
Program Progress Performance Report for University Transportation Center at
Johns Hopkins University

Submitted to U.S. Department of Transportation
Office of the Assistant Secretary for Research and
Technology (OST-R)

Grant Number: 69A3552348325

Project Title: **Center for Climate-Smart Transportation (CCST)**
Consortia member:

- Diné College, Tsaile, AZ 86556
- Massachusetts Institute of Technology, Cambridge,
MA 02139
- Morgan State University, Baltimore, MD 21251
- University of Texas at Austin, Austin, TX 78712
- University of Utah, Salt Lake City, UT 84112

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Submitting Official: Same as above

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Recipient Organization: Johns Hopkins University

Grant Period: June 1st, 2023 - May 31th, 2028

Reporting Period End Date: September 30, 2023

Report Term: Semi-annual

Signature: 

1. ACCOMPLISHMENTS: What was done? What was learned?

What are the major goals and objectives of the program?

MISSION:

The Center for Climate-Smart Transportation (CCST) is a consortium of 6 universities including Diné College, Massachusetts Institute of Technology, Morgan State University, University of Texas at Austin, University of Utah and led by Johns Hopkins University. CST's proposed research, education, leadership and technology transfer programs and activities are inspired by the urgent call for an evidence-based research agenda that goes beyond scientific merits, focuses on solutions and is practice-ready and would result in changes in transportation policy and practice, making climate change the center of transportation decisions as emphasized in the USDOT Strategic Plan Goals and the USDOT Climate Adaptation and Resilience Plan. CST contributes to this mission in the following focus areas:

CATEGORY #1: Research

GOAL 1: CCST PROPOSES MULTIDISCIPLINARY RESEARCH IN FIVE BROAD AREAS:

Focus Area 1: Promoting Climate Culture in All Levels of Transportation Decisions by focusing evidence-based research agenda that goes beyond scientific merits, focuses on solutions and is practice-ready and would result in changes in transportation policy and practice.

Focus Area 2: Community-Centered Solutions to Environmental Justice by empowering communities to undertake their own investigations and actively engage in actions and decision-making.

Focus Area 3: Accelerating the Mass Market Adoption of EVs & Alternative Fuels to make transportation sector as one of the biggest contributors to VMT/GHG emission.

Focus Area 4: VMT & GHG Reduction via Modal Shift and Changes in Travel Behavior by expanding the policy-oriented efforts in public transit use, promote practices toward climate-responsible urban development to reduce VMT/GHG emission.

Focus Area 5: Smart Cities & Innovative Adaptation and Mitigation Technologies by developing and implementing a sustainable, scalable, and transferrable method for collaborating with communities to co-create solutions that meet their needs and align with their values.

GOAL 2: COMPETITIVE, PEER REVIEW PROJECT SELECTION PROCESS

- CCST projects for the year 2-5 are selected through a Request for Proposals (RFP) process. (First year projects are selected based on initial grant proposal.)
- RFPs are open to faculty at member insinuations. All faculty members, postdocs and research associates are eligible to submit research, education and technology transfer project proposals responding to CCST RFPs.
- Proposal evaluation and selection process are based on external peer review and rely on the expertise of practitioners and researchers nationally.

GOAL 3: DIVERSE RESEARCH GRANT CATEGORIES

- *RFP process:* CCST will prioritize projects are multidisciplinary and multimodal and promotes diversity and inclusion through the CCST RFP. Projects that are solutions-based and practice-ready and would make impactful changes on transportation practice and policy.
 - Projects that focus on diversity and equity
 - Projects that involve underrepresented students
 - Projects that involve untenured junior faculty
 - Projects that involve researchers from multiple disciplines & multiple universities
 - Projects that involve faculty and students from our two Minority Institutions
- *High Impact Project(s): From Research to Policy and Practice:* CCST will a part of its budget per year to build upon the previous cutting- edge research of consortium members to transform them into actionable outcomes for practitioners in partnership with transportation agencies, local governments, private sector and non-profit community organizations. Each project should demonstrate practice-readiness and should have at least three non-academic partners. The high-impact projects will go through our peer review process, and we expect to fund 2-3 practice- ready projects per year in this category.

GOAL 4: ENHANCE COLLABORATIVE RESEARCH & PARTNERSHIP OPPORTUNITIES

- *External Advisory Board:* The Advisory Board will help CCST to identify transformative research topics, to define CCST's annual plan and strategies and to connect with appropriate partners.
- *Project Stakeholders and Partners:* As part of RFP package, CCST requests each PI to establish two partnering relationships with local, state or national organizations to implement the project results.
- *Diverse Internal Collaborations:* CCST encourages Multi-modal, multi-disciplinary and multi-university collaborations across disciplines and our areas

of research covers expertise from engineering, planning, public policy, business, social science and big data.

CATEGORY #2: Education and Workforce Development

CCST's education and workforce development goals will be accomplished through the creation of pre-college, undergraduate and graduate programs and professional development learning opportunities.

GOAL 1: ATTRACT AND EDUCATE PRE-COLLEGE STUDENTS

- *Sustainable Energy Education Program:* CCST in partnership with ROSEI will develop a nation-wide online course on sustainable energy education. It will host high school students for a summer course at JHU campus or virtually to train them on sustainable energy solutions to climate change, educational opportunities and career paths.
- *COMTO Minority Initiative:* CCST will partner with the Maryland Conference of Minority Transportation Officials (COMTO) on a series of high-school educational activities including a scholarship program and a field trip for minority students to provide mentorship and free campus visit at JHU.

GOAL 2: ATTRACT AND EDUCATE UNDERGRADUATE AND GRADUATE STUDENTS: CCST is committed to enhance educational programs in Climate-Smart Transportation by designing and offering the following courses/programs:

- *Climate and Transportation Leaders Training:* CST will develop a multi-university set of courses on *Climate and Transportation Leadership* which will be open to undergraduate and graduate students of all majors and will offer students a unique interdisciplinary on developing and implementing climate & transportation related projects and communicating them with public, professionals and policymakers.
- *Graduate Concentration in Citizen Science and Environmental Justice (CSEJ):* This track will be offered to master's and doctoral students in transportation-related degrees within our consortium with the goal to train future transportation workforce with novel tools and approaches designed for empowering minority communities to actively participate in decision-making, even undertake their own investigations.
- *Energy Minor for Undergraduate Students:* The ROSEI center at JHU has developed a new Energy Minor for BS and BA students at JHU in conjunction with several multidisciplinary departments. CCST will create a new course on Clean Energy and Transportation: Opportunities and Challenges which will be integrated into the Energy Minor. We will make this course available online to students from our Minority Institutions which will be counted towards their credit requirements.

- *Undergraduate Experiential Learning Program:* In collaboration with center for Community Health (CHARMED) at JHU, we promote opportunities for undergraduate students to involve in research in transportation and climate change with CCST-funded research projects.

GOAL 3: PROVIDE RESEARCH OPPORTUNITIES TO UNDERGRADUATE AND GRADUATE STUDENTS:

- *Experiential Training Opportunities through Students' Involvement in Research Projects:* CCST requires research projects to involve undergraduate and graduate students. We also will aim to broaden these students' exposure to the range of transportation professions available, particularly through the lens of equity and upward social mobility. Our intent is to expand the workforce pool and diversity of new professionals.
- *Hire Graduate Research Assistant:* CCST requires all research projects to include graduate students to provide training opportunities for research in transportation and climate change.
- *Student Competitions, Fellowship and Scholarship Programs:* To demonstrate our commitment to the ongoing education for students, CCST will offer competitive scholarships, fellowships, assistantships and awards to attract students, especially those from underrepresented populations, as following:
 - ***Climate Change and Transportation Competition:*** CCST hold the annual competition among the multidisciplinary student teams that propose policy solutions to a real-world climate and transportation challenge. We offer two awards to the top student teams.
 - ***Environmental Justice Scholarship:*** CCST will grant up to 3 scholarships annually to student projects that focuses on a local pressing environmental justice caused by a decision in the past and offer innovative solutions.
 - ***Student-led Publications and Presentations:*** CCST will provide mini-grants to students who lead transportation and climate change related publications in top scholarly transportation journals. CST will support up to 25 student-led presentations related to the CST focus areas at the annual TRB conference in Washington D.C.

GOAL 4: PROFESSIONAL DEVELOPMENT OPPORTUNITIES

- *CCST Net-Zero Emission Academy (NEA):* CCST will develop and implement a virtual academy, tailored particularly for local government transportation leaders and decisionmakers. Our curriculum will cover a range of topics from best practices of paths to next-zero emission, innovative technologies, equity considerations and effective policy interventions.

- *Data for Environmental Justice Workshop*: CCST will offer a day-long virtual workshop particularly designed for transportation staff to build data-driven public sector that fairly and justly uses data, research and analytics to better understand the complex nature of environmental justice challenges, engage residents, and implement policy interventions that lead to equitable outcomes. We teach staff how to explore and understand complex data systems, extracting insights that can be used to improve governance.

GOAL 5: PROMOTE EDUCATIONAL DIVERSITY BY PROVIDING EDUCATIONAL OPPORTUNITIES FOR MINORITY STUDENTS. CCST is committed to offering opportunities for underrepresented students and researchers in all its educational, research and scholarship programs including:

- *Indigenous Communities Educational Initiative*: CST recognizes the extreme gap in education and workforce training opportunities for Tribal communities and, in partnership with Dine College, is particularly committed to support educational and workforce development activities for this population group.

CATEGORY #3: Engagement and Technology Transfer

GOAL 1: REGULAR DISSEMINATION OF INFORMATION FOR CCST PROGRAMS, EVENTS AND NEWS:

- *CCST Website* will be a principal communication channel to both disseminate the research news and an online host for the news outlets to share CCST news with the broader audience.
- *CCST Social Media*: CCST will develop an extensive social media and electronic presence so that information are shared in the way that is accessible to all, efficient and consistent.
- *CCST Subscription and Email Pipeline*: CCST research, news, events and updates are publicly accessible through subscription. CCST will send a quarterly e-newsletter to a list of recipients to drive interest and awareness in center's programs.
- *YouTube Channels*: CCST YouTube channels also make CCST's recorded events, webinars, and other educational programs publicly accessible.
- *CCST Testimonies*: CCST establishes a new tradition of outreach; regular and free-of-charge presentations to inform decision makers.

GOAL 2: EFFECTIVE DISSEMINATION AND IMPLEMENTATION OF EACH RESEARCH PROJECT

- *Two-Page Policy Briefs*: Each project is required to produce a plain-language research brief written for decision- and policy makers.
- *Implementation plan*: CCST research proposals will identify a strategy for implementing their outcomes and/or research findings.

- *Webinar Series:* CCST projects are required to present a webinar session upon completion of the projects.
- *Partnership Development:* CCST establishes extensive partnerships with a number of local/ regional and national organizations/communities to implement the results of each project's funding. Table 2 provide an overview of these partners and the collaboration program during this reporting period.

What was accomplished under these goals?

Administrative Tasks

CCST has completed the following administrative tasks and related research and engagement activities during the reporting period of June 1st to September 30th, 2023:

- Formed an Executive Committee.
- In a collaborative effort with Consortium members, finalized the mission and vision statements, finalized the focus areas and started developing the strategic plan. The Executive Committee members met and provided feedback, individually and together.
- Established an exclusive email address (CCST@jhu.edu) for CCST-related communications.
- Held teleconferences with campus Associate Directors (members of the Executive Committee) to provide updates and receive feedback.
- Established regular monthly meeting with executive committee for the first year.
- Drafted the subcontract master agreement and completed subcontract negotiations with consortium members.
- Finalized the job description, got internal required approvals and hired a full-time Associate Director for the Center.
- Drafted and completed the strategic plan for the first-year research programs with input from the executive committee.
- Prepared and submitted the Data Management Plan, which is approved by OST-R
- Held a kick-off meeting with executive committee on August 2nd, 2023.
- Formed a subject-based Peer Review Database with input from Executive Committee as well as scholarly and professional community.
- Peer Review Committee: The CCST Peer Review Committee has been established and is consist of practitioners from several US regions involved in shaping policy and making decisions on key transportation issues around the country, as well as academics who are moving the field forward through cutting edge research. Committee members were chosen for the relevance of their work to the CCST theme and focal areas.
- CCST Director Director attended of the 2023 CUTC Summer Meeting and discussed collaboration with other UTCs.

Research

YEAR 1 PEER REVIEW PROJECT SELECTION PROCESS:

RFP Preparation and Solicitation:

- Prepared the RFP for the CCST’s first year general research program within the Center’s themes. The RFP included the guidelines and template for each research project’s Data Management Plan (DMP), and requested the descriptions, outlines, output, impacts, timelines and budgets.
- The Executive Committee reviewed and finalized the RFP before solicitation.
- On Aug 9th, the RFP for consortium member researchers to submit their proposals for 1st year research projects.
- CCST Director and Associate Director worked with the PIs and their consortium member staff during the proposal submission process to provide support with the requirements, matching sources, documentation and budgeting for their projects.
- The proposals were submitted by PIs in September.
- Each proposal was reviewed for intellectual merit and broad impacts, modified to the CCST theme. Each proposal was also reviewed and scored by Director and Associate Director for the following programmatic criteria:
 - Fit with the CCST theme and focus areas;
 - Student support/mentoring
 - Support for tenure-track faculty
 - Leveraging of matching funds
 - Substantive and meaningful external collaboration; multi-disciplinary and/or multi-campus collaboration.
 - Synthesized results from external and programmatic review, and ranked proposals accordingly.
- By September 2nd, 2023, CCST received 14 fully developed proposals
- Awarded proposals totaled \$1,474,053.
- The projects are listed below, with the principal investigator university noted:

Table 1: List of proposed research projects through CCST General RFP Grant Category

Project ID	Focus Area	Project Name	Consortium Member	Status
2023_01	4	Predicting The Impacts of Mixed-Use Development on Vehicle Miles Travelled	U of Utah	Awarded
2023_02	1	Climate Change Adaptation for Active Transportation: What Are American Cities Doing?	U of Utah	Awarded
2023_03	4, 5	The 15-Minute City Quantified Using Mobility Data	MIT	Awarded
2023_04	2, 5	A Granular Characterization of Mobility-Related Air Pollution Exposure Disparity	MIT	Awarded

2023_05	4	Green TOD: Concept, Framework, and the Empirical Case Study of Austin, TX	UT Austin	Awarded
2023_06	5, 4	Digital Twins as a Catalyst for Sustainable and Smart Cities	UT Austin	Awarded
2023_07	5	Deploying Autonomous Robot Delivery System to Replace Truck Delivery and Reduce GHG Emission in Austin, TX	UT Austin	Awarded
2023_08	3	Charging Forward: Crafting an Inclusive SMART Roadmap for Electric Vehicle Infrastructure in Navajo Nation, AZ	Dine' & UT Austin	Awarded
2023_09	2, 3	Factors Affecting Electric Vehicle and Public Charging Infrastructure Adoption in Baltimore, MD	MSU	Awarded
2023_10	1	Metropolitan Planning Organizations' Long-range Transportation Plans: Best Practices in Sustainability, Equity, and Climate Change	MSU	Awarded
2023_11	4	National Investigation on the Environmental, Safety and Livability Impacts of Travel Lane Width: Evidence from 10 American Cities	JHU	Awarded
2023_12	1,4	How Actionable are Climate Action Plans? In-depth Analysis through an Integrated Policy Mix Framework	JHU	Awarded
2023_13	1,2	A Census of the US Climate-High Risk Area Population: Transportation and Environmental Justice Considerations	JHU	Awarded
2023_14	1,2	Road to Zero Emission in Tribal Communities: A Comprehensive Analysis on Challenges, Implementation Barriers and Facilitators	Dine' & JHU	Under review

Education and Workforce

ATTRACT AND EDUCATE PRE-COLLEGE STUDENTS

- CCST Director and Associate Director provided a presentation on Climate -Smart Transportation to 25 undergraduate students who visited Johns Hopkins University in August 2023. The lecture offered an introduction to transportation and planning as a potential major for their undergraduate studies.

ATTRACT AND EDUCATE UNDERGRADUATE AND GRADUATE STUDENTS

- *Research Assistantships:* Through the first cycle of CCST general RFP, a total of 26 undergraduate and graduate students are being funded to participate in research programs. Through research assistantship positions, they will gain research skillsets, technical and experiential training opportunities. Notably, nine of these students are from underrepresented population.

- *CCST Student Leadership Council*: Each member university identified a lead student council. The student members will be core foundation of CCST student leadership council.

Engagement and Technology Transfer

REGULAR DISSEMINATION OF INFORMATION FOR CCST PROGRAMS, EVENTS AND NEWS:

- Designed and launched the CCST website and supporting infrastructures. The website provides extensive sources of information for CCST vision, mission, plans and programs, researcher, executive committee, location and contact information. The news and event fields will be updated frequently.
- CCST logo and other promotional materials were created to be used in all Center official communications.

DISSEMINATION AND IMPLEMENTATION OF EACH RESEARCH PROJECT:

- CCST 1st general RFP required PIs two-page policy brief and implementation plan in addition to their research, describing the plans to disseminate their results. CCST is now developing formal guidelines and a template for the policy brief.
- Each CCST PI are requested to prepare one webinar that will be shared through CCST website to explain their project's goal, methodology, outcome and impact to technical and non-technical audiences.

How have the results been disseminated? If so, in what way/s?

Nothing to report for this period

What do you plan to do during the next reporting period to accomplish the goals and objectives?

Research

- CCST Advisory Board will be established.
- Completing the award notifications for projects that are not awarded in the current reporting period.
- Hiring a Post Doc for CCST research projects.
- Data management Plan for each project will be drafted, reviewed and approved.
- Submission and reporting of the first quarterly progress reports from the PIs
- The 1st year annual CCST annual meeting will be held at TRB Conference
- The graduate/undergraduate research assistants for CCST-funded projects will be hired.

Education and Workforce

- CCST plan and strategies for educational and training programs will be established.
- CCST student leadership council: the CCST student organization will be established, and the council will start developing plans for future activities.
- Environmental Justice Scholarship program will be initiated: This initiative will award up to 3 scholarships on a competitive basis to a student project/video that focuses on a local pressing environmental justice issue caused by transportation decisions in the past and offer innovative solutions presentable to policymakers.
- Climate Change and Transportation competition will be initiated: Teams of students will propose policy solutions to a real-world climate and transportation challenge. Each team will be required to include students from at least three different disciplines.
- CCST Consortium members will continue offering courses and degrees in transportation related fields.

Engagement and Technology Transfer

CCST Partnership with local, regional and national organizations:

- Each CCST-funded project will establish partnership with local/regional and national organizations for future implement the results as was proposed in their proposals.
- *TRB annual meeting:* CCST faculty will attend and present extensively at TRB conference and CCST will provide support faculty and students to lead and participate in committees and presentations during the 2024 TRB annual meeting.
- *ACSP annual meeting:* CCST will support researchers and faculty to lead and participate in committees and presentations during the 2024 ACSP annual meeting.
- *E-Newsletter:* The first CCST E-Newsletter will be published and disseminated widely.
- *Website:* Continue updating CCST website functionalities and performance. The CCST will include more detailed information on research projects and their progress.

1. PRODUCTS: What has the program produced?

All research projects are in-progress; there are not yet any specific product from CCST funded projects.

Publications, conference papers, and presentations

Nothing to report for this period

Website(s) or other Internet site(s)

CCST Website Address: <https://publichealth.jhu.edu/center-for-climate-smart-transportation>

Technologies or techniques

Nothing to report for this period

Inventions, patent applications, and/or licenses

Nothing to report for this period

Other products, such as data or databases, physical collections, audio or video products, software or NetWare, models, educational aids or curricula, instruments, or equipment

Nothing to report for this period

2. PARTICIPANTS & COLLABORATING ORGANIZATIONS: Who has been involved?**What organizations have been involved as partners?**

The members of the consortium include Johns Hopkins University (lead institution), Massachusetts Institute of Technology (MIT), University of Texas at Austin, University of Utah, Morgan State University (MSU), and Dine College. CCST has created a governance structure that reflects our basis in collaboration. Our Executive Committee is consist of one representative from each member university and provides overall direction for the center, make project funding decisions and select center award recipients. Table 2 presents a list of current and future CCST external partners:

Table 2 CCST External Partners

Partner	Collaboration Type	Program	Member Institution	Status
Bloomberg American Health Initiative	Research-Education	Project #2023_11; Project #2023_12; Project #2023_13	JHU	2
Ralph O'Connor Sustainable Energy Institute (ROSEI)	Research-Education	Research and education partnership	JHU	1
Center for Community Health (CHARMED)	Research	Research partnership	JHU	2
Bloomberg Philanthropy	Research	Project #2023_11	JHU	2
Maryland Environmental Service	Research	Project #2023_12	JHU	1

Baltimore Transit Equity Coalition	Research	Research partnership	JHU	1
Texas Robotics	Research	Project #2023_07	UTA	2
Urban Information Lab	Research	Project #2023_06, Project #2023_08	UTA	2
MIT Senseable City Lab	Research	Project #2023_03, Project #2023_04	MIT	2
Metropolitan Research Center	Research	Project #2023_01, Project #2023_02	UU	2
California Air Resources Board	Research	Project #2023_01	UU	1
Salt Lake City, Transportation Division	Research	Project #2023_02	UU	1
Wasatch Front Regional Council	Research	Project #2023_02	UU	1
VW Group of America	Research	Project #2023_03	MIT	1
City of Boston	Research	Project #2023_03	MIT	1
New York City Department of Health and Mental Hygiene	Research	Project #2023_04	MIT	1
Massachusetts Department of Environmental Planning	Research	Project #2023_04	MIT	1
Capital Metro	Research	Project #2023_05	UTA	1
City of Austin	Research	Project #2023_05	UTA	1
Austin Department of Transportation	Research	Project #2023_06	UTA	1
Austin Fire Department	Research	Project #2023_07	UTA	1
Navajo Nation Division of Transportation	Research	Project #2023_08	Dine'	1
Navajo Nation Chapters including 5 local communities: Chinle Agency, Crownpoint/Eastern Agency, Fort Defiance Agency, Shiprock Agency, Tuba City/Western Agency	Research	Project #2023_08	Dine'	1
Baltimore City Office of Sustainability	Research	Project #2023_09	MSU	1
Baltimore City Parking Authority	Research	Project #2023_09	MSU	1
Baltimore Metropolitan Transportation Council	Research	Project #2023_10	MSU	1

Sacramento Area Council of Governments	Research	Project #2023_10	MSU	1
Status *** 1 Initial arrangement 2 Agreement made, will be implemented 3 Implementation phase 4 Completion				

Have other collaborators or contacts been involved? Please see Table 2

3. IMPACT: What is the impact of the program? How has it contributed to transportation education, research and technology transfer?

What is the impact on the development of the principal discipline(s) of the project?

Nothing to report for this period

What is the impact on the other disciplines?

Nothing to report for this period

What is the impact on development of human resources?

Nothing to report for this period

What is the impact on physical, institutional, and information resources at the university and/or other partner institution?

Nothing to report for this period

What is the impact on technology transfer (include transfer of results to entities in government or industry, adoption of new practices, or instances where research has led to the initiation of a start-up company)?

Nothing to report for this period

What is the impact on society beyond science and technology?

Nothing to report for this period

4. CHANGES/PROBLEMS

Changes in approach and reasons for change

Nothing to report for this period

Actual or anticipated problems or delays and actions or plans to resolve them

Nothing to report for this period

Changes that have a significant impact on expenditures

Nothing to report for this period

Significant changes in use or care of human subjects, vertebrate animals, and/or**Biohazards**

Nothing to report for this period

Change of primary performance site location from that originally proposed

Nothing to report for this period