Program Progress Performance Report for University Transportation Center at

Portland State University

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Project Title:	National University Transportation Center National Institute for Transportation and Communities (NITC) *Consortia members: Portland State University (PSU), University of Oregon (UO), University of South Florida (USF), Oregon Institute of Technology (OIT), University of Utah (UU)*
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Signature:	

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

The information provided in this section allows the OST-R grants official to assess whether satisfactory progress has been made during the reporting period.

What are the major goals of the program?

The major goals for NITC as described in our application fall into six categories:

Research

- **Build and extend our current research through Year 1 Projects**. During the first year, we will undertake research projects that build upon and extend our current work, and reflect priorities identified by our external advisory board. All Year 1 project work plans will be peer-reviewed.
- **Competitive, peer-review project selection process in Years 2 and 3.** Our projects in Years 2 and 3 will be selected through an open RFP process to consortium faculty. These funds will be available for projects consistent with our theme.
- **Transportation for Livable Communities Pooled-Fund Research.** We will continue the Transportation for Livable Communities Pooled-Fund Research program. This program provides regional and local agencies, such as metropolitan planning organizations and municipalities, more opportunity to be invested in research.

Leadership

- **High Standing within National and International Arenas of Transportation.** NITC faculty are well regarded nationally and internationally as leaders in their fields. They will continue to demonstrate this leadership through publishing in the top journals and presenting their work at conferences. NITC takes the concept of leadership far beyond academic circles, as evidenced by the wide dissemination of research results in professional, technical and general publications and other media.

  NITC faculty help address national transportation problems through volunteer leadership on TRB committees and in other positions. By serving on these committees, faculty will help set national research agendas and connect with agency leaders and practitioners on pressing research issues. To continue and reinforce this practice, NITC will mentor our new, junior faculty to apply for committee and panel membership and recognize the activities of all faculty members.

- **Solving Regional and National Transportation Problems.** NITC researchers have a long history of conducting research that is useful in solving the problems practitioners and decision-makers face every day. NITC's director and staff will serve as points of contact for agency leaders and policymakers regionally, statewide and nationally. When we identify needs that match the expertise of our researchers, we will make a connection. We will work with key staff at the DOT modal administrations, both in Washington, D.C., and within our regions to determine the most effective way for our researchers to learn from and inform agency activities.

- **Future Leaders**. We recognize the investment we must make in our young faculty and students by prioritizing research projects that include them. We will support students traveling to conferences to present their work, a key activity in developing the next generation of leaders.

- **Development and Delivery of Programs.** We demonstrate our leadership in innovating transportation education, workforce development, deployment of research results and conducting research.

Education and Workforce Development

- **Offer Degrees and Courses in Multiple Disciplines.** NITC will continue to offer a rich array of degrees that serve the transportation profession.

- **Provide Experiential Learning.** A key component of our education strategy is experiential learning, which will help attract and retain students. Our campuses will continue to provide these opportunities, and NITC will seek ways to expand them.

- **Develop Innovative New Curriculum.** We will develop new, innovative curriculum consistent with transportation and livable communities that can be tested and shared among NITC and other universities.

- **Educate Professionals.** NITC will maintain a vibrant program of seminars, workshops, professional courses and other training opportunities that provide transportation practitioners with the latest tools and techniques.

- **Attract and Support Undergraduate Students.** NITC will build upon existing and effective mechanisms to expose K-12 students to transportation, attract and retain new undergraduate students to our degree programs, and involve undergraduates in our research.

- **Attract and Support Graduate Students.** NITC will support graduate students directly through research assistantships working on projects. We will provide dissertation fellowships for students to research surface transportation topics that fit under the NITC theme. This will be a competitive process open to Ph.D. students at NITC universities.

- **Sponsor a Transportation and Livable Communities Student Competition.** To further attract students to transportation-related professions and to promote integrated education into transportation and livability issues, NITC will sponsor an annual competition on transportation and livable communities.

Technology Transfer

- **Move Research into Practice.** Each research project will include a well-defined scope of work that identifies the problem the research will solve, how the research will address the problem and how the results will be implemented. We will continue our practice of having every final report peer reviewed by at least one academic and one practitioner with relevant knowledge. We will also identify "implementation champions" the influential decision makers, executives and other top officials who can

cut through organizational obstacles to deploy research results. We will provide these champions yearly summaries of our deployment successes as a reminder of the value of our research. Researchers working closely with practitioners and champions throughout the project ensures that our research stays current with the changing needs of practice and delivers research results in the optimal format.

- **Use Innovative** Approaches to Communicate Research Results. NITC will embark on an ambitious program of sharing information through traditional and new media.

Collaboration

- **Collaborating within our consortium.** NITC's governance structure is cooperative and leadership is distributed. The Executive Committee includes one faculty member from each campus. The Executive Committee provides overall direction for the Center, makes project funding decisions, and selects Center award recipients, including student of the year. They will meet in person at least once a year, rotating the location between campuses, and hold regular conference calls. Each Executive Committee member will be responsible for representing and supporting their respective campus

- **External collaboration.** In addition to the partnerships that occur through individual projects and the pooled-fund program, NITC will foster collaboration with a range of "end-users" of our work through an External Advisory Board.

Diversity

- **Attract underrepresented students to transportation careers**. We aim to attract underrepresented middle through high school students to transportation as a career through our partnerships with STEM and WTS.

- Priority funding to research with an equity focus. We give priority to funding research projects that have an equity focus by awarding them additional points in the RFP process. In addition, three of our projects selected for the first year directly address equity issues.

What was accomplished under these goals?

Research

- **Build and extend our current research through Year 1 Projects.**

Thirteen projects were selected for NITC National Year 1 funding. The total allocation of NITC funds for these projects is $870,266. Of these projects, 10 projects have been completed of which two are being prepared for publishing on NITC's website. Two projects are still active and are, on average, 50% completed. One project was cancelled, because the PI passed away and the necessary expertise was not anymore available at the university to complete the project.

The completed projects include:

  - Encouraging Low-Income Households to Make Location-Efficient Housing Choices, Andree Tremoulet, Portland State University

- Do TODs make a Difference? Phase 2, Arthur Nelson and Reid Ewing, University of Utah and Jenny Liu, Portland State University
- Improving Trip Generation Methods for Livable Communities, Kelly Clifton, Portland State University and Nico Larco, University of Oregon
- Metropolitan Centers: Evaluating local implementation of regional plans and policies, Richard Margerum and Rebecca Lewis, University of Oregon, and Keith Bartholomew, University of Utah
- Developing a model for Transit Oriented Development in Latino Immigrant Communities: A National Study of Equity and TOD, Sandoval, Gerardo
- Rapidly Expanding Mobile Apps for Crowd-sourcing Bike Data to New Cities. Sean Barbeau, University of South Florida
- Modeling and Analyzing the Impact of Advanced Technologies on Livability and Multimodal Transportation Performance Measures in Arterial Corridors, Miguel Figliozzi, Portland State University
- Integrating Freight into Livable Communities, Kristine Williams, University of South Florida

The completed projects that are currently finalized for publishing include:

- Transportation Cost Index: A Comprehensive Performance Measure for Transportation and Land Use Systems and its Application in OR, FL, and UT, Liming Wang and Jenny Liu, Portland State University
- Changing attitudes toward sustainable transportation: The impact of meta-arguments, David Sanbonmatsu and David Strayer, University of Utah

The projects in progress include the following:

- Creating Livable Communities through Connecting Vehicles to Pedestrians and Cyclists, John MacArthur, Portland State University
- Improving Bicycle Crash Predictions, Sirisha Kothuri, Portland State University

The following project was cancelled:

- Generalized Adaptation of an Electric-Hydraulic hybrid drive system, James Long and David Culler, Oregon Institute of Technology.

- **Competitive, peer-review project selection process in Year 2**

A request for proposals (RFP) for the NITC National Year 2 funds was released in January of 2015 for research and technology transfer projects. NITC required that all proposals fit within the NITC theme of livability, safety and environmental sustainability. The NITC Advisory Committee provided guidance at the December 2014 meeting that the RFP give priority for research funding that examined the economic impact of transportation and livable communities. Fifty-eight abstracts and 39 proposals, requesting more than $4 million were received.

Sixteen projects were selected through a competitive, peer review process and with the approval from the Executive Committee on June, 10th, 2015. The allocation of NITC funds for these projects is $1,525,362. Several of the funded projects had an economic focus that

evaluated urban greenways, location affordability in shrinking cities, transportation affordability in developments near transit, smart-parking programs, or effects of bus rapid transit on surrounding property values. Many of the projects started August 1, 2015. Projects are between 12 and 18 months in duration. Of the funded projects, five projects have been completed and are currently in different stages of the publishing process. The remaining 11 projects are, on average, 72% complete.

Completed projects that are currently prepared for publishing include the following:

- Integrating Title VI and Equitable Investment in Transportation Alternatives into the MPO Transportation Planning Process, Kristine Williams, University of South Florida, and Aaron Golub, Lisa Bates and Liming Wang, Portland State University
- Planning Ahead for Livable Communities Along the Powell-Division BRT: neighborhood conditions and change, Lisa Bates and Aaron Golub, Portland State University
- How Does Transportation Affordability Vary Between TODs, TADs, and Other Areas, Brenda Scheer and Reid Ewing, University of Utah
- Evaluating Efforts to Improve the Equity of Bike Share Systems, Nathan McNeil, John MacArthur and Jennifer Dill, Portland State University
- Impacts of Bus Rapid Transit (BRT) on Surrounding Residential Property Values, Victoria Perk and Martin Catala, University of South Florida

Projects in progress include the following:

- Understanding the Economic Impacts of Urban Greenway Infrastructure, Jenny Liu, Portland State University.
- Building Planner Commitment: Are Oregon's SB 1059 & California's SB 375 Models for Climate-Change Mitigation? Keith Bartholomew, David Proffitt and Reid Ewing, University of Utah
- Racial Bias in Drivers' Yielding Behavior at Crosswalks: Understanding the Effect, Kimberly Barsamian Kahn, Portland State University
- The Economic and Environmental Impacts of Smart-Parking Programs, Nicole Ngo, University of Oregon
- What Do We Know About Location Affordability in U.S. Shrinking Cities? Joanna Ganning, University of Utah
- Framing Livability: A Strategic Communications Approach to Improving Public Transportation in Oregon, Kelli Matthews, Deb Morrison and Nico Larco, University of Oregon
- Effectiveness of Transportation Funding Mechanisms for Achieving National, State, and Metropolitan Economic, Health, and Other Livability Goals, Rob Zako and Rebecca Lewis, University of Oregon
- Multimodal Trip Generation, Vehicle Ownership and Use: Characterizing The Travel Patterns of Residents of Multifamily Housing, Kelly Clifton, Portland State University
- Incorporate Emerging Travel Modes in the Regional Strategic Planning Model (RSPM) Tool, Liming Wang, Kelly Clifton and Jennifer Dill, Portland State University
- Evaluation of roadway reallocation projects, Miguel Figliozzi, Portland State University

- Addressing Bicycle-Vehicle Conflicts with Alternate Signal Control Strategies, Sirisha Kothuri, Christopher Monsere, Portland State University, Krista Nordback, University of North Carolina, and Ed Smaglik, Northern Arizona University

In addition, four Small Starts projects were funded. The purpose of the Small Starts grant is to assist researchers who are interested in transportation but have not yet had an opportunity to undertake a small project that supports safe, healthy, and sustainable transportation choices to foster livable communities.

These projects were selected on November 15th, 2015 and started in January 2016. Two of the projects are completed, and their reports are in different stages of the publishing process. The remaining projects are, on average, 73% completed.

Completed projects include the following:

- Narratives of Marginalized Cyclists: Understanding Obstacles to Utilitarian Cycling Among Women and Minorities in Portland, Oregon, Amy Lubitow, Portland State University
- Travel to Food: Transportation Barriers for the Food Insecure in Tampa Bay, Kevin Salzer, University of South Florida

Active projects include the following:

- Active and Public Transportation Connectivity between North Temple TOD and Jordan Park River Trail, Ivis Garcia Zambrana, University of Utah
- How Do Stressed Workers Make Travel Mode Choices That Are Good For Their Health, Safety, and Productivity? Liu-Qin Yang, Portland State University

- **Competitive, peer-review project selection process in Year 3**

The NITC National Year 3 RFP was released in January of 2016 for research projects following the same format as in previous years. Twenty-seven proposals were submitted, requesting $2.7 million with $3.5 million available for match. Eleven projects were selected through a competitive, peer review process and with approval from the executive committee on June, 21st, 2016. The allocation of NITC funds for these projects is $929,970. Most projects started on August 1st, 2016 and are 18 months in duration. The projects are, on average, 38% completed.

Funded projects include the following:

- Overcoming Barriers for the Wide-Scale Adoption of Standardized Real-time Transit Info, Sean Barbeau, University of Southern Florida
- Transferability & Forecasting of the Pedestrian Index Environment (PIE) for Modeling Applications, Kelly Clifton, Portland State University
- Does Compact Development Increase or Reduce Traffic Congestion? Reid Ewing, University of Utah and Shima Hamidi, University of Texas
- V2X: Bringing Bikes into the Mix, Stephen Fickas, University of Oregon
- The Contribution of Transportation and Land Use to Citizen Perceptions of Livability in Oregon MPOs, Rebecca Lewis and Robert Parker, University of Oregon

- Understanding Economic and Business Impacts of Street Improvements for Bicycle and Pedestrian Mobility, Jenny Liu and Jennifer Dill, Portland State University
- Electric Bicycle Nationwide Survey, John MacArthur, Portland State University and Christopher Cherry, University of Tennessee
- Biking and Walking Counts: Data Quality, Nathan McNeil and Kristin Tufte, Portland State University
- Rapid Transportation Structure Evaluation Toolkit, Charles Riley, Oregon Institute of Technology
- Evaluating and Enhancing Public Transit Systems for Operational Efficiency, Service Quality and Access Equity, Ran Wei, University of Utah and Liming Wand and Aaron Golub, Portland State University
- SEGMENT: Applicability of an Existing Segmentation Technique to TDM Social Marketing Campaigns in the United States, Philip Winters and Amy Lester, University of Southern Florida

Two Small Starts projects were selected in September 2016 and started in November 2016. The projects are, on average, 28% completed.

The projects include the following:

- Engaging Youth to increase their Transportation System Support, Understanding, and Use, Autumn Shafer, University of Portland
- The Use of Mt. Mazama Volcanic Ash as Natural Pozzolans for Sustainable Soil and Unpaved Road Improvement, Matthew Sleep, Oregon Institute of Technology

- **Transportation for Livable Communities Pooled-Fund Research.**

This program provides regional and local agencies more opportunity to be invested in research that has a national impact. The program offers a process by which cities, counties, MPOs and other regional or local agencies can pool relatively small pots of research dollars to leverage NITC funds for a single project. Partnering agencies work with NITC staff to develop a clear problem statement and identify match partners. NITC then issues the request for proposals (RFP) for a response from faculty at our partner universities.

NITC staff worked with the lead agency, Portland Bureau of Transportation, to secure $125,000 in cash match from the municipalities and partners including the cities of Los Angeles, Chicago, Seattle, Washington, D.C., Portland, Oakland and Cambridge; TriMet; Metro; Washington County; and SRAM Foundation to support the project 'Contextual Guidance at Intersections for Protected Bicycle Lanes'. Two proposals were received from teams at our NITC partner campuses. The technical advisory committee consisting of members from partner cities selected the Portland State University team led by Civil and Environment Engineering Chair, Professor Christopher Monsere. The Portland State team also includes Jennifer Dill and Nathan McNeil.

There are two objectives of this research. The first is to identify the context in which the intersection treatments are most effectively employed. This will ideally result in quantitative guidance about motor vehicle and bicycle speeds, volumes, turning movements and delay, intersection geometry, interactions with transit stops and other

factors that will indicate the best treatment. The second objective is to identify the critical elements and dimensions of each treatment so the design treatments can achieve a uniformity and level of standardization across jurisdictions.

We anticipate that this research will provide cities around the country with better, evidence-based, information with which to design intersection treatments for protected bike lanes, allowing for safer and more comfortable bicycling conditions.

Leadership

- **Shape national & international conversations on transportation research and education.**

Highlighted examples of how NITC researchers are leading the way:

"Does Compact Development Increase or Reduce Traffic Congestion?" is a question Reid Ewing and colleagues are addressing as part of their NITC research. The research team is using a modeling approach they previously developed to address this problem. Their models suggest that an increase in compactness reduces vehicle miles traveled (VMT), but also concentrates those VMT. The two effects roughly cancel each other out. This result does not support the idea that sprawl acts as a "traffic safety valve," as some have claimed. However, it also does not support the reverse idea that compact development offers a solution to congestion, as others have claimed. Developing in a more compact manner and providing more transit service may help at the margin, but the greatest reduction in congestion appears to be achievable through expansion of surface streets and higher highway user fees.

In collaboration with the Tampa Bay Network to End Hunger (TBNTEH), Ann Joslin and Kevin Salzer, University of South Florida, evaluate transportation barriers and challenges to accessing emergency food in the Tampa Bay area in their project "Travel to Food: Transportation Barriers for the Food Insecure in Tampa Bay." Their results showed some significant concerns, including a significant lack of adequate access to transit for the food insecure. In light of the limited public transit in the region and a percentage of food insecure above the national average, this result was not surprising. It was unexpected, however, that several diverse healthcare organizations became interested in this research and the intersection between poor transportation access and poor health. Representatives from BayCare Health System, Pasco County Department of Health (public health), BayCare Behavioral Health Center, and Hillsborough County Aging Services attended a panel discussion lead by Kevin Salzer (Chair of TBHTEH Transportation Innovation Group) for the annual TBHTEH Annual Conference. The panel discussed the importance of transportation in accessing food for the food insecure in Tampa Bay, which included findings from this research project. Health care organizations were interested in the research results and asked to be included in the next meeting, signaling that this research is informing discussions in the healthcare sector.

NITC researchers provided a significant presence at the 2017 TRB meeting in Washington, DC. Thirty-one presenters from the NITC consortium disseminated their research findings in 12 lectern sessions, 30 posters and five workshops. Eleven of the presentations offered results that were practice ready. The diversity of contributors also highlighted NITC's

commitment to support current and future leaders in transportation research. Presenters included seasoned and early career academics, research associates and students. Thirteen students presented 18 research projects; students were lead authors on all of the projects they presented. Graduate student, Patrick Singleton, PSU, received the best presentation award for his Dissertation Research in the Transport Modeling and Traveler Behavior session.

NITC staff is finalizing the planning and promotions for the Transportation and Communities Summit (formerly the Oregon Transportation Summit) to be held on September 11 and 12th, 2017 at Portland State University. The goal of the summit is to educate professionals, advance the state of research and to facilitate a conversation between practitioners and researchers to shape future research. The first day of the summit will allow attendees to participate in a variety of workshops. The second day will focus on providing a carefully curated full day of sessions that are relevant and offer new perspective on the most current transportation and policy research findings and needs.

- **Serve on national committees and panels.**
  - Faculty members and students at the five NITC member campuses currently hold 67 TRB volunteer memberships and serve on 46 different TRB committees/task forces and 12 different NCHRP/SHRP2/NCFRP/TRB panels. Four faculty members serve as Chair or Co-Chair on panels or committees.
  - Twenty-one NITC faculty and staff serve on editorial, policy and other advisory boards.
  - NITC staff are active in the AASHTO-RAC liaison group.
  - NITC faculty are part of the team (led by ICF International) that developed FHWA's Strategic Agenda for Pedestrian and Bicycle Transportation.
  - NITC's Director, Jennifer Dill, serves on the Executive Committee of the Council of University Transportation Centers (CUTC) and the Board of Trustees for the Transit Center. She also chaired the 2016 UTC-TRB Spotlight Conference, focused on Pedestrian and Bicycle Safety.

- **Solving Regional and National Transportation Problems.**

The majority of NITC funded research works to solve transportation problems that can have a direct impact at the regional and national level. Highlighted examples below will prove to have near immediate impact in communities across the county.

NITC researcher, Miguel Figliozzi, Portland State University, provides important insights on how to improve pedestrian safety at crosswalks. He examined traffic and trajectory factors that might explain whether a driver complies with Oregon law, which has strong pedestrian protections. In Oregon, drivers must stop for pedestrians as soon as they move onto the roadway in a crosswalk with the intent to proceed. Results of his study indicate that drivers are more likely to comply with the pedestrian law if the pedestrian stopped while crossing or had to speed up in response to approaching vehicles. The results also suggest that treatments or driver notifications that discourage accelerating towards the crosswalk would be most useful to increase compliance. In addition, it is important to monitor vehicles' speed profiles near crosswalks in arterials with signal progression or in areas with a high number of pedestrians. Enforcement and education campaigns can be

useful to lower noncompliance rates, but they should be complemented by appropriate engineering designs.

Danya Rumore, University of Utah, is applying her expertise in collaborative decision-making and stakeholder engagement to develop curriculum and tools that utilize these concepts to solve complex planning and transportation challenges. For example, her NITC funded education project "Collaborative Regional Planning: Tools and techniques for teaching collaborative regional planning to enhance livability and sustainable transportation" is developing a number of academic and stakeholder education tools to teach core concepts and skills of regional collaborative transportation and land use planning. As part of the project, she also facilitates a pilot collaborative regional planning effort in the Zion National Park region, an effort that already provides a valuable model for other gateway regions facing complex transportation and planning-related challenges. In addition, Dr. Rumore initiated a collaborative regional planning effort in Bonner County, Idaho that is using the model and lessons learned from the Zion Regional Collaborative. Using research data to evaluate her tools and efforts, she is finding that collaborative regional planning is indeed a valuable way to help communities, regions around national parks effectively address the planning and transportation challenges they face.

Kristina Currans, a Ph.D. candidate at Portland State University, is already influencing practice by participating in expert panels and conducting research that is practice ready. She has been a panel member on the Institute of Transportation Engineer's Expert Panel on Urban Trip Generation and is a co-author on a trade-journal article and a white paper for the Institute of Transportation Engineers that corresponds with the group's call for data they released. Her research (particularly the work in the second half of her dissertation) has also influenced revisions to the City of Portland's transportation system development charges, moving toward a person-based framework and integrating recently collected data, as well as new multimodal urban protocols. Her impact is not surprising in light of her academic accomplishments. Ms. Currans received several NITC scholarships, was named NITC Student of the Year (2013), received the prestigious Dwight Eisenhower fellowship (2013), and was awarded a NITC Dissertation Fellowship (Spring 2016). She will defend her dissertation in June 2017 and will start her new position as Assistant Professor at the University of Arizona in Tucson in August 2017. She is also an example of how NITC support helps shape future leaders that help solve transportation problems.

Education and Workforce Development

- **Offer Degrees and Courses in Multiple Disciplines.**

The five-university consortium offers 13 graduate and six PhD degrees in transportation, closely related fields, and many dual degree options. During the past academic year, 58 undergraduate- and 58 graduate-level transportation-related courses were offered among the universities.

- **Provide Experiential Learning.**

Our campuses continue to incorporate access to community partners and employment opportunities in a number of ways. The support for the student groups and student

scholars are our priority method for accomplishing this goal. Student groups are also active in hosting events and attending conferences, and their activities are outlined here.

The University of Utah student group, Point B, continues their partnership with the local WTS chapter and participates in the TransportationYOU program with middle school girls in the Salt Lake City area. This group also hosted and/or participated in the following events during the reporting period:

- National Association of City Transportation Officials Designing Cities conference in Seattle, WA (1 student)
- Students presented papers on transportation topics at the Association of Collegiate Schools Planning Annual Conference (ACSP; 4 students)
- Point B hosted a research presentation on protected bike intersections (35 attendees)

The University of Oregon student group, LiveMove, organizes a diverse range of events to connect students and the public with professionals that focus on sustainable transportation. During this reporting period, the group hosted nine different events, including:

- Five events as part of their Speaker Series that is also open to the public:
  - Screening of the full-length documentary "The Slow Way Home," with comments and a Q&A session with Director Len Shappa (20 attendees)
  - Courtney Farris and Dustin Locke, Untitled Studio, and Lora Lillard, Urban Designer with the City of Portland's Bureau of Planning and Sustainability, discussed their winning design for the 2016 LoopPDX competition (35 attendees)
  - Jarret Walker presented "Abundant Access: Public Transit as an Instrument of Freedom" (300 attendees)
  - Greg Raisman presented "Tactical urbanism and the importance of community-oriented livable streets" (45 attendees)
  - Orlando Lopez, OPAL's Bus Riders Unite! organizer in Portland, OR, discussed his efforts in building community power and creating change for transit-dependent people across the region (25 attendees)
- Three Planner's Pub sessions allowed students to learn from local planners and include discussions with:
  - Emma Newman, City of Springfield, OR (20 students)
  - Jeff Kernen, City of Coburg, OR (25 students)
  - Zach Galloway, City of Eugene, OR (25 students)
- End of Term Event, a social gather of student group members (8 students)

The Oregon Institute of Technology (OR Tech) student group, ITE, organized, hosted, and/or attended several events:

- Student group members attended the ITE Oregon Section Traffic Bowl in Portland, OR and visited transportation firms and agencies (8 students)

- The group helped organize the OR Tech Engineer's Week that included presentation and technological displays related to traffic engineering
- With funding from NITC and the ITE student chapter, students attended eight webinars, including:
  - ACI Alaska Chapter concrete paving (4 students)
  - Rural Road Safety Center, Defining the Future for Safe Rural Transportation in America (5 students)
  - Kittelson Associates, Careers in Transportation (21 students)
  - TRB, Effective Presentations (5 students)
  - NITC Smart Growth America Webinar "empty spaces" (4 students)
  - Small Town and Rural Multi-Modal Networks Guide Concrete (4 students)
  - Pavement Containing High Volumes of Recycled Materials ITE (5 students)
  - Advancing New and Emerging Traffic Control (26 students)
- Support from ITE allowed 4 OR Tech students, who received a total of 6 scholarships to attend scholarship dinners and receptions to receive their awards:
  - Coral Sales Scholarship dinner (2 students)
  - Asphalt Pavement Association of Oregon Annual Meeting & Scholarship Banquet (3 students)
  - WTS Portland Scholarship dinner (1 student)
- With ITE funding, OR Tech students were able to participate in several professional activities. Students later shared their experiences in a separate ITE event through student-lead presentations with their peers. The events they attended included:
  - ITE International Student Reception, Washington, DC (6 students)
  - 2017 TRB Annual Meeting, Washington, DC (6 students)
  - ITE Western District Student Leadership Conference, Cal State Fullerton, CA (6 students)

The Portland State University student group, STEP, hosted and/or participated in the following events during the reporting period:

- ITE Oregon Section Traffic Bowl, Portland, OR, and won second place (4 students)
- Career Talk with Greg McFarlane, (14 students)
- Two movie nights that included the viewing and discussion of the documentary, 'City on Speed: Bogota Change' (6 students) and 'Urbanized' (15 students)
- University of Manitoba Student Visit (12 students)
- Big Data Lunch n' Learn (11 students)
- Transportation Brown Bag with the Oregon Department of Transportation (8 students)
- 6th Annual TRB Aftershock, (15 students)

At Portland State University, the College of Urban and Public Affairs continues to offer the Pedestrian and Bicycle Planning Lab. The lab provides the opportunity to participate in a workshop-based planning process and is taught by top professionals in the field of bicycle and pedestrian planning and design.

The University of South Florida chapter of LiveMove hosted or participated in the following events:

- Visit of Gil Penalosa, founder of 880 cities, a non-profit organization that champions the Open Streets concept. This visit included meetings with two MPO Boards, student groups and the general public (120 attendees)
- Walking Tour of Ybor City, with two USF graduate students as guides to learn about Ybor City's history and observe its urban form (9 attendees)
- Riverwalk Tour, lead by Karen Kress of the Downtown Tampa Partnership, who discussed the planning process, construction process, challenges, and future plans of the riverwalk development (17 students)
- Roundabout, Walkabout, Bikeabout, Driveabout Tour, as part of a course several group members participated in the tour that was also joined by County Commissioner Pat Kemp. The tour examined areas with successful implementation of upgrades to streets to accommodate pedestrians, bicyclists, and transit users (17 students)

- **Develop Innovative New Curriculum.**

In Year 1 and Year 2, ten education projects were awarded. Of these projects, nine are completed. One project is still active and 70% completed.

- Multimodal Transportation Planning, Kristine Williams, University of South Florida, The course is completed and is now also included in a new Sustainable Transportation concentration and certificate program now available to MURP and transportation engineering graduate students at USF
- Phase 2: Multimodal Transportation Planning Curriculum for Urban Planning Programs, Kristine Williams, University of South Florida; this course introduces students to specific applications in multimodal planning that are reinforced through community projects
- Graduate-level Civil Engineering Transportation Course, Roger Lindgren, Oregon Institute of Technology
- Dynamic Evaluation of Transportation Structures with iPod-Based Data Acquisition Charles Riley, Oregon Institute of Technology
- Advanced GIS: Smart Transportation, Christopher Bone, University of Oregon
- Design of an Aging Population, Trygve Faste and Kirsten Muenchinger, University of Oregon, this is a studio course that challenges students to find solutions to the many problems aging adults face as they use the bus system
- Pedestrian and Transit Oriented Design, Keith Bartholomew, University of Utah
- Graduate Certificate in Sustainable Transportation, Keith Bartholomew, University of Utah, this project laid the groundwork for establishing a Graduate Certificate in Sustainable Transportation
- Introduction to Scientific Computing for Planners, Engineers, and Scientists Liming Wang, Portland State University

The Year 2 project still in process includes:

- Pedestrian Observation and Data Collection Curriculum, Jennifer Dill, Portland State University; this course will help students relate to travel behavior, traffic safety, urban planning and design, or civil engineering while also gaining research experience and collecting valuable data for the research and transportation community

In Year 3, the following three education projects started in the summer of 2016 and are, on average, 60% completed:

- Instructional Modules for Obtaining Vehicle Dynamics Data with Smart Phone Sensors, Roger Lindgren, Oregon Institute of Technology
- A Smart Bike Project for Grades 6-12, Stephen Fickas, University of Oregon
- Collaborative Regional Planning: Tools and techniques for teaching collaborative regional planning to enhance livability and sustainable transportation, Danya Rumore, University of Utah

- **Educate Professionals.**

During the reporting period, NITC supported 25 events offering six professional development hours. The events were attended by 1410 people and are detailed below.

NITC hosted six webinars/seminars on funded research between October 1st, 2016 and March 31st, 2017. A total of 749 practitioners and policymakers participated in the following events:

- Transit Signal Priority Evaluation and Performance Measures (62 attendees)
- The Association Between Light Rail Transit, Streetcars and Bus Rapid Transit on Jobs, People and Rents (73 attendees)
- State-wide Pedestrian and Bicycle Miles Traveled-- Can we estimate it? (162 attendees)
- Improving Walkability at Signalized Intersections with Signal Control Strategies (249 attendees)
- Integrating explicit and implicit methods in travel behavior research: A study of driver attitudes and bias (131 attendees)
- Bang for the Buck? Following the Money from Transportation Decisions to Outcomes (72 participants)

Each Friday during the academic year, Portland State University holds a Friday Transportation Seminar that is open to the public, and streamed live on-line. During this reporting period, PSU held 17 Friday seminars that were attended by 468 non-student participants (primarily professionals), who either viewed the seminar in-person or live webcast.

The Initiative for Bicycle and Pedestrian Innovation (IBPI) sponsored the Ann Niles Active Transportation lecture in which Vanessa Garrison, the co-founder of GirlTrek, a national health movement, outlined how GirlTrek mobilizes black women and girls to change their lives and communities for the better (64 attendees). The event included pre-lecture walk to learn about creating an activist movement with Vanessa Garrison (13 attendees).

- **Attract and Support Undergraduate Students.**

The NITC program supports projects and initiatives that expose students to transportation concepts and careers.

NITC aims to attract and retain new undergraduate students to transportation-related degree programs and increase the number of women and students of color in these programs. Exposing these students to transportation concepts at a young age will eventually expand the workforce pool and diversity of new professionals. NITC has been planning two programs that will be offered late spring or in the summer, including:

- *ChickTech Workshops:* NITC developed and hosted a workshop in May 2016 with the Portland chapter of ChickTech for high school girls interested in technology. ChickTech's high school program focuses on events that pose engineering challenges to get girls excited about technology. NITC's workshop combined an introduction to GIS with solving a transportation problem to expose girls to opportunities in the transportation field. The program was met with enthusiasm and planning is under way to offer the workshop again this May.
- *National Summer Transportation Institute Program (NISTI)***:** NISTI provides experiential learning on transportation that supports livable communities, connects high school girls with women in transportation-related fields and attracts young women from diverse backgrounds to transportation-related course work in their higher education pursuits. The program was first offered last summer at Portland State University as a free two-week day camp for 15 to 25 girls entering 9th through 12th grade. For 2017, NITC is expanding the program by offering it nationwide, making it a 2-week residential program and partnering with Oregon Institute and Technology and the University of Oregon to assist with outreach and recruitment.

NITC continues to fund the Transportation Undergraduate Research Fellowships (TURF) program at Portland State University. The main purpose of this program is to equip current engineering undergraduate students with critical thinking and research skills through supervised research on topics relevant to transportation engineering and planning with a livability theme under a faculty mentor. Undergraduate students are able to work with a faculty on a pre-approved research plan and are expected at the end of the research program to provide a concise technical report describing research findings. Four undergraduate students and one high school student received a fellowship for the 2016-2017 academic year.

- **Attract and Support Graduate Students.**

During the 2016-2017 academic year, NITC continued to award scholarships to support student-led research projects. To-date, NITC has awarded 93 scholarships, including 42 awarded to students at Portland State University, 19 to the University of Oregon, 13 to the University of Utah, 14 to the Oregon Institute of Technology and five to the University of South Florida. Each student who receives a NITC scholarship develops a research product (such as a thesis or conference paper) that fits within NITC themes.

During the reporting period, NITC awarded one fellowship to the following PhD candidate:

- Steven Howland, Portland State University, OR

Technology Transfer

- **Move Research into Practice.**

NITC researchers gave 63 presentations on their NITC funded research at professional and trade conferences reaching 11964 people. This research has been published in 10 peer-reviewed journal articles and as six publications in trade journals or on professional websites.

- **Use Innovative Approaches to Communicate Research Results.**

Social media generated ten percent of visits to the NITC website, with nearly all social referrals coming from Facebook (51 percent) or Twitter (48 percent). Facebook saw a smaller number of new users than Twitter (47 percent versus 52 percent), but users arriving via Facebook viewed more pages per session than those arriving via Twitter (2.25 vs. 1.57) and stayed on the site longer (2:49 versus 1:09). The site-wide average session lasted 2 minutes, 21 seconds.

Collaboration

- **Collaborating within our consortium.**

The Executive Committee collaboratively selected the dissertation fellow for the Fall Dissertation RFP.

- **External collaboration.**

The following people and organizations were members of the NITC Advisory Board during this reporting period:

Alan Lehto, Director of Planning & Policy, TriMet
Michael Baltes, ITS Program Manager, Office of Mobility Innovation, Federal Transit Administration
Michael Bufalino, Research Section Manager, Oregon Department of Transportation
Wendy Cawley, Traffic Safety Engineer, Portland Bureau of Transportation
Tyler Deke, Executive Director, Bend MPO
Susan Handy, Director, National Center for Sustainable Transportation
Matthew Hardy, Program Director, Policy and Planning, AASHTO
Susan Herbel, Principal, Cambridge Systematics
Craig Honeyman, Legislative Director, League of Oregon Cities
Cameron Kergaye, Director of Research, Utah DOT
Wayne Kittelson, Founding Principal, Kittelson & Associates, Inc.
Ted Knowlton, Sustainability Director, Wasatch Front MPO
Brian Lagerberg, Director, Public Transportation Division, WSDOT
Alan Lehto, Director of Planning & Policy, TriMet
Ivan Marrero, Division Administrator, Utah Division, Federal Highway Administration
Gabe Rousseau, Safety Operations Team Leader, FHWA
Brian Saelens, Professor of Pediatrics and Psychiatry & Behavioral Sciences, Seattle Children's Hospital

Tom Schwetz, Planning & Development Manager, Lane Transit District
Ted Trepanier, Director of Product Management, Traffic, Inrix
Yinhai Wang, Director, PacTrans

Diversity

- **Attract underrepresented students to transportation careers.**

NITC staff are preparing for its second NSTI summer program that is designed to attract underrepresented students to transportation careers. This program has been developed in partnership with Oregon MESA and is critical in attracting young women and students of color. The weeklong residential program will be at no cost to the participants in order to reduce any financial barrier to participation. NITC is also continuing its partnerships with WTS Portland and ChickTech with a focus on attracting female students to the transportation workforce.

NITC continues to provide grants to faculty who wish to include an underrepresented, undergraduate student in their research project. In addition, NITC is supporting PSU's Transportation Undergraduate Research Fellowship (TURF) that is focused on training engineering undergraduate students' critical thinking and research skills through supervised research and access to technology. During this reporting period, TURF supported one high school student and four undergraduate students, who included one female student.

- **Priority funding to research with an equity focus.**

Two of our Year 1 projects address equity issues. The research project 'Encouraging Low-Income Households to Make Location-Efficient Housing Choices' and 'Developing a model for Transit Oriented Development in Latino Immigrant Communities' are completed.

Five of the Year 2 projects address equity issues. These research projects include:

- Integrating Title VI and Equitable Investment in Transportation Alternatives into the MPO Transportation Planning Process
- Racial Bias in Drivers' Yielding Behavior at Crosswalks: Understanding the Effect
- What do we know about Location Affordability in U.S. Shrinking Cities?
- Evaluating Efforts to Improve the Equity of Bike Share Systems
- Planning ahead for livable communities along the Powell-Division BRT: neighborhood conditions and change

One of the Year 3 projects addresses equity issues.

- Evaluating and Enhancing Public Transit Systems for Operational Efficiency, Service Quality and Access Equity

How have the results been disseminated?

The NITC researchers gave 63 presentations at conferences and reached nearly 11964 fellow academics, practitioners and policy makers. Sixteen articles have been published, including 10 in peer-reviewed academic journals and six in trade publications or on professional websites.

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

Expected highlights for the next reporting period include:

- Continue publishing Year 1 & 2 research reports
- Promote NITC final reports through social media and webinars
- Identify and implement specific research results with partner agencies
- Hold several IPBI summer workshops
- Host the 2017 National Summer Transportation Institute (NSTI)
- Host the 2017 Transportation and Communities Summit

2. PRODUCTS: What has the program produced?

Publications, conference papers, and presentations
To date, 63 presentations on NITC National research reaching 11,964 people have been given at professional and trade conferences. Sixteen articles have been published, including 10 in peer-reviewed academic journals and six in trade publications or on professional websites.

Website(s) or other Internet site(s)
The website for NITC is located here: http://nitc.us

Technologies or techniques
In the NITC project "Improving Walkability at Signalized Intersections with Signal Control Strategies," Sirisha Kothuri, Portland State University, and co-investigator Edward Smaglik, Northern Arizona University, looked at pedestrian strategies around the country to determine if they were primarily safety or efficiency measures. They learned that if pedestrian strategies existed, they tended to be safety based and identify efficiency-based strategies for pedestrians. The research team also undertook a simulation approach, simulating an intersection using ASC/3 signal controller software. They looked at the different strategies for efficiency and identified what the impacts of each strategy were to all users: pedestrians, cyclists, motor vehicles and heavy vehicles. Based on the simulation study, Dr. Kothuri and colleagues were able to get a good assessment of the delays experienced by the different users. Using that knowledge, they came up with a scale and a guidebook for practitioners on which measures would be best used when, and what sorts of delays to expect for vehicles and pedestrians.

NITC researcher, Miguel Figliozzi, Portland State University, combined modeling with data collected from video recordings of driver behaviors at crosswalks to assess how to improve pedestrian safety at crosswalks. The modeling results revealed that speed and headway changes (the distance between vehicles), as well as driving trajectory before reaching the crosswalk, are the most significant variables to predict whether a driver will be in compliance with crosswalk law. These results suggested that drivers are more likely to comply with the pedestrian law if the pedestrian stopped while crossing or had to speed up in response to approaching vehicles. They also indicate that treatments or driver notifications that discourage accelerating towards the crosswalk would be most useful to

increase compliance. In addition, it is important to monitor vehicles' speed profiles near crosswalks in arterials with signal progression or in areas with a high number of pedestrians. Enforcement and education campaigns can be useful to lower noncompliance rates, but they should be complemented by appropriate engineering designs.

Inventions, patent applications, and/or licenses
Nothing to report for this period.

Other products
Nothing to report for this period.

3. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS: Who has been involved?

What organizations have been involved as partners?

The members of the consortium include Portland State University, University of Oregon, Oregon Institute of Technology, University of Utah, and the University of South Florida. Each NITC-funded research project is required to have 120% match; other projects require a 100% match. Match partners for Year 1, Year 2, and Year 3 projects include the following:

American Automobile Association
Caltrans
City of Cambridge
City of Chicago
City of Eugene
City of Flagstaff
City of Los Angeles
City of Oakland
City of Seattle
City of Tigard
Cleveland State University
District of Columbia Department of Transportation
Florida Department of Transportation
Hillsborough County MPO
Institute of Sustainable Solutions (Portland State University)
Intel
Lane Transit District
NACCO Industries
Natural Resources Defense Council
Oregon Department of Transportation
Oregon METRO
People for Bikes
Portland Bureau of Planning and Sustainability
Portland Bureau of Transportation
SRAM

Summit Foundation
Tampa Bay Network to End Hunger
Transportation for America
TriMet
University of Arizona
University of Colorado, Denver
Utah Department of Transportation
Utah Transit Authority
Vancouver Housing Authority
Wasatch Front Regional Council
Washington County

Have other collaborators or contacts been involved?

Many NITC researchers are also working closely or are supported in their research efforts by a variety of stakeholders above and beyond match partners. This includes non-profit organizations, private industry, public agencies, research centers, or other university partners. Below is a list of these partners.

Bedford Stuyvesant Restoration Corporation in Brooklyn, New York
Bicycle Product Suppliers Association (BPSA)
Bicycle Transportation Alliance
Chicago Department of Transportation
City of Arlington, VA
City of Gresham, OR
Cleveland Regional Transit Authority
Community Cycling Center
Department of Land Conservation and Development (DLCD)
GTFS-realtime communities (online community)
Land Conservation Development Commission (LCDC)
Mark O. Hatfield School of Government Center for Public Service (PSU)
National Park Service, Zion National Park
Oregon Modeling Collaborative (OMC)
Philadelphia IndeGO Bike Share
Portland Business Alliance
Portland Development Commission
Robert F. Bennett Institute for Transportation and Development
Sacramento Area Council of Governments (SACOG)
San Francisco Public Health Department
Sustainable Cities Initiative
Toole Design Group
Town of Rockville
Town of Springdale
Twin Cities Metropolitan Council
University of Idaho
University of Wisconsin at Milwaukie
Venture Portland

Robert Zako's (University of Oregon) project Effectiveness of Transportation Funding Mechanisms for Achieving National, State, and Metropolitan Economic, Health, and Other Livability Goals is getting interest from around the country. In addition to the state DOTs and MPOs Dr. Zako and his research team are studying, the (national) State Smart Transportation Initiative, the (Michigan-based) Mackinac Center for Public Policy, and others are interested in seeing their findings and recommendations for best practices.

4. 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 program?

Nothing to Report for this period.

What is the impact on the development of transportation workforce development?

NITC continues to lead the education of the current and next generation of bicycle and pedestrian professionals. During this reporting period, NITC has been planning the summer 2017 workshops for academics and professionals that focus on enhancing multimodal education, getting the latest research into the hands of professionals, and illustrating how information can be used to help design better bicycle facilities in communities. These workshops will be offered through Portland State's Initiative of Bicycle and Pedestrian Innovation (IBPI) on PSU's Campus.

The bike-ped topics workshop, held in July 2017, will train university faculty to help them expand their curriculum to include multimodal topics. This is essential in helping update outdated curriculum. Current transportation professionals, who work on bicycle and pedestrian transportation, will have the opportunity to advance their knowledge and skills by participating in three different courses, including a Small Town and Rural Multimodal Networks Guide Training (June 2017), an advanced bikeways design workshop (July 2017) and a week-long fundamental bikeways design workshop (August 2017).

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

Nothing to Report for this period.

What is the impact on technology transfer?

During the reporting period, NITC supported 25 events that were attended by 1410 people. These events included six webinars that highlight NITC sponsored research during the reporting period and were attended by 749 individuals. One AICP credit was offered per webinar.

NITC also made seven previously recorded NITC sponsored webinars available through American Planning Association (https://www.planning.org/) that allowed professionals to view the webinars on demand while earning one AICP credit. One hundred fifteen practitioners took advantage of this opportunity.

What is the impact on society beyond science and technology?

Nothing to Report for this period.

5. 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.

Additional information regarding Products and Impacts

Nothing to Report for this period.