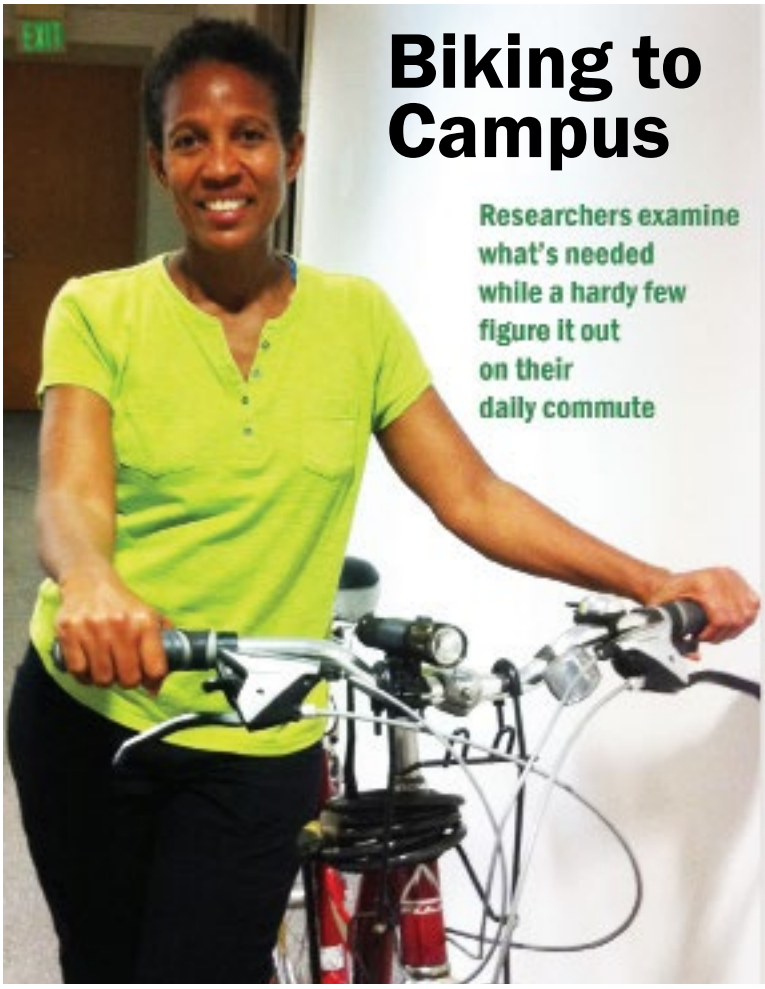
The Morgan State University National Center for Transportation Management, Research & Development Newsletter

The NTC Today

FALL 2015



Biking to Campus

Researchers examine what's needed while a hardy few figure it out on their daily commute

Dr. Petronella James leaves her home on Taylor Avenue on a typical summer morning, hops on her hybrid bike and zips through neighborhoods to Walther Avenue, which has bike lanes, en route to her job at Morgan State University.

Dr. James, who is the director of assessments and online programs in the electrical engineering department and teaches in the transportation program, arrives just after rush hour traffic. If she's sweaty, she cleans up in the bathroom – although the CBEIS building has shower facilities, it doesn't have a shelf, table or even a hook to hang the change of clothes she carries with her.

But cyclists face bigger infrastructure obstacles than the lack of a hook. On Walther, for example, the bike lane abruptly ends at several intersections to make room for car turn lanes. As she approaches those spots, Dr. James looks behind her for cars. "I'll slow down and let them pass because they're metal and I'm flesh and bone," she said.

Although she bikes daily to campus in the warmer months, Dr. James stops riding in late fall due to the onset of cold weather. "I haven't found the right gloves," she said with a laugh. In winter, though, she keeps her bike in her office for quick trips across campus or even to Lake Montebello for fun.

Her experience mirrors the findings in a study, Characterization of Bike-to-Campus Needs and Key Policies towards Successful Bicycle Promotion – Baltimore Metropolitan Area, conducted by Morgan students.

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Project Management is All in a Day's Work for MDOT/MSU Interns

Once again, the MDOT/MSU Graduate School Internship Program successfully prepared interns for the future with real-world experience that included project management and negotiating contracts.

The program pairs graduate students from Morgan State University with mentors in the agencies of the Maryland Department of Transportation.

"It was great – we had a mixture of everything," said Kaveh Kelarestaghi, a Ph.D. student in Transportation who interned at the State Highway Administration's Office of Traffic & Safety. "We had a chance to meet with people, we had real hands-on projects, and I had a chance to be the project manager on some of them."

The 2014-2015 year-long paid internship program, which this year had 17 participants, concluded with a luncheon on June 9, 2015.

Morgan Provost Dr. Gloria Gibson formally welcomed the interns and mentors, and Kevin C. Reigrut, the assistant secretary of operations for MDOT, spoke and presented interns with certificates.

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Kevin Reigrut, MDOT assistant secretary of operations

A Message from the NTC Director

DR. ANDREW FARKAS

We have been working closely with our partners in both the University of Maryland National Transportation Center for Strategic Transportation Policies, Investments and Decisions and the Region 3 Mid-Atlantic Transportation Sustainability Center led by the University of Virginia. While transportation research and education have been at the forefront of our efforts, we and our UTC partners are placing greater emphasis on technology transfer and outreach. We have always had downloadable final research reports, but now are managing our website to be even more informative. We are also now on Facebook and Twitter.

This focus on tech transfer and outreach is particularly important for us in the Baltimore Metropolitan Area. Recent turmoil in Baltimore City points out, according to Dr. David Wilson, President of Morgan State University, " … the inadequate education, persistent poverty, mistrust in police, high unemployment, substandard housing, high crime, and broken politics. These issues have persisted for years and have not been effectively and systemically addressed." Along with colleagues at the university, I was appointed by President Wilson to a Task Force to Develop a Morgan State University Action Plan for Baltimore; I look forward to the opportunity for our center to assist in this action plan.

Transportation is, of course, key to addressing most if not all of the issues faced by the city.

Transportation is, of course, key to addressing most if not all of the issues faced by the city. Research that we did years ago and recently confirmed by others indicates that Baltimore City residents still do not have transportation systems that provide swift access to suburban job opportunities. The recent cancellation by the State of Maryland of a planned light rail line in Baltimore merely highlights that the access-to-jobs problem is not easily overcome. Our center's research may not solve all urban challenges, but certainly it should be involved in deriving solutions for people. Stay tuned for more research of national and community significance.

During this past summer we also turned our attention to our nationally recognized internship and pre-college programs. We have much evidence that they have influenced students' education and career opportunities and choices over the years. We are grateful to our partners who have supported these efforts: the Maryland Department of Transportation, Maryland State Highway Administration and Federal Highway Administration. Please note the articles about the education programs featured in this issue. •

About the Center

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.

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NTC Expands Research Opportunities with Membership in MATS UTC

The National Transportation Center at Morgan State University is now a member of the Mid-Atlantic Transportation Sustainability University Transportation Center (MATS UTC).

Other universities in the consortium include University of Virginia, Virginia Tech, Old Dominion University, the University of Delaware, and Marshall University.

The consortium's research focus includes energy-efficient and environmentally sustainable modes of transportation.

Two Morgan students, Alona Green and Willine Richardson, were chosen for the MATS UTC undergraduate summer research program. •

STI, TTI Ignite Interest in Transportation

The engineering ruler fascinated the teachers in the Teacher Transportation Institute, who learned just what that three-sided instrument was for as they created a traffic roundabout to scale.

High school students in the Summer Transportation Institute were similarly amazed by the concepts and planning that go into creating a roundabout.

Both groups were part of innovative summer programs hosted by the National Transportation Center at Morgan State University to bring awareness of opportunities in the transportation field and the STEM concepts students need to prepare for them.

Six education professionals attended the 2015 Summer Teacher Transportation Institute, a two-week long workshop in which they researched traffic roundabouts and then created one of their own.

"Whenever you do something yourself, you are more apt to do it in the classroom," said Ray Tamoshunas, a teacher at Gilmore Elementary School, adding that he enjoyed guessing what was the best approach, then having his decisions challenged and ultimately backing them up with data.

Delana Penn, a librarian at the National Academy Foundation, appreciated learning about signage.

Charles Hicks, a math teacher, noted that students can be presented with real-world problems that they can solve with STEM concepts. "I'll be talking to students about what angle should a vehicle come in [to a roundabout] to get a different speed."

Ebony Myers-White, a school counselor at Carver Vocational Technical High School, said, "the best part of my experience has been visiting the State Highway Administration and seeing the different careers that you didn't have to have a degree for. A safety engineer can start as a tech, get that degree and grow to a senior level."

Twenty-five high school students participated in the 2015 four-week Summer Transportation Institute, now in its 19th year at Morgan, designed to expose them to all aspects of transportation.

"I learned that transportation is more than just the crossing guard or the bus driver – it's what makes the world go

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Eisenhower Fellowships Available

The Dwight David Eisenhower Transportation Fellowship Program is a national program that awards fellowships to students pursuing degrees in transportation-related disciplines. The Eisenhower Historically Black Colleges and Universities (HBCU) Fellowship provides HBCU students with additional opportunities to pursue transportation-related education. HBCU Fellowships also serve as a feeder for other Eisenhower fellowships.

Dr. Celeste Chavis is the campus manager for the Eisenhower program. She oversees a local competition among applicants, who are ranked by a panel after the competition. The rankings then go to the Federal Highway Administration, which decides which students will be funded and the amount of their fellowships. Last year, 175 Eisenhower Fellowship awards were made to undergraduate and graduate students at universities across the nation.

Those interested in applying for fiscal year 2016 can contact Dr. Chavis at celeste.chavis@morgan.edu. For more information, visit www.fhwa.dot.gov/tpp/ddetfp.htm •

2015 Fellows and Interns

2015 Eisenhower Fellows
Kiante Bush
Harry Wynter

2015 TRB Fellows
Alasn Jarju: M.S. Student
Jeffrey Scruggs: B.S. Student

2015 MSU/SHA Interns
Crystal West
Christopher Moller
Jarrett Raghnal
Howard Winchester

2015-2016 MSU/MDOT Interns
Enoch Nyarkoh
Adebowale Abeleje
Sultan Alrowaili
Oluwaseun Adewolu
Idemudia Amiohu
Ashley Seymour
Damilola Lawal
Laura Bianca-Pruett
Temitope Fakiyesi
Ayoola Mabinuri
Olushola Ogundele
Sushma Shrestha

New Research Projects

Integration of Multimodal Transportation Services
***Dr. Celeste Chavis**, Dr. Vikash Gayah, (Penn State) Dr. Elise Miller-Hooks, (University of Maryland) Dr. Paul Schonfeld (University of Maryland)*

Improving the Reliability of Freight Transportation
Dr. Paul Schonfeld, (University of Maryland) Dr. George List, (North Carolina State University) ***Dr. Hyeon-Shic Shin***

Understanding Regional Disparities in Public Transit Performance Using Realtime Transit Data
Dr. Aaron Golub, (Arizona State University), Dr. Alex Karner, (Arizona State University), ***Dr. Celeste Chavis***

Environmental and Safety Attributes of Electric Vehicle Ownership and Commuting Behavior: Public Policy and Equity Considerations
Dr. Andrew Farkas**, **Dr. Hyeon-Shic Shin**, Jianhe Du (Virginia Tech), Christine Risch (Marshall University),* ***Seyedehsan Dadvar, Jessica Molina

Mitigating Pollutants from Highway Infrastructure for Total Maximum Daily Load (TMDL) Compliance: Monitoring Efficacy of Best Management Practices and Advancing Decision Support
Dr. James Hunter**, **Dr. Dong Hee Kang

Multi-layered Integrated Urban Freight Delivery Network – Phase I: Identification of Policy Preferences based on Qualitative and Conjoint Analysis
Dr. Hyeon-Shic Shin**, **Dr. Michael Callow

Highway Runoff Storm Water Management Potential Site Characterization Using NASA Public Domain
Dr. Frederick Wilson**, **Dr. Oludare Owlabi

Validation of Source Approval of HMA Surface Mix Aggregate using Spectrometer
Dr. Frederick Wilson**, **Dr. Oludare Owlabi

Development of Local CalibrationFactors for Implementing the Highway Safety Manual PHASE II: Freeway Ramp Applications
Dr. Hyeon-Shic Shin

Recycled Road Material Provides Support Baby Oysters Need

Research conducted at Morgan State University's Patuxent Environmental Aquatic and Research Lab (PEARL) shows that recycled concrete from road projects can be used to create habitat for oysters without harming the ecosystem of the Chesapeake Bay.

The study, completed in February, also examined whether the recycled concrete aggregate (RCA) used to create oyster reefs would be suitable for the commercial harvesting of oysters by watermen.

When highways are resurfaced, the old concrete is crushed and milled into RCA. To restore the oyster population, baby oysters, called spat, are grown in tanks and then placed on oyster shells, which are planted on a hard reef that keeps them from sinking into the Bay's silt bottom. Traditionally, the reefs themselves were made of oyster shells, but oysters have declined so much that shells are now scarce. The Maryland State Highway Administration commissioned the three-phase study to find out if RCA would be a suitable material to support the oysters. Researchers at PEARL conducted the studies and the National Transportation Center at Morgan State University contributed funding.

"These unique studies addressed objectives for more sustainable transportation infrastructure and oyster aquaculture," said Dr. Andrew Farkas, director of the National Transportation Center. "The benefits of both could contribute to enhanced Bay water quality."

The first phase of research examined whether the RCA could harm the bay with leaching of chemicals or any unintended consequences. Laboratory experiments determined the type and quantity of leachates and the impacts of RCA on the survival and growth of juvenile oysters. The RCA leachate remained well below regulatory levels and did not raise the pH above the threshold for introduction into Maryland waters.

The second phase examined whether the RCA would affect other marine life populations. It also examined whether RCA would disrupt the use of traditional harvesting gear. Finally, the study explored the lack of regulation regarding such alternative materials.

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2015 Completed Research Projects

Phase II Evaluation of Waste Concrete Road Materials for Use in Oyster Aquaculture - Field Test
Dr. Chunlei Fan**, **Dr. Kelton R. Clark

Safety Analysis for the Prioritized Three Safety Improvement Locations on I-495
Dr. Hyeon-Shic Shin, Seyedehsan Dadvar

Stainless Steel Prestressing Strands and Bars for Use in Prestressed Concrete Girders and Slabs
Dr. Monique Head

Durability Assessment of Prefabricated Bridge Elements and Systems
Dr. Monique Head

Ongoing Research Projects

Measuring User Acceptance of and Willingness-to-pay for CVI Technology
Dr. Hyeon-Shic Shin**, **Dr. Michael Callow**, **Dr. Andrew Farkas**, **Dr. Young-Jae Lee

Driver's Willingness to Pay Progressive Rate for Street Parking
***Dr. Mansoureh Jeihani**, **Anam Ardeshiri**, Jianhe Du (Virginia Tech), Dr. Hesham Rakha (Virginia Tech)*

Connected Vehicle-Infrastructure Application Development for Addressing Safety and Congestion Issues Related to Public Transportation, Pedestrians, and Bicyclists
Dr. Kitty Hancock (Virginia Tech), ***Dr. Young-Jae Lee**, Dr. Hesham Rakha (Virginia Tech)*

Needs, Barriers, and Analysis Methods for Integrated Urban Freight Transportation
***Dr. Hyeon-Shic Shin**, Dr. Paul Schofeld (University of Maryland), Dr. Avinash Unnikrishnan (West Virginia University)*

Measuring Economic Contribution of Freight Industry to the Maryland Economy
Dr. Hyeon-Shic Shin**, **Dr. Sanjay Bapna

Research Product Transfer for Local Calibration Factors of the Highway Safety Manual (HSM) and Integrated Surrogate Safety Assessment Framework
***Dr. Hyeon-Shic Shin**, **Dr. Young-Jae Lee**, Dr. Byungkyu "Brian" Park (University of Virginia)*

Structural Health Monitoring to Determine Long-Term Behavior of AFRP Composite Bars in Prestressed Concrete Panels for Field Deployment
***Dr. Monique Head**, Dr. Devin Harris (University of Virginia)*

Get Behind the Wheel

Simulator lets researchers observe driver's reactions, choices

Hop into a driving simulator at the National Transportation Center at Morgan State University, and the first thing you notice is how realistic everything looks.

Dr. Mansoureh Jeihani

Recognizable Baltimore buildings whiz by, and the road signs, including overhead signs, are familiar, as are the routes, 100, I-95, I-295 and Pratt Street.

The buildings and streetscapes were carefully crafted from Google images, and the software can add details such as rain, fog, pedestrians, other cars and motorcycles. Oh, and if you blow by that familiar speed limit sign – as we've all done in real driving – you're liable to find yourself with a ticket, courtesy of that realistic-looking police car waiting in the median.

While it's great fun, the two driving simulators – known formally as the Travelers' Behavior Analysis and Simulation Lab – are actually serious research tools, allowing researchers to examine driver's reactions, perceptions and choices. The UC-win/Road software, developed by Forum 8 Co., can create a road network of 20 kilometers by 20 kilometers, about 120 square miles.

Research involving more than 100 drivers addressed a crucial question: Do the overhead signs on highways cause traffic to slow down as people read them? (Short answer: No.) The simulators also allow researchers to examine how effective those signs are in reducing congestion by prompting drivers to consider an alternate route.

Dr. Mansoureh Jeihani is the driving force behind the lab. An associate professor in the Department of Transportation and Urban Infrastructure Studies at Morgan, she has a doctorate in civil engineering, along with a master's in economics, another master's in socio-economic systems engineering and a bachelor's in computer engineering.

"There are so many capabilities of this simulator; it's unique in that we can make a road network and the driver can select their route," Dr. Jeihani says. "We can study distractions, the effects of inclement weather, and we can look at a work zone and how people react – do they really reduce their speed? We can also conduct research into connected vehicles, which is a very hot topic right now. We can study how drivers react in a CV and what happens if they have to take control of the vehicle."

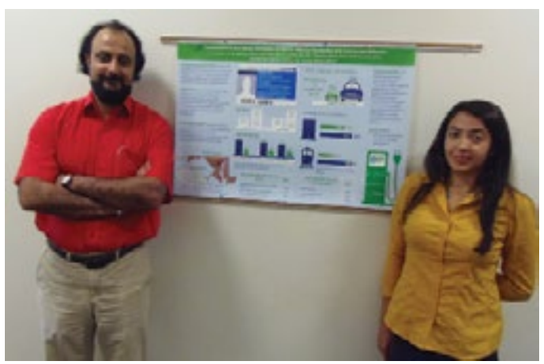
Dr. Jeihani purchased the $100,000 simulator in 2011 with funding from the National Transportation Center. Its capabilities were unveiled at a grand opening, to which Federal Highway Administration, Maryland Transit Administration and State Highway Administration officials were invited, "and based on that, I got two research projects right away," Dr. Jeihani says.

In 2013, a second simulator, which cost $50,000, was added. The new simulator features a motion platform, which allows a driver to feel bumps like potholes and rumble strips, and can be used for research into road conditions.

Research subjects are given 15 minutes to play around with the simulator and get used to it. Younger drivers, who have grown up with realistic video games, take to it easily.

"Kids are good with it – they know how to do it and they don't have to practice," Dr. Jeihani says.

In addition to research, the simulators can be used for educational purposes. Dr. Jeihani's research interests include distracted driving. "Everybody says, 'Yeah, I know I shouldn't do it, but I'm OK with it.' We can show them here how distracted they are," she says. •



The NTC presented a poster of attributes of electric vehicle ownership and commuting behavior that was well received at the MATS UTC meeting in August. From left, Morgan students Seyedehsan Dadvar and Jessica Molina helped create the poster.

The MDOT/MSU interns and their mentors celebrated the completion of the program at a June luncheon.

MDOT/MSU Internships Create a Pipeline for Employers

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"What excites me the most about today is that I am likely in the presence of my future colleagues," Reigrut said. He noted that changes in transportation and challenges in transportation funding will demand practical solutions for the transportation network. "It's the people in this room whom we can count on to come up with creative solutions."

Gareth Adams, who is working on a Doctor of Engineering in civil engineering, interned in the traffic design division, where he was involved in contract negotiations and a project to replace conventional highway lighting with LED lighting.

"I think I was able to get a good grasp of the design element of traffic signals and signs, and I was able to put my knowledge from school to use," he said. "I was able to know how to use the different standards. The internship helped me a lot. I was able to get involved in a way that enabled me to move forward to the next step. I believe this internship has made me a lot more marketable in terms of my ability to do certain tasks."

Ashley Seymour, an MBA student, interned at the Maryland Transit Administration's Office of Fair Practice.

"I loved it; I got to do a lot of hands-on real work – I loved that I could sign my name to a document," she said.

While interning at the State Highway Administration, Namita Acharya, who just graduated with an MBA, enjoyed relating what she had learned to practical applications.

"I think this is going to boost my future wherever I go," she said.

Students in the program, which is co-administered by the National Transportation Center at Morgan, work full-time in the summer and part-time during the school year. The center's director, Dr. Z. Andrew Farkas, noted the competitive program is almost 30 years old.

"We're very proud of it and very grateful for it," Dr. Farkas said. "It gives our students the needed professional experience that will serve them well." The next group of 15 interns for 2015-2016 started in July. •

Giving Spat a Suitably Firm Foundation to Help Bay's Oyster Population

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The second phase took place at two oyster aquaculture sites with different salinities, one in the Patuxent River just north of Broomes Island and the other in Fishing Bay on the Eastern Shore. To test whether watermen could harvest the oysters, a tank at the PEARL in St. Leonard, Md., was filled with 500 oysters on a "reef" made of RCA and oyster shell. Boards placed on the side of the tank simulated the washboards on a boat, allowing watermen to tong the oysters, and the time it took to fill their tongs was recorded. The watermen also filled out questionnaires.

While the study found that RCA does not attract predators or affect marine life and is suitable for creating oyster habitat, it revealed that because RCA weighs more than oyster shells, it was more difficult to tong. The watermen suggested it could be used with either a veneer of oyster shells or in areas that are not going to be tonged. •

Students, Teachers Explore Transportation

Some 80 students applied for the competitive STI program, which this year had 25 slots.

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round in terms of goods and services," said Tyjae Jordan, a student at Baltimore Polytechnic Institute.

The students took a boat trip to see maritime transportation, experienced a driving simulator, visited aviation museums and also studied traffic roundabouts and then created one of their own.

Zack Burke, who attends Randallstown High School, said, "What I mostly got out of it was the exposure, all the field trips. I liked the aerospace part – I looked at being a pilot or an aeronautical engineer."

Both programs concluded with a banquet on July 24. Gregory Murrill, division administrator with the Federal Highway Administration, was the keynote speaker.

He said, "It is my hope, especially for the teachers, that you will continue the work to help students be successful in math and engineering to be prepared for the opportunities ahead." He told the students, "I hope that you will continue to explore the opportunities in transportation for almost anything imaginable." •

Biking to Campus Challenges Researchers and Riders

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Maryam Sheykholmolouki, Kaveh B. Kelarestaghi, and Seyedehsan Dadvar, Ph.D. students at Morgan, did the study as their class project for TRSP 625.

"We wanted to see what are the main factors that affect the frequency of biking to campus," said Dadvar. The study examined the biking behavior of students, faculty and staff at the campuses of Morgan, The Johns Hopkins University's Homewood and East Baltimore locations, Towson University, UMBC and Loyola. Demographics and general attributes – such as household and individual income level – were also examined, as well as what would help more people opt to ride instead of drive.

"We found significant differences between the different universities, and that was interesting," Dadvar said. But across all campuses, weather was a major obstacle, followed by road conditions and the belief that motorists do not exercise enough caution for bicyclists.

Dr. Celeste Chavis, assistant professor in the Department of Transportation and Urban Infrastructure Studies at Morgan, regularly biked when she was earning a master's and Ph.D. at the University of California, Berkeley. But in Baltimore, she said, "There is no yielding culture."

Although she has ridden around the Hopkins campus, the Charles Village resident hasn't attempted to ride to Morgan. "I live close enough I should be able to do it, but I haven't done it yet. Drivers in California yield to bikers and pedestrians. [Baltimore] has a culture of vehicles first."

Adds Dr. James, "I've built up my courage over years of riding, but even now I will not come out in traffic at 8 a.m."

The students' study found that knowing someone who had had an incident on their bike influenced biking behavior. Ethnicity also was a factor, with white participants biking to campus more, followed by Asians, blacks and then other races.

The study identified factors that would help make biking to campus more attractive, such as the continuity of bike lanes, buffers between bikes and traffic, and improved bike lanes and paths. One simple need identified was a bike repair station on campus.

In a presentation the students made at the Mid-Colonial District Annual Conference in April, they noted that their research revealed that commuting five miles or less to campus seemed to be the magic distance – traveling any farther than five miles caused a significant drop-off in biking, an important fact for policy makers

While Dr. James would like to see more bike-friendly infrastructure, she's enjoying the benefits of her ride. "I like keeping healthy. I like that I'm going to get my exercise." •