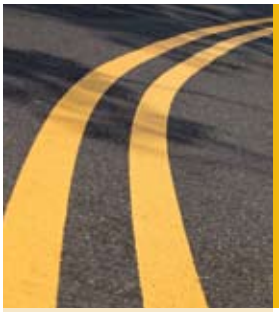


RUTGERS

CAIT Newsletter, Issue One ■ January 2008

Center for Advanced Infrastructure and Transportation

transportation today

INSIDE

A Powerful Plan4Safety: Crash Analysis

Everyone recognizes that vehicular crashes are devastating events. But tracking where—and ultimately figuring out why—crashes happen provides the specific insights we need to find a solution. Plan4Safety software, developed by the Transportation Safety Resource Center (TSRC) at CAIT, is a new and valuable tool that will help us understand and take measures to solve the problem of roadway crashes.

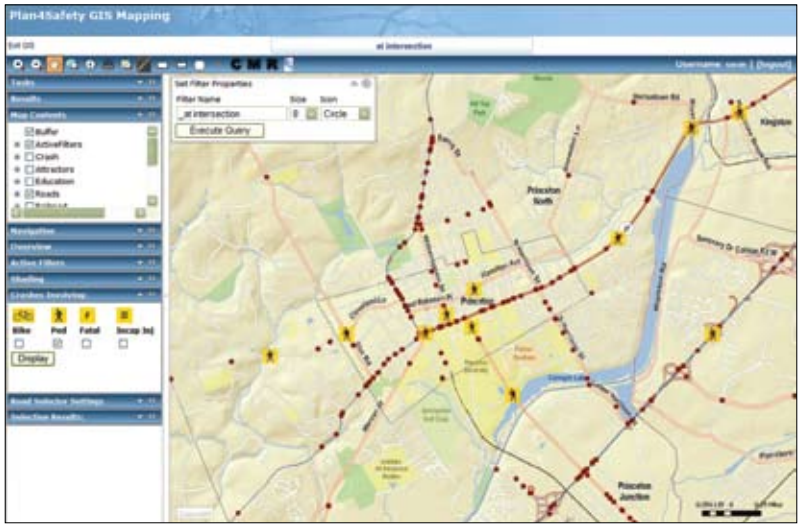
The new Plan4Safety web-based application is being launched in January 2008. It will let crash prevention specialists gather, organize, filter, and use crash data to improve road safety.

Developed under the direction of Patricia Ott, director of NJDOT's Office of Traffic Engineering and Safety, Plan4Safety is a data analysis tool for municipal and county engineers, planners, and decision makers. The program compiles and analyzes data gathered by police at crash scenes. It currently integrates New Jersey crash data from 2003 to 2006, a total of approximately 1.3 million records. If that sounds like a lot of information, consider that each of those 1.3 million records can contain up to 154 distinct pieces of data, including the type of crash, level of injury, type and number of vehicles involved, property damage sustained, driver data not linked with personal identity (e.g., age and gender), location, time of day, and so on. Plan4Safety software allows users to quickly search crash records and filter the data to compare information, giving them a snapshot of the "who, what, where, when, and how" of road crashes.

Other software has attempted this Herculean task, but Plan4Safety is the most up-to-date program that succeeds on multiple levels. The tool allows filtering of data using logic statements to produce results. For example, the query "driver age >15 *and* driver age < 21" will identify crashes in which driver age ranged from 16 to 20 years. The program also simultaneously performs statistical and geographic analyses. Through a user-friendly graphical presentation of this information, Plan4Safety then literally draws a detailed picture of what kind of crashes are happening and where. Clusters of incidents and patterns emerge that show problem areas, allowing local officials to see where to focus their enforcement, education, and other prevention efforts.

Plan4Safety previously existed as a stand-alone desktop application, which was useful but required that the end user have a powerful computer to process the vast amounts of data quickly. Since the new online version is hosted on centralized servers, massive volumes of information can be processed with little effect on the task speed. The new web-based application, accessible to authorized users from any internet-capable computer, eliminates the need for uncommon power, processing speed, and support applications, making the tool accessible to many more transportation professionals. Additionally, the program is secure, employing unique user names and passwords to protect the content. The distinct ID feature

continued on next page



Map Screen View: Plan4Safety software allows users to quickly search crash records and filter the data to compare information. Through a user-friendly graphical presentation of this information, Plan4Safety then literally draws a detailed picture of what kind of crashes are happening and where.

CAIT Commitment: Sharing Our Story

In this inaugural issue of the CAIT newsletter, we are pleased to share with you a small portion of our recent activities in education, research, and technology transfer.

CAIT has made great strides in becoming a national resource for advancing knowledge and practices in transportation infrastructure management, technology, and operations. As a leading research center in the New York/New Jersey metro area, our proximity to 11,000 miles of highway, extensive transit networks, three major airports, and the nation's third largest port and marine terminal system, positions us perfectly to carry out our innovative research and put it to the test. Combining our capabilities and resources with the opportunities all around us, we are tackling the complex infrastructure-related problems that exist in high-volume, intermodal corridor environments.

As we look ahead in 2008, we aim to continue and expand our partnerships and leverage resources with other University Transportation Centers, government agencies, professional associations, and industry leaders. We consider such collaborations an emerging norm and necessary to address the challenges ahead.

Our efforts to address today's infrastructure management issues—renewal, safety, security, congestion, environment, and problem solving in all realms—will certainly continue in line with the national, regional, and local priorities of our stakeholders. We will keep you posted on our progress!

Ali Maher, Ph.D., *Director*

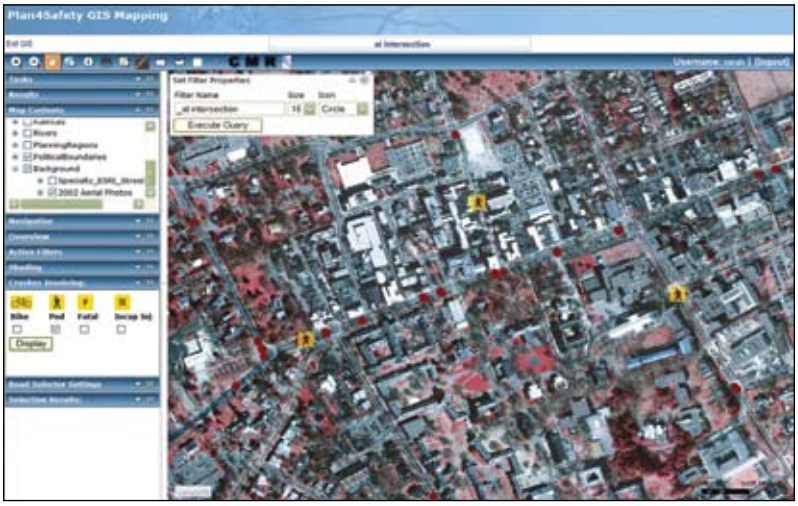
A Powerful Plan4Safety continued

also allows users to save filters and preferences.

For all Plan4Safety can do now, it is becoming even more robust as features are added. Under development now are network screening functions that create computer models by looking at incident patterns and their properties. The resulting models can help predict potential problem areas so that they can be addressed proactively. This feature will lay the foundation for the next phases of development: a diagnosis and countermeasurement tool that will propose safety solutions for high-incident areas; an economic analyses tool that will help decision makers better identify priorities and allocate their limited resources appropriately; and an evaluation tool that will assess the implemented safety treatments for future reference.

Another impressive aspect of the Plan4Safety initiative is work being done to make crash data more complete. Since not all crashes occur in locations that have geographical reference points (such as highway mileposts), about 35 percent of all crash reports—nearly half a million records—do not contain exact geographical locations. To pinpoint incidents with GPS coordinates, records have to be geocoded manually. TSRC has taken a lead in this arduous task, utilizing engineering students at Rutgers to do the legwork while giving them valuable hands-on experience. TSRC's goal is to cut the number of records that are missing GPS data in half by 2009. NJDOT is primarily responsible for data "scrubbing"—fixing incomplete, inconsistent, or incorrect report data—and has implemented programs to improve data collection from law enforcement. As accurate GPS tools become more readily available to police officers, the inclusion of exact geographical data in crash reports will improve. Clearly, the fewer holes there are in crash data, the more accurate and complete analyses can be, moving us in the right direction toward safer roads.

Like any powerful tool, knowing how to use it correctly is crucial to its effectiveness, so TSRC is offering free training to key New Jersey groups slated to test the beta version of the Plan4Safety online application. Following an appropriate testing phase, hopes are to distribute this tool to the wider transportation community in the near future.



Ortho Map Screen View: Plan4Safety users can also see data superimposed on a satellite map, which allows them to see the environment (e.g., whether the area is residential or business) and identify other specifics, such as buildings, around the crash site. Here we see incident locations (red dots) and which of those involved pedestrians (yellow squares).

notable news: honors ■ awards ■ new projects

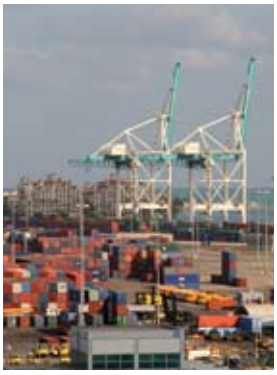
CAIT's NJ LTAP Cares about Work Zone Safety

Roadway work zone safety isn't something the general public thinks about on a daily basis. But it is for the hundreds of family members and friends of the men and women who build and maintain our roads. It also matters to Dr. Claudia Knezek, program director for the New Jersey Local Technical Assistance Program (NJ LTAP), which makes its home at CAIT.

The American Road and Transportation Builders Association's Transportation Development Foundation (ARTB-TDF) recognized Dr. Knezek and the New Jersey Work Zone Safety Partnership of which she is chair, in October 2007 for the group's contributions in making roadways safer for workers. In addition to NJ LTAP, the New Jersey Work Zone Safety Partnership includes members from the public and private sectors representing engineering, enforcement, and education groups.

ARTBA-TDF encourages initiatives and awards outstanding efforts to reduce roadway work zone construction accidents, injuries, and fatalities. The New Jersey Work Zone Safety Partnership won this year for its New Jersey Traffic Control Coordinators (TCC) program, which includes a full curriculum of safety, best practices, and operations training for various transportation personnel, such as contractors, union laborers, NJDOT, and local government agencies. The program trains more then 300 workers each year.

Since the inception of the TCC program in 1997, work zone fatalities in New Jersey have shown an overall downward trend. Even though New Jersey is the most densely populated and congested state, its work zone fatality rate now ranks among the lowest in the United States. The New Jersey Work Zone Safety Partnership will not rest until that fatality rate reaches zero.



NSF Grant for Maritime Studies

CAIT's Freight and Maritime Program (FMP) has received a grant through the National Science Foundation's International Research and Education in Engineering (IREE) program. According to principal investigator Dr. Maria Boilé, the grant will support research and education relating to global freight, maritime transportation, and port operations—all vital areas of our nation's economy.

Because of the global nature of maritime transportation, we must examine its complex issues from an international perspective. To help them do this, CAIT researchers will spend months collaborating with scientists and freight and logistics experts at the Institute of Transport and Maritime Management Antwerp in Belgium.

The project made possible by the NSF grant will examine the dynamic nature of freight operations among and between players in major trading regions and how the specifics of these relationships affect various aspects of maritime infrastructure: capacity, technology, economics, regulations, international policies, business decisions, and operations strategies.

Rutgers Scientists Share Nobel Honors

Eight Rutgers researchers—including Dr. Monica Mazurek, CAIT resident faculty member and assistant professor of civil and environmental engineering—are among the participants in the United Nations' Intergovernmental Panel on Climate Change (IPCC), which shares the 2007 Nobel Peace Prize with former Vice President Al Gore.

The IPCC is being recognized for its efforts to raise awareness and to lay the foundation for measures needed to counteract global warming. The panel has involved more than 2,000 scientists from 130 nations and was cited by the Nobel Prize committee for 20 years of scientific reports that have focused attention on the relationship between human activities and global warming. The Rutgers faculty members who contributed to the work of the IPCC are from several scientific disciplines, including environmental science, marine science, climatology, geography, and geology.

Dr. Mazurek's current research at CAIT is examining the chemical composition of vehicle emissions and their effects on air quality, health outcomes, and the environment. Dr. Mazurek is also conducting cooperative research on alternative biofuels with the University of São Paulo, the Rutgers School of Environmental and Biological Sciences, and the Rutgers Biotechnology Center for Agriculture and the Environment.

For a full listing of the Rutgers researchers on the IPCC and more information the panel's work, go to news.rutgers.edu and search "IPCC."

USDOT Research and Innovative Technology Administration Visits CAIT

October 24, 2007, visitors from the USDOT's Research and Innovative Technology Administration (RITA) spent a full day learning about the latest CAIT projects and programs.

RITA representatives Kelly Leone, Deputy Associate Administrator for Research, Development and Technology, and Amy Stearns and Lydia Mercado, both University Program Specialists, came from Washington, D.C., for the day's events. The purpose of the visit was to witness firsthand how CAIT is fulfilling its role as a USDOT Tier I University Transportation Center (UTC).

The site visit started with an overview of the center that included presentations by lead investigators from each of CAIT's major programs. Here are just a few examples of the exciting work presented to the RITA team:

- A method to assess the condition of infrastructure, like bridge decks and road beds, using 3-D ground-penetrating radar and seismic waves that can detect anomalies or flaws before they become major catastrophes.
- A group of projects being conducted by CAIT's pavement resource team. One such project looks at a new type of asphalt that can be mixed at lower temperatures than traditional hot mix asphalt. Among the advantages of warm mix asphalt are reduced emissions, lessening worker health risks and environmental impacts, and lower energy consumption in production and placement. Another project is working to develop asphalt for airfield runways that is fuel resistant and reduces surface slippage.
- A project on vessel traffic in the Delaware River and Bay that is studying the economic impact and risks of high-volume waterway traffic in the region and formulating strategies to prepare for, respond to, and recover from high-consequence events such as natural disasters, spills, or crashes.

RITA University Program Specialists Amy Stearns (left) and Lydia Mercado (center) converse with Dr. Nenad Gucunski at the site visit luncheon.

- Outreach and education for transportation workers on the local and state level done by the New Jersey Local Technical Assistance Program (NJ LTAP) and CAIT, which offer nearly 200 training programs per year on everything from construction site safety to efficient snow removal.

In addition to these presentations, RITA guests were given tours of the CAIT labs and demonstrations of the work being done there. They also met with many of CAIT's government and industry partners who serve on the center's advisory board. RITA guests had a chance to "quiz" these partners on how CAIT is advancing state-of-the-art transportation technologies and benefiting each of their organizations.

Dr. Phillip Furmanski, Rutgers Vice President for Academic Affairs, addressed the visitors and more than 80 CAIT faculty, staff, students, and industry and agency partners at a luncheon. In his comments, Dr. Furmanski cited the university's commitment to transportation technology and policy and acknowledged CAIT's important contributions in advancing that mission. At the luncheon and throughout the day, RITA representatives had multiple opportunities to speak directly and candidly with the center's faculty, students, and stakeholders about their work and experiences.

The event was a good opportunity for CAIT and RITA to renew a shared commitment to improving transportation infrastructure here and around the world. It demonstrated solidarity in this purpose and illustrated that CAIT is playing a vital role in solving today's most pressing transportation challenges.

CAIT UTC Student of the Year

Every year, each of the 60 University Transportation Centers (UTCs) in the country selects an outstanding student whose achievements and ambitions demonstrate great promise for contributions to the transportation field in the future. Students of the year are selected based on their technical merit and research, academic performance, professionalism, and leadership. The UTC Student of the Year program is now in its17th year.

CAIT's selected student of the year for 2007 is Sarah Weissman. Sarah got her undergraduate degree in civil engineering from Vanderbilt University and then went on to work for PB Americas. After two years, she decided to pursue her graduate studies at Rutgers, where she discovered CAIT and the field of transportation safety. Sarah joined CAIT full time in 2006 and manages technical and outreach activities for its Transportation Safety Resource Center (TSRC) while simultaneously pursuing her graduate degree. She also coordinates TSRC's cooperative efforts with NJDOT and other state and local agencies. Since 2002, Sarah has been actively involved with the American Society of Civil Engineers and the Institute of Transportation Engineers. She also volunteers her time serving on the steering committees of New Jersey Math Counts and the Future City Competition, organizations that encourage youth to pursue math, science, and engineering careers.

Sarah Weissman

For more information about the UTC program and student of the year awardees, see utc.dot.gov/utc_about.html.

new to CAIT: staff ▪ faculty ▪ appointments

John Betak, Ph.D., was appointed as a CAIT fellow in December 2007. He will be working on rail and intermodal transportation projects with the center's Freight and Maritime Program (FMP). John is a senior consultant with more than 30 years of diverse experience in transportation management, consulting, and research for major universities, nonprofits, and industry. As a consultant, John worked with Class I railroads to improve operations and organizational structures. This work included addressing operational and market-based issues with commuter and intercity passenger rail operators. He formerly held several positions with Consolidated Rail Corporation (Conrail), including Assistant Vice President of Asset Development and President of Conrail's real estate management subsidiary, CRC Properties, Inc.

Carl Rascoe is a research scientist with CAIT's Infrastructure Condition Monitoring Program (ICMP). He joined the staff full time in October 2007. Carl is an expert in pavement and geophysical engineering with a concentration in nondestructive evaluation of infrastructure. He previously worked for WaveTech Consulting, Inc., in Louisiana, consulting for public and private agencies on pavement and asset management. In addition to working in nearly every region of the United States, Carl has headed up major road condition assessment projects in countries as far-spread as Brazil, Croatia, Denmark, Israel, Spain, and Taiwan, among others. Carl is also an accomplished trainer and has conducted classes for Local Technical Assistance Program centers nationwide for 14 years.

Martin E. Robins was appointed as a CAIT fellow in September 2007. As a national planning and policy expert with more than 30 years experience, Martin will apply the wealth of his experience as he coordinates CAIT's many partnerships with institutions, agencies, and the private sector. From 1994 to 1998, he was project director for Access to the Region's Core—a project sponsored by NJ TRANSIT in partnership with the Port Authority of New York and New Jersey that examined the need for new trans-Hudson rail tunnels. Prior to that, he served as director of NJ TRANSIT's Waterfront Transportation Office and was involved in planning the successful Hudson-Bergen Light Rail Line.

Sotiris Theofanis, Ph.D., is Associate Director of Strategic Planning at CAIT. He is responsible for establishing a framework for research projects and evaluation processes with the center's Freight and Maritime Program (FMP). He develops and promotes CAIT's research and capabilities and reinforces existing client/sponsor relationships. As a recognized expert in maritime transportation, he has more than 25 years of international experience in management and operations of complex port and harbor facilities.

Allison Thomas was appointed CAIT Associate Director of Marketing and Communications in October 2007. She is tasked with developing the center's first coordinated, comprehensive marketing and communications program. In addition to writing, art directing, and overseeing production for all of the center's print publications, websites, and other informational materials, she will expand outreach efforts to share "the CAIT story" with a wider audience and advise the director on communications strategies. Allison came to CAIT after more than 14 years with Rutgers' Department of University Relations Office of Creative Services as a senior project manager, editor, customer liaison, and creative contributor.

Jorge Zapata joined CAIT in August 2007 as a grant specialist. He is a financial professional with extensive experience in nonprofit fiscal management and accounting. For seven years, Jorge worked for Rutgers' Division of Grant and Contract Accounting (DGCA). He brings all his experience to CAIT, where his responsibilities include reporting to sponsors and overseeing compliance with grant requirements and state and federal regulations as well as filling the role of business manager for the center.


John Betak


Carl Rascoe


Martin E. Robins


Sotiris Theofanis


Allison Thomas


Jorge Zapata

Transportation for Toddlers?

It's never too early to start preparing the next generation of transportation professionals. Consider the amusing children's book *The Pigeon Loves Things That Go!* to introduce 1- to 4-year-olds to the wonderful world of transportation. Author Mo Willems riffs on his earlier *Don't Let the Pigeon Drive the Bus!,* a Caldecott Honor Book, with a micro story of multimodal transport. In this 10-page board book, the recalcitrant but loveable pigeon character imagines the joys of operating a bus, train, and airplane. The book teaches readers the words "bus," "train," and "airplane" with pictures, then ends with a groan-worthy joke. Willems was previously a television writer and animator who won six Emmy Awards for his work on Sesame Street before he began writing best-selling children's books. The wry humor of the Pigeon books will delight young children and young-at-heart adults and just may inspire a child to join the transportation field.

RUTGERS
Center for Advanced Infrastructure and Transportation

Rutgers, The State University of New Jersey
100 Brett Road
Piscataway, NJ 08854-8058

cait.rutgers.edu

Transportation Today is published by the Center for Advanced Infrastructure and Transportation (CAIT) at Rutgers.

Ali Maher, *Director*
Patrick Szary, *Associate Director*
Allison Thomas, *Associate Director, Marketing and Communications*

For questions or comments about the newsletter, please contact Allison Thomas, a.thomas@rutgers.edu, 732-445-0579, ext. 113.

Original photography by Katherine Marks and Nick Romanenko.