

# Research in Business Analytics

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**UMassAmherst**

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of Management**

# Acknowledgment

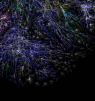
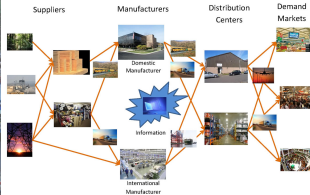
**Many thanks to Professors Ann Melissa Campbell, Kang Zhao, and Beste Basciftci for bringing us all to Iowa City for this interesting, very timely workshop!**



- **Background and Motivation**
- **Research and the Academic Life**
- **What is Special About Business Schools**
- **Networking and Grantsmanship**
- **Some Research Areas of Business Analytics in Business Schools**
- **Being True to Yourself.**

# Background and Motivation

# I Work on the Modeling of Network Systems



## Much of My Recent Research Has Been on Supply Chains



# Some of My Books



# For the Love of **Operations Research (OR)** and **Networks**

From my first course at Brown University on the subject to my first projects in industry - working on naval submarines in Newport, Rhode Island, I was drawn to the power of networks, especially when combined with computing.



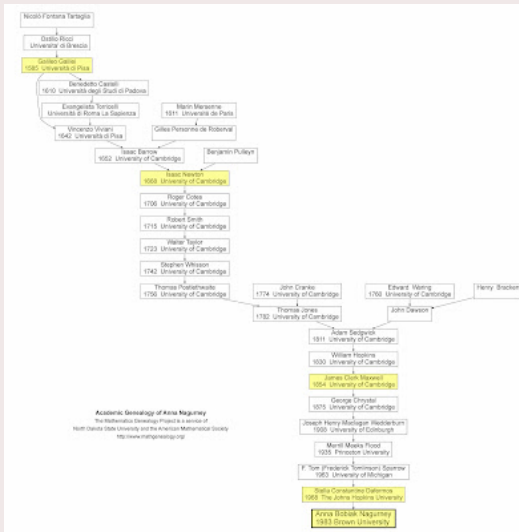
# Off to Grad School for a PhD

While working in high tech defense consulting I very soon I realized that I did not like having a boss. I commuted, ran marathons, and worked full time while taking courses for my Master's at Brown. Dr. Stella Dafermos was the only female professor at the time in either Engineering or Applied Mathematics at Brown University. I became her first PhD student.



Stella was only the second female in the US to have received a PhD in OR and that was at Johns Hopkins University.

# On the Shoulders of Giants - My Academic Genealogy - Maxwell, Newton, and Galileo



# Job Offers While Finishing My PhD

**I received offers from consulting companies and various academic departments including in Applied Mathematics, Computer Science, and in Business.**

**I enjoyed the interdisciplinarity of a business school, so what is now the Isenberg School became my academic home.**

**However, I have also held a variety of appointments, including Fulbrights, at such institutions as Brown University, Harvard University, MIT, the Royal Institute of Technology and the University of Gothenburg in Sweden, the University of Innsbruck in Austria, and Oxford University in the UK.**

# Research and the Academic Life

# Academic Life is the Best

- No two days are ever alike;
- One is always able to work on challenging, important problems of your choice;
- Mentoring and educating students is rewarding and impactful;
- You get to travel and see exciting places because of conferences, invitations, etc.;
- One is always meeting interesting people and one's network keep's on growing;
- Your work can have a positive impact on society;
- There are many leadership opportunities.

# Several of My Former PhD Students Are Now Leading Business Analytics Programs

Dr. Jose M. Cruz



U. of Connecticut

Dr. Shivani Shukla



U. of San Francisco

Dr. Dmytro Matsypura



U. of Sydney

# **What is Special About Business Schools**

**Business schools tend to look for the “entire package” in a candidate - someone who can do both excellent research and teaching and also contribute to the service mission (although the latter grows as your time in academia increases).**

**For example, in many universities one may even have a document - in the Isenberg School of Management it is called the **Red Book** - that spells out the standards for achieving promotion and tenure.**

**Feedback is provided through Annual Faculty Reports and also, often, a “mini-tenure review” after the the third year as an Assistant Professor. Paying attention to feedback is very important.**

# What is Special About Business Schools

**Research in business schools can be quite interdisciplinary. I consider this to be a plus since many important problems out there need an interdisciplinary approach.**

**Also, although business schools don't "push" grantsmanship like engineering schools and other STEM disciplines do, getting grants may be valued and I will come back to this.**

**Working with businesses and organizations in your research can add a lot of value.**

# Tenure Expectations in Terms of Research

**Obviously, the expectations will differ, depending on the type of academic institution that you join (whether a Research 1, a Research Intensive, More of a Teaching Institution, etc.).**

**Many business schools do have a journal list and publishing in the journals is often a necessary condition for tenure. Also, you can take personal pride and satisfaction in publishing in such journals and doing so can help your career. (You may want to move from the institution that you start out at, for example).**

**Some departments even incentivize publications in the top tier journals (sometimes even for PhD students).**

# What is Special About Business Schools

**As mentioned, business schools, typically, have a “journal list,” which is a list of journals that they expect you to publish in. Quality of publications, which includes the journal outlets, is highly valued.**

**There are lists such as the Financial Times 50, the UT Dallas journal list, the ABDC journal list, and others.**

**Most business schools will agree on the “premier” journals but may differ on the A and A- ones. Important to be aware of your department/school’s journal list.**

# Journal Rankings in Operations Management (OM)

## Operations Management Rank



Management Science	Premier
Operations Research	Premier
Production and Operations Management	Premier
Manufacturing & Services Operations Management	Premier
Journal of Operations Management	Premier
INFORMS Journal on Computing	Premier
European Journal of Operational Research	A
IIE Transactions	A
Naval Research Logistics	A
Transportation Research Part B: Methodological	A
Journal of the Operational Research Society	A
Transportation Science	A
Annals of Operations Research	A-
Decision Sciences	A-
Journal of Global Optimization	A-
Networks	A-
Omega - International Journal of Management Science	A-
Transportation Research Part E: Logistics and Transportation Review	A-

# Networking and Grantsmanship

# Networking Can Help You Find Collaborators

**A professional society can provide its members valuable support and networking opportunities at different stages of their professional careers and, for this, and the friendships made and the memories, I am very grateful.**



**How Do I Build  
a Professional  
Network with the  
Help of INFORMS?**

Anna Nagurney, University  
of Massachusetts Amherst 

# Networking Can Help You Find Collaborators

**There is sometimes luck involved in getting collaborators.**

**For example, someone may reach out to you to collaborate on a paper or even a grant.**

**Someone may enjoy a talk that you gave at a conference, and contact you to work on a paper or project.**

**You may even have serendipity while traveling.**

**Networking takes different forms as your career progresses.**

# Taking Part in Conferences is Important



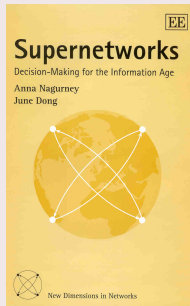
# Your University May Have Global Partnerships

I acknowledge the partnership between the University of Massachusetts Amherst and the Kyiv School of Economics in Ukraine.



# Value of Getting Grants in Business Schools

**The book, “Supernetworks: Decision-Making for the Information Age,” was written in 2001.**



**The Virtual Center for Supernetworks was established in the Fall of 2001, with several NSF grants plus an AT&T Industrial Ecology Fellowship.**

# Value of Getting Grants in Business Schools

**Universities have internal grants that you can apply for, which can help you to leverage applications for funding from national agencies such as the NSF, for example.**

**Having additional funding can enhance your travel support, the funding of additional PhD students, summer stipends, supplies, etc.**

**We have had major funding from the NSF, the Rockefeller Foundation, as well as through various fellowships such as through the Radcliffe Institute for Advanced Study at Harvard University as well as Fulbrights.**

# Places that You May Go as You Grow Your Networks

## Yalta, Ukraine with my taxi driver Igor



## Buenos Aires, Argentina and the Blue Lagoon in Reykjavik, Iceland



# Places that You May Go as You Grow Your Networks

## Italy and Switzerland



## Oxford University and Imperial College

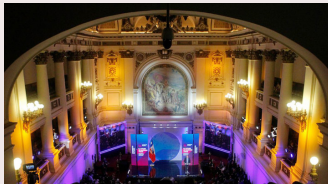


# Places that You May Go as You Grow Your Networks

## Radcliffe Institute for Advanced Study at Harvard University



## Congreso Futuro, Chile!



# **Some Research Areas of Business Analytics in Business Schools**

One may be able to contribute to methodologies such as:

- optimization theory
- decision theory
- game theory
- simulation
- statistical methodologies
- AI and machine learning
- algorithms.

**There is a lot of research activity now on applications in:**

- **supply chain analytics,**
- **healthcare analytics,**
- **retail analytics,**
- **disaster management and emergency preparedness,**
- **sustainability,**
- **use of technology in operations including blockchain, AI, drones, etc.**

# The Research Statement

**You may be asked to write a research statement as an academic job applicant and when you undergo a mini-tenure review and review for promotion & tenure.**

**This is a valuable document to prepare since it helps one to focus on one's research strengths and interests and also, to a certain degree, what your institution (especially new one) values.**

**For the academic job applicant, a research statement may need to be geared towards the specific position one is applying for.**

**The research statement should be very professional and carefully polished and proofread. You should be proud of it.**

# Being True to Yourself

## Be True to Yourself!

A. Nagurny, D. Hassani, O. Nivievskyi, and P. Martyshev,  
“Exchange Rates and Multicommodity International Trade:  
Insights from Spatial Price Equilibrium Modeling with Policy  
Instruments via Variational Inequalities,” *Journal of Global  
Optimization* 87 (2023), pp 1-30.

Journal of Global Optimization  
https://doi.org/10.1007/s101070240004

Exchange rates and multicommodity international trade  
insights from spatial price equilibrium modeling with policy  
instruments via variational inequalities

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### Abstract

In this paper, we construct a multicommodity international trade spatial price equilibrium model of spatial equilibrium to agriculture in which exchange rates are included along with policy instruments in the form of tariffs, subsidies as well as quotas. The model allows for multiple trade routes between country origin nodes and country destination nodes and these trade routes can include different modes of transportation and transport through different countries. We capture the impact of exchange rates through the definition of effective path costs and identify the prevailing multicommodity international trade spatial price equilibrium conditions, which are then formulated as a variational inequality problem in producer path flows. Distance results are established and a computational procedure presented. The literature associated examples and a case study are inspired by the impacts of the war against Ukraine on agricultural trade flows and producer prices. The modeling and algorithmic improvements in the generalization of the impact of exchange rates and various trade policies, as well as the addition or deletion of supply markets, demand markets, another routes, on supply and demand markets in food commodities, and on the volume of producer trade flows with implications for food security.

**Keywords** Exchange rates · Spatial price equilibrium · International trade · Networks · Variational inequalities · Agriculture

### 1 Introduction

Exchange rates represent the value (price) of one currency relative to another currency. They are important economic parameters in international trade, with changes in the exchange rate affecting the decision-making of individuals, businesses, and governments. A separate

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# Celebrate Successes



# Thank You Very Much!




## The Virtual Center for Supernetworks



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

Director's Welcome	About the Director	Projects		Center Associates	Media Coverage	Braess Paradox
Downloadable Articles	Visuals	Audio/Video	Books	Commentaries & OpEds	The Supernetwork Sentinel	Congratulations & Kudos



**POMS 2024  
Minneapolis  
April 27, 2024**

**The Virtual Center for Supernetworks** is an interdisciplinary center at the Isenberg School of Management that advances knowledge on large-scale networks and integrates operations research and management science, engineering, and economics. Its Director is Dr. Anna Nagurney, the Eugene M. Isenberg Chair in Integrative Studies.


**Mission:** The Virtual Center for Supernetworks fosters the study and application of supernetworks and serves as a resource on networks ranging from transportation and logistics, including supply chains, and the Internet, to a spectrum of economic networks.

**The Applications of Supernetworks Include:** decision-making, optimization, and game theory; supply chain management; critical infrastructure from transportation to electric power networks; financial networks; knowledge and social networks; energy, the environment, and sustainability; cybersecurity; Future Internet Architectures; risk management; network vulnerability, resiliency, and performance metrics; humanitarian logistics and healthcare.

Announcements and Notes	Photos of Center Activities	Photos of Network Innovators	Friends of the Center	Course Lectures	Fulbright Lectures	UMass Amherst INFORMS Student Chapter
Professor Anna Nagurney's Blog	Network Classics	Doctoral Dissertations	Conferences	Journals	Societies	Archive

**Announcements and Notes from the Center Director**  
**Professor Anna Nagurney**

Updated: May 23, 2024

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Research, Education, Networks, and the World:  
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**New Books**

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Use a Paradox of Traffic Planning

Environmental Impact Assessment of Transportation Networks with Degradable Links in an Era of Climate Change

Anna Nagurney, Qing Qiang, and Lixin He & Nagurney