

**Fiscal Year 2020
National Summer Transportation Institute
Statement of Work**

Boise state University NSTI Transmittal Sheet

University/College Host Site

Host Site: Boise State University
Address (including zip): 1910 University Drive, Boise Idaho 83725
Project Director: Donna Llewellyn
Phone: 208-426-1903
E-Mail: donnallewellyn@boisestate.edu

State Transportation Agency Liaison:

Name: Russ Rivera
Title: EEO/DBE Program Manager
Phone: 208-334-8884
E-Mail: Russ.Rivera@itd.idaho.gov

Federal Highway Administration (FHWA) Division Office Representative

Name: Michael Caliendo
Title: Civil Rights Specialist/Program Management Analyst
Phone: 208-334-9180, ext. 131
E-Mail: Michael.Caliendo@dot.gov

The host site must complete this form and return it with its Statement of Work to the <<State>>
DOT.

Fiscal Year 2020
National Summer Transportation Institute
Statement of Work Application

Section A: Program Information

Host site:	Boise State University	
State:	Idaho	
Congressional District Number(s):	First and Second Congressional District, ID	
FHWA Funding Proposed Allocation:	\$49,927	
Is this a new NSTI?	No	
Years Hosting NSTI:	1	
Program Length for Session I:	1	
Program Length for Session II:	1	
Program Length for Session III:	0	
Total Weeks (All Session Combined)	2	
Program Dates:	From	To
	6/15/2020	6/26/2020
Anticipated Number of NSTI Students:	60	
Total NSTI Program Length:	2	
FAA ACE Academy:	--	
ACE Academy Location:	--	
Anticipated Number of ACE Students:	--	
Select Type of Program:	Residential	Non-Residential
	No	Yes
Select Grade Levels:	Junior High School (or Middle; Grades 7-8; 7-9)	High School (grades 9-12; 10-12)
	6-8	--
Priority (if applicable, rank 1-5)	--	

Section B: Program Overview

In this section host site, must provide a one to two-page synopsis of how it plans to implement this year's NSTI program. The synopsis should address program objectives explained in the solicitation memorandum (Call for SOWs). Include a description of curriculum, specific field trips planned, and examples of planned enhancement activities.

STEM on the Move is an innovative academic summer camp designed to boost underserved middle grades children's access to high-quality STEM education through participation in new and engaging curriculum developed by university researchers and delivered by certified classroom teachers and college students earning teaching degrees. Hosted at Boise State University, a high-research doctoral granting university centrally located in the downtown area of Idaho's capital city, the program brings together faculty in biology, environmental health science, and computer science under the guidance of experts in the Institute for STEM and Diversity Initiatives and the Center for School Improvement and Policy Studies.

The program features two, unique, one-week all-day camps serving up to 60 children entering grades 7 and 8 in Canyon County, Idaho. The camps leverage the capacity of Boise State's Summer Academy program, which has offered summer academic camps for area children since 1985. Project personnel are local leaders in STEM education, with long-standing track-records for designing and delivering large-scale programs supporting improved STEM teaching and learning across a variety of contexts.

By solving puzzles, inventing and participating in games, and integrating content-based curriculum with inquiry-based teaching, STEM on the Move will help young people build the experience, confidence, and interests needed to stay active and successful in school and beyond. The objectives of the program are for participants to (a) increase their knowledge of STEM, (b) develop self-efficacy and interest in STEM, and (c) build social, emotional, and critical thinking skills through engagement in problem solving and generative play.

A key feature of the program is the partnership between university researchers and the Summer Academy. This affords staff the ability to manage training, liability, and day-to-day processes through existing structures, as well as access for recruiting and engaging teachers and college students with the knowledge and experience needed to respond to children's developmental needs. Consequently, program staff can focus on working with university faculty to develop engaging and educational STEM and transportation-related STEM content rather than spending an excessive amount of planning time developing camp infrastructure.

In Year 1, STEM on the Move curriculum was developed collaboratively between program organizers, certified teachers, and university research-active faculty. Transportation-related content was woven into all aspects of the STEM on the Move experience including during physical education and coding time. Students employed science and engineering practices (e.g. develop a model, analyze and interpret data) to explore local issues. Transportation topics addressed during STEM on the Move included: air quality, urban planning, and renewable fuels. This model will be utilized again in Year 2 as it allows camp participants to engage in relevant, real-world issues alongside researchers doing this work.

SAMPLE

STEM on the Move Curriculum

We will use a place-based approach and connect our STEM activities and experiences to Canyon County--a familiar and local space for student participants. Activities will require students to address and solve real-world transportation issues. As a young program, we plan to work closely with the Boise State researchers and local classroom teachers to tailor curriculum based on interests, expertise, and student needs. Some initial ideas generated by project leadership include:

- Designing a City for All
 - Design a city that serves the needs and health of its citizens
 - Map designed city to scale, utilizing ratio, scale, and proportion
- Building Bridges and Overcoming Barriers
 - Explore various bridges in Canyon County and visit bridges around Boise State's campus to identify what problem they solve or challenge they overcome (e.g. train tracks, water body); design and develop a model for a bridge to meet a transportation barrier
 - Extension: Research different bridge designs and develop an explanation supported by evidence of why different bridge designs are utilized to solve different problems; Study bridge failures and develop technologies to mitigate bridge failure

Taking a problem-based and place-based approach will allow STEM on the Move participants to build an authentic connection between STEM, transportation, and their everyday experience. In addition to transportation STEM content, students will also participate in STEM experiences aligned to the cutting-edge research of Boise State faculty.

On-campus Field Trips

We expect that, for many camp participants, STEM on the Move will be their first time visiting the City of Boise, let alone Boise State University. In order to offer enriching place-based experiences, we will host camp events across campus (e.g. from the Student Union Building to undergraduate Chemistry Department laboratories) to offer exposure to a university campus and university community. Lunch & Learn experiences will allow camp participants to informally experience campus. In addition, Lunch & Learn will serve as a time to informally interact with a STEM concept, or meet with members of the community (e.g. university faculty, students that share the background of campers and participate in STEM research on campus). Meeting with members of the community serves to allow children of middle school age to build a sense of belonging in STEM and a sense of belonging on a university campus.

Off-campus Field Trips

Boise State is well-situated to offer students opportunities to engage in enriching experiences at formal and informal learning spaces near main campus (e.g. Boise Greenbelt, Morrison Knudsen Nature Center, Discovery Center of Idaho, Zoo Boise, and the Boise State Computer Science Department located downtown). We plan to take students on two field trips per week that support youth engagement with STEM and transportation ideas.

Enhancement Activities

All planned activities will be scaffolded to allow entry and participation by all participants. Extension opportunities will be created during the curriculum development phase. Throughout all STEM on the Move activities and experiences, teachers and teaching assistants will model and make visible 21st Century skills and help students embody and practice these skills. 21st Century skills naturally pair with authentic and engaging STEM experiences. As camp participants tackle a given STEM activity in camp they will also be honing their ability to collaborate, communicate, think critically, etc. These skills will be essential as these children transition to the Idaho workforce in the future. Furthermore, with each activity, there will be time for student reflection to explore and reinforce self-awareness and metacognition. At our Lunch & Learn experiences, Boise State faculty and STEM students will underscore the importance of utilizing 21st Century skills and self-awareness to address challenges, overcome barriers, and find success.

Program Background and Summary

Boise State's STEM on the Move will provide a strong benefit not only to the participating students, but to the region.

STEM on the Move targets participation by students from populations that are not traditionally represented in STEM fields (i.e. students from underrepresented minorities, women). According to the STEM Action Center (2017), 7000 science, technology, engineering, and math jobs were unfilled in Idaho. That amounts to [\\$24 million in lost potential Idaho State tax revenue](#).

People of color will [comprise the majority](#) of the U.S. population by the year 2050. Without relying on groups that have been traditionally underrepresented in STEM, demand will have to be met by employing foreign-born workers. The solution is to “activate” the hidden workforce comprising of African Americans, American Indians, and Latinos.

In a 2014 article in the U.S. News and World Report, it was noted that African Americans, Hispanics, American Indians and Alaska Natives comprise only 10 percent of STEM workers, yet represent 26 percent of the general population. The same trend also persists for women who represent approximately half of the college-educated workers, yet women only represent about [28 percent of STEM workers in the U.S.](#) According to national statistics this trend continues in the number of women and minorities that are employed in federal highway construction projects versus other fields. (Source: Solutions for an Emerging Workforce: Strategies for recruiting, training, hiring, retaining and advancing youth of color and women in the highway construction trades, Western States Regional Summit on Youth of Color and Women in the Highway Construction Trades Project, White Paper, 2005.)

Transportation careers include the construction workforce. Women comprise about [nine percent of the construction workforce today](#). The percentages of women and minorities are also low for the civil engineers that are employed on highway projects as design engineers and project managers. This trend [holds for state highway departments](#), consulting engineering firms and construction companies.

In recent years, Idaho has been among the [fastest growing states in the nation](#), with Ada and Canyon counties accounting for half the growth. However, STEM education outcomes lag behind. In 2015, Idaho placed 50th in the nation in the [proportion of students who graduate from high school on time and go directly to college](#) and 46th in the nation in [college going rates of high school graduates](#). As the population continues to grow and become more diverse, it is essential that all students are exposed to high-quality STEM experiences. The STEM on the Move camp offers this opportunity by offering an engaging out-of-school STEM experience for students.

The [Idaho Out-of-School Network program provider directory](#) illustrates the disparity of access to out-of-school programs in Idaho. In Ada County — home to Boise State University — there are over 150 registered out-of-school programs for area students. By contrast, adjacent Canyon County has only 34 registered out-of-school programs. Though STEM on the Move will be housed at Boise State University, in Ada County, the camp will serve middle school students from Canyon County. As STEM on the Move is offered at no-cost to students and families, we expect to serve students who would traditionally not attend nor have access to high-impact summer experiences like STEM on the Move.

Recently, the Idaho Out-of-School network surveyed Idaho out-of-school providers, families, and students. They consistently found transportation cited as a barrier to participation in out-of-school and high-impact experiences (report pending; other corroborating sources include: [Youth Today](#), and [Afterschool Alliance](#)). To address this barrier, STEM on the Move will provide transportation to and from camp at no-cost students and families. In April and May 2019, we will work with area schools, administrators, teachers, and counselors, to recruit students to participate in the camp. We will work particularly closely with Title I schools to ensure that all students have access to this opportunity. Each day during the weeks of camp, buses will transport students from Canyon County schools to Boise State University and back.

Boise State's STEM on the Move will engage young students in engineering and science related transportation activities.

In February 2020, Boise State University will recruit area certified teachers to serve as camp counselors for STEM on the Move. In addition, these certified teachers will work with Boise State University faculty to create curriculum for STEM on the Move. This will allow camp participants to experience camp curriculum that integrates authentic, cutting-edge STEM research from various fields including transportation. With a theme of transportation and movement, we hope that this will help students grasp that STEM exists in our everyday lives and experiences. STEM on the Move will mirror the structure and format already used in the Boise State Summer Academy. In addition to STEM activities, participants will also spend time with a game-like environment exploring code and coding and will spend time engaging in art activities with STEM and transportation themes. Coding, physical education, and art are each important components of middle grades education, yet there are limited resources in the public schools in the region served by STEM on the Move. Therefore, the camp's high quality instruction in these areas will help students learn holistically and make connections between their inherent skills for problem solving, creative expression, and curiosity-based inquiry. Further, it will help make the connections between the content developed by Boise State STEM faculty and the more traditional math and science content they may encounter in school.

Some examples of curriculum we expect to develop and/or improve for the camp include:

- Coding
 - Visual programming
 - Gamified coding
 - Code puzzles
 - Creative computational thinking
 - Animation
- Physical Education (with STEM and transportation themes)
 - Rules of the road
 - Cooperative play
 - Cause and effect
 - Team-building challenges
- STEM
 - Microbial ecology in local ecosystems
 - Astrobiology
 - Computational thinking
 - Engineering design challenges
- Transportation
 - Air quality monitoring
 - Urban planning
 - Renewable fuels
 - Automated public transportation
- Integrated Art Projects
 - visual storytelling
 - scale models
 - urban designs
 - videography
 - 3D printing

Measuring Program Effectiveness

To measure the effectiveness of STEM on the Move, students will complete pre- and post-camp surveys. For the student survey, we plan to use a modified version of the widely used Student Attitudes toward STEM Surveys (S-STEM) (Friday Institute, 2012), particularly the Engineering/Technology and 21st Century skills subscales. The survey will include questions to address students' familiarity with STEM, comfort with STEM, and sense of place and belonging in STEM fields. In order to evaluate the effectiveness of individual activities, teachers and teaching assistants will evaluate student learning in individual activities through fun, informal, and formative assessments. In addition, throughout each week, we will document observations during camp to measure the effectiveness of individual activities and experiences. This will serve to improve our activities in future years of STEM on the Move.

Student Recruitment for Boise State's STEM on the Move

To facilitate recruitment, program staff will modify existing recruitment materials for the Summer Academy to highlight the STEM on the Move program. We will provide the associated flyers to Canyon County middle schools in both English and Spanish. We will work with

principals, teachers, counselors and community members to share this opportunity with middle school families. This year we will use an application process to allow families to complete either a hard-copy or digital application form. We expect that this will allow families without regular access to the internet the opportunity to apply to participate in the camp. Our district partners will help distribute flyers and applications. Participants will be selected from the application pool in Spring 2020. Based on the careful design of transportation, food and other assistance, our local connections with schools through other STEM education programs, and the successful annual recruiting outcomes for the paid Summer Academy programs, we anticipate strong local interest in the camp among the target student population and their families.

Faculty Coordinators

This project will be led by **Donna Llewellyn**, Ph.D., Executive Director of the Institute for STEM & Diversity Initiatives, and **Joe Champion**, Ph.D., Associate Professor of Mathematics, co-Director of the IDoTeach STEM Education program, and Director of the Summer Academy. Each has broad experience supporting implementation of STEM Education programs, including many state- and federal-funded K-12 programs for children and teachers. Megan Gambs will be the project manager, drawing on her teaching and administrative experience and connections with Canyon County educators to support implementation, data collection and analysis, and reporting. In addition, several research faculty have committed to supporting curriculum development:

- Kevin Feris, Professor of Biology and Chair of the Department of Life Sciences - expertise in microbial ecology
- Luke Montrose, Assistant Professor, Department of Community & Environmental Health - expertise in air quality and human systems
- Sole Pera, Associate Professor, Department of Computer Science - expertise in computer science for promoting equity and inclusion for children

Section C: Program Administration

1. Recruitment and Student Selection Procedures

In order to recruit Canyon County students, the Program organizers will work closely with Caldwell and Nampa School District administrators, teachers, and counselors to identify students who are likely to benefit from and thrive in the Boise State STEM on the Move camp. Families will be invited to apply to participate in the camp in spring. Applications will be available in both English and Spanish. Selected applicants will be selected in late spring.

2. Staffing Requirements - Complete Table A

3. Program Cost (Detailed Budget Summary) - Complete Table B

4. Intermodal Advisory Committee - Complete Table C

5. Specific-Named Partners - Complete Table D

6. Implementation Schedule - Complete Table E

7. Program Curriculum (STEM-Focused)

- Academic
- Enhancement
- Sports/Recreation (*residential programs*)

8. Follow-up Survey of Students

At the start and end of each week of camp, participating youth will complete pre- and post-camp surveys. The survey will include questions to address participants' attitudes toward STEM subjects, 21st century skills, and STEM careers. In addition, throughout each week, certified teachers will document observations during camp to measure the effectiveness of individual activities and experiences. This will serve to improve our activities in future years of STEM on the Move. The observations made during the 2019 camp will inform the planning for camp in June 2020.

Note: Please review your application to ensure it is accurate & complete Excel Tables A-E

State DOT Representative that reviewed and recommends approving this Statement of Work:

Name: _____

Signature: _____

Date: _____