K-12 Workforce Development and Technical Transfer Activities

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**TABLE OF CONTENTS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISCLAIMER</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENT OF SPONSORSHIP AND STAKEHOLDERS</td>
<td>ii</td>
</tr>
<tr>
<td>LIST OF AUTHORS</td>
<td>iii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>v</td>
</tr>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>vi</td>
</tr>
<tr>
<td>1.0 INTRODUCTION</td>
<td>7</td>
</tr>
<tr>
<td>2.0 PERFORMANCE</td>
<td>8</td>
</tr>
<tr>
<td>2.1 October 2017 – June 2018</td>
<td>8</td>
</tr>
<tr>
<td>2.2 July 2018 – September 2018</td>
<td>8</td>
</tr>
<tr>
<td>2.3 October 2018 – December 2018</td>
<td>9</td>
</tr>
<tr>
<td>2.4 January 2019 – March 2019</td>
<td>10</td>
</tr>
<tr>
<td>2.5 April 2019 – May 2019</td>
<td>11</td>
</tr>
<tr>
<td>3.0 EDUCATIONAL PROGRAM AND PRODUCT</td>
<td>11</td>
</tr>
<tr>
<td>4.0 CONCLUSION</td>
<td>12</td>
</tr>
<tr>
<td>5.0 REFERENCE LIST</td>
<td>12</td>
</tr>
<tr>
<td>6.0 APPENDIX</td>
<td>13</td>
</tr>
<tr>
<td>6.1 Appendix A – WTS Transportation YOU Activities for Middle and High School Girls</td>
<td>13</td>
</tr>
<tr>
<td>6.2 Appendix B – NCSSM Learning Modules</td>
<td>26</td>
</tr>
<tr>
<td>6.3 Appendix C – Support for NCDOT Summer Transportation Institute Programs</td>
<td>47</td>
</tr>
<tr>
<td>6.4 Appendix D – NCDOT Construction Career Day</td>
<td>59</td>
</tr>
</tbody>
</table>
ABSTRACT

The mission of the U.S. DOT University Transportation Centers (UTC) Program is to advance the state-of-the-art in transportation research and technology, and to develop the next generation of transportation professionals. STRIDE, in its efforts to achieve this mission, seeks to fund projects that engage K-12 students—especially females and underserved/rural populations—to expand their knowledge of and encourage interest in transportation careers. The first two tasks of this multi-year project involved outreach to various stakeholders—state DOT administrators, transportation experts, and public educators—to develop four K-12 proposals for STRIDE funding. The proposals focus on conducting a variety of activities to improve connections for middle and high school age students between their science, technology, engineering and math (STEM) topics in the classroom and the application of these topics in the transportation industry. Outreach through in-person meetings, conference calls and email discussions was completed to facilitate the proposal development. The draft proposals were reviewed by their respective stakeholders, finalized and submitted to STRIDE for funding consideration.

Keywords: K-12 students, Workforce development, STEM
EXECUTIVE SUMMARY

The mission of the U.S. DOT University Transportation Centers (UTC) Program is to advance the state-of-the-art in transportation research and technology, and to develop the next generation of transportation professionals. STRIDE, in its efforts to achieve this mission, seeks to fund projects that engage K-12 students—especially females and underserved/rural populations—to expand their knowledge of and encourage interest in transportation careers. The first two tasks of this multi-year project involved outreach to various stakeholders—state DOT administrators, transportation experts, and public educators—to develop four K-12 proposals for STRIDE funding. The proposals focus on conducting a variety of activities to improve connections for middle and high school age students between their science, technology, engineering and math (STEM) topics in the classroom and the application of these topics in the transportation industry. Outreach through in-person meetings, conference calls and email discussions was completed to facilitate the proposal development. The draft proposals were reviewed by their respective stakeholders, finalized and submitted to STRIDE for funding consideration.

The four proposals are titled as follows:

1. Women in Transportation Seminar (WTS) Transportation YOU Activities for Middle and High School Girls;
2. NC School of Science and Math (NCSSM) Learning Modules;
3. Support for NCDOT Summer Transportation Institute (STI) Programs; and
4. NC Department of Transportation (NCDOT) Construction Career Days.

Proposal 1 would draw from the success of the WTS chapter-based “Transportation YOU” program to produce several STEM-focused ‘presentation in a box’ activities for use by school teachers and youth leaders statewide. Proposal 2 involves working with NCSSM faculty to develop classroom learning modules for exposing high school students to careers in transportation. Proposal 3 would support NCDOT and its STI host sites to develop and deliver presentations, hands-on learning activities, and field trips for their summer program students. Proposal 4 sets forth a plan to expand NCDOT’s established Construction Career Days program with an annual statewide, team-based student competition.

STRIDE administrators, following their review of the four proposals, expressed interest in funding either the WTS Transportation YOU activity (Proposal 1) or the NCDOT Summer Transportation Institute activity (Proposal 3) for Year 3 of this project. As of this report date, STRIDE and ITRE leadership were in discussion on the final proposal selection, project budget, and next steps.
1.0 INTRODUCTION
The mission of the U.S. DOT University Transportation Centers (UTC) Program is to advance the state-of-the-art in transportation technology and research, and to prepare the next generation of transportation professionals. While conducting applicable research is STRIDE’s principal task in meeting this mission, the research results and products it develops must be shared with the broader transportation community in order to facilitate the implementation of scientific knowledge. To this end, STRIDE researchers are tasked with developing and conducting technology transfer activities to disseminate their findings and related materials to community stakeholders. STRIDE faculty are also responsible for engaging students in the research to expand their knowledge towards improving our transportation system into the future.

In support of the STRIDE consortium in conducting technology transfer and workforce development activities aimed at achieving the FHWA Region 4 UTC grant theme of “reducing congestion,” Tasks 1 and 2 of this project were to evaluate resources and opportunities, develop initial ideas and, in collaboration with other STRIDE professionals, prepare proposals for activities in the thrust areas of:

- K-12 Engagement—extension and enhancement of the “Girls in Engineering” program begun under the previous STRIDE UTC and previous collaboration with the Women’s Transportation Seminar (WTS) to enhance their Transportation You events introducing Middle school girls to transportation will serve as a launching point in this area;
- Exploration of opportunities for rapid development of tools that implement research findings; and
- Exploration of course enhancement and development through the NC Local Technical Assistance Program (LTAP) that integrate practice-ready research findings.

Activity Idea Development was planned as Task 1 of the project, with Proposal Preparation planned as Task 2. Both tasks were initially scheduled for completion in Year 1 of the project.
2.0 PERFORMANCE

The following narrative describes the work performed toward the completion of Tasks 1-2 during each reporting period of the project.

2.1 October 2017 – June 2018

Year 1 of the project began October 1, 2017, and, through June 30, 2018, there was an unexpected delay in project work as ITRE’s executive leadership was in transition. Mr. James B. Martin, PE, assistant director of ITRE and the project’s original PI, served as the Institute’s interim director and took on additional administrative duties during this period. Dr. Billy Williams, STRIDE assistant director for NC State University, was appointed ITRE director in June 2018. That same month ITRE submitted to STRIDE a request for a no-cost extension to the project and a change in PI to Mr. Eugene Murray. Work on Tasks 1-2 was extended to be completed by June 30, 2019, effectively shifting proposal development to Year 2 of the project and moving subsequent project activities to STRIDE Year 3 and beyond. Director Williams and Assistant Director Martin met with new PI Murray in June to discuss the project plan and revised schedule.

2.2 July 2018 – September 2018

From July 1, 2018 – September 30, 2018, PI Murray planned and conducted meetings, and corresponded by phone and email, with various stakeholders to begin developing ideas for K-12 activities.

In July, Mr. Murray facilitated an in-person meeting at ITRE with administrators, researchers and faculty from ITRE NCSU, the NC Department of Transportation (NCDOT), and the NC School of Science and Mathematics (NCSSM). Attending from ITRE NCSU were Dr. Billy Williams, James Martin, Highway Systems program manager Chris Cunningham, and senior researcher Dr. Daniel Findley. Neil Mastin, NCDOT Research and Development manager, and Dr. Joe LoBuglio, Dean of Engineering and Computer Science from NCSSM also attended.

Initial discussion was held and ideas suggested on ways ITRE and NCDOT might engage NCSSM high school students in research activities focused on transportation-related STEM topics and encouraging students to consider transportation-related careers. A key goal discussed was how these efforts could integrate with STRIDE research and workforce development activities and lead to proposals for STRIDE grant funds to support them. Following the meeting, Dr. Findley shared with Dr. LoBuglio additional suggestions on current research projects/efforts at ITRE NCSU that could work well for NCSSM student projects, as well as links to instructional videos and data resources available from ITRE NCSU that students can use.

Mr. Murray in this period also met with NC Local Technical Assistance Program (LTAP) management to discuss how STRIDE practice-ready research findings might be
integrated into existing and new LTAP training courses. Mr. Martin, who directs NC LTAP at ITRE, and assistant program director Linda Collier noted that the training currently being delivered to practitioners at state DOT and municipal agencies did not directly align with STRIDE research, so integration with existing course topics was unlikely at the present. The meeting and discussion did not immediately yield ideas for new LTAP training that could tie-in to STRIDE research.

2.3 October 2018 – December 2018
Between October 1, 2018, and December 31, 2018, PI Murray held follow-up discussions with faculty and staff at NCSSM, initiated discussions with an additional stakeholder at NCDOT, and shared information with STRIDE administrators about the project.

In October, Mr. Murray and Ms. Ondine Wells, STRIDE K-12 Workforce Development / Technology Transfer Coordinator, discussed the progress to date and shared ideas on the project. Mr. Murray discussed the next steps planned for working with NCSSM and new outreach planned for the Women’s Transportation Seminar (WTS). Ms. Wells expressed interest in exploring NCDOT’s efforts on the National Summer Transportation Institute Program (NCSTI) and suggested that NCSTI may align well with STRIDE’s goals for this project. She noted, for example, that STRIDE is increasing its workforce development outreach to 2-year colleges which play a role as NCSTI host sites. Mr. Murray agreed to contact NCDOT to learn more.

Later in October, Mr. Murray spoke with Ms. JoAna McCoy, NCDOT Coordinator for National Summer Transportation Institute Program, about NCDOT’s NCSTI program. From the discussion Mr. Murray learned:

- NCDOT requests proposals from NC universities and colleges to be host sites for NCSTI, with particular focus on introducing minorities and women to transportation careers. Each host site proposes either a residential or a non-residential program with a minimum of 15 students. The curriculum, which includes classroom instruction and field trip activities, is designed to encourage students to pursue transportation-related courses at the university level.
- Each November FHWA announces its call and requirements for NCSTI proposals. NCDOT guides interested institutions through the proposal process and submits all proposals to FHWA in late December-early January. FHWA typically selects and notifies host sites in early April. Each institution then recruits its own applicants for its program to be held that summer.
- FHWA in 2018 funded 5 NCSTI programs in North Carolina. NCDOT presently expects to submit at least 4 proposals for 2019 – one each from NC A&T State University and Vance-Granville Community College aimed at high school students, and two proposals from Elizabeth City State University for middle and high school programs. NCDOT this year is increasing its outreach to NC
Community Colleges and encouraging more proposals from the state's rural regions.

- FHWA funding for NCSTI is used for the college and university staff/faculty time, educational materials, lunches and other meals for students as needed during instructional days, and other program expenses. Some students may receive a stipend to attend, and some program activities involve travel with overnight stays.

- Ms. McCoy explained that FHWA funding has limitations on certain types of expenses. Mr. Murray suggested that that STRIDE funding, if available, may be able to cover some of these expenses. For example, STRIDE funding may be used for ITRE/NCSU staff and faculty to assist in program planning and instruction; equipment and non-consumable supplies; snack food items; student t-shirts and other items customized for the program; and field trip transportation costs not covered by FHWA funds.

- Ms. McCoy expressed strong interest in exploring a proposal for STRIDE funding to support NCDOT NCSTI programs beginning in summer 2020. Mr. Murray planned to follow-up in early 2019 – after NCDOT’s proposals for summer 2019 are submitted to FHWA – to further discuss ways ITRE NCSU and STRIDE may help NCDOT improve and add value to its NCSTI program.

Mr. Murray in December met again with Dr. LoBuglio at the NCSSM campus to review an example of an online learning module he and his faculty had developed, and discussed a STRIDE proposal idea for developing a similar module on transportation engineering-related topics. The module—if made possible through STRIDE—would be available to high school students enrolled in NCSSM’s distance learning program across the state. During this visit, Dr. LoBuglio introduced Mr. Murray to Mr. Keethan Kleiner, NCSSM Computer Science instructor, and to Ms. Sarah Shoemaker, NCSSM Mentorship and Research director, for further conversation on ways ITRE might engage with NCSSM students.

2.4 January 2019 – March 2019
Between January 1, 2019, and March 31, 2019, both PI Murray and ITRE researcher Brittany Gaustad conducted follow-up meetings and email correspondence with the proposal partners, and began the proposal writing during this period.

In February and March, Mr. Murray met in-person, by conference calls and shared emails with JoAna McCoy at NCDOT, and with Dr. Joe LoBuglio and Keethan Kleiner of the NCSSM faculty, to refine ideas for two K-12 proposals involving their respective programs. Ms. Gaustad participated in conference calls and email discussions.
Also in February through March, Mr. Murray held in-person meetings, conference calls, and exchanged emails with representatives from the following two groups to discuss developing two additional proposals:

- Gina Sansoni, PE, program chair, and Elizabeth Phelps, EI, program vice chair, for the Transportation YOU program of the WTS NC Triangle Chapter; and
- Dr. Ayanna Hamilton, program manager, and Vanessa Powell, program coordinator, for the NCDOT Construction Career Days (CCD) program.

Both the WTS and the CCD programs engage middle- and high-school age students in STEM-related activities designed to introduce students to transportation careers and related academic fields of study. Both programs also focus their activities on attracting underserved populations—young women (WTS) and minority students (CCD). The representatives from these programs were very interested in the opportunity to be part of a STRIDE-funded project that would help improve and expand their respective programs. Ms. Gaustad also participated in the conference calls and email discussions.

In late March, Mr. Murray and Ms. Gaustad drafted the four K-12 project proposals from the information learned and their discussions with the proposal partners. The draft proposals were shared with the respective stakeholders, and with ITRE associate director James Martin, for their comments, edits, and approval.

2.5 April 2019 – May 2019

In early April, PI Murray and Ms. Gaustad received comments and edits on the draft proposals from the various stakeholders. The proposals were revised and forwarded to Dr. Williams for final review and approval. On April 19, 2019, Dr. Williams submitted the proposals by email to Ms. Wells et al. at STRIDE, completing Tasks 1-2 of the project. The four proposals are attached to this report.

Ms. Wells followed up by email with Dr. Williams, Mr. Murray et al. on May 29, 2019. In her message, Ms. Wells and STRIDE expressed interest in funding either the WTS Transportation YOU proposal or the NCDOT Summer Transportation Institute proposal for Year 3 of the project. As of this report date, STRIDE and ITRE leadership were in discussion on the final proposal selection, project budget, and next steps.

3.0 EDUCATIONAL PROGRAM AND PRODUCT

The educational program(s) and/or product(s) resulting from this project have yet to be developed pending the funding of one or more the four proposals.
4.0 CONCLUSION
If funded, each of these K-12 activity proposals would facilitate STEM learning and illustrate practical applications for the participating students. Additionally, most of the proposals address activities aimed at populations who have traditionally been underrepresented in the field of transportation, including women and underserved/rural populations. All four proposals were deliberated and prepared through a collaborative process with stakeholders, including transportation professionals and experts. The proposed activities would benefit students interested in transportation by making STEM knowledge accessible and fun. Additionally, these activities can help to facilitate career interest in the field of transportation.

5.0 REFERENCE LIST
No references are applicable for this report.
6.0 APPENDIX
The four STRIDE K-12 Project proposals produced for this project are included below:

6.1 Appendix A – WTS Transportation YOU Activities for Middle and High School Girls

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<td>2. Project Title:</td>
<td>STRIDE Partner K-12: WTS Transportation YOU Activities for Middle and High School Girls</td>
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<td>3. Principal Investigator Information:</td>
<td></td>
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<tr>
<td>Name:</td>
<td>Eugene Murray</td>
</tr>
<tr>
<td>Title:</td>
<td>Communications/Distance Learning Specialist and Training Coordinator</td>
</tr>
<tr>
<td>Institution/Department:</td>
<td>Institute for Transportation Research &amp; Education at NC State University</td>
</tr>
<tr>
<td>Mailing Address:</td>
<td>Centennial Campus, Box 8601 Raleigh, NC 27695-8601</td>
</tr>
<tr>
<td>Phone:</td>
<td>919-515-8037</td>
</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:eemurra2@ncsu.edu">eemurra2@ncsu.edu</a></td>
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<tr>
<td>4. Proposed Start/End Dates:</td>
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<td>5. STRIDE Funding Request:</td>
<td>Include a detailed budget and the federal indirect cost rate for your institute (IDC)</td>
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<td>Total requested amount:</td>
<td>(Include your institution’s IDC rate)</td>
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<td>STRIDE funds: $36,580 (Includes 33.6% public service indirect cost rate)</td>
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<td>Matching funds: $36,580</td>
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(Note: A cost-share letter on file is required. See # 11.)

6. Scope
This section describes the K12 project(s) that your institution will implement. For each project, please provide the following:

- **Description**: Include a detailed narrative of the activity including the goal and description of how the activity will be implemented; number of participants; length of time each participant will be engaged in activity; demographics of participants (if a specific demographic is targeted such as girls, underrepresented minorities, etc.); any products that will be created (curricula, lesson plans, etc.) and other relevant details.
K-12 Workforce Development and Technical Transfer Activities

- **Collaborations:** Names of collaborators (student groups, other departments, outside organizations/agencies, etc.) and description of their contribution
- **Impacts:** Please provide data on any impacts that will measured during or at the end of the activity (ex. pre/post-tests, post evaluation survey, etc.).

**Description & Collaborations:**

NC State University’s Institute for Transportation Research and Education (NCSU ITRE) and the NC Triangle chapter of the Women’s Transportation Seminar (WTS), with support from the NC Department of Transportation, propose working together on an educational project for middle and high school age girls. This project would build on an existing WTS program to expand its reach beyond the local chapter area and impact students in communities across the state.

WTS is an international organization of more than 5,000 members – both men and women, professionals and students – dedicated to the professional advancement of women in transportation. Organized by local chapters, WTS engages with its members and others in their communities through professional activities, networking opportunities, and educational programs. Supporting the U.S. Department of Transportation’s (DOT) workforce development initiative is an important part of the WTS mission. In its efforts to provide opportunities and encourage women to pursue transportation as a career path, DOT has collaborated with the WTS in outreach to and recognition of women in the transportation field.

WTS through its local chapters administers Transportation YOU – a hands-on, interactive, mentoring program that introduces middle and high school age girls to a wide variety of transportation careers. The program plans to deliver activities to spark girls’ interest in all transportation modes and encourages them toward courses and study in science, technology, engineering and math (STEM). Transportation YOU also strives for diversity and inclusion, connecting girls of different ages, abilities, ethnicities, races, religions and socioeconomic status.

The WTS NC Triangle chapter’s Transportation YOU program is in its seventh year, with over a dozen volunteer professional women mentoring girls ages 10-18 coming from schools in Wake and Durham counties and from local Girl Scout troops. Located in Raleigh, NC, the chapter holds quarterly events at NCSU ITRE. Each two-hour event includes speakers from the transportation industry and STEM focused hands-on activities exploring different aspects and modes of transportation. The activities are also designed to develop and improve skills in critical thinking, problem solving, and public speaking, among others.

WTS NC Triangle mentors also volunteer with NCDOT on its annual “Introduce a Girl to Engineering Day” in Raleigh for area high school girls interested in engineering. Students at this event participate in hands-on transportation-related engineering activities and in question-and-answer sessions with female engineers from various civil engineering disciplines. Engineers
share about the duties and skills required for their jobs while encouraging young women to maintain and improve their math and science skills necessary for entering college and STEM careers.

While WTS NC Triangle is experiencing success with its Transportation YOU program, its local volunteer mentors, resources and geographic reach are limited. NCDOT leadership has expressed interest to WTS NC Triangle leaders in ‘packaging’ their Transportation YOU activities and expertise to create ‘presentations in a box’ that can be used across the state – especially in rural communities – in schools, youth groups, and other NCDOT-sponsored educational events.

With support from STRIDE, project partners WTS NC Triangle, NCSU ITRE and NCDOT would work together to draw from the Transportation YOU program and produce several ‘presentations in a box’ aimed at school teachers and youth leaders. Each ‘box’ would be complete with a lesson plan, STEM learning objectives, resources, list of materials and supplies, and related guidance needed to successfully deliver the transportation focused activity to middle and high school students. The ‘box’ activities would be designed to be administered by teachers and youth leaders even if they do not have expertise in the subject matter.

The project partners would first examine and pull from the inventory of popular Transportation YOU program activities previously executed by WTS NC Triangle and other WTS chapters. New activities – including congestion reduction/mitigation related topics – would be designed by the partners’ subject matter experts and pilot tested at WTS NC Triangle events. Two examples of WTS NC Triangle hands-on activities from its Transportation YOU program that could be ‘packaged’ include:

- **PEDESTRIAN SAFETY ACTIVITY**: Students divide into teams, and each team is given a map of an area, a crash analysis data sheet, tracing paper to lay their plan on the map, and art supplies to create their safety measures. Teams present their work to all attendees at the end of the activity, explaining their evaluation of the data and map used to identify the site-specific problems as well as their solutions to improve pedestrian safety. Solutions suggested by WTS NC Triangle mentees included new street lighting, crosswalks, traffic/pedestrian signals, and at least one "way out in the future" solution from each team, such as teleporting devices to transport people across the street.

- **RAIL TRANSPORTATION ACTIVITY**: Student teams make a futuristic “air train” using an assortment of materials. The objective is to move the train, with passengers, across the rail track as quickly as possible. Some factors to consider for the students are the safety of their passengers, the weight of the train, and the friction that would be caused on the track. Each team presents and demonstrate their air train while explaining which aspects are most important to them when designing their creation.
In addition to the above task, NCSU ITRE would assist WTS NC Triangle with the following:

- Identifying and recruiting new volunteer speakers and mentors for its *Transportation YOU* program. NCSU ITRE would perform outreach to various organizations including its own faculty/staff, other local area colleges and universities, local engineering and planning firms (especially prime contractors on NCDOT projects), and nearby NCDOT divisions and units.

- Awareness and promotion of its *Transportation YOU* program through outreach to local area school systems and youth organizations to help grow program participation.

**Impacts:**
Individual instructors may choose to include pre & post-tests in their activities. The results and lessons learned from these additional efforts would be documented as guidance to help other WTS chapters grow their own programs.

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### 8. Expertise (A brief summary of your skills, qualifications and experience as they relate to this project.)

Eugene Murray has over 30 years of experience in media production, media project management, and event planning. As communications and distance learning specialist for ITRE, Mr. Murray manages the Institute’s web meeting technologies; develops online learning and video projects; programs and disseminates web surveys; performs copywriting, editing, and content/graphics layout for reports, newsletters and e-news; and produces web/email marketing communications. He also conducts conference and training event planning; coordinates with program directors to manage and improve ITRE training courses and resources; and supervises administrative support staff for training activities. Mr. Murray is experienced with various webinar and webcasting technologies, video/rich media/web authoring tools, and online survey tools. Mr. Murray’s diverse expertise in communications, as well as leading events/programs, will be beneficial for this project.

Blythe Carter (MS in Civil Engineering in progress) will serve as a source of expertise on transportation-related topics, due to her background on the subject matter as well as varied skills and experience on different types of transportation-related projects.

Gina Hoover, PE, serves as our stakeholder partner, and her background in transportation design will serve as a source of expertise.
9. Biographical Information: (2-page limit per investigator, using 12 pt Times New Roman font with 1-inch margins) Include a Curriculum Vitae for each investigator associated with this project. STRIDE has adopted the NSF format for biographical sketches (NSF Chapter 2, Section C.2.f.).

E. Eugene Murray
Communications and Distance Learning Specialist, Conference Planner and Training Coordinator
(919) 515-8037, eemurra2@ncsu.edu

Professional Employment
Communications & Distance Learning Specialist, ITRE at NC State University, Raleigh NC, 2006 – present
Media Production Manager, Horizon Productions, Durham NC, 2002 – 2006
TV Producer/Director and Media Services Manager, North Carolina Agency for Public Telecommunications, Raleigh NC, 1986 – 2002
Production Assistant, WRAL-TV, Raleigh NC, 1985 – 1986

Education and Certifications
B.A., RTVMP (Mass Communications), University of North Carolina at Chapel Hill, 1985
Certificate, Developing High-Impact Training, National Highway Institute, 2006

Project Experience
Event planner (2017-2018) and Lead planner (2018-present) for annual statewide conference of 800-1000 attendees. Duties include oversight of all program planning, event logistics, budgeting, contracting, materials design and printing, and documenting of the conference proceedings.

NC AirTAP – North Carolina Airport Technical Assistance Program 2016 – present
Training event planning, presentations and outreach to practitioners, web content management, and administrative support. In partnership with the NCDOT Division of Aviation and the NC Airports Association, NC AirTAP helps North Carolina’s public- and private-sector airport professionals improve the safety, quality and efficiency of their airport operations through training activities, information and networking opportunities to exchange best practices.

ICOET International Conference on Ecology and Transportation 2009 – present
Lead event planner (2009-2017) and Steering Committee member (2017-present) for biennial ICOET conference of 400-500 attendees from 20+ countries. Duties include oversight of all program planning, event logistics, budgeting, contracting, materials design and printing, and documenting of the conference proceedings. Event locations: Duluth, MN (2009); Seattle, WA (2011); Scottsdale, AZ (2013); Raleigh, NC (2015); Salt Lake City, UT (2017).

TRB Airport Cooperative Research Program Research 11-05/Tasks 1 and 5 2013 – 2017
Dissemination and assessment tasks to assist the ACRP in delivering applicable and effective research products to the aviation industry. Web video production, publication writing and production, online survey development, and webinar facilitation.

**North Carolina Division of Motor Vehicles Web-based Training** 2012 – 2017
Script editing, creative and technical production of various online training modules for the NC DMV to improve its employee processes for driver license/identification card issuance including verification of a customer’s legal status, understanding voter ID laws, and compliance with Payment Card Industry (PCI) data security standards.

Technical planning and production of live interactive video webcasts for 13 FHWA-sponsored workshops to deliver CSS principles and implementation strategies to a national audience including transportation planning and project partners. Member of project team which developed 15 regional workshops across the U.S. addressing CSS case studies, best practices, and emerging approaches. Produced four additional panel discussion webcasts presenting highlights and results of both National Dialog projects.

**NCHRP 25-36 Handbook for Transportation-Efficient Growth** 2014
Graphic design and layout of web resource document (PDF format) to assist planners when working in small communities and rural areas to site new development with transportation efficiency in mind. The handbook includes numerous images of computer modeling results and streetscape visualizations showing how growth can be accommodated without losing the character and feel of the towns and communities in such areas.

**FHWA Methods for Gauging Livability Performance Measures** 2013
Video/multimedia producer/editor and script editor of online training module introducing a web-based tool called “Community Vision Metrics” designed for practitioners to utilize in planning and project development processes to help achieve livable and sustainable outcomes. Also, technical facilitator for a series of ‘virtual’ forums with subject matter experts to collect input on a related web-based tool designed for the public which provides resources for researching desirable communities in which to live, work, and play.

**North Carolina Department of Transportation Sustainability Blueprint Video** 2010 – 2011
Producer and director of outreach video to introduce NCDOT employees to the department’s new sustainability initiative.

**TRB SHRP2 CO8 Community Visioning Research Project Online Tutorials** 2008 – 2010
Creative and technical multimedia production of online training modules to support the ‘Transportation – Visioning for Communities’ (T-VIZ) web resource developed by Cambridge Systematics and ITRE.
Awards and Honors
Golden Reel Award of Excellence, ITVA International Video Festival; Awards of Excellence, MCA-I and ITVA Carolinas Region Silver Reels Video Festival; Special Achievements in Editing and in Music/Sound Design, ITVA Carolinas Region Silver Reels Video Festival; Best in Category, Audio Visual Presentation, Sir Walter Raleigh Awards; PACE Region II Award for TV PSA, American Association of Motor Vehicle Administrators; First Place, Exhibit Category, National Agri Marketing Association; Employee Award for Excellence, NC Department of Administration.
Blythe Carter
Bicycle & Pedestrian Research Assistant
Institute for Transportation Research and Education at North Carolina State University

Email: bacarte2@ncsu.edu Tel: 919-515-8751

Technical Skills
Data collection, management, cleaning and processing; basic GIS analysis; intermediate Python, Matlab, and R coding; Microsoft Office; mathematics and statistical analysis.

Degrees Completed
- B.S. Mathematics & B.S. Environmental Sciences, University of North Carolina at Chapel Hill, May 2014
- M.S. Civil Engineering, Transportation Systems, North Carolina State University, expected May 2021

Select Experience
North Carolina Non-Motorized Volume Data Program, November 2013-June 2019, NCDOT
Monitored data from over 20 bicycle and pedestrian count stations in North Carolina for inconsistencies and potential maintenance issues. Coordinated with local agencies to implement proper maintenance needs. Worked in the field to conduct maintenance on Eco-Counter pedestrian and bicycle count systems. Validated Eco-Counter equipment to create Performed Quality Assurance / Quality Control methods to clean invalid data from dataset. Processed data to create quarterly and annual data reports. Prepared Technical Briefs of each bicycle and pedestrian station.

Evaluating the Economic Impact of Shared-Use Paths, April 2015 – November 2017, NCDOT
Collected data on the American Tobacco Trail in Durham, NC and Brevard Trail in Brevard, NC through user surveys and manual trails counts. Cleaned surveys of errant and missing data. Entered data into project database. Performed statistical analysis on resulting dataset.

Glow-in-the-Dark Bike Paths Technical Assistance Request, April 2017 – August 2017, NCDOT

North Carolina Observational Survey of Seatbelt Use, March 2017 – July 2017, GHSP
Assisted team of three data observers to collect over 10,000 observations of seat-belt use compliance in cities across North Carolina. Recorded driver and passenger demographics, seat-belt compliance, and driver phone use. Data used to report statewide seat-belt use and phone use rates for state of North Carolina.

Smart Trips Austin, City of Austin, TX
Assisted the development and execution of Smart Trips Austin, a personalized targeted marketing program to encourage mode-shift from single occupancy vehicle to a shared or active mode. Developed creative copy for Smart Trips materials, developed transportation behavior and attitudes survey for Smart Trips customers, developed training in program elements and motivational interview techniques for Smart Trips employees, oversaw customer service requests, and led data driven evaluation of program. The North Austin Smart Trips program was a component of Austin’s USDOT Mayor’s Challenge Ladders of Opportunity Award.

Tar Heel Bikes Capstone Project, January 2014 – May 2014, UNC Curriculum for the Environment
Designed and executed bikeshare research project to guide the expansion of the student-led UNC campus bikeshare system. Developed general campus transportation behavior surveys, bikeshare customer surveys, and a GPS-driven route analysis of current bike share trips. Served as lead data analyst and survey designer for project team.

**Professional Experience**

- **Research Assistant, ITRE, Raleigh, NC (1/2017-Present)**
  - Provide research and technical data assistance on bicycle and pedestrian transportation research projects
- **Community Services Program Coordinator, City of Austin Transportation Department, Austin, Texas (2/2016-10/2016)**
  - Provided programmatic assistance with active transportation encouragement programs, including event coordination, copy writing, program evaluation, and final reporting
  - Coordinated and re-designed curriculum for the City of Austin B-Cycle Benefit Course
- **Environmental Educator, City of Austin Nature & Science Center, Austin, Texas (5/2015–1/2016)**
  - Facilitated nature based educational science and adventure activities for children and young adults
  - Assisted in curriculum re-development of teen homeschool science program
- **Americorps Service Member, Casa Verde Builders, Austin, TX (1/2015-4/2015)**
  - Assisted in the maintenance and construction of sustainable and affordable homes
- **Construction Intern, Lopez Island Community Land Trust, Lopez Island, WA (8/2014-10/2014)**
  - Assisted in the construction of sustainable and affordable housing units
- **Undergraduate Research Assistant, UNC Department of Environmental Sciences & Engineering, Chapel Hill, NC (1/2012-1/2014)**
  - Provided data analysis support to porous media parallel computing model and physical model studies
- **Challenge Course Facilitator, UNC Outdoor Education Center, Chapel Hill, NC (3/2012-5/2014)**
  - Facilitated high ropes and low ropes team building programs for local business, church groups, and student groups
  o Designed formal cave tour programs and presented tours two to four times daily
  o Provided informal customer services assistance to park visitors

Publications
Gina P. Hoover, PE
Gina.Hoover@arcadis.com

**Professional Preparation**

**The Pennsylvania State University**

*Bachelors of Science in Civil Engineering*  
University Park, PA  
May 2013

**Licensure:** Professional Engineer, NC  
February 2018

**Appointments**

**Bridge Design Engineer**  
January 2019-Present  
Arcadis  
Raleigh, NC

Designed concrete bridges for state routes in Georgia. Calculated quantities and assisted in plan preparation.

**Design Engineer**  
June 2013-January 2019  
Johnson, Mirmiran & Thompson  
Raleigh, NC

Designed highway structures including various types of prestressed concrete girder, cored slab beams, and foundations. Performed and verified detailed field inspections, prepared bridge repair plans, and developed load ratings for various structural steel and concrete bridges. Outside of highway structures, designed traffic signal pole foundations as well as soil and rock slope stabilization.

**Summer Research Opportunities Program Scholar**  
June 2012 – August 2012  
The Pennsylvania State University  
University Park, PA

Performed research through a program that aims to increase the number of underrepresented students in their fields. Compiled a technical paper and presentation for the end of the program symposium.

**Synergistic Activities**

**Chair/Co-Chair, Women’s Transportation Seminar’s Transportation YOU**  
September 2016 – Present

Organize and run four mentoring events each year for middle school and high school girls interested in STEM. Each event focuses on a transportation topic and engages the girls through hands-on activities. The mission is to change the face of the transportation industry by growing the involvement and interest of girls and young women in STEM and all modes of transportation. Participated as a mentor since September 2013.

**Teaching Mentor, Penn State Undergraduate Teaching and Research Experiences in Engineering**  
January 2012 – May 2013

Taught new technical presentation styles which increased information understanding and retention by over 20%, compared to traditional slide design and delivery. Improved communication and team skills within the College of Engineering.

**Facilitator, Penn State Women in Engineering Program’s Girl Scout Saturdays**  
September 2009 – May 2013

Led half-day workshops that provided hands-on introductions to a variety of engineering disciplines.
10. Detailed Budget (Include Institution’s IDC Rate, separate budget for each institution, if multi-institution, show cost share and provide a justification for your budget in narrative form):

Please include a justification for your budget.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Budgeted Amount from Federal Share</th>
<th>Budgeted Amount from Matching Funds</th>
<th>Explanatory Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Salary</td>
<td>n/a</td>
<td>n/a</td>
<td>Faculty salary for award administration and research projects</td>
</tr>
<tr>
<td>Administrative Staff Salaries</td>
<td>$2,000</td>
<td>$2,000</td>
<td>Administrative salary support</td>
</tr>
<tr>
<td>Other Staff Salaries</td>
<td>$9,000</td>
<td>$9,000</td>
<td>OPS and staff support</td>
</tr>
<tr>
<td>Student Salaries</td>
<td>$7,000</td>
<td>$7,000</td>
<td>Graduate student salary</td>
</tr>
<tr>
<td>Staff Benefits</td>
<td>$7,381</td>
<td>$7,381</td>
<td>Fringe benefit rates based on each consortium institution's negotiated rate</td>
</tr>
<tr>
<td>Total Salaries and Benefits</td>
<td>$25,381</td>
<td>$25,381</td>
<td></td>
</tr>
<tr>
<td>Student Tuition</td>
<td>$0</td>
<td>$0</td>
<td>Student tuition payment or waiver based on each institution's current tuition rates</td>
</tr>
<tr>
<td>Permanent Equipment</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Expendable Property, Supplies, and Services</td>
<td>$500</td>
<td>$500</td>
<td>Printing of project materials and reports, consumable research and office supplies, communications, equipment and office use, computing</td>
</tr>
<tr>
<td>Domestic Travel</td>
<td>$500</td>
<td>$500</td>
<td>Faculty and student travel to various conferences and for various research and outreach activities</td>
</tr>
<tr>
<td>Foreign Travel</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Other Direct Cost (specify)</td>
<td>$1,000</td>
<td>$1,000</td>
<td>Workforce Development and Technology Transfer activities, data processing equipment, fellowship</td>
</tr>
<tr>
<td>Total Direct Costs</td>
<td>$27,381</td>
<td>$27,381</td>
<td></td>
</tr>
<tr>
<td>F&amp;A (Indirect) Costs (33.6%)</td>
<td>$9,200</td>
<td>$9,200</td>
<td>F&amp;A calculated using each consortium institution’s negotiated rate</td>
</tr>
<tr>
<td>TOTAL COSTS</td>
<td>$36,580</td>
<td>$36,580</td>
<td></td>
</tr>
</tbody>
</table>

11. Matching Source Commitment Letter: Insert/attach documentation showing a matching commitment. Final awards will not be released without an agreement letter from the matching source(s).
April 18, 2019

Re: Letter of Institutional Support for STRIDE proposals with North Carolina State University

We look forward to participating in the STRIDE University Transportation Center and are pleased to provide institutional support to help make it a success.

We intend to use matching funds from the North Carolina Department of Transportation projects. We will use a combination of projects already under contract and additional projects that will be under contract at a future date. All matching funds will be documented to occur during the STRIDE budget period.

Contract for contractual matters:
North Carolina State University
Sponsored Programs and Regulatory Compliance Services
2701 Sullivan Dr., Suite 240, Box 7514
Raleigh, NC 27695-7514.
Phone 919-515-2444, Fax 919-515-7721, Email: sps@ncsu.edu

If you need any additional information from NCSU, please access the following: http://research.ncsu.edu/sparcs/proposals/proposals-ids/
From this site you can access and print documents such as NCSU’s a-133 Audit Report, F&A Agreement, Insurance Certification, etc.

Ginny Moser
Regional Director for Research Administration
Office for Research Innovation and Economic Development
### 6.2 Appendix B – NCSSM Learning Modules

<table>
<thead>
<tr>
<th>1. STRIDE Project Type:</th>
<th>“K-12”</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Project Title:</td>
<td>STRIDE Partner K-12: NCSSM Learning Modules</td>
</tr>
</tbody>
</table>

#### 3. Principal Investigator Information:

<table>
<thead>
<tr>
<th>Name:</th>
<th>Eugene Murray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title:</td>
<td>Communications/Distance Learning Specialist and Training Coordinator</td>
</tr>
<tr>
<td>Institution/Department:</td>
<td>Institute for Transportation Research &amp; Education at NC State University</td>
</tr>
<tr>
<td>Mailing Address:</td>
<td>Centennial Campus, Box 8601 Raleigh, NC 27695-8601</td>
</tr>
<tr>
<td>Phone:</td>
<td>919-515-8037</td>
</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:Eugene_murray@ncsu.edu">Eugene_murray@ncsu.edu</a></td>
</tr>
</tbody>
</table>

#### 4. Proposed Start/End Dates:

September 1, 2019 – August 30, 2020

#### 5. STRIDE Funding Request: Include a detailed budget and the federal indirect cost rate for your institute (IDC)

Total requested amount: (Include your institution’s IDC rate)

STRIDE funds: $40,553 (Includes 33.6% public service indirect cost rate)

Matching funds: $40,553

(Note: A cost-share letter on file is required. See # 11.)

#### 6. Scope

This section describes the K12 project(s) that your institution will implement. For each project, please provide the following:

- **Description:** Include a detailed narrative of the activity including the goal and description of how the activity will be implemented; number of participants; length of time each participant will be engaged in activity; demographics of participants (if a specific demographic is targeted such as girls, underrepresented minorities, etc.); any products that will be created (curricula, lesson plans, etc.) and other relevant details.

- **Collaborations:** Names of collaborators (student groups, other departments, outside organizations/agencies, etc.) and description of their contribution.

- **Impacts:** Please provide data on any impacts that will measured during or at the end of the activity (ex. pre/post-tests, post evaluation survey, etc.).
Description & Collaborations:
NC State University’s Institute for Transportation Research and Education (NCSU ITRE) and the North Carolina School of Science and Mathematics (NCSSM), with support from the NC Department of Transportation (NCDOT), propose working together to develop transportation-focused learning modules for high school level engineering, computer science, and mathematics courses. Through the modules students will learn and practice critical thinking and problem-solving using real-world transportation data and scenarios, while also gaining awareness of transportation issues and impacts. As the students pursue STEM-related degrees in colleges and universities, their experience with the learning modules may inspire some to consider careers in transportation.

NCSSM is the nation’s first public residential high school for science, technology, engineering, and math (STEM) and a global leader in STEM education. Located in Durham, NC and less than 30 miles from NC State University, NCSSM annually educates 1,400 students in grades 9-12 from across North Carolina through its residential, online, and videoconferencing academic programs and engages hundreds more in its summer programs. Over 8,000 NCSSM alumni presently work around the state and the world as leaders in science, technology, education, business, the arts, and more.

NCSSM offers several courses through its Department of Engineering and Computer Science and Department of Mathematics in which transportation-focused learning modules can be developed and programmed. Engineering and Computer Science courses teach fundamental skills such as critical thinking and problem-solving as well as subject specific courses, such as civil and environmental engineering. Mathematics courses focus on concepts, applications, and the use of technology to help students build a solid understanding in mathematics. All NCSSM courses are designed to give students an educational experience to help inform their decisions about college majors and professions.

A sample of course topics in which the learning modules may be added include:
- **Scientific Programming** – teaches computer programming skills and how to apply them for analyzing, interpreting, and displaying both large and small scientific data sets.
- **Databases** – introduces students to basic database concepts, relational databases, database design, and gives them experience using databases for real-world applications.
- **Statistics** – teaches students to think about problems from a statistical point of view, covering data analysis, summary statistics and graphical techniques, with emphasis on interpretation and communication.
- **Mathematical Modeling** – senior students explore creative and analytic aspects of modeling real-world phenomena. Models from engineering, biology, political science, management science, and everyday life are examined through a variety of techniques.
K-12 Workforce Development and Technical Transfer Activities

• Structure and Dynamics of Modern Networks – examines the mathematical bases for social networks, computer networks, biological networks, economic networks, and small world networks and their applications.
• Artificial Intelligence – advanced programming students survey topics in A.I, including machine learning techniques that can analyze and find patterns in data. Students consider the ethical implications of studied topics and A.I in current technology.

A key to this project’s success will be enabling students to explore datasets and investigate problem statements that relate to their age, interests, and current/future transportation experiences. The types of data-driven questions that, for example, may interest students might be:

• How is the use of ride-sharing services like Uber and Lyft in urban areas negatively impacting public transportation services and increasing traffic congestion?
• How would a community concerned about air quality determine optimal locations for charging stations to best facilitate and encourage the use of electric cars by its citizens?

For this project NCSU ITRE and NCSSM faculty/staff will collaborate to first identify the different transportation datasets that NCSU ITRE could provide through its various research resources including NCDOT data. The datasets will be reviewed to determine in which NCSSM courses topics they can be best used, the different ways students can analyze the data, and the learning objectives that can be met. Next, the curriculum and lesson plans for how to utilize the datasets in the selected courses would be developed. Last, the learning modules would be integrated into the courses during the academic term.

Impacts:
The project team will measure the results and success of the learning modules through surveys and qualitative assessments from both students and course instructors. A survey of students will be conducted to gauge how the modules have increased their awareness of and interest in transportation-related careers.

STRIDE funding of this project will support faculty/staff time for both NCSU ITRE and NCSSM. In order for the project development work at NCSSM to occur during the academic term months (August-May), part-time and grant-funded NCSSM faculty/staff will be utilized. Full-time NCSSM faculty, whose time on project work is limited to June-July, would serve in advisor roles during the academic term.

NCSSM operates on a trimester academic calendar. Presuming a September start date for the project, if selected by STRIDE, the learning modules would be developed through the NCSSM fall/winter trimesters and taught in the spring trimester. Suggestions for refinements to the modules, based on the above-mentioned measurements, and final report to STRIDE will occur during June-July.
Both NCSU ITRE and NCSSM will disseminate the project results and market the use of the learning modules through presentations (if accepted for presentation) at various transportation and academic conferences such as TRB, NCSSM’s annual Teaching Contemporary Mathematics conference, and the annual National Consortium of Secondary STEM Schools professional conference.

8. Expertise (A brief summary of your skills, qualifications and experience as they relate to this project.)

Eugene Murray has over 30 years of experience in media production, media project management, and event planning. As communications and distance learning specialist for ITRE, Mr. Murray manages the Institute’s web meeting technologies; develops online learning and video projects; programs and disseminates web surveys; performs copywriting, editing, and content/graphics layout for reports, newsletters and e-news; and produces web/email marketing communications. He also conducts conference and training event planning; coordinates with program directors to manage and improve ITRE training courses and resources; and supervises administrative support staff for training activities. Mr. Murray is experienced with various webinar and webcasting technologies, video/rich media/web authoring tools, and online survey tools. Mr. Murray’s diverse expertise in communications, as well as leading events/programs, will be beneficial for this project.

Keethan Kleiner, MS, Instructor of Computer Science and Mathematics, and Joe Buglio, PE, PhD, Dean of Engineering and Computer Science at the North Carolina School of Science & Math (NCSSM) bring subject matter expertise to this project, which is critical to the development of transportation in STEM modules.

Resumes for Robert Gotwals, MS, NCSSM Instructor of Computational Science, and Taylor Gibson, MEd, NCSSM Dean of Mathematics, are included. Both may also be involved with the project in a subject matter expertise and advisory role.
E. Eugene Murray
Communications and Distance Learning Specialist, Conference Planner and Training Coordinator
(919) 515-8037, eemurra2@ncsu.edu

Professional Employment
*Communications & Distance Learning Specialist*, ITRE at NC State University, Raleigh NC, 2006 – present
*TV Producer/Director and Media Services Manager*, North Carolina Agency for Public Telecommunications, Raleigh NC, 1986 – 2002
*Production Assistant*, WRAL-TV, Raleigh NC, 1985 – 1986

Education and Certifications
B.A., RTVMP (Mass Communications), University of North Carolina at Chapel Hill, 1985
Certificate, Developing High-Impact Training, National Highway Institute, 2006

Project Experience
Event planner (2017-2018) and Lead planner (2018-present) for annual statewide conference of 800-1000 attendees. Duties include oversight of all program planning, event logistics, budgeting, contracting, materials design and printing, and documenting of the conference proceedings.

*NC AirTAP – North Carolina Airport Technical Assistance Program* 2016 – present
Training event planning, presentations and outreach to practitioners, web content management, and administrative support. In partnership with the NCDOT Division of Aviation and the NC Airports Association, NC AirTAP helps North Carolina’s public- and private-sector airport professionals improve the safety, quality and efficiency of their airport operations through training activities, information and networking opportunities to exchange best practices.

*ICOET International Conference on Ecology and Transportation* 2009 – present
Lead event planner (2009-2017) and Steering Committee member (2017-present) for biennial ICOET conference of 400-500 attendees from 20+ countries. Duties include oversight of all program planning, event logistics, budgeting, contracting, materials design and printing, and documenting of the conference proceedings. Event locations: Duluth, MN (2009); Seattle, WA (2011); Scottsdale, AZ (2013); Raleigh, NC (2015); Salt Lake City, UT (2017).

*TRB Airport Cooperative Research Program Research 11-05/Tasks 1 and 5* 2013 – 2017
Dissemination and assessment tasks to assist the ACRP in delivering applicable and effective research products to the aviation industry. Web video production, publication writing and production, online survey development, and webinar facilitation.

**North Carolina Division of Motor Vehicles Web-based Training 2012 – 2017**
Script editing, creative and technical production of various online training modules for the NC DMV to improve its employee processes for driver license/identification card issuance including verification of a customer’s legal status, understanding voter ID laws, and compliance with Payment Card Industry (PCI) data security standards.

Technical planning and production of live interactive video webcasts for 13 FHWA-sponsored workshops to deliver CSS principles and implementation strategies to a national audience including transportation planning and project partners. Member of project team which developed 15 regional workshops across the U.S. addressing CSS case studies, best practices, and emerging approaches. Produced four additional panel discussion webcasts presenting highlights and results of both National Dialog projects.

**NCHRP 25-36 Handbook for Transportation-Efficient Growth 2014**
Graphic design and layout of web resource document (PDF format) to assist planners when working in small communities and rural areas to site new development with transportation efficiency in mind. The handbook includes numerous images of computer modeling results and streetscape visualizations showing how growth can be accommodated without losing the character and feel of the towns and communities in such areas.

**FHWA Methods for Gauging Livability Performance Measures 2013**
Video/multimedia producer/editor and script editor of online training module introducing a web-based tool called “Community Vision Metrics” designed for practitioners to utilize in planning and project development processes to help achieve livable and sustainable outcomes. Also, technical facilitator for a series of ‘virtual’ forums with subject matter experts to collect input on a related web-based tool designed for the public which provides resources for researching desirable communities in which to live, work, and play.

**North Carolina Department of Transportation Sustainability Blueprint Video 2010 – 2011**
Producer and director of outreach video to introduce NCDOT employees to the department’s new sustainability initiative.

**TRB SHRP2 CO8 Community Visioning Research Project Online Tutorials 2008 – 2010**
Creative and technical multimedia production of online training modules to support the ‘Transportation – Visioning for Communities’ (T-VIZ) web resource developed by Cambridge Systematics and ITRE.
Awards and Honors
Golden Reel Award of Excellence, ITVA International Video Festival; Awards of Excellence, MCA-I and ITVA Carolinas Region Silver Reels Video Festival; Special Achievements in Editing and in Music/Sound Design, ITVA Carolinas Region Silver Reels Video Festival; Best in Category, Audio Visual Presentation, Sir Walter Raleigh Awards; PACE Region II Award for TV PSA, American Association of Motor Vehicle Administrators; First Place, Exhibit Category, National Agri Marketing Association; Employee Award for Excellence, NC Department of Administration.
K-12 Workforce Development and Technical Transfer Activities

Keethan Kleiner
605 W. Main St., Apt. 207
Durham, NC 27701
928.289.5431
keethan.kleiner@gmail.com

Education
University of North Carolina at Chapel Hill
M.S. Computer Science, December 2014
THESIS: Evaluation of Authorship Attribution Methods on the Congressional Record
Advised by Prof. Stanley Ahalt & Prof. Diane Pozefsky
B.S. with Honors Computer Science, Minors in Physics & Mathematics, May 2013
THESIS: Evaluation of Compression-based Authorship Attribution Methods
Advised by Prof. Stanley Ahalt

Technical Skills
Programming Languages
Ruby on Rails, MySQL, NoSQL, Javascript, MATLAB, Java, C, Python, Lua, PHP
Linux, Canvas, Eclipse, Vim, Git, Docker, \LaTeX

Work Experience
North Carolina School of Science & Mathematics, Durham, NC
Instructor of Computer Science
- Taught courses for both residential and distance education
- Wrote placement exam for all levels of Computer Science courses
- Analyzed and Wrote about the efficacy of education for Accreditation
- Contributed to the following committees: Morganton Steering, Graduate Visioning, Action Team 3, Mental Health & Wellness, and Academic Honesty
- Assigned committees and Communicated with school administration and UNC system as Faculty Senate Vice President

Duke Youth Programs, Durham, NC
Instructor
- Taught Cryptology alongside mathematics instructor to high-school students
- Developed lesson plans with other instructor

Automated Insights, Inc., Durham, NC
Software Engineer
- Mentored software engineering intern in creating database models for Comcast project
- Supported BodyBuilding.com project and Added workout plans to customer reports
- Stabilized, Maintained, and Developed new features for Wordsmith for Marketing product
- Implemented Multivariate Testing framework for Wordsmith product

Renaissance Computing Institute (RENCI), Chapel Hill, NC
Research Assistant for Prof. Stanley Ahalt
- Conceived of novel Natural Language Processing research topics and methods
- Investigated use of Compression and Neural Networks for Authorship Attribution
- Performed and Categorized text using Python and Analyzed text using MATLAB
- Explored Compression of Genomic Data

Residential Networking, Education, and Technology, UNC-Chapel Hill
Senior Residential Computing Consultant (Senior RCC)
- Lead and Supervised team of more than ten RCCs
- Conducted training and support events and Reviewed RCCs’ performances
- Researched and Publicized local technology philanthropic opportunities
- Provided residents with technology support and education
Software Engineering Laboratory, UNC-Chapel Hill
Software Engineer for Matthew Leming
- Designed, Developed, and Tested the UNC Mobile App for iOS and Android
- Leveraged power and utility of Corona SDK and Lua
- Worked closely in a team of three and with client
- Created and Maintained project website and documentation

Department of Physics & Astronomy, UNC-Chapel Hill
Teaching Assistant
- Assisted instructor in classroom, including in a SCALE-UP environment
- Provided problem-solving sessions and tutoring
- Taught both Introductory Mechanics and Electromagnetism both with and without Calculus

Isothermal Community College, Columbus, NC
Instructor
- Instructed students and Developed lesson plans and assignments
- Taught Mechanics with Calculus, Safety for Social Networking, and Programming with Alice

COURSE PROJECTS
Machine Learning in Computational Biology with Prof. Vladimir Jojic
Particle Swarm Optimized Reinforcement Learning
- Fall 2013
Recognizing People, Objects, and Actions with Prof. Tamara Berg
Particle Swarm Optimization for Tracking in Crowded Scenes
- Fall 2013
Artificial Intelligence with Prof. Vladimir Jojic
Human-like Bots in Video Games
- Spring 2013
Interdisciplinary Video Game Design & Development with Prof. Anselmo Lastra
Platformer Video Game with Gravity Gun in UDK
- Spring 2013
Introduction to Numerical Techniques in Physics with Prof. Fabian Heitsch
Genetic Algorithm Optimization via a Genetic Algorithm
- Spring 2011

ACTIVITIES
Relevant Discussions Attended
AI & the Future of Work: A Discussion with Local Companies
- Duke Learning Innovation
- Education with and in Artificial Intelligence
- Desired traits of Engineers in Artificial Intelligence
Consider This ... Artificial Intelligence
- UNC-CH General Alumni Association
- Future Legislation and Economics of Artificial Intelligence
- Potential Psychology of Artificial Intelligence
- Technology and Research in Artificial Intelligence
- December, 2018

NCSSM Alumni Association Board of Directors, Durham, NC
Member
- Contributed to Communications and Fundraising subcommittees
- Organized and Volunteered at Alumni events
- Developed committee’s strategic plan

Kramden Institute, Inc., Durham, NC
Volunteer
- Refurbished donated computers for local underprivileged families
- Inspected and Replaced hardware
- Installed operating system and other software
- January 2008 - May 2014

References are available upon request.
FULL NAME: Joseph Nicholas LoBuglio
NATIONALITY: United States

EDUCATION:

6/12 Gillings School of Global Public Health, UNC-Chapel Hill, Chapel Hill, NC. PhD, Environmental Sciences and Engineering
Honors: Royster Society of Fellows Graduate Fellowship
Delta Omega Public Health Honor Society

6/90 Stanford University, Stanford, CA. M.S., Aeronautical/Astronautical Engineering.
Honors: Stanford University School of Engineering merit fellowship.

6/86 Princeton University, Princeton, NJ. B.S.E., Mechanical Engineering.
Honors: Summa cum laude, Phi Beta Kappa, Tau Beta Pi.

PUBLICATIONS:


CONTRIBUTIONS TO REPORTS


(124 pp. Will be available from http://tech-action.org/resources.htm)


PRESENTATIONS:
LoBuglio, J. N., G. W. Characklis, and M. L. Serre, Utilizing spatiotemporal random field theory and uncertain information to assess and reduce monitoring cost for surface waters subject to TMDLs. 2006 World Environmental and Water Resources Congress, EWRI and ASCE, May 21-25, Omaha, NE.

Prize for outstanding research awarded by the University of North Carolina School of Public Health for a poster titled “Using Uncertain Information to Improve Assessment of Surface Water Quality”, Fall 2006 (first of three authors)

PROFESSIONAL AFFILIATIONS:
1993 - present Registered professional engineer in North Carolina
2012 – Present American Society for Engineering Education
2012 – Present National Association of Rocketry

WORK EXPERIENCE:
01/19 Interim Director of The Ryden Program for Innovation and Leadership in AI,
- North Carolina School of Science and Mathematics, Durham, NC
Present
• Develop and update the Program’s business plan.
• Oversee the strategic plan for the Program and lead strategic initiatives.
• Lead the development effort for ongoing funding.
• Set annual goals and standards for program’s mission goals, expenditure/budget, and income, and assess and report the Program performance.
• Develop relationships across the departments at NCSSM and with external academic and industry partners working in fields associated with AI.
• Develop the reputation and identity of the Program.
Dean of Engineering and Computer Science, North Carolina School of Science and Mathematics, Durham, NC

- Present
  • Manage faculty teaching a variety of introductory and college-level engineering and computer science courses to students gifted in STEM
  • Facilitate departmental goals and strategic plan including staffing, courses offered, and activities beyond the residential program.
  • Participate in Strategic Planning for current Durham campus and for new western campus opening in 2021.
  • Teaching courses in research and engineering and advising nationally recognized robotics and rocketry teams.

Instructor of Engineering, North Carolina School of Science and Mathematics, Durham, NC

- 02/17
  • Recipient of “NCSSM Exceptional Contribution in Outreach” award for efforts promoting professional development and STEM courses in North Carolina.
  • Teach courses in engineering and robotics in a public residential high school for juniors and seniors with high intellectual ability and commitment to scholarship.
  • Develop curriculum for state-wide engineering initiative
  • Advise academic clubs and teams in robotics, engineering, and technology

Associate Director for Research, The Water Institute at UNC, UNC-Chapel Hill

- 12/09
  • Served as research manager for the Water Institute, including identification of funding opportunities, creating and supervising project proposals and grant applications, and project management.
  • Managed office staff and affiliated students. Assist in the assessment and recruitment of staff and students.
  • Contributing researcher on several projects relating to water supply, water quality, sustainability, and modeling.
  • Represented the Water Institute at internal and external functions including with potential funders, speaking engagements discussing the Water Institute, and educational opportunities for presenting water, sanitation, and hygiene issues.

Research Associate, UNC-Chapel Hill, National Strategy for Environment and Health

- 8/08-8/09 United Arab Emirates
  • Assessed drinking water infrastructure through literature review, on-site inspections, and meetings with key administrators.
  • Authored drinking water section of “National Strategy and Action Plan for Environmental Health” which provides actions recommended for protecting and improving drinking water quality in the UAE.
  • Created “burden of disease” model to estimate the burden of disease in the UAE associated with drinking water contamination using Analytica® modeling package to quantify estimate uncertainties.
  • Authored drinking water section of environmental burden of disease report.
  • Presented study methods, progress, and results to stakeholders in the UAE.
  • Led workshop of stakeholders to set action priorities, to solicit information, and foster cooperation.
2008  **Research Associate**, UNC-Chapel Hill

- Created stochastic water resource model of Catawba River Basin and contributed to report entitled "Promoting North Carolina's Economic Development through Strategic Water Resource Management" as part of a North Carolina Research Competitiveness Fund grant.
- Contributed to 2008 Report of the Water Allocation Study of the NC Environmental Review Commission in sections dealing with interbasin transfers, water system regionalization and interconnections, and capacity use areas.

1/98 – 9/01  **Environmental Data Project Manager**, Massachusetts Water Resources Authority, Boston, MA

- Provided technical support in environmental data management, analysis, and presentation to marine environmental quality monitoring group overseeing the Boston Harbor Cleanup Project. Responsible for creating data applications to satisfy NPDES reporting requirements.

2/96 - 12/97  **Engineering Consultant**, self-employed, Brookline, MA and Carrboro, NC

- Wrote commercial software application for thermal energy storage (TES) manufacturer
- Aided in planning, designing, and testing of novel electrical generator. Calculated thermodynamic performance and performed overall energy balance and efficiency calculations. (MATLAB, Simulink, Mathcad, Visual Basic)
- Designed and built transducer conditioning hardware for monitoring performance tests of electrical generator.
- Assessed changes in heat exchanger design for TES system. Suggested and analyzed structural changes in steel storage tank to ease assembly and reduce warranty problems. (NASTRAN)
- Performed sizing calculations for cooling and dehumidifying coils as per ARI STD: 410.

1/93 - 1/96  **Engineering Analyst**, SilentPower Technologies, Inc., Research Triangle Park, NC

- Analyzed thermodynamic and dynamic systems of regenerative thermal machines for heat pump and electrical generation applications. Evaluated heat exchangers, linear alternators, and system dynamics to choose optimum system configuration. Wrote thermodynamic/ dynamic/ electromagnetic model simulations for analyzing nonlinear characteristics of heat pump/generator performance.
- Managed heat pump proof-of-concept project. Planned, budgeted, and helped design (using PRO/Jr) and build SilentPower's first working heat pump.
Engineering Manager, FAFCO, Inc., Redwood City, CA
- Supervised 4-7 individuals responsible for design, documentation, and quality control of solar heating devices, industrial thermal energy storage units, and swimming pool system controllers. Executed two major product development projects and oversaw quality improvement program.
- Redesigned thermal energy storage units (ice storage) for greater efficiency, ease of manufacturing, and reliability. Wrote computer simulation of system thermodynamics, analyzed flow characteristics and structural requirements. Performed required testing at factory test facility. Aided in field installation, start-up, and inspection of several TES systems.
- Scheduled engineering, marketing, and manufacturing activities for development of microprocessor-based swimming pool system controller. Co-developed user-friendly interface. Wrote control logic (~1000 lines of C code). Helped choose and troubleshoot hardware.

Product Engineer, Saturn Corporation (General Motors subsidiary), Troy, MI.
- Responsible for analysis of approximately 50% of space frame components. Used NASTRAN, CATIA and full scale testing to optimize structural performance of Saturn vehicles. Determined optimum section geometry, material thickness, weld pattern, joint configuration, and reinforcement placement.
- Led special aerodynamic drag reduction project which resulted in significant aerodynamic improvements. Validated results with experiments in General Motors wind tunnel.
K-12 Workforce Development and Technical Transfer Activities

Robert R. Gotwals, Jr.
Computational Science Educator

about
2614 Newquay St.
Durham, North Carolina
27705

gotwals@ncssm.edu
gotwals@gmail.com
ltb://gotwals

interests
Computational sciences, with a particular interest in computational chemistry, computational biology/bioinformatics, computational medicinal chemistry, scientific programming, Mathematica, and computational science education

education
1982 M.S. Ed. Science Education
Education of Hearing-Impaired
Rochester Institute of Technology
Science Education
Education of the Hearing-Impaired
University of Rochester

1982 B.S. Chemistry
Major in Chemistry
East Carolina University, Greenville, NC

languages and codes
English
American Sign Language
Braille

programming
Mathematica
R
Python
FORTRAN
perl
NetLogo
Schrodinger Software Suite
Gaussian
MOPAC
STELLA Architect
GAMESS
ImageJ
Paraview
Bioinformatics tools
Unix
\LaTeX

experience
2006-Present North Carolina School of Science and Mathematics
Courses in the computational sciences, general chemistry, and research methods
Durham, NC

2016-2018 North Carolina State University
Visiting Scholar, Jakubikova Lab, Computational Chemistry
Raleigh, NC

Development of programs for K-12 students in the computational sciences
Durham, NC

2002-2005 Morehead Planetarium and Science Center
Associate Director/Senior Science Educator
UNC-Chapel Hill, NC

1992-1996 North Carolina Supercomputing Center
Computational science educator
Research Triangle Park, NC

1987-1992 Montgomery Blair High School Magnet Program
Chemistry and computer science teacher
Silver Spring, MD

1983-1987 Gallaudet University
Chemistry instructor
Washington, DC
publications and grants (post-2000)

NSF Award Abstract 1741831, Principles And Resources For Integrating Computational Thinking Into High School Science Courses, October 2017-September 30, 2020, Awarded Amount: 1,249,632, Investigator(s): Daniel Heck dheck@horizon-research.com (Principal Investigator), Joan Pasley and Robert Gotwals (Co-Principal Investigators)

NSF Extreme Science and Engineering Discovery Environment (XSEDE) Allocation, 2016-Present


interests and hobbies

Beekeeping, hiking and backpacking, music, American Sign Language, Braille, reading.

awards and honors

Nominated, Presidential Awards for Excellence in Mathematics and Science Teaching, 2019
NCSSM/UNC Board of Governors (BOG) Excellence in Teaching Award, 2017
North Carolina Technology Educator of the Year, North Carolina Technology Association, 2017
Nominated for James Conant Bryant National American Chemical Society Teaching Award, 2017
ACS Division of Chemical Education Southeastern Regional Award for Excellence in High School Teaching, 2016
National Center for Women and IT (NCWIT) Educator Award, 2016
Genetics Education Award, National Association of Biology Teachers, 2014
East Carolina University Educators Hall of Fame, 2012
Chancellor’s Award, University of North Carolina Chapel Hill, 2003
Junior Officer of the Year, Reserve Intelligence Area 15, 1992
Taylor Gibson
1509 Carolina Avenue, Durham, North Carolina 27715

gibson@ncsum.edu • 919/961-0004 • https://www.nccse.edu/directory/taylor-gibson

SCHOOL

North Carolina School of Science and Mathematics, Durham, North Carolina
Dean of Mathematics 2018 – Present
Mathematics Instructor 2013 – Present

Greenhill School, Addison, Texas
Mathematics Instructor 2011 – 2013

Plano East Senior High School, Plano, Texas
Mathematics Instructor, Coordinator for Instructional Technology 2010 – 2011

Roswell High School, Roswell, GA
Mathematics Instructor 2007 – 2010

LEADERSHIP

Dean of Mathematics 2018 – Present
• Supervises 15 faculty members and 1 support staff member within the department
• Collaborates with colleagues across the school to make effective decisions for students, faculty, and staff
• Represents the department faithfully to administration

Mathematics Department Coordinator 2017 – 2018
Manages day-to-day and long-term logistical planning for the department
• Screens applications, organizes interview groups, and creates schedule for each candidate
• Assists the Dean in scheduling department course offerings, assigns classrooms and exam rooms
• Runs department meetings when Dean is unable to attend
• Facilitates faculty interviews for Open House, Discovery Day, and Welcome Day
• Coordinates grading of admissions and placement tests

Strategic Planning Team, Internal Facilitator 2017 – Present
• Will guide NCSSM through the upcoming update to the Strategic Plan as one of three facilitators
• Trained in Strategies by the Cambrian Group, December 2017

Faculty Senate, Senator 2014 – 2018
Served two terms on the Faculty Senate
• Served as a liaison to the NCSSM Foundation Board
• Served as a liaison to the Board of Trustees Distance Education subcommittee

Strategic Planning Team, Co-Chair: Action Planning Team 2015 – 2016
• Led 12 members of the school community to develop action plans for Strategy 7 in the NCSSM strategic plan

SCHOLARSHIP

Contemporary Pre-Calculus Through Applications, Revision Facilitator 2016 – Present
Facilitating the revision of NCSSM’s CPTA textbook, last edited in 2002.
• Revised two chapters of existing textbook
• Editing and collaborating on all additional chapters
• Programming textbook in PreTeXt schema to allow for online and print publication

Introduction to Cryptography, Curriculum Development 2017 – 2019
Proposed and designed a new interdisciplinary course to increase elective choice for students interested in mathematics and computer science but are unable to meet pre-requisite requirements for existing electives

OUTREACH

Mathematics Teacher: Technology Tips Column, Editor 2017 – Present
The official journal of the National Council of Teachers of Mathematics.
• Collaborates with the editorial panel to referee journal articles
• Works with authors to revise their manuscripts for publication

UNC System Mathematics Pathways Task Force, Member 2017 – Present
Defining a vision and guiding recommendations for improving student success in mathematics across UNC System campuses
Mathematical Modeling Faculty Mentorship Network
Math Modeling Faculty Mentoring Fellow 2017 – 2018
- Collaborates with experienced teachers of math modeling to learn about, discuss, and implement math modeling instructional approaches and materials
- Provides feedback on resources in anticipation of the official launch of the the Math Modeling Hub in Fall 2018

Cary Academy, Cary, North Carolina
Standards-Based Grading Workshop Facilitator Nov 2017
- Led a workshop on how to implement standards-based grading in the Upper School mathematics program

College Board, Kansas City, Missouri
AP Calculus Exam Reader Jun 2016
- Worked with other educators to grade almost 500,000 AP Exams in 7 days

Winston-Salem State University, Winston-Salem, North Carolina
Workshop Facilitator, Center for Mathematics, Science, and Technology Education Jul 2015
- Led a two-day workshop on implementing modeling activities in the Common Core curriculum

COMMITTEE WORK

Student Information System RFP Ad-Hoc Committee, Faculty Representative 2017 – 2018
Testing and researching different SIS options to co-write an RFP

Calendar and Timetable Committee, Co-chair 2016 – 2017
Led team of 20+ members of the school community in researching new calendar and timetable proposals

Admissions Committee Application Reader 2016, 2017, 2019
Served as the mathematics department representative to read admissions applications

Graduation Requirements Ad-Hoc Committee Math Department Representative 2014 – 2015
Assisted in updating the graduation requirements to include Engineering/Technology coursework

SERVICE TO STUDENTS

North Carolina School of Science and Mathematics, Durham, North Carolina
Mathematics Instructor, Summer Bridge Program 2015 – 2017
- Developed and taught mathematics curriculum to incoming students to help them succeed at NCSSM
- Created teaching schedule for the 2.5 week program

Varsity Cross-Country Assistant Coach
Works with the varsity boys and girls cross-country teams 2015 – Present
- Ensures eligibility for 100+ member team
- Assists in planning and implementation of workouts

Hall Sponsor, Third Beall 2017 – Present
Sponsored Third Beall Residence Hall. Student Life Instructor: Mary Lassiter

Safe Space Training 2014
Attended NCSSM sponsored Safe Space training facilitated by Ross Knight

OTHER WORK EXPERIENCE

North Carolina School of Science and Mathematics, Durham, North Carolina
Cryptography Instructor, Summer Accelerator 2015 – 2018
- Developed and taught cryptography and programming curriculum for a three-week cryptography summer enrichment program for high-school aged students

Duke University, Durham, North Carolina
Cryptography Instructor, Duke Youth Programs Jul 2014
- Co-developed and co-taught a two-week cryptography summer enrichment program for high-school aged students

SELECTED CONFERENCE PRESENTATIONS

“Soap Bubbles: Mathematical Modeling Spanning from Geometry to Calculus,”
NCTM Annual Meeting, Washington, D.C. Apr 2018

“Standards-Based Grading,”
Teaching Contemporary Mathematics Conference, Durham, NC. Jan 2018

“Designing Desmos Activities to Promote Mathematical Investigation,”
Teaching Contemporary Mathematics Conference, Durham, NC. Jan 2018
“Standards-Based Grading in the STEM Classroom,”
NCSS Professional Conference, Chicago, IL. Nov 2017

“Dive into Modeling, the Mathematics of Sustainability,”

“Standards-Based Grading, an Honest Assessment,”
NCTM Annual Meeting, Greensboro, NC. Nov 2015

“Modeling the Cycloid from Geometry to Calculus,”
NCTM Annual Meeting, Boston, MA. Apr 2015

“Standards-Based Grading in an AP Calculus AB Classroom,”
Teaching Contemporary Mathematics Conference, Durham, NC. Jan 2015

“Modeling Using Difference Quotients,”
NCTM Annual Meeting, Greensboro, NC. Oct 2014

EDUCATION
University of Georgia, Athens, Georgia

Georgia Institute of Technology, Atlanta, Georgia
Bachelor of Science (B.S.) in Biomedical Engineering Aug 2002 – May 2006

CERTIFICATION
SP2 Professional Educators License, State of North Carolina Mathematics (9-12), Middle School Mathematics (6-8) Aug 2013 – Present

National Board Certification, National Board for Professional Teaching Standards Mathematics: Adolescence and Young Adulthood 2017 – Present

RECENT COURSES TAUGHT

MA/CS358: Cryptography Years Taught: 2018-2019


MA430/432/434: AP Calculus BC with Advanced Topics Years Taught: 2017-18

PROFESSIONAL AFFILIATIONS
North Carolina Council of Teachers of Mathematics, Raleigh, NC Member 2013 – Present

National Council of Teachers of Mathematics Member 2007 – Present

North Texas Area Association of Advanced Placement Mathematics Teachers President May 2012 – May 2013
Member May 2011 – May 2013

TECH SKILLS
Desmos, Geogebra, LoggerPro, Socrative, Microsoft Office, Mathematica, PreText, bibtex

REFERENCES
Katie O’Connor
Vice Chancellor for Academic Programs
North Carolina School of Science and Mathematics
1219 Broad Street, Durham, NC
katie.oconnor@ncssm.edu • (919) 416-2086
### Detailed Budget

Include Institution’s IDC Rate, separate budget for each institution, if multi-institution, show cost share and provide a justification for your budget in narrative form:

Please include a justification for your budget.

#### NCSSM Learning Modules STRIDE Budget Plan

**9/1/2019 - 8/30/2020**

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Budgeted Amount from Federal Share</th>
<th>Budgeted Amount from Matching Funds</th>
<th>Explanatory Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Salary</td>
<td>$6,000</td>
<td>$6,000</td>
<td></td>
</tr>
<tr>
<td>Administrative Staff Salaries</td>
<td>$2,000</td>
<td>$2,000</td>
<td>Administrative salary support</td>
</tr>
<tr>
<td>Other Staff Salaries</td>
<td>$8,000</td>
<td>$8,000</td>
<td>OPS, Postdoctoral, Researcher, and staff support</td>
</tr>
<tr>
<td>Student Salaries</td>
<td>$7,000</td>
<td>$7,000</td>
<td>Graduate student salary</td>
</tr>
<tr>
<td>Staff Benefits</td>
<td>$7,112</td>
<td>$7,112</td>
<td>Fringe benefit rates based on each consortium institution's negotiated rate</td>
</tr>
<tr>
<td><strong>Total Salaries and Benefits</strong></td>
<td>$24,112</td>
<td>$24,112</td>
<td></td>
</tr>
<tr>
<td>Student Tuition</td>
<td>$0</td>
<td>$0</td>
<td>Student tuition payment or waiver based on each institution's current tuition rates</td>
</tr>
<tr>
<td>Permanent Equipment</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Expendable Property, Supplies, and Services</td>
<td>$500</td>
<td>$500</td>
<td>Printing of project materials and reports, consumable research and office supplies, communications, equipment and office use, computing</td>
</tr>
<tr>
<td>Domestic Travel</td>
<td>$500</td>
<td>$500</td>
<td>Faculty and student travel to various conferences and for various research and outreach activities</td>
</tr>
<tr>
<td>Foreign Travel</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Other Direct Cost (specify)</td>
<td>$1,000</td>
<td>$1,000</td>
<td>Workforce Development and Technology Transfer activities</td>
</tr>
<tr>
<td><strong>Total Direct Costs</strong></td>
<td>$26,612</td>
<td>$26,612</td>
<td></td>
</tr>
<tr>
<td>F&amp;A (Indirect) Costs (33.6% - Public Service)</td>
<td>$8,941</td>
<td>$8,941</td>
<td>F&amp;A calculated using each consortium institution's negotiated rate</td>
</tr>
<tr>
<td><strong>TOTAL COSTS</strong></td>
<td>$40,553</td>
<td>$40,553</td>
<td></td>
</tr>
</tbody>
</table>

11. Matching Source Commitment Letter:

Insert/attach documentation showing a matching commitment. Final awards will not be released without an agreement letter from the matching source(s).
April 18, 2019

Re: Letter of Institutional Support for STRIDE proposals with North Carolina State University

We look forward to participating in the STRIDE University Transportation Center and are pleased to provide institutional support to help make it a success.

We intend to use matching funds from the North Carolina Department of Transportation projects. We will use a combination of projects already under contract and additional projects that will be under contract at a future date. All matching funds will be documented to occur during the STRIDE budget period.

Contract for contractual matters:
North Carolina State University
Sponsored Programs and Regulatory Compliance Services
2701 Sullivan Dr., Suite 240, Box 7514
Raleigh, NC 27695-7514.
Phone 919-515-2444, Fax 919-515-7721, Email: sps@ncsu.edu

If you need any additional information from NCSU, please access the following:
http://research.ncsu.edu/sparcs/proposals/proposals-ids/

From this site you can access and print documents such as NCSU’s a-133 Audit Report, F&A Agreement, Insurance Certification, etc.

Ginny Moser
Regional Director for Research Administration
Office for Research Innovation and Economic Development
6.3 Appendix C – Support for NCDOT Summer Transportation Institute Programs

<table>
<thead>
<tr>
<th>1. STRIDE Project Type:</th>
<th>“K-12”</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Project Title:</td>
<td>STRIDE Partner K-12: Support for NCDOT Summer Transportation Institute Programs</td>
</tr>
</tbody>
</table>

| 3. Principal Investigator Information: |
| Name:                           | Eugene Murray |
| Title:                          | Communications/Distance Learning Specialist and Training Coordinator |
| Institution/Department:        | Institute for Transportation Research & Education at NC State University |
| Mailing Address:               | Centennial Campus, Box 8601 Raleigh, NC 27695-8601 |
| Phone:                         | 919-515-8037 |
| E-mail:                        | Eugene_murray@ncsu.edu |

| 4. Proposed Start/End Dates: |
| September 1, 2019 – August 30, 2020 |

| 5. STRIDE Funding Request: |
| Include a detailed budget and the federal indirect cost rate for your institute (IDC) |
| Total requested amount: (include your institution’s IDC rate) |
| STRIDE funds: $35,553 (Includes 33.6% public service indirect cost rate) |
| Matching funds: $35,553 |

(Note: A cost-share letter on file is required. See # 11.)

6. Scope
This section describes the K12 project(s) that your institution will implement. For each project, please provide the following:

- **Description:** Include a detailed narrative of the activity including the goal and description of how the activity will be implemented; number of participants; length of time each participant will be engaged in activity; demographics of participants (if a specific demographic is targeted such as girls, underrepresented minorities, etc.); any products that will be created (curricula, lesson plans, etc.) and other relevant details.

- **Collaborations:** Names of collaborators (student groups, other departments, outside organizations/agencies, etc.) and description of their contribution

- **Impacts:** Please provide data on any impacts that will measured during or at the end of the activity (ex. pre/post-tests, post evaluation survey, etc.).
Description & Collaborations:
The NC Department of Transportation (NCDOT) has several educational programs for middle and high school students across the state – and especially for students from rural and underserved populations – to help bring greater awareness to careers in transportation. One such program is the National Summer Transportation Institute (NSTI). NC State University’s Institute for Transportation Research and Education (NCSU ITRE) and NCDOT propose working together to bring additional resources to the state’s NSTI host sites and enhance the students’ learning experience.

NSTI is an educational initiative of the U.S. DOT Federal Highway Administration (FHWA) which provides its principal funding. Administered nationwide by host site colleges, universities and other accredited academic institutions, NSTI is a Science, Technology, Engineering and Math (STEM) focused program that introduces secondary school students to careers in all modes of transportation. The program provides academic activities and encourages students to pursue STEM courses at the community college and university levels. Students typically spend 2-4 consecutive weeks with the host site for classroom instruction and transportation-related field trips. Sites must host a minimum of 15 students, and may offer a day program or a residential program in which room and board are provided.

In North Carolina NCDOT helps identify and support the state’s NSTI host sites, with particular emphasis on participation from minority and women students. FHWA in 2018 selected 5 NSTI programs in the state, and more host sites are proposed for 2019. NCDOT this year increased its efforts to develop NSTI proposals from NC Community Colleges in the state's rural regions where students have fewer economic opportunities and would benefit even more from the NSTI program. NCDOT is presently awaiting FHWA review and selection of the 2019 host sites.

While FHWA funding for NSTI covers most program expenses at the host site – e.g., faculty/staff time, educational materials, student meals during instructional days, activities involving travel with overnight stays – the funding is limited or unavailable for off-site resources, and not applicable for other expenses which can add value to the students’ experience. STRIDE funding can help in this area.

With STRIDE support, NCSU ITRE faculty and professional staff will collaborate with peers at NCDOT and the NSTI host sites to develop and deliver presentations, hands-on learning activities and field trips. NCSU ITRE faculty/staff will visit and present at the host sites as well as coordinate student field trip visits to NCSU ITRE and other NCSU facilities in Raleigh. NCSU ITRE will provide programmatic, instructional and logistical support as needed for the presentations, activities and field trips.
NCSU ITRE conducts research, technical support and training in several focus areas (listed below) and will involve subject matter experts (SMEs) from these areas as determined by the interest and needs of the NSTI host sites:

- Aviation (UAS/Drone Systems, Airport Operations)
- Bicycle and Pedestrian (Planning, Facilities Design)
- Economics and Policy Assessment
- Highway Systems (Planning, Design, Engineering)
- Traffic Modeling and Computing Services
- Public Transportation (Transit, Rail, Port and Ferry)
- School System Planning and Pupil Transportation

SMEs from NCSU ITRE will introduce to the NSTI students various transportation-related fields of study and technical skills that they can pursue including, for example:

- Engineering (civil, construction, environmental)
- Computer science
- Mathematical modeling
- Planning
- Economics
- Pavement maintenance
- Erosion control
- Work zone traffic control and safety

Educational topics to be presented will be aligned with STEM concepts and also tailored to practical applications and real-world problems encountered by transportation professionals, in particular topics addressing congestion reduction/mitigation. Multiple modes of transportation will be addressed in the presentations and activities.

NCDOT typically assists the NSTI host sites with field trips to its transportation projects under construction and recently completed. NCSU ITRE will coordinate with NCDOT and the host sites to tie in classroom topics to these field trips, introducing students to the variety of careers and skills required to plan, design and execute the project.

As allowable under STRIDE funding, NCSU ITRE will also assist the NSTI host sites with project expenses for which FHWA funds are unavailable or not allowed, e.g., production of supplemental educational materials; equipment and non-consumable supplies; snacks for visiting students; student t-shirts and/or book bags customized to their NSTI experience; and supplemental costs for field trips.

**Impacts:**

Individual instructors may choose to include pre & post-tests in their activities.
Eugene Murray has over 30 years of experience in media production, media project management, and event planning. As communications and distance learning specialist for ITRE, Mr. Murray manages the Institute’s web meeting technologies; develops online learning and video projects; programs and disseminates web surveys; performs copywriting, editing, and content/graphics layout for reports, newsletters and e-news; and produces web/email marketing communications. He also conducts conference and training event planning; coordinates with program directors to manage and improve ITRE training courses and resources; and supervises administrative support staff for training activities. Mr. Murray is experienced with various webinar and webcasting technologies, video/rich media/web authoring tools, and online survey tools. Mr. Murray’s diverse expertise in communications, as well as leading events/programs, will be beneficial for this project.

James Martin has over 35 years as a PE, technical assistance lead, and has led many research projects focusing on transportation. James Martin will serve as a source of expertise.

JoAna McCoy is the Education Initiatives Program Officer for the North Carolina Department of Transportation. Among her duties Ms. McCoy works with the Federal Highway Administration to manage National Summer Transportation Institute Program at host sites throughout the state of North Carolina.
9. Biographical Information: (2-page limit per investigator, using 12 pt Times New Roman font with 1-inch margins) Include a Curriculum Vitae for each investigator associated with this project. STRIDE has adopted the NSF format for biographical sketches (NSF Chapter 2, Section C.2.f.).

E. Eugene Murray

Communications and Distance Learning Specialist, Conference Planner and Training Coordinator

(919) 515-8037, eemurra2@ncsu.edu

Professional Employment

Communications & Distance Learning Specialist, ITRE at NC State University, Raleigh NC, 2006 – present

Media Production Manager, Horizon Productions, Durham NC, 2002 – 2006

TV Producer/Director and Media Services Manager, North Carolina Agency for Public Telecommunications, Raleigh NC, 1986 – 2002

Production Assistant, WRAL-TV, Raleigh NC, 1985 – 1986

Education and Certifications

B.A., RTVMP (Mass Communications), University of North Carolina at Chapel Hill, 1985

Certificate, Developing High-Impact Training, National Highway Institute, 2006

Project Experience


Event planner (2017-2018) and Lead planner (2018-present) for annual statewide conference of 800-1000 attendees. Duties include oversight of all program planning, event logistics, budgeting, contracting, materials design and printing, and documenting of the conference proceedings.

NC AirTAP – North Carolina Airport Technical Assistance Program 2016 – present

Training event planning, presentations and outreach to practitioners, web content management, and administrative support. In partnership with the NCDOT Division of Aviation and the NC Airports Association, NC AirTAP helps North Carolina’s public- and private-sector airport professionals improve the safety, quality and efficiency of their airport operations through training activities, information and networking opportunities to exchange best practices.

ICOET International Conference on Ecology and Transportation 2009 – present

Lead event planner (2009-2017) and Steering Committee member (2017-present) for biennial ICOET conference of 400-500 attendees from 20+ countries. Duties include oversight of all program planning, event logistics, budgeting, contracting, materials design and printing, and documenting of the conference proceedings. Event locations: Duluth, MN (2009); Seattle, WA (2011); Scottsdale, AZ (2013); Raleigh, NC (2015); Salt Lake City, UT (2017).

TRB Airport Cooperative Research Program Research 11-05/Tasks 1 and 5 2013 – 2017
Dissemination and assessment tasks to assist the ACRP in delivering applicable and effective research products to the aviation industry. Web video production, publication writing and production, online survey development, and webinar facilitation.

**North Carolina Division of Motor Vehicles Web-based Training** 2012 – 2017
Script editing, creative and technical production of various online training modules for the NC DMV to improve its employee processes for driver license/identification card issuance including verification of a customer’s legal status, understanding voter ID laws, and compliance with Payment Card Industry (PCI) data security standards.

Technical planning and production of live interactive video webcasts for 13 FHWA-sponsored workshops to deliver CSS principles and implementation strategies to a national audience including transportation planning and project partners. Member of project team which developed 15 regional workshops across the U.S. addressing CSS case studies, best practices, and emerging approaches. Produced four additional panel discussion webcasts presenting highlights and results of both National Dialog projects.

**NCHRP 25-36 Handbook for Transportation-Efficient Growth** 2014
Graphic design and layout of web resource document (PDF format) to assist planners when working in small communities and rural areas to site new development with transportation efficiency in mind. The handbook includes numerous images of computer modeling results and streetscape visualizations showing how growth can be accommodated without losing the character and feel of the towns and communities in such areas.

**FHWA Methods for Gauging Livability Performance Measures** 2013
Video/multimedia producer/editor and script editor of online training module introducing a web-based tool called “Community Vision Metrics” designed for practitioners to utilize in planning and project development processes to help achieve livable and sustainable outcomes. Also, technical facilitator for a series of ‘virtual’ forums with subject matter experts to collect input on a related web-based tool designed for the public which provides resources for researching desirable communities in which to live, work, and play.

**North Carolina Department of Transportation Sustainability Blueprint Video** 2010 – 2011
Producer and director of outreach video to introduce NCDOT employees to the department’s new sustainability initiative.

**TRB SHRP2 CO8 Community Visioning Research Project Online Tutorials** 2008 – 2010
Creative and technical multimedia production of online training modules to support the ‘Transportation – Visioning for Communities’ (T-VIZ) web resource developed by Cambridge Systematics and ITRE.
Awards and Honors
Golden Reel Award of Excellence, ITVA International Video Festival; Awards of Excellence, MCA-I and ITVA Carolinas Region Silver Reels Video Festival; Special Achievements in Editing and in Music/Sound Design, ITVA Carolinas Region Silver Reels Video Festival; Best in Category, Audio Visual Presentation, Sir Walter Raleigh Awards; PACE Region II Award for TV PSA, American Association of Motor Vehicle Administrators; First Place, Exhibit Category, National Agri Marketing Association; Employee Award for Excellence, NC Department of Administration.
James Martin, PE  
ITRE at North Carolina State University  
Box 8601, Raleigh, NC 27695-8601  
jbm@ncsu.edu, Tel. 919-515-8620, Fax 919-515-8898

Professional Preparation  
M.C.E., Transportation Engineering, North Carolina State University, 1981.  
B.S., Civil Engineering (with Honors), NC State University, 1979.

Relevant Certification(s)  
Registered Professional Engineer in North Carolina, #11633

Appointments  
Associate Director, ITRE  
Associate Director, Center for Transportation and the Environment  
Director, NC Local Technical Assistance Program  
The Institute for Transportation Research and Education  
North Carolina State University

Synergistic Activities  
- Team member on NCHRP 25-24 to assess Environmental Streamlining on ten state DOT projects.  
- PI on a research project that examined processes procedures and efficiencies with regards to the management and customer service at License Plate Agencies of NC Division of Motor Vehicles.  
- PI on ACRP 11-05 Dissemination of Research Results

Current Commitments  
1. Project Title: NC LTAP Program; Duration: Ends 12/31/2016; Project Sponsor: NCDOT  
2. Project Title: ACRP 11-05; Duration: Ends 7/31/2016; Project Sponsor: ACRP  
3. Project Title: Economic Analysis of Vegetation Management; Ends 08/15/2017; Sponsor: NCDOT

Relevant Publications  
K-12 Workforce Development and Technical Transfer Activities

JoAna McCoy
North Carolina Department of Transportation
Phone: (901) 331-0835, jfmccoy@outlook.com

EDUCATION

Kentucky State University, Frankfort KY
Master of Public Administration, December 2015

University of Tennessee at Chattanooga, Chattanooga TN
Bachelor of Science in Business Administration

WORK EXPERIENCE

North Carolina Department of Transportation, Raleigh, NC 2016 – Present
Office of HBCU Outreach

Education Initiatives Program Officer
- Working to influence and shape NCDOT’s campus presence for North Carolina HBCU student program and enjoy collaborating with a wide community of stakeholders.
- Working to create a clear, compelling strategy for HBCU Internship Program content, including program design, full life cycle recruiting, on-boarding, agency learning and development, and performance evaluations.
- Create and support the implementation of internship programs designed by establishing a framework for operations, program content; working to create inclusive strategies to maximize resources in services being utilized by all Office of HBCU Outreach programs
- Plan, coordinate, and execute special events such as receptions and workshops to support students’ development journey while working with NCDOT.
- Work with Federal Highway Administration on managing National Summer Transportation Institute Program at host sites throughout the state of North Carolina.
- Review grant proposals from potential host sites to determine viability of programming.
- Monitor grant award payments, conduct on-site visits, and review host site invoices for payment.
- Implement and execute annual Summer STEM event in collaboration with WakeEd Partnership for one day full business immersion event with Wake County educators; providing insight and tools for Project Based Learning.

Kentucky Transportation Cabinet, Frankfort, KY 2013 – 2015
Office for Civil Rights and Small Business

Development Title VI Coordinator/EEO Investigator
- Performed annual Title VI assessment reviews with divisions within the Kentucky Transportation Cabinet, Area Development Districts, Metropolitan Planning Organizations, and Local Public Agencies.
Title VI/Program Coordinator, Office for Civil Rights
- Coordinated the collection of data and developed periodic reports regarding EEO complaints for various internal and external stakeholders.

Kentucky State University, Frankfort, KY 2009 - 2013
Land Grant Program – Educational Outreach

Successfully managed two federally funded grant programs and staff for four years. Successfully drafted, prepared, and submitted four grant proposals while with the University.

Program Director, AgDiscovery
- Two-week residential program conducted by the university in partnership with United States Department of Agriculture (USDA)/Animal and Plant Health Inspection Service (APHIS)/Veterinary Services (VS) Division

Program Director, National Summer Transportation Institute 2011 – 2013
- Four-week residential program conducted by the university in partnership with the Federal Highway Administration (FHWA) and Kentucky Transportation Cabinet (KTC).

CONTINUING EDUCATION
- True Colors team Building Workshop
- Grantsmanship Grant Writing Workshop
- Core Development Training
- Oz Principle Training
- Youth Development Basics
- Federal Highway Administration (FHWA) Civil Rights Basics
- Federal Highway Administration (FHWA) Designing Pedestrian Facilities for Accessibility
- Equal Employment Opportunity Commission (EEOC) Lexington Seminar

MEMBERSHIPS/OUTREACH
- American Association of University Women (AAUW)
- Tri-State Diversity Conference - Co-Marketing Chair (previous)
- Minorities in Agriculture, Natural Resources, and Related Sciences (MANRRS) Advisor – Kentucky State American Society for Public Administration (previous student member) University

COMMUNITY SERVICE
- God’s Pantry Food Bank
- Weatherstone Elementary School
- Previous Charitable Giving Coordinator (KYTC- Office for Civil Rights & Small Business Development) Operation Preparation – Kentucky State University
- Reality Store – Kentucky State University
- Pioneer Day- Cane Ridge Elementary
- Dress for Success – Triangle Region
10. Detailed Budget *(Include Institution’s IDC Rate, separate budget for each institution, if multi-institution, show cost share and provide a justification for your budget in narrative form.)*:

*Please include a justification for your budget.*

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Budgeted Amount from Federal Share</th>
<th>Budgeted Amount from Matching Funds</th>
<th>Explanatory Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Salary</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Administrative Staff Salaries</td>
<td>$2,000</td>
<td>$2,000</td>
<td>Administrative salary support</td>
</tr>
<tr>
<td>Other Staff Salaries</td>
<td>$8,000</td>
<td>$8,000</td>
<td>OPS, Postdoctoral, Researcher, and staff support</td>
</tr>
<tr>
<td>Student Salaries</td>
<td>$7,000</td>
<td>$7,000</td>
<td>Graduate student salary</td>
</tr>
<tr>
<td>Staff Benefits</td>
<td>$7,112</td>
<td>$7,112</td>
<td>Fringe benefit rates based on each consortium institution's negotiated rate</td>
</tr>
<tr>
<td><strong>Total Salaries and Benefits</strong></td>
<td><strong>$24,112</strong></td>
<td><strong>$24,112</strong></td>
<td></td>
</tr>
<tr>
<td>Student Tuition</td>
<td>$0</td>
<td>$0</td>
<td>Student tuition payment or waiver based on each institution's current tuition rates</td>
</tr>
<tr>
<td>Permanent Equipment</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Expendable Property, Supplies, and Services</td>
<td>$500</td>
<td>$500</td>
<td>Printing of project materials and reports, consumable research and office supplies, communications, equipment and office use, computing</td>
</tr>
<tr>
<td>Domestic Travel</td>
<td>$1,000</td>
<td>$1,000</td>
<td>Faculty and student travel to various conferences and for various research and outreach activities</td>
</tr>
<tr>
<td>Foreign Travel</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Other Direct Cost (specify)</td>
<td>$1,000</td>
<td>$1,000</td>
<td>Workforce Development and Technology Transfer activities, data processing equipment, fellowship</td>
</tr>
<tr>
<td><strong>Total Direct Costs</strong></td>
<td><strong>$26,612</strong></td>
<td><strong>$26,612</strong></td>
<td></td>
</tr>
<tr>
<td>F&amp;A (Indirect) Costs (33.6% - Public Service)</td>
<td>$8,941</td>
<td>$8,941</td>
<td>F&amp;A calculated using each consortium institution's negotiated rate</td>
</tr>
<tr>
<td><strong>TOTAL COSTS</strong></td>
<td><strong>$35,553</strong></td>
<td><strong>$35,553</strong></td>
<td></td>
</tr>
</tbody>
</table>

11. Matching Source Commitment Letter:

*Insert/attach documentation showing a matching commitment. Final awards will not be released without an agreement letter from the matching source(s).*
April 18, 2019

Re: Letter of Institutional Support for STRIDE proposals with North Carolina State University

We look forward to participating in the STRIDE University Transportation Center and are pleased to provide institutional support to help make it a success.

We intend to use matching funds from the North Carolina Department of Transportation projects. We will use a combination of projects already under contract and additional projects that will be under contract at a future date. All matching funds will be documented to occur during the STRIDE budget period.

Contract for contractual matters:
North Carolina State University
Sponsored Programs and Regulatory Compliance Services
2701 Sullivan Dr., Suite 240, Box 7514
Raleigh, NC 27695-7514.
Phone 919-515-2444, Fax 919-515-7721, Email: sps@ncsu.edu

If you need any additional information from NCSU, please access the following:
http://research.ncsu.edu/sparcs/proposals/proposals-ids/
From this site you can access and print documents such as NCSU’s a-133 Audit Report, F&A Agreement, Insurance Certification, etc.

Ginny Moser
Regional Director for Research Administration
Office for Research Innovation and Economic Development
6.4 Appendix D – NCDOT Construction Career Day

<table>
<thead>
<tr>
<th>1. STRIDE Project Type:</th>
<th>“K-12”</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Project Title:</td>
<td>STRIDE Partner K-12: NCDOT Construction Career Days</td>
</tr>
<tr>
<td>3. Principal Investigator Information:</td>
<td></td>
</tr>
<tr>
<td>Name:</td>
<td>Eugene Murray</td>
</tr>
<tr>
<td>Title:</td>
<td>Communications/Distance Learning Specialist and Training Coordinator</td>
</tr>
<tr>
<td>Institution/Department:</td>
<td>Institute for Transportation Research &amp; Education at NC State University</td>
</tr>
<tr>
<td>Mailing Address:</td>
<td>Centennial Campus, Box 8601 Raleigh, NC 27695-8601</td>
</tr>
<tr>
<td>Phone:</td>
<td>919-515-8037</td>
</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:Eugene_murray@ncsu.edu">Eugene_murray@ncsu.edu</a></td>
</tr>
<tr>
<td>4. Proposed Start/End Dates:</td>
<td></td>
</tr>
<tr>
<td>September 1, 2019 – August 30, 2020</td>
<td></td>
</tr>
<tr>
<td>5. STRIDE Funding Request:</td>
<td>Include a detailed budget and the federal indirect cost rate for your institute (IDC)</td>
</tr>
<tr>
<td>Total requested amount:</td>
<td>(Include your institution’s IDC rate)</td>
</tr>
<tr>
<td>STRIDE funds: $38,944 (Includes 33.6% public service indirect cost rate)</td>
<td></td>
</tr>
<tr>
<td>Matching funds: $38,944</td>
<td></td>
</tr>
<tr>
<td>(Note: A cost-share letter on file is required. See # 11.)</td>
<td></td>
</tr>
</tbody>
</table>

6. Scope
This section describes the K12 project(s) that your institution will implement. For each project, please provide the following:

- **Description**: Include a detailed narrative of the activity including the goal and description of how the activity will be implemented; number of participants; length of time each participant will be engaged in activity; demographics of participants (if a specific demographic is targeted such as girls, underrepresented minorities, etc.); any products that will be created (curricula, lesson plans, etc.) and other relevant details.
- **Collaborations**: Names of collaborators (student groups, other departments, outside organizations/agencies, etc.) and description of their contribution
- **Impacts**: Please provide data on any impacts that will measured during or at the end of the activity (ex. pre/post-tests, post evaluation survey, etc.).
Description & Collaborations:
The NC Department of Transportation (NCDOT) has several educational programs for middle and high school students across the state – and especially for students from rural and underserved populations – to help bring greater awareness to careers in transportation. One such program is the NCDOT Construction Career Days events. NCDOT and NC State University’s Institute for Transportation Research and Education (NCSU ITRE) propose to develop new skill-based, problem-solving activities for these events.

Construction Career Days events encourage students to think about careers in fields related to science, technology, engineering and math (STEM) and to understand the different transportation careers and pathways within these areas. Each event brings together hundreds of students from grades 6-12 to meet NCDOT engineers and supervisors, prime construction contractors, and associated professionals working on highway, rail, and multi-modal projects. Students learn about the many people and processes involved in designing and constructing transportation systems, and activities include heavy equipment demonstrations. Students also meet faculty and staff from North Carolina community colleges and universities offering training and degree programs aligned with the transportation industry.

NCDOT annually organizes three major Career Day events – one in each of the state’s three geographic regions – plus more than a dozen smaller events statewide. Collectively these events engage nearly 2,000 students each year.

With support from STRIDE, partner organizations NCDOT and NCSU ITRE, with assistance from NCSU Civil and Construction Engineering faculty, propose a project to expand the Construction Career Days activities with an annual statewide, team-based student competition. Project partners will develop the competition’s curriculum and guidelines for participating students and schools.

Modeled after NCDOT’s annual “Model Bridge Building Competition” and the North Carolina Mathematics and Science Education Network’s annual “MSEN Day” competition, the proposed Construction Career Days competition would help students learn and practice math, science and technical skills used in transportation construction careers. If this proposal is accepted, development of the curriculum and guidelines would follow one and/or two paths with input from STRIDE to determine if one or both paths is preferred.

Development Path 1: Project SMEs would design problem statements describing common transportation issues including traffic congestion reduction/mitigation. Student teams – comprised of students from a single school or from a school district – would select a problem statement to study, research, and create a design-build construction solution. Teams would work on their problem statement during the academic year leading up to their region’s Construction Career Days event. Students would present their work to a panel of judges and be
scored. Presentations may be in the form of a poster, a computer simulation, and/or model building based on the problem statement and other parameters.

Separate competitions for middle and high school students would be conducted. Judging panels would include NCDOT and contractor SMEs. Judging would begin at the NCDOT divisional level (14 divisions). The top scoring team from each division would be presented and judged at the three regional events. At each judging round, student teams would receive feedback and have the opportunity to refine their work before the next round. The top team from each region would be judged in a final round to determine the statewide winner.

**Development Path 2:** Project SMEs would develop lessons to teach technical and problem-solving skills involved in roadway construction such as leveling, surveying, traffic control, etc. These lessons would be taught during the academic year – in each participating school and/or in NCDOT division-hosted workshops – leading up to their region’s Construction Career Days event. Student teams at the three regional events would compete in an ‘obstacle course’ of various academic and hands-on challenges, drawing on the skills learned from the lessons. Teams would be scored on both speed and accuracy in completing all the obstacles. The top three winning teams from each region would be recognized.

The competition curriculum would be developed to meet the Career and Technical Education (CTE) learning objectives established by the NC Department of Public Instruction. CTE programs are designed to develop students’ basic skills as well as their ability to work independently and as part of a team, think creatively and solve problems, and utilize technology in their thinking and problem-solving. Leveraging the subject matter expertise of NCDOT and NCSU ITRE, the curriculum will connect STEM concepts to real-world transportation problems to which these concepts can be applied.

**Impacts:**
Following each competition year, the post-secondary education and employment experience of the student participants could be tracked. Data of how many participants go on to college and major in a transportation-related discipline, and how many go directly from high school into the transportation workforce would be a useful measure of this project’s success.
8. Expertise (A brief summary of your skills, qualifications and experience as they relate to this project.)

Eugene Murray has over 30 years of experience in media production, media project management, and event planning. As communications and distance learning specialist for ITRE, Mr. Murray manages the Institute’s web meeting technologies; develops online learning and video projects; programs and disseminates web surveys; performs copywriting, editing, and content/graphics layout for reports, newsletters and e-news; and produces web/email marketing communications. He also conducts conference and training event planning; coordinates with program directors to manage and improve ITRE training courses and resources; and supervises administrative support staff for training activities. Mr. Murray is experienced with various webinar and webcasting technologies, video/rich media/web authoring tools, and online survey tools. Mr. Murray’s diverse expertise in communications, as well as leading events/programs, will be beneficial for this project.

Brittany Gaustad, MPP, has over five years of research experience, three of which are in the field of transportation. Brittany will serve in a project support role as well as a source of expertise. Her varied experience in research methods will be useful in assisting with the development of programmatic materials.

NCSU ITRE staff on this project will work closely with Dr. Ayanna Hamilton, program manager, and Vanessa Powell, program coordinator, for the NCDOT Construction Career Days program.
Biographical Information:

Include a Curriculum Vitae for each investigator associated with this project. STRIDE has adopted the NSF format for biographical sketches (NSF Chapter 2, Section C.2.f.).

E. Eugene Murray

Communications and Distance Learning Specialist, Conference Planner and Training Coordinator

(919) 515-8037, eemurra2@ncsu.edu

Professional Employment

Communications & Distance Learning Specialist, ITRE at NC State University, Raleigh NC, 2006 – present

Media Production Manager, Horizon Productions, Durham NC, 2002 – 2006

TV Producer/Director and Media Services Manager, North Carolina Agency for Public Telecommunications, Raleigh NC, 1986 – 2002

Production Assistant, WRAL-TV, Raleigh NC, 1985 – 1986

Education and Certifications

B.A., RTVMP (Mass Communications), University of North Carolina at Chapel Hill, 1985

Certificate, Developing High-Impact Training, National Highway Institute, 2006

Project Experience


Event planner (2017-2018) and Lead planner (2018-present) for annual statewide conference of 800-1000 attendees. Duties include oversight of all program planning, event logistics, budgeting, contracting, materials design and printing, and documenting of the conference proceedings.

NC AirTAP – North Carolina Airport Technical Assistance Program 2016 – present

Training event planning, presentations and outreach to practitioners, web content management, and administrative support. In partnership with the NCDOT Division of Aviation and the NC Airports Association, NC AirTAP helps North Carolina’s public- and private-sector airport professionals improve the safety, quality and efficiency of their airport operations through training activities, information and networking opportunities to exchange best practices.

ICOET International Conference on Ecology and Transportation 2009 – present

Lead event planner (2009-2017) and Steering Committee member (2017-present) for biennial ICOET conference of 400-500 attendees from 20+ countries. Duties include oversight of all program planning, event logistics, budgeting, contracting, materials design and printing, and documenting of the conference proceedings. Event locations: Duluth, MN (2009); Seattle, WA (2011); Scottsdale, AZ (2013); Raleigh, NC (2015); Salt Lake City, UT (2017).

TRB Airport Cooperative Research Program Research 11-05/Tasks 1 and 5 2013 – 2017
Dissemination and assessment tasks to assist the ACRP in delivering applicable and effective research products to the aviation industry. Web video production, publication writing and production, online survey development, and webinar facilitation.

**North Carolina Division of Motor Vehicles Web-based Training** 2012 – 2017
Script editing, creative and technical production of various online training modules for the NC DMV to improve its employee processes for driver license/identification card issuance including verification of a customer’s legal status, understanding voter ID laws, and compliance with Payment Card Industry (PCI) data security standards.

Technical planning and production of live interactive video webcasts for 13 FHWA-sponsored workshops to deliver CSS principles and implementation strategies to a national audience including transportation planning and project partners. Member of project team which developed 15 regional workshops across the U.S. addressing CSS case studies, best practices, and emerging approaches. Produced four additional panel discussion webcasts presenting highlights and results of both National Dialog projects.

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Brittany Victoria Gaustad  
brittanyvgaustad@gmail.com  
Centennial Campus, Box 8601, Raleigh, NC 27695

EDUCATION

Master of Public Policy  
Oregon State University, June 2015

Bachelor of Science – Psychology, Minor: Child Youth Care  
University of Wisconsin - La Crosse, May 2012

HONORS

Dean’s List for Academic Honors; Psi Chi Honor Society; Phi Theta Kappa Honor Society

POLICY & RESEARCH EXPERIENCE

Researcher - ITRE, North Carolina State University, July 2016 - Present
- Managed research tasks for a 2-year project which included supervising four students, culminating in a 371-page report to the NCDOT which included a mixed-methods economic analysis of transportation projects in ten case studies – historical transportation investments
- Led daily research tasks which included supervising four students and making regular progress to meet the research timelines for 3 projects: license plate process analysis, economic analysis of vegetation management practices, customer service practices of NC license plate agencies
- Served as Principal Investigator and formulated research idea to identify metrics representing transportation disadvantage to implement in the NC transportation funding prioritization process

Analyst - Precision Academic Consulting, August 2015 – July 2016
- Provided consulting for both qualitative and quantitative academic dissertations
- Completed 15-page discussions of the results of dissertations, including conclusions and recommendations for policy and practice, the development of actionable information, and problem solving in the face of complex challenges
- Composed 42 reports with an average of 30 pages and 65 references

Analyst - Oregon Sea Grant, June 2014 – June 2015
- Served as the lead researcher for 23 interviews in Coos Bay, Oregon
- Coded and analyzed 1,996 pages of FERC public hearing testimonies at 10 locations
- Assisted with 22 interviews in Astoria, Oregon
- Completed one 56-page report of 118 sources and five presentations

Research Assistant – Corvallis Environmental Center, OSU, April – June 2014
- Completed quantitative analysis of a survey of 4,809 participants using STATA
- Coded and analyzed 918 open-ended survey responses using NVivo
- Completed three presentations and wrote two sections of the final 50-page report
- Composed an additional 22-page report of 20 sources
• Completed 13 interviews with stakeholders, transcribed and analyzed the data
• Contributed to the literature review and descriptive statistics
• Wrote 35-page research report of 73 sources with colleagues
• Completed one presentation to the Corvallis School District administrative board

• Completed 306 pages of legislative updates in 17 policy briefs over four months
• Worked with administrators to set policy priorities and established internship program

Graduate Teaching Assistant - Economics Department - OSU, September 2014 – June 2015
• Graded tests and assignments for undergraduate students
• Completed data entry, management, cleaning, and write-up

RESEARCH REPORTS
• Analysis and Validation of Historical Transportation Investments. *Sep. 2018.*
• Improving Customer Service at LPA Offices. *July 2018.*
• Stakeholder perceptions of public participation in Coos Bay, Oregon. MPP Essay, OSU. *June 2015.*
• Undercurrents of change: Understanding barriers to energy conservation. OSU. *Feb. 2015.*
• Crossing the finish line: On-time graduation... Oregon Policy Analysis Lab. *June 2014.*
• Re: Energize Corvallis: Evaluating a community sustainability program. OSU. *May 2014.*

OTHER PROFESSIONAL EXPERIENCE

Summer Educator - Walking Mountains Science Center, June – August 2013
• Designed and led a two-day lesson plan, “Animal Architects,” for the 1st and 2nd grade summer day camp program, Earth Explorers Co-taught and prepared materials for 8 weeks of lessons in summer science camps for Children, grades 1-4

Moderate Needs Paraprofessional - Battle Mountain High School, August 2012 – May 2013
• Worked with the Special Education team to adapt high school class material to different learning abilities
• Assisted children with accommodations associated with specific learning disabilities

**Summer Camp Leader** - Bluff Country Family Resources, *May - August 2012*
• Organized 12 summer camp activities
• Led children’s activities (boating, ropes course, horseback riding, roller skating)

**CAMPUS and COMMUNITY INVOLVEMENT**

• Led public awareness and recruitment using social media, flyers and word of mouth

**Volunteer** – Avery House Nature Center, *Sep. 2013 – March 2014*
• Assisted with weekly environmental education lessons and public events for ages 4-9

**Character Development Intern** - St. Peters Catholic Elementary School, *Dec. 2011 – May 2012*
• Designed weekly lesson plans about social and environmental issues for K-8
• Led educational team building activities for five age groups
Billy M. Williams, PhD, PE
Professor of Civil Engineering, NC State University

Education
PhD in Civil Engineering (Transportation), University of Virginia, January 1999
Master of Civil Engineering, NC State University, May 1990
Bachelor of Science in Civil Engineering (Magna Cum Laude), NC State University, May 1984

(a) Employment
• 2015-Present: Professor, Civil Engineering, North Carolina State University Raleigh, NC
• 2008-2015: Associate Professor, Civil Engineering, North Carolina State University Raleigh, NC
• 2002-2008: Assistant Professor, Civil Engineering, North Carolina State University Raleigh, NC
• 1999-2002: Assistant Professor, Civil Engineering, Georgia Inst. of Technology, Atlanta, GA
• 1987-1988: Assistant Staff Civil Engineer, Field Support Activity, Anacostia, VA
• 1984-1986: Asst. Resident Officer in Charge of Construction, Long Beach Naval Station, Long Beach, CA

(b) Selected Professional Activities
2012-Present Faculty Group Coordinator
North Carolina State University, Department of Civil, Construction, and Environmental Engineering
2010 – 2015 Chair
ASCE Transportation and Development Institute, Advanced Technologies Committee
2013 – 2014 Scientific Committee
ASCE Transportation and Development Institute, 2nd T&DI Congress, Orlando, FL
2006 – 2008 Member
10th International Conference on the Application of Advanced Technologies in Transportation (AATT 2008) Traffic Engineering and Technology Committee
2000 – 2012 Member
Artificial Intelligence and Advanced Computing Applications Committee, Transportation Research Board Statistical Methods Committee, Transportation Research Board
2004 – 2014 Member

(c) Selected Recent Publications


Journal of the Transportation Research Board No. 2935, pp. 41-48. (Awarded the TRB Highway Capacity and Quality of Service Committee’s Best Paper Award for 2013)


(d) Awards and Honors
1. The National Academies of Sciences, 2013 Highway Capacity and Quality of Service Committee Best Paper Award, “Methodology for Developing an HCM-Based Oversaturated Speed Flow Model”, Washington, D.C.,
2. National Science Foundation Faculty Early Career Development Award, 2002-2007
3. Milton Pikarsky Award for Outstanding Doctoral Dissertation, Council of University Transportation Centers, 2000
4. Eisenhower Graduate Fellowship, National Highway Institute, 1995-1998
5. Navy Commendation Medal, 1986

(e) Thesis Advisor and Postgraduate Scholar Sponsor
1. PhD Advisees: Sangkey Kim, ITRE; Anxi Jia, Kittelson and Associates; Majed Al-Ghandour, NCDOT; Jisun Lee, KOTI; Hyejung Hu, KICT; Ting Yi, WSA Group; Jianhua Guo, Southeast University, Nanjing; Angshuman Guin, Georgia Tech

Total PhD students advised to graduation: 8
## Detailed Budget

(Include Institution’s IDC Rate, separate budget for each institution, if multi-institution, show cost share and provide a justification for your budget in narrative form.)

Please include a justification for your budget.

### NCDOT Construction Career Days STRIDE Budget Plan

10/1/2019 - 9/30/2020

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Budgeted Amount from Federal Share</th>
<th>Budgeted Amount from Matching Funds</th>
<th>Explanatory Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Salary</td>
<td>$1,000</td>
<td>$1,000</td>
<td>Faculty salary for award administration and research projects</td>
</tr>
<tr>
<td>Administrative Staff Salaries</td>
<td>$2,000</td>
<td>$2,000</td>
<td>Administrative salary support</td>
</tr>
<tr>
<td>Other Staff Salaries</td>
<td>$9,000</td>
<td>$9,000</td>
<td>OPS, Postdoctoral, Researcher, and staff support</td>
</tr>
<tr>
<td>Student Salaries</td>
<td>$7,000</td>
<td>$7,000</td>
<td>Graduate student salary</td>
</tr>
<tr>
<td>Staff Benefits</td>
<td>$7,650</td>
<td>$7,650</td>
<td>Fringe benefit rates based on each consortium institution's negotiated rate</td>
</tr>
<tr>
<td>Total Salaries and Benefits</td>
<td>$26,650</td>
<td>$26,650</td>
<td></td>
</tr>
<tr>
<td>Student Tuition</td>
<td>$0</td>
<td>$0</td>
<td>Student tuition payment or waiver based on each institution's current tuition rates</td>
</tr>
<tr>
<td>Permanent Equipment</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Expendable Property, Supplies, and Services</td>
<td>$500</td>
<td>$500</td>
<td>Printing of project materials and reports, consumable research and office supplies, communications, equipment and office use, computing</td>
</tr>
<tr>
<td>Domestic Travel</td>
<td>$1,000</td>
<td>$1,000</td>
<td>Faculty and student travel to various conferences and for various research and outreach activities</td>
</tr>
<tr>
<td>Foreign Travel</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Other Direct Cost (specify)</td>
<td>$1,000</td>
<td>$1,000</td>
<td>Workforce Development and Technology Transfer activities, data processing equipment, fellowship</td>
</tr>
<tr>
<td>Total Direct Costs</td>
<td>$29,150</td>
<td>$29,150</td>
<td></td>
</tr>
<tr>
<td>F&amp;A (Indirect) Costs (33.6%)</td>
<td>$9,794</td>
<td>$9,794</td>
<td>F&amp;A calculated using each consortium institution's negotiated rate</td>
</tr>
<tr>
<td>TOTAL COSTS</td>
<td>$38,944</td>
<td>$38,944</td>
<td></td>
</tr>
</tbody>
</table>

### Matching Source Commitment Letter

Insert/attach documentation showing a matching commitment. Final awards will not be released without an agreement letter from the matching source(s).
April 18, 2019

Re: Letter of Institutional Support for STRIDE proposals with North Carolina State University

We look forward to participating in the STRIDE University Transportation Center and are pleased to provide institutional support to help make it a success.

We intend to use matching funds from the North Carolina Department of Transportation projects. We will use a combination of projects already under contract and additional projects that will be under contract at a future date. All matching funds will be documented to occur during the STRIDE budget period.

Contract for contractual matters:
North Carolina State University
Sponsored Programs and Regulatory Compliance Services
2701 Sullivan Dr., Suite 240, Box 7514
Raleigh, NC 27695-7514.
Phone 919-515-2444, Fax 919-515-7721, Email: sps@ncsu.edu

If you need any additional information from NCSU, please access the following:
http://research.ncsu.edu/sparcs/proposals/proposals-ids/
From this site you can access and print documents such as NCSU’s a-133 Audit Report, F&A Agreement, Insurance Certification, etc.

Ginny Moser
Regional Director for Research Administration
Office for Research Innovation and Economic Development