

COVER  
STORY

# KEEPING THE WH





# EELS TURNING

## TRANSPORTATION RESEARCH AT NJIT



↖ Portway

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PULLING INTO THE LINE OF TRUCKS WAITING TO GET INTO NEW JERSEY'S PORT NEWARK ON A HOT, DUSTY SPRING DAY FEELS LIKE JOINING A HERD OF LUMBERING BEASTS. IN THE LINEUP, WE MOVE OH-SO-SLOWLY ALONG DOREMUS AVENUE. "IT TAKES THESE TRUCKS ALL DAY TO GO A FEW MILES," SAYS GEORGE FALLAT, DEPUTY DIRECTOR OF THE NATIONAL CENTER FOR TRANSPORTATION AND INDUSTRIAL PRODUCTIVITY (NCTIP) BASED AT NEW JERSEY INSTITUTE OF TECHNOLOGY. "WE'RE TRYING TO CHANGE THAT," HE SAYS AS WE TOUR THE INDUSTRIALIZED REAL ESTATE WHERE MANY OF THE WORLD'S CONTAINER SHIPS UNLOAD.



U.S. Representative Don Young (left), chair of the House Transportation and Infrastructure Committee, discussed transportation issues with NJIT President Robert Altenkirch during a recent fact-finding trip to New Jersey.

Under the direction of Fallat's colleague, Lazar Spasovic, NCTIP is a key player in efforts to see that the wheels keep on turning. From bulk freight to bicycles, the study of transportation is one of NJIT's busiest research arenas, and a funding magnet as well. In fiscal 2003, the university's programs drew more than \$4.7 million in support from agencies that include the Federal Aviation Administration, the Federal Highway Administration, the Federal Transit Administration, the New Jersey Department of Transportation and TRANSCOM, which is comprised of 21 governmental transportation authorities in the Tri-State area.

In recognition of the university's transportation expertise, New Jersey Governor James McGreevey has named NJIT President Robert A. Altenkirch one of seven appointees to the newly created Governor's Blue Ribbon Commission on Transportation. The commission will make recommendations to the state legislature regarding transportation funding and priorities.

### Research with national relevance

NJIT houses four centers focused on transportation — the National Center for Transportation and Industrial Productivity, the International Intermodal Transportation Center, the Transportation Information Decision Engineering Center and the Transportation Economic Land Use Systems Program. Researchers at these centers are tackling problems as global in scope as speeding the delivery of international goods and as prosaic as moving New Jersey Transit buses along Newark's Broad Street more quickly.

Transportation research at NJIT means Janice Daniel working to reduce traffic congestion around the area's marine terminals and to design a better bus stop. (See box on page 24.) It means Cheryl Allen-Munley studying Jersey City's surprisingly bicycle-safe downtown streets to test her thesis on the root causes of biking accidents. (See box on page 23.) But even when they're looking at local problems, NJIT researchers know their work has relevance for communities across the nation.

As the most densely populated state in the country, New Jersey is dealing with issues that others may not face for decades. Meanwhile, with the U.S. economy dependent on a large import market, getting goods from ship to marketplace poses major transportation challenges for the Garden State.

### Hauling cans

To truckers, "hauling cans" is the job of picking up and delivering containerized freight, which can be maddeningly slow along the roads near Newark Liberty International Airport. It is an industry that began in New Jersey in 1956 when Malcolm McLean, a former trucker from North Carolina, grew tired of waiting dockside for stevedores to unload his cotton bales, one at a time.

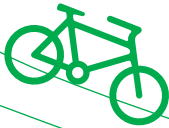
McLean came up with the idea of container shipping. He bought an old tanker and started a company named Sea-Land. On April 26, 1956, McLean watched the first such shipment leave Port Newark for Houston, Texas. His concept revolutionized shipping and established Newark and Elizabeth as major ports. But access to the area by road and rail has not kept pace with demand. Since peak unloading times coincide with rush hours, truck traffic is added to local highways when embattled commuters are using the same roads.

One research effort by Assistant Professor of Civil and Environmental Engineering Janice Daniel has focused on computerized scheduling as a way to pace pickups more efficiently. But the larger problem is that incoming containers are often too heavy to put directly on trucks because the highways can't handle the weight. That means breaking down the contents of containers into smaller, lighter loads and putting more trucks on the road. Part of the answer, Portway, is in the works.

Due to open this year, Portway is a 17-mile super-heavy-duty highway that will include improvements in Newark, Jersey City, Elizabeth, Kearny, Linden and Rahway. It will replace the current two-lane roadway, the one currently choked with slow-moving truck traffic.

Most important for the future, though, is that Portway and accompanying rail lines will be able to handle the heavy containers and eliminate traffic bottlenecks at the docks. Railroad companies CSX and NS have invested more than \$120 million in the past five years to upgrade the regional freight rail network. Another \$150 million in public funds is slated to help complete the work.





NJIT's research role in Portway has involved creating computer simulations to show the New Jersey Department of Transportation what happens to traffic flow with various highway reconfigurations. "They are like computer war games," says Spasovic, "We can see what the future looks like."

Trucks and trains will take many of the loaded containers to new facilities near the ships, where local workers will unpack them. These new large-scale distribution centers and industrial parks will be built on what are now unused industrial lands.

### Less congestion, more jobs

Driving the demand for faster shipping is the changing pattern of global commerce. Spurred by free-trade agreements, shipment of containers to the West Coast is expected to decline, while the amount of containerized freight entering on the East Coast is projected to increase. Northern New Jersey's commercial harbors make up the largest container port on the Atlantic and the third largest in the nation. Business is booming, as imports from Asia, Central and South America and Europe increase.

There is fierce competition among regions that want to host all this business. If the congestion does not improve, there's been talk of shippers and haulers looking for less busy ports, Fallat cautions. "When you lose time, it adds a lot to your costs," he says.

## CYCLING NATION

Bicycling is more than a healthy hobby for doctoral candidate Cheryl Allen-Munley. Her transportation studies dissertation, recently completed at NJIT, is on bike safety. A licensed civil engineer, Allen-Munley is intent on making the U.S. a bike-friendly nation through better municipal planning. And with a resume that includes serving as Jersey City's transportation director, membership on the board of the New Jersey Transportation Planning Authority, and being named the U.S. Department of Transportation's Outstanding Student of the Year in 2002, she has made a strong start.

By incorporating bike-friendly transit systems into community planning, government could improve New Jerseyans' quality of life, Allen-Munley believes. Ultimately, she wants to make bicycles a commonplace mode of urban transportation, as they are in many other nations.

Jersey City is already committed to making the bicycle a more practical means of transportation. This commitment includes adding bike lanes to existing roads and installing bicycle parking facilities near major mass-transit stations. For her dissertation, Allen-Munley set out to find a scientific way to predict which bike routes would be best.

She says that key factors for commuters are finding a short route and being safe on the road. Since most bicycle/motor vehicle accidents happen in urban areas, Allen-Munley decided to look for a way to predict the safest urban cycling routes. "I was surprised at what I found in Jersey City," she says, "Some of the most congested roads with no bicycle lanes turned out to be safer than some roads with wide shoulders."

For instance, though Kennedy Boulevard seemed a good bike route because it is flat and has a curb lane, motorists tended to exceed the 25 m.p.h. speed limit and use the curb lane to pass. But Central Avenue, a busy two-way retail street, turned out to be safer and more bike-friendly because the cyclists could go faster than the vehicles stuck in traffic. The full results of Allen-Munley's research, titled *Development of a Multivariate Logistic Model to Predict Bicycle Route Safety in an Urban Area*, are due to be published in the near future.





## Traffic Congestion

### COUNTING CARS

Janice Daniel, assistant professor of civil and environmental engineering at NJIT, knows how to do sophisticated mathematical analyses of complex data. But when she describes the day-to-day business of designing congestion strategies for dealing with traffic problems, she smiles. “It’s easy,” Daniel says, “it’s all about counting cars.”

Addressing New Jersey’s automobile commuting patterns means working with industry, local and state planners, and strategizing ways to get commuters to change their own values, particularly their tendency to favor autonomy behind the wheel even if it means sitting in traffic. “We need smarter growth,” Daniel says. “We can’t continue sprawling.”

But to do that, businesses will have to be convinced that locating new facilities in rural areas means workers may have frustrating commutes — particularly since those employees may not choose to move closer to their new workplace. Yet with rural areas often seeking new office parks as good ratables, that can be a tough sell.

“The bottom line is design,” says Daniel. If areas like downtown Newark could be made more attractive to business and industry, people would gravitate toward using mass transit and give up their cars.

Meanwhile, relieving some of the traffic on New Jersey’s major arteries means addressing the congestion brought on by the success of the ports of Newark and Elizabeth. “We have trucks waiting for hours to pick up their loads. Then they get on the Turnpike at rush hour. There has to be a better way,” Daniel says.

She has been working with Maher Terminals, one of the port’s largest container shippers, to try to eliminate bottlenecks. Things should flow more smoothly when the Portway, a vastly improved highway and rail grid, opens later this year. (See story.)

Getting commuters to use mass transit for shorter trips, particularly where there is good bus service, is another piece of the puzzle, she says. But there Daniel runs into two competing interests. For buses to run on time, it will be necessary to put their schedules ahead of those of motorists. For instance, configuring Newark’s Broad Street to be bus-friendly means blocking one lane for other vehicles. One of Daniel’s research interests at NJIT has been a national plan to construct “bus nubs,” basically building sidewalks that jut out into the road so buses can pull in front of them to board passengers. “It definitely makes it worse for cars. “But mass transit is the only alternative to our problems,” says Daniel. “You can’t have it both ways.”

### A MOVING NJIT EXPERIENCE

NJIT offers interdisciplinary master’s degree and Ph.D. programs in transportation that combine studies in engineering, urban planning and management. In 2002, 209 people graduated with master’s degrees and 11 earned doctorates.



Today, over 12 percent of all U.S. international container trade — more than 375 million tons annually — moves through northern New Jersey. The New Jersey International Intermodal Transportation Corridor, as it is officially known, connects ports, airports, rail lines and major highways in a system to get the goods to market — a system that includes not only the New York-New Jersey metropolitan area but the U.S. Midwest and even Canada.

Federal forecasters predict a 10 percent increase in tonnage by 2040. But their prediction comes with a big “if” — the completion of a \$773.7 million package of proposed improvements designed to keep the freight moving. Central to that package is the completion of Portway.

The Portway program is also expected to create jobs on a scale not seen in Newark since World War II. As of this year, there were approximately 180,000 port-related jobs in the New York-New Jersey area. By 2040, that could climb to 400,000 jobs, about half in indirect employment such as assembling goods. Although some jobs will be at satellite terminals 75 to 300 miles away from Newark and Elizabeth, planners hope that many will remain closer.

### Dealing with the empties

Despite the “containers for sale” billboards, the piles of empty shipping containers at Port Newark and the Port Authority Marine Terminal in Elizabeth keep getting higher and spreading out. It’s a big problem.

“It’s not economical to recycle the steel,” says Spasovic. “Nor is it cost-effective to send the containers back because it’s cheaper to buy a new container than pay to ship it back to Asia or Europe. So we’re seeing container junkyards.”

When container transport became a major business several decades ago, what to do with the empties was not a problem. The ships brought in the containers from the Far East and elsewhere. Trucks pulled up to the docks and unloaded the containers. Then more trucks arrived and filled them with goods and produce to be shipped out.

But New Jersey no longer exports as much. From trinkets to electronics, the goods in our stores are increasingly coming from abroad. The Newark-Elizabeth port complex unloaded 1.6 million full containers in the first 11 months of 2002 but shipped out only 688,000, according to figures from the Port Authority of New York and New Jersey.

While our region’s economy is strong enough to support an ever-growing appetite for goods, it no longer manufactures those goods. In fact, says Fallat, even goods labeled as put together in the U.S. are often foreign goods trucked down the New Jersey Turnpike to warehouses in central New Jersey. Since workers put them into packages there, they can be labeled as “assembled in the U.S.” The result is that a new skyline feature now blights the Port area — stacks of empty containers.

NJIT and the North Jersey Transportation Planning Authority (NJTPA), which approves federal funding of transportation projects, are studying the problem. Fallat says NJIT research suggests encouraging companies to find other sites for storage. To jobs-and-ratables-hungry Newark, for instance, storing containers is a viable use of some vacant lands in industrially zoned areas.

Simply ordering companies to remove them would seem to be a common-sense solution, but there are concerns that this might drive away business, Fallat says. Yet if the containers are not removed, their presence may slow another major quest of NJIT’s transportation planners. That goal is to clean up and reuse abandoned or underutilized industrial sites known as “brownfields” in some quarters.

There are thousands of brownfield acres in the region. A comprehensive report by NJIT and the North Jersey Transportation Planning Authority calls for incentives to reduce container storage on vacant lands near the ports. For example, the Port of Hampton Roads in Virginia has dealt with a similar problem by setting up a quota system.

As people realize the potential of the acreage available for redevelopment, Spasovic says the term brownfields is falling into disuse. “Brownfields suggests these lands are contaminated when they really are not,” he says. “Maybe grayfields would be better.”

Working with the McGreevey administration and the new Office of Smart Growth, NJIT researchers are looking to make these sites as attractive as “greenfields” — the term state planners use for former farmlands now housing acres of warehouse and assembly operations near the New Jersey Turnpike’s Exit 8A in Middlesex County. As Spasovic and NJTPA principal investigator John Hummer conclude in their report on brownfield redevelopment, the economic, environmental and social benefits to New Jersey that can be realized from linking brownfield site reuse with trade growth are tremendous. ■