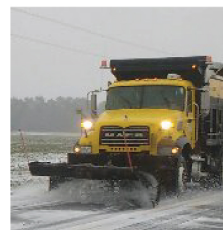
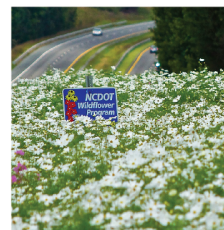




NORTH CAROLINA

Department of Transportation



HBCU OUTREACH INITIATIVE

Presented by Al Austin – Director

October 14, 2020



THE HBCU OUTREACH INITIATIVE STRATEGIC PLAN FRAMEWORK

MISSION: To create inclusion and opportunities for HBCUs/MSIs in the transportation industry.

VISION: Expand and diversify the transportation industry through the power of inclusion, and by strengthening the sustainable impact of North Carolina's Historically Black Colleges and Universities.

PURPOSE

INFORM

PREPARE

CONNECT

WORK

SUSTAIN

STRATEGIC PRIORITIES

Expand Diversity in the Transportation Industry Through Employment and Contracting

Value and Promote a Culture of Diversity and Inclusion at NCDOT

Establish Strategic Alliances and Advocacy Efforts

Strengthen the Sustainability of North Carolina's HBCUs/MSIs

Connect HBCUs and Minorities with Emerging Trends in Transportation

OPPORTUNITY

This framework supports NCDOT's Strategic Plan on workforce development and HR recruitment.



N.C. DEPARTMENT OF TRANSPORTATION

Office of HBCU Outreach

Historically Black Colleges and Universities (HBCU)

HBCU OUTREACH TEAM



"Teamwork, Makes the Dream Work."



N.C. DEPARTMENT OF TRANSPORTATION

Office of HBCU Outreach

Historically Black Colleges and Universities (HBCU)

- HBCU Summer and Year-Round Internship Program
- HBCU 2-year Fellows Program
- HBCU Scholarship Program
- National Summer Transportation Institute (NSTI)
- HBCU Transportation Research Consortium
- HBCU Educational Awareness/Engagement Sponsorships
- Summer STEM Program
- Speaker Series
- Botswana African Initiative

CORE PROGRAMS



Virgin Hyperloop Summer Interns with
NCDOT Chief Deputy Secretary, David Howard



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Office of HBCU Outreach

Historically Black Colleges and Universities (HBCU)

INTERN PROGRAM OVERVIEW

- The HBCU/MSI (Minority Serving Institutions) Summer and Year-Round Internship Program provides hands-on, real-world experience for students attending historically black colleges or universities or minority institutions of higher education.
- The goal of the program is to increase the pipeline and diversity of students interested in a transportation career.
- Throughout the summer program and year-round, interns gain knowledge, resources and expertise that they can apply to their future careers. Essential components of the internship experience include professional development workshops on skills such as résumé building, business writing and networking.
- The Summer Intern Program is 10 weeks and begins late May and goes through the end of July, and the Year-Round intern Program is 14 weeks and beginning and ending dates vary with student and departmental needs.
- **Success:** 20 students (Summer 2017), 42 (Summer 2018), 44 (Summer 2019) and goal of 40 (Summer 2020-**Cancelled due to COVID19**). Also 7 students hired in the transportation industry from the program in last two years

HBCU SUMMER INTERN PROGRAM UPDATES



SUMMER 2019 COHORT



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Historically Black Colleges and Universities (HBCU)

FELLOWS PROGRAM OVERVIEW

- Real work experiences and learning opportunities for recent graduates.
- Requires a bachelor's and/or a master's degree from one of the ten (10) North Carolina HBCUs and one MSI (Minority Serving Institutions).
- Fellows fill an immediate need for NCDOT business units and increase diversity in the workforce.
- Develops a pool of qualified individuals for future permanent positions within NCDOT, as well as the greater transportation industry.
- Two-year commitment and there have been 13 Fellows since 2019 and 10 are currently working in the program.
- **Success:** 1 HBCU Fellow hired as a private industry transportation planner as a result of the program, and 2 HBCU Fellows have been hired by NCDOT.



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Office of HBCU Outreach
Historically Black Colleges and Universities (HBCU)

FELLOWS PROGRAM UPDATES





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Office of HBCU Outreach

Historically Black Colleges and Universities (HBCU)

SCHOLARSHIP PROGRAM OVERVIEW

- Transportation Scholarship Program is designed to help foster new diverse transportation professionals by helping students at HBCUs/MSI matriculate through college.
- The purpose for developing this program is to build partnerships with HCBUs/MSI to provide opportunities for students to gain access to vast resources and career opportunities with NCDOT. Scholarships support students pursuing undergraduate and master's degrees in transportation related fields.
- This program provides financial assistance to help cover the cost for highly motivated future transportation professionals and leaders who are pursuing their undergraduate and master's degrees.
- The scholarship program is an education initiative developed to support HBCUs/MSI, their students and to advance NCDOT strategic priorities for a more diverse and inclusive workforce.
- **Success:** 22 scholarships awarded (2019) and 27 scholarships awarded (2020) – (Program did not exist prior to 2019)



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Historically Black Colleges and Universities (HBCU)

SCHOLARSHIP PROGRAM OVERVIEW



Bryana Williams

Elizabeth City
State University



Shahzaib Bangash

North Carolina
Agricultural and
Technical State
University



Patrick Stanley

North Carolina
Agricultural and
Technical State
University



Alexander Oakes

North Carolina
Central University



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Office of HBCU Outreach

Historically Black Colleges and Universities (HBCU)

NSTI PROGRAM OVERVIEW

- The National Summer Transportation Institute (NSTI) program is a Science, Technology and Math (STEM) focused program for high school and junior high/middle school students.
- It is administered by accredited colleges, community colleges and universities, accredited Minority Serving Institutions (MSIs) throughout the United States, the District of Columbia, the Commonwealth of Puerto Rico, Pacific Island territories and the U.S. Virgin Islands.
- The NSTI program objectives are to improve STEM skills, provide awareness to middle and high school students - particularly minority, female and disadvantaged youth - about transportation careers, and encourage them to consider transportation-related courses of study in their higher education pursuits.
- The length of the program is typically 2-4 consecutive weeks.
- **Success:** Eight NSTI sites across the state which is the most in the country, and we have the longest running program at NCA&T- 28 years. One of only two DOTs in the country to host a virtual program in 2020.



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Historically Black Colleges and Universities (HBCU)



NSTI UPDATES

- North Carolina has the largest NSTI program in the country according to our FHWA Program Manager with eight sites.
- We also have the one of the longest running programs sites in the country at the Transportation Institute located at North Carolina A&T University in Greensboro, NC. They have hosted this program for approximately 28 years.



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Office of HBCU Outreach

Historically Black Colleges and Universities (HBCU)

HBCU RESEARCH CONSORTIUM OVERVIEW

NEW

- North Carolina has several UTCs (University Transportation Centers) which are highly regarded around the country for exceptional transportation research.
- The North Carolina Department of Transportation (NCDOT) would like to use the UTC as a model to create a state program that would grow the transportation research capacity at Historically Black Colleges and Universities (HBCU) within North Carolina. The research would be forward focused to support the creation of NCDOT's 2050 plan.
- A new North Carolina HBCU Transportation Research Consortium would be formed to oversee the program.
- The goal of the consortium would be to tackle key transportation research projects that would be useful for NCDOT but capitalize on their unique assets and strengths from HBCUs and Minority Serving Institutions (MSI).
- NCDOT has Volpe Center's completed assessment of HBCU and MSI capacity and readiness for transportation related research.
- The Volpe Center is currently supporting FHWA's Center for Transportation Workforce Development that supports initiatives to develop and expand the nation's transportation workforce.



N.C. DEPARTMENT OF TRANSPORTATION

Office of HBCU Outreach

Historically Black Colleges and Universities (HBCU)

Contact Us

NCDOT.GOV

Search Window – Type Office of HBCU

Al Austin

Director

ajaustin1@ncdot.gov

(919) 707-2815

JoAna McCoy

Program Manager

jmccoy5@ncdot.gov

(919) 707-2776



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Office of HBCU Outreach

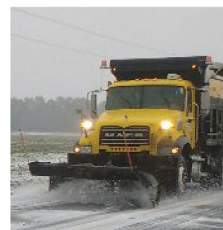
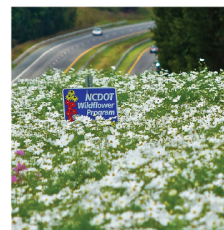
Historically Black Colleges and Universities (HBCU)





NORTH CAROLINA

Department of Transportation

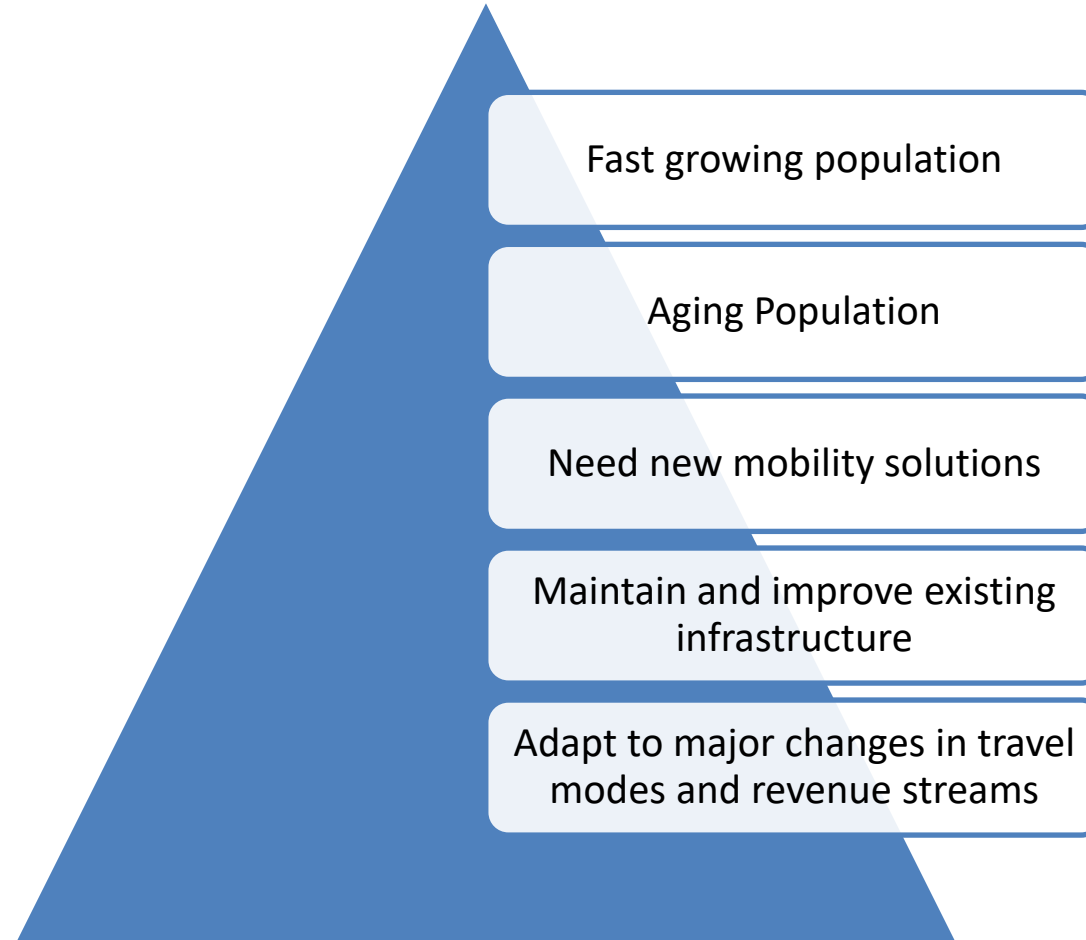


NCDOT HBCU/MSI Research Outreach

Neil Mastin, P.E. – NCDOT R&D Manager

October 14, 2020

Preparing for the transportation future in NC is a major challenge





What do we research?

- Materials
- Design
- Mobility and Safety
- Environment
- Planning
- Equity
- Finance
- ???

Components of the NCDOT Research Program

Contract Research –
Primarily with Universities
Includes Transportation
Centers of Excellence

In-house Research

Technology Transfer (T²)
and Implementation
Support

Short-term Technical
Assistance

State and National
Program Coordination and
Support

Research Library and
Reference Services

Who are our research partners?

Universities



Consultants



U.S. Department of Transportation
Federal Highway Administration



Focused Outreach Efforts

- Retained USDOT Volpe Center to assess HBCU/MSI programs in relation to transportation
 - <https://www.volpe.dot.gov/>
- Produced Key Documents Including
 - Summaries of each HBCU/MSI's capabilities in various technical and policy areas
 - Workforce Pipeline potential
 - Potential for cooperative research activities

Volpe Center - HBCU Summaries

Highlights academic and programmatic strengths and challenges at each of NC's ten HBCUs and one MSI

Developed in MS PowerPoint – easily updated on a regular basis

Vetted with each institution

Main finding: every school has something to offer for NCDOT



Project Page: <https://connect.ncdot.gov/projects/research/pages/ProjDetails.aspx?ProjectID=2019-34>

Report: https://connect.ncdot.gov/projects/research/RNAProjDocs/HBCU%20Summaries_FINAL.pdf

4 Parts: K-12 outreach; Entrepreneurship; NCDOT Internship; and Course-based experiences

Emphasizes existing programs at NCDOT while identifying gaps in communication and delivery that, if addressed, could catalyze a powerful pipeline effort



[https://connect.ncdot.gov/projects/research/RNAProjDocs/School%20to%20Work%20Pipeline%20Recommendations FINAL.pdf](https://connect.ncdot.gov/projects/research/RNAProjDocs/School%20to%20Work%20Pipeline%20Recommendations%20FINAL.pdf)

Next Steps – What's planned in the next year?

Virtual visits with key researchers and staff at each school

Discussions on engagement possibilities with each school

Exploring how cooperative efforts could be put together large and small schools.

Focused follow-up during idea and RFP phases

Explore undergraduate engagement potential

A New Wrinkle: Transportation Centers of Excellence – In-State Consortiums

Brand new effort
sponsored by the
Chief Deputy
Secretary's Office

3 Centers were
selected –
1 NC A&T Led

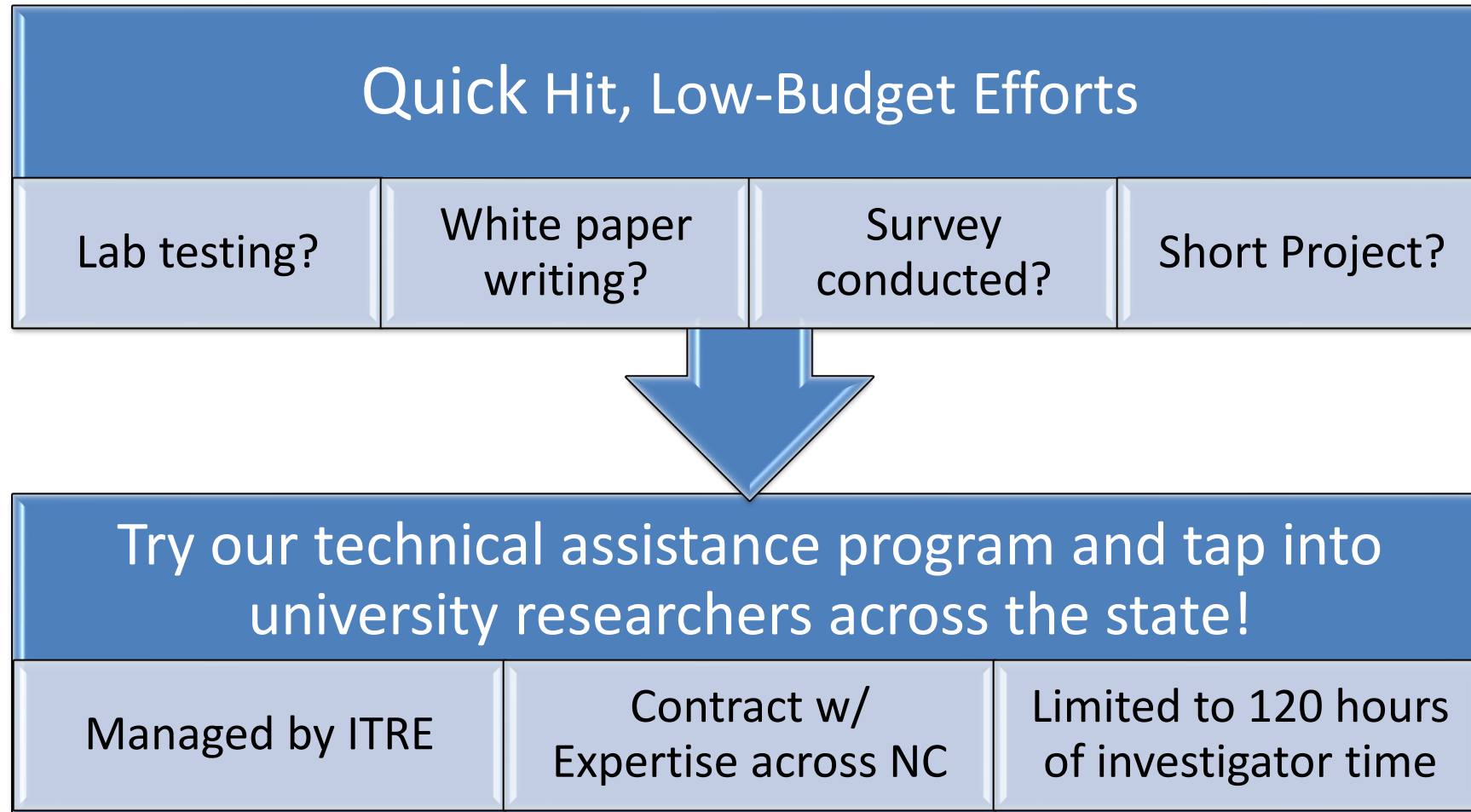
Focus is on
Mobility and
Advanced
Technology

Think of them as
state-level UTCs
with additional STA
engagement

Expect to have
additional efforts in
the not-to-distant
future

Selected by an
Executive
Committee

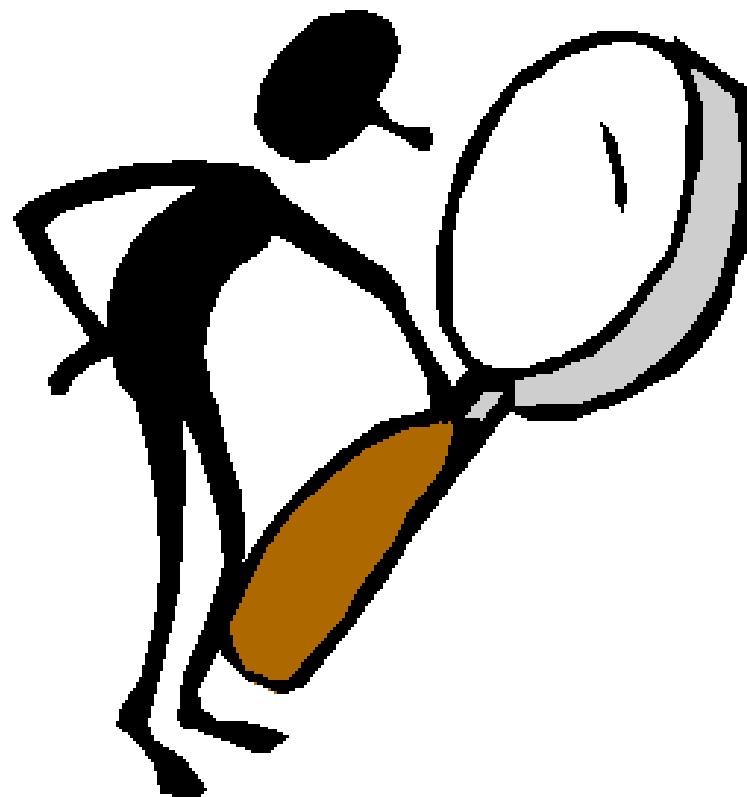
Technical Assistance



*Has been a great way to engage new researchers in a low-risk, low-cost scenario

Other State Opportunities

- <https://www.osbm.nc.gov/operational-excellence/strategic-partnerships>



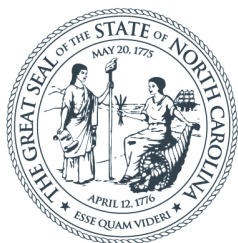
Thank You

Research Office Contact Info

Neil Mastin	Research Manager	919-707-6661	jmastin@ncdot.gov
Lisa Penny	Mobility, Safety, Roadway Design, etc.	919-707-6663	lepenny@ncdot.gov
John Kirby	Stormwater, Environment, Planning	919-707-6662	jkirby@ncdot.gov
Mustan Kadibhai	Pavement, Materials, Maintenance, Structures, Construction, Geotech	919-707-6667	mkadibhai@ncdot.gov
Curtis Bradley	Implementation Manager, Planning, Policy, Multimodal	919-707-6664	cbradley8@ncdot.gov
Lamara Williams-Jones	Research Librarian	919-707-6665	lcwilliams2@ncdot.gov
General Contact	Research	919-707-6660	research@ncdot.gov

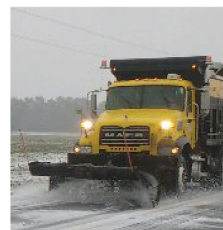
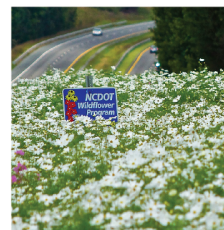
Research Connect Page (for Forms, completed and active projects and more):
<https://connect.ncdot.gov/projects/research/Pages/default.aspx>

Research Directory Page:
<https://apps.ncdot.gov/dot/directory/authenticated/UnitPage.aspx?id=8781>



NORTH CAROLINA
Department of Transportation

Research & Innovation Summit - 2020



Transportation research, workforce development, and outreach efforts at Fayetteville State University

Burcu Adivar, PhD.

October 14, 2020



FAYETTEVILLE
STATE UNIVERSITY™

BROADWELL COLLEGE OF BUSINESS AND ECONOMICS

CAREER-READY GRADUATES

**INDUSTRY
PARTNERSHIPS**

CERTIFICATIONS

**PROJECT-BASED
LEARNING**

**CORPORATE
DAYS**

COMMUNITY & STUDENT ENGAGEMENT

COLLEGE OF BUSINESS & ECONOMICS @FSU



Transportation Research at FSU

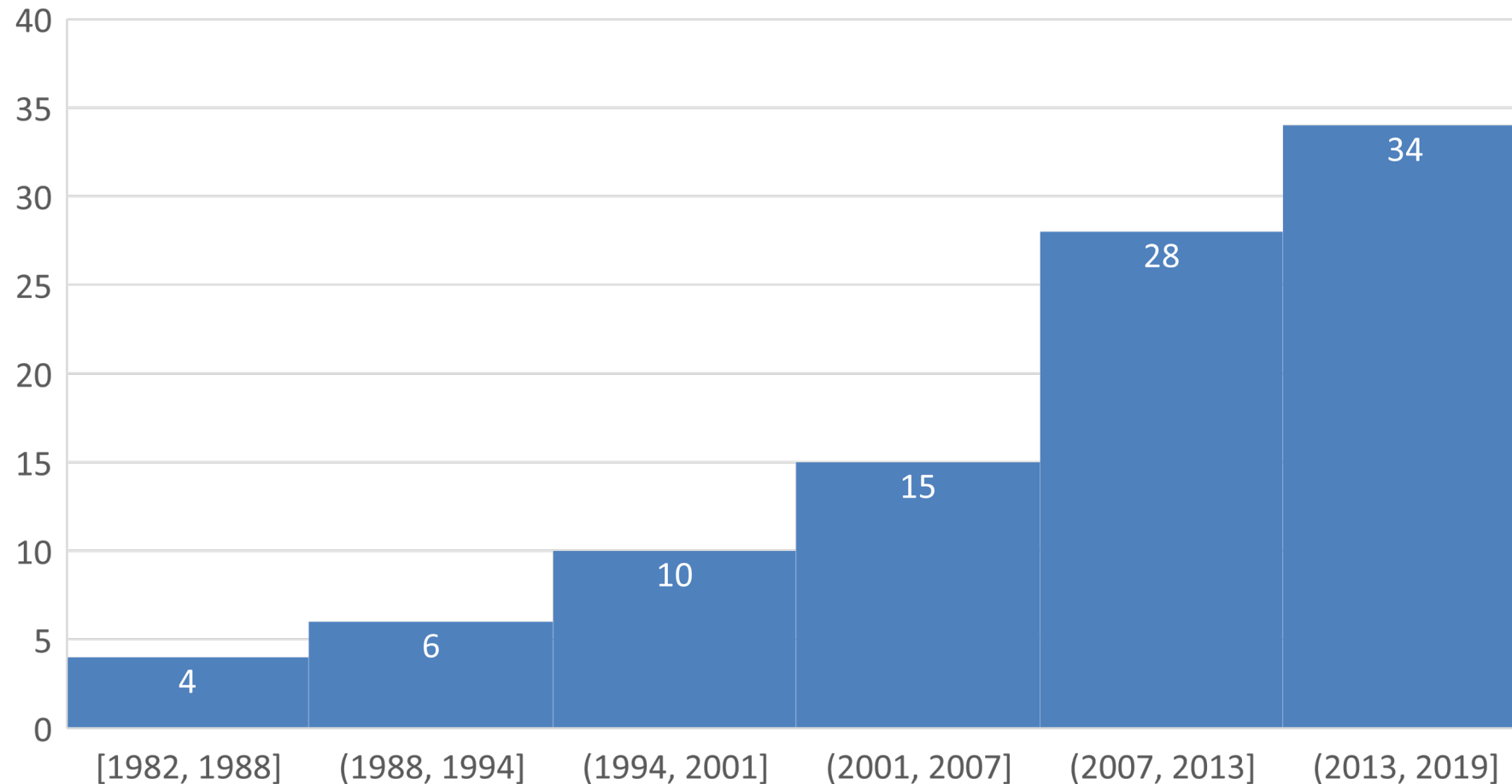
- **NC Transportation Centers of Excellence - Mobility and Congestion**
TCE2020-02 (NCSU, FSU, NCA&T, UNC)
 - **Project #1:** *Deep Learning Software for Traffic State Prediction*
 - FSU*: S. Bhattacharya, M. Adivar
 - **Project #3:** *Transit and MaaS Role in Improving Economic Healthcare Access for Underserved Populations*
 - FSU – B. Adivar; T. Tran
- **NC DMV Optimal Location Analysis, RP2020-48 (FSU)**
 - FSU – B. Adivar
 - Presented at 2019 TRB Visualization Symposium, SESUG 2019, NCDOT R&I Summit 2020

FSU Research and Outreach Centers

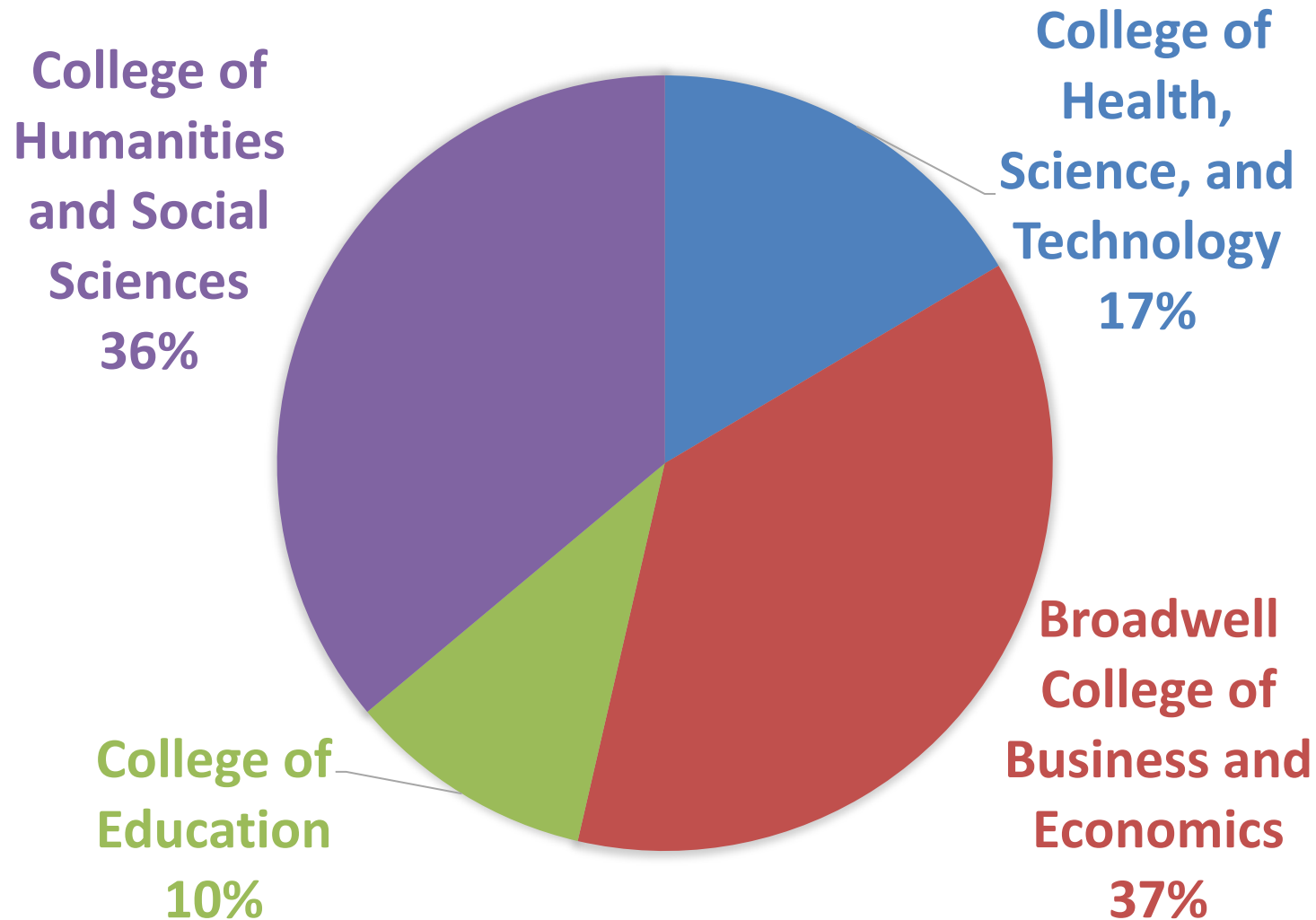


FSU's Impact on Transportation Workforce

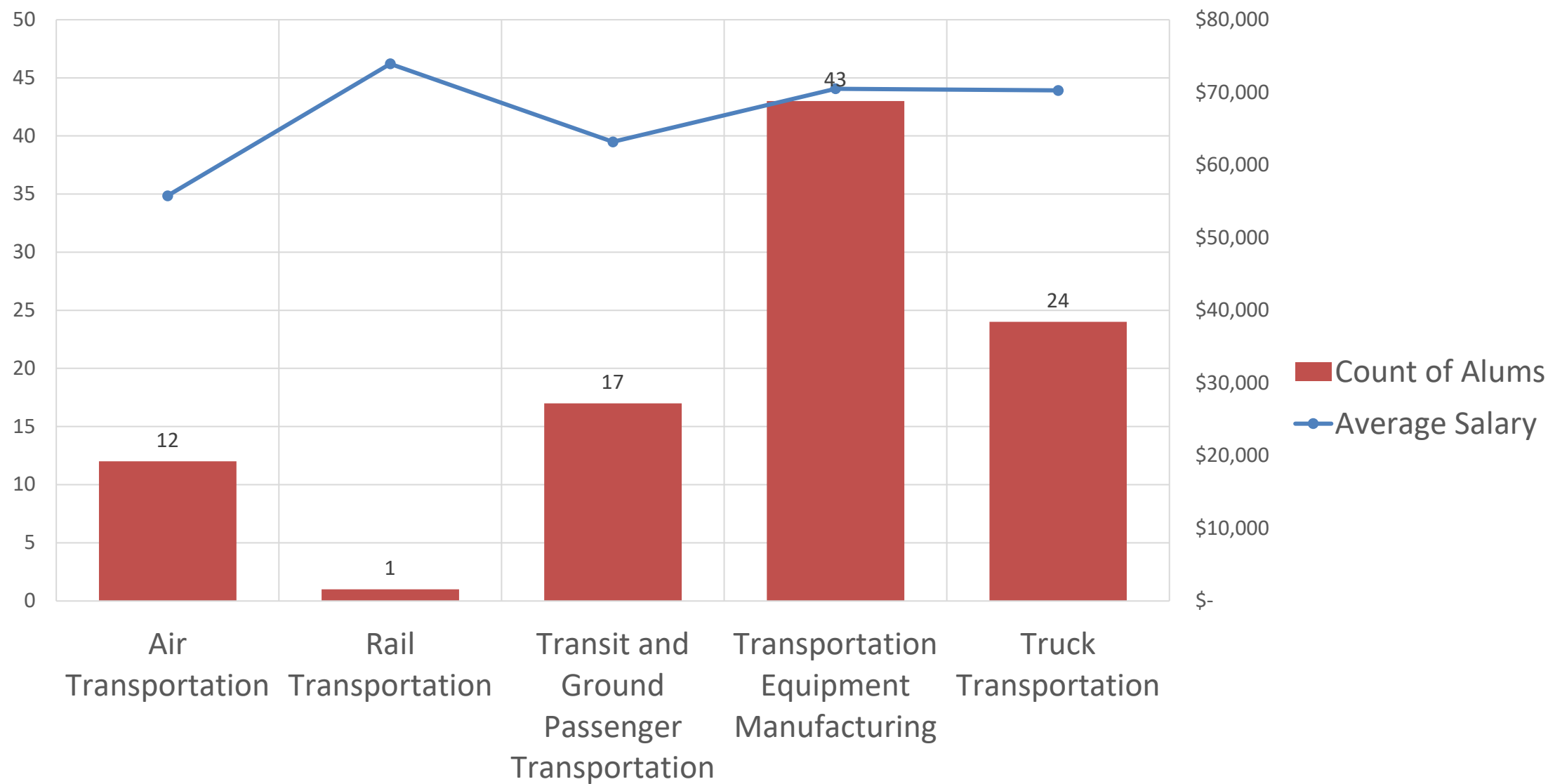
Number of FSU Alums Working in Transportation vs. Graduation Year



Impact Distribution by Colleges



NAICS Breakdown and Average Salary



Major Employers of FSU Alum in Transportation



Example Positions

- Operations Manager, **NCDOT**
- Manager; Aviation Safety, Flights Standards Service **Federal Aviation Administr.**
- Customer Assistance Representative, **American Airlines**
- Pricing Analyst, **United Airlines**
- Manager, **Defense Logistics Agency**
- Instructor, **Army Logistics University**
- Logistic Analyst, **Chenega Healthcare Services**
- Traffic Control Officer, **Cumberland Sheriffs Office**
- Assistant Project Manager, **Washington Metropolitan Area Transit Authority**
- Delivery Driver, **FedEx Ground**
- Conductor, **National Railroad Passenger Corporation**

How do we build a better and more diverse transportation workforce for the future?

- More NCDOT exposure to students by
 - Field trips to N.C. Ports
 - Career Days to promote internships, scholarships
 - Capstone project competition
- Involve more faculty in transportation research through
 - University centers or Center of Excellence projects
 - Providing travel grants to TRB conferences
 - Providing grant opportunities exclusively for HBCUs

Skills for Future Transportation Workforce

- Analysis of changing consumer needs and purchasing preferences to project demand for transportation (*marketing and consumer behavior*)
- Policy making to adopt new developments in technology, security, international trade and environmental requirements (*business law, climatologist, etc.*)
- IoT, ERP, Business Intelligence and Data Analytics, Simulation, GIS, UAVs, Robotics, Emergency Logistics
- Infrastructure design/maintenance/operation for road, rail, air, energy, and information

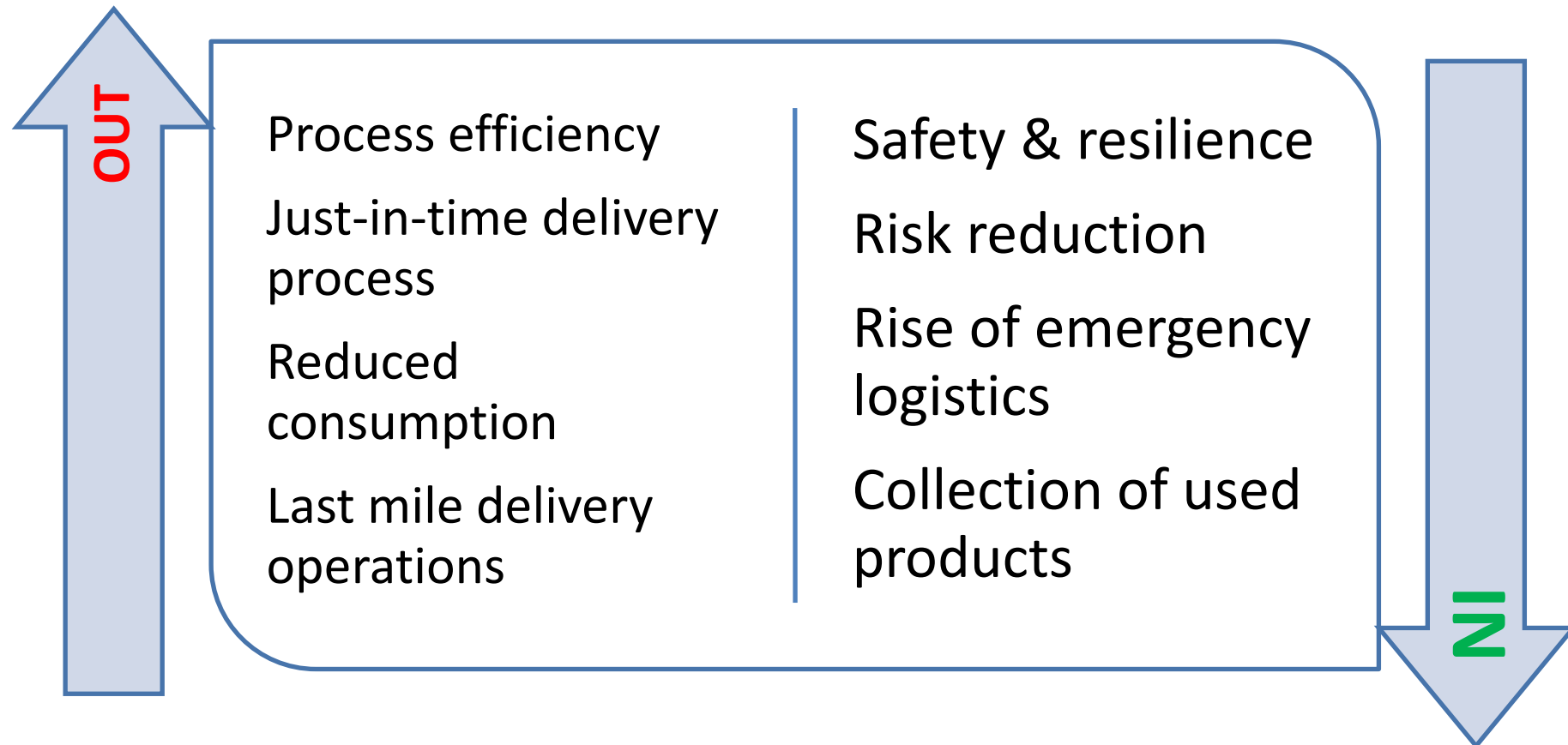
Offering “Transportation” Degree Program

- Degree programs focusing on transportation
- Undergraduate and graduate degree programs at HBCUs
- Interdisciplinary curriculum with
 - 8-week NCDOT internship requirement
 - A capstone project for NCDOT
- Tuition assistance or NCDOT scholarship
- Employment opportunity upon successful completion
- Advisory Board consisting of NCDOT Researchers and Practitioners

Misconceptions about transportation research

- As field, transportation covers all modes of transport
 - Misconception: more coverage on highway transportation or trucking
- Addresses both the engineering and the social science(consumer behaviour, economics, safety, security, equity, health, etc.) perspective
 - Misconception: only engineering
- Requires truly multidisciplinary collaboration of researchers, practitioners, engineers and policymakers
 - Misconception: policymakers always work with engineers
- Have significant impact on other infrastructure systems such as food, health, education, defense, communication and energy.
 - Misconception: isolated research field

A world shifting away from efficiency maximization to vulnerability mitigation and resilience



Challenges Facing Transportation

- Secure communications, proactive cybersecurity
- Transition to renewable energies
- Decarbonizing logistics
- Modal shift from road to rail or water for freight
- Scenario planning to envision the future of transportation and connect these visions to the short-term decisions
- Digital transformation of business processes with IoT and robotic process automation

THANK YOU!

Burcu Adivar, Ph.D., Associate Professor
Assistant Dean, Broadwell College of Business and Economics
<http://www.uncfsu.edu/bcbe>
Fayetteville State University
1200 Murchison Road
Fayetteville, North Carolina 28301
Office: 910-672-1362
e-mail: bdivar1@uncfsu.edu



North Carolina
Agricultural and Technical
State University™

R & I Summit 2020 HBCU OUTREACH AND ENGAGEMENT

John C. Kelly, Jr.
Associate Professor, Electrical and Computer Engineering
October 2020



- **Autonomous Control and Information Technology (ACIT) Institute**

- Autonomy
- Data-mining
- Test and Evaluation



- **NC Transportation Center of Excellence on Connected and Autonomous Vehicle Technology (NC-CAV)**

- CAV Infrastructure
- CAV Impacts
- CAV applications



- **Center for Advanced Transportation Mobility**

- Mobility challenges associated with the movement of both people
- Transportation systems under emergency conditions



- **Autonomous Cooperative Control of Emergent Systems of Systems (ACCESS) Laboratory**

- Smart Transportation Systems
- Autonomous vehicles
- Sensing, Perception, and Control



- **Aggie Autonomous Auto (A3) Laboratory**

- Autonomous Car Development





A fleet of Self-driving shuttles
(to be operationalized in Spring 2021)



Gateway University Research Park - North Campus
Autonomous Vehicle Test Track

5900 Summit Ave.
Browns Summit, NC 27214

A one-mile test track for
testing autonomous car developments



An urban test-track for autonomous car testing



A fleet of self-driving cars, UAVs, and ground vehicles

Developing a level-4 Self-driving car

The Aggies Autonomous Auto (A3) team has developed an autonomous car under the Autodrive Challenge.

Organized by SAE International and General Motors, the Autodrive Challenge is a four-year competition to develop and demonstrate a fully autonomous passenger vehicles. Through this competition, GM provided N.C. A&T team with a Chevrolet Bolt EV as the vehicle platform.

The technical goal of the competition is to navigate an urban driving course in an automated driving mode as described by SAE Standard (J3016) level 4 definition by year three.

In this competition, the A3 team placed second across North America, staying above Virginia Tech, Michigan Tech, Michigan State, Texas A&M, Waterloo, and Kettering.



Connecting NCA&T Campus and Greensboro downtown



- NC-CAV in collaboration with Downtown Greensboro Inc and City of Greensboro investigates the feasibility study for connecting NCAT campus to downtown Greensboro. This project investigates the required infrastructure, the number of vehicles, the number and location of stops, the average service time, and the service capacity.
- The goal is to deploy the developed self-driving shuttles at NCA&T. The team are now identifying a proper dedicated road for this use-case.

NCDOT awards to NC A&T

1. NC Transportation Center of Excellence on Connected and Autonomous Vehicle Technology (NC-CAV) (2020)
2. Developing a Safe and Cost-Effective Flight Control Methodology for a UAV-Enabled Bridge Inspection (2019)
3. BioRePavation: Biological-based Asphalt Pavement Binder (2017)



NCDOT subawards to NC A&T

1. NC Transportation Centers of Excellence - Mobility and Congestion (2020)
2. NC Transportation Center of Excellence in Advanced Transportation Technology Safety and Policy (2020)
3. Enhancing AV Traffic Safety through Pedestrian Detection, Classification, and Communication (2019)
4. Evaluation of Acceptance Strength Tests for Concrete Pavements (2003)



**North Carolina
Agricultural and Technical
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The NC Transportation Center of Excellence on Connected and Autonomous Vehicle Technology (NC-CAV)

Goal: *To establishing a multidisciplinary Center of Excellence in “Advanced Transportation Technologies” to investigate the adoption, utilization, and deployment of CAVs and their impacts on the transportation system in North Carolina and the nation.*



The center incorporates three interwoven research thrusts that will progress synergistically:

- **Thrust 1 (CAV Impacts)** investigates the impact of Connected and Autonomous Vehicle's (CAV) on North Carolina's transportation system and associated revenue.
- **Thrust 2 (CAV Infrastructure)** assesses North Carolina's readiness for CAVs in traditional and emerging transportation infrastructure.
- **Thrust 3 (CAV Applications)** explores emerging applications of CAVs, and will develop and deploy CAVs and Unmanned Aerial Vehicles (UAVs) for advancing transportation systems.



Sponsored by NCDOT, this project uses UAV-enabled bridge inspection to provide an economical and safer alternative to conventional inspection practices.

Project Goals:

- testing and evaluating the performance of commercially available platforms for bridge inspection
- developing robust flight control techniques to enhance the performance of the UAVs to handle high turbulent flows around bridges, taking into account bridge types, terrain characteristics, and weather information.



Check <https://www.uas4bridge.com/> for details





Derek Daniels graduated from North Carolina Agricultural and Technical State University. He majored in Mechanical Engineering. Derrick participated in 2018 and 2019 with the **Office of HBCU Outreach Summer Internship Program**. At the end of his internship, he was **employed with NCDOT in the Transportation Engineering Associate Program**.



Kiana Williams is a senior at N.C. A&T State University majoring in supply chain management. She worked in a co-op position with Georgia Pacific and is the first student from N.C. A&T to intern with Chick-fil-A, Inc. Being awarded this scholarship “has allowed me to get closer to my goal of graduating from North Carolina A&T State University by giving me peace of mind to focus on my school work and extracurriculars instead of money for tuition.”



In the Summer of 2018, four NCDOT HBCU Summer interns from North Carolina A&T were the first HBCU students to visit the International Headquarters of Virgin Hyperloop in California and Nevada. Hyperloop is a new futuristic mode of transportation that will move people and freight through low pressure tubes at 600 mph to 700 mph.

IT! is for Girls

On August 2020, the NC-CAV Center team worked with the American Association of University Women (AAUW) to organize a summer camp named “IT! is for Girls.”

Objective: inspiring young girls to pursue interests in STEM education.

During the one-week summer camp the middle school girls explored subjects and got to do hands-on projects on the Internet of Things, robotics, etc.

The participants were exposed to the current research activities and research objectives of the NC-CAV Center and transportation concepts, challenges, and opportunities.



NC-CAV Center





NORTH CAROLINA
Department of Transportation

Research & Innovation Summit - 2020



HBCU Outreach and Engagement at NC A&T State University

Maranda McBride
October 14, 2020



North Carolina
Agricultural and Technical
State University

Workforce & Development and Outreach Activities

- STI programs for 28 years
 - Bridge building project
 - NCDOT Site Visits
 - Student projects
 - Invited talks
- Transportation Awareness Day
 - State Farm exhibit
- Closing Bell talk: “Embracing Transportation in All Careers”
 - David Howard



Education/Workforce Development

- Summer High School Transportation Institute



Air and Space Museum



Greensboro Transit Authority

**Garrett Morgan Youth
Symposium
in Tampa, FL**



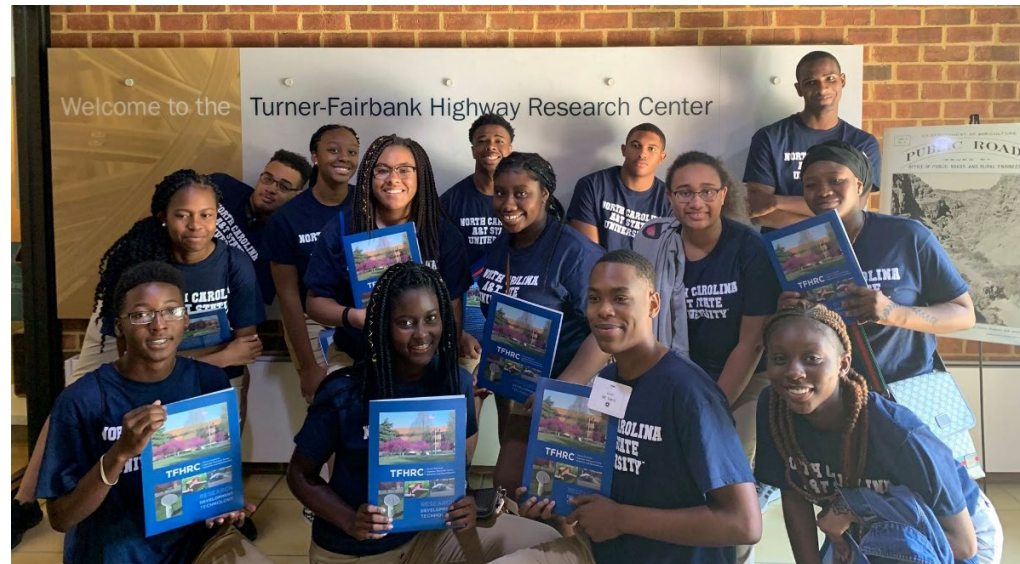
Washington, DC Metro

Education/Workforce Development

- Summer High School Transportation Institute



Turner Fairbank Highway Research Center



Outreach

- Transportation Awareness Day
– April 2019



Outreach

- Transportation Awareness Day
 - April 2019



Tech Transfer

- NCDOT Research & Innovation Summit 2019
– Curtis Bradley, Neil Mastin



Research Activities

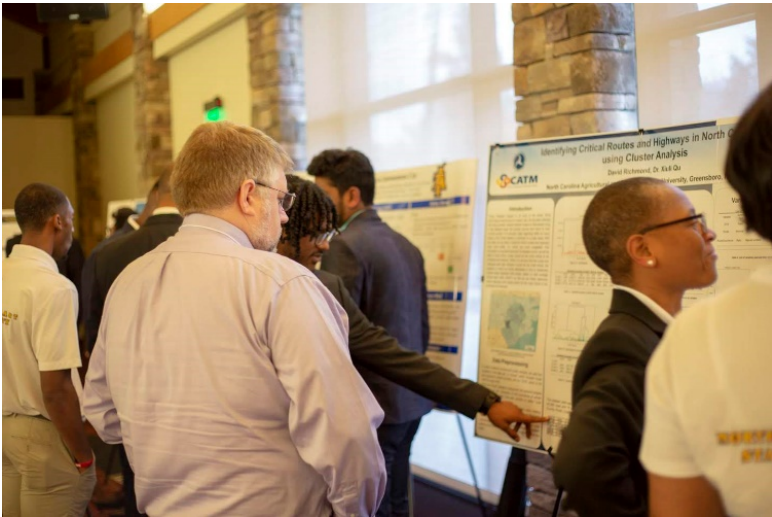
- Research projects
 - Ali Karimoddini, Maranda McBride, Hyoshin Park
- NCDOT Transportation Centers of Excellence
 - NC CAV: NC A&T State University (ATT Center)
 - TSAP: UNC – Chapel Hill (ATT Center)
 - Congestion and Mobility: NC State University (M&C Center)



RESEARCH & DEVELOPMENT

Other Engagement Activities

- Research program info sessions
- CATM External Advisory Board membership
- CATM Symposium participation



Thank you!

- Contact Information

- Maranda McBride, PhD
- Center for Advanced Transportation Mobility, Director
- Transportation Institute, Director
- Department of Management, Professor
- Email: mcbride@ncat.edu
- Phone: 336-285-3359



**NORTH CAROLINA AGRICULTURAL
AND TECHNICAL STATE UNIVERSITY**

