NISS
Parameters

NISS Tackles Traffic Travel Time Predictions

It's a problem throughout the nation that causes headaches every day and costs money for businesses that rely on just-in-time deliveries – traffic congestion. A group of research institutions,

Traffic in busy places like LA can be a headache to many drivers. (Photo from iStockphotos)

including NISS, are looking at the various data sources that traffic engineers use to make traffic travel time predictions and are developing recommendations to improve the traffic prediction models.

Commerce is very reliant on being able to transport products from one place to another and traffic congestion costs millions of

dollars each year due to lost time in delivery of these products. In fact, congestion in the highways has a large influence on the efficiency of international trade, according the U.S. Department of Transportation (DOT). Having a better handle on traffic congestion can also make our highways safer, and reducing congestion saves fuel and decreases vehicle emissions. Studying the longer term effects of travel time also helps policy makers with decisions on planning for more roads, widening corridors and providing alternative methods of commuting, such as mass transit.

The cost of congestion is also staggering. According to the Texas Transportation Institute, the costs of congestion were estimated at $63.1 billion in 2000 and $16.7 billion in 1982.

Leading the research is the Institute for Transportation Research and Education (ITRE)

at NC State University. The other research institutions working on the project are: NISS, Kittelson & Associates, Inc. (KAI), the University of Utah, Berkeley Transportation Systems (BTS), Northwestern University, Old Dominion University (ODU), and Rensselaer Polytechnic Institute (RPI). The research group will be looking at three areas throughout the country, most likely focusing on locations in California, New York and North Carolina.

The research collaboration will span a three year period. The Transportation Research Board that is funding the project is part of the National Research Council.

Causes of Congestion

There are seven main sources of traffic congestion, according to the U.S. DOT's Office of Operations. These include traffic incidents, such as crashes, breakdowns and debris in the road; work zones, weather conditions, fluctuations in normal traffic, special events, traffic control devices that are not working correctly, and physical bottlenecks.

A Note from the Director

The big news here, of course, is the recent debut of our new web site, from which some of you may even have downloaded this issue of *NISS Parameters*. Only the URL—www.niss.org—is unchanged. The new home page is pictured below.

Our new website is easy to navigate, and features news and updates about NISS and the people who are part of the NISS family, a calendar of events with online registration and credit card payment, profiles of affiliates and postdoctoral fellows, and more, including photos of such event as our Independence Day cookout. Importantly, the web site responds to community requests by providing clear paths for statistical scientists and others to become engaged in the programs and activities of NISS.

Design Hammer, Inc., a web design firm based in Durham, NC, created the new site, which is based on an open-source content management database system that makes it easy to add new content, as well as new features needed in the future. Three members of the superb NISS staff—communications director Jamie Nunnelly, webmaster Katherine Kantner and computer systems manager James Thomas—played the major roles in bringing the project to a successful conclusion.
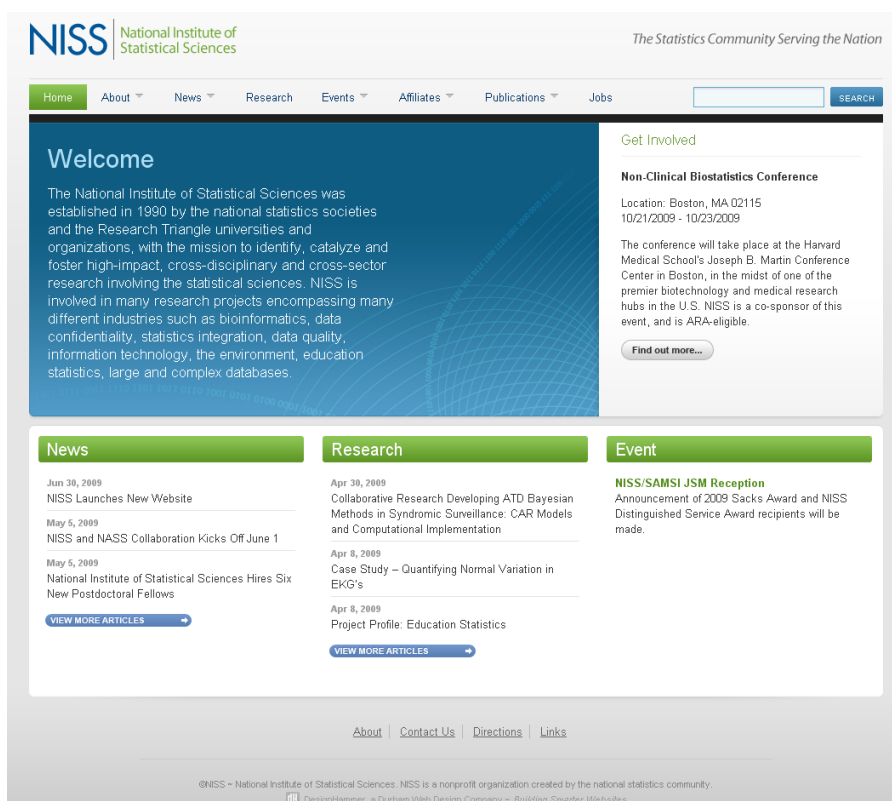
One of the most important features of the new site is the capability for web streaming of

Postdoctoral fellows Sourish Das of SAMSI and Xingdong Feng of NISS get to know each other at the Independence Day cookout. Photos such as these can be found on the new website.

events such as workshops held in the lecture room in the building addition. The streaming system can mix live video, data and even DVDs. I confess to mixed feeling about this. I believe that many of the most important things that happen at workshops take place "off-line," in coffee breaks, meals and small group discussions. Nevertheless, I realize that the time and expense of attending workshops here are an impediment to some people, so we look forward to serving more people without diluting the value of in-person attendance.

Alan Karr
Director

Photos From:
NISS-NASS Cooperative Research Conference

The NISS-NASS Cooperative Research Conference to kick off the NISS-NASS Cross-Sector Research Program took place on June 1-2 at NISS in Research Triangle Park.

Team two is looking at the design and estimation methodologies for estimating the number of small farms from NASS sampling frames.

On the second day of the conference, three research teams formed. This team is focusing on multivariate imputation of agricultural resource management survey data.

Scott Holan (left) from U. of Missouri, Criselda Toto (center), a graduate student from Worcester Polytechnic Institute, and Jianqiang Wang, (right) NISS postdoctoral fellow, are part of the team looking at statistical multi-source predictive models and error estimation in support of crop production forecasts and estimates.

Postdoc Profile:

Saki Kinney

Satkartar (Saki) Kinney grew up in Los Angeles, California. She graduated from the University of California, Berkeley in 1997 with a B.A. in Mathematics. She then worked at Lawrence Berkeley National Laboratory in the Environmental Energy Technologies Division for six years, during which time she attended California State University, East Bay and received her M.S. degree in Statistics in 2002. She moved to the East Coast in 2003 and received her Ph.D. from Duke University in Statistical Science in 2007.

Kinney's research at Duke University involved statistical disclosure limitation, with emphasis on synthetic data methods. She was responsible for generating synthetic data for the U.S. Census Bureau's Synthetic Longitudinal Database and developed analytical methodologies for certain multiple imputation applications. In 2004-2005, she was a SAMSI graduate fellow, working in the Model Uncertainty group of the program on Latent Variable Models in the Social Sciences.

Since coming to NISS, Kinney has worked on data confidentiality projects funded by the National Center for Education Statistics (NCES), The National Center for Health Statistics (NCHS) and the National Science Foundation (NSF), as well as additional "official

Satkartar (Saki) Kinney is enjoying her second year at NISS.

statistics" problems ranging from configuration and data integration for longitudinal education studies to nonresponse bias.

In particular, Kinney has designed and executed extremely insightful experiments that assess the "real-world" effectiveness of proposed methodologies. For instance, she conducted a detailed assessment of the value of continuing students participating in one educational study (grades K-8) to a subsequent study (of grades 9-12). Such continuation is extremely costly, but is the only way of producing full K-12 records. Kinney's experiments showed that very modest (1% of students in the initial study) levels of continuation yield valuable information. Interestingly,

however, using readily available "past information" about students in the 9-12 study and statistical imputation, important relationships that cross between studies can be elucidated even when there is no continuation group!

Last year, she attended four international conferences in Italy, Australia, Turkey and England. This year, she will be attending the JSM and making a presentation on "*The Synthetic Public-Use Release of the Longitudinal Business Database*," on August 6.

When she is not at work, she is spending time with her daughter, Cassandra, and her husband, Kris.

Affiliate Profile:

University of Florida

The Department of Statistics at the University of Florida in Gainesville, Florida has a dynamic faculty researching a variety of topics. This year, the department was ranked the **9th best in the U.S. News & World Report**.

The department was founded in 1963 by Dr. William Mendenhall and was housed in the College of Agriculture. Over time, the department grew and diversified. It became a part of the College of Arts and Sciences, but kept its relationship with the College of Agriculture, so the department is

Department of Statistics at the University of Florida in Gainesville, FL.
actually housed in two colleges.

There are approximately fifty undergraduate and fifty graduate majors in the department and twenty faculty members. The interests of the faculty range from the theoretical to applied research. Department faculty work on many different areas of research

including methodology for categorical data, Bayesian theory and methodology, biostatistics, nonparametrics, analysis of genetic and genomic data, and probability theory.

"Being located in Florida gives our department a unique opportunity to work on very special projects, such as red tide, manatees and sea turtles and environmental health tracking," notes Dr. Linda Young, associate chair of the Institute of Food and Agricultural Sciences Department of Statistics and NISS Board of Trustees member.

This year, some people from the department were able to attend the NISS Explorations Workshops. They participated in the workshop on data explorations, the OCC-NISS workshop on financial risk modeling and the NISS-NASS cooperative research conference. "These workshops provided new opportunities to interact with people in industry and government that we may not have had otherwise," remarks Young.

University of Florida graduate student Kenny Lopiano is spending the summer at NISS as part of the NISS-NASS (National Agricultural Statistical Service) Cross-Sector Research program. He comments about his experience at UF, "You do a really rigorous review of all the material. The students have a deeper understanding of all of the material that is covered. You spend a lot of time working through the details. We also have great interaction with other departments in the university, which gives us a lot of opportunities to work on applied projects. We also are lucky to have some of the best professors in the world, who are the ones who have written books on the subjects we are learning."

Young and Lopiano are helping NASS on the design and estimations methodologies for estimating the number of small farms from NASS sampling frames. Both will reconvene with the larger group working on this project next summer.

Travel Time (Continued)

Transportation engineers consider capacity as the ability to move vehicles past a point over a given span of time. When capacity is exceeded, congestion occurs: traffic flow breaks down and vehicles slow down and crowd together.

Travel time reliability deals with the variability and seeming unpredictability of travel times, for example, from hour to hour or day to day. The research team is concerned first with constructing estimates of travel times using multiple sources of data, such as in-road induction loop detectors, video cameras and specially equipped "probe vehicles." The second concern is how best to convey this information to very diverse users of the road network.

Alan Karr, director of NISS, explains, "The overall objective is to enable the people who run traffic management systems (mainly state and metropolitan DOT's) to understand travel times better and to provide better, and more reliable information to users."

Traffic time reliability can be better predicted.
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Calendar of Events

JSM Affiliates Meeting
Devoted to affiliates clusters
Saturday, August 1, 2009, 3-6 PM
Renaissance Hotel, Renaissance Ballroom West B

NISS/SAMSI JSM Reception
2009 Sacks Award and NISS Distinguished Service Award recipients
Monday, August 3, 2009, 5-7 PM,
Washington Convention Center, Room 201

Design and Analysis of Experiments Conference: DAE 2009
October 14-17, 2009
University of Missouri, Columbia, MO
dae.stat.missouri.edu
This event is ARA-eligible

Exploration Workshop II on Financial Risk Modeling
October 21-22, 2009
Washington DC
This event is ARA-eligible

2009 Non-Clinical Biostatistics Conference
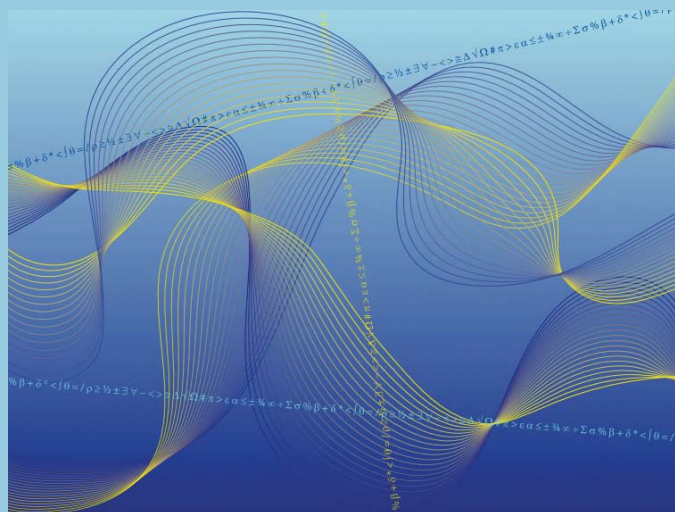October 21-23, 2009
Boston, MA
www.hsph.harvard.edu/ncb/index.html
This event is ARA-eligible

Affiliates Workshop on Computational Advertising
November 4-5, 2009
NISS Headquarters in RTP, NC

NISS Activities at JSM 2009 Washington, DC

NISS-SAMSI Affiliates Meeting
Saturday, August 1, 3-6 p.m.

Session 68
Sunday, August 2, 4 p.m.
Nonparametric Methods Based on the Bootstrap
Presentation by Xingdong Feng, NISS Postdoc

Session 100
Monday, August 3, 8:30 a.m.
Bayesian Inference/Modeling for Non-Gaussian Data
Presentation by Xia Wang, NISS Postdoc

NISS-SAMSI JSM Reception
Monday, August 3, 5-7 p.m.
Presentation of Sacks Award and Distinguished Service Awards

Session 299
Tuesday, August 4, 10:30 a.m.
Making Research Data Public: Intelligible or Just Available?
A result of the Explorations Workshop held February 2008

Session 280
Tuesday, August 4, 8:30 a.m.
Statistical Issues Related to Safety Data
Presentation by Yingchun Zhou, NISS Postdoc

Session 325
Tuesday, August 4, 10:30 a.m.
Issues in Subgrouping Analysis and Preclinical and Phase I Trials
Presentation by Jessie Xia, NISS Postdoc

Session 392
Wednesday, August 5, 8:30 a.m.
The Role of Statistics in the Nation's Financial Recovery and Stability
A result of the NISS Explorations Workshop held February 2009

Session 464
Wednesday, August 5, 10:30 a.m.
Industry-Sponsored Science: Are Consultants Really Biased?
Panelist: S. Stanley Young, Assistant Director, NISS

Session 588
Thursday, August 6, 10:30 a.m.
Data User Experience: Working with Data Protected by Synthetic Methods
Presentation by Satkartar Kinney, NISS Postdoc

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NISS/SAMSI Affiliates

Industry

AT&T Labs-Research, Florham Park, NJ
Avaya Labs, Basking Ridge, NJ
Bayer HealthCare Pharmaceuticals, West Haven, CT
Bell Labs - Lucent Technologies, Murray Hill, NJ
GlaxoSmithKline, Research Triangle Park, NC and Collegeville, PA
Merck Research Laboratories, West Point, PA
MetaMetrics, Inc., Durham, NC
PNYLAB, LLC, Princeton, NJ
RTI International, Research Triangle Park, NC
Sanofi-Aventis Pharmaceuticals, Bridgewater, NJ
SAS Institute, Cary, NC
SPSS, Chicago, IL
Wyeth, Collegeville, PA
Xerox Innovation Group, Webster, NY
Yahoo! Research Laboratory, Silicon Valley, CA

Government Agencies & National Laboratories

Bureau of Labor Statistics, Washington, DC
US Census Bureau, Washington, DC
Energy Information Administration, Washington, DC
National Agricultural Statistics Service, Fairfax, VA
National Center for Education Statistics, Washington, DC
National Center for Health Statistics, Hyattsville, MD
National Security Agency, Ft. George W. Meade, MD
Office of the Comptroller of the Currency (Treasury Department), Washington, DC

University

University of California - Berkeley, Department of Statistics
Carnegie Mellon University, Department of Statistics
Columbia University, Department of Biostatistics
University of Connecticut, Department of Statistics
Duke University, Departments of Statistical Science and Mathematics
Emory University, Department of Biostatistics
University of Florida, Department of Statistics
Florida State University, Department of Statistics
George Mason University, Department of Statistics
Georgetown University Medical Center, Department of Biostatistics, Bioinformatics, and Biomathematics
University of Georgia, Department of Statistics
University of Illinois Urbana-Champaign, Department of Statistics
Indiana University, Department of Statistics
University of Iowa, Department of Statistics
Iowa State University, Department of Statistics
Johns Hopkins University, Department of Applied Mathematics and Statistics
Medical University of South Carolina, Department of Biostatistics, Bioinformatics and Epidemiology
University of Michigan, Departments of Statistics and Biostatistics

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North Carolina State University, Department of Statistics
North Carolina State University, Department of Mathematics
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University of North Carolina at Chapel Hill, Department of Biostatistics
University of North Carolina at Chapel Hill, Department of Mathematics
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Pennsylvania State University, Department of Statistics
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Rice University, Department of Statistics
Rutgers University, Department of Statistics
University of South Carolina, Department of Statistics
Southern Methodist University, Department of Statistical Science
Stanford University, Department of Statistics
Texas A&M University, Department of Statistics
Virginia Commonwealth University, Departments of Biostatistics and Statistical Sciences