



CENTER FOR ADVANCING RESEARCH IN
Transportation Emissions, Energy, and Health
A USDOT University Transportation Center

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US Department of Transportation

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Project Title: Center for Advancing Research in Transportation Emissions,
Energy, and Health (CARTEEH)

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Recipient Organization: Texas A&M Transportation Institute
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Recipient Identifying Number: 617981; 165824

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Reporting Period End Date: September 30, 2023

Report Term: Semi-Annual

Signature of Submitting Official:

A handwritten signature in blue ink, appearing to read "Tara Ramani", is written over a horizontal line.

OVERVIEW

The Center for Advancing Research in Transportation Emissions, Energy, and Health (CARTEEH) has been awarded a U.S. Department of Transportation (USDOT) grant for a Tier 1 University Transportation Center (UTC) for the next five years under the Bipartisan Infrastructure Legislation (BIL) UTC program. This grant builds on a previous grant awarded from the 2016 Fixing America's Surface Transportation Act UTC Competition. CARTEEH will address transportation emissions, energy, and health with a focus on advancing health equity and the engagement of underserved communities. Under this grant, the CARTEEH consortium has expanded with the addition of two partners who offer expertise on health equity and engagement of disadvantaged communities, the Morehouse School of Medicine and North Dakota State University. These new partners join the existing consortium members, TTI/Texas A&M University (lead institution), Georgia Institute of Technology, Johns Hopkins University, University of California at Riverside, and the University of Texas at El Paso.

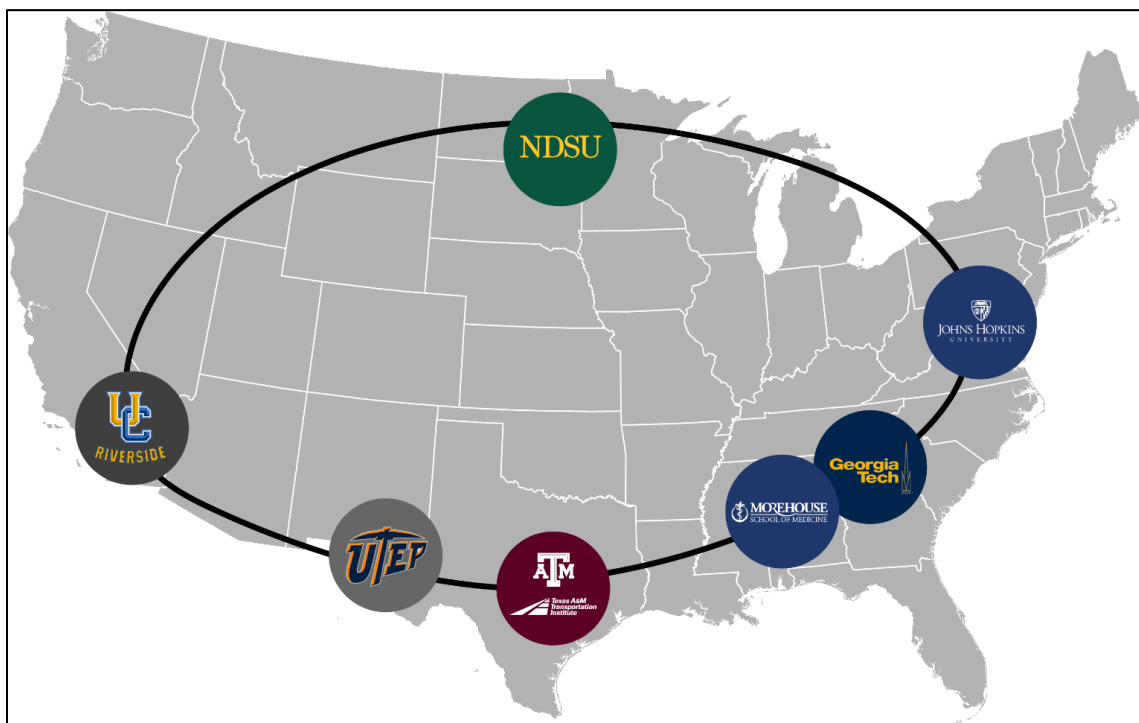


Figure 1. CARTEEH Consortium Members

This reporting period mainly included grant start-up activities, including contracting and subcontracting with consortium members, and initiation of research activities.

On May 8, 2023, CARTEEH leadership attended the kickoff meeting at the USDOT headquarters in Washington D.C. CARTEEH attendees from TTI were Dr. Joe Zietsman (Center Director), Dr. Tara Ramani (Deputy Director), Ms. Haylee Yung (CARTEEH Administration). Other consortium team members in attendance included Dr. Michael Rodgers (Georgia Institute of Technology), Dr. Kirsten Koehler (Johns Hopkins University), Dr. Pamela Daniels (Morehouse School of



Medicine), Dr. Kanok Boriboonsomsin (University of California at Riverside), Dr. Wen-Whai Li (University of Texas at El Paso) and Dr. Jill Hough (North Dakota State University). The one-day event included a meet and greet with Dr. Firas Ibrahim, Director of the Office of Research, Development, and Technology, and Mr. Caesar Singh, Director of University Transportation Centers (UTC), and the UTC program grant managers including CARTEEH Grant Manager Dr. Robin Kline. The CARTEEH team presented their vision for the center and gained a greater understanding of the USDOT’s plans, activities, and expectations to achieve success.



Figure 2 The CARTEEH Team Attended a Kickoff Meeting at USDOT on May 9, 2023

1. ACCOMPLISHMENTS

Major Goals of the Program

In this new grant, CARTEEH’s work will support the United States Department of Transportation’s Strategic Plan goals of **equity, climate, and sustainability**. Equity will be addressed as we tackle the disproportionate impact of air pollution on poorer communities and communities of color, who are also often underserved in terms of access to transportation and health-promoting opportunities. We will also address climate and sustainability issues through the linkages of pollutant emissions to greenhouse gases, climate change, and decarbonization.



Our work, which will revolutionize research, education, and technology transfer in this area, will also support the goal of transformation.

Since this reporting period mostly involved grant setup activities, there is limited progress to report under the three goal areas of:

1. Research
2. Education and workforce development
3. Technology transfer and collaboration.

The following sections provide a high-level discussion of activities initiated and planned during this reporting period, which will be built on in future reporting periods of the grant.

CARTEEH Goal #1: Research Program

CARTEEH has already established a strong research base and expertise addressing the full chain between transportation emissions and health. This is a critical field of study for transportation, health, and environmental practitioners, who need to understand how the transportation system generates emissions, that in turn, disperse into the environment, resulting in exposures and health impacts (Figure 3).



Figure 3. "Full Chain" Between Transportation Emissions and Health Impacts

Our main technical focus areas will include (a) the transportation system, (b) emissions and energy, and (c) exposures and health impacts (Figure 4). Equity will serve as a cross-cutting theme for all center activities. All our research will focus on the integration of data to support policy and decision-making. We will also ensure that all research outcomes are linked to Technology Transfer and Collaboration (T2C) and Education and Workforce Development (EWD) outputs and activities.



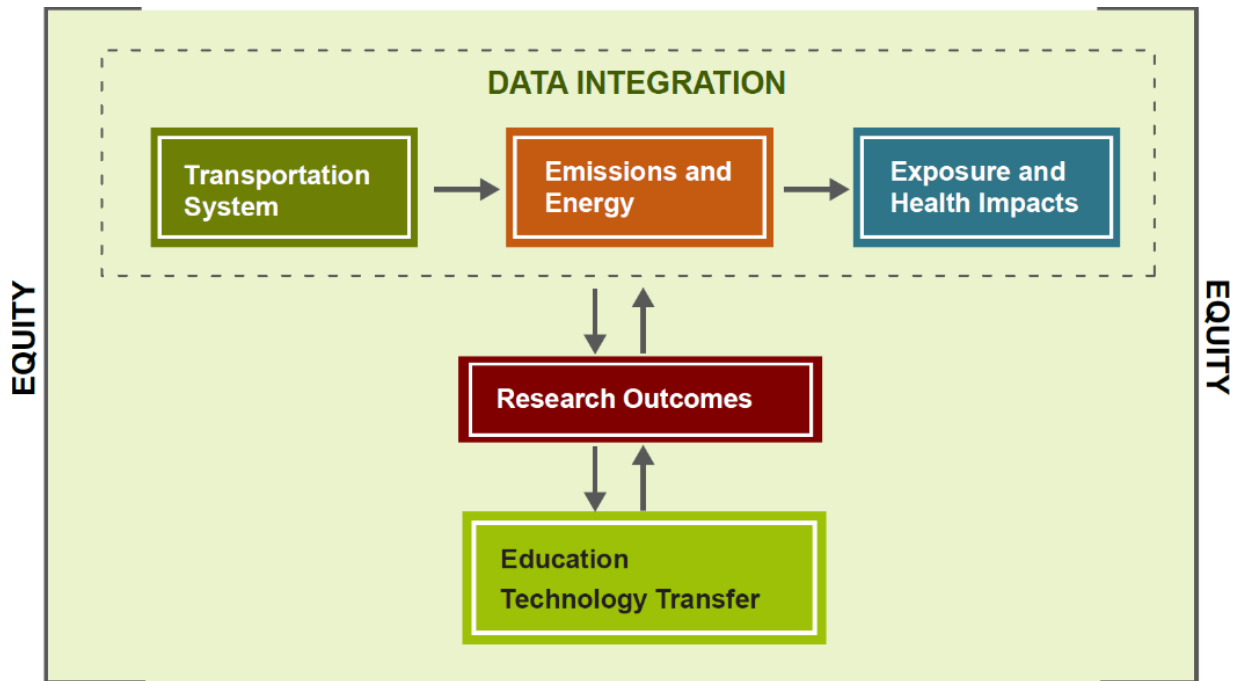


Figure 4 Scope of CARTEEH's Research Activities

In the area of **research**, our center is ready to launch a set of high-impact collaborative research projects to address critical topics. Each will produce usable results and utilize the synergistic capabilities of our members. Topics that will be addressed by the projects include (a) understanding the life-cycle emissions and health impacts of electric vehicles, (b) developing an integrated transportation-health modeling platform for decision support, (c) incorporating health equity into transportation planning, (d) reducing freight emissions in and around ports, (e) addressing health risks for transit users, (f) performing air monitoring for high-traffic areas within high- risk communities, and (g) evaluating low-emissions technologies for tribal and rural communities.

Table 1 shows the list of these collaborative projects, their motivation, and the partners and lead institution for each. These projects will be initiated in November 2023, with the CARTEEH consortium leadership meeting in person on November 9, 2023, for a workshop to discuss and finalize the project workplans. In future reporting periods, it is also anticipated that the CARTEEH competitive research program will be initiated with a request for proposals (RFP) open to all universities within the consortium.



Table 1. Initial Collaborative Projects

Project #1—Electric versus Internal Combustion: What are the Actual Emissions and Health Impacts?	
Lead: Texas A&M Transportation Institute/Texas A&M University	Collaborators: GT, JHU, UCR
<i>Motivation: EVs are changing the transportation landscape. The deployment of electric buses to replace diesel school buses has the potential to reduce exposure to a vulnerable population but must be studied from a comprehensive life-cycle perspective.</i>	
Project #2—Integrated Transportation-Health Modeling Platform for Decision-Support	
Lead: Georgia Institute of Technology	Collaborators: TTI/TAMU, JHU, UCR
<i>Motivation: The “transportation emissions to health” modeling chain is traditionally resource-intensive and computationally complex. This project aims to create a modeling platform that balances analytic rigor with practical feasibility, resulting in a tool that is of practical applicability to transportation stakeholders.</i>	
Project #3—Health Risks for Vulnerable Transit Users	
Lead: John Hopkins University	Collaborators: GT, UTEP, NDSU
<i>Motivation: Transit users are often economically disadvantaged relative to drivers of private vehicles and often face health risks related to air quality and exposure to emissions, as well as other areas. This project will address health disparities by considering the emissions exposure of students who take transit to school in Baltimore.</i>	
Project #4—Transportation and Health Equity: Tools for Community Engagement	
Lead: Morehouse School of Medicine	Collaborators: UTEP, NDSU, TTI/TAMU
<i>Motivation: Engagement of historic and current underserved communities is a critical element of promoting health equity in transportation and promoting community-centered decision-making. This project uses dissemination and implementation research methods for a unique application in the metropolitan Atlanta region to develop an equity framework and community-engagement tools for transportation planners.</i>	
Project #5—Low-Emission Technologies for Tribal and Rural Communities	
Lead: North Dakota State University	Collaborators: TTI/TAMU, MSM, UCR
<i>Motivation: Often, new technologies and advances in transportation are not readily accessible to all, resulting in their benefits being unavailable to several underserved communities, such as in rural and tribal areas.</i>	
Project #6—Mitigating Freight Emissions in EJ Communities in and Around Ports	
Lead: University of California, Riverside	Collaborators: UTEP, MSM, GT
<i>Motivation: The heavy-duty vehicle sector, associated with freight movement, is outpacing light-duty vehicles in growth and contribution to mobile source emissions. Communities near port areas are shown to be disproportionately impacted by freight emissions.</i>	

Research Results Disseminated

Nothing to report.



Plans for Next Reporting Period to Accomplish Research Goal

In the next reporting period, the collaborative projects will be initiated, along with progress toward issuing the first competitive RFP for additional projects to be funded through the center.

CARTEEH Goal #2: Education and Workforce Development

Under education and workforce development, CARTEEH will continue to mentor the future transportation workforce and train and inform practitioners. Our programs include research assistantships and summer internships for university students and programs for high schoolers and community health workers. CARTEEH represents a diverse team, with each consortium member bringing unique and complementary roles and trans-disciplinary expertise. Currently, CARTEEH has initiated the development of a workplan with Texas A&M University's College of Education to continue their K-12 educational activities conducted under the previous FAST Act UTC grant. CARTEEH's summer internship program for the summer of 2024 has also been announced with the application period currently open.

Education and Workforce Development Results Disseminated

Nothing to report.

Plans for Next Reporting Period to Accomplish Education and Workforce Development Goal

In the next reporting period, students will be hired to work on the research projects, as they get kicked off. We also expect to recruit student internships for the summer internship program, and also continue building on the previous STEM education activities conducted in collaboration with Texas A&M University's College of Education.

CARTEEH Goal #3: Technology Transfer and Collaboration

Under technology transfer and collaboration, CARTEEH will build on the Clean Transportation Collaborative (CTC), a stakeholder organization established to advance clean transportation. We will also establish a Clean Transportation Innovation Hub to focus on commercialization opportunities, anticipated to be kicked off in the second year of the grant funding.

CARTEEH Webinar Series

CARTEEH has a webinar scheduled on the topic of Health Equity, to kick off the new BIL UTC grant, on October 12, 2023. The flyer for this event is shown in Figure 5, and it features past work conducted by CARTEEH under the FAST Act grant, as well as the perspectives of new consortium members who have joined the CARTEEH team.





Center for Advancing Research in
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Transportation Emissions and Health Equity: Research Perspectives WEBINAR

The Center for Advancing Research in Transportation Emissions, Energy, and Health (CARTEEH) will host a webinar on **Thursday, October 12, 2023, from 10:30 a.m. to 12:00 p.m. Central**. This webinar features a panel of CARTEEH consortium members sharing their research and perspectives on topics at the nexus of transportation emissions and health equity.

PANELISTS



Robert Mayberry, Ph.D., M.P.H.
Morehouse School of Medicine
Perspectives on Health Equity and Transportation



Ben Ettelman
Texas A&M Transportation Institute
Considering Health Equity for Transportation Infrastructure



Jeremy Mattson, Ph.D.
North Dakota State University
Access to Rural Health Care



Mary Fox, Ph.D., M.P.H.
Johns Hopkins University
Evaluating Transportation Health Impact Assessments: Equity Considerations and the 14-Pathways Model



Ji Luo, Ph.D.
University of California, Riverside
Variability of Human Exposure to Traffic Emissions Within Geographic Unit and its Health Equity Implications

FACILITATOR



Tara Ramani, Ph.D. P.E.
Deputy Director,
CARTEEH



**OCT 12
2023**

10:30 A.M. - 12 P.M. CST.

Please click [here](#) to find out more about speakers and presentation topics.

Click [here](#) to join the meeting. Click [here](#) to download a calendar invite.



carteeh.org



Figure 5. October 12 Webinar on Health Equity

Technology Transfer and Collaboration Results Disseminated
Nothing to report.

Plans for Next Reporting Period to Accomplish Technology Transfer and Collaboration Goal

In the next reporting period, as center activities kick-off, we anticipate working with stakeholders, and developing tools and project outputs that can directly aid practitioners in their work. We will also



continue to update and refine our technology transfer outputs and products developed under the FAST Act grant, and schedule webinars and other outreach events.

2. PARTICIPANTS AND COLLABORATING ORGANIZATIONS

The CARTEEH consortium is a seven-member consortium led by the Texas A&M Transportation Institute (TTI)—part of The Texas A&M University System. Other members include The University of Texas at El Paso, Johns Hopkins University, Georgia Technology University, University of California at Riverside, Morehouse School of Medicine, and North Dakota State University. Currently, this new consortium has not officially engaged with organizations or collaborators under this grant and anticipates formally initiating these activities in the next reporting period.

Organizations Involved as Partners

Nothing to report.

Other Collaborators and Contacts

Nothing to report.

Technology Transfer and Collaboration Results Disseminated

Nothing to report.

3. OUTPUTS

The CARTEEH website (www.carteeh.org) has been updated to differentiate products and outputs from the FAST Act Grant and BIL Grant. The Data Management Plan for the center was also developed and submitted for review on 09/28/2023.

Journal Publications

Nothing to report.

Books or Other Non-Periodical, One-Time Publications:

Nothing to report.

Other Publications, Conference Papers, and Presentations

Nothing to report.

Technologies or Techniques

Nothing to report.

Inventions, Patent Applications and/or Licenses

Nothing to report.



4. OUTCOMES

Nothing to report.

5. IMPACTS

Nothing to report.

6. CHANGES/PROBLEMS

Nothing to report.

7. SPECIAL REPORTING REQUIREMENTS

Nothing to report.

