



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

**PROGRAM PROGRESS PERFORMANCE REPORT**

Federal Agency: Office of the Assistant Secretary for Research and Technology  
US Department of Transportation

Federal Grant Number: 69A3551747128

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

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Submission Date: April 30, 2018

DUNS & EIN Numbers: 93-848-5539; 74-2270624

Recipient Organization: Texas A&M Transportation Institute  
3135 TAMU  
College Station, TX 77843-3135

Recipient Identifying Number: 12-60801; 12-165928

Grant Period: November 30, 2016 – September 30, 2022

Reporting Period End Date: March 31, 2018

Report Term: Semi-annual

Signature of Submitting Official: *Marcia Walker*

## OVERVIEW

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The Center for Advancing Research in Transportation Emissions, Energy, and Health (CARTEEH) has been highly productive during this reporting period. Both the cooperative and competitive research projects are progressing, all involving a group of talented students. In addition, we have initiated several of our technology transfer activities, which have received extremely positive feedback. At the end of this reporting period, we are proud of our progress and excited about upcoming activities in all of our goal areas.

## ACCOMPLISHMENTS

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### Leadership and Communications

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During this reporting period, CARTEEH leadership, including the partner leads from around the country, have maintained regular contact through a number of meetings, either in person, or via conference call, or WebEx.

USDOT Kick-Off Meeting: On June 13, 2017, the CARTEEH Executive Committee (ExCOM) hosted USDOT personnel for a kick-off meeting at the Texas A&M Transportation Institute (TTI) headquarters in College Station. During the morning meeting, CARTEEH partners introduced themselves and provided brief presentations on their institution's area of expertise within the Center. Dr. Robin Kline and Dr. Kevin Womack from USDOT gave a presentation on the requirements and expectations for projects under the University Transportation Center program and took questions from the group. CARTEEH members gained valuable information during the meeting, which served to provide discussion points for the ExCOM meeting which was held that afternoon.

Executive Committee Meetings: The morning meeting with USDOT was followed by an afternoon ExCOM meeting. The CARTEEH team was joined by TTI Agency Director Greg Winfree. Based on his prior position with USDOT and the UTC program, Mr. Winfree provided insight from the federal perspective on CARTEEH's initiatives and overall vision. Planning sessions for several of the CARTEEH initiatives were held, as well as an overview of the reporting requirements for the upcoming PPPR and Performance Indicator reports.

Regular ExCOM meetings are held on a monthly basis via conference call or WebEx. Topics include updates on or planning of CARTEEH initiatives, progress on research projects, and administrative issues such as reporting requirements or subcontract modifications.

CARTEEH Advisory Board: CARTEEH has established its Advisory Board, whose members serve in an advisory capacity to the ExCOM for strategic advice on:

- Scientific activities and research programs
- Emerging transportation and health issues and trends in national and global contexts



- Knowledge translation and dissemination of research
- Partnerships and leveraging opportunities

The initial Advisory Board is comprised of distinguished, high-level professionals who are strategically positioned to offer guidance on emerging trends, partnerships, leveraging opportunities, and scientific activities and research.

**Table 1: Advisory Board Members**

NAME	TITLE	INSTITUTION
Dr. Thomas Burke	Jacob I. and Irene B. Fabrikant Professor and Chair in Health Risk and Society	Johns Hopkins University Bloomberg School of Public Health
Dr. Katherine Turnbull	Executive Associate Director	Texas A&M Transportation Institute
Dr. Roberto Osegueda	Vice President for Research	University of Texas at El Paso
Dr. Matthew Barth	Yeager Families Professor, College of Engineering	University of California - Riverside

It is envisioned that the Board will grow, to add select participants from industry, other research institutes, or government, with total membership not expected to exceed 12 members. The Advisory Board will hold its first meeting on May 11, 2018. Board members have also been provided with written Terms of Reference developed by CARTEEH leadership. Following this meeting, information on each member will be added to the CARTEEH website, which will be updated as other members are added.

Human Subject Compliance: Due to the collaborative nature of the projects identified in CARTEEH’s first year, a procedure for coordinating institutional review board (IRB) approvals among and across the partner institutions was required, for the protection of human subjects in research. CARTEEH administration worked closely with the Texas A&M University (TAMU) IRB to develop an “umbrella protocol” for the CARTEEH center, which was the first of its kind for TAMU. This procedure has been communicated to the partner leads, as well as the Principal Investigators of the competitive projects, and is included as part of the project requirements provided to new PIs.

Professional Service and Outreach: Several CARTEEH researchers continue to serve as ambassadors for our center through their appointments and participation in technical committees, making presentations at conferences, and speaking at other venues. CARTEEH was also represented by the Center Director the Summer 2017 CUTC meeting held in Buffalo, N.Y., as well as at the UTC meeting held in conjunction with the 97<sup>th</sup> Annual TRB Meeting held in January 2018.

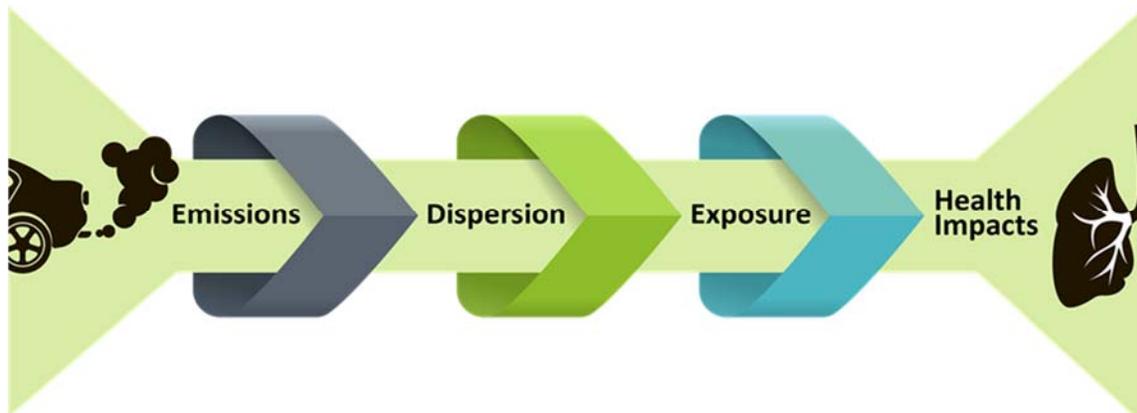
Progress in each CARTEEH goal area for this reporting period is explained in further detail in the following sections.



## Major Goals of the Program

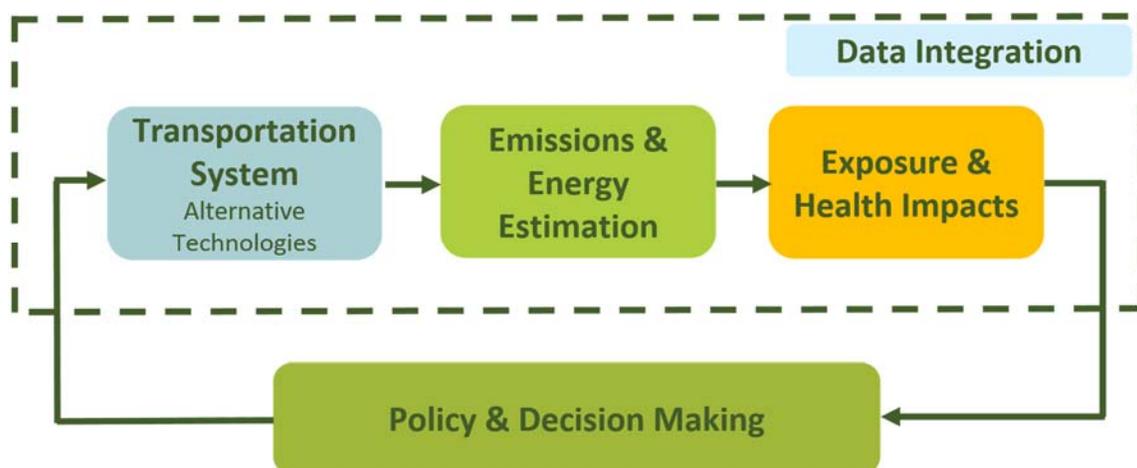
CARTEEH is advancing research that addresses transportation emissions in the context of public health, bringing together experts from transportation and public health, two disciplines that have not traditionally worked together. We address the “full-chain,” or spectrum, between transportation emissions and human health, as shown below.

**Figure 1: Full-Chain Between Transportation Emissions and Health**



By promoting interdisciplinary collaboration and communication, CARTEEH will advance transportation research, technology transfer, and education and workforce development in each of the following focus areas:

**Figure 2: CARTEEH Focus Areas**



## CARTEEH Goal #1: Research Program

### Cooperative Research Program

CARTEEH's year one research program focused on the six cooperative research projects identified in the Center proposal. Work on these projects is successfully progressing as they approach the conclusion of their first year. We anticipate providing project outputs on several of these projects in our future PPPRs.

**Table 2: Year One Cooperative Research Projects**

Project	Lead Institution	PI	Partner Institutions
<b>Transportation Emissions and Health Data Hub (#01)</b> Reconciles differences in characteristics of transportation and health data, and develops a platform to house datasets and link to relevant information related to transportation emissions and public health data.	TTI	Dr. Andrew Birt	All
<b>Truck Emissions Exposure Study in Ports (#02)</b> Assesses pollutant emissions at selected major ports and evaluates the potential reduction of exposure that can come from using alternative fuel and powertrain technologies for trucking operations at the ports.	GT	Dr. Michael Rodgers	UCR, TTI
<b>Border Crossing Emissions Impact Study (#03)</b> Characterizes the emissions impact of border crossings in El Paso and identifies the population groups most affected by the emissions.	TTI	Dr. Tara Ramani	UTEP, JHU
<b>Healthy Living and Traffic-Related Air Pollution in an Underserved Community (#04)</b> Quantifies traffic-related air pollution and the associated respiratory health for vulnerable school children living in a near-road, underserved community in El Paso, Texas; develops guidelines on healthy living for the underserved, roadside communities.	UTEP	Dr. Wen-Whai Li	TTI, JHU
<b>Development and Evaluation of Connected Vehicle Application for Alternative Fuel Trucks (#05)</b> Evaluates the energy and emission benefits of battery electric trucks and plug-in hybrid electric trucks over conventional diesel trucks; develops a connected vehicle application for these trucks.	UCR	Dr. Peng Hao	GT, TTI
<b>Health Risk Characterization for Transportation Users (#06)</b> Develops a cumulative exposure and risk profile for transportation workers and/or transportation system users considering chemical and non-chemical stressors.	JHU	Dr. Mary Fox	UTEP

### Competitive Research Program

The first research funding competition was held in November and December 2017, as year one funds were primarily devoted to the cooperative project initiation. The procedure for the proposal review process was as follows:

- Partner leads issued a call for problem statements at their respective institutions
- Once received, problem statements were vetted by an internal committee at each institution, to identify innovative projects fitting within CARTEEH's mission.



- The CARTEEH ExCOM met to discuss all proposals recommended for funding and finalize the selections. The ExCOM also reviewed the scopes of work and made suggestions for revisions.
- Researchers whose projects were chosen for funding were notified, and a detailed work plan and budget were requested
- Partner leads worked with their researchers to finalize work plans, providing the final copies to CARTEEH – TTI
- CARTEEH - TTI admin staff provided each of the competitive program PIs with an official notice of award and welcome to the CARTEEH program, as well as detailed deliverable requirements, reporting templates, and other administrative information.

The five institutions received a combined total of 22 problem statements. Of these, the consortium funded nine projects which address one or more of CARTEEH’s focus areas. These projects have been added to both the RiP Database and the CARTEEH website. With the competitive projects underway, CARTEEH now has 15 different principal investigators working on a broad range of projects, addressing the mission of the center.

**Table 3: Year Two Competitive Projects**

<b>Project</b>	<b>Lead Institution</b>	<b>Principal Investigator</b>	<b>Project Number</b>
<b><i>Assessing Regulatory Compliance and Community Air Pollution Impacts of Crude Oil by Rail (CBR) Transport in Baltimore City, Maryland</i></b> Delivers evidence-based characterization of emissions impacts of CBR within Baltimore City, Maryland	JHU	Dr. Genee Smith	JHU-01-07
<b><i>PM Exposure for Paratransit Transport</i></b> Characterizes exposure to PM faced by sensitive populations using paratransit transport	GaTech	Dr. Alex Samoylov	GT-01-08
<b><i>Measuring Temporal and Spatial Exposure of Urban Cyclists to Air Pollutants Using an Instrumented Bicycle</i></b> Develops an understanding of local cyclists’ exposure to PM2.5 air pollutants in an urban environment	GaTech	Dr. Kari Watkins	GT-01-09
<b><i>Traffic-Related Air Pollution and Childhood Asthma in the United States: A Burden of Disease Assessment</i></b> Conducts a burden of disease estimate of childhood asthma attributable to traffic-related air pollution within the US	TTI	Dr. Haneen Khreis	TTI-01-10
<b><i>Characterizing In-Cab Air Quality in Heavy Duty Diesel Construction Equipment</i></b> Analyzes air quality and driver exposure inside the cabs of heavy-duty diesel construction equipment	TTI	Dr. Phil Lewis	TTI-01-11
<b><i>Study of Emissions and Exposure at School Sites in Dallas, Texas</i></b> Investigates emissions and air quality at school sites with a focus on on-site vehicular traffic on children’s exposure levels.	TTI	Dr. Suriya Vallamsundar	TTI-01-12
<b><i>Quantifying Bioavailable Metals and Potential Dust Emissions from Highway-Related and Desert Sediments at Lordsburg Playa, New Mexico</i></b>	UTEP	Dr. Thomas Gill	UT-01-13



Project	Lead Institution	Principal Investigator	Project Number
Scopes the presence of bioavailable metals and potential dust emissions from highway-related and desert sediments in New Mexico			
<b><i>Secondary Particulate Matter Exceed Primary Emissions from Current Gasoline Vehicles: Air Quality and Public Health Implications</i></b>	UCR	Dr. Georgios Karavalakis	UCR-01-14
Assesses emissions from gasoline direct injection and multipoint injection vehicles when operated under different driving cycles			
<b><i>Quantifying Traffic Congestion-Induced Change of Near-Road Air Pollutant Concentration</i></b>	UCR	Dr. Jill Luo	UCR-01-15
Quantifies the contributions to the ambient air quality degradation due to traffic congestion based on statistical methods			

### *Strategic Initiatives*

In addition to the competitive projects identified above, CARTEEH started work on two small strategic initiatives in the current reporting period:

Health and Transportation: Dr. Mark Nieuwenhuijsen, of ISGlobal in Barcelona, Spain, is a highly-regarded expert in the field of the health impact assessment of traffic-related air pollution, whom we are fortunate to have participating or advising on several of the CARTEEH activities. Dr. Nieuwenhuijsen conducted a seminar/webinar on “Perspectives on Transportation Emissions, Exposures, and Health” in early December (further discussed under our technology transfer goal). He is also looking at potentially providing personal exposure measurement equipment on-loan from ISGlobal, at no cost to CARTEEH, for use in future field studies. We anticipate opportunities for additional collaboration with Dr. Nieuwenhuijsen and his institution in future periods.

Truck Driver Health: A strategic initiative on truck driver health was initiated late in the current reporting period and will get underway once IRB approval is received from TAMU IRB. In collaboration with Dr. Teresa Penbrooke from GPRed, the study will focus on truck driver wellness in the context of occupational constraints which lead to exposures to poor air quality, increased sedentary behaviors, and poor nutritional habits. The intent of this small, strategic initiative is to implement a pilot project to assess factors that may either impede or help improve health factors and behaviors for truckers within the rest areas they frequent. In a later phase, we hope to further develop the initiative by putting our findings into practice in partnership with one or more members of the trucking industry.

### *Research Results Disseminated*

The cooperative projects are approaching the end of their first year, while the competitive projects all got underway within the past month. While we’re receiving quarterly reports on all projects, there are no final reports yet. However, we are starting to formally disseminate project



results by submitting abstracts for consideration at conferences, as well as discussing projects and CARTEEH activities in different venues.

### *Plans for Next Reporting Period to Accomplish Research Goal*

CARTEEH leadership will provide support, guidance, and assistance to project principal investigators to aid in achieving individual project objectives. Additionally, we will ensure that Center activities progress in accordance with the approved work plans.

## **CARTEEH Goal #2: Education and Workforce Development**

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With the initiation of our competitive research program and progress on our cooperative projects, the number of students involved in CARTEEH has greatly increased. Table 4 shows the estimated student involvement (i.e. students directly working on research projects) as of the conclusion of this reporting period. This does not include students participating in other CARTEEH activities such as seminars and the professional development program.

**TABLE 4: CARTEEH Student Involvement**

LEVEL	NUMBER
Undergraduate	4 (TTI 1, GaTech 1, UTEP 2)
Master's	7 (TTI 2, GaTech 1, JHU 1, UTEP 3)
Doctoral	9 (TTI 2, GaTech 1, UTEP 1, UCR 5)

### *Curriculum Course Development*

Progress is rapidly being made on the creation of CARTEEH's course titled "Traffic-Related Air Pollution, Human Exposures, and Health." The course is being developed under the leadership of Dr. Haneen Khreis of TTI, and Dr. Mike Rodgers of Georgia Tech, with extensive input from other partners. The course will be cross-disciplinary, covering key topics from the transportation, urban planning, exposure assessment and public health and policy domains.

The course is intended to form the basis for a three-credit-hour graduate-level course offered by consortium member institutions and targeted at students and practitioners in the areas of urban planning, transportation planning, transportation engineering, geography, environmental sciences, environmental epidemiology, and public health. However, the course's individual lectures were designed to "stand-alone" and as such, they can be mixed and matched to be transferable to other locations and be used for other purposes including:

1. Complementing existing academic or professional courses
2. Devising a smaller course with select lectures for target audiences with specific needs and/or existing knowledge.



It is envisioned that there will be 52 lectures, which will include a 15 minute pre-recorded video lecture from a subject matter expert for each. The course outline has been completed, and lecturers are being identified for each session.

In parallel with the curriculum development, a group of CARTEEH consortium members is exploring collaboration on a book on the same topic. We will follow up with the UTC grant manager to discuss this topic in future reporting periods.

### *CARTEEH Student of the Year Award*

CARTEEH's student of the year award program solicited nominees from among consortium members, in accordance with DOT guidelines. The winner of the 2017 award was Alana Wilson, a second-year master's student at the Georgia Institute of Technology. She received a trip to the 2018 TRB Annual Meeting in Washington, D.C. where she attended CUTC's 2018 Award Banquet, as well as a \$1,000 stipend.

### *CARTEEH Summer Internship Program*

In conjunction with the SAFE-D UTC, CARTEEH has awarded summer internships to four upper-level undergraduate students. Running from May 29th through August 3rd the interns will participate in some joint activities (with the SAFE-D interns) as well as a number of activities targeted specifically to the CARTEEH students in transportation and health. Each student will be paired with a mentor to gain hands-on experience on projects related to one of the CARTEEH focus areas. At the completion, they will participate in a poster session with other TAMU summer undergraduate interns.

### *Student Professional Development Program*

Conducted jointly with the SAFE-D UTC, CARTEEH, and SAFE-D graduate students are participating in a professional development program, designed by Dr. Melissa Tooley. Speakers have been provided on topics such as "Career Readiness," and Networking. The lectures are held at TTI, and webcast to all partner SAFE-D and CARTEEH institutions.

### *Other Activities*

At UC, Riverside, CARTEEH co-sponsored the Science and Technology Education Partnership (STEP) conference. The conference was highly successful and was attended by approximately 240 K-12 teachers, 250 high school students, and 40 middle school students.

Project #JHU-01-07, "Assessing Regulatory Compliance and Community Air Pollution Impacts of Crude Oil by Rail Transport in Baltimore City, Maryland" has been incorporated into the co-PI's "Environmental Justice: Concepts, Methods, and Practice" class. Community members and activists have come to the class to summarize the history of crude oil by rail (CBR) and their concerns with the transport throughout the city. Students have already participated in site canvassing and are now completing oral and written reports on testable hypotheses related to the community concerns about CBR transit. These mini-reports are meant to generate ideas and



receive feedback on potential research questions that can be pursued by investigators, community members, and students.

### *Education Results Disseminated*

Several of our technology transfer initiatives, such as the seminars and literature library reach students as part of their education. Project work has been incorporated into graduate-level classes at University of Texas at El Paso, and Johns Hopkins University.

### *Plans for Next Reporting Period to Accomplish Education Goal*

During the upcoming reporting period, the current education initiatives will continue and CARTEEH will look for additional opportunities for education and workforce development growth. We anticipate further progress on the curriculum course development, as well as the completion of our inaugural summer internship program.

## **CARTEEH Goal #3: Technology Transfer**

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A number of technology transfer activities are underway and progressing on schedule. The CARTEEH technology transfer activities aim to make research results and knowledge available to the research community and beyond.

### *Data Hub*

Cooperative Project #01 (“Transportation Emissions and Health Data Hub”) is a key component of CARTEEH’s technology transfer vision. It will provide a means to reconcile different methods of data collection and analysis in the fields of transportation and public health. Where applicable, data sets will be de-identified and shared in compliance with the relevant institutions’ IRB policies. Data will be available in the future for novel research applications. This project output and data sharing capability will serve as one of the products of our technology transfer goals. A platform for the data hub (i.e. test website) has been created and is currently being tested and piloted internally by users. The final IRB approval from the TAMU IRB, which will address the data storage elements, is anticipated to be received in May.

In addition to the use of human subjects on individual research projects, there are also human subject implications for data that is being shared and stored in the Data Hub, as well as the Data Management Plan. We are currently developing standard operating procedures for the Data Hub, which will be incorporated into our updated Data Management Plan and submitted to USDOT for approval.

### *Technology Transfer Plan*

Based on the UTC meeting at TRB, in which technology transfer requirements were emphasized, CARTEEH is revisiting its strategic and communication plans to instead develop a Technology Transfer Plan that encompasses communication elements, as a supplement to the Strategic Plan,



which puts forward a vision for the center. The formal DOT technology transfer requirements, sent on April 16, 2018 will be addressed, and our Plan will be submitted for approval by July 31.

### *CARTEEH Seminars/Webinars*

On December 4, 2017, a seminar was held at TTI featuring Dr. Mark Nieuwenhuijsen from ISGlobal of the Barcelona Institute for Global Health. Dr. Nieuwenhuijsen spoke on “Perspectives on Transportation Emissions, Exposures, and Health.” The seminar was well attended, both face-to-face, and from a distance. There were approximately 35 attendees at TTI, with between 65-70 joining online. Dr. Nieuwenhuijsen’s talk was well received and was recorded and posted to the CARTEEH website.

The next seminar will be held in April 2018 and will be hosted by Johns Hopkins University. Dr. Thomas Burke, a former Science Advisor and Deputy Assistant Administrator for Research and Development at the US EPA during the Obama Administration (and CARTEEH Advisory Board member) will be speaking on “The Road to a Healthy Environment: Transportation Research, Planning, and Public Health.” This seminar will also be accessible online as well as in person.

### *CARTEEH Conference on Health and Transportation*

An international conference on health and transportation is being planned for March – April 2019, to be held in Austin, Texas. The planned title of the conference is “Perspectives on Transportation Emissions, Air Quality, and Health.” The goal of the conference is to promote healthy transportation planning and policy by bringing together different disciplines working in the distinct areas of transportation systems, emissions, energy, air pollution, exposures, and public health. The targeted audience for this conference includes students, researchers and university faculty or staff, as well as transportation professionals.

Currently, plans are underway to confirm the venue, and structure of the agenda. The Center Director will follow up with the UTC grant manager to obtain additional input prior to finalizing the conference date and location via a “Save the Date” flyer. TTI’s Event Management and Planning group will handle all conference planning and logistics, including issuing an RFP for conference facilities, finalizing arrangements and collecting registration fees. All registration fees collected will be put towards the cost of the conference.

### *CARTEEH Literature Library*

A literature library has been created and added to the CARTEEH website. This literature library is intended as a resource for students, researchers, and practitioners interested in transportation and health, especially the impact of transportation emissions and air pollution on human health. It currently contains a reference list of over 500 scientific studies addressing the full-chain of events between transportation pollution sources and health impacts. It tabulates several attributes for each study, including the citation details, the publication type, topic area, and type of study. This reference list will be periodically updated to include new studies as they become



available. The literature library was uploaded on the website and enhancements made towards the end of this reporting period. It will be formally launched in May 2018

### *Outreach Video*

A video on the topic of transportation emissions and health is in the planning stages. TTI Communications has offered to produce the video at minimal charge to CARTEEH. Our goal is to feature not only TTI personnel but collaborators from our partner institutions as well, to provide an overview of ongoing research at CARTEEH.

### *Technology Transfer Results Disseminated*

All center activities are posted to the CARTEEH website, with several updates made to the site following this reporting period. In addition, upcoming and planned activities such as webinars are advertised on the website. Once the webinars are completed, a video is posted for public viewing.

### *Plans for Next Reporting Period to Accomplish Technology Transfer Goal*

Annual Corporate Report: Following the submission of the April 30 PPPR, work will immediately begin on the CARTEEH annual corporate-style report. The report will be published on the CARTEEH website in a printable format, but hard copies will not be printed. It is expected to be completed in early summer of 2018.

SharePoint Site: A SharePoint portal will be created to serve as a central repository for CARTEEH researchers from all partner institutions. Envisioned as a tool for both research and administration, project reports, publications, and forms will be saved in an easily accessible, central location.

CARTEEH Conference: Plans for the CARTEEH Transportation and Health Conference will continue. The venue and dates will be finalized, which will allow the invitations and publicity to begin.

Working Papers: In addition to journal papers being written for individual projects, CARTEEH leadership and researchers are working on white papers/potential journal papers looking at health and transportation from a high-level policy perspective, with an emphasis on the emissions-related aspects of the disciplines. Working papers being drafted or planned include 1) investigation of the paradigm shift in addressing transportation air quality and health, 2) development of a conceptual model for transportation, health and emissions, 3) investigation of the effectiveness of emissions control strategies in reducing health impacts.

## **PRODUCTS**

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### **Presentations**

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**Name** Josias Zietsman, Center Director, TTI

**Event:** Seminar at Barcelona Institute for Global Health (June 30, 2017)

**Title:** Introducing the Center for Advancing Research on Transportation Emissions, Energy and Health

**Location:** Barcelona, Spain

**Name:** Josias Zietsman, Center Director, TTI

**Event:** Seminar to TTI Researchers (September 5, 2017)

**Title:** Introducing the Center for Advancing Research on Transportation Emissions, Energy and Health

**Location:** College Station, Texas

### Abstracts Submitted

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**Name:** Amit U. Raysoni, Juan A. Aguilera, Leah D. Whigham, Stephanie Garcia, Moises Garcia, Adan Rangel, Mayra C. Chavez, Ivan M. Ramirez, Wen-Whai Li, University of Texas at El Paso

**Event:** American Public Health Association 2018 Annual Meeting (November 2018)

**Title:** Airway inflammation and lung function measurements in asthmatic children at two road-side elementary schools in El Paso, TX

**Name:** Juan Aguilera, Amit Raysoni, Stephanie Garcia, Wen-Whai Li, Leah D. Whigham

**Event:** American Public Health Association 2018 Annual Meeting

**Title:** Associations of fruit and vegetables intake, naturally occurring breath carbon stable isotopes, and air quality in children with asthma attending elementary schools near a heavy traffic road in El Paso, TX

**Name:** Tara Ramani, Rohit Jaikumar, Amber Trueblood, Inyang Uwak, Suriya Vallamsundar, Natalie Johnson, Josias Zietsman

**Event:** American Public Health Association 2018 Annual Meeting

**Title:** Traffic-Related Air Pollution exposures from border crossings: Assessing affected populations in El Paso, Texas

**Name:** Raed A, Mathew Bechle, Julian D. Marshall, Tara Ramani, Joe Zietsman, Mark J Nieuwenhuijsen and Haneen Khreis

**Event:** The Joint Annual Meeting of the International Society of Exposure Science and the International Society for Environmental Epidemiology (ISES-ISEE 2018)

**Title:** Air Pollution and the Burden of Childhood Asthma in the Contiguous United States

**Name:** Tara Ramani, Rohit Jaikumar, Amber Trueblood, Inyang Uwak, Suriya Vallamsundar, Natalie Johnson and Josias Zietsman

**Event:** International Conference on Health and Transportation



**Title:** Traffic-Related Air Pollution Exposures from Border Crossings: Assessing Affected Populations in El Paso, Texas

## Media References

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CE-CERT Partners with Bourns Inc. to Host Another Successful STEP Conference.  
<http://www.cert.ucr.edu/news/2017/2017-10-25.html>

## Website

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The CARTEEH website is being refined and is being regularly updated. News articles relevant to the CARTEEH focus areas are added weekly, as are videos from CARTEEH seminars, and the new literature library. In conjunction with TTI Communications, we are working to improve our graphics and strengthen our branding.

## Technologies

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None to report for this period

## Inventions

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None to report for this period

## Other Products

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None to report for this period

## PARTICIPANTS AND COLLABORATING ORGANIZATIONS

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CARTEEH is made up of a consortium of five institutions: TTI is a member of the Texas A&M University System and home to the Center. Faculty and students from other colleges such as the Texas A&M Health Science Center are also involved. Johns Hopkins University, Georgia Tech, University of Texas-El Paso, and the University of California, Riverside complete the partnership.

### Figure 3: CARTEEH Consortium Members





## Partner Organizations and Other Significant Collaborators

CARTEEH's focus areas cross multiple disciplines, bringing opportunities for a unique collaborative effort with institutions and individuals. These partners are essential to the success of the Center. Organizations and individuals in the following tables have directly supported or collaborated on Center activities.

**Table 5: Partner Organizations**

ORGANIZATION NAME	LOCATION	CONTRIBUTION
Houston-Galveston Area Council	Houston, Texas	Collaboration
North Central Texas Council of Governments	Arlington, Texas	Collaboration
El Paso Independent School District	El Paso, Texas	Facility and student access
Port of Los Angeles	Los Angeles, California	Personnel
Port of Long Beach	Long Beach, California	Facilities
Port of Savannah	Savannah, Georgia	Facilities
Port of Galveston	Galveston, Texas	Facilities
Port of Houston	Houston, Texas	Facilities
The Nature Conservancy	Austin, Texas	Collaboration
The City of Dallas	Dallas, Texas	Collaboration
Dallas Independent School District	Dallas, Texas	Access to facilities
City of Los Angeles	Los Angeles, California	Data
Oak Ridge National Laboratory	Oak Ridge, Tennessee	Computer models
California Energy Commission	Sacramento, California	In-kind support
City of Carson	Carson, California	Personnel
South Coast Air Quality Mgmt. District	Diamond Bar, California	Data and equipment



Tampere University of Technology	Finland	Equipment
Mount Winans Community group	Baltimore, Maryland	Collaboration, facility access



**Table 6: Significant Collaborators**

NAME	AFFILIATION	CONTRIBUTION	COUNTRY
Dr. Mark Benden	TAMU Health Science Center	Collaboration	U.S.
Dr. Wei Li	TAMU – Landscape Architecture and Urban Planning	Collaboration	U.S.
Dr. Eun Sug Park	TTI – Mobility Analysis Program	Collaboration	U.S.
Dr. Teresa Qu	Michigan State University	Collaboration	U.S.
Dr. Andrea Strzelec	Mississippi State University	Collaboration	U.S.
Dr. Qi Ying	TAMU – Civil Engineering	Collaboration	U.S.
Dr. Yunlong Zhang	TAMU – Civil Engineering	Collaboration	U.S.
Dr. Susan Chrysler	TTI – SAFE-D UTC Assistant Director	Collaboration	U.S.
Dr. Mark Nieuwenhuijsen	Barcelona Institute for Global Health	Collaboration	Spain
Dr. Mark Burris	TAMU – Civil Engineering	Collaboration	U.S.
Dr. Robin Autenreith	TAMU – Civil Engineering	Collaboration	U.S.
Dr. Kai Zhang	University of Texas Health Science Center	Collaboration	U.S.
Dr. Michael Jerett	University of California, Los Angeles	Collaboration	U. S.
Dr. Julian Marshall	University of Washington	Collaboration	U.S.
Ms. Victoria DeGuzman	University of Southern California/METRANS	Collaboration	U.S.
Kent Johnson	University of California, Riverside	Data	U.S.
Tom Durbin	University of California, Riverside	Data	U.S.
Niina Kuittinen	Tampere University of Technology	Collaboration	Finland
Brandon Feenstra	South Coast Air Quality Management District	Data, Equipment Use	U.S.
Hugh Pocock	Maryland Institute College of Art	Data collection access	U.S.
Douglass Mann	Maryland Institute College of Art	Data collection access	U.S.
Dr. George Thrushton	New York University School of Medicine	Collaboration	U.S.
Dr. Rob Scott McConnell	The University of Southern California, Keck School of Medicine	Collaboration	U.S.
Kees de Hoogh	Swis Tropical and Public Health Institute	Collaboration	Switzerland

## IMPACT

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### Impact on Development of the Principal and Other Disciplines

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CARTEEH has just begun the development of its programs, however with recent activities and those planned for the coming months, we feel that impact on the disciplines of transportation and health are underway.



### **Impact on Development of Transportation Workforce Development**

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CARTEEH has just begun the development of its programs. Therefore, we have not yet generated impacts of enough significance to be included at this time.

### **Impact on Physical, Institutional, and Information Resources at the University or Other Partner Institutions**

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None to report for this period.

### **Impact on Technology Transfer**

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CARTEEH has just begun the development of its programs. Therefore, we have not yet generated impacts of enough significance to be included at this time.

### **Society Beyond Science and Technology**

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Nothing to report for this period.

### **CHANGES/PROBLEMS**

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In order to be more accessible as part of internet searches, it was determined that dropping the hyphen (CAR-TEEH), would create a more direct path to the CARTEEH website. With the approval of Dr. Kline, we have revised our titles and branding to "CARTEEH."

### **SPECIAL REPORTING REQUIREMENTS**

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No special reporting requirements.

