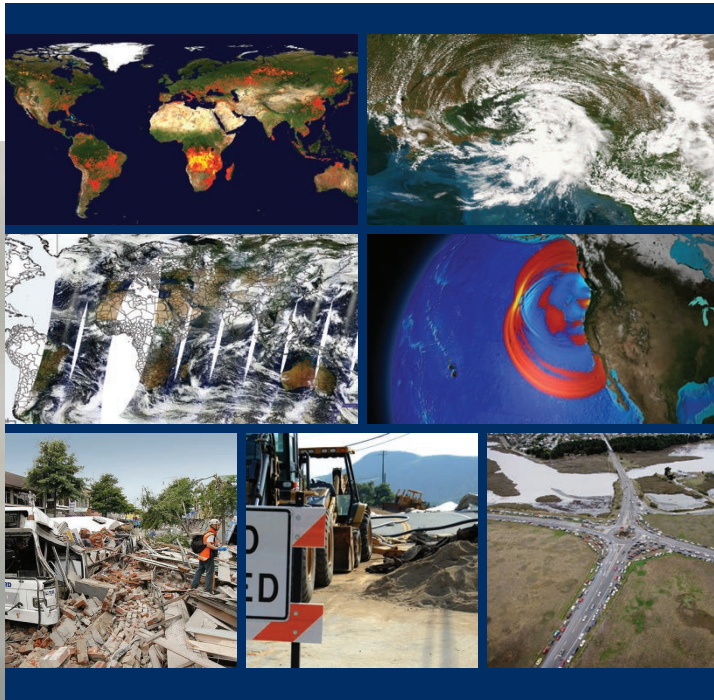


August 13-15, 2012

ICEM 2012

2nd International Conference on
Evacuation Modeling and Management



**Northwestern University
Transportation Center**

CCITT Center for the Commercialization of
Innovative Transportation Technology

Northwestern University
NORRIS UNIVERSITY CENTER

Credits

ICEM INTERNATIONAL STEERING COMMITTEE

Serge Hoogendoorn, T.U. Delft
Hani S, Mahmassani, Northwestern University
Michael A.P. Taylor, University of South Australia

ICEM 2012 CONFERENCE CHAIR

Hani S. Mahmassani, Northwestern University

ICEM 2012 LOCAL ORGANIZING COMMITTEE

Breton Johnson, coordinator
Rebecca Weaver-Gill, co-coordinator
Hillary Bean, treasurer
Betsy Lee, conference secretary
Diana Marek
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To the ICEM 2012 Participants:



The First International Conference on Evacuation Modeling and Management (ICEM) was convened and hosted by T.U. Delft in Scheveningen in September 2009. It brought together a growing community of researchers and professionals from various disciplines, who continue to grapple with the vexing complexities of planning for and implementing successful evacuations under challenging conditions, while relying on methodologies developed for everyday, business-as-usual conditions.

While evacuation models and management strategies have been featured at various conferences since the early 1980's, those venues almost never cover in any depth the breadth of technical issues and methodological questions that arise in the context of evacuations. The focus is typically on traffic flow questions at traffic flow conferences, pedestrian models at pedestrian conferences, behavioral considerations in evacuation at behavior conferences, network algorithms at optimization conferences, or management strategies at gatherings of agency professionals. Yet successful evacuation modeling, and design of effective strategies require consideration of all these aspects, in an integrated manner, not the result of a mix-and-match exercise.

The ICEM conference series was launched in response to this fragmentation, to meet the need and desire of researchers working on evacuation questions to get together and discuss in the same venue issues that lie at the core of evacuation models, and share developments, successes, and in some cases disappointments related to evacuation models and their application to the design and analysis of evacuation strategies. A large body of technical work has accumulated on evacuation-related topics over the past three decades, yet the collective knowledge that could emerge from this accumulation still seems to be lacking. Hence lies the motivation for ICEM, as a unique venue focused on the methodological cross-disciplinary challenges of developing and applying models of evacuation processes and decision-oriented analytics.

Different disasters give rise to specific requirements; different warning periods, different degrees of infrastructure degradation, different spatial and temporal characteristics—all call for different evacuation activities. Earthquakes are different from floods, which are in turn different from a nuclear leak at a power plant. Yet in all cases the similarities across these motivating events are much greater than the similarities of any of them with everyday conditions. Nonetheless, understanding common themes and elements is just as important to understanding the differences.

An area where differences had appeared more substantial than similarities is between pedestrians and vehicles, and between horizontal and vertical facilities. ICEM is unique in embracing pedestrians evacuating buildings and plazas along with vehicles running on contraflow lanes on multilane freeways. ICEM recognizes that in all these cases it is essentially people who need to be evacuated. In some instances evacuating persons are embedded in a crowd of other people, impeding attempts to reach a safe haven; in others these people are moving in vehicles, on a highway network. In all cases, user behavior plays a central role, and the methods to measure and model behavior become relevant to all evacuation types or causes.

This Second ICEM is intended to build on the successes of the first one, and continue the momentum generated at that first conference. The inter-disciplinarity, the balanced approach to pedestrian-related vs. highway traffic questions, the focus on behavior and its measurement are all part of what ICEM is about. Collegiality, pleasant surroundings and interactivity are also part of what makes ICEM what it is. We have strived to provide these elements at ICEM 12; the extent to which we succeed will be determined by the participants themselves. On behalf of the Northwestern University Transportation Center, I am very pleased to welcome all of you to ICEM12. We have an excellent technical program, and several social events intended to foster meaningful and enjoyable interaction among the participants. We hope you will come away with a renewed sense of interest and excitement, as well as plenty of new ideas for addressing some of the numerous technical, behavioral and methodological challenges of evacuation studies.

Sincerely,

Hani S. Mahmassani
ICEM 2012 Conference Chair

Schedule Overview

TIMES	ACTIVITIES	LOCATIONS
Sunday, 12 August 2012		
6:00-9:00 PM	Welcome Reception BBQ Dinner	Norris University Center (East Lawn)
Monday, 13 August		
<i>Norris University Center</i>		
8:30-9:15 AM	Registration	Louis Room North
9:15-9:50 AM	Welcome	Louis Room South
10:00-10:30 AM	Coffee Break	Louis Room North
10:30-11:30 AM	Keynote: Serge Hoogendoorn, Technical University of Delft	Louis Room South
11:30-1:00 PM	Lunch	Louis Room North
1:00-2:30 PM	Measuring and Modeling Evacuation Behavior	Louis Room South
2:30-3:00 PM	Coffee Break	Louis Room North
3:00-4:30 PM	Evacuation Planning 1	Louis Room South
3:00-4:30 PM	Pedestrian and Crowd Evacuation Models 1	Northwestern Room
4:30-5:45 PM	Evacuation Management Systems	Louis Room South
4:30-5:45 PM	Building Evacuation	Northwestern Room
5:45 PM	Adjourn	(return to hotel)
6:15-7:15 PM	Reception at Orrington Hotel	9th Floor, Hinman Foyer
7:15 PM	Dinner (free time – make your own arrangements)	
Tuesday, 14 August		
8:30-9:00 AM	Registration	Louis Room North
9:00-10:30 AM	Weather-related Evacuation Planning	Louis Room South
9:00-10:30 AM	Pedestrian and Crowd Evacuation Models 2	Northwestern Room
10:30-11:00 AM	Coffee Break	Louis Room North
11:00-12:30 PM	Evacuation Planning 2	Louis Room South
11:00-12:30 PM	Traffic Operational Interventions	Northwestern Room
12:30-1:30 PM	Boxed Lunch	Louis Room North
1:30-3:00 PM	Evacuation Management Strategies 1	Louis Room South
3:00 PM	Adjourn	
4:00 PM	Bus Pickup at Orrington Hotel	
6:00 PM	Boarding: Blues Cruise (Odyssey cruise ship)	Navy Pier
7:00-10:00 PM	Blues Cruise and Banquet	Offshore
10:15 PM	Boarding: Buses Returning to the Orrington Hotel	Navy Pier
Wednesday, 15 August		
8:30-9:00 AM	Registration	Louis Room North
9:00-10:00 AM	Keynote: Karen Smilowitz, Northwestern University	Louis Room South
10:00-10:30 AM	Coffee Break	Louis Room North
10:30-12:00 PM	Evacuation Management Strategies 2	Louis Room South
10:30-12:00 PM	Pedestrian and Crowd Evacuation Models 3	Northwestern Room
12:00-12:30 PM	Closing Session	

Sessions and Presentations

Monday, 13 August

10:30-11:30 AM **Keynote** Louis Room South

Serge Hoogendoorn, Technical University of Delft
Innovations in Data Collection for Traffic and Travel Behavior in Emergency Conditions

11:30-1:00 PM **Lunch** Louis Room North

1:00-2:30 PM ***Measuring and Modeling Evacuation Behavior*** Louis Room South

Session Chair: Samer Hamdar

Modeling the Evacuation Decision

Brachman, M., Bassett, D., Petrovic, N. (Santa Barbara, CA, USA)

A Panel Regression Model to Understand the Changes in Evacuate-Stay Decision between Hurricanes Ivan and Katrina

Yin, W., Murray-Tuite, P. (Blacksburg, VA, USA),

Ukkusuri, S. (West Lafayette, IN, USA)

Estimation of Dynamic Hurricane Evacuation Demand Using a Time-dependent, Audio-Visual, Stated Choice Method of Data Collection
 Gudishala, R., Wilmot, C. (Baton Rouge, Louisiana, USA)

Bayesian Network Modeling of Adaptation Effects in Driving Behavior under Emergency Situations

Hoogendoorn, R., Hoogendoorn, S., Brookhuis, K., Daamen, W. (Delft, The Netherlands)

3:00-4:30 PM ***Evacuation Planning 1*** Louis Room South

Session Chair: Chester Wilmot

The DYNEV II System for Evacuation Planning

Weinisch, K., Lieberman, E., Wuping, X. (Hauppauge, NY, USA)

Spatial Distribution and Visualization of Daily Population within an Activity-based Modeling Framework For Emergency Evacuation Plans

Sun, W., Chung, G., Janowicz, E. (San Diego, CA, USA)

Forecasting Shelter Accessibility and Vehicle Availability for Hurricane Evacuation in Northern New Jersey: A Step-by-Step Methodology Using Sample Enumeration

Deka, D., Carnegie, J. (New Brunswick, NJ, USA)

An Earthquake Evacuation Simulation Model for Santa Clara County

Brown, C. (Hartford, CT, USA), Wallace, M. (Walnut Creek, CA, USA), and Bradley, M. (Santa Barbara, CA, USA)

Pedestrian and Crowd Evacuation Models 1 Northwestern Room

Session Chair: Breton Johnson

Slower Is Faster: The Influence of Departure Time Distribution on the Overall Evacuation Performance

Lämmel, G. (Berlin, Germany), Klüpfel, H. (Cologne, Germany)

Modeling Decision and Game Theory-based Pedestrian Velocity Vector Decisions in Emergency Evacuations

Mesmer, B., Bloebaum, C. (Buffalo, NY, USA)

Role of Panic on Initiating a Potential Crowd Disaster

Ma, T., Wang, Q., Larrañaga, M.D. (Oklahoma City, OK, USA)

Sessions and Presentations

Monday, 13 August (continued)

4:30-5:45 PM **Evacuation Management Systems** *Louis Room South*

Session Chair: Ta-Yin Hu

*An Integrated Inventory Management Framework for
Emergency Operations*

Ozguven, E., Ozbay, K. (Piscataway, NJ, USA)

*Downtown Vancouver Transportation and
Emergency Management System*

Giese, K., Joshi, C. (Portland, OR, USA)

A Coordinated Control System for Emergency Evacuation

Hamdar, S. (Washington, DC, USA), Khan, M.Z. (Peshawar, Pakistan),
Zhang, K. (Argonne, IL, USA)

Building Evacuation

Northwestern Room

Session Chair: Kuilin Zhang

*Vacate-GT: An Emergency Evacuation Simulator Incorporating a
Decision and Game Theory Based Exit Decision Model*

Mesmer, B., Bloebaum, C. (Buffalo, NY, USA)

*Toward a Generic Data Model for Multi-agent Evacuation Simulation
in Disaster Management Context*

Bakillah, M. (Heidelberg, Germany), Klüpfel, H. (Cologne, Germany),

Lämmel, G. (Berlin, Germany), Zipf, A. (Heidelberg, Germany)

Seismic Evacuation Model Accounting for Human-structure Interaction

Liu, Z., Jacques, C., Jalalpour, M., Szyniszewski, S., Adelburg, J.,
Guest, J.K., Igusa, T., Schafer, B.W., Mitrani-Reiser, J. (Baltimore, MD, USA)

6:15-7:15 PM Reception at Orrington Hotel *9th Floor, Hinman Foyer*

Tuesday, 14 August

9:00-10:30 AM **Weather-Related Evacuation Planning** *Louis Room South*

Session Chair: Pamela Murray-Tuite

*A Dynamic Evacuation Trip Distribution Model for
Emergency Planning under Typhoons*

Hu, T.Y., Ho, W. M. (Tainan City, Taiwan)

Rain-Flood Emergency Planning

Santos, B. F., Leandro, J. (Coimbra, Portugal), Melo, N. (Guarda, Portugal),
Antunes, A.P. (Coimbra, Portugal)

Estimating Preparation Time and Risk Attitude of Hurricane Evacuees

Dixit, V., Wilmot, C., Wolshon, B. (Baton Rouge, LA, USA)

*Fuzzy Logic-Based Decision Support for Mass Evacuation of
Coastal Cities Prone to Submersion in the Context of Climate Change*

Jia, X., Morel, G., Hissel, F. (Compiègne, France)

Tuesday, 14 August (continued)**9:00-10:30 AM** ***Pedestrian and Crowd Evacuation Models 2*** *Northwestern Room*

Session Chair: Hubert Ley

Simulation of Evacuation Planning Regarding the Influence of Noxious Substances

Mayer, H., Hartmann, D. (Munich, Germany), Zechlin, O. (Zug, Switzerland)

A Mixed-flow Optimization Model for Emergency Evacuation in Urban Networks

Zhang, X. (College Park, MD, USA)

Quantitative Verification of Crowd Models

Seyfried, A. (Jülich, Germany)

11:00-12:30 PM ***Evacuation Planning 2*** *Louis Room South*

Session Chair: Yu (Marco) Nie

A Framework for Large-scale Multi-modal Microscopic Evacuation Simulations

Dobler, C. (Zürich, Switzerland), Lämmel, G. (Berlin, Germany)

The MACsim Macroscopic Traffic Simulation Model for Evacuation Planning

Lieberman, E., Xin, W. (Hauppauge, NY, USA)

Application of a Transims-based Evacuation Planning Tool to the Chicago Metropolitan Area

Auld, J., Hope, M., Ley, H., Kang, X., Sokolov, V., Zhang, K., (Argonne, IL, USA)

A Two-level Transit-based Evacuation Model for Planning of Emergency in Highly Populated Urban Zones

Liu, Y., Heydar, M., Petering, M. (Milwaukee, WI, USA)

Traffic Operational Interventions to Improve Evacuation Flow *Northwestern Room*

Session Chair: Kaan Ozbay

Modeling Ramp Closure as a Strategy to Reduce Evacuee Travel Time

Machiani, S. G., Murray-Tuite, P., Jahangiri, A., Yin, W., Liu, S. (Falls Church, VA, USA), Park, B. (Charlottesville, VA, USA), Chiu, Y.C. (Tucson, AZ, USA)

Optimal Decision-making between Signalized and Uninterrupted Flow Strategies during Emergency Evacuation

Luo, Z., Liu, Y. (Milwaukee, WI, USA)

Assessment of Roundabouts during Evacuation—An Experimental Study

Eshragh, S. (Newark, DE, USA), Mensah, S. (Baton Rouge, LA, USA), Faghri, A. (Newark, DE, USA)

12:30-1:30 PM **Lunch***Louis Room North*

Sessions and Presentations

Tuesday, 14 August (continued)

1:30-3:00 PM **Evacuation Management Strategies 1** *Louis Room South*

Session Chair: Srinivas Peeta

Service Level-oriented Route Guidance During Evacuations

Landman, R., Hegyi, A., Hoogendoorn, S. (Delft, The Netherlands)

Pseudo-dynamic Assignment for Evacuation Modeling Procedure

Ozbay, K., Li, J. (Piscataway, NJ, USA), Yazici, A. (New York, NY, USA),

Shrisan, I., Ozguven, E. (Piscataway, NJ, USA), Carnegie, J.A.

(New Brunswick, NJ, USA), Bartin, B. (Piscataway, NJ, USA)

Risk-Based Spatial Zoning Problem for Evacuation Operations

Hsu, Y.T., Peeta, S. (West Lafayette, IN, USA)

Designing Optimal Network Evacuation Strategies: Robust Algorithms

Using Perturbation Analysis

Babai, H., Mahmassani, H. (Evanston, IL, USA)

Wednesday, 15 August

9:00-10:00 AM **Keynote** *Louis Room South*

Karen Smilowitz, Northwestern University

Humanitarian Logistics: Optimization for Disaster Relief Operations

10:30-12:00 PM **Evacuation Management Strategies 2** *Louis Room South*

Session Chair: Irina Dolinskaya

Demand-oriented Traffic Management for Disasters and Incidents

Flötteröd, Y.P., Bieker, L. (Cologne, Germany)

Evacuation of a 22-Story Building in Simulation and Reality

Groß, M., Kappmeier, J-P.W. (Berlin, Germany)

Optimal Safe Routing of Traffic in Evacuation of a Network with

Multiple Threat Zones and Various Threat Levels

Nassir, N., Zheng, H., Hickman, M. (Tuscon, AZ, USA)

Pedestrian and Crowd Evacuation Models 3 *Northwestern Room*

Session Chair: Serge Hoogendoorn

Evacuation Strategies for Large Crowds: Modeling and Application

Abdelghany, A. (Daytona Beach, FL, USA), Al-Halabi, W. (Makkah,

Saudi Arabia), Abdelghany, K. (Dallas, TX, USA),

Mahmassani, H. (Evanston, IL, USA)

Analysis of Spatial Factors that Influence Evacuation Efficiency

under Normal Situations

Liu, Y., Liu, D., (Harbin, China), Malkawi, A., Badler, N. (Philadelphia, PA, USA)

A Comparison of Discrete and Continuous Evacuation

Simulation Models for Rail Tunnel Evacuation Cases

Liu, S.B., Lo, S.M. (Hong Kong, China)

Keynote Speakers



Serge Hoogendoorn is Chair of the Traffic Management, Transport & Planning of the Delft University of Technology and professor of Traffic Flow Theory and Simulation, staff member of the TRAIL Research School on Transport and Logistics, freelance consultant for different Dutch firms and agencies, chair of the Network Management foundation and staff member of the Expert Centre for Traffic Management, author of over 100 journal publications, 50 book chapters and 150 conference papers. Professor Hoogendoorn is setting the pace for young, talented, successful researchers.

His research involves theory, modelling, and simulation of traffic and transportation networks, focusing on innovative approaches to collect detailed, microscopic traffic data and the use of these data to underpin the models and theories. This is achieved through an outstanding list of research grants, developed software and Ph.D. researches, e.g. the NWO-VIDI project 'Tracing Congestion Dynamics – With Innovative Traffic Data to a Better Theory', microscopic traffic data using advanced video techniques for a new generic theory of driving behavior; the Full Traffic project, where twenty instrumented vehicles were used to investigate driving behavior with advanced driver support systems, the NOMAD pedestrian simulation model applied in several projects to solve design problems. The NWO-AMICI 'Advanced Multi-agent Information and Control of multi class Integrated traffic networks' aimed at developing new models and control strategies for regional traffic networks, the Travel Simulator Laboratory (TSL), an interactive laboratory to study travel behavior dynamics, etc. He recently acquired an NWO-VICI grant for a large research program (budget 1,4 million Euro) focussing on transport and traffic management in case of exceptional events.



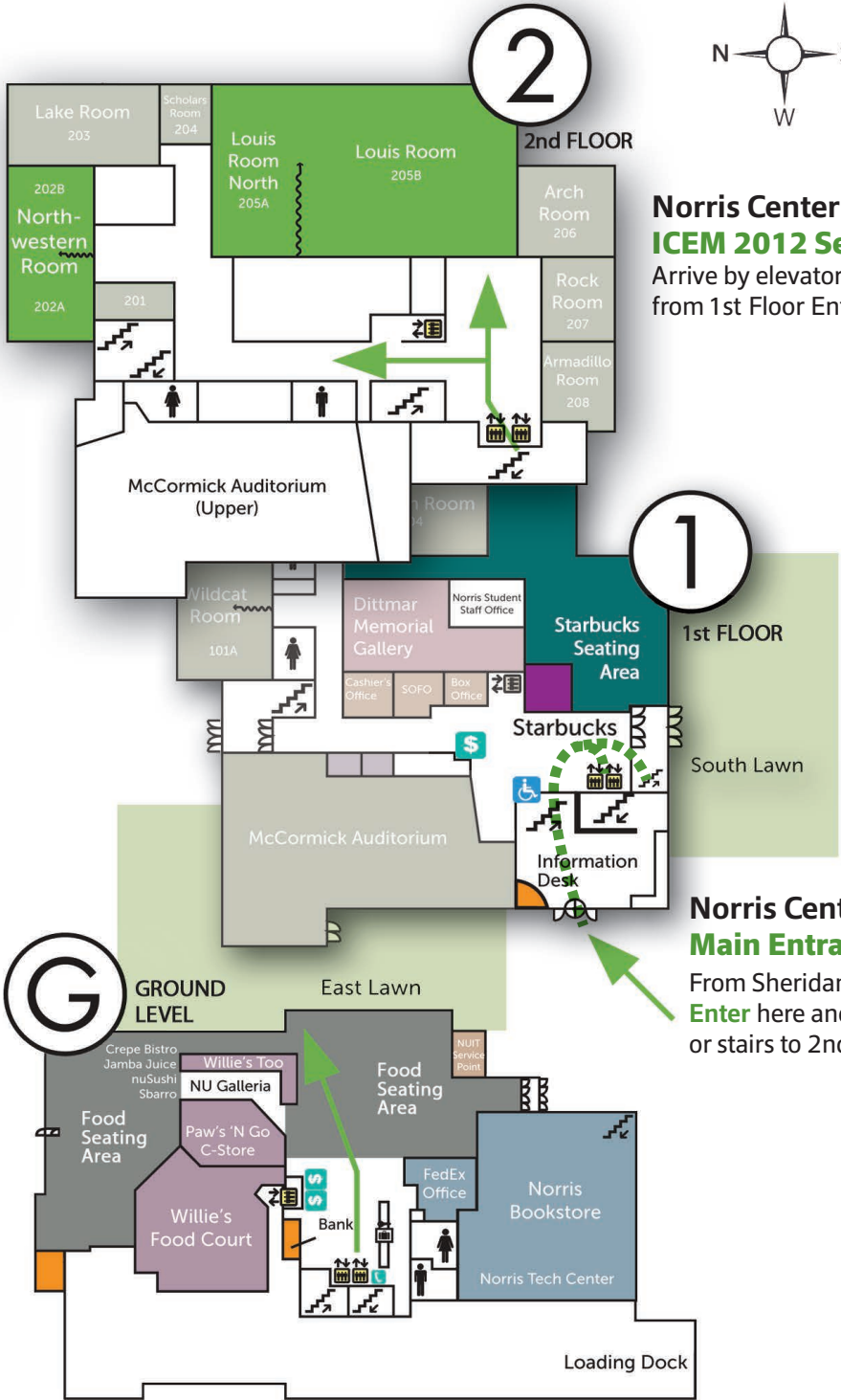
photo: Andrew Campbell

Karen Smilowitz is Associate Professor in the Department of Industrial Engineering and Management Sciences at Northwestern University and holds a joint appointment with the Northwestern Transportation Center. Dr. Smilowitz holds the Junior William A. Patterson Chair in Transportation.

She received her Ph.D. in Civil and Environmental Engineering from the University of California, Berkeley and her BSE in Civil Engineering and Operations Research from Princeton University.

Dr. Smilowitz received a CAREER award from the National Science Foundation and a Sloan Industry Studies Fellowship. Her work has also been recognized by the National Academy of Engineering: in 2004, she was an invited participant in their Frontiers of Engineering Workshop and in 2008, she participated in NAE's Engineering, Social Justice, and Sustainable Community Development Conference. Dr. Smilowitz studies modeling and solution approaches for logistics and transportation systems. She has developed innovative modeling and solution techniques for these complex transportation systems in both commercial and non-profit applications, working with transportation providers, logistics specialists and a range of non-profit organizations. She is currently leading the Northwestern Initiative on Humanitarian Logistics with fellow IEMS faculty member Irina Dolinskaya.

Norris Center Building



Norris Center 2nd Floor
ICEM 2012 Sessions Here
 Arrive by elevator or stairs from 1st Floor Entrance

Norris Center 1st Floor
Main Entrance
 From Sheridan Avenue
 Enter here and take elevator or stairs to 2nd Floor

Norris Center Lower (Ground) Level
 Take elevator or stairs to Ground Level to use seating areas, ATM, FedEx, or to exit onto East Lawn



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