



2009-10

# Annual Report

MORGAN STATE UNIVERSITY NATIONAL CENTER  
FOR TRANSPORTATION MANAGEMENT, RESEARCH & DEVELOPMENT

The 2009-10 Annual Report highlights research, educational, and outreach activities conducted by the National Transportation Center at Morgan State University from September 1, 2009, to August 31, 2010.

Located in Baltimore, Md., Morgan State University is a doctorate-granting and research-intensive public urban university.

The National Transportation Center (NTC) at Morgan State University is committed to transportation research and education that support the well-being and economic development of communities.

### **Theme**

The NTC's theme is "Transportation: A Key to Human and Economic Development." The center's research examines how multi-modal surface transportation systems affect people, particularly in terms of socioeconomics, equity, efficiency, technology, the environment, and safety. As a complement to this theme, the center aims to increase the numbers of minorities and women in transportation careers.

### **History**

The NTC is officially known as the Morgan State University National Center for Transportation Management, Research and Development. The center is part of the U.S. Department of Transportation's University Transportation Centers (UTC) Program. The NTC is also a member of the Council of University Transportation Centers.

The NTC was established by Congress under the Intermodal Surface Transportation Efficiency Act of 1991; reauthorized in 1998 by the Transportation Equity Act for the 21st Century; and reauthorized again in 2005 by the Safe, Accountable, Flexible, Efficient Transportation Equity Act—a Legacy for Users.

### **About the Cover Photo**

On April 2, 2010, Gov. Martin O'Malley led the groundbreaking for the NTC's future home, the Center for the Built Environment and Infrastructure Studies. By fall 2012, the building will also house the School of Architecture and Planning, the Department of Civil Engineering, and the Department of Transportation and Urban Infrastructure Studies. From left to right: Dr. Eugene DeLoatch, dean of the School of Engineering; Monika Davis, an architecture student; Dr. Mary Anne Akers, dean of the School of Architecture and Planning; Dr. David Wilson, MSU president; Gov. O'Malley; Dr. Earl Richardson, former MSU president; and the Hon. Laurence Levitan, member of the university's board of regents. Photo by Paul Greene/Morgan State University.



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# MANAGEMENT STRUCTURE

The NTC's director devises and manages programs, supervises the center's staff, and ensures that the center's objectives and contractual and financial responsibilities are met. The director also meets with representatives from the Research and Innovative Technology Administration (RITA) and other UTCs to share experiences and establish national priorities for transportation research and education.

The director leads the center under the guidance and direction of the Dean of the School of Engineering. The NTC Advisory Committee, which meets with the center's staff three times a year, also provides guidance and advice on the center's activities.

Four full-time staff members and two contractual employees support the NTC's programs. Additional contractual personnel, faculty and students, are hired to fulfill specific project requirements. All employees report directly to the center director.

## KEY PERSONNEL



**Dr. Andrew Farkas**  
*Director*



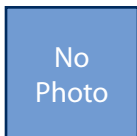
**Dr. Eugene DeLoatch**  
*Dean of the School of Engineering*



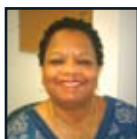
**Anita Jones**  
*Administrative Assistant*



**Dr. Hyeon-Shic Shin**  
*Assistant Research Professor*



**Erica Johnson**  
*Communications Manager/Editor*

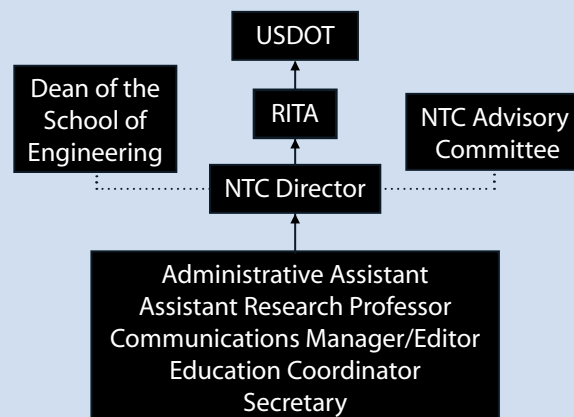


**Valencia Baker**  
*Education Coordinator*



**Sonia McDonald**  
*Secretary*

## ORGANIZATIONAL CHART



## NTC ADVISORY COMMITTEE

### Elizabeth Baker

Regional Administrator  
National Highway Traffic  
Safety Administration

### Adiele Nwankwo

Senior Vice President  
Central Region  
PB Americas

### Nathan Beil

President  
KCI Technologies

### Edward H. Power

Senior Vice President  
HDR Engineering, Inc.

### Nelson Castellanos

Division Administrator  
Federal Highway  
Administration

### Clyde Pyers

Retired  
Maryland State Highway  
Administration

### Alfred H. Foxx

Director  
Baltimore City  
Department of  
Transportation

### Jay P. Watkins

Chief Executive Officer  
Construction  
Management

### Ronald L. Freeland

Executive Secretary  
Maryland Transportation  
Authority

### Paul J. Wiedefeld

Administrator  
Maryland Transit  
Administration

### Bob Garrett

Manager  
Bureau of Municipal  
Services  
Pennsylvania Department  
of Transportation

### Richard Y. Woo

Director  
Office of Policy & Research  
Maryland State Highway  
Administration

### Gail McFadden-Roberts

Community Planner  
Region 3  
Federal Transit  
Administration

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**THE NATIONAL TRANSPORTATION CENTER** at Morgan State University is pleased to present its fourth annual report under the current UTC grant.

Education, technology transfer, and research are the three fundamental components of the UTC program and NTC. The NTC devotes many resources to research because it yields solutions, expands the knowledge base, and provides students with valuable educational opportunities. Transportation research is critical to increasing accessibility, mobility, safety, and economic development.

National policy has become more supportive of scientific research because of concerns for climate change, energy dependence, air quality, and human health. However, some stakeholders of university transportation research have questioned its direction, relevance, and redundancy.

Regarding redundancy, the scientific method requires that research be replicated and that hypotheses be tested repeatedly and rigorously. The findings of social science and engineering-based research are often not conclusive. Such research has to be applied to different circumstances, locations, environments, and time periods, because we do not travel or ship goods in controlled laboratories. When there is voluminous and robust literature on a topic, there is a stronger foundation for testing hypotheses in the “real world.”

Interdisciplinary research is the best way to assure stakeholders about the direction and relevance of research. The NTC’s research has involved faculty, staff, and students in transportation, civil engineering, marketing, sociology, psychology, public health, biology, ecology, and chemistry. The investigations examined transportation’s relationships with funding and public policy, land use and traffic modeling, facilities engineering, motorcycle safety, impaired driving, senior mobility, and aquatic ecology. The topics are relevant, timely, and nationally significant, and various government and industry experts have peer-reviewed the projects. The NTC’s project results could potentially shape the policy and procedures of local and national organizations.

Please take a close look at all that we have accomplished, not only in research but also in our other activities.

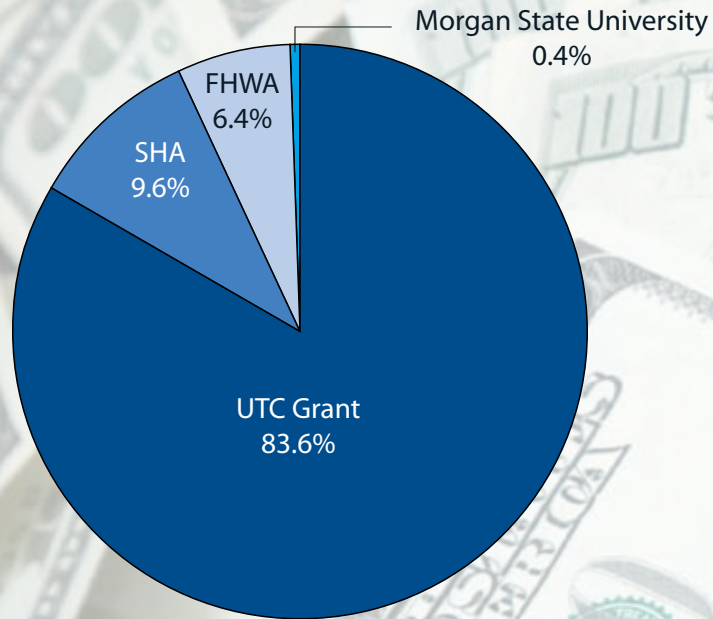
**Dr. Andrew Farkas**  
Director  
National Transportation Center

# FUNDING AND EXPENDITURES

The NTC's funding sources provided over \$1 million. The pie charts on this page show where the money came from and how it was spent. However, the remainder of the report will illustrate the outcomes of the investment.

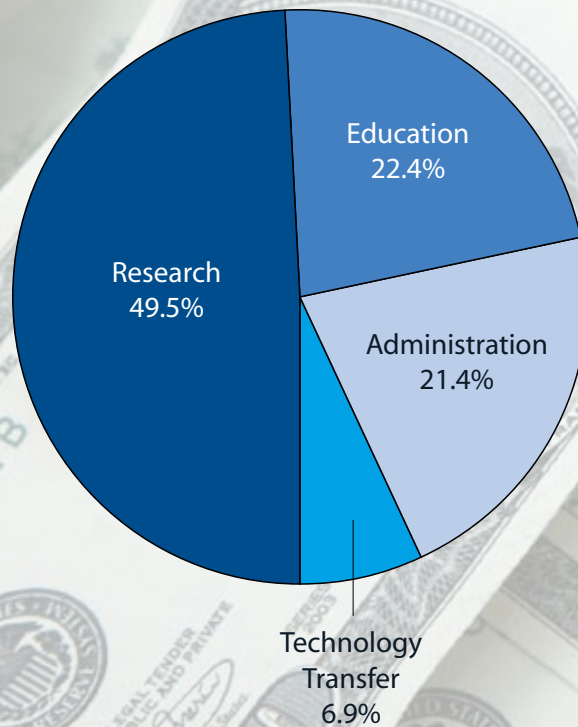
## REVENUE

\$1,195,756.17



## EXPENDITURES

\$1,233,388.85





Awards and opportunities  
taking students  
from backpacks  
to business cards

**FIFTY-EIGHT STUDENTS AND 11 TEACHERS** directly benefitted from the NTC's educational efforts during the 2009-10 grant year.

- Through the Transportation Systems Scholarship, the NTC provided a total of \$10,500 to the 19 students who are enrolled in Morgan's undergraduate program in transportation systems.
- Despite hiring freezes and funding constraints, nine students were selected for paid internships with SHA and MDOT because of the NTC's ongoing partnerships with the agencies.
- The NTC selected five Eisenhower HBCU Fellows and five NTC Fellows, all of whom received awards that will fund their education and research.
- The NTC's promotion of the Maryland Transit Administration's internship with its Red Line consultants led to practical work experience for four students.
- The Summer Transportation Institute introduced 18 high school students to educational and career opportunities in transportation.
- The Teacher Transportation Institute—which focuses on linking math, science, and technology to transportation topics—showed 11 secondary school educators a new way to teach and motivate their students.



*“Of the opportunities MSU has granted me thus far, I think **the MDOT internship is most meaningful** because it gives me hands-on experience with the transportation industry, ties into my coursework at MSU, and gives me ideas for research projects.”*

**Myeisha Bell**

*MDOT-MSU Graduate Intern*

*MTA Intern*

*NTC Fellow*

## **2009-10 FELLOWS, INTERNS, AND SCHOLARSHIP RECIPIENTS**

### **Eisenhower HBCU Fellows**

Bimal Devkota  
Ijeoma Marian Ihuoma  
Gholamhossein Mazloomdust  
Amir Naeeni  
Francis Udenta

### **NTC Fellows**

Myeisha Bell  
Celine Kalembo  
Natasha Koduah  
Sheila Rivers  
Naveed Shah

### **Maryland Department of Transportation- Morgan State University Graduate Interns**

Ato Bekoe  
Myeisha Bell  
Sriram Jayanti  
Adam Howell  
Mary Kariuki  
Chcolby McFarland  
Dayna Taitt

### **Transportation Systems Scholarship Winners**

Akeem Bryant  
Lauren Campbell  
Harvey Diggs  
Fathy Elgendi  
Shawn Ellerbe  
Nakisha Gaddy  
Fongoh Gwanvoma  
Tavon Hawkins  
Ashley Jones  
Leslie Jones-Cook  
Jonathan McCoy  
Danielle Nance  
Lester Oates  
Jordan Ogburn  
Bakari Smith  
Richard Stuller  
Maurice Sylver  
Nina Tambe  
Nollan Thomas-White

### **Maryland State Highway Administration Summer Interns**

Joel Hall  
Stacey Oriafo

### **Maryland Transit Administration Summer Interns**

Myeisha Bell  
Crystal L. House  
Lyneisha Jackson  
Charles E. Miles IV

## Naveed Shah and Myeisha Bell



Over 340 students, faculty, and policymakers saw Naveed Shah (center) receive his Student of the Year certificate at the Council of University Transportation Centers' 13th Annual Awards Banquet in Washington, D.C. Photo credit: CUTC website

### Naveed Shah

NTC Student of the Year  
NTC Fellow

Of all the awards Naveed Shah received this year, NTC Student of the Year has meant the most professionally and personally.

"It gave me a sense of achievement," Shah said. A brief survey of his resume illustrates years of impressive work.

In 1999, Shah received his undergraduate degree in civil engineering from Mehran University of Engineering & Technology in Jamshoro, Pakistan. For nearly three years, he was a research engineer for Pakistan's federal government. In that time, Shah presented two research papers at the 2nd and 3rd International Civil Engineering Congress.

Since 2006, he has been a civil engineer and project manager for Harford County's Department of Public Works. He is responsible for maintaining county roadway infrastructure, and he is developing a methodology to improve the county's storm drain system.

Shah, who is pursuing a master's of science in transportation, is also the recipient of NTC Fellowship.

"He's very hard-working, persistent," said Dr. Mansoureh Jeihani, a frequent investigator for NTC projects and an assistant professor in the Department of Transportation & Urban Infrastructure Studies. Dr. Jeihani taught Shah in two classes. "He's a good student," she said.

### Myeisha Bell

MDOT-MSU Graduate Intern  
MTA Intern  
NTC Fellow

Myeisha Bell has collected three honors from the NTC, and each has brought her closer to accomplishing her professional goals.

"My research interests are traffic design and sustainable energy. I hope to one day implement a new transportation system that decreases traffic congestion and air pollution," she said.

For eight weeks this summer, Bell interned with Whitman, Requardt & Associates, one of the Maryland Transit Administration's consultant firms for its Red Line project. The Red Line will expand Baltimore's existing public transit system and create faster east-west travel through the city. Bell assisted project managers, mentored high school students, and helped survey how the Red Line would affect specific areas.

As a MDOT-MSU graduate intern, Bell will work in the Maryland Aviation Administration's Office of Planning and Environmental Services through July 2011. She will write and compile proposals for BWI and Martin State Airports, work with aviation management, and research a sustainable energy plan for BWI.

The NTC Fellowship has helped her avoid student loans as she pursues her master's in transportation engineering. It has also allowed her to assist in Dr. Jeihani's new research on digital speed display signs.



"Pursuing my master's at Morgan State University has opened the door to so many opportunities, all of which I am grateful for receiving," Bell said.

The STI teachers and participants visited the Association of Maryland Pilots. The association's pilots navigate all commercial ships in Maryland waters. According to the group's website, it is America's oldest state-codified organization of ship handling specialists.



## SUMMER TRANSPORTATION INSTITUTE 2010

**FOR 14 YEARS**, each component of the NTC's Summer Transportation Institute (STI) has been included in pursuit of one goal: to develop a well-qualified workforce for the transportation industry.

The interactive design projects hone students' math, science, and engineering skills. Discussions with industry professionals expose students to career paths and illustrate the importance of mentors. SAT tutoring prepares students for college entrance exams. Field trips show students that classroom concepts have a real-world application.

It is hoped that these efforts provide the high school participants with the foundational skills necessary to pursue industry careers. The 2010 participants' program evaluations indicate that these experiences have opened their eyes to new possibilities. However, surveys of current and former participants show that it takes more

than four weeks to transform curiosity into a career.

### **The Participants and the Curriculum**

This year's STI program exceeded its recruitment goal of 15-20 students. Of the 28 who applied, 21 were accepted, and 18 completed the program. The students represented grades 10-12 and schools in Baltimore City; Nigeria; and Baltimore, Howard, and Prince George's counties. The students' surveys showed that parents are the most effective recruiters, with more than half of the participants learning about STI from a parent.

Valencia Baker, the NTC's education coordinator, organized this year's program around global positioning system (GPS) technology's use in transportation.

"Students are familiar with it in cars [as a navigational tool], but they're not familiar with GPS as tool for

***“I’ve learned a lot being in this program...I know that even though I want to be a lawyer and business major, I can still have a career in the transportation industry.”***

**Destiny Wiggins**  
*STI Class of 2010*

disaster relief and a tool for rescue and recovery,” Baker explained.

The program was held July 2-30. The curriculum’s 11 field trips emphasized the technology’s full scope, and Baker was impressed by the students’ insightful questions and eagerness. They peppered representatives of the Association of Maryland Pilots with questions on how a GPS on a boat differs from one in a car. They asked Coast Guard members how they use GPS to locate people lost at sea who can’t identify their locations.

“Their willingness to learn something new was fascinating,” said Baker. “They were not familiar with the whole process of geocaching, but they were so enthused about it because they could map a location into the GPS device, get in the van, get close to that location, get out of the van, and find the caches that had the treasures in them. It was just fascinating to watch them.”

### **How Students Rated the Program**

Consistently, STI participants name their new friendships as a highlight of the program. However, the three students selected to speak at the STI awards banquet also credited the program with changing their perception of the industry.

“The trip to the U.S. Department of Transportation started to get me thinking about an engineering career and began to pull me away from architecture,” said Vashti Pyatt, a rising junior at Western Senior High School. “I never thought that I would change my view about a career in the engineering field.”

Student evaluations of the overall program illustrated near unanimous satisfaction with STI’s components (especially the staff and field trips), and all indicated that they would recommend the program to their friends.

The NTC also instituted two surveys in order to gauge STI’s influence on participants’ educational and career goals. The preliminary survey asked students about their expectations for the program, and the closing survey asked whether those expectations were met. The results show that the curriculum’s college planning component fulfilled objectives and exceeded students’ hopes, but the professional and academic elements

left students wanting more.

Before STI began, 17 students expected to learn about educational opportunities in transportation; after STI ended, 16 students felt aware of such opportunities. Sixteen students expected information on transportation careers, and thirteen felt that they had been provided with it. Thirteen students thought that their STI experience would help improve their science grades and ten thought that it would help improve their math grades. At the end of the program, nine students felt that STI would help their grades in each subject.

The participants’ suggested improvements included extending



*The students learned mapping skills to prepare for geocaching, a treasure-hunting game that uses handheld GPS devices.*



At the STI banquet, participants Vashti Pyatt (left) and Destiny Wiggins (right) turned the tables and publicly acknowledged Valencia Baker's work with the program. "Mrs. Baker's influence on the program can't be put into words," Pyatt said.

the program by a few weeks, increasing the amount of SAT preparation, and allotting more time for design projects.

### **STI's Long-Term Effects?**

The NTC contracted Dr. Natasha Pratt-Harris, a professor in Morgan's Department of Sociology and Anthropology, to develop and implement the aforementioned surveys and an online survey of STI alumni. Over 200 students have participated in the NTC's program between 1997 and 2009, and the ongoing survey asks how STI affected their college and career decisions.

Thus far, the majority of the respondents remember the program as informative and a positive experience, but one noted the following:

*When I attended the program, you were only allowed to do the program for one year. The reason I would say it didn't affect my life and course to college, is because I took the program early in high school and I was never contacted by the program until now. For students that may not have access to other college-bound programs, you should try to keep in touch more with students (when they begin preparing for college, through their years in high school, and even after high school), to have mentors and possible guests to come in and talk to current students, to have a peer to talk about school, etc.*

In July, the MSU Summer Transportation Institute Alumni Group was established on Facebook, the popular social networking website. While follow-up activities will require more funding and involvement from sponsors and non-governmental partners, the efforts will fortify students' interest in transportation.



Forty percent of the TTI was devoted to the mathematics of bridge construction.

*“The **collaboration** between math and science teachers in this program has been unbelievable, **phenomenal.**”*

**Julia Van Hook**  
TTI 2010 Participant



The TTI participants were recognized at the STI awards banquet.



## TEACHER TRANSPORTATION INSTITUTE 2010

The NTC’s second annual Teacher Transportation Institute for math and science teachers was held July 19-30. The 11 participants’ classroom experience ranged from 2 to 31 years, and they all had the same goal: to learn new methods to motivate their students.

In 2009, TTI ran for one week and focused on various supplemental classroom activities. The 2010 program gave the teachers a specific answer to students’ age-old question, “How can I use this?” The teachers were introduced to civil engineering as a career over two weeks of field trips, design projects, and guest speakers. Each activity emphasized the math and science involved in bridge building, from site planning to construction.

“It’s going to help me encourage students to see the world in a larger perspective,” said Michael Chambers, a math teacher at Crossroads Center, an alternative school in Baltimore County.



***“It’s amazing because most of the universities provide funding for TRB for the annual meeting. Some of them don’t even do that, and I think that the opportunity to come to another session focused on what each of us does, and not just the annual meeting, is huge.”***

**Aikaterini Rentziou**

*M.S. candidate at Iowa State University  
TRB Travel Scholarship Recipient*

The NTC’s technology transfer activities focused on enhancing the dialogue between students and industry professionals.

## **APTA WEBINAR**

The NTC hosted the American Public Transportation Association’s first Workforce Development Student Symposium on November 10, 2009. The event focused on the skill set that students need to develop and the recruitment strategies that employers should use to move the industry forward.

The workshop was held in Morgan’s Schaefer Building Library and streamed live on APTA’s website to make the discussion accessible to a large audience. On-site panelist Dr. Farkas promoted the NTC’s efforts to extend learning opportunities outside of the classroom for students at every grade level.

## **TRB CONFERENCE**

The benefits of networking with professionals was also the impetus for the NTC’s sponsorship of the Transportation Research Board’s 4th International Conference on Financing Surface Transportation in the United States. The three-day event in New Orleans attracted over 200 professionals, government officials, and academics from across the United States, and the NTC’s sponsorship provided travel scholarships that allowed seven students to attend the conference for free.

Naveed Shah, the NTC’s 2010 Student of the Year and a civil engineer for Harford County, was one of the scholarship recipients who benefitted from the experience in several ways.

“One thing, of course, is the knowledge,” Shah said. “I really learned a lot of stuff like how the federal government is thinking about how it funds projects on the state and local level. Private

and public partnership is the second thing—how they are facing challenges and how they are doing it. The third thing is meeting all of the professionals in the public and private sector, even some on the executive level.”

The conference focused on finding new funding sources for transportation surface projects and presented the latest research findings and policy analyses. The scholarship recipients were selected based on their research interests and educational goals.

Price Armstrong, an MPA candidate at the University of Oregon, is interested in transportation finance because he believes that the way it is financed determines how it looks. His specific interests include bike and pedestrian infrastructure, and he would eventually like to play a role in transportation policy. He was excited by the candid and contentious debate at one of the conference’s first sessions on whether a vehicle miles traveled (VMT) tax is a “green” finance method.

“In that larger group I think you got to see the actual diversity of opinions, and I think that’s really valuable, especially as a person going into transportation,” he said.

The conference also featured a student video competition sponsored by the University of Iowa. One of the winners, Allison Reiter, is pursuing a bachelor’s degree in communications studies and journalism at the University of Iowa. Despite her major, she recognized the relevancy and importance of the conference. Reiter’s video, *Road Scholars*, illustrated how the public overestimates the amount of

money spent on roads.

“As I was telling someone else, working at the [University of Iowa’s] Public Policy Center and this video have made me more aware of the road. It’s just something you don’t think about and it affects a lot of people,” Reiter said. “I tell my boyfriend ‘these roads are horrible’ as soon as we leave the toll roads. The roads are good with tolls and then you leave, and it’s like, ‘Oh.’ You can already tell a difference. I’m just more aware of that.”

Over 200 professionals from around the world attended the TRB’s transportation finance conference. The NTC cosponsored the event.

Aaron Malinoff, a student at the University of California, Berkeley, presented a poster on financing transit improvements to achieve California’s climate change goals, and the conference helped address his questions about changing funding ideas from specific programs and projects to more programmatic ideas.

“Somebody raised, in one of the plenary sessions, the idea of a transportation trust fund rather than a highway trust fund,” Malinoff said. “I think that certainly gave a lot more concreteness to the thought that I had about how you dedicate sources for transportation funding, instead of having it just be a general fund expenditure.”

Several of the student attendees were weeks away from finishing their postgraduate degrees. As Victor Mendez, the administrator of the Federal Highway Administration, said in his remarks at the conference’s opening breakfast, “It’s nice to see the younger generation learning about what we do.”



### TRAVEL SCHOLARSHIP RECIPIENTS

- Price Armstrong, *University of Oregon*
- Eric Ganther, *San Jose State University*
- Marc Howlett, *University of North Carolina at Chapel Hill*
- Lisa Jacobson, *University of Pennsylvania*
- Catherine Lowe, *Cornell University*
- Aikaterini Rentziou, *Iowa State University*
- Naveed Shah, *Morgan State University*

### STUDENT VIDEO COMPETITION AWARDEES

- Allison Reiter, *University of Iowa: Road Scholars*
- Alexandra Sweet, *University of Pennsylvania: Fahrenheit I-95*



The NTC completed two projects, selected four new projects, and continued research on five others.

The completed projects—**Assessing the Magnitude of Polycyclic Aromatic Hydrocarbon Loading From Road Surface Runoff and Its Effect on Algal Productivity** and **Trip Generation Studies for Special Generators**—were both funded by the NTC. **Trip Generation Studies for Special Generators** was done in cooperation with the Maryland State Highway Administration (SHA).

The new project **Susceptibility of Eastern Oyster Early Life Stages to Road Surface Polycyclic Aromatic Hydrocarbons (PAHs)** builds upon the findings of the completed investigation into runoff's effects on algae. The new study will examine how PAHs affect oyster development. Maryland has made a major commitment to oyster aquaculture, and an understanding of how transportation affects the organism could be critical to the industry's success or failure. The project, led by Morgan's Estuarine Research Center, is a collaboration with St. Mary's College of Maryland and the University of Maryland Center for Environmental Science's Chesapeake Biological Laboratory.

It is generally acknowledged that there is insufficient research on public transportation issues, so the NTC funded a new transit research effort. **Mathematical Model for Analyzing the Feasibility of Accelerated Rail Transit Operation: Focusing on Alternate Stations Stopping Service** will mathematically define the feasible conditions that can improve the overall benefits of a rail transit alternate stations stopping scheme.

The NTC's sponsorship of the TRB's conference on surface transportation finance and research focus on that topic resulted in **The Mediating Role of Motorists' Evaluation of Current Roadway Conditions in Determining Their Willingness to Pay for Future Improvements**. This research examines the public's willingness to pay for projects aimed at improving congestion, pollution, and safety.

# The NTC committed more than \$610,000 to research activities during the 2009-10 grant year.

Historically, safety has been a fertile area of research for the NTC. **Evaluating the Effectiveness of Dynamic Speed Display Signs** will use conventional statistical analysis and the Bayesian network concept to determine whether the signs slow drivers. Dynamic speed display signs measure and digitally present the speed of vehicles approaching the device.

All of the aforementioned projects are examples of basic research (as they involve theory development, scientific experimentation, generation of primary data, and modeling cause and effect). Nonetheless, their findings and conclusions could lead to real-world applications.

In the past few years, faculty from the Department of Transportation and Urban Infrastructure Studies have conducted several applied research projects regarding land development, traffic generation, and traffic flow modeling.

In that same vein, the SHA and NTC have funded **Cumulative Impact of Developments on the Surrounding Roadways**, an investigation of how built developments' collective trips affect a multi-roadway corridor. The SHA selected the project through its 2009-10 solicitation and peer review of problem statements for State Planning and Research (SP&R) funding.

The SHA also selected two problem statements for 2010-11 SP&R funding, proving that the NTC's new investigative interest in transportation systems' effect on aquatic ecology has paid off. Both projects' proposals have yet to be completed, but Morgan State faculty and researchers are the anticipated project leads. The two projects—**Evaluation of Waste Concrete Road Materials for Use in Oyster Aquaculture** and **Identification of Techniques to Meet pH Standards During In-stream Construction**—will be considered for NTC funding after the proposals are ready for review.

Final reports for completed projects and project descriptions of new and ongoing work can be found on the NTC's website at [www.morgan.edu/soe/ntc](http://www.morgan.edu/soe/ntc).

## NEW PROJECTS

### **Evaluating the Effectiveness of Dynamic Speed Display Signs**

Principal Investigator (PI): Dr. Mansoureh Jeihani  
Sponsoring Organization: NTC

### **Mathematical Model for Analyzing the Feasibility of Accelerated Rail Transit Operation: Focusing on Alternate Stations Stopping Service**

PI: Dr. Young-Jae Lee  
Sponsoring Organization: NTC

### **The Mediating Role of Motorists' Evaluation of Current Roadway Conditions in Determining Their Willingness to Pay for Future Improvements**

PIs: Dr. Michael Callow and Dr. Nathan Austin  
Sponsoring Organization: NTC

### **Susceptibility of Eastern Oyster Early Life Stages to Road Surface Polycyclic Aromatic Hydrocarbons (PAHs)**

PI: Dr. Chunlei Fan (Morgan State University Estuarine Research Center) and Dr. Randolph K. Larsen (St. Mary's College of Maryland)  
Sponsoring Organization: NTC

### **Cumulative Impact of Developments on the Surrounding Roadways**

PI: Dr. Mansoureh Jeihani  
Sponsoring Organizations: NTC and SHA  
Contract/Grant Number: SP009B4R

## ONGOING PROJECTS

### **A Comprehensive Review of Motorcycle Crashes in Maryland**

PI: Dr. Mansoureh Jeihani  
Sponsoring Organization: NTC and SHA  
Contract/Grant Number: SP909B4J

### **Line-Striping Life Cycle Analysis Phase II**

PI: Dr. Young-Jae Lee  
Sponsoring Organizations: NTC and SHA  
Contract/Grant Number: SP808B4P

### **A Social Network Analysis of Alcohol-Impaired Drivers in Maryland: An Egocentric Approach**

PIs: Dr. Ashraf Ahmed and Dr. Andrew Farkas  
Sponsoring Organizations: NTC and SHA  
Contract/Grant Number: SP808B4E

### **The Influence of Custodial Care of Children Among Elderly African Americans on Their Travel Behavior and Transportation Needs**

PIs: Dr. Robert J. Smith and Dr. Stella Hargett

Sponsoring Organization: NTC  
Contract/Grant Number: 0608-002

### **Implementation of the Concrete Maturity Meter for Maryland**

PI: Dr. Robert Johnson  
Sponsoring Organizations: NTC and SHA  
Contract/Grant Number: SP708B4K

### **COMPLETED PROJECTS**

#### **Assessing the Magnitude of Polycyclic Aromatic Hydrocarbon Loading From Road Surface Runoff and Its Effect on Algal Productivity**

PIs: Dr. Jon T. Anderson (Morgan State University Estuarine Research Center) and Dr. Randolph K. Larsen (St. Mary's College of Maryland)  
Sponsoring Organization: NTC

Summary: The hypotheses of the study were that PAHs washing off roads would retard the growth of aquatic life-supporting algae and promote the growth of harmful, toxin-producing algae in estuaries, such as the Chesapeake Bay. Runoff from various road surfaces was tested for PAH concentrations. The tests revealed PAHs and heavy metals in various concentrations. The research results show that road surface runoff does not seem to affect algae detrimentally after a few days under normal summer conditions. Either the chemicals in the runoff degrade over time or bacteria in the runoff break down the chemical pollutants. In both cases, once the PAHs degrade, they seem to stimulate algal growth. The one exception is *Chaetoceros*, a beneficial algae, which was negatively affected by both 1 percent and full strength concentrations on newly paved and low traffic asphalt. Since PAH levels were relatively low for those two sites, it is possible that the response was not due to PAHs from these road surfaces but to heavy metals. Brackish water algae, such as *Chaetoceros*, may experience toxicity from the PAHs and heavy metals. *Chaetoceros* contains significant fat reserves in which PAHs and heavy metals could accumulate. As those algae are consumed by an aquatic organism, such as oysters, the PAHs and heavy metals may become concentrated in the organism.

#### **Trip Generation Studies for Special Generators**

PI: Dr. Mansoureh Jeihani  
Sponsoring Organizations: NTC and SHA  
Contract/Grant Number: MD-09-SP808B4J

Summary: This research examined how town centers and senior housing affect surrounding roadways and transit. The two development types have become increasingly prominent in Maryland. The Institute of Transportation Engineers (ITE) Trip Generation Manual, which determines the number of trips produced or attracted by different developments, does not include town centers. It has also been argued that the ITE manual underestimates

senior housing trip rates. The results verify that the ITE manual underestimates trips generated by age-restricted housing. The ITE trip rates are one-third of the calculated ones. However, the studied age-restricted developments generated 27 to 63 percent fewer trips than regular housing. The results have been sent to the ITE for incorporation in its manual. Town centers seem to have trip generation patterns that are completely different from shopping centers. Therefore, town centers need to be included as a new category in the ITE manual.

## RESULTS USED BY STAKEHOLDERS

Three NTC projects have provided the SHA with valuable information that could help improve Maryland's roads.

**Trip Generation Studies for Special Generators** examined the accuracy of trip rate estimates for town center and senior housing developments.

**Estimation of Traffic Recovery Time for Different Flow Regimes on Freeways** created a set of linear regression models that can enhance SHA's incident response.

**Statewide GIS Mapping of Recurring Congestion Corridors** supplied exploratory research for the SHA's ongoing development of short-term traffic management tools for chronically congested roadways.

The Office of Planning and Preliminary Engineering will use the results of **Trip Generation Studies for Special Generators** as another data point in the evaluation of traffic impact studies for town center and senior housing developments.

The Office of Traffic Safety intended to implement the other projects' findings, but funding constraints are delaying application.

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## PRESENTED AT CONFERENCES

### **Life Cycle and Economic Efficiency Analysis for Pavement Marking Materials: Two-Year Data Collection for the State of Maryland**

Dr. Young-Jae Lee

TRB's Developing a Research Agenda for Transportation Infrastructure and Renewal Conference, Nov. 12, 2009

### **Estimating Non-Recurrent Post-Incident Traffic Recovery Time Under Different Flow Regimes Using Simulation Modeling**

Petronella James

TRB 89th Annual Meeting, Jan. 10, 2010

### **Assessing the Magnitude of Polycyclic Aromatic Hydrocarbon Loading From Road Surfaces and Its Effect on Algal Productivity**

J. Anderson, M. Kuschner, E. Egorova, A. Drohan, A. Heyes, R. Larsen  
American Chemical Society  
Spring 2010 National Meeting and Exposition, Mar. 21-25, 2010

### **Do Retirement Housing Developments Make Fewer Trips Than Regular Housing Ones?**

Dr. Mansoureh Jeihani

ITE Annual Conference, August 2010

### **A Descriptive Analysis of the Social Contexts of Drinking Among First Time DUI Offenders**

Dr. Kenneth Beck (University of Maryland, College Park; project's senior researcher)

Tri-Annual Meeting of the International Council on Alcohol, Drugs and Traffic Safety, Aug. 24, 2010

## ARTICLES PUBLISHED IN JOURNALS

### **Real-Time Highway Traffic Condition Assessment Framework Using Vehicle-Infrastructure Integration (VII) with Artificial Intelligence**

Dr. Mansoureh Jeihani (coauthor)  
IEEE Transactions on Intelligent Transportation Systems  
December 2009

# NTC BY THE NUMBERS



**RESEARCH SELECTION**

Number of selected research projects that are funded by the NTC's grant: 5

Number of those projects that are  
basic research: 4  
advanced research: 3  
applied research: 1

Total budget for the projects listed above: \$600,386

**RESEARCH PERFORMANCE**

Number of research papers presented at academic/professional meetings that are based on  
NTC-funded projects: 5

**EDUCATION**

Number of students participating in transportation research projects: 12

**HUMAN RESOURCES**

Number of students enrolled in advanced degree programs in engineering, transportation,  
architecture, landscape architecture, and city and regional planning:  
177 master's, 43 doctoral

Number of graduates with degrees in transportation-related concentrations:  
43 master's, 2 doctoral

**TECHNOLOGY TRANSFER**

Number of transportation seminars, symposia, or distance learning classes conducted by the NTC  
for transportation professionals: 3

Number of transportation professionals participating in those events: 389





TRANSPORTATION:  
A Key to Human and Economic  
Development



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