



National Center
for Sustainable
Transportation

Program Progress Performance Report for University Transportation Centers

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Center Director: Professor Susan Handy, UC Davis, 530-752-5878, slhandy@ucdavis.edu

Recipient Organization: The Regents of the University of California, c/o Sponsored Projects Office, 1850 Research Park Drive, Suite 300, University of California, Davis, CA 95616-6153

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Name of Submitting Official: SUSAN HANDY	Phone: 530-752-5878 Email Address: slhandy@ucdavis.edu
Signature of Submitting Official: 	Date Report Submitted: June 30, 2017

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ACCOMPLISHMENTS

What are the major goals and objectives of the program?

The National Center for Sustainable Transportation (NCST) is led by the University of California, Davis (UC Davis) and brings together the expertise of its consortium members: Georgia Institute of Technology (Georgia Tech); University of Southern California with California State University, Long Beach (METTRANS); University of California, Riverside (UC Riverside); and University of Vermont.

The goal of the NCST is to meet the challenge of **Preserving the Environment** by transforming the transportation system to improve environmental sustainability nationwide. We aim to provide leadership that produces meaningful action and outcomes by mobilizing innovative and accomplished research teams, and partnering with influential leaders and stakeholder groups. To provide this leadership, we are building upon the early successes of the Center by strengthening the existing programs and adding important new initiatives, including research in the critical areas of sustainable freight, new mobility, and environmental review. The well-established and highly influential transportation centers in our consortium have developed a self-supporting center that grows influential research and education programs fully integrated with an aggressive program of engagement.

Specific actions NCST is taking to achieve our goals include:

- mobilizing a network of leading universities to generate new knowledge and tools that address environmental sustainability in transportation;
- designing and evaluating real-world strategies that contribute to the mitigation of environmental impacts of transportation and enhance system resiliency; and
- delivering knowledge and tools through an innovative engagement program to state departments of transportation, Metropolitan Planning Organization (MPOs), local governments, and other public and private sector stakeholders to support implementation of these real-world strategies.

What was accomplished under these goals?

During this report period (November 30, 2016 to May 31, 2017) of NCST's second UTC Grant ("Grant #2"), the NCST advanced our goals by accomplishing the following administrative, research, engagement, and educational activities:

Administrative Accomplishments

- **UC Davis** hired Lauren Iacobucci to serve as the full-time Program Manager of the NCST.
- NCST developed its Data Management Plan to comply with the requirements of the DOT Public Access Plan. At the end of this reporting period, the NCST submitted to the OST-R Grant Manager, version two of the Center's Data Management Plan with additional information and requirements.
- **UC Davis** is in the process of negotiating subaward agreements for subcontracts with consortium members. Two subaward agreements are completed to date.

- The NCST Executive Committee conducted one in-person meeting to kick off the new grant and two teleconference meetings to discuss and coordinate activities. The NCST Director scheduled one-on-one meetings as needed with partners to discuss and coordinate the requirements of Grant #2.
- The NCST Director and Program Manager, with the input of the Executive Committee, finalized various documents designed to improve the organization and operations of the Center, including:
 - The NCST Executive Committee Agreement, which outlines each consortium partners’ responsibilities.
 - The Principal Investigator Requirements Agreement, which describes the obligations and reporting requirements of each project award.
 - NCST Use of Research, Education & Outreach Projects for Grant Cost-Share Information Sheet, which is available for use with sponsors when requesting to use an eligible project as cost-share.
- The NCST Director negotiated commitments of matching funds from the California Department of Transportation (Caltrans).
- The California universities are working together to pursue new matching funds from non-federal sources.
- The NCST Director and Program Manager visited the National Institute for Transportation and Communities (NITC) at Portland State University to discuss best practices with the more established UTC. The NITC Associate Director and Research Program Administrator provided insights on UTC operations, research management, and guidance on transitioning from one UTC grant to another.

Research Accomplishments

- All of the NCST universities coordinated on the Call for Proposals (CFP) for Grant #2, Year 1 research projects. UC Davis, UC Riverside and the University of Vermont all released a CFP in February 2017, METRANS released its CFP in early March, and all CFPs requested proposals due in early April 2017. These universities are completing internal and external reviews of the proposals received, and project awards are expected to be completed by mid-July 2017.
- Georgia Tech is expected to release its CFP in Summer 2017.
- The NCST partners are coordinating and developing proposals to present to potential non-federal funders or in response to funders’ calls for proposals.

To date, NCST has one new research project in progress (Table 1).

Table 1: Research Projects in Progress

Univ.	Title of Research Project	Funder
UCR	Renewable Natural Gas (RNG) Technology Demonstration Phase 2	US DOT

Engagement Accomplishments

The following tables highlight the range of engagement activities completed during this reporting period, including presentations by NCST researchers (Table 2), events sponsored and/or organized by NCST (Table 3), NCST meetings (Table 4), and NCST social media and online engagement activities (Table 5).

Table 2: Presentations by NCST Researchers on NCST-funded Projects

Date	Title	Speaker(s)	Event	Location
4/5/17	<i>Impact of biodiesel blends on chemical composition of nitro-PAH and carbonyl compound emissions and stimulation of inflammatory responses in cells</i>	Britt Holmen, Univ of Vermont	253 rd American Chemical Society National Meeting	San Francisco, CA
5/17/17	<i>Overview of the Center for Renewable Natural Gas</i>	Arun Raju, UC Riverside	Renewable Natural Gas Symposium - RNG Adoption from Lab to Market – Advancing Technological Innovation and Efficiency Gains	UC Riverside

Table 3: NCST Sponsored and/or Organized Events

Date	Event Name	Description	Organizer	Location
3/30/17 - 3/31/17	7th International Portable Emissions Measurement Systems (PEMS) Conference	This conference brought together over 200 people to exchange ideas, develop new projects, and form partnerships for the implementation PEMS. One of the primary goals of the conference is to provide the emissions workforce with the latest knowledge and technology to be applied in the field.	UC Riverside	Riverside, CA
5/17/17	College of Engineering - Center for Environmental Research and Technology (CE-CERT) Open House	100 visitors toured CE-CERT's laboratories and discussed the latest research in sustainable transportation with researchers, graduate students, and faculty.	UC Riverside	Riverside, CA

Table 4: NCST Meetings

Date	Purpose and Description	Location
1/4/17	NCST Executive Committee Meeting	Phone call
2/10/17	NCST In-person Executive Committee Meeting	Davis, CA
3/20/17	NCST Introductory Meeting with new Leadership Council Member, Michele Boomhower (Vermont Agency of Transportation)	Phone call
4/26/17	NCST Executive Committee Meeting	Phone call
5/9/17	NCST visit with the National Institute for Transportation and Communities UTC	Portland State University

Table 5: Media and Online Engagement Summary

Media Platform	Activity
Web Page	UC Davis manages the main NCST website (ncst.ucdavis.edu), and has updated the site to reflect the themes and goals of the new Grant #2. NCST will continue to update and improve the website to better represent the Center and to better meet the needs of its researchers.
Online Engagement	NCST manages two social media accounts (Twitter and LinkedIn) to disseminate research results, news, events, and other updates; and to engage with policymakers and practitioners. In addition, UVM manages Twitter and Facebook accounts; METTRANS manages Twitter, Facebook, and LinkedIn accounts; and UC Davis manages separate Facebook and Twitter accounts.

Educational Accomplishments

Educational Courses and Conferences:

UC Davis solicited proposals from faculty for ad hoc transportation courses for 2017-2018. These unique courses are not in the course catalog and may only be taught one time. Currently, students are voting on the proposed courses they would be most interested in taking.

Student Travel:

NCST funds at **UC Riverside** assisted in supporting student travel to the 96th Annual Transportation Research Board Meeting held in Washington D.C. from January 8th through 12th, 2017.

Dissertation Fellowships:

UC Davis received Spring 2017 dissertation fellowship applications, and is in the process of completing reviews.

UC Riverside is in the process of competitive review of Spring 2017 graduate fellowship award applications. Selection and announcement of award recipients is expected mid-June.

Undergraduate Summer Research Fellowships:

UC Davis released a call for applications for undergraduate summer research fellowships. The objective of the research fellowship program is to introduce a select group of undergraduate students to the transportation field through participation in our extensive research program. The fellowship will support students for an eight-week period over the summer to participate in ongoing research projects with faculty and graduate students. UC Davis expects to make fellowship awards early in the next reporting period.

What opportunities for training and professional development has the program provided?

UC Riverside used NCST Grant #2 funding to support its 7th International Portable Emissions Measurement Systems (PEMS) Conference on March 30th and 31st, 2017. One of the primary goals of the conference is to provide the emissions workforce with the latest knowledge and technology to be applied in the field. Over 200 people from 50 different companies, agencies or institutions representing 10 countries from around the world came together to exchange ideas, develop new projects and form partnerships for the implementation of PEMS. The comprehensive panel discussions on topics such as regulatory development and trends, approaches for making in-use particle measurements, development of new instrumentation for in-use and PEMS measurements, PEMS applications for full fleet characterization, and research developments provided important information for the industry workforce.

How have the results been disseminated?

New research activities for the NCST have not yet produced results, but the engagement activities listed above served to disseminate prior research from the consortium members.

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

During the next report period (June 1, 2017 to November 30, 2017) of NCST's Grant #2, the Center has the following planned administrative, research, engagement, and educational activities:

Planned Administrative Activities

- The NCST Executive Committee will continue to hold quarterly conference calls.
- UC Davis will continue to process the remaining subaward agreements for consortium members.
- The NCST Program Manager will attend the 2017 Council of University Transportation Centers (CUTC) Annual Summer Meeting in Buffalo, New York, from June 19-21, 2017. The meeting will provide relevant information about the UTC grant requirements, the data management plan and requirements, UTC operations, and recommendations for UTC-state DOT partnerships.

- The NCST Program Manager will assist researchers with the set-up of newly awarded projects, including completing initial reporting requirements.
- The NCST will develop updated partner budgets and submit an application to US DOT for the second year of funding under Grant #2.
- The NCST Program Manager will work with available resources at UC Davis to set up a Project Proposal Management System, an open-source project database program created by the National Institute for Transportation and Communities at Portland State University. This program will help to automate and streamline project management, which will be essential as NCST’s portfolio of projects increases.

Planned Research Activities

The NCST consortium universities will make research project, white paper, and seed grant awards from each of their respective Calls for Proposals. **UC Davis** expects to make approximately eight awards using US DOT funds, and will identify projects to be funded by Caltrans once that funding is secured.

Table 6: Research Projects and White Papers that Will Start in Next Reporting Period

Univ.	Title of Project	Funder
UCR	Deep Learning-based Eco-driving System for Battery Electric Vehicles	US DOT
UVM	White Paper: Career Pathways for Transportation Sector Climate Adaption Professionals	US DOT
UVM	Roadway Characteristics Contributing to Emissions Differences between Conventional and Hybrid-Electric Vehicles	US DOT

Planned Engagement Activities

NCST will continue organizing and participating in a wide range of activities to disseminate research results and engage with relevant stakeholders and policy makers. Activities that have been planned to date are listed in Tables 7, 8, and 9.

Beginning in September 2017, with the start of the Fall quarter, UC Davis will host weekly seminars with support from the NCST. Seminar topics are to be determined.

Table 7: Upcoming NCST Sponsored and/or Organized Events

Date	Event Name	Description	Organizer	Location
8/22/17 - 8/25/17	Biennial Asilomar Conference: Transportation Innovation and Policy in a Fragmenting World	This year's conference will address emerging issues, including "global peak oil demand," vehicle electrification, sustainable freight, and the energy impact of shared mobility and automated vehicles. This conference attracts around 250 attendees representing academia, industry, public sector, and environmental non-governmental organizations.	UC Davis	Pacific Grove, CA
10/4/17	2017 STEP Conference	This annual conference provides students from area high schools with a strong concentration in STEM subjects the opportunity to explore ongoing research at CE-CERT through hands-on demonstrations and discussions with faculty, researchers, and students.	UC Riverside	Riverside, CA
10/17/17 - 10/20/17	2017 METRANS International Urban Freight Conference (I-NUF)	This conference provides a forum for multidisciplinary research on all aspects of urban freight, and raises the visibility of urban freight research. I-NUF is recognized as the premier venue for urban freight research, and draws participants from around the world representing the research community, the private sector, and government.	METRANS	Long Beach, CA

USC's Genevieve Giuliano serves as a member of the ITS-Davis Biennial Asilomar Conference planning committee. Dr. Giuliano also co-chairs the sustainable freight session subcommittee, and will moderate the sustainable freight session at the conference.

Table 8: Upcoming NCST Meetings

Date	Purpose	Location
6/19/17 - 6/21/17	2017 CUTC Annual Summer Meeting	Buffalo, NY
7/17/17	NCST Executive Committee meeting	Phone call
8/24/17	NCST Executive Committee meeting on Education Activities	Pacific Grove, CA
8/25/17	NCST Leadership Council meeting	Pacific Grove, CA
11/2017	NCST Executive Committee meeting (date TBD)	Phone call

Table 9: Planned Media and Online Engagement Activities

Media Platform	Activity
YouTube	All UC Davis seminars and webinars will be recorded and posted on YouTube.
Web Page	UC Davis will continue to update the NCST main website. METRANS and UVM will maintain a NCST page on their websites. Georgia Tech will manage an outreach web page for their fuel emissions calculator for transit vehicles.
Online Engagement	UC Davis will continue to manage NCST's two social media accounts. UVM will continue to manage its two social media accounts; METRANS will continue to manage its three social media accounts; and UC Davis will continue to manage its two separate social media accounts. METRANS students also produce a publicly available weekly email newsletter: "METRANS on the Move".

Planned Educational Activities

UC Davis will offer a graduate elective course in Fall 2017 on Pavement for Managers and Policymakers. The course will cover concepts and knowledge needed by planners and managers to understand pavements, including discussion of all urban hardscapes, including basic understanding of materials, design, construction, maintenance and rehabilitation, and end-of-life, and how these influence costs, environmental impacts and societal impacts. Discussion will focus on asset management, pavement finance, new types of pavement for different purposes (permeable pavement for storm water management, pavements with lower tire/pavement noise, pavements and bicycle ride comfort, etc.), how to communicate pavement issues with decision-makers, and alternatives to current approaches for providing pavement functionality.

UC Davis will award travel grants to students who are presenting transportation related research at academic and professional conferences and events.

The NCST will be sponsoring a graduate student exchange program for Summer 2017, in which faculty can send one or more of their graduate students to one of the NCST partner institutions to work with a colleague or collaborator, and vice versa.

The focus of the NCST Executive Committee meeting on August 24, 2017, will be on strategies to advance NCST's educational activities.

PRODUCTS

All research is on-going; there are not yet any specific products from NCST Grant #2-funded projects.

WEBSITE(S) or OTHER INTERNET SITE(S)

UC Davis hosts the NCST website (<http://ncst.ucdavis.edu>) and continues to update it with information on our research, education, and engagement activities. Other NCST partners have also created NCST pages on their websites. Of particular note are the sites hosted by METRANS (<http://www.metrans.org/uc-davis-national-center-sustainable-transportation>) and UVM (<http://www.uvm.edu/trc/collaborative-research/>). Additional information about websites and other internet sites (such as social media accounts) is covered in sections above.

NCST staff at UC Davis are also developing a website dedicated to bicycle research completed by UC Davis researchers. This webpage will be live prior to the 2017 International Cycling Safety Conference on September 21-22, 2017, hosted by the City of Davis, and sponsored in part by NCST.

PARTICIPANTS AND OTHER COLLABORATING ORGANIZATIONS

NCST's key partners are the members of our consortium, which include the University of California, Davis; University of California, Riverside; University of Southern California; California State University, Long Beach; Georgia Institute of Technology; and the University of Vermont. NCST also makes an effort to stay connected with the other UTCs focusing on preserving the environment. We regularly post research results from the other environmental UTCs on our social media sites, and NCST schedules a meeting with all the environmental UTCs at the annual TRB conference.

NCST has regular interactions with all of our funders, as well as leaders from industry, government, professional associations, and non-governmental organizations all stages of our research to ensure the research is addressing the most pressing policy and practice related questions, and delivering results that are timely, relevant, and valuable to policymakers and practitioners. We call upon this broader community when selecting projects, providing guidance while research is in progress, and assisting with dissemination once a project is completed.

The NCST's Leadership Council provides ongoing guidance on the research needs and policy challenges of public agencies in advancing environmental sustainability. The current membership of the NCST Leadership Council is presented in Table 10.

Table 10: Current Membership of NCST Leadership Council

Name	Affiliation
Rick Blasgen	Council of Supply Chain Management Professionals
Michele Boomhower	Vermont Agency of Transportation
Emily Castor	Lyft
Steve Cliff	California Air Resources Board
James Corless	Transportation for America
Shannon Eggleston	American Association of State Highway and Transportation Officials
Hasan Ikhata	Southern California Association of Governments
Brian Kelly	California State Transportation Agency
Jeffrey Lindley	Institute of Transportation Engineers
Janea Scott	California Energy Commission
Douglas Shinkle	National Conference of State Legislatures
Stephanie Stuckey-Benfield	City of Atlanta
Barry Wallerstein	University of California, Riverside
Erich Zimmermann	National Association of Regional Councils

UC Davis collaborates with researchers at the Institute of Transportation Studies, the Plug-In Hybrid & Electric Vehicle Research Center, the Sustainable Transportation Energy Pathways program, the Urban Land Use and Transportation Center, the China Center for Energy and Transportation, and the Policy Institute for Energy, Environment, and the Economy. This collaboration is both interdepartmental and interdisciplinary.

All partners are collaborating on the development of the model sustainable transportation curriculum. University of Virginia's regional UTC, focusing on environmental sustainability, is also collaborating on this work.

The NCST encourages interdisciplinary proposals, proposals involving collaborations across NCST partner institutions, and proposals that involve outside organizations. These proposals receive priority consideration for award.

NCST's current working groups include Freight Efficiency Strategies Development Group and the Zero Emission Market Acceleration Partnerships (ZE MAP). These groups provide an open and ongoing forum for generating ideas, sharing research results, identifying future research needs, and developing best-practices and policy strategies that put research findings into action.

IMPACT

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

The NCST Call for Proposals for 2017-2018 requires researchers to develop a Policy and Practice Impact Plan, including identifying relevant policies and agency activities, and developing an engagement strategy. This has encouraged researchers to meet and engage with key decision-

makers and practitioners at all levels of government to discuss their research and explore opportunities for research to impact policy discussions in a timely way.

The NCST will also providing funding to support the opening of a Renewable Natural Gas Research Center at UC Riverside. The center will be among the first academic establishments in the U.S. dedicated to the study and applied research of renewable gas technologies, and will focus on improving technologies and removing barriers to increase renewable gas use in California and beyond

The NCST and its researchers were referenced in the media, focusing the attention of a potentially unlimited audience on the importance of working toward sustainable transportation systems:

\$14 Million Federal Grant for Sustainable Transportation Research - Renewed Funding for UC Davis-Led National Center for Sustainable Transportation – UC Davis Press Release <https://www.ucdavis.edu/news/14-million-federal-grant-sustainable-transportation-research>

Partners Open Renewable Natural Gas Research Center at UC Riverside – Next-Gen Transportation News <https://ngtnews.com/partners-open-renewable-natural-gas-research-center-uc-riverside>

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

The NCST is an interdisciplinary consortium involving faculty from engineering, urban planning, environmental policy, and other disciplines. The activities of the NCST are promoting increased focus in these disciplines on environmental preservation in the transportation sector.

What is the impact on other disciplines?

Interdisciplinary collaboration is a core principle of the NCST's research projects, educational programs, and engagement activities. Involvement of students and researchers from disciplines not traditionally linked to the transportation field will strengthen efforts to advance sustainable transportation and will strengthen these disciplines by adding to the real-world problems to which they apply their theories and methods.

What is the impact on transportation workforce development?

Workshops, training sessions, presentations, and engagement activities are being developed by NCST to engage the transportation workforce at many different levels, including:

- **USC and CSULB** are planning to hold a Sustainable Freight Planning class in cooperation with Los Angeles Metro, targeted towards state DOT and MPO audiences. CSULB designs and implements week-long freight academies for public agencies, including Caltrans. The class will use a current transit-oriented development as a case study to incorporate freight access into the planning process. The class will be offered first in California and then, in subsequent years, in other states in coordination with NCST's

partners.

- **CSULB** and the Southern California Regional Transit Training Consortium will offer an updated online class designed to improve bus technicians' understanding of basic digital volt ohm meters, a key component in the transition to a sustainable fleet for transit operators. This is a class that was offered under the previous NCST grant, however the updated curriculum will be offered to a wider audience in the late summer/early fall of 2017. Outreach will focus on campus fleet operators in the areas where NCST consortium members are located.

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

The NCST is generating increased awareness of and emphasis on the importance and breadth of transportation at all partner institutions, as well as other collaborating institutions in the region and nationwide. All partners are leveraging each other's dissemination infrastructure (e.g., email lists, social media sites, etc.) to increase the awareness and availability of NCST products and reports, and to enhance the flow of information.

What is the impact on technology transfer?

NCST is connecting research to policymakers and practitioners through in-person events, training sessions, briefings, seminars, and forums, as described in earlier sections. NCST is also creating online opportunities to engage with our research, such as regularly updating our website; managing several social media accounts where we share research and engage with our followers; and organizing webinars highlighting our research, as well as commentary from guest respondents representing industry, public sector, and/or policy perspectives. All partners in the NCST operate in interdisciplinary research and education environments. Our team believes this provides the best base and content for widespread technology transfer within a range of professions and communities.

What is the impact on society beyond science and technology?

The NCST is fostering greater collaboration between academic institutions, industry, government, and NGOs, which is helping to expedite solutions to some of today's greatest transportation environmental challenges. With this new Grant #2, NCST has increased its focus on research with an element of environmental justice. This is not only valuable for environmental review processes, but also generates knowledge to improve mobility and accessibility in vulnerable communities of concern.

CHANGES AND/OR PROBLEMS

UC Davis hired Lauren Iacobucci to serve as the full-time Program Manager of the NCST. The NCST did not experience any significant problems during the period.

SPECIAL REPORTING REQUIREMENTS

Website: <http://ncst.ucdavis.edu/>

Directory of Key Personnel:

Information available on the NCST website <http://ncst.ucdavis.edu/about/executive-committee/>

Financial and Annual Share Reports:

- The SF425 requirements will be met by separate report.
- FFATA Sub award and Executive Compensation Report will be met by separate submission.