



# Transportation Institute

North Carolina Agricultural and Technical State University

## Passing the Torch: CATM and CR2C2 Joint Annual Symposium

The Center for Advanced Transportation Mobility (CATM) was established in 2016, through the University Transportation Center Program under the Fixing America’s Surface Transportation (FAST) Act. Under the leadership of Director, Maranda McBride, Ph.D., professor in the N.C. A&T Willie A. Deese College of Business and Economics, consortium member institutions (North Carolina Agricultural and Technical State University (lead), Virginia Polytechnic Institute and State University and Embry-Riddle Aeronautical University – Daytona Beach) have collaborated on projects focused on identifying solutions to mobility concerns within two primary thematic areas: 1) Enabling safe and efficient mobility for vulnerable road users and 2) Optimizing mobility in emergency situations. (below: left: N.C. A&T Provost Dr. Tonya Smith-Jackson welcomes symposium attendees. right: The symposium audience listens to CR2C2 Director Ali Karimodini.)



The CATM grant concluded its impactful work in October 2024 and the Center for Regional & Rural Connected Communities (CR2C2) is now leading the UTC efforts at N.C. A&T under the direction of Ali Karimodini, Ph.D., who is a professor in the Department of Electrical and Computer Engineering at N.C. A&T, with McBride acting as co-director. CR2C2 is the Region 4 UTC representing the southeastern region of the US and will continue the strong foundation built by CATM. McBride said:

*“Over the past 7 years, the CATM consortium continuously worked to ensure that the needs of vulnerable road users be considered carefully in the design of current and future transportation systems. Through our consortium, we helped bring attention to a wide array of needs that pertained to general human factors associated with day-to-day transportation needs but also those special needs that are experienced during emergency situations.*

*As we close out the CATM grant, I am confident that the CR2C2 team will continue to push the boundaries of transportation research. It’s been an honor to lead these efforts, and now I’m excited to pass the baton to a new set of leaders who will build upon the foundation we’ve established to drive innovation and collaboration in the field.”* ([continued on page two](#))

### Fall 2024 Issue

- CATM/CR2C2 Joint Symposium
- U.S. Transportation Secretary Pet Buttigieg Visits N.C. A&T
- CATM Research Project Review
- CATM Education & Workforce Development Highlights
- CATM Event Highlights
- 2024 Summer Transportation

## Joint 2024 CATM Symposium *(continued from page one)*

The two centers hosted a joint UTC symposium on April 17-18, 2024, at the Alumni Foundation Event Center on the campus of N.C. A&T. The symposium brought together leading experts from academia, industry and government to explore the latest developments in transportation research, with a focus on innovations impacting rural and underserved communities.

The event featured presentations and discussions on a range of topics, including technology transfer and research and workforce development efforts led by CATM and CR2C2. One highlight was a plenary session presented by Randa Radwan, Ph.D., senior advisor for Safety & Mobility at the Office of the Assistant Secretary for Research and Technology, on “Leveraging Technology for Equitable and Safe Mobility.” The session explored the potential for emerging technologies



to create safer and accessible transportation systems, particularly for vulnerable and rural populations. *(above: Some symposium attendees at the autonomous shuttle demonstration.)*

The symposium featured 27 oral and 33 poster presentations, showcasing cutting-edge research from transportation professionals and students. Additionally, attendees participated in panel discussions examining the broader impacts of transportation innovations on society. A deployment forum and demonstration provided a hands-on experience where participants witnessed autonomous vehicles navigating a rural test track and explored the research facilities at N.C. A&T’s Gateway Research Park. The symposium also emphasized the importance of transportation education and workforce development. By connecting students and young professionals with experts in the field, the event aimed to inspire the next generation of transportation innovators.

The joint 2024 symposium showcased the achievements and ongoing research of both centers, highlighting N.C. A&T’s significant role in the UTC program. For additional information including the symposium agenda, the 2024 program and presentation details can be accessed using [this link](#). Below is a list of the CATM symposia hosted prior to 2024 along with links to further information about each. For more general information, you can also visit the [CATM Symposium page](#).

1. [CATM Virtual Research Symposium \(February 7-8, 2022\)](#)
2. [Third Annual CATM Symposium \(November 4, 2019\)](#)
3. [Second Annual CATM Symposium \(November 5, 2018\)](#)
4. [First Annual CATM Symposium \(October 17, 2017\)](#)



## N.C. A&T UTCs Showcase Transportation Innovations During U.S. Transportation Secretary Buttigieg’s Visit

On July 2, 2024, U.S. Transportation Secretary Pete Buttigieg, along with North Carolina Governor Roy Cooper, visited N.C. A&T to learn more about the university’s role in advancing transportation research. The event was hosted at N.C. A&T’s Gateway Research Park by CR2C2 and CATM.



During their visit, Buttigieg and Cooper experienced firsthand the innovative work, including rides in autonomous shuttles and demonstrations of vertical takeoff and landing drones. Buttigieg commended the university’s efforts, emphasizing the potential impact of these technologies on improving transportation equity, healthcare access, and connectivity for rural areas. *(left: A student explains his research model to the honored guests)*

Faculty researchers, including Dr. Ali Karimoddini, CR2C2 Director, and Dr. Maranda McBride, CATM Director, showcased their groundbreaking work in autonomous vehicle systems, drone-based infrastructure inspections and equity in transportation. The university’s transportation research projects, supported by collaborations with institutions, including Clemson University and NASA, aim to tackle real-world transportation challenges while advancing research in both urban and rural mobility.

Buttigieg’s visit was part of a broader nationwide tour highlighting many of the transportation investments by the federal government made possible by the Bipartisan Infrastructure Law, which includes significant funding for infrastructure upgrades and furthering the progress of research in transportation. Buttigieg highlighted the critical role of centers, like CATM, in advancing the foundation and future of transportation, particularly when ensuring that progress in new technology include benefits for diverse communities, such as vulnerable road users who are often overlooked by traditional transportation systems.



*(Above from left: Ali Karimoddini, Pete Buttigieg, Maranda McBride.)*

# Driving Innovation: A Look at CATM's Extensive Research Projects

Since its inception in 2017, CATM has been dedicated to advancing transportation research, with a strong focus on vulnerable road users, emergency response and equitable mobility solutions. Through collaborations with consortium-member institutions, Virginia Tech Transportation Institute (VTTI) and Embry-Riddle Aeronautical University - Daytona (ERAU), CATM has sponsored impactful research projects. This work has produced innovative and useful information regarding autonomous vehicle systems, traffic optimization during emergencies and transportation solutions for underserved populations. Below is a list of key projects, funded by CATM over the years, that have driven transportation research and technology forward. For complete information about each project, please visit the [CATM Research Projects](#) page.

## 1. CATM Vulnerable Road User (VRU) Themed Research



### ***Automated Last Mile Connectivity for Vulnerable Road Users***

**Research Affiliates:** Stephanie Baker, Andy Alden, Kevin Grove, Cristian Druta, Anne Hall and Christine Link-Owens (all VTTI)

**Project Summary:** This project focuses on improving last-mile connectivity for vulnerable road users (VRUs) by developing an automated, accessible platform.

**For more information,** Final Report A can be viewed [here](#) and Final Report B [here](#). (left: VTTI's automated low-speed shuttle)

### ***VRU-Personalized Optimum Dynamic (VRU-POD) Routing***

**Research Affiliates:** Hyoshin Park (NC A&T: Lead), Justin M. Owens (VTTI), Sun Yi (NC A&T) and Younho Seong (NC A&T)

**Project Summary:** This project developed an adaptive routing system tailored for vulnerable road users, focusing on enhancing their safety and mobility by offering real-time, personalized route optimization.

**For more information,** the Final Report can be viewed [here](#).

### ***Development, Design, and Calibration of the Vulnerable Road User Mobility Assistance Platform (VRU-MAP)***

**Research Affiliates:** Justin Owens (VTTI: Team Leader), Andrew Miller (VTTI), Younho Seong (NC A&T) and Sun Yi (NC A&T)

**Project Summary:** This project focused on creating and calibrating a platform to assist vulnerable road users, such as pedestrians and cyclists, by providing mobility support through innovative technologies.

**For more information,** the Final Report can be viewed [here](#).

### ***Vulnerable Road Users Transit Optimization with Healthcare Privatization (VRUTOP)***

**Research Affiliate:** Hyoshin Park (NC A&T)

**Project Summary:** This research focused on improving the transit service of vulnerable road users while addressing recent trends in Medicaid transformation. Different maximum utility values are presented as a function of varying travelers' risk tolerance levels and the planner can be adopted by existing state agencies.

**For more information,** the Final Report can be viewed [here](#).

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## 1. CATM Vulnerable Road User Themed Research *continued from page four*

### ***Analysis of the Non-Driving Mobility Needs of People with Disabilities***

**Research Affiliate:** Justin Owens (VTTI).

**Project Summary:** This project investigated the mobility challenges faced by people with disabilities, particularly in non-driving contexts. It uses surveys and data analysis to understand the barriers they encounter when accessing public transit and other transportation services.

For more information, the Final Report can be viewed [here](#).

### ***Acceptance and Adoption of Shared Autonomous Shuttles for Vulnerable Road Users: A Readiness Study***

**Research Affiliate:** Maranda McBride (NC A&T)

**Project Summary:** This project examined the acceptance and adoption of shared autonomous shuttles for vulnerable road users. The research focused on understanding the factors that influence the readiness of individuals and communities to embrace autonomous shuttle technology.

For more information, the Project Abstract can be viewed [here](#).



## 2. CATM Emergency Themed Research

### ***Multi-scale Models for Transportation Systems Under Emergency Conditions***

**Research Affiliates:** Xiuli Qu (NC A&T: Team co-leader), Dahai Liu (ERAU: Team co-leader), Lauren Davis (NC A&T), and Younho Seong (NC A&T)

**Project Summary:** This project developed multi-scale models to improve transportation systems during emergency situations such as natural disasters. By analyzing traffic patterns and infrastructure capacity under stress, the research aimed to enhance evacuation strategies and optimize transportation resource allocation during emergencies.

For more information, Final Report A can be viewed [here](#) and Final Report B [here](#).

### ***Multiscale Model for Hurricane Evacuation and Fuel Shortage***

**Research Affiliates:** Sirish Namilae (Lead), Dahai Liu and Scott Parr (all ERAU)

**Project Summary:** This project developed a multi-scale model to analyze hurricane evacuation scenarios and fuel shortages. The research focuses on the dynamics of pedestrian and vehicle movement during large-scale evacuations, particularly in the context of limited fuel availability.

For more information, the Final Report can be viewed [here](#).

### ***Dynamic Routing of Unmanned Aerial Systems for Emergency Incident Management***

**Research Affiliates:** Hyoshin Park (NC A&T: Lead), Andy Alden (VTTI) and Sun Yi (NC A&T)

**Project Summary:** This project focused on dynamic routing for unmanned aerial systems (UAS) to enhance urban air mobility. By developing routing algorithms that account for weather, airspace constraints, and operational factors, the research aimed to optimize flight paths and improve safety for UAS operations in congested urban environments.

For more information, the Final Report can be viewed [here](#).



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## 2. CATM Emergency Themed Research *continued from page five*

### ***Machine Learning for Improving Air Mobility in Emergency Situations***

**Research Affiliate:** Yongxin Liu (ERAU)

**Project Summary:** This project focused on improving air mobility during emergency situations by developing strategies for the deployment of unmanned aerial systems (UAS) and other air transportation methods. The research aimed to optimize the use of air mobility in disaster response and emergency evacuations, enhancing the efficiency and safety of operations.

**For more information,** the Final Report can be viewed [here](#).

### ***Real-Time Recommendations for Traffic Control in an Intelligent Transportation System during an Emergency Evacuation - Parts 1 and 2***

**Research Affiliate:** Xiuli Qu (NC A&T)

**Project Summary: Part 1** - This project developed a real-time traffic control intelligent system to enhance traffic management in urban areas. The research focused on creating adaptive traffic signal control algorithms that utilize real-time data from sensors and cameras to reduce congestion, improve traffic flow, and minimize delays.

**Project Summary: Part 2** - The second part of a study focused on the development and application of advanced traffic signal control algorithms that utilize real-time data to optimize traffic flow during evacuations.

**For more information,** Final Report Part 1 can be viewed [here](#) and Final Report Part 2 [here](#).

### ***Particle Dynamics Model for Hurricane Evacuation and Fuel Shortage: Model Based Policy Analysis***

**Research Affiliate:** Sirish Namilae (ERAU: Lead) and Dahai Liu (ERAU)

**Project Summary:** This project investigated a particle dynamics model to simulate pedestrian and vehicle interactions in urban environments. The research aimed to improve the understanding of crowd and traffic behavior by analyzing movement patterns and predicting potential conflicts.

**For more information,** the Final Report can be viewed [here](#).

### ***Multi-agent Reinforcement Learning-based Pedestrian Dynamics Models for Emergency Evacuation***

**Research Affiliates:** Hyoshin Park (NC A&T: Lead), Dahai Liu (ERAU), and Sirish Namilae (ERAU)

**Project Summary:** This project developed multi-agent pedestrian dynamic models to simulate pedestrian movement in various environments. The research focused on understanding how individual behaviors and interactions influence overall pedestrian flow, particularly in crowded or constrained spaces.

**For more information,** Final Report A can be viewed [here](#) and Final Report B [here](#).

### ***Application of Artificial Intelligence in the Optimization of Mobility in Dynamic Airspace Configurations*** *(Original project title: Machine Learning for Dynamic Airspace Configuration towards Optimized Mobility in Emergency Situations)*

**Research Affiliates:** Houbing Song (ERAU: Original Lead), Yongxin Liu (ERAU: New Lead), Dahai Liu (ERAU)

**Project Summary:** This project explores the application of machine learning techniques to analyze and predict traffic patterns.

**For more information,** the Final Report can be viewed [here](#).

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## 2. CATM Emergency Themed Research *continued from page six*

### ***Real-time Deep Reinforcement Learning for Evacuation Under Emergencies***

**Research Affiliates:** Dahai Liu (ERAU: Lead), Sirish Namilae (ERAU)

**Project Summary:** This project applies real-time deep reinforcement learning to optimize evacuation strategies during emergencies. The research focuses on developing intelligent systems that can adapt to rapidly changing conditions.

**For more information,** the Final Report can be viewed [here](#).

### ***Epidemiological Models for Transportation Applications: Secondary Crashes***

**Research Affiliates:** Sirish Namilae (ERAU: Lead), Dahai Liu (ERAU), Scott Parr (ERAU)

**Project Summary:** This project focuses on using epidemiological models to analyze secondary crashes that occur after an initial incident. The research aims to understand the factors contributing to these crashes and develop strategies to reduce their occurrence.

**For more information,** the Final Report can be viewed [here](#).

### ***Modeling Future Outbreaks of COVID-19 Using Traffic as a Leading Indicator***

**Research Affiliates:** Scott Parr (lead), Dahai Liu, and Sirish Namilae (both ERAU)

**Project Summary:** This project models future outbreaks of COVID-19 using traffic data as a leading indicator. The research aims to predict the spread of the virus by analyzing transportation patterns and their correlation with infection rates.

**For more information,** the Final Report can be viewed [here](#).

### ***Analyzing the Role of Air-Transportation in COVID-19 Pandemic Disaster***

**Research Affiliates:** Sirish Namilae (ERAU: lead), Dahai Liu (ERAU)

**Project Summary:** This project analyzes the role of air transportation in the spread of COVID-19 during the pandemic. The research examines how air travel contributed to the virus's transmission across regions and aims to provide insights for mitigating risks in future pandemics.

**For more information,** the Final Report can be viewed [here](#).



### ***Multi-scale and Collaborative Disaster Evacuation Planning Framework***

**Research Affiliates:** Dahai Liu (ERAU: Lead), Houbing Song (ERAU)

**Project Summary:** This project investigates methods for detecting early-stage dementia through the analysis of naturalistic driving behavior. The research aims to identify specific driving patterns and behaviors that may serve as indicators of cognitive decline.

**For more information,** the Final Report can be viewed [here](#).

### ***Usability of Urban Air Mobility: Quantitative and Qualitative Assessments of Usage in Emergency Situations***

**Research Affiliates:** Scott Winter (ERAU, lead)

**Project Summary:** This project explores the integration of unmanned aerial vehicles (UAVs) into urban air mobility (UAM) systems. The research focuses on addressing the challenges of airspace management, safety, and operational efficiency for UAVs in densely populated urban areas.

**For more information,** the Final Report can be viewed [here](#).

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## 2. CATM Emergency Themed Research *continued from page seven*

### ***Discrete Dynamics and Epidemiological Multi-Physics Models for Transportation Applications***

**Research Affiliates:** Sirish Namilae (ERAU: Lead), and Dahai Liu (ERAU)

**Project Summary:** This project developed a multi-scale and collaborative disaster evacuation planning framework. The research aimed to improve evacuation strategies by integrating various scales of data, from individual behaviors to regional traffic patterns, during disaster situations.

**For more information,** the Final Report can be viewed [here](#).

### ***Travelers' Rationality in Online Anticipatory Emergency Response Model***

**Research Affiliate:** Hyoshin Park (NC A&T)

**Project Summary:** This project investigated travelers' rationality and decision-making processes in transportation systems during emergencies. By applying behavioral models, the research aimed to understand how travelers make route choices under stress and uncertainty.

**For more information,** the Final Report can be viewed [here](#).



## 3. CATM Optimizing Transportation Services Research

### ***Public Dialysis Transport Efficiency Using Digital Media***

**Research Affiliates:** Mary Lind (NC A&T: Lead) and Rhonda Hensley (NC A&T)

**Project Summary:** This project investigated transportation challenges faced by dialysis patients and aimed to improve access to healthcare through better transportation planning. The research focused on identifying barriers to timely transportation for dialysis and developing strategies to enhance patients' mobility options.

**For more information,** the Final Report can be viewed [here](#).

### ***Asymmetric Information Sharing in Dialysis Paratransit Using an Agency Approach***

**Research Affiliates:** Mary Lind (NC A&T: Lead) and Rhonda Hensley (NC A&T)

**Project Summary:** This project explored asymmetric dialysis transportation schedules to address inefficiencies in current transportation services for dialysis patients. The research aimed to optimize transportation routes and schedules by considering the unique irregular timing needs of dialysis patients.

**For more information,** the Final Report can be viewed [here](#).

### ***Equitable Dynamic Pricing for Express Lanes***

**Research Affiliate:** Venkatesh Pandey (NC A&T)

**Project Summary:** This project examined equitable dynamic pricing models for express lanes to ensure fair access to transportation options. The research focused on developing pricing strategies that balance efficiency, traffic flow and affordability for all income levels.

**For more information,** the Final Report can be viewed [here](#).

### ***A Multiobjective Reinforcement Learning Framework for Equitable Toll Design for Express Lanes***

**Research Affiliate:** Venkatesh Pandey (NC A&T)

**Project Summary:** This project developed a reinforcement learning framework for equitable toll design, aimed at creating fair and efficient toll pricing systems. The research focused on using machine learning algorithms to optimize toll rates based on traffic conditions and socioeconomic factors, ensuring that the pricing system is effective and equitable.

**For more information,** the Final Report can be viewed [here](#).

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### 3. CATM Optimizing Transportation Services Research *continued from page eight*

#### ***Rural Older Adult Driver Tailored Research Integrated Plan (ROAD TRIP) - Parts 1 and 2***

**Research Affiliate:** Jon Antin (VTTI)

**Project Summary - Part 1:** This project focused on improving the safety and mobility of rural, older adult drivers. The research aimed to develop strategies tailored to the specific needs of this demographic, including risk mitigation and enhancing driving independence.

**Project Summary - Part 2:** This project focused on transforming the mobility landscape for aging populations, particularly in rural areas. The research built on previous findings to develop innovative solutions that address the mobility challenges faced by older adults.

**For more information,** the Final Report can be viewed [here](#).

### 4. CATM Transportation Decision-Making Research

#### ***Mask-Wearing Behaviors in Air Travel During Coronavirus Pandemic – An Extended Theory of Planned Behavior Model***

**Research Affiliate:** Jing Yu Pan (ERAU)

**Project Summary:** This project examined mask-wearing behaviors during air travel in the COVID-19 pandemic using the Extended Theory of Planned Behavior model. The research explored how factors such as attitudes, subjective norms and perceived behavioral control influenced passengers' decisions to wear masks during flights.

**For more information,** the Final Report can be viewed [here](#).



#### ***High-speed Rail in the US – The Intention to Use and Mode Choice Behavior***

**Research Affiliate:** Jing Yu Pan - (ERAU)

**Project Summary:** This project investigated the factors influencing the intention to use high-speed rail in the United States, focusing on mode choice behavior. The research aimed to identify the key factors that impact travelers' decision-making when considering high-speed rail as an alternative form of transportation.

**For more information,** the Final Report can be viewed [here](#).

#### ***Mode Shift Intentions to High-Speed Rail in the US - Mediation and Moderation Analysis***

**Research Affiliate:** Jing Yu Pan (ERAU)

**Project Summary:** This project investigated the intention to shift to high-speed rail (HSR) in the United States, focusing on the factors that influence travel mode choice. The research explored how variables such as cost, convenience, environmental concerns and travel time affect travelers' decisions to adopt high-speed rail over other transportation options.

**For more information,** the Final Report can be viewed [here](#).

#### ***Travelers' Rationality in Online Anticipatory Emergency Response Model***

**Research Affiliate:** Hyoshin Park (NC A&T)

**Project Summary:** This project investigated travelers' rationality and decision-making processes in transportation systems. The research aims to understand how travelers make route choices and how their decisions are influenced by various factors such as time, cost and convenience.

**For more information,** the Final Report can be viewed [here](#).

## 5. CATM Research Focused on Human Interactions with Advanced Transportation



### ***Assessing Pedestrians' Perceptions and Willingness to Interact with Autonomous Vehicles***

**Research Affiliate:** Scott Winter (ERAU)

**Project Summary:** This project assessed pedestrians' perceptions of safety in urban environments to better understand factors that influence their sense of security. The research examined variables such as infrastructure design, traffic patterns and environmental features that impact pedestrian safety.

**For more information,** the Final Report can be viewed [here](#).

### ***Connected Electric Vehicles (CEV): Vehicle-Pedestrian Communications to Enhance Vision Impaired Pedestrian Safety - Part 1***

#### ***Pedestrian Auditory Situational Awareness: Tesseract Crosswalk Module - Part 2***

**Research Affiliates:** Rafael Patrick (VT: Lead), Tanner Upthegrove (VT)

**Project Summary - Part 1: CEV -** This project explored solutions for improving transportation accessibility for vision-impaired individuals. The research focused on developing tools and technologies that enhance the mobility and safety of vision-impaired travelers, particularly in urban environments.

**Project Summary - Part 2: Tesseract -** This project is an extension of the CEV study and focused on enhancing pedestrian auditory situational awareness at crosswalks through the development of the Tesseract Crosswalk Module. The research aimed to improve pedestrian safety by creating an auditory alert system that helps pedestrians better navigate crosswalks.

**For more information,** the Final Report for both Part 1 and Part 2 can be viewed [here](#).

### ***Acoustic Situation Awareness and Its Effects on Pedestrian Safety in a Virtual Environment***

**Research Affiliates:** Rafael Patrick (VT: Lead), Myoungsoon Jeon (VT)

**Project Summary:** This project investigated acoustic situation awareness and its impact on pedestrian safety within virtual environments. The research aimed to enhance understanding of how auditory cues can improve pedestrians' awareness of their surroundings, particularly in urban areas with heavy traffic.

**For more information,** the Final Report can be viewed [here](#).

### ***Evaluation of the Impact of App-Based Feedback and Monetary Incentives on Teen Driver Safety***

**Research Affiliate:** Charlie Klauer (VTTI: Lead)

**Project Summary:** This project evaluated web-based driving feedback tools designed for teens and their parents. The research aimed to assess how effective these tools are in improving driving behaviors and reducing risks among young drivers.

**For more information,** the Final Report can be viewed [here](#).

### ***Detecting Early-Stage Dementia Using Naturalistic Driving***

**Research Affiliate:** Jon Antin (VTTI: Lead)

**Project Summary:** This project explored methods for detecting early-stage dementia using data from naturalistic driving behavior. The research aimed to identify patterns and indicators in driving performance that may signal cognitive decline.

**For more information,** the Final Report can be viewed [here](#).

## 6. Technology Transfer

### *Data Curation and Technology Transfer for Recent ERAU-CATM Projects*

**Research Affiliates:** Sirish Namilae , Dahai Liu and Scott Parr (all ERAU)

**Project Summary:** This project focused on the curation and transfer of data and technology developed from recent CATM research projects. The research aimed to enhance the accessibility and usability of data generated from transportation studies by creating comprehensive data repositories and improving technology transfer processes.

**For more information**, the Final Report can be viewed [here](#).

### *First Responder Transportation Safety Conference*

**Research Affiliates:** Scott Parr, Sirish Namilae and Dahai Liu (all ERAU)

**Project Summary:** This project focused on organizing a First Responder Transportation Safety Conference aimed at addressing the safety challenges faced by first responders in transportation environments. The conference brought together experts, policymakers, and first responders to discuss strategies for improving safety, reducing risks and enhancing response times during emergencies.

**For more information**, the Final Report can be viewed [here](#).



The transportation research conducted by CATM has played a vital role in the advancement of our transportation systems by identifying ways to improve mobility, safety and access for all people, especially vulnerable populations. By addressing real-world challenges, such as emergency evacuations, autonomous vehicle interactions, and accessibility for individuals with disabilities, these CATM research projects contribute to societal resilience and equitable transportation solutions. Our work has helped enhance the efficiency of transportation systems and benefit public health, safety and environmental sustainability.



## Empowering the Future of Transportation: Education and Workforce Development Highlights

One of CATM's top priorities has always been preparing the next generation of transportation leaders through a diverse range of education and workforce development initiatives, promoting personal, educational and professional growth. From hands-on industry visits to competitive research internships and scholarships, CATM focused on providing students with unique opportunities to explore careers, network with industry professionals, and gain practical experience in the transportation field.

**Transportation Industry and Lab Visits:** Since 2017, CATM has sponsored hundreds of students for industry and lab visits to explore transportation careers and technologies. In the past, this has included, for example, tours of the Turner-Fairbanks Highway Research Center in Washington, D.C. and the AI Lab in Unmanned Systems Lab at Embry-Riddle University in Daytona, FL.

In October 2023, CATM Director Maranda McBride and Dr. Venkatesh Pandey accompanied 20 N.C. A&T students on a tour of the NCDOT's Greensboro Traffic Management Center. More information about locations and details about industry visits can be accessed [here](#).



N.C. A&T students at the N.C Department of Transportation's Greensboro Traffic Management Center.

**Transportation Research Internships:** During the summer breaks and sometimes extending into the academic year, CATM has employed graduate and undergraduate students as research interns, offering hands-on experience with real transportation challenges. Projects ranged from studying shared bike usage to addressing transportation issues related to food scarcity. More details about transportation research internships can be accessed [here](#).

**Invited Speakers:** CATM invited many industry professionals from various sectors to share their direct insider insights into current careers, trends and innovations in transportation. These face-to-face engagements allowed students to discuss topics, ranging from salaries to supply chain management, with people actually working in the field. A representative list of the guest speakers can be accessed [here](#).

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## CATM Education and Workforce Highlights *continued from page twelve*

**Transportation Research Scholarships:** CATM provided a group of undergraduate students, named “CATM Scholars”, with scholarships for tuition assistance and, in some cases, a monthly stipend. These students were majoring in supply chain management, civil engineering, or another transportation-related field. Throughout the school year, the scholars had to maintain academic standards and meet participation requirements in CATM activities that exposed them to a wide range of transportation professions.

Every year, several students were supported while applying for the Dwight D. Eisenhower Transportation Fellowship Scholarship Program (DDETFP). In 2023, four students received a total of \$30,500. More details and application information about DDETFP scholarships can be found [here](#).

**Transportation Conferences:** CATM sponsored numerous students in attending professional conferences, offering valuable opportunities to network with industry professionals, gain real-world insight into transportation careers, and stay updated on the industry’s latest innovations and challenges. Additionally, each year, CATM also supports a group of students attending the annual Transportation Research Board Conference in Washington, D.C., where some have the opportunity to present their own research. You can find more information about conferences attended [here](#).



Attendees at 2024 TRB Meeting: (L to R) Dr. Venkatesh Pandey, Byron Hall, Trevor Elliott, Habeeb Mohammed, Oladimeji Basit Alaka, Ridwan Tiamiyu, Christian Bowens, Mikal Ali, Anusha Neupane, Doreen Jehu-Appiah, Victoria Lanier and Rifa Tasnia .

**ASETTTS Program:** The Advancing STEM Education Through Transportation Studies program, led by Dr. Maranda McBride and Dr. Venkatesh Pandey of N.C. A&T., is a digital badge initiative designed to strengthen undergraduates' STEM skills, enhancing their employability after graduation. The program operated in cooperation with CATM on many student projects and promoted learning through mentorships, experiential activities, research opportunities, and scholarships while exposing students to real-world transportation careers. More information about the ASETTS program can be found [here](#).

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## CATM Education and Workforce Highlights *continued from page thirteen*

**Student-to-Student Initiative Workshops:** The student-to-student events connected high school students and university students to explore education and career paths in transportation and supply chain management. Through both in-person and virtual sessions, university students shared their academic and industry experiences, offering peer insights and advice that sparked curiosity and excitement about possible future careers in transportation. Find out more about events [here](#).

**Brown Bag and Research Seminars:** These seminars showcased research projects, such as research on improving public dialysis transport through digital media and enhancing last-mile connectivity for vulnerable users. They provided a collaborative platform for faculty, students, and professionals to share and discuss innovative transportation research. Find more details [here](#).

Visit [CATM's Education and Workforce Development Activities page](#) to learn more today!



*Attendees of the Southern District ITE Student Leadership Summit at Virginia Tech in February 2022.*

## CATM Event Highlights: A Timeline of Innovation and Collaboration in Transportation Research

Since its inception, CATM has hosted and participated in a variety of impactful events, each designed to advance transportation research and information sharing and promote innovative solutions for mobility, safety, and equity. From symposia on underserved communities to webinars on cutting-edge research, these events reflect CATM's commitment to driving progress in transportation technology and accessibility. The timeline on the following page highlights key events sponsored by CATM over the years, showcasing CATM's leadership in fostering collaboration and addressing critical issues in transportation. More about CATM's ongoing contributions to the transportation field can be found on the [CATM website](#).

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## CATM Event Highlights *continued from page fourteen*

### 2024:

- **Visit by U.S. Transportation Secretary Pete Buttigieg and N.C. Governor Roy Cooper (July 2):** Showcased N.C. A&T's leadership in transportation research and its focus on autonomous vehicles and equitable mobility solutions. For more information, visit [here](#).
- **Joint CATM & CR2C2 Symposium (April 17-18):** Focused on transportation innovations for underserved communities. For more information, visit [here](#).

### 2023:

- **Emergency Responder Transportation Safety Research Summit (November 1-2, Rutgers CAIT Piscataway, NJ):** For more information, visit [here](#).
- **Webinar: Auditory Situational Awareness for Vehicle-Pedestrian Communication Systems: Tesseract Crosswalk Module (November 14):** Rafael Patrick, Tanner Upthegrove (VTTI). View the webinar [here](#).



### 2022:

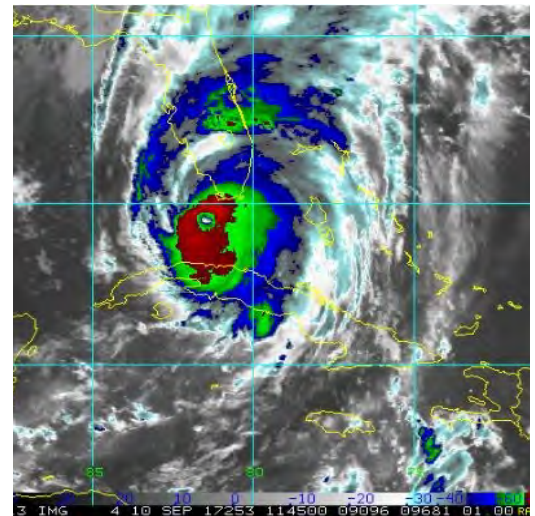
- **Webinar: Rural Older Adult Driver Tailored Research Integrated Plan (ROAD TRIP) (December 1):** Jon Antin, Brian Wotring. (VTTI) View the webinar [here](#).
- **Webinar: Secure and Trustworthy Transportation Cyber-Physical Systems (October 4):** Dr. Houbing Song. (ERAU) View the webinar [here](#).

### 2021:

- **Webinar: Modeling Approaches for Equitable Dynamic Congestion Pricing (December 3):** Dr. Venkatesh Pandey. (NC A&T) View webinar [here](#).
- **Webinar: Mask-Wearing Behaviors in Air Travel During Coronavirus Pandemic - An Extended Theory of Planned Behavior Model (October 8):** Dr. Jin Yu Pan (ERAU). View the webinar [here](#).

### 2020:

- **Webinar: Collaborative Multimodal Decision-making with Advanced Transportation Technologies and Computing (December 18):** Dr. Hyoshin (John) Park, (N.C. A&T) View the webinar [here](#).
- **Webinar: Transportation Applications of Multiscale and Epidemiological Models (August 27):** Dr. Sirish Namilae (ERAU). View the webinar [here](#).
- **Webinar: Mobility, Fairness & Accessibility for Vulnerable Road Users in Socio-Technical Systems with Advanced Transportation (May 1):** Younho Seong, Sun Yi (N.C. A&T). View the webinar [here](#).



[\(continued on page sixteen\)](#)

## CATM Event Highlights *continued from page fifteen*

### 2020

- **Webinar: Low-Speed Autonomous Vehicles - Real World Implementation (April 30):** Andrew Aldin, Kevin Grove (VTTI). View the webinar [here](#).

### 2019:

- **NCDOT Research & Innovation Summit (May 7):** In conjunction with The North Carolina Department of Transportation, CATM held this one-day event to facilitate the dissemination of applied transportation research and innovations. The Summit provided researchers and practitioners with opportunities to showcase transportation research results, innovative transportation technologies, and network and discuss relevant transportation related issues. Read more on page three [here](#).
- **Transportation Awareness Day (April 9):** CATM hosted the first Transportation Awareness Day (TAD). The event was held at the BB&T Stadium on the university's campus and attended by over 3000 youth, ranging from third grade to high school, from 34 local schools. Read more and view pictures [here](#). *(Right– Wes Kumfer from UNC-CH Highway Safety Research Center explains the safety challenge exercise to a group of interested students at TAD.)*



## Shaping Future Innovators: N.C. A&T's 2024 Summer Transportation Institute Inspires Next Generation of Transportation Leaders

CATM has been supporting the N.C. A&T Summer High School Transportation Institute (STI) since 2017. The 2024 STI program, which was the 32nd consecutive STI program hosted by the N.C. A&T Transportation Institute, offered an enriching and transformative experience for 16 high-achieving rising juniors and seniors during the summer of 2024. This year's two-and-a-half week program, running July 7-July 24, included participants from North Carolina, South Carolina, Georgia, Florida, New York, Texas, Maryland and Virginia. Students were selected for their interest in transportation and STEM (Science, Technology Engineering, and Math), as well as their academic performance, extracurricular engagement and community involvement.

The residential 2024 STI program on the N.C. A&T campus provided students with a comprehensive introduction to aspects of the transportation and STEM fields as well as a taste of the N.C. A&T Aggie college experience, including dorm life, campus food and recreational facilities. Through classroom instruction, group projects and field trips, students learned about supply chain management, transportation technologies, the various modes of transportation and more. Personal development activities, like public speaking, were integrated into the program, helping students build essential skills for their future academic and professional careers.

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## 2024 Summer Transportation Institute *continued from page sixteen*

One highlight of the 2024 STI experience was the visit to N.C. A&T's Center for Regional and Rural Connected Communities (CR2C2), where students were exposed to cutting-edge research in autonomous vehicle technology. The STI participants had the opportunity to explore self-driving cars and get hands-on experience with the autonomous vehicle systems developed at the center. The tour also featured a driving simulator, where students participated in driving scenarios and engaged with the technology used in autonomous vehicle research.

Since its inception in 1993, the Summer Transportation Institute has introduced hundreds of high school students to professions and academic pursuits in the field of transportation. N.C. A&T's program is the oldest in the country and has earned a national reputation for offering a high-quality educational experience. Many alumni of STI have gone on to careers with Fortune 500 companies and government entities, making significant contributions to the transportation industry. The 2024 program continued this tradition of inspiring and shaping future leaders in the transportation industry by exposing students to exciting career paths, hands-on learning experiences, and the latest technological advancements. More information about the 2024 and past STI programs can be found [here](#).

*(Below left : 2024 STI group from left to right)— Braedon Twitty, Jordon Rodgers, Dallas Long, Brandon Macon, Joshua Godfrey, Bella Lamin, Justin Frazier, Tivani Hull, Aiden Dunnell, Kamiya Taylor, Emanuel Crumsey, Micaiah Riddick, Brinan Burt, Claire Jefferson, Des'Raye Barringer, Lillian (Below right:.) - 2024 STI group at the U.S.S. Battleship Memorial in Wilmington, N.C. (Bottom) - 2024 STI group at N.C. A&T & UNCG Joint School of Nanoscience and Nanoengineering in front of autonomous car..*





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