National Center for
INFRASTRUCTURE
TRANSFORMATION
Led by: Prairie View A&M University

- **Federal Agency and Organization Element to Which Report is Submitted** – US Department of Transportation, Office of the Assistant Secretary for Research and Technology (OST-R), University Transportation Center Program (UTC)
- **Federal Grant or Other Identifying Number Assigned by Agency** - National University Transportation Center (UTC) headquartered at Prairie View A&M University and focused on Improving the Durability and Extending the Life of Transportation Infrastructure
- **Project Title** – National Center for Infrastructure Transformation
- **Center Director Name, Title, and Contact Information (e-mail address and phone number)** – Judy A. Perkins, Ph.D., PE, Director, juperkins@pvamu.edu, 936-261-1655.
- **Name of Submitting Official** – Same as Center Director
- **Submission Date** – April 30, 2024
- **DUNS Number** (138170220) and **EIN Number** (74-6001078)
- **Recipient Organization (Name and Address)** – Prairie View A&M University, 700 University Drive, Prairie View, Texas 77446
- **Recipient Identifying Number or Account Number** - No. 69A3552344813 and No. 69A3552348318.
- **Project/Grant Period (Start Date, End Date)** – June 1, 2023 – May 31, 2029
- **Reporting Period End Date** – October 1, 2023 – March 31, 2024
- **Report Term or Frequency (annual, semi-annual, quarterly, other)** – Semi-Annual.
- **Signature of Submitting Official** -

PRAIRIE VIEW A&M UNIVERSITY
Texas A&M Transportation Institute
RUTGERS Center for Advanced Infrastructure and Transportation
MICHIGAN STATE UNIVERSITY
ASU Arizona State University
BLINN COLLEGE DISTRICT
TEXAS A&M UNIVERSITY

1. ACCOMPLISHMENTS

a. *What are the major goals of the program?*
The National Center for Infrastructure Transformation (NCIT) is led by Prairie View A&M University (PVAMU). The following consortium partners support PVAMU - Arizona State University (ASU), Blinn College District (BCD). Michigan State University (MSU), Rutgers University (RU), Texas A&M Transportation Institute (TTI) and Texas A&M University (TAMU). NCIT's goal is to support improving the durability and extending the life of transportation infrastructure by transforming the transportation system through leadership, research, education, and workforce development (EWD), and technology transfer and collaboration (T2C).

b. *What was accomplished under these goals?*
Leadership/Management Important Activities

- The NCIT Leadership met biweekly and consist of the following individuals:
  - Judy Perkins – Director/Advancing Education in Excellence (AEIE) Coordinator
  - Melissa Tooley - Deputy Director/Research Coordinator
  - Claudia Zapata – ASU - Associate Director & AEIE Coordinator
  - Marshall Rich – BCD - Associate Director & EWD Coordinator
  - Bora Cetin – MSU – Associate Director
  - Md Jobair Bin Alam – PVAMU- Associate Director
  - Yonggao Yang – PVAMU- Associate Director & EWD Coordinator
  - Patrick Szary – RU – Associate Director
  - Anand Puppala – TAMU – Associate Director
  - Charles Gurganus – TTI – Associate Director & EWD Coordinator
- The NCIT Executive Leadership consisting of the Director and Deputy Director met with all Associate Directors, the AEIE Coordinators, and EWD Coordinators to discuss management and operational matters, their roles and responsibilities, and policies and standing operating procedures (SOPs) that will guide NCIT's business practices.
- The Director and Deputy Director meet virtually and in person on a regular basis to ensure the execution of NCIT's Year-1 implementation plan and calendar of events.
- The Associate Directors meet periodically with the research faculty at their respective institutions to share Center information, ensure implementation of individual and collaborative projects/programs, and respond to questions and/or comments.
- In October 2023, the Director and Deputy Director met with the NCIT Advisory Board Co-Chairs, namely, Pamela Obiomon (PVAMU Dean, Roy G. Perry College of Engineering (RGPCOE)) and Greg Winfree (TTI Agency Director) to discuss format, operations, and dates of the first NCIT Advisory Boarding.
- The Director, Deputy Director, and the RU Associate Director attended the Council of University Transportation Center (CUTC) Awards Banquet and Winter Meeting in Washington, DC in January 2024.
- In February 2024, we reconfirmed the following individuals to serve on NCIT's Advisory Board and our first meeting will occur by August 2024.
  - Mr. Paul C Ajegba, PE, Senior Vice President, Infrastructure Engineering Incorporated and Affiliates
  - Dr. Jay Anderson, Vice Chancellor, BCD Applied Sciences, Workforce and Economic Development
  - Mr. Greg A. Baker, PE, Vice-President, Senior Project Director, Arcadis Incorporated
  - Dr. Bouzid Choubane, Director of the National Center for Pavement Preservation, MSU
  - Ms. Megan Dere, Civil Rights Program Manager, Federal Highway Administration (FHWA) Texas Division Office
  - Dr. Zachary Grasley, Chair, Zachry Department of Civil and Environmental Engineering, TAMU

- Ms. Allison Klein, Senior Vice President of Strategic Engagement, American Road and Transportation Builders Association (ARTBA)
- Dr. Ali Maher, Professor of Civil Engineering and Center for Advanced Infrastructure & Transportation (CAIT) Director, RU
- Dr. Ram Pendyala, Director of the School of Sustainable Engineering and Built Environment at ASU and Director of Teaching Old Models New Tricks (TOMNET), a Tier 1 University Transportation Center (UTC)

Collectively and individually, NCIT's leadership cadre are having a significate impact on the UTC infrastructure community through the education, research, and outreach efforts occurring on their campuses and beyond. The NCIT consortium members continue to mentor and encourage students, early career faculty, and experienced researchers to seek additional prominent roles throughout the transportation profession. Below are achievements of NCIT's faculty, students, and staff for this reporting period.

- **ASU**
  - Kamil Kaloush, Keynote Speaker, "Innovative Material in Roofing Shingles to Resist Excessive Heat," Asphalt Roofing Manufacturers Association (ARMA) 2nd Virtual Asphalt Roofing Recycling Forum, October 24, 2023.
  - Kamil Kaloush, Keynote Speaker, "Sustainable Pavements: Research and Industry Practices in the Southwest – USA," The 15th National Bitumen, Asphalt and Machinery Conference, Iran, November 2023.
  - The NCIT ASU research group was granted one of the twelve 2023 Global Road Achievement Award (GRAA) for the "Research Category" by the International Road Federation (IRF). The IRF Awards Programs recognizes exemplary people and projects that place the industry at the forefront of social and economic development. This prestigious award was announced at the 6th Annual IRF Global Roads2Tomorrow (R2T) Conference & Exhibition and the Arizona Pavements/ Materials Conference on November 16, 2023. Per Photo 1, from *left to right* is Kamil Kaloush, Jose Medina, Jolina Karam, Judy Perkins, Carlos Obando, and Ramadan Salim.

Photo 1 – 2023 GRAA Award for Research

  - In March 2024, the NCIT ASU research team led by Kamil Kaloush participated in the ASU Lab to Launch Pitch Day. The objective of the competition is to support inventions to transition from the lab to initial field implementation and marketing. The Team was awarded $10,000 to support its field applications efforts of the product deliverable from the NCIT research project entitled, "A Sustainable Approach for Making More Climate Resilient Asphalt Pavements."
  - Hasan Ozer, Keynote Speaker, "Fracture Tests for Asphalt Mixtures Containing Recycled Roofing," ARMA Association 2nd Virtual Asphalt Roofing Recycling Forum, October 24, 2023.
  - Hasan Ozer, Director of Southwest Pavement Technology Consortium, 2023-Present
  - Claudia Zapata, Associate Editor of Journal of Geotechnical and Geoenvironmental Engineering, 2023–Present.
- **MSU**
  - Surya Congress received the 2023 Quigley Award from Canadian Geotech Society.
  - Surya Congress presided over three Transportation Research Board (TRB) Annual Meeting Sessions - #2015 - Evaluation of Material Properties for Transportation Earthworks, #3193 -

Advances in Geotechnical Lab and Field Instrumentation, and #4058 - Advances in Geotechnical Aspects of Pavement Modeling and Management.

- **PVAMU**
  - Jobair Bin Alam received the RGPCOE Outstanding Faculty Researcher Award during the 2024 Engineer's Week Celebration in February 2024.
  - Jobair Bin Alam received the Division of Research & Innovation 2024 Principal Investigator Appreciation Award in February 2024.
  - Donna Broussard, Sharon Evans, and Judy Perkins attended the 2024 PVAMU RGPCOE Inaugural Women of Leadership Conference held in March 2024.
  - Judy Perkins serves on the 2024 Future of Transportation (FoT) Summit Steering Committee, Chairperson of the Poster Committee, and Chairperson of the Infrastructure Thematic Lectern Committee.
  - Judy Perkins served a panelist for the Helping Women in Academia Develop Leadership Skills Session at the 2024 PVAMU RGPCOE Inaugural Women of Leadership Conference.
- **RU**
  - Patrick Szary was elected CUTC Active Past-President for June 2023 - June 2024 term.
  - Hao Wang won the New Jersey Department of Transportation (NJDOT) Research Implementation Award during the 2023 NJDOT Research Showcase on October 25, 2023.
  - Hao Wang, presided over the 2024 TRB Annual Meeting Session 1022 - Climate Change Effects on Asphalt Mixture Performance Prediction: What Are the Gaps and Challenges?
- **TAMU**
  - Nripo Biswas, Invited Speaker, "Role of Silica Based Admixtures for Effective Stabilization of Problematic Soils, 2nd International Conference on Construction Resources for Environmentally Sustainable Technologies, November 20, 2023.
  - Yong-Rak Kim, presided over the 2024 TRB Annual Meeting Session 1022 - Climate Change Effects on Asphalt Mixture Performance Prediction: What Are the Gaps and Challenges?
  - Anand Puppala, Invited Speaker, "Sustainable Ground Improvement Practice and Comprehensive Assessments for Problematic Expansive Soils," 2nd International Conference on Construction Resources for Environmentally Sustainable Technologies, November 20, 2023.
  - Anand Puppala, presided over the 2024 TRB Annual Meeting Session 2219 - Performance of Geomaterials Supporting Transportation Infrastructure
  - Anand Puppala has been honored with inclusion by the American Society of Civil Engineers in its 2024 class of distinguished members.
- **TTI**
  - Elissa Cuellar, Melissa Tooley, and Haylee Yung attended the 2024 PVAMU RGPCOE Inaugural Women of Leadership Conference held in March 2024.
  - Brianne Glover, Invited Speaker, "Can Solar Panels in Highway ROW Be the Next Big Step in Renewable Energy," Thinking Transportation Podcast, November 7, 2023.
  - Laura Higgins received the 2023 TTI Glenda Evans Inspiration and Positivity Award.
  - Edith Mercado, "How to Ensure That US Infrastructure Remains Greater Than the Sum of its Parts," Thinking Transportation Podcast, December 12, 2023.
  - Melissa Tooley served a panelist for the Helping Women in Industry Develop Leadership Skills Session at the 2024 PVAMU RGPCOE Inaugural Women of Leadership Conference held in March 2024.
  - Melissa Tooley, Member, Region 3 Sustainable Mobility and Accessibility Regional Transportation Equity Research Center, Advisory Board, 2023-Present.
  - Melissa Tooley, Associate Director, Region 6 Southern Plains Transportation Center (SPTC), 2023-Present.
  - Melissa Tooley, Chairperson, Resilient Navigation & Timing Foundation, 2023–Present.

- Greg Winfree, Invited Speaker, "How Texas Became a Transportation Technology Hotbed," Automotive News Shift: A Podcast about Mobility, October 15, 2023.
- Greg Winfree, Keynote Speaker, Global Initiatives and Prospects for Future Mobility Center," Mobility Innovation Week, November 2023.
- Greg Winfree, Member, US Department of Transportation Advisory Committee on Transportation Equity, 2023-Present.
- Haylee Yung received the 2023 TTI Professional Support Award

Research Important Activities

NCIT's research program includes traditional engineering and planning research but also policy research to ensure that the Infrastructure Investment and Jobs Act's unprecedented investment is made wisely. In our initial semi-annual progress report (SAPR), NCIT funded and deployed a total of 16 projects - 13 research, 2 EWD, and 1 T2C.

During this reporting period, we funded three new research projects which are listed in Table 1 below. NCIT now has a total of 19 active projects operating in the first year of the grant and supports 38 researchers.

The Principal Investigators (PIs) received the Kickoff Research Packet for the three NCIT research projects/programs. Per Table 1, ASU's Project #1 addresses two research questions – (1) Can the infrared cameras equipped on commercial unmanned aerial vehicles be accurate and precise enough to capture temperature differentials during laydown when temperatures are 200-to-300-degree Fahrenheit? and (2) Can near real-time feedback be provided to the construction crew to adjust and improve the quality of construction?

ASU's Project #2 focus is to thrive in sustainability by evaluating various aerogel products as well as using recycled materials to provide guidelines for the proper utilization of a new recycled-aerogel composite (RaC). RaC includes recycled materials such as crumb rubber particles, oil, fibers, and/or material in the form of aerogel particles or fibers. To date, results showed that the High Temperature Stability Test (HTST), developed at ASU can distinguish the performance of the various aerogels and rank them in terms of their ability to decrease the thermal susceptibility of binders.

The current project has contributed to the ASU start-up company called "aerogel Coating Technologies Inc - (aCT Inc)." To date, the potential application of aerogel technology is getting good traction in Arizona. The research team has been collaborating with Fisher Industries' Southwest Asphalt Division and MR Tanner (local producer and contractor) to produce the material. In January 2024, the team had a meeting with the City of Phoenix Street Transportation Department and discussed the potential to build a pilot project this summer. The team also met with personnel from the design and maintenance group and state engineers of the Arizona Department of Transportation (ADOT). ADOT is interested in using the technology in the northern portion of the State to provide pavement temperature benefits during the winter, and therefore potentially reduce the ice on roads during the winter season.

TTI collaboration with RU on Project #3 in Table 1 seeks to perform a durability-based performance evaluation of selected bridge deck concrete mixes and identify the deficiencies (if any) and areas of improvements for extending service life. The results will position the research team to refine predictive models with actual deterioration models and develop an improved, comprehensive model for performance predictions based on varying bridge deck concrete mix designs.

Moreover, significant accomplishments have been made across the initial 16 projects reported in SAPR #1. In addition to accomplishments occurring within the respective project-level scope of work,

presentations (podium and posters), and the publication of papers are further evidence of achieving NCIT's research program goals.

Table 1 – NCIT Research Projects (3 Total)

Project Number	Project Title	Lead Institution	Collaborators
1	Automated Construction Quality Monitoring and Inspection Protocols using Uncrewed Aerial Vehicles	ASU	
2	Implementation of a New Silica-Based Composite in the Modification of Asphalt Mixtures: Solving Asphalt Pavement Shortcomings Related to Thermal Cracking and Permanent Deformation	ASU	
3	Increasing the Lifespan and Resiliency of Bridge Superstructure Concrete Through Durability-Based Performance Evaluation	TTI	RU

EWD Important Activities

The scope and reach of the NCIT consortium will have a major impact on the transportation workforce through its EWD programs. NCIT is creating an inclusive culture to develop a globally competitive workforce by educating the next generation of transportation leaders. Through collaboration and engagement with various educational stakeholders, programs and activities are designed to address critical workforce needs and prepare a diverse pool of future professionals who are innovative and creative thinkers. To support the goal of producing graduates and a professional workforce proficient in the skills needed in the infrastructure focus areas, a collection of strategies and approaches are used.

Across the consortium, there are a total of 38 students supported by this grant mostly due to their participating in projects/programs offered in the categories of research, EWD, and T2C. Of the total, 8 are doctoral students, 16 master's students and 14 undergraduates. This is the immediate pool of future transportation leaders we are nurturing as well as mentoring to become transportation professionals.

Leadership through Mentoring Program

In a bid to cultivate the next generation of leaders in the infrastructure and transformation sector, NCIT proudly introduces its innovative Leadership through Mentoring Program tailored for both graduate and undergraduate students to learn how to diversify their participation in leadership processes beyond the hierarchical leader-follower construct. This unique initiative is spearheaded by NCIT's ASU partner, and it focuses on understanding leadership as a ubiquitous and ever-present social process of influence within groups to prepare students for working in the transportation industry.

Transportation industry professionals need a broad array of leadership competencies to engage with multiple simultaneous complex projects responding to communities changing regional needs, climate change, or remediating past highway projects that harmed historical marginalized communities. Graduate students and undergraduate students apply together for this semester-long collaboration and those undergraduates selected receive a stipend. This structured mentorship process emphasizes shared leadership actions that are distinct from traditional mentorship and offers an enriching experience that goes beyond hierarchical leading actions. The mentor pairs develop and implement a mentoring plan that supports both partners' goals and objectives. A mentorship coordinator (NCIT Associate Director or NCIT Faculty Researcher) supports the mentor pairs, meeting individually with pairs to start and

then twice monthly. All the mentor pairs also participate in online exercises to expand their leadership knowledge and competencies.

Highway Construction Workforce Partnership (HWCP) Program Graduation

In the wake of the pandemic's Great Resignation, the transportation and construction industries in Texas have faced unprecedented challenges, particularly in recruiting entry-level employees. To help tackle this issue, BCD, TTI, NCIT, and the Texas Asphalt Pavement Association partnered to deliver a comprehensive 15-week course designed to empower students with the knowledge and skills needed to jump-start their careers in the highway construction industry. The course combines traditional classroom training with valuable firsthand experience, exposing students to the intricacies of the highway construction field. On October 12, 2023, the HWCP Program graduated their first Cohort. Below are the graduates and among them is the first female (Kamryn Carter) to graduate from the program.

Table 2 – HWCP Success Stories

Student Name	High School	Employer
Jacob Barrington	College View High School	Texas Department of Transportation
Kamryn Carter	Franklin High School	Knife River
Cullen Cooke	College View High School	Transitioning from Big Creek Construction
Carson Hohensee	Home School	Knife River
Layne King	Franklin High School	Big Creek Construction

Photo 2 – HWCP Cohort #1 Graduation

(Left to Right) – Judy Perkins (NCIT Director), Rick Davenport (TTI Project Specialist II), Jon Anderson (BCD Vice Chancellor for Applied Sciences, Workforce and Economic Development & NCIT Advisory Board Member), Jacob Barrington, Kamryn Carter, Cullen Cocke, Carson Hohensee, Layne King, Charles Gurganus (TTI PI of HWCP), and Greg Winfree (TTI Agency Director & Co-Chair of NCIT Advisory Board).

Outreach – Increasing Awareness of Transportation

To increase an understanding and awareness of the transportation field, in November 2023, Hasan Ozer from ASU hosted two educational activities. The Asphalt Paving Workshop: Best Management

Practices for Asphalt Production, Paver and Roller had 45 attendees and the Southwest Pavement Consortium Open House attracted 100 attendees.

On December 12th, RU hosted a technical tour for 10 young adults enrolled in the Pre-Apprenticeship in Career Education (PACE) class. Patrick Szary and Todd Pisani gave tours of CAIT's pavement labs, the Bridge Evaluation and Accelerated Structural Testing (BEAST) lab, as well as discussed career opportunities in transportation, construction, and heavy equipment operation.

NCIT First Graduates

We are thrilled to announce the outstanding achievements of Chukwudi Egwu and Kelvin Itemuagbor, who graduated in December 2023, as the first two students funded by NCIT. Both obtained graduate degrees in Computer Information Systems and highlighted exemplary dedication in advancing their respective research endeavors, thus reflecting on their commitment to fostering innovative research in transportation infrastructure.

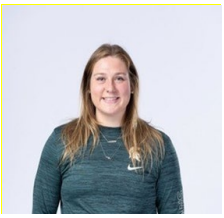
Mr. Egwu supported Dr. Vahid Faghihi's project entitled, "Adopting Construction 4.0 Concepts to Enhance Execution and O&M Phases of Transportation Infrastructure Projects." Mr. Itemuagbor supported Dr. Jobair Bin Alam's project entitled, "A Smart IoT-Based Detection System for Remote Earth Movement of Highway Embankment Civil Engineering.

NCIT AEIE Scholarship

NCIT recognizes that there are barriers to the entrance in the transportation field. To help bring a diverse perspective and support the career advancement of females, underrepresented minorities, and underserved populations, each year, up to three students will receive the NCIT AEIE Scholarship. In addition, the winners are paired with a mentor from among the NCIT leadership ranks, such as an advisory board or steering committee member, be required to complete the NCIT's Leadership Through Mentoring Mini-Course and participate in the NCIT Student Council.

Below in Table 3 is information regarding our AEIE Scholarship recipients. All the recipients are majoring in civil engineering and plan to pursue a career in transportation.

Table 3 – NCIT AEIE Scholarship Recipients

Student	Partner Institution	Student	Partner Institution
 **Taylor Stenzel**	MSU	 **Destiny Elmore**	PVAMU
 **Bryenne U'Selis**	MSU	 **Taline Kelly**	RU

NCIT Expanding Research Opportunities for Females, Underrepresented, and Underserved Populations Program

NCIT offers undergraduate and graduate students the opportunity to participate in a program that expands research opportunities for females, underrepresented, and underserved populations. We achieve this by connecting with national programs (FHWA Dwight David Eisenhower Transportation Fellowship Program, (DDETFP) and the National Science Foundation (NSF) Louis Stokes Alliance for Minority Participation) and local programs that support two US Department of Transportation (US DOT) strategic goals, namely, transformation and equity.

Annually, two select students (one undergraduate and one graduate) will participate in transportation infrastructure-related research and attend the TRB Annual Meeting. For 2023-2024, Precious Ejikeme and Paternocio Manana Engonga Obono were selected for the program. Precious Ejikeme is a computer science graduate student and is working on a project that will use artificial intelligence to create e-bike routes in College Station, Texas. Paternocio Manana Engonga Obono is a mechanical engineering undergraduate student and is working on a project entitled, "Integration of Equity and Justice in Transportation Asset Management." This project involves researchers from RU (lead) and PVAMU.

TTI 2024 Summer Undergraduate Research Internship Program

It is more than just an internship; it is an opportunity for students to embark on a journey of discovery within the dynamic and ever-evolving field of transportation. Whether someone is interested in infrastructure durability and resiliency, economic analysis for transportation improvements, or innovative technologies shaping the future of transportation, this internship is a gateway for undergraduates to participate in real-world research.

This program is offered through NCIT's TTI partner and is open to undergraduate juniors. Every student should possess a strong enthusiasm for engaging in research, will be paired with a TTI research mentor, and will contribute to an ongoing research initiative within one of TTI's UTCs. The core focus area of the respective UTCs are as follows:

- Center for Advancing Research in Transportation Emissions, Energy, and Health: Transportation Emissions, Energy, and Health
- NCIT: Infrastructure Transformation
- SPTC: Climate-related Transportation Challenges/Resilience

Although the internship will occur from May 28, 2024 – August 2, 2024, in March 2024 five students were selected to participate in this amazing EWD program at the Texas A&M RELLIS Campus located in Bryan, Texas.

NCIT Travel Funding Assistance for TRB

There are NCIT programs providing enhanced opportunities for students seeking a graduate education at our member institutions. Assistance to attend TRB is provided to graduate students who author or co-author and present a peer reviewed TRB paper. This practice promotes active student involvement in TRB through paper development and presentation and helps to improve students' research and communication skills. The program also provides students opportunities to network with peers from other institutions and make contacts with potential employers. The target goal is to each year support up to 10 graduate students by providing $1500 toward their TRB travel expenses.

Through this program, a total of five students were able to present their research via a poster session at the 2024 TRB Annual Meeting Performance of Geomaterials Supporting Transportation Infrastructure-Session 2219 and one student did a podium presentation at the Building Better Asphalt Pavements-Session 4031.

T2C Important Activities

Proven T2C techniques combined with strong industry, agency, and association partnerships will ensure that NCIT's outputs are put into practice.

NCIT T2C/Intellectual Property (IP)/Commercialization Seminar

NCIT is very intentional about ensuring that all PIs and Co-PIs complete the required one-hour T2C/IP/Commercialization online seminar during the first year of the grant. Pete O'Neill, Chief Innovation Officer of the Texas A&M Innovation Office presented to 23 NCIT researchers on November 6, 2023, and 28 on February 13, 2024, topics covering IP (license of IP rights), patents (process and timeline), copyrights, trademarks, proprietary information, trade secrets, commercialization, invention disclosures, and public disclosures.

NCIT Consortium Partners Conferences

- During November 14-17, 2023, NCIT's ASU partners hosted the 20th Arizona Pavements/Materials Conference. During the same period and in partnership with the IRF, ASU hosted the 6th IRF Global R2T Conference & Exhibition. Participating as moderators were Claudia Zapata (NCIT ASU Associate Director), Hasan Ozer (NCIT ASU Researcher), and Ram Pendyala (NCIT Advisory Board Member). Student participants participated in the posters and presentations sessions as well.
- NCIT's TAMU partner has a Center for Infrastructure Renewal (CIR). The CIR is a key NCIT capability that is located on the TAMUS RELLIS research campus, along with TTI Headquarters and BCD. The 138,000-square-foot CIR is a state-of-the-art research facility that is a leading resource for developing transformative infrastructure solutions and was built around a commitment to develop practical, affordable ways to building more durable infrastructure faster and cheaper. The CIR hosted the NSF and the Industry University Cooperative Research Centers (IUCRC) Consortium event focusing on composites in civil infrastructure on December 7 - 8, 2023. The event brought together researchers and industry experts from the University of Miami, North Carolina State University, and West Virginia University, for the purpose of creating a dynamic platform for collaboration and knowledge exchange. The IUCRC program was initiated in 1973 to develop long-term partnerships among industry, academia, and government. The NSF invests in these partnerships to promote research programs of mutual interest, contribute to the nation's research infrastructure base, enhance the intellectual capacity of the science, technology, engineering, and mathematics workforce through the integration of research and education, and facilitate technology transfer.
- During December 2023, the NCIT Webinar Committee shared their implementation plan for launching the Year #1 online seminar series. The first speaker of the series was confirmed during this reporting period, and it will be Derrick Dasenbrock, P.E., D. GE, F. ASCE, Geotechnical Engineer, Geotechnical and Hydraulic Engineering Team, FHWA Resource Center. More information regarding the online seminar presentation will occur in SAPR #3.

NCIT Involvement at TRB

- During the 2024 Transportation Research Board Annual Meeting, the Standing Committee on Stabilization of Geomaterials and Recycled Materials, Standing Committee on Mechanics and Drainage of Saturated and Unsaturated Geomaterials, Subcommittee on Sustainable and Resilient Pavements, and the Subcommittee on Young Members Session sponsored Workshop Session 1021- 'Opportunities, Challenges, and Perspectives on Base and Subgrade Stabilization with Nontraditional Stabilizers." This workshop includes panel-led presentations on the recent advancements, opportunities, challenges, and perspectives in using non-traditional stabilizers and a panel discussion occurred at the last part of the workshop will be a panel discussion. Anand Puppala (NCIT TAMU Associate Director) and Bora Cetin (NCIT MSU Associate Director) were presenters as well as panelists during this session. Nripojyoti Biswas (NCIT TAMU Researcher) served as a panelist as well. Other panelist included – L. Edwards (U.S. Army Corps of Engineers (USACE)), L. Peirce (LHOIST Corporation), P. Akula (Oregon State University), and J. Tingle (USACE).
- To further amplify NCIT's T2C efforts, we hosted our inaugural PVAMU NCIT TRB Reception. The reception was sponsored in full by the AAR Testing and Inspection, Inc., A.O. Maki &

Associates, L.L.C, Binkley & Barfield | DCCM, ICONIC Consulting Group, Inc., Pennum Industries, PVAMU Roy G. Perry College of Engineering, TTI, and WSB Engineering.

- The primary focus of the event was twofold:
  - Network by forging valuable connections within the transportation community; and
  - Gain knowledge about NCIT to foster collaborating by exploring opportunities and potential partnerships.

Photo 3 – PVAMU NCIT TRB Reception Flyer & Banner

- While there was a very larger attendance at the event, we want to highlight the key US DOT personnel and members of PVAMU's leadership that came to support as well as celebrate this inaugural event.
  - Robert Hampshire, US DOT Deputy Assistant Secretary for Research and Technology and Chief Science Officer
  - Tomikia LeGrande, PVAMU President
  - Michael McFrazier, PVAMU Interim Provost and Senior Vice President for Academic Affairs
  - Pamela Obiomon, PVAMU Dean of RGPCOE & Co-Chair of NCIT Advisory Board
  - Greg Winfree, TTI Agency Director & Co-Chair of NCIT Advisory Board
  - NCIT Consortium Partner Representatives
- Per Photo 4 below, we have the following individuals:
  - *Left Side, Left to Right*
    - Ahmed Ahmed, NCIT PVAMU Researcher
    - Ali Maher, CAIT Director
    - Melissa Tooley, NCIT Deputy Director
    - Anand Puppala, NCIT TAMU Associate Director
    - Judy Perkins, NCIT Director
    - Kamil Kaloush, NCIT ASU Researcher
  - *Right Side-Front Row, Left to Right*
    - Greg Winfree, TTI Agency Director & Co-Chair of NCIT Advisory Board
    - Claudia Zapata, NCIT ASU Associate Director

- Jolina Karam, NCIT ASU PhD Candidate

- *Right Side-Back Row, Left to Right*
  - Nripojyoti Biswas, NCIT TAMU Researcher
  - Robert Hampshire, US DOT Deputy Assistant Secretary for Research and Technology and Chief Science Officer
  - Patrick Szary, NCIT RU Associate Director
  - Tomikia LeGrande, PVAMU President
  - Raghava Kommalapati, NCIT PVAMU Researcher

Photo 4 – NCIT Special Guests and Consortium Members

Advanced Bridge Technology Clearinghouse (ABTC) Cooperative Agreement Award

- The US DOT released a Notice of Funding Opportunity (NOFO) for the purpose of awarding a competitively selected cooperative agreement with an existing UTC to develop an ABTC. The estimated total funding would be $10 million with a 50% local non-federal matching cost share requirement. October 13, 2023, was the final submission date for the applications.
- In January 2024, the US DOT awarded the RU School of Engineering's CAIT, as prime contractor, a five-year, $10 million cooperative agreement ($5 million federal and $5 million non-federal) to develop an ABTC. RU's CAIT is leading this effort on behalf of NCIT and the other NCIT partners participating are ASU, MSU, PVAMU, TAMU, and TTI. The ABTC digital platform will provide bridge owners with a resolute "one-stop-shop" to find technically robust and unbiased information on the latest innovations in all aspects of bridge engineering — from bridge materials, design, and construction to asset management, condition assessment, monitoring and more.

Administrative/Management Important Activities

- In November 2023, the NCIT headquarters welcomed Sharon Evans as the Associate Administrator (III). In January 2024, Keysha White (Budget Specialist II) and Donna Broussard (Program Coordinator II) filled two more staff positions.
- In January 2024, Lening Wang, a new Computer Science Assistant Professor works with Yonggao Yang (NCIT PVAMU Associate Director & EWD Coordinator) on an NCIT funded project.
- The Director and TAMU Sponsored Research Services (SRS) representatives met on a regular basis with our UTC Grants Manager to ensure NCIT would successfully meet the UTC reporting requirements.

- NCIT's executive leadership consisting of the Director and Deputy Director participated in the NCIT PVAMU Internal Oversight Committee Kick Off Meeting on March 6, 2024. The Committee members consist of the Provost and Senior Vice President for Academic Affairs; Senior Vice President for Business Affairs and Chief Financial Officer; Vice President of Research & Innovation; and Dean of RGPCOE. This committee is charged with monitoring the effectiveness of NCIT's internal processes, thus ensuring compliance with the NOFO. The committee will meet quarterly and are immensely proud to have PVAMU leading a national-tier US DOT UTC focused on improving durability and extending the life of transportation infrastructure.
- In attendance in Photo 5, starting from the *left* was Ramaswamy Krishnamoorthi (Executive Director from Office of Research and Innovation), Jernika Hall-White (Senior Business Administrator I), Judy Perkins (NCIT Director), Michael McFrazier (Interim Provost and Senior Vice President for Academic Affairs), Emmanuel Nzewi (Interim Head, Department of Civil & Environmental Engineering) and Melissa Tooley (NCIT Deputy Director).

Photo 5 – NCIT PVAMU Internal Oversight Committee

b. How have the results been disseminated?

Combining the efforts of 38 supported researchers (with 8 that are part of the NCIT leadership cadre), we successfully disseminate the results from our three core areas of research, EWD, and T2C through the following avenues:

- NCIT website [https://ncit.pvamu.edu/], total visits to the site as of January 2024 was 4,503.
- 19 conference poster presentations
- 5 conference presentations
- 5 invited keynote speeches
- 5 invited speaker presentations
- 1 journal article publication
- 4 leadership appointments to national organizations
- 2 leadership appointments to regional organizations
- 3 podcast sessions
- 2 webinar presentations
- 2 workshop presentations
- Release first newsletter [https://ncit.pvamu.edu/newsletter/]


NCIT INSIGHTS
ISSUE 1 • DECEMBER 2023
Led by: Prairie View A&M University

TABLE OF CONTENTS
Message From the Director • 2
Message From PVAMU President • 3
Our Mission • 4
Spotlight: Dr. Judy A. Perkins, PE • 5-6
Q&A with Dr. Pamela Holland Obiomon • 7-8
PVAMU Launches National University Transportation Center • 9
Highway Construction Workforce Partnership • 10
Student Programs and Opportunities • 11-12
Partner Highlights • 13-24
NCIT TRB Reception • 25

OUR VISION
The vision of the National Center for Infrastructure Transformation (NCIT) is to ensure that America's transportation infrastructure is transformative from both a physical and policy perspective.

Screenshot 1 – Fall 2023 NCIT Newsletter

c. *What do you plan to do during the next reporting period to accomplish the goals?*

Leadership/Management Important Activities

- NCIT's Advisory Board initial meeting will occur by August 2024.
- The Director and Deputy Director will complete the site visits to the consortium partner's campus to meet with researchers, students, and tour their facilities.
- Select two NCIT T2C coordinators to fill the current vacancies.

Research Important Activities

- Ensure all Year-1 and Year-2 research projects/programs have started.
- Ensure PVAMU and the UTC Grants Manager receive all IRB approvals for specific research projects/programs.
- Jobair Bin Alam (PVAMU NCIT Associate Director) abstract submission to ASCE Geotechnical Frontiers 2025 Conference was accepted in March 2024. The title of the abstract is "An IoT-Based Monitoring System for Detecting Slope Movement." The final submission of a full manuscript for publication as well as conducting a presentation at the conference will occur respectively, in May 2024 and March 2025.
- Bora Cetin's (MSU NCIT Associate Director) doctoral students Md Fyaz Sadiq and Qasim Zulfiqar abstract submissions to ASCE Geotechnical Frontiers 2025 Conference was accepted in March 2024. The titles of their abstracts are "Evaluation of Shape Array Sensors (SAS) for Characterizing Frost Heave-Thaw Settlement and Spatial Distribution of Roadways" and "Field Analysis of Temperature Variances: Identifying Hydration Processes in Chemically Stabilized Soils." The final submission of a full manuscript for publication as well as conducting a presentation at the conference will occur respectively, in May 2024 and March 2025.
- Nripojyoti Biswas' (TAMU Researcher) doctoral student Avinash Gonnabathula abstract submission to ASCE Geotechnical Frontiers 2025 Conference was accepted in March 2024. The title of the abstract is "Life Cycle Analysis of Wicking Geotextile for Infrastructure Built Over Expansive Soil." The final submission of a full manuscript for publication as well as conducting a presentation at the conference will occur respectively, in May 2024 and March 2025.

EWD Important Activities

- Ensure all Year-1 and Year-2 EWD projects/programs have started.
- Ensure PVAMU and the UTC Grants Manager receive all IRB approvals for specific EWD projects/programs.

T2C Important Activities

- Ensure that all PIs and Co-PIs complete the required T2C/IP Webinar in Year-1.
- Work on activating social media platforms such as Facebook, Instagram, Twitter, and YouTube to transfer research results to practitioners and the transportation infrastructure community.
- Create a NCIT Blog to display current and trending news to practitioners and the transportation infrastructure community.
- Ensure the Research in Progress (RiP) Database is current regarding all active projects, thus contributing to the dissemination of valuable knowledge and research findings.

Administrative/Management Important Activities

- Finalize hiring NCIT's headquarters primary staff that will fill two vacant positions – (1) Associate Level (1) and (2) Communications Manager.
- Occupy designated NCIT office space.
- Prepare for NCIT Ribbon Cutting Event.

2. PARTICIPANTS & COLLABORATING ORGRANIZATIONS

a. *What organizations have been involved as partners?*

As part of every NCIT project proposal, the PI must identify a Project Monitor (i.e., stakeholder(s)). Additionally, they must describe how they will engage industry stakeholder(s) and what they expect

them to add to the project. Engagement of stakeholder(s) from the outset will ensure that all projects work toward improving durability and extending the life of the nation's infrastructure, with the mindset of adoption and implementation of research findings. Below is a list of organizations (name, location, and partner's contribution) that are involved with the new NCIT ASU project for which Kamil Kaloush is the PI.

- Arizona Department of Transportation, Phoenix, AZ - Facilities, and In-Kind Support
- Arizona Science and Technology Centers, ASU Tempe Campus, AZ - Facilities, Financial, and In-Kind Support
- City of Mesa, Mesa, AZ - In-Kind Support
- City of Phoenix, Phoenix, AZ - Facilities and In-Kind Support
- Creative Paving Solution, Tempe, AZ - Facilities and In-Kind Support
- Fisher Industries' Southwest Asphalt Division, Glendale, AZ - Facilities and In-Kind Support
- FORTA Corporation, Grove City, PA, Collaborative Research, and In-Kind Support
- GAF, Parsippany, NJ - Facilities and In-Kind Support
- International Road Federation , Alexandria, VA – Facilities
- Maricopa Department of Transportation, Phoenix, AZ - Facilities and In-Kind Support
- Roads Transport Authority, Dubai, UAE - Facilities and In-Kind Support

During this reporting period, two of the RU PIs, namely, Vassiliki Demetracopoulou and Todd Pisani engaged with the organizations (name, location, and partner's contribution) below to provide input that will support project outputs and make recommendations to the research team based on their expertise.

- Infrastructure Data Solutions (IDS), City of Regina in Province of Saskatchewan, Canada, Collaborative Research
- New Jersey Department of Transportation – Division of Civil Rights/Affirmative Action, Trenton, NJ, In-Kind Support
- New Jersey Department of Transportation – Division of Highway and Traffic Design, Trenton, NJ, In-Kind Support
- More Than Our Worst, Philadelphia, PA, In-Kind Support

One of TTI's PI, Curtis Morgan, is dialoguing with the organization (name, location, and partner's contribution) listed below. Discussions with the organization focused on the survey tool that will be sent out to a variety of stakeholders in the autonomous truck technology field. The purpose of the survey will be to get a first-hand perspective of what stakeholders and operators consider to be desired infrastructure needs and to gather any other information related to policy, safety, and obstacles.to provide input that will support project outputs and make recommendations to the research team based on their expertise.

- Texas Department of Transportation Connected and Autonomous Vehicles Task Force, Austin, TX, Information Exchange

The remaining partners, BCD, MSU, PVAMU, and TAMU continued to engage with the stakeholders listed in SAPR #1. Collaborative research is still the primary contribution organizations, including other consortium partnering institution, are providing to the individual as well as collaborative NCIT projects deployed.

b. *Have other collaborators or contacts been involved?*

Hasan Ozer, ASU PI of the NCIT funded research project entitled, "Automated Construction Quality Monitoring and Inspection Protocols using Uncrewed Aerial Vehicles," initiated collaborative discussions with the City of Mesa, Sunland Asphalt, M R Tanner Construction, and Southwest Asphalt to arrange site visits and discuss data collection strategies.

Additionally, contacts with others external to NCIT occurred during this reporting period. The following seven organizations (AECOM, Austin Transportation and Public Works Department, Biomass Energy Systems Inc., Conference of Minority Transportation Officials, ITS America, Shrewsberry & Associates LLC, and the US Amry Construction Engineering Research Laboratory contribute to NCIT's long-term sustainability goals as well as support two stand-alone projects.

3. OUTPUTS

a. *Publications, conference papers, and presentations*

NCIT faculty and students were successful in publishing journal articles as well as presenting their research results at six different venues. NCIT is extremely proud of our students, faculty, and the mentoring our students receive from the faculty. Below is a summary of the output for this reporting period.

1) *Journal publications:*
   Members from the ASU partner submitted a paper for publication in the Transportation Research Record. Vedula, N., Beheshti, M., Al-Alawi, O., & Ozer, H. (2024). Thermal Profiling of Asphalt Pavement Construction using Unmanned Aerial Vehicle (UAV), 2024 Transportation Research Record (in press awaiting publication).
2) *Books or other non-periodical, one-time publications:* Nothing to Report.
3) *Identify for each one-time publication:* Nothing to Report.
4) *Other publications, conference papers and presentations:*
   Poster Presentations – Total is 20.
   - Poster presentation by S. Abdollahi (MSU), P. Vaddy (MSU), and M. Kutay (MSU) on "The Development of a Mechanistic-Empirical-Based Highway Cost Allocation Model for Flexible Pavements," occurred at the 2024 TRB Annual Meeting, Session 2169.
   - Poster presentation by S. Abdollahi (MSU), M. Kutay (MSU), and M. Lanotte (MSU) on "UPDAPS-Flood: A Mechanistic-Empirical Flexible Pavement Analysis Tool to Evaluate the Effect of Flooding Events on Flexible Pavement Performance," occurred at the 2024 TRB Annual Meeting, Session 3116.
   - Poster presentation by C. Aydin (MSU), M. Hatipoglu (ITU), B. Cetin (MSU), and H. Ceylan (ISU) on the "Effect of Moving Vehicle Load on Stiffness Characteristics of Unbound Granular Materials," occurred at the 2024 TRB Annual Meeting, Sesson 2219.
   - Poster presentation by A. Bazarbekova (TAMU), Yong-Rak Kim (TAMU), D. Little (TAMU), J. Jung (TAMU), and Yong-Boo Park (TAMU) on "Enhancing Durability of Stabilized Expansive Clays Through Gypsum Incorporation," occurred at the 2024 TRB Annual Meeting, Session 2041.
   - Poster presentation by A. Bazarbekova (TAMU), Yong-Rak Kim (TAMU), D. Little (TAMU), and J. Rushing (TAMU) on "Mechanical Characterization of Stabilized Soils Using a Simple Strain Sweep Cyclic Testing," occurred at the 2024 TRB Annual Meeting, Session 2040.
   - Poster presentation by T. Chengula (SCSU), J. Mwakalonge (SCSU), G. Comert (SCSU), S. Siuhi (SCSU), and J. Perkins (PVAMU) on "Using Empirical Bayes Estimation Approach to Quantify the Abnormality of Traffic Conditions During the COVID-19 Pandemic," occurred at the 2024 TRB Annual Meeting, Session 2235.
   - Poster presentation by S. Chou (TAMU), N. Biswas (TAMU), A. Puppala (TAMU), O. Huang (TAMU), M. Radovic (TAMU) on the "Evaluation of Locally Available, Calcined, Clay-Based Geopolymer for the Stabilization of Expansive Soils," occurred at the 2024 TRB Annual Meeting, Session 2041.
   - Poster presentation by S. Haider (MSU), Q. Zulfiqar (MSU), B. Cetin (MSU), H. Coban (MSU), and S. Abdollahi (MSU) on "Comparison of Lab Versus Backcalculated Layer Moduli

of Virgin Aggregate and Recycled Aggregate Base," occurred at the 2024 TRB Annual Meeting, Session 2047.

- Poster presentation by J. Huang (TAMU), A. Bazarbekova (TAMU), J. Grajales (TAMU), D. Little (TAMU), Yong-Rak Kim (TAMU), and J. Rushing (TAMU) on "Mechanical Performance of Sandy Soil Treated with a Cationic Polyelectrolyte," occurred at the 2024 TRB Annual Meeting, Session 2041.
- Poster presentation by A. Kumar (TAMU), N. Biswas (TAMU), and A. Puppala (TAMU) on "Evaluating the Efficacy of Chemical Stabilization to Rehabilitate Highway Embankment Slopes in Texas," occurred at the 2024 TRB Annual Meeting, Sesson 2219.
- Poster presentation by P. Kumar (TAMU), A. Puppala (TAMU), N. Biswas (TAMU), S. Congress (MSU), J. Tingle (TAMU), and D. Little (TAMU) on the "Assessment of Durability of Chemically Stabilized Soils Using Different Moisture Susceptible Methods," occurred at the 2024 TRB Annual Meeting, Session 2040.
- Poster presentation by P. Kumar (TAMU), A. Puppala (TAMU), S. Congress (MSU), and J. Tingle (TAMU) on "Resilient Moduli Characterization of Cement-Treated Silty Soil at High-Compaction Energy Condition," occurred at the 2024 Transportation Research Board Annual Meeting, Session 2040.
- Poster presentation by M. Naqvi (MSU), Md Sadiq (MSU), B. Cetin (MSU), and John Daniels (UNC-Charlotte) on "Unlocking a Smoother Ride: Mitigating Pavement Damage with Engineered Water Repellency," occurred at the 2024 TRB Annual Meeting, Sesson 2219.
- Poster presentation by T. Pisani (RU) on "Equity & Safety—Hand in Hand on the Road to Success," occurred at the Annual NJDOT Research Showcase on October 25, 2023.
- Poster presentation by N. Rahman (ASU), S. Castro (ASU), M. Beheshti (ASU), N. Vedula (ASU), H. Noorvand (ASU), and H. Ozer (ASU) on the "Development of a Cyclic Fracture Experiment for Characterization of High-Performance Asphalt Concrete Mixes," occurred at the 2024 TRB Annual Meeting, Session 3057.
- Poster presentation by P. Vaddy (MSU), T. Islam (MSU), M. Kutay (MSU), S. Haider (MSU), B. Cetin (MSU) on "Creep Stiffness Behavior of Spray-on Rejuvenator Treated Asphalt Pavements Under Different Aging Conditions," occurred at the 2024 TRB Annual Meeting, Session 4090.
- Poster presentation by N. Vedula (ASU), M. Beheshti (ASU), O. Al-Alawi (ASU), and H. Ozer (ASU) on "Thermal Profiling of Asphalt Pavement Construction Using Uncrewed Aerial Vehicle (UAV)," occurred at the 2023 Arizona Pavement Materials Conference.
- Poster presentation by N. Vedula (ASU), M. Beheshti (ASU), O. Al-Alawi (ASU), and H. Ozer (ASU) on "Thermal Profiling of Asphalt Pavement Construction Using Uncrewed Aerial Vehicles," occurred at the 2024 TRB Annual Meeting, Session 4031.
- Poster presentation by N. Vedula (ASU), M. Beheshti (ASU), O. Al-Alawi (ASU), and H. Ozer (ASU) on "Thermal Profiling of Asphalt Pavement Construction Using Uncrewed Aerial Vehicles," occurred at the 2024 School of Sustainable Engineering and the Built Environment Graduate Poster Symposium.

Presentations – Total is 5.

- Presentation by B. Cetin (MSU) on the "Application of Engineered Water Repellency to Improve Moisture Resistance of Subgrade Soils," occurred at the 2024 TRB Annual Meeting, Session 1021.
- Presentation by A. Deshmukh (TAMU), A. Fakhrabadi (TAMU), G. Lei (TAMU), X. Yu (TAMU), and A. Puppala (TAMU) on the "Design and Implementation of a Full-Scale Shallow Geothermal Bridge De-Icing System in North Texas," occurred at the 2024 TRB Annual Meeting, Session 2021.
- Presentation by A. Gajurel (TAMU), A. Puppala (TAMU), N. Biswas (TAMU), and H. Chimauriya (TAMU) on the "Application of Satellite-Based Remote Sensing for the

Management of Pavement Infrastructure Assets," occurred at the 2024 TRB Annual Meeting, Session 4058.

- Presentation by A. Puppala (TAMU) and N. Biswas (TAMU) on the "Stabilization of Geomaterials with Different Polymer Additives," occurred at the 2024 TRB Annual Meeting, Session 1021.
- Presentation by H. Wang (RU) on "Asphalt Pavement Pothole Repair," occurred at the Annual NJDOT Research Showcase on October 25, 2023.

Webinar Presentations – Total is 2.

- Webinar presentation by E. Kutay (MSU), S. Abdollahi (MSU), and M. Lanotte (MSU) on "Incorporating the Flooding Effects in Mechanistic-Empirical Flexible Pavement Analysis to Evaluate the Pavement Network Resiliency Against Flooding," occurred at the December 19, 2023, National Road Research Alliance (NRRA) Pays Off Webinar Series [link to video-https://www.youtube.com/watch?v=1_fS0uJe8m4].
- Webinar presentation by M. Lanotte (MSU), A. Farina (MSU), and H. Ibrahim (Khalifa University) on "Integrating MEPDG Analysis in the LCA Framework of Pavement Materials and Monetization of Environmental Impacts for Cost-Benefit Evaluation," occurred at the November 21, 2023, NRRA Pays Off Webinar Series [link to video-https://www.youtube.com/watch?v=1Pi88-ICnxk]

Workshop Presentations – Total is 2.

- Workshop presentation by K. Kaloush (ASU) on the "Development of Resilient and Sustainable Binders for Road Building," occurred at the 2023 Arizona Pavements and Materials Conference in partnership with the 6th IRF Global R2T Conference & Exhibition.
- Workshop presentation by M. Kutay (MSU) on "How We Can Make Pavement Networks More Resilient Against Climate Change Using Mechanistic-Empirical Methods," occurred at the 2024 TRB Annual Meeting, Session 1022.

b. *Website(s) or other Internet site(s).*
NCIT will continue to be a national showplace through the Internet and social media platforms such as Facebook, Instagram, Twitter, and YouTube to transfer research results to practitioners and the research community. Currently, the NCIT website is accessible via the following link [ncit.pvamu.edu.] The site provides comprehensive information about NCIT and its programs/projects. Updates to the NCIT website will occur on a continual basis. Currently, there are major tabs covering the NCIT's background, organization, research, education, technology transfer, and events. To directly access NCIT's nineteen active research projects use the following link [https://ncit.pvamu.edu/projects/].

c. *Technologies or techniques.*
Nothing to Report.

d. *Inventions, patent applications, and/or licenses.*
Currently under review is an invention disclosure was filed to ASU's Skysong Innovations. The title of the submission is "Unmanned Aerial-Vehicle Assisted Real-Time Construction Quality Support System."

e. *Other products, such as data or databases, physical collections, audio or video products, application software, analytical models, educational aids, courses or curricula, instruments, equipment, or research material.*

- Jennifer Chandler of NCT ASU team completed the development of NCIT's Leadership Through Mentoring online course in January 2024. Perusall is the online platform used by all participants. In March 2024, Dr. Chandler also created an NCIT Leadership Mini Course for our four NCIT AEIE Scholarship recipients.
- We have two consortium partners that use the YouTube platform for widespread marketing of HWCP. Click on the links below to review the videos.
  - BCD developed a video related to the Next Generation Highway Worker Program for use as a marketing tool to recruit students for the summer 2024 cohort. The video highlights the success

of Kamryn Carter, the first HWCP female graduate [https://www.youtube.com/watch?v=UWzHjBn6YsM].
    - TTI published two YouTube videos to promote HWCP. One video provides an overview of HWCP [https://youtu.be/OhpTtLQxUVQ] and the other covers the road to graduation of Cohort #1 [https://www.youtube.com/watch?v=cfClrw0LxLk].
- Yonggao Yang (NCIT PVAMU Associate Director & Head of PVAMU's Computer Science Department) in October 2023 developed a Road Incident Report System (***ReportRdInc)***. The system collects and process road incident data that is crucial for finding the traffic issue hotspots and better arrange valuable resources to improve traffic condition. The system allows real-time submitting and visualizing real-time road incident reports, including road issues, aggressive driving, and road rages. He is also the PI for the NCIT project entitled, "Smart Transportation Technology Workshop." The first workshop will occur during May 20-23, 2024, and there are thirteen participants registered to attend it.

4. OUTCOMES

a. Increased understanding and awareness of transportation issues.
Nothing to Report.

b. Passage of new policies, regulation, rulemaking, or legislation.
Nothing to Report.

c. Increases in the body of knowledge.
Nothing to Report

d. Improved processes, technologies, techniques, and skills in addressing transportation issues.
Nothing to Report.

e. Enlargement of the pool of trained transportation professionals.
Per Table 2, four graduates of the HWCP Cohort #1 are gainfully employed in the highway construction field. One graduate is transitioning between employees.

f. Adoption of new technologies, techniques, or practices.
Nothing to Report.

5. IMPACTS

a. What is the impact on the effectiveness of the transportation system?
Nothing to Report.

b. What is the impact of technology transfer on industry and government entities, on the adoption of new practices, or on research outcomes which have led to initiating a start-up company?
Nothing to Report.

c. What is the impact on the body of scientific knowledge?
Nothing to Report.

d. What is the impact on transportation workforce development?

- **BCD**
  Per Table 2, four graduates of the HWCP Cohort #1 are gainfully employed in the highway construction field. One graduate is transitioning between employees.
- **PVAMU**
  NCIT's first two graduate students - Chukwudi Egwu and Kelvin Itemuagbor - are gainfully employed as computer scientists. One is working at Hewlett Packard Incorporation and the other is with Intel Corporation.

6. CHANGES/PROBLEMS

a. Changes in approach and reasons for change.
Nothing to Report.

b. Actual or anticipated problems or delays and actions or plans to resolve them.
Nothing to Report.

c. Changes that have a significant impact on expenditures.
Nothing to Report.

d. Significant changes in use or care of human subjects, vertebrate animals, and/or biohazards
Three PIs initiated their IRB application to their respective institutional committees during the first SAPR reporting period. All IRB applications are now approved and are on file at NCIT.

e. Change of primary performance site location from that originally proposed.
Nothing to Report.

7. SPECIAL REPORTING REQUIREMENTS

NCIT completed the Exhibit D Form for three new projects and entered required information for these new projects into the TRB's RiP Database (https://rip.trb.org/).