
The Supernetwork Sentinel

The Newsletter of the Virtual Center for Supernetworks

Summer 2008



Welcome to the Summer 2008 edition of **The Supernetwork Sentinel**, the newsletter of the Virtual Center for Supernetworks at the Isenberg School of Management, UMass Amherst. **The Supernetwork Sentinel** is published in Fall, Winter, and Summer editions. Its purpose is to keep you informed of events, activities, and successes of the Virtual Center for Supernetworks, the Center Associates, and the Supernetworks Laboratory for Computation and Visualization. In this newsletter, we include Professor Anna Nagurney's Fulbright experience essay. We also share information on recently received distinctive awards and recognitions and highlight the Bellagio Center conference on humanitarian logistics. As always, we provide a list of our recent publications as well as upcoming events.

We wish everyone a wonderful Summer!

Anna Nagurney
John F. Smith Memorial Professor
Director – Virtual Center for Supernetworks
<http://supernet.som.umass.edu>



Above: Participants in the Humanitarian Logistics: Networks for Africa Conference, Bellagio Center, Italy, May 2008

Right: Dr. Denise Sumpf of the United Nations in Bangkok, Thailand visits the Supernetworks Laboratory after her presentation

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Dr. Barbagallo with Professors Daniele and Nagurney at the Fulbright Workshop at the University of Catania, Italy

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Professor Anna Nagurney's Fulbright Essay The Fulbright Experience -- Education Without Borders

**Professor Nagurney was a Senior Fulbright Specialist in Business Administration,
March 5-19, 2008 at the University of Catania, Italy**

In 2000, the Fulbright Program, which is sponsored by the US Department of State, created the Fulbright Senior Specialists Program to complement the traditional Fulbright Scholar Program, which is considered to be America's flagship international exchange activity. This year, according to the Fulbright Commission; see: <http://www.cies.org>, there will be over 400 US faculty and professionals who will travel abroad through the Fulbright Senior Specialists Program, which provides short-term (two to six week) academic opportunities to "prominent US faculty and professionals to support curricular and faculty development and institutional planning" at academic institutions around the globe.

My journey as a Senior Fulbright Specialist in Business Administration in Italy began on March 5, 2008 when I boarded Northwest/KLM flight 98 in Bradley Airport to Amsterdam Schiphol. This new airline route provides a direct route to Europe, had been eagerly awaited, and, propitiously, the Fulbright Commission requires a US carrier for transoceanic flights. Although our departure was late I had hopes of making my next connection to Milan Linate (the smaller airport in Milan) via Alitalia and then onward on another flight to Catania. The University of Catania on the island of Sicily was my host institution for the two week Fulbright. I settled in comfortably into my seat and knowing the grueling additional journey that awaited me drifted off to sleep. The flight itself was uneventful but its arrival too late for me to make the next connection. Then the negotiations began between Alitalia on the one side, KLM on the other side (these airlines are in acrimonious discussions due to a possible merger), and me in the middle at 8:30AM Amsterdam time at T2, the location for transfers at Schiphol. I was informed that I needed to contact my US travel agent (who I knew would still be sleeping for several hours) to rebook for the next day and so I checked into the Sheraton hotel at the Amsterdam airport and informed my Italian hosts that I would be arriving a day late.

The next morning, at 6:30AM as I was checking out of the Sheraton I heard "Dr. Nagurney, Dr. Nagurney, do you remember me?!" Standing in front of me was one of my former Isenberg School of Management students who had since graduated, had received his MBA from Harvard, and who was on a business trip in Europe. From that point on I knew that the Fulbright would be special and an adventure. I arrived later that day, along with my luggage, at the brand new and lovely Catania airport, took a 15 minute taxi ride to the Una Palace Hotel, and was greeted by my host, Professor Patrizia Daniele. Together, as part of the Fulbright, we had organized a workshop on *Complex Networks: Equilibrium and Vulnerability Analysis with Applications* that was to take place the following Monday through Wednesday. The goals of my Fulbright were to lead the workshop, which explored the importance and analysis of networks ranging from congested urban transportation systems to supply chains, including electric power ones, the Internet, and financial networks. I was also to give a two hour lecture to an undergraduate class, to evaluate curricular materials, and to give additional lectures.

The three-day workshop exceeded our expectations -- not only did we have lively discussions from faculty participants from the University of Catania (many of whom had never met one another since they were in different departments or schools) but also from workshop participants from Naples, Messina, Calabria, and Genoa. There were even presentations from undergraduate students and graduate students! Top level administrators greeted and welcomed us and a special cake decorated as an Italian flag with my name on it and filled with rum and cream was offered. The workshop was a great success and the audience members commented on how terrific it was that we had brought different disciplines together to tackle some of the most challenging problems today. There were many female speakers and for some it was the first time that they had been invited to speak at the University of Catania.

Sicilian foods and desserts were served during the workshop breaks and lunches and new friendships and colleagues made.

One of the highlights of the experience was to instruct an undergraduate class. The names of the students sounded like those of characters in an opera -- from Concetta to Giuseppe. I gave the lecture *Operations Research and the Captivating Study of Networks and Complex Decision-making*. The opportunity to talk with the students afterwards about their hopes and dreams was eye-opening. Despite the education that they were receiving they had minimal hopes for obtaining good jobs after graduation. The eagerness in their eyes was evident and after the lecture I was touched by a standing ovation. The curriculum is quite advanced but many courses never make use of computer technology and students, typically, have no assigned homework and no projects or presentations. Each undergraduate class meets for 60 hours with a half an hour final oral exam per pupil. The contrast in educational styles there versus what we do at the Isenberg School of Management was truly enlightening. I offered many suggestions as to how to enhance the students' educational experiences.

Catania is a geological and historical wonder. It is the second largest city in Sicily with Mt. Etna (which still periodically erupts) in the background and the Mediterranean in the foreground. It has architecture dating to ancient Greek and Roman times, which has survived both earthquakes and volcanic eruptions, and the streets are made of lava stone. Flowers, palm trees, and cacti dot the magnificent plazas, along with churches and cathedrals. The sunny streets of Catania are filled with pedestrians of all ages enjoying the sights, the sense of community, and the marvelous stores, pastry shops, and gelaterias. The pedestrian and vehicular traffic were both fascinating to watch and to experience, which just added to the currency of the Fulbright Specialists theme!

The logistical support provided by my hosts was incredible -- from pickups and dropoffs at my hotel, which was located on Via Etnea, the majestic central boulevard of Catania. The ride to the University each morning involved navigating through 6-7 lanes of traffic in parts, filled with (often-dented) vehicles and motorcycles. As for the latter, they sometimes have to be dodged even on the sidewalks.

Mid-way through the Fulbright, my family joined me and the hosts entertained us all by welcoming us in their homes and taking us out to eat. A fish caught earlier in the day would be brought to our table and then a delicious stew prepared. The lunches on weekends would last for hours with conversations accompanying numerous courses. The importance and value of time for family and friends made us truly enjoy one another. We saw a massive funeral at the cathedral, which we later found out was for a father of a prominent politician. We saw a wedding taking place in the plaza next to the funeral. We marveled at the variety of police in uniform and the different types of police cars, be they for the "carabinieri" or the "municipale" or for the "penitenziari." Police on horseback guarded the churches on Palm Sunday next to individuals kneeling on the lava cobblestones and seeking alms. We were struck by the contrasts of families spending hours at cafes and then being approached by children no more than 6 or 7 begging for money (with no obvious parental unit in sight).

The Fulbright experience ended much too quickly but the memories will last a lifetime. The beauty of the Sicilian landscape, the warmth and durability of its people, as well as the contrasts in what the US has to offer its citizens and that which the denizens of Sicily have. On the way back from Schiphol to Bradley, I was greeted by a fellow UMass Amherst faculty member and neighbor who was also on the flight. Virtual connections are good but nothing beats the enriching experiences of face-to-face interactions across time-zones and cultures!

This was my second Fulbright. In 2002, I spent four months with my family in Innsbruck, Austria as a Distinguished Chaired Fulbright at the SOWI Business School at the University of Innsbruck. The lectures given in Catania along with the workshop information and photos can be found at: <http://supernet.som.umass.edu/fulbright-catania/FulbrightCataniaNagurney.htm>

UMass Amherst INFORMS Student Chapter Spring 2008 Speaker Series a Big Success

The award-winning UMass Amherst INFORMS Student Chapter is noted for the esprit de corps of its members who come from different schools at UMass Amherst, including the Isenberg School of Management, the College of Engineering, and the College of Natural Sciences and Mathematics, among others, and for its social and other activities including the organization of its Speaker Series. The Spring 2008 Speaker Series was a big success. This past term we hosted Dr. Denise Sumpf from the United Nations in Bangkok, Thailand, Dr. Eitan Bachmat of Israel, who was visiting Brandeis University, Dr. Jenna Marquard of the Department of Mechanical and Industrial Engineering at UMass Amherst, Dr. Andrew Papachristos of the Sociology Department at UMass Amherst, Dr. David Wypij of the School of Public Health at Harvard University, Dr. Vamsi Chadalavada of ISO New England, and Dr. John Birge of the Graduate School of Business at the University of Chicago. We thank all these speakers who took time out of their very busy schedules to share with the audience at the Isenberg School of Management their extraordinary research and professional experiences!

As a bonus this past term, ISO (Independent System Operator) New England invited the Student Chapter for a tour of its high tech facilities that monitor electric power in New England. The tour of the facilities took place on May 27, 2008. The Chapter thanks Ms. E. Foley, the Communications Director of ISO New England, for hosting this tour!



INFORMS Student Chapter Tour at ISO- New England, Holyoke, MA, May 27, 2008

Professor Anna Nagurney is the Faculty Advisor to this Student Chapter and its Speaker Series. Center Associate Trisha Woolley was the Speaker Series Coordinator for 2007-2008. We thank Ms. Woolley for her outstanding work regarding the series.

For more information about the Student Chapter, see:

<http://student.som.umass.edu/informs/>



Professor Anna Nagurney with Professor Matthias Ehrgott at the MCDM Conference

Plenary Lecture in New Zealand

January 7-12, 2008, Professor Anna Nagurney attended the 19th International Conference on Multiple Criteria Decision Making --- MCDM for Sustainable Energy and Transportation Systems, which took place at the University of Auckland in New Zealand. On January 8, she delivered the plenary lecture, entitled, "Multicriteria Decision-Making for the Environment: Sustainability and Vulnerability Analysis of Critical Infrastructure Systems from Transportation Networks to Electric Power Supply Chains."

The conferees were hosted to a welcome ceremony by the Maori, the indigenous people of New Zealand, and also given a tour of the museum in Auckland.

Professor Anna Nagurney thanks her host, Professor Matthias Ehrgott of the University of Auckland for being such an incredible host and conference organizer!

Rockefeller Foundation Bellagio Center Conference

May 5-9, 2008, Professor Anna Nagurney convened the conference, "Humanitarian Logistics: Networks for Africa," at the Rockefeller Foundation's Bellagio Conference Center on Lake Como in Italy. Professor Nagurney invited speakers/participants from academia, industry, and NGOs to discuss the latest research and practice on this topic with a goal of also expanding the educational resources in Africa and the US. The official Rockefeller Foundation announcement is available at:

<http://www.rockfound.org/bellagio/101707conferences.shtml>

The website for the conference which contains the conference presentations and additional resource materials is at:

<http://hlogistics.som.umass.edu>

The conference was a transformative event. Although it was 11 months in the planning it took place shortly after Cyclone Nargis hit Burma/Myanmar, and ended a few days before the devastating earthquake in Sichuan Province, China, demonstrating all too vividly the timeliness of the conference. Professor Anna Nagurney acknowledges the tremendous support provided by the Rockefeller Foundation through its Bellagio Centers program, and thanks the Institute for International Education for providing additional travel support for conferees from developing nations. Finally, Professor Nagurney acknowledges support provided by the John F. Smith Memorial Fund at the University of Massachusetts at Amherst for additional travel support for several conferees.



Several of the Bellagio Center Conferees

Kudos and News

Center Associate Professor Patrizia Daniele of the University of Catania was Professor Anna Nagurney's host during her Fulbright in March 2008. Together they co-organized the workshop, "Complex Networks -- Equilibrium and Vulnerability Analysis with Applications." Professor Anna Nagurney is indebted to Professor Daniele as well as to Professor Antonino Maugeri for their incredible warmth and hospitality during her Fulbright!

Dr. Stavros Siokos, former Managing Director of Citigroup in London, UK, and Center Associate, has become the Vice President of the Piraeus Bank in Athens, Greece. He assumed his new position in April 2008.

Center Associate, Dr. Tina Wakolbinger of the Fogelman College of Economics and Business Administration at the University of Memphis in Tennessee, had a very busy Spring semester. She was selected to participate in the INFORMS

Practice Conference that took place in Baltimore, MD, April 13-15, 2008, and then flew to Texas to be an invited panelist at the Southwest INFORMS Regional Conference at Texas A&M University, April 18-19, 2008. Dr. Wakolbinger spoke on the panel on how to have a successful INFORMS Student Chapter. Dr. Wakolbinger is a past President of the UMass Amherst INFORMS Student Chapter and served as its Speaker Series coordinator for two years.

In addition, Dr. Wakolbinger was elected Junior Vice President of Communications of WORMS (Women in Operations Research and the Management Sciences); see:

<http://worms.forum.informs.org/>

We congratulate Center Associate, Dr. Jose M. Cruz, who is an Assistant Professor at the School of Business at the University of Connecticut in Storrs for the publication of his single-authored paper, "Dynamics of Supply Chain Networks with Corporate Social Responsibility Through Integrated Environmental Decision-Making," published in (2008) in the top journal: *European Journal of Operational Research*, 184, pp. 1005-1031.

Zugang "Leo" Liu successfully defended his doctoral dissertation, "Transportation and Dynamic Networks: Models, Theory, and Applications to Supply Chains, Electric Power, and Financial Networks," on April 29, 2008. He received his PhD in the Graduate Ceremonies at UMass Amherst held May 23, 2008. Congratulations to Dr. Liu! Dr. Liu will be an Assistant Professor at Penn State University in Hazleton beginning in the Fall 2008.

Center Associate Qiang "Patrick" Qiang successfully defended his doctoral dissertation proposal, "Network Efficiency/Performance Measurement with Vulnerability and Robustness Analysis with Application to Critical Infrastructure," this past Spring. Professor Anna Nagurney is Chair of his dissertation committee.

In addition, Patrick Qiang received a Graduate Fellowship from the University of Massachusetts at Amherst for the 2008-2009 academic year. Patrick was one of only twenty graduate students recognized in this way at the University. Congratulations to Patrick for his terrific academic work and leadership as the 2007-2008 President of the UMass Amherst INFORMS Student Chapter!

Zugang "Leo" Liu, Patrick Qiang, and Trisha Woolley traveled to Boston, MA to present posters on May 10, 2008 at the SIAM Conference on Optimization. On May 16, 2008, along with past UMass Amherst INFORMS Student Chapter President, Christian Wernz, they were recognized for their outstanding service to the UMass Amherst Student Chapter: <http://student.som.umass.edu/informs/>

Center Associates Zugang "Leo" Liu and Qiang "Patrick" Qiang were inducted into the National Business Honor Society Beta Gamma Sigma in ceremonies at the Isenberg School on May 3, 2008.

Professor Anna Nagurney gave an invited talk at the Microeconomic Dynamics Mini-conference at Caltech in Pasadena, California, which took place May 23-25, 2008. The title of her presentation was: "Dynamic Modeling of the Internet via Evolutionary Variational Inequalities with Vulnerability Analysis." This presentation as well as others can be found on the Supernetworks website:

<http://supernet.som.umass.edu/visuals.html>

In May 2008, Professor Anna Nagurney was appointed a consultant to the World Bank. In June 2008 she will be conducting a short course at the World Bank in Washington, DC, on Network Economics.

Professor Anna Nagurney will deliver the paper, "Environmental Impact Assessment of Transportation Networks with Degradable Links in an Era of Climate Change," co-authored with Center Associates, Qiang "Patrick" Qiang and Professor Ladimer Nagurney at the Third International Conference on Financing Transport Infrastructure, in Paris, France, June 19-20, 2008.

In addition, Professor Anna Nagurney will present the paper, "An Integrated Electric Power Supply Chain and Fuel Market Network Framework: Theoretical Modeling with Empirical Analysis for New England," co-authored with Center Associate, Dr. Zugang "Leo" Liu, at the 14th Conference on Computing in Economics and Finance, June 26-28, 2008, in Paris, France.

Center Associate Professor Ding Zhang, who is also the MBA Director at the School of Business in SUNY Oswego, will be spending time this summer in China.

Center Associate Professor Ladimer Nagurney of the University of Hartford will be on sabbatical the coming academic year and will be visiting CASA, the Center for the Adaptive Sensing of the Atmosphere, at the University of Massachusetts at Amherst. The Director of the Center is Professor David McLaughlin.

Center Associate Professor June Dong of the School of Business at SUNY Oswego will be on sabbatical during the Fall 2008 semester.

For more information on the talks, conferences, and upcoming events, see:

<http://supernet.som.umass.edu/conferences.html>



Center Associates Zugang "Leo" Liu and Qiang "Patrick" Qiang with Professor Anna Nagurney prior to the Beta Gamma Sigma Induction Ceremony

Recent Center Publications

Copies of these (and other) center articles are at: <http://supernet.som.umass.edu/dart.html>

An Integrated Framework for the Design of Optimal Web Banners, L. Hai, L. Zhao, and A. Nagurney (2008), submitted.

A Relative Total Cost Index for the Evaluation of Transportation Network Robustness in the Presence of Degradable Links and Alternative Travel Behavior, A. Nagurney and Q. Qiang (2008), to appear in *International Transactions of Operational Research*.

Spatially Differentiated Trade of Permits for Multipollutant Electric Power Supply Chains, T. Woolley, A. Nagurney, and J. K. Stranlund, to appear in *Optimization in the Energy Industry*, K. Kallrath, P. Pardalos, S. Rebennack, and M. Schei, Editors, Springer, Berlin, Germany.

A System-Optimization Perspective for Supply Chain Network Integration: The Horizontal Merger Case, A. Nagurney, *Transportation Research E* (2008), in press.

Identification of Critical Nodes and Links in Financial Networks with Intermediation and Electronic Transactions, A. Nagurney and Q. Qiang, in *Computational Methods in Financial Engineering*, E. J. Kontoghiorghes, B. Rustem, and P. Winker, Editors, Springer, Berlin, Germany (2008), pp. 273-297.

A Unified Network Performance Measure with Importance Identification and the

Ranking of Network Components, Q. Qiang and A. Nagurney (2008), *Optimization Letters*, **2**, pp. 127-142.

A Network Equilibrium Framework for Internet Advertising: Models, Qualitative Analysis, and Algorithms, L. Zhao and A. Nagurney, *European Journal of Operational Research* (2008), **187**, pp. 456-472.

Dynamics of Supply Chain Networks with Corporate Social Responsibility Through Integrated Environmental Decision-Making, Jose M. Cruz (2008), *European Journal of Operational Research*, **184**, pp. 1005-1031.

Projected Dynamical Systems, Evolutionary Variational Inequalities, Applications, and a Computational Procedure, M.-G. Cojocaru, P. Daniele, and A. Nagurney, in *Pareto Optimality, Game Theory, and Equilibria*, A. Chinchuluun, A. Migdalas, P. M. Pardalos, and L. Pitsoulis, Editors, Springer, Berlin, Germany (2008), pp. 347-406.

Statics and Dynamics of Global Supply Chain Networks with Environmental Decision-Making, A. Nagurney, J. Cruz, and F. Toyasaki, in *Pareto Optimality, Game Theory, and Equilibria*, A. Chinchuluun, A. Migdalas, P. M. Pardalos, and L. Pitsoulis, editors, Springer, Berlin, Germany (2008), pp. 803-836.

A Network Efficiency Measure with Application to Critical Infrastructure Networks, A. Nagurney and Q. Qiang, *Journal of Global Optimization* (2008), **40**, pp. 261-275.

An Efficiency Measure for Dynamic Networks with Application to the Internet and Vulnerability Analysis, A. Nagurney and Q. Qiang, *Netnomics*, published online by Springer on March 19, 2008.

An Integrated Electric Power Supply Chain and Fuel Market Network Framework: Theoretical Modeling with Empirical Analysis for New England, Z. Liu and A. Nagurney (2007), submitted.

View of Lake Como from the Humanitarian Logistics: Networks for Africa Conference Venue



Happy Summer of 2008!

The Center Director, Professor Anna Nagurney, and the Center Associates, thank you for your support throughout the academic year!

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If you would like to be put on our email list, contact supernet@som.umass.edu

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