, Isenberg School of Management, University of Massachusetts Amherst, 2010.

**Min Yu**, Title: Analysis, design, and management of supply chain networks for time-sensitive products, Isenberg School of Management, University of Massachusetts Amherst, 2012.

**Amir H. Masoumi**, Title: Supply chain management of perishable products with application to healthcare, Isenberg School of Management, University of Massachusetts Amherst, 2013.

**Dong "Michelle" Li**, Title: Quality Competition in Supply Chain Networks with Applications to Information Asymmetry, Product Differentiation, and Outsourcing, Isenberg School of Management, University of Massachusetts Amherst, 2015.

**Sara Saberi**, Title: Network Game Theory Models of Services and Quality Competition with Application to Future Internet Architectures and Supply Chains, Isenberg School of Management, University of Massachusetts Amherst, 2016.

**Shivani Shukla**, Title: Game Theory for Security Investments in Cyber and Supply Chain Networks, Isenberg School of Management, University of Massachusetts Amherst, 2017.

**Pritha Dutta**, Title: Blood Supply Chain Networks in Healthcare: Game Theory Models and Numerical Case Studies, Isenberg School of Management, University of Massachusetts Amherst, 2019.

**Deniz Besik**, Title: Essays on Competitive Fresh Produce Supply Chain Networks: From the Impacts of Tariffs and Quotas to the Integration of Quality, Isenberg School of Management, University of Massachusetts Amherst, 2020.

**Mojtaba Salarpour**, Title: Essays on Supply Chain Economic Networks for Disaster Management Inspired by the Covid-19 Pandemic, Isenberg School of Management, University of Massachusetts Amherst, 2022.

### **Co-Chair Ph.D. Dissertations**

**Jie Pan**, Title: Variational inequalities in the modeling and computation of spatial economic equilibria: Structural reformulations and the method of multipliers, Department of Mathematics and Statistics, University of Massachusetts Amherst, 1992.

**Niklas Arvidsson**, Title: Essays on operational freight transport efficiency and sustainability, School of Business, Economics and Law, University of Gothenburg, Gothenburg, Sweden, 2013.

### **External Doctoral Opponent**

J. H. Wu, University of Montreal, Canada  
 Nils Jacob Berland, University of Bergen, Norway  
 William Chung, University of Waterloo, Canada  
 Mette Bjorland, Norwegian School of Economics and Business Administration, Bergen, Norway

### **Habilitation Committee Member**

Dr. Patrick Maille, Rennes, France, October 7, 2015

### **Oral Examiner of Doctoral Dissertation**

Andrea Raith, University of Auckland, New Zealand, 2009

### **Doctoral Dissertation Viva Assessment**

Ellen Knebel, Oxford University, England, 2016

### **Present Doctoral Student**

Dana Hassani

## **Member Ph.D. Committees (University of Massachusetts Amherst)**

Narendra Mulani, School of Management  
 Ajit Kumar, School of Management  
 Charles Robinson, School of Management  
 Abbas Abedian, Department of Industrial Engineering and Operations Research  
 Thomas Abraham, School of Management  
 Marie Wright, School of Management  
 Jinghua Xu, Department of Civil and Environmental Engineering  
 Bryan Horling, Computer Science Department  
 Diogo Souza Monteiro, Department of Resource Economics  
 Shenghan Xu, Isenberg School of Management  
 Jin Yue, Department of Mechanical and Industrial Engineering  
 Xuan Lu, Department of Civil and Environmental Engineering  
 Armagan Bayram, Isenberg School of Management  
 Mahyar Amirgholy, Department of Civil and Environmental Engineering  
 Mahour Rahimi, Department of Civil and Environmental Engineering  
 Michael Prokle, Mechanical and Industrial Engineering  
 Thiago Teixeira, Electrical and Computer Engineering  
 Ekin Koker, Mechanical and Industrial Engineering  
 Amirhossein Yazdi, Isenberg School of Management  
 Haris Sipetas, Department of Civil and Environmental Engineering  
 Wei Wei, Isenberg School of Management

## **Member Ph.D. Committees (Universidad de los Andes, Colombia)**

Luis Andres Marentes

### **Master's Committee Membership**

Jyotti Murthy, Chair (HRTA)  
 Sharon Romanski Young

### **Independent Study Supervisor**

Christina Calvaneso  
 Christopher Bardi  
 Dmytro Matsypura  
 Jeff Gallbraith  
 Carl Chimi  
 Charles Robinson  
 Lilly Lancaster  
 Debbie Hertz  
 Robert Gladchuck  
 Sam Sokolosky  
 Scott Grolemond  
 William Brandt  
 Mary Bailey  
 Linda Kennedy  
 Dae-Shik Kim  
 Kathy Dhanda  
 Vidya Shankar Thumsi  
 Min Yu  
 Dong "Michelle" Li  
 Adam Miller  
 Sara Saberi  
 Shivani Shukla

Deniz Besik  
 Karen Li  
 Mojtaba Salarpour  
 Meiyu Huang  
 Jainmei Wu  
 Dana Hassani

## **Teaching Honors**

Finalist for Distinguished Teaching Award, 1999  
 Nominated for Distinguished Teaching Award by graduate students 1984, 1987, 1991, 1997, 1998, 2003  
 Nominated for Distinguished Teaching Award by undergraduate students 1988  
 Nominated for Isenberg School Teaching Award by students 2016

## **Service at the University of Massachusetts Amherst**

Chairperson SOM Mathematics Committee, 1984-1987  
 SOM Adhoc Computer Committee, 1984-1986  
 SOM Ph.D. Policy Committee, 1987-1988, 1990-1991, 1991-1992, 1992-1993, 1993-1994, 1994-present  
 SOM Personnel Committee, 1986-1988  
 General Business & Finance Chair Search Committee, 1988  
 General Business & Finance Personnel Committee, 1985-6, 1993-94  
 General Business & Finance Personnel Committee, Alternate 1984-5  
 General Business & Finance Travel Committee Chair, 1985-6, member 1984-5  
 General Business & Finance Management Science Recruiting Committee, 1985-6, 1986-7  
 General Business & Finance Managerial Economics Recruiting Committee, 1986-7  
 General Business & Finance Management Science Ph.D. Revision Committee, 1986-7  
 Chancellor's Talent Award Sponsor, 1984, 1985  
 University of Massachusetts Research Council, 1993-present  
 University of Massachusetts Press Committee, 1992-present  
 Strategic Planning Committee for Research and Graduate Education, 1993-present  
 IE/OR - FOMGT Committee, 1994  
 Finance and Operations Management Search Committee, 1997-1998  
 Dean of NSM Search Committee, 2000  
 Provost's Distinguished Professorships Advisory Committee, 2000-present  
 Isenberg Chair Professor Search Committee, 2001  
 University of Massachusetts Faculty Mentor, 2001-present  
 Ad Hoc Committee to meet with Vice Chancellor for Research candidates, 2003  
 Distinguished Faculty Lecture Series Committee, 2003 - 2005  
 Provost Search Committee, 2004  
 Faculty Advisor - INFORMS Student Chapter at UMASS Amherst, 2004 - present  
 Dean of Commonwealth College Search Committee, 2006  
 Chair -- Faculty Search Committee, Two positions in Operations Management, 2007-2008  
 Finance and Operations Management Department Personnel Committee, Alternate -- 2007-2008  
 UMass Amherst Research Commons Committee, 2008  
 Member of the Search Committee for the Dean of the Isenberg School of Management, 2008-2009  
 Initial Chair - Faculty Search Committee, Position in Operations Management (in Cyber Security), 2010  
 Search Committee Member - Systems Engineering CHC Faculty Position, Department of Mechanical and Industrial Engineering, UMass Amherst, 2013-2014  
 Isenberg School of Management Personnel Committee, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022  
 Chair - Graduate Program Strategic Planning Committee, OIM Department, Spring 2015  
 Member - World University Network Review Committee, 2015  
 Chair - OIM Faculty Search Committee, OIM Department 2017

Management Science Area PhD Coordinator, 2018-  
 Sustaining Faculty Excellence Committee, Isenberg School, 2020-present  
 Appointed to the UMass Amherst Research Council, Fall 2021-present  
 OIM Department Strategic Planning Committee, Fall 2021  
 Adhoc Task Force on Displaced Ukrainian Scholars and Students, March 2022 – present  
 KSE-UMass Amherst Isenberg School Selection Committee of Virtual Scholars in Ukraine  
 Search Committee Member, Operations Management Position, 2022

## **External Service -- Referee for**

National Science Foundation  
 Department of Homeland Security  
 Natural Sciences and Engineering Research Council (Canada)  
 EPSCR - UK  
 Swedish Research Council  
 Science Foundation of Ireland  
 U. S. Civilian Research and Development Foundation  
 Hong Kong Science Foundation  
 Danish Council for Strategic Research  
 Marsden Fund – New Zealand  
 Transportation Research Board  
*Operations Research*  
*Management Science*  
*Networks*  
*Transportation Science*  
*Transportation Research (B, C, D, E)*  
*Journal of Optimization and its Applications*  
*Regional Science and Urban Economics*  
*Journal of Economics and Business*  
*International Regional Science Review*  
*Annals of Regional Science*  
*Papers in Regional Science*  
*Mathematical Programming*  
*Operations Research Letters*  
*European Journal of Operational Research*  
*Journal of Regional Science*  
*ORSA Journal on Computing*  
*INFOR - Canadian Journal of Operational Research and Information Processing*  
*Socio-Economic Planning Sciences*  
*IEEE Transactions on Automatic Control*  
*Computational Economics*  
*Journal of Economic Dynamics and Control*  
*Netnomics*  
*Optimization Letters*  
*Optimization*  
*International Journal of Sustainable Transportation*  
*Europhysics Letters*  
*Automatica*  
*Games and Economic Behavior*  
*Energy Systems*  
*Production and Operations Management*  
*MSOM*

## **National Service**

Transportation Supply Analysis Committee, National Research Council, 1989-1991; 1991-1994; 1994-1997.

Transportation Science Section of the Operations Research Society of America, Councillor, 1989-1991.

National Science Foundation Advisory Panel for Advanced Scientific Computing, 1990-1992.

Chair - Committee of Visitors, Division of Advanced Scientific Computing, National Science Foundation, 1990.

Transportation Science Section Dissertation Prize Committee, 1990, 1991.

Chair - Transportation Science Section Dissertation Prize Committee, 1992.

Workshop on Computational Economics, National Science Foundation, March 6, 1991.

Cornell National Supercomputer Facility National Allocation Committee, 1990-1995. National Science Foundation Panel: Special CAREER Award Transportation, March 1, 1996, Arlington, VA.

Robert Herman Transportation Science Section Lifetime Achievement Prize Committee, 1995, 1998, 2001.

Computer Science Technical Section of INFORMS Prize Committee, 1997.

Chair, Computer Science Technical Section of INFORMS Prize Committee, 1998.

National Science Foundation Panel; KDI-NCC, Arlington, VA, August 3-5, 1998.

Girls, Inc., National Economic Literacy Advisory Board, 1999-

National Science Foundation Panel; URI, Arlington, VA, October 22-23, 1998.

National Science Foundation Panel; PAESMEM, May 13-14, 1999.

Chair - 2000 Robert Herman Lifetime Achievement Prize in Transportation Science.

National Science Foundation - Committee of Visitors – Programs on Gender Equity and People with Disabilities, May 3-4, 2000.

National Science Foundation Panel; ITR, Arlington, Virginia, April 23-24, 2001.

INFORMS speaker with the INFORMS Speaker Bureau, 2004-

National Science Foundation Panel; Human and Social Dynamics, Arlington, Virginia, June 24-25, 2004.

National Science Foundation Panel, Human and Social Dynamics, Arlington, Virginia, May 26-27, 2005.

National Science Foundation Panel, Human and Social Dynamics, Arlington, Virginia, May 15-16, 2006.

Chair - Ad Hoc Committee on Diversity; INFORMS, July 2006 -- January 2007.

National Science Foundation Panel, Engineering Research Centers, Arlington, VA, August 1-2, 2007.

Editor-in-Chief of *Transportation Science* Search Committee of INFORMS, 2008.

Chair of the 2009 WORMS (Women in Operations Research and the Management Sciences) Award.

National Science Foundation Panel, Cyber Enabled Discovery and Innovation, Arlington, VA, 2010.

Member of Subdivisions Council, INFORMS, 2009-2011.

Alternative UMass Amherst representative for I3P (Institute for Information Infrastructure

Protection), 2010 – 2012.

National Science Foundation Panel, CAREER, Arlington, VA, October, 2010.

Information Technology Committee, INFORMS, January 2011- December 2012.

Chair – INFORMS Speakers Program, January 2011 – December 2012.

WORMS – Junior VP of Communications, January, 2012 – December 2012; VP of Communications, January 2013 – December 2013.

National Science Foundation Panel, CAREER, Arlington, VA, October 2016.

Committee member – INFORMS Computing Society best student paper award, 2016-2018; Chair 2018.

Committee member – INFORMS History & Traditions Committee, 2016-2018.

National Science Foundation Panel, CISE, March 2017.

Committee Member – INFORMS, Service Awards, 2017-2018; Chair in 2019.

### **International Service**

- Councilor - International Regional Science Association, 1989-1991.
- Discipline Advisory Committee for Fulbright Scholar Awards in Management Information Systems, July 1995 - July 1999.
- Committee Member, Fudan Premier Prize in Management Science, Shanghai, China, 2006.
- Advisory Board Member, Computational Optimization, Econometrics, and Finance (COMISEF) project, funded by the European Union, 2006-present.
- Advisory Council Member of the Society for Computational Economics, 2007-2010.
- Advisory Committee - 2<sup>nd</sup> International Conference on Transportation Logistics (T-LOG), July 4-7, 2007, Shenzhen, China.
- Regional Science Association International Fellow Selection Committee, 2009 and 2010. Chair of this Committee for 2011.
- Shevchenko Scientific Society (USA) and U.S.-Ukraine Foundation Mathematics Competition Committee, 2008, 2009, and 2010, 2019.
- Elected Councillor at Large, North American Regional Science Council (NSARC) for the term 2011-2013.
- Member of Scientific Committee, 11<sup>th</sup> World Congress of the RSAI, Istanbul, Turkey, April 25-28, 2016.
- Erdős-Rényi Prize in Network Science committee 2017 and 2018.
- Inaugural best paper prize committee in two categories for the journal: *International Transactions in Operational Research* 2019.
- Scientific Advisory Board member for the project: Relief-OpS: Designing a resilient relief supply network for natural disasters in West Java Indonesia using optimisation-via-simulation, EPSRC grant, PI: Stephan Onggo, 2020-present.

- International Transactions in Operational Research Best Paper Prizes Committee 2019, 2020, and 2021.
- Chair – Stella Dafermos Award in Transportation Science, TSL Society, INFORMS, 2022.
- Member Shevchenko Scientific Society Fellow Selection Committee – Displaced Scholars and Artists of Ukraine. Reviewed 50 applications for funding from the Emergency Fund. More than 250 applications submitted. Summer of 2022.

## Book Series Editorships

**Advances in Computational Economics**, Co-Editor with H. Amman, Springer (formerly Kluwer Academic Publishers).

**New Dimensions in Networks**, Edward Elgar Publishing.

### Book Series Editorial Board

**Advances in Computational Management Science**, Springer (formerly Kluwer Academic Publishers).

**Advances in Spatial Science**, Springer, 2010-2012.

## Journal Editorships

Co-Editor – *Netnomics*, 2003 – 2006.

Associate Editor - Special Issue of *Operations Research* on Stochastic Models in Transportation.

Associate Editor - *Operations Research Letters* (1990-2002).

Associate Editor - *The International Journal of High Performance Computing*, for over a dozen years – 2012.

Associate Editor - *Computational Economics*, formerly *Computer Science in Economics and Management*.

Associate Editor - *Annals of Regional Science*.

Associate Editor – *Networks*, over 20 years until 2014.

Associate Editor - *Computational Management Science*.

Associate Editor - *Journal of Economic Dynamics and Control* (2000-2008).

Associate Editor - *The Journal of Financial Decision Making*.

Associate Editor - *International Journal of Sustainable Transportation*.

Associate Editor - *Optimization Letters*.

Associate Editor - *International Transactions in Operational Research* (ITOR).

Associate Editor - *Journal of Computational Optimization in Economics and Finance*.

Associate Editor – *Numerical Algebra, Control and Optimization*.

Associate Editor – *Economics of Transportation*.

Associate Editor – *Transportation Research E*, 2013 –2019.

Associate Editor – *TOP*, 2013 – 2014.

Associate Editor – *International Journal of Financial Engineering and Risk Management*, 2013 –

Associate Editor – *Service Science*, 2015-2018.

Editorial Board Member – *European Journal of Operational Research*, November 2021 – present.

Associate Editor – *Journal of Global Optimization*, January 2022 – present.

### **Newsletter Editorship**

Editor – *Supernetwork Sentinel*, The Newsletter of the Virtual Center for Supernetworks; see:  
<http://supernet.isenberg.umass.edu>