“Safety,” is defined by USDOT to include any method to “improve public health and safety by reducing transportation-related fatalities and injuries.” With such a big target, you’d think you couldn’t miss, but almost the opposite is true; it can be hard to focus your sights.

CAIT programs and activities addressing safety methodically break it down by audience or specific issue—agency operations, roadway design, training, emergency response, and even human factors. The end result is a comprehensive safety approach that covers the target with an arsenal of training, technology transfer, and research.

Many of those programs and activities fall under the umbrella of the New Jersey Local Technical Assistance Program (NJ LTAP), which has operated as part of CAIT for more than two decades, growing into the mature, nationally respected program it is today.

Part of CAIT’s Technology Transfer Group, NJ LTAP offers New Jersey state, county, and
If I had to choose among the pressing transportation infrastructure issues of 2014, the three top choices would be funding, workforce development, and safety. Heading into our second year as a National UTC, the CAIT consortium is making great strides in these areas, so we’re dedicating the majority of this issue of Transportation Today to them.

All of these subjects have been on the radar for years, but we’ve sensed a gradual shift over the last 12-plus months in how people are talking about them. First, debate over the critical condition of U.S. infrastructure is closed. Transportation practitioners, academicians, policymakers, and lawmakers unanimously agree that our economy, at home and in a global context, is suffering and will not recover unless we invest in our country’s infrastructure. The slight shift in 2014 on this front is that the public now seems to understand the gravity of the situation and that the fiscal solutions won’t be painless.

In October, CAIT hosted a public hearing held by the New Jersey Assembly Transportation and Independent Authorities Committee about the options for our state’s transportation trust fund. (See story on page 5.) Several potential solutions have been tossed around, but everyone knows the likely candidate in the short term is increasing New Jersey’s gas tax, currently the second lowest in the country. Testimony was heard from labor unions, policy advocates and think tanks, chambers of commerce, past legislators, and common citizens. Despite the wildly diverse interests represented, it was surprising almost everyone agreed that it’s time to swallow the bitter pill of tax increases. While this is not happy news, it was encouraging to see people are accepting the reality that if we don’t make the hard choice to invest now, every person in the region will end up paying in lost productivity, hobbled economic growth, and acute inconvenience.

In the last three months, CAIT learned it has been chosen for three nationally prominent initiatives involving the other big issues of 2014: workforce development and safety.

With nearly 50 percent of the current workforce expected to retire before the end of the next decade, attracting and preparing new talent is a priority for every transportation entity, public and private. CAIT and Rutgers’ Heldrich Center for Workforce Development recently launched the FTA-backed Transit Virtual Career Network, a web portal that links jobseekers with career opportunities in the $55 billion transit industry.

Another workforce-focused team we are proud to serve on is part of a new FHWA initiative, the Northeast Regional Surface Transportation Workforce Center at the University of Vermont. (See story on page 9.) For jobseekers—as well as transportation HR departments and workforce organizations—the new center will amalgamate information on learning, training, and job opportunities and create a network of stakeholders, all for the purpose of attracting and preparing future transportation workers and providing the current workforce with training that keeps them relevant and ripe for career advancement.

Big news in CAIT’s efforts to improve safety: In November, we received confirmation that a competitive proposal submitted by Montana State University—with CAIT, InTrans, Four Corners TTAP, and industry partners—had been selected to create the National Center for Excellence in Roadway Safety under a four-year grant from FHWA. (See story on page 12.)

Our cover story provides only a few examples from hundreds of individual CAIT courses, events, and other initiatives that address both workforce development and safety. For years, NJ LTAP, part of CAIT’s Technology Transfer Group, has led efforts to train workers in safe operations and practices and to keep them up-to-date. NJ LTAP and the CAIT National UTC consortium institutions offer more than 300 different learning opportunities benefitting around 12,000 members of the transportation workforce annually.

Before you go on to read about these endeavors, I want to acknowledge and thank the sponsors of the 2015 CAIT networking reception at TRB. Applied Research Associates, Benesch, Ingegneria Dei Sistemi North America, Innophos, and Pennoni Associates Inc. are not just sponsors, they’re partners. We are grateful for their long-standing support of CAIT and infrastructure research and for their contributions to the industry.

And don’t forget, CAIT is hosting the upcoming CUTC Annual Summer Meeting, so join us in Jersey, June 2015!
local transportation agencies with hundreds of courses ranging from proper snow removal to federal grant compliance. NJ LTAP and the CAIT National UTC consortium institutions offer more than 300 different learning opportunities benefitting around 12,000 members of the transportation workforce annually.

A great number of courses, workshops, conferences, and other initiatives that CAIT and NJ LTAP offer directly or indirectly relate to the safety of transportation workers and drivers in New Jersey. Now, with the recent announcement of CAIT joining the Western Transportation Institute (WTI) at Montana State University as a partner in the National Center for Excellence in Roadway Safety, we’re riding shotgun when it comes to nationally influencing roadway safety. (See story on page 12.)

There are no magic bullets, but the “Shooting for safety” examples in this issue (see adjacent story and on pages 4 and 8) are part of the CAIT/TTG/NJ LTAP portfolio of programs that illustrate how we are having positive impacts on safety for workers, drivers, vehicle passengers, and pedestrians. We invite you to read on.

ON THE COVER: CAIT programs, tech transfer activities, and events promote safety for transportation workers and motorists and train today’s and tomorrow’s workforce. Photos: iStock, Rutgers/CAIT.

Opposite page: Assembly transportation committee chair John Wisniewski (left) and Rutgers President Robert Barchi (right) just before the start of the hearing hosted by CAIT on October 14, 2014. Photo: ©2014 A. Thomas/Rutgers CAIT.

Time for TIM: NJ LTAP training for traffic incident first responders

DOTs throughout the country are unwavering in their pursuit of “zero traffic fatalities,” but when crashes do occur, it’s important that first responders manage the scene as quickly, cooperatively, and effectively as possible. There are a lot of moving parts to consider in this high-pressure situation; the more training that EMS, fire, police, and other emergency personnel have, the more smoothly—and safely—the incident can be cleared.

Supported and approved by the Federal Highway Administration, NJ LTAP is working with NJDOT to deliver the Traffic Incident Management (TIM) course to make sure people who bear responsibility in the aftermath of a crash are up to speed on New Jersey’s Highway Incident Traffic Safety Guidelines for Emergency Responders.

Three vehicle crashes resulting in injuries occur every minute in the United States, putting nearly 39,000 incident responders in harm’s way each day. Rubbernecking, congestion, and other disruptions from these incidents increase the likelihood of secondary crashes, cause delays, increase driver frustration, and bring commerce to a screeching halt.

The longer responders remain on the scene, the greater the risk they, and the traveling public, face. The TIM course focuses on responding in a way that protects motorists and emergency personnel, while minimizing negative effects on traffic.

The training uses a multi-discipline approach and covers topics including TIM guidelines, fundamentals, and terminology; detection, notification, and scene size up; scene safety and risk management; traffic management; clearing the scene; special circumstances; and wrap up.

Funded by FHWA and the New Jersey Department of Transportation, the course is free for all traffic-incident first responders, including personnel in law enforcement, fire fighting, EMS, public safety, public works, towing and recovery, and hazardous materials (HAZMAT). The program kicked off with three Train-the-Trainer sessions, which reached more than 200 people. Four-hour workshops are now being provided throughout the state at various local fire departments and other locations as well as at CAIT headquarters.
Roadway design with seniors in mind: Helping engineers improve safety for older drivers

When it comes to human nature, seniors aren’t all that different than people of any age. They tend to cling to their independence and—having longer, healthier lives—generally, they can. A big part of independence is freedom, and a big part of freedom is mobility, so many older folks opt to keep driving. But, in some cases, that can mean trouble on the road.

According to the National Highway Traffic Safety Administration, by 2020 there will be more than 50 million people 65 years of age and older in the United States. Nineteen states will have one million or more citizens in this age bracket.

We all face a progressive, natural decline in myriad functions as we age. Self-evaluating one’s driving ability may prompt individuals to restrict or eliminate certain situations, like not driving at night or in inclement weather, or avoiding high-speed, high-volume roads. Unfortunately, skewed perception of one’s own capabilities, another common human trait not limited to seniors, isn’t always accurate when it comes to gauging “road worthiness.” That shortcoming has serious safety implications for the elderly driver as well as everyone else on the road.

In addition to providing the right family support and social services for older people to maintain mobility—behind the wheel or on foot—engineers and safety experts also have to make roadways safer by taking into consideration those who may have compromised sight or reaction times.

In MAP-21 (the current transportation legislation), an Older Drivers and Pedestrians Special Rule was created to address this growing issue. The special rule states that if a given state’s per capita fatalities and serious injuries for drivers and pedestrians over the age of 65 increases during the most recent two-year period for which data are available, the state is required to identify specific strategies in their subsequent Strategic Highway Safety Plans and take actions to reduce that trend.

New Jersey, which currently is designated as a pedestrian and intersection focus state by FHWA, already has more than 14 percent of its population age 65 or older; data indicate the special rule for older road users will apply to New Jersey in the very near future.

With all of this in mind, NJ LTAP developed and hosted a New Jersey Older Driver and Pedestrian Engineering Workshop this past September for 28 local, county, and state transportation agencies and consultant engineers.

Speaker-experts who are directly involved in issues relating to older drivers talked about guidelines in the 2014-updated Handbook for Designing Roadways for the Aging Population and engineering and design details and countermeasures that can increase safety.

Caroline Trueman, FHWA–New Jersey Division safety engineer, talked about the importance of roadway design and engineering as it relates to New Jersey’s aging population in her opening address. Gene Amparano, safety engineer at the FHWA Resource Center, talked about specific challenges that transportation engineers face with ever-increasing numbers of older drivers on our streets and highways. He gave an overview of the need for the Handbook for Designing Roadways for the Aging Population and outlined the relationship of the handbook to other design guidelines, such as the AASHTO Green Book, MUTCD, and state design manuals.

FHWA transportation specialist Craig Allred discussed capabilities typically affected in aging drivers and pedestrians—like visual, mental, and physical acuity—and engineering countermeasures that can help compensate for them.

Sessions covered recommendations for at-grade intersections, interchanges, roadway segments, work zones, and rail-grade crossings in terms of their relationship to standards set forth in the publications Amparano covered and other manuals. Attendees did an exercise in which they developed and presented recommendations for an intersection design addressing needs of elderly residents in the area.

The New Jersey Older Driver and Pedestrian Engineering Workshop was made possible through funding from the Accelerating Safety Activities Program of the FHWA Office of Safety.

Evaluations collected from workshop participants indicated the program was a great success, with 100 percent of respondents saying the workshop increased their knowledge on the subject of roadway design with seniors in mind.

By 2020, more than 50 million people in the United States will be 65 years of age and older. Already, 14 percent of New Jersey residents are in that bracket. A workshop organized by NJ LTAP covered updated design standards that help municipal engineers make roads safer for older Americans.
That last bit—the funding—is an intractable problem throughout the United States at local, state, and federal levels.

That’s why the New Jersey Assembly Transportation and Independent Authorities Committee, chaired by Assemblyman John Wisniewski (D-District 19), organized a series of hearings starting this past autumn on the condition of New Jersey roads, bridges, rails, ports, and transit systems and the status of the state’s transportation trust fund. CAIT was asked to host the second of these hearings on October 14, 2014.

Nothing drives home the importance of infrastructure investment quite as well as when a bridge is out between you and where you want to go. Or when, as a business owner, you can’t make deliveries on time because your trucks are idling in traffic. Or, as a commuter, when you’re hours late for dinner because there’s a breakdown or an accident in a tunnel and no alternative way around it.

On the federal level, our country’s current surface transportation legislation (which sets policy and funding as law), MAP-21, is already in its first extension and set to expire in May 2015. The last transportation bill limped along with 18 continuing resolutions and nine extensions over seven years, indicating the issue is recurring and not likely to just go away.

Secretary of Transportation Anthony R. Foxx is well aware of this. He said in a June 2014 letter to state DOT directors, “I know how difficult this looming insolvency is for you, your team, and communities within your state that are depending on your work… You know well that the current crisis is just the latest iteration of a longstanding problem… The cumulative effect is a system badly in need of a change…”

New Jersey is facing the same problem in the very near future: The state transportation fund is expected to reach insolvency at some point next year, after which it will only be able to finance payments on its $14 billion debt for past projects, leaving nothing for new projects.

A prime candidate for raising capital to fund New Jersey’s transportation systems is the state gas tax. But the question of...
how much to raise it has been hotly debated and loosely estimated at 15 to 30 cents a gallon being necessary to meet the state’s needs.

New Jersey’s current gas tax of 14.5 cents per gallon is the second lowest in the country while the state’s infrastructure is some of the nation’s oldest and most used and abused.

The last time the state gas tax was increased was in 1988, though the federal tax went up 5 cents in 1993. To say it has not kept pace with inflation is an understatement, and that the revenue it generates is insufficient to keep our roads and bridges in serviceable condition—much less expand and improve the transportation network—overstates the obvious.

Many people argue that relying on this revenue stream is not sustainable because of increased fuel efficiency, hybrid and electric vehicles, and, according to federal government data, an eight-year decline in the national average for annual miles driven per person. To date however, no one has successfully proposed a viable option that can begin to fill the several-billion-dollar funding gap, or that will be readily accepted by the public. Raising tolls or tolling additional roads has been discussed. The most talked about alternative to raising fuel taxes is switching to a per-mile user fee and unlinking the revenue from fluctuating gas prices, which can influence driver consumption.

Almost everyone agrees raising the gas tax isn’t the permanent answer or the only answer, but it is the most expedient way available in the short term to bolster the state’s transportation coffers.

The serious deterioration of New Jersey’s infrastructure due to aging, unrelenting use, and underinvestment can’t be ignored. The gas tax is a political hot potato that, eventually, is going to end up in somebody’s hands. It seems, based on the series of hearings that Wisniewski and the transportation committee initiated in September 2014, that they may be that “somebody.”

Opening the October hearing at Rutgers, President Robert Barchi welcomed the committee and the public, and reaffirmed that, as the state university, Rutgers’ services, expertise, research, and technology can be put to good use in the quest to maintain and improve New Jersey’s infrastructure. He said, “I think one of the things that I was most enthralled with when I came to Rutgers was the [RABIT™ bridge inspection robot], watching that thing glide out there. And then seeing it down in Washington, DC, and seeing it across the country with the Rutgers logo on it. That’s what we can do in terms of taking our knowledge and making it work for you.”

Wisniewski expressed his appreciation for the relationship with Rutgers, saying, “we believe that institutes such as CAIT and other universities can provide valuable collaboration—not only in how we fund transportation but, with centers like CAIT, how we make those dollars go even further.”

Originally planned for two hours, a string of testimony examining the issue from almost every angle was heard between 10 a.m. and 2 p.m. on that day. Leaders from labor unions, chambers of commerce and other business organizations, transportation agencies, policy and planning experts, as well as engineers, economists, and private citizens all offered their perspectives. Despite the diverse interests represented, almost everyone agreed that it’s time to swallow the bitter pill of tax increases.

Former Senator Gordon MacInnes, now president of New Jersey Policy Perspective, said his organization proposes applying the standard 7 percent sales tax to gasoline purchases because “close to a third of our gas revenues come from out-of-state drivers” and if that is the model, “as gas prices rise, revenues increase.” MacInnes admitted it wasn’t a perfect solution but calculated it would generate about $1.18 billion a year.

Former Senator Gordon MacInnes, now president of New Jersey Policy Perspective, said his organization proposes applying the standard 7 percent sales tax to gasoline purchases because “close to a third of our gas revenues come from out-of-state drivers” and if that is the model, “as gas prices rise, revenues increase.” MacInnes admitted it wasn’t a perfect solution but calculated it would generate about $1.18 billion a year.

Dr. Alison Premo Black, senior vice president and chief economist for the American Road and Transportation Builders Association (ARTBA) and a member of the advocacy group Forward New Jersey, shared findings from a recent ARTBA study.

Black reported their study came up with ratings for New Jersey’s infrastructure condition that were similar to those of the American Society of Civil Engineers’ 2013 Report Card, which calculates 66 percent of New Jersey’s roads in poor or mediocre condition and 36 percent of its bridges either structurally deficient or obsolete.

She pointed out that, left unaddressed, those problems would grow exponentially in the next 20 years—if as expected, freight shipments double and the population grows from 8.8 to 9.6 million residents—making already awful congestion even worse. Black told the committee, “New Jersey residents already have the second-longest average commute in the United States. That’s 33 minutes per day; the national average is 24 minutes. And that extra 9 minutes may not sound like a lot, but … over the course of a year, it’s 37.5 hours—almost an extra work week that New Jersey drivers are stuck in traffic. And, most importantly, there’s a safety issue here. Poor roadway conditions are a contributing factor in about half of roadway fatalities.”

In fact, the tone and conclusion of Black’s remarks were the same as several people’s testimony that day: “By failing to act, the situation is going to continue to get worse, and New Jersey residents are going to pay one way or another,” said Black. “You either pay through increasing

-- p4 Hearing about hard choices

Above (left to right): Assembly committee members Robert Clifton (R-District 12), Glen Beebe (assembly director of policy), Maria Rodriguez-Gregg (R-District 8), and Scott Rumana (R-District 40). Photo: ©2014 A. Thomas/Rutgers CAIT.
investment, or you’re going to pay through congestion, lost productivity, and deteriorating conditions” leading to hobbled businesses and acute inconvenience to everyone in the region.

James Kirkos, president and CEO of the Meadowlands Regional Chamber of Commerce, noted his members were concerned that the burden be equally distributed and that funds be unequivocally dedicated to repairing and improving the network, not pilfered for other purposes.

Labor representatives from the AFL-CIO and CWA also supported the increase, seeing past the “short-term pain” to job growth and the long-term economic benefits of infrastructure improvements.

At the end of October 2014, Wisniewski introduced a bill that proposes to increase the state gas tax to 25 cents a gallon.

The legislation would target the state’s petroleum products tax on wholesale purchases by distributors at refineries, now 4 cents per gallon, and raise the annual minimum going to the trust fund from $200 million to $1.45 billion—a $1.25 billion increase in trust fund revenues. The legislation also would change the way that tax is calculated. Instead of straight cents-per-gallon, it would charge distributors 9 percent of the retail price of gasoline. In that case, revenues would go up along with gas prices, and to guard against falling prices at the pump, the bill sets August 2014 prices as a minimum baseline for calculating the tax.

Wisniewski acknowledged that motorists would ultimately end up footing the bill for the petroleum tax hike because wholesale fuel taxes are routinely passed on to station owners, who then pass them on to people filling up.

Like any legislation, Wisniewski described it as a “work in progress” that could be amended during the process. A separate bill has been introduced by Senator Ray Lesniak (D-District 20) that would raise the gas tax by 5 cents a year for three years.

Above (clockwise from top left): A welcome from Rutgers President Robert Barchi was followed with testimony from former Senator Gordon MacInnes (New Jersey Policy Perspective), Alison Premo Black (American Road and Transportation Builders Association), and James Kirkos (Meadowlands Regional Chamber of Commerce). Photos: ©2014 A. Thomas/Rutgers CAIT.
Work zone safety is everybody’s business

A surprising statistic: drivers and passengers make up four out of five fatalities in work zone accidents. NJ LTAP and the New Jersey Work Zone Safety Partnership are committed to reducing the number of workers and motorists killed or injured in construction areas. One product of their cooperative efforts is the Annual Work Zone Safety Conference, which they have organized and hosted for the past 15 years.

Between 200 and 300 attendees come from construction, transportation, engineering, public safety, law enforcement, public utilities, and operations. It usually is held in conjunction with National Work Zone Awareness Week in April and focuses on a theme specified by FHWA. This year’s national theme was “Work Zone Speeding: A Costly Mistake.”

All sorts of accidents can befall workers: being struck by a vehicle, slip-and-falls, or heat exhaustion. The 2014 conference opened with remarks from Robert Kulick, regional director of the Occupational Safety and Health Administration (OSHA), who summed up his advice for all employers to reduce these and other risks in three simple words: “plan, provide, train.”

The keynote speaker was Bruce Drewes, a consultant and former Idaho LTAP executive, who shared his experiences from the West with his East Coast colleagues. “People will only slow down when they perceive a need,” he noted. “The public wants to get from point A to point B as quickly as possible. Advanced warning signage should take into account that the average person’s perception and reaction time in a work zone situation is five seconds.”

Presenters, like the audience, come from every public and private group that has “skin in the game.” Presentations this year included ADA compliance in work zones, “focus four” hazards, and Work Zone Road Safety Audits. Audits show the implications of various temporary traffic control elements and stress that safety should be explicitly addressed in road projects. “It’s easier to set up better temporary traffic control than to change driver behavior,” noted Ted Green, an NJ LTAP engineer who presented on the topic.

Every year includes an update on new technologies and products that improve worker safety. This time, attendees learned about innovations such as automated flagging systems and hardhats with vision enhancing technology.

Citing still-disturbing data on worker fatalities in New Jersey and across the United States, Rob Weissman, safety manager for the New Jersey Turnpike Authority, summed it up: “It’s everyone’s job to ensure that everyone goes home at the end of the day.”

The right tools for the right job

In late 2013 and early 2014, a particularly harsh winter and a series of rainstorms near biblical proportions wreaked havoc on infrastructure in general, including local roads. Facing a mounting to-do list of repairs and preventive maintenance this summer, municipal public works departments had their hands full. We all know that whether you’re fixing a lawnmower or a road, having the right tools makes the job a whole lot easier.

When work crews are out, their safety—and that of people in vehicles—is compromised. It’s an inherently risky situation in which proper signage and safety equipment can make a big difference.

Thanks to NJ LTAP and funding from the New Jersey Division of Highway Traffic Safety, five municipalities now have the equipment they need to stay safe. For the second year in a row, NJ LTAP invited local public agencies to apply for free work zone safety equipment packages and selected the “winning” public works departments based on their need to replace outdated, lost, or damaged equipment. For example, one of last year’s recipients, Edison Township, had a fire in their storage unit and salt barn last year that destroyed most of their every day equipment. More than 50 applications were submitted for 2014; Boonton, Brielle, Edison, Belvidere, and Linden were the lucky recipients.

Even two years after the fact, many towns are still trying to bounce back after Superstorm Sandy, like Brielle and Linden, who both lost a lot of equipment in the storm. Another major flood in Belvidere swept away a significant number of their traffic control and warning signs.

The new equipment sets included two Class-2 high visibility vests with MUTCD-compliant compact sign stands, 20 orange traffic cones with retroreflective stripes, and two stop/slow paddles for flagging operations.

Along with its work zone safety and traffic control training and workshops continuously offered throughout the year, NJ LTAP hopes to continue the equipment giveaway program in 2015 as part of its offerings that aim to keep municipal workers—and citizens on their streets—safe and sound.
On the other side of the equation are job seekers in a competitive, constantly evolving market. The transportation sector is no exception; workers need to rise to its challenges, but sometimes don’t know how or where to find the training they need or exciting professional opportunities. In fact, some high school and college students aren’t even aware of the expansive and varied career choices in transportation.

To maintain a workforce with the necessary skills, awareness, and ability to adapt, this gap between the transportation industry and viable candidates needs to be closed.

If only there were some sort of matchmaking mechanism. Some way for transportation agencies to effectively reach potential employees and for young talent to step into the void left by people who have finished decades of service.

FHWA regional workforce centers program: Matchmakers of the transportation industry
Thanks to a Federal Highway Administration (FHWA) program that has created five geographically based centers to facilitate employer-employee connections, the University of Vermont (UVM) and its partners CAIT and the John J. Heldrich Center for Workforce Development (both at Rutgers), aim to fill the role of Patti Stanger, pairing job seekers with eager transportation employers. UVM was selected to host the Northeast Regional Surface Transportation Workforce Center and received a four-year grant to coordinate the effort. The new center, based in Burlington, Vermont, will serve 11 states and the District of Columbia.

This center will forge relationships between private and public transportation agencies and an extensive network of education, labor, and workforce enrichment organizations. Together they will develop programs, resources, and opportunities aiming to prepare future transportation workers—including young people still in school—and provide current transportation workers with chances for career development and advancement.

UVM and Rutgers each have their own distinct advantages when it comes to this task; one is their disparate surroundings. UVM is located amid largely rural and small-town environs, while Rutgers is in the middle of the most densely populated and developed area in the United States. Their collaboration ensures needs of the

Nearly half of the public transportation workforce is expected to retire over the next five to 10 years, leaving a gaping hole in many agencies. You’ve heard the adage about the three most important things in real estate being location, location, location? These days it seems the three most important things in the transportation industry are workforce, workforce, workforce.
entire region—both rural and urban—are served. For jobseekers—as well as career placement and workforce investment organizations—the new center will compile learning, training, and job opportunities. It also will create a network of stakeholders: transportation agencies and providers, labor groups, and educators. Input from all these groups is essential to growing an inclusive one-stop resource center.

The Northeast Regional Surface Transportation Workforce Center will amass resources, create a web portal, support innovations in entry-level STEM efforts, and tap the wealth of talent in currently underrepresented groups. This includes encouraging women to pursue careers in transportation and illuminating pathways from other fields, such as promoting opportunities for veterans.

**Meeting on mass transit?**

UVM sought to partner with CAIT and the Heldrich Center because both Rutgers organizations have significant experience and assets to bring to the “marriage.” One of those assets is the recently launched FTA-backed Transit Virtual Career Network (TVCN), an online portal linking jobseekers with career opportunities. Another is an expansive, long-standing public sector workforce training portfolio administered by NJ LTAP at CAIT.

Losing almost half the current transportation workforce to retirement before the end of the decade could put the brakes on public transit, especially since it’s happening simultaneously with upticks in ridership. The surge in popularity is due, in part, to millennials’ preference to use public transport rather than own a car.

Transit agencies say these combined factors—a shrinking workforce and expanding need for services—mean there are huge opportunities in the industry. Denver, Washington, DC, Houston, and many other metro areas are adding transit services to keep up with increased demand. They’re betting TVCN can help them publicize jobs and training and generate interest in transportation careers.

Transit is a $55 billion industry that directly employs more than 400,000 workers, and many of these positions don’t require a four-year college degree. Agencies often offer their own in-house training and encourage employees’ advancement. Using TVCN, jobseekers can explore more than 50 different frontline transit-related occupations, learn what it takes to prepare for these jobs, identify local educational and training programs, and access current job listings. Users can customize their TVCN account so they can save occupational preferences and other information. Users also can visit the site to find sources of financial aid and to develop requests for academic credit based on previous experience, such as military service.

“Transit has quite a number of entry-level positions with a lot of room for growth,” said Lydia C. Grose, director of civil engineering at SEPTA in Philadelphia. She adds that because the industry provides 24/7 on-the-ground services, it can’t be outsourced abroad. “And we provide on-the-job-training and leadership opportunities,” says Grose. “Many of our managers and supervisors worked their way up a career ladder.”

“We are excited to support an innovative new resource,” said Therese McMillan, acting administrator for the Federal Transit Administration. “Workforce training [is] vitally important to helping people … join the middle class and secure a brighter future for themselves and their families.”

“By working in transit, you have the satisfaction of helping the public get to where they need to go, safely,” said Santiago Osorio, director of operational training at Metropolitan Transit Authority of Harris County in Texas.
“If you’re the type who doesn’t like being in a cubicle and wants to be physically active, you can be a mechanic or a transit police officer or fare enforcement monitor. Of course, if you do enjoy an office, transit also employs engineers, planners, analysts, and [other jobs where you work mostly indoors].”

The website was funded by the U.S. Department of Transportation’s Federal Transit Administration and created by a consortium of university and nonprofit and technology partners. The original VCN open-source platform on which it operates was funded by the U.S. Department of Labor.

More on the web: vcn.org/transit

Opposite page: With more than 50 percent of transportation employees retiring during the next decade, there will be many positions to fill in the $55 billion transit industry, which employs more than 400,000 workers. Photo: John Kirk/iStock.

Below: Undergraduates in a hands-on Rutgers civil engineering class. The new workforce center will develop initiatives and resources for education at all stages and encourage participation from underrepresented groups including women and veterans. Photo: ©Don Hamerman.

Below: The annual Future Cities competition, sponsored by the American Society of Civil Engineers, is an engaging initiative that exposes middle-school students to STEM fields, including career opportunities in transportation. Photo: Courtesy of ASCE New Jersey Chapter.
CAIT will be part of a team led by the Western Transportation Institute (WTI) at Montana State University (MSU) chosen by the USDOT Federal Highway Administration (FHWA) to create a national center that will provide a one-stop shop for training and resources, ultimately, to help transportation professionals reduce serious injuries and fatalities on roads that they manage. Based at WTI’s headquarters on the MSU campus, the National Center for Excellence in Roadway Safety will offer training, technical support, and easily accessible information to transportation practitioners around the country, and provide national leadership in finding solutions to critical safety issues, especially on rural roads.

Contrary to popular belief that all of New Jersey looks like the scenery between exits 9 and 15 on the NJ Turnpike, the state actually has more than 11,800 miles of rural roads according to the Bureau of Transportation Statistics.

CAIT is leading the tech transfer component—largely clearinghouse activities and outreach—for the new center at WTI. CAIT also will participate in a sort of “help desk” service and have a supporting role in strategic planning, data analysis, training, and education.

A consideration in selecting the team was to include established programs in key geographic areas that efficiently address safety training and technical assistance needs on a regional basis. CAIT fits those criteria. It has crash data and analysis tools, like its in-house developed Plan4Safety, that can be adapted and used to great advantage in other regions and settings.

“We have access to both data and decision support tools for implementing low cost safety measures in local jurisdictions and rural networks, which are greatly varied across the country,” explained CAIT’s NJ LTAP director Janet Leli. “We will be looking for ways to bridge those gaps.”

MSU Professor Nicholas Ward, who serves as principal scientist for this grant, views the center as critical to understanding the unique needs of rural road agencies by providing necessary information and workforce development in a relevant, accessible way. “The higher risk of fatal and serious crashes in rural areas dictates the need [for] research about those risk factors that are unique to the rural environment, including driver behavior and local cultures, and then ensuring this information is integrated into road agency practices,” said Ward.

CAIT director Dr. Ali Maher was excited at the news: “Training the current and the next generation of workers is essential for sustainability of our transportation system, and a key component of the UTC program mission and our role as a National UTC. We are proud to be a part of the newly funded National Center for Excellence in Roadway Safety at Montana State University and look forward to working with all the partners to expand safety culture in rural networks through technology transfer. CAIT will use its extensive portfolio of training, experience in housing New Jersey’s local technical assistance program, and expertise in safety data collection and analysis to contribute to the success of this new center for excellence,” Maher said.

Other National Center for Excellence in Roadway Safety partners include the Institute for Transportation (InTrans) at Iowa State University, Cambridge Systematics, Inc., the IDT Group, and the Four Corners Tribal Technical Assistance Center; it also will work closely with NJ LTAP at CAIT and LTAPs in Louisiana, Montana, and Iowa.

Above: Drivers on rural roads face a disproportionate share of safety risks, including 55 percent of roadway fatalities and high rates of roadway departure crashes. Photo: iStock.com.
CAIT 2014 CUTC Student of the Year Danniel Rodriguez

This year, the CAIT Council for University Transportation Centers (CUTC) Student of the Year Danniel David Rodriguez comes from National UTC consortium partner University of Texas at El Paso (UTEP). Rodriguez is a first-generation Mexican-American doctoral student and research assistant. He received his bachelor’s degree in civil engineering from UTEP in 2011 and dove into the doctoral program immediately.

He has been involved in pavement research since he was an undergraduate. His current research focuses on flexible pavement performance and asphalt-treated base design. Now in the final year of study for completion of his Ph.D., his thesis title is Performance Life of Various Hot Mix Asphalt Mixtures in Texas.

Rodriguez’s adviser, Dr. Soheil Nazarian, director of UTEP’s Center for Transportation Infrastructure Systems, describes him as, “… hardworking and self-motivated.” Nazarian says, “I’m impressed that he is not afraid of the unknown. He currently is developing sophisticated models for estimating the survival rate of pavement layers; with his perseverance, he has been able to understand and solve several very complicated problems.”

Nazarian also says that Rodriguez is a great presenter and communicator, at ease whether he’s talking to fellow students or a sponsor, and he notes Rodriguez “follows through the tasks he’s assigned to perfection.” Rodriguez’s academic accomplishments are extraordinary, though not unusual for ambitious sons and daughters of immigrant parents. He is an NSF Louis Stokes Alliances for Minority Participation Fellow, an Eisenhower Hispanic-Serving Institutions Fellow, and the current president of the Southwestern District Caucus of Chi Epsilon: The Civil Engineering Honor Society.

After he completes his doctoral degree, Rodriguez says he plans to work for FHWA. “I see working for FHWA as a way to give back to the country that has provided so many opportunities for me and my family to succeed,” he says.

Rodriguez was selected as the 2014 CAIT Student of the Year due to his dedication to pavement research, his academic track record and research merit, and for his vision and ambition to make service to his community and country the first priority in his career as a transportation professional.

He currently resides in El Paso and describes himself as a devout Catholic and a “pretty good dancer.” He cites Pope Francis for inspiration in following one’s dreams: “Dear young people, do not bury your talents, the gifts that God has given you! Do not be afraid to dream of great things!” Rodriguez clearly has embraced the Pope’s advice and is destined to achieve his dreams.

infrastructure >> infrastructure, culture & the arts

#transportation #infrastructure

If the use of infrastructure-related hashtags on the popular photo-sharing social network Instagram is a gauge of people’s awareness, we’re encouraged. Seems that photographers everywhere are showing their love and appreciation for bridges, roads, asphalt, railroads, ports, powerlines, pipelines, and all manner of infrastructure as worthy and beautiful photo subjects. As of this writing, here are the total images tagged with a few favorite infrastructure words:

- #road: 6,924,786
- #bridge: 5,648,880
- #highway: 1,582,354
- #port: 1,040,037
- #concrete: 586,106
- #traintracks: 311,946
- #powerlines: 219,052
- #transportation: 208,496
- #asphalt: 107,164
- #infrastructure: 34,880

YOUR PHOTO HERE!

Use the hashtags #rutgerscait and #infrastructure on your Instagram photos and we’ll pick our favorites to publish in the next issue of Transportation Today. 

All photos property of the original Instagram user named below the image.
The K.B. Woods Award was established by the TRB Executive Committee in 1971 and is given annually for an outstanding paper published in the field of transportation facility design and construction.

Only one other person has won the K.B. Woods Award more than Bennert; this is his third win in seven years. Bennert and Dr. Ali Maher were honored with the K.B. Woods Award in 2008 for their paper Field and Laboratory Evaluation of a Reflective Crack Interlayer in New Jersey, and in 2011 for Influence of Production Temperature and Aggregate Moisture Content on Performance of Warm-Mix Asphalt.

State transportation agencies in the Northeast are promoting the use of sustainable materials in transportation infrastructure and investigating different strategies that will enable them to use higher percentages of RAP than they do now. The trick is not sacrificing pavement performance; fatigue and thermal cracking are particular concerns in the Northeast, and the general workability and handling of higher RAP content asphalt mixes is important in all regions and climates.

Bennert’s winning paper this year, Strategies for Incorporating Higher RAP Percentages: Review of Northeast States Implementation Trials, recounts a study that looked at three main strategies: 1) using a softer asphalt binder grade to offset the stiff RAP asphalt binder; 2) limiting the amount of RAP binder credited to the total asphalt content of the asphalt mixture; and 3) using a performance-based specification that the high RAP content mixture must meet for acceptance. The research involved actual field trials and evaluated commercially produced RAP mixtures to provide insight as to how these different strategies performed.

Findings indicated the three strategies examined have different levels of complexity.

Using softer asphalt binders requires minimal or no changes in the asphalt mixture design. However, when specifying a softer asphalt binder, there may be issues with local availability, which may increase general costs.

When limiting the percentage of RAP binder in the total asphalt content of the mix, generally, the asphalt mixture has to be redesigned since additional virgin binder would need to be added. Without a redesign, the mixture may fail established volumetric requirements, but after redesign is completed, the original performance grade (PG) mix typical in the region could still be used.

Dr. Thomas Bennert, director of CAIT’s Pavement Resource Program, is this year’s winner of the K.B. Woods Award for outstanding paper awarded by the Transportation Research Board (TRB). The paper covers environmentally sustainable strategies to incorporate higher percentages of recycled asphalt pavement (RAP) in new paving projects.
Employing performance-based specifications for high RAP mixtures, both a redesign and change in asphalt binder grade may be necessary, depending on performance requirements set by the state agency. However, unlike the other two strategies (using softer binders or limiting RAP content), DOTs can have a certain level of confidence that the high RAP mixture will perform to their expectations.

In this study, the softer binder grade strategy did result in slightly better low-temperature cracking properties in thermal stress tests, but was not as significant for critical cracking analysis. When evaluating the intermediate temperature cracking performance, the use of a softer binder grade did not improve the crack propagation resistance. This may indicate that production (mixing temperature, silo storage time, etc.) and mixture parameters (volumetrics, gradation, etc.) may negate or minimize the effectiveness of bumping to a softer PG graded binder.

For the RAP binder contribution project on Route 25 in New York, the 75 percent and 50 percent RAP mixtures both achieved better intermediate fatigue performance when compared to the baseline 100 percent RAP contribution mixture. Although the resultant increase in asphalt content due to limiting the RAP binder contribution clearly improved the intermediate fatigue performance, low temperature properties were not evaluated and definitive conclusions cannot be drawn. It should also be noted that this mixture only contained 20 percent RAP. However, the methodology does seem to be viable at higher RAP contents and a promising alternative.

Bennert and his co-authors, Dr. Jo Sias Daniel (University of New Hampshire) and Dr. Walaa Mogawer (University of Massachusetts Dartmouth), will be recognized at the TRB Annual Meeting in January 2015.

More on the web: A list of all K.B. Woods award winners at trb.org/AboutTRB/WoodsAward.aspx
Eileen Sheahy, P.E., manager of NJDOT’s Bureau of Materials, Bennert’s research was needed before NJDOT could move forward with using WMA in its standard asphalt specification, Baseline Document Change 8.29.14, released this summer.

Another winner from CAIT was Zilong Wang, whose paper, *Integrated Life-Cycle Cost Analysis of Pavement Preservation*, won the Bureau of Research’s award for Best Student Paper. Wang is a civil and environmental sciences doctoral candidate working under the advisement of CAIT researcher and Rutgers assistant professor Dr. Hao Wang. Zilong Wang’s research aims to develop an integrated life-cycle cost analysis model to quantify pavement preservation costs to agencies, vehicle operators, and the environment. Additionally, the paper considers the variation of cost and performance to characterize the uncertainty of pavement maintenance strategies. The result is that NJDOT can begin to quantify the impacts of different maintenance strategies and make informed decisions based on different selection criteria.

Above (left to right): Rutgers engineering assistant professor Dr. Hao Wang, adviser to Best Student Paper winner Zilong Wang, NJDOT Bureau of Research manager Camille Crichton-Sumners, and CAIT director Dr. Ali Maher, who accepted the implementation award for Dr. Thomas Bennert.

Big Data, big future
Workshop on big data’s valuable role in infrastructure management

State DOTs and other transportation agencies collect vast quantities of data—big data.

Wrangling all this information presents different challenges for different end users—including how to analyze, curate, share, store, transfer, visualize, and keep it secure, as well as privacy issues connected with all data these days. But let’s take a step back: What is “big data”?

Big data generally refers to data sets so large and complex that it is difficult to almost impossible to process them using traditional data processing applications. It requires we formulate completely new ways to manage, access, and share it.

One of the key advantages of big data is its ability to derive correlations and detect patterns and trends that separate smaller data sets cannot, even if they contain the same total amount of data. The catch with any data—large or small—is it isn’t worth much if you can’t use it, and since transportation asset management is a process based in the concept of data-driven decisions, big data has benefits that make it worth the “extra effort” of figuring out the best ways to employ it.

On December 5, 2014, Dr. Jie Gong, assistant professor in Rutgers’ civil and environmental engineering department and a CAIT affiliate researcher, and CAIT UTC partners Dr. Sue McNeil, professor of civil and environmental engineering and urban affairs and public policy at the University of Delaware, and Dr. Kevin P. Heaslip, associate professor of civil and environmental engineering at Virginia Tech, organized a one-day workshop examining the current and future roles of big data and analytics in transportation infrastructure management and how one shapes the other.

The one-day workshop attracted users and data collectors from government, academia, and industry, including a mélange of people in R&D (who are building next-gen hardware, software, apps); practitioners (who are generating, manipulating, and/or using data); and end users (those who make decisions based on underlying data, but don’t know, nor need to know, any specifics about big data). These groups examined and proposed solutions to economic, legal, and technical barriers that currently hinder big data and analytics to be effectively used by transportation agencies. It also looked at the future of the big data technology and potential future applications.

Next steps include creating a position paper on the subject, discussing whether an ongoing workgroup should focus on a particular theme, and planning another workshop.

CAIT hosts “how to” on LTBP bridge inspections

In 2008, CAIT was selected to serve as principal investigators on the largest and most ambitious bridge research project ever undertaken by FHWA: the Long-Term Bridge Performance program (LTBP). LTBP is envisioned as a 20-year or longer comprehensive study of the most prevalent types of highway bridges in the U.S. bridge inventory. Researchers are trying to gain a detailed and timely picture of bridge health and how, and to what degree, combined physical and functional variables (weather, age, materials, traffic, etc.) influence overall bridge performance.

Through detailed periodic “check ups,” monitoring, and evaluations, using both visual inspections and testing with nondestructive evaluation (NDE) tools, the LTBP team is gathering data that will be compiled in a comprehensive database containing more quantitative information on bridge performance than has existed to date.

Researchers and IDIQ contractors are inspecting LTBP program sample bridges across the country, collecting granular data for a the database.

As part of an extension to the original $25.5 million contract with CAIT, FHWA tasked the center with conducting a two-day training program on the prescribed protocols for IDIQ contractors who will inspect LTBP bridges. It is essential that this data be gathered and recorded according to very detailed standards to ensure consistency and data integrity, no matter who is doing the inspection. The exhaustive program meticulously covered how to examine and record the condition of every element of the superstructure (girders, bracing, truss components, etc.) and substructure (piers, pier caps, bearings, anchor plates, bolts, etc.). The inspectors record information on deterioration, corrosion, cracking, delamination, spalling, moisture damage and efflorescence, and more.

Ultimately, the data gathered will be analyzed and applied to improve life-cycle cost and predictive models, deepen our understanding of bridge deterioration, and develop more effective maintenance and repair strategies.
CAIT recognized for research to improve mobility for autistic adults

This past September, the Family Resource Network/Autism Family Services of New Jersey selected CAIT to receive the 2014 Community Partner Award. The honor was presented at the Family Resource Network annual awards ceremony on October 9 for research CAIT has been doing relating to transportation needs of adults with autism and “for serving as champions for people with disabilities and their families.”

CAIT was deemed deserving of the award largely due to the efforts of one very dedicated advocate-researcher, Cecilia Feeley, who also is the mother of a teenaged son with autism. In the past two years, she has received more than $719,550 in research grants to study transportation needs of developmentally disabled adults, including from the New Jersey Governor’s Council for Medical Research and Treatment of Autism and the New Jersey Department of Health.

She participates in many statewide advocacy events, including one in August 2014 celebrating the passage and signing into law of the Autism Collaboration, Accountability, Research, Education and Support (Autism CARES) Act. The legislation was authored by U.S. Senator Robert Menendez (D-NJ) and guarantees critical federal programs addressing autism spectrum disorders will continue. The law also includes first-ever dedicated federal efforts toward the needs of young adults with autism as they age out of school-based support and services.

“The Autism CARES Act not only provides for the continuation of vital federal efforts, but [will see to it] they provide better outcomes,” Senator Menendez said. “The law now ensures that we continue research into potential causes, new early diagnostic and intervention techniques, and more effective supports and services for those with autism and their families, and it pays attention to the unique needs facing those transitioning to adulthood and to independent lives.”

“We are encouraged that the scope of the Autism CARES Act expands to include the needs of transitioning youth and adults,” stated Feeley. “Including community-based services like transportation and residential support in this legislation demonstrates these aspects of the day-to-day are recognized as necessary for individuals on the autism spectrum to achieve a high quality of life.”

Teaching municipal engineering inspectors for 25 years

In 2015, CAIT’s Municipal Engineering Construction Inspection (MECIP) course is celebrating its 25th birthday. This six-day workshop is the longest running course at NJ LTAP, part of CAIT’s Technology Transfer Group.

The MECIP workshop has trained more than 700 public and private sector municipal construction inspectors over the past quarter century. The training was originally conceived by the New Jersey Society of Municipal Engineers and developed in cooperation with NJ LTAP and the American Public Works Association’s New Jersey chapter.

The course is comprehensive and designed for municipal engineers who want to improve their overall knowledge in proper inspection of public and private construction projects throughout the state. The course covers contract documents, underground conduit, embankments and foundations, roadway asphalt, concrete construction, accessibility for the disabled, laws and ethics, roadway work zones, the functions of the local government, public relations, and record keeping relevant to municipal engineering inspection. Content is continuously updated to reflect ever-changing government regulations, construction methods and materials, and inspection tools.

An important component to the continued success of this course has been the instructional team’s vast experience. We thank all our instructors for their dedication and the hundreds of inspectors who kept up to date by taking this course. MECIP is offered periodically throughout the year. Check the CAIT training website for next available course.

More on the web: cait.rutgers.edu/cait/training

Transportation Today is published by the Center for Advanced Infrastructure and Transportation (CAIT) at Rutgers, The State University of New Jersey.

Editor-in-Chief and Art Director: Allison Thomas, Associate Director of Marketing and Communications

Editorial Contributors: Bethany Allinder, Thomas Bennert, Jie Gong, Allison Inserro, Peter J. Jin, Janet Leli, Hooman Parvardeh

For questions or comments, contact a.thomas@rutgers.edu.

CAIT is a National University Transportation Center supported by the U.S. Department of Transportation’s Office of the Assistant Secretary for Research and Technology.

©2015 Rutgers CAIT. All rights reserved. NL16/01-2015/5M
New Brunswick, home to Rutgers’ 250-year-old campus, is situated in the most densely populated, diverse, and busiest transportation corridor in the United States, making it the ideal setting for the CUTC Summer Meeting. This vibrant cultural hub is less than one hour from New York City, the Statue of Liberty, the Jersey Shore, and many other attractions.

Join us in June for informative technical tours and exciting activities! Details at

cait.rutgers.edu/cutc-summer-2015

CAIT is still accepting sponsorships for this event. Contact Ian Pfeiffer at ipfeiffe@rci.rutgers.edu for more information or call 848-445-0579.