Research Project Name: University of Miami's National Summer Transportation Institute (UM)

Improving the Durability and Extending the Life of Transportation Infrastructure

Principal Investigator:
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Project Partners: N/A

Research Project Funding:
Federal: $47,227 Match: $23,612 (UM)

Project Start Date: 01/01/2026 **Project End Date**: 12/31/2026

Project Description: Already inhabited by more than 50% of the population and contributing to more than 55% of the nation's gross domestic product (GDP), coastal regions are still continuing to grow and attract people. At the same time, coastal regions are facing increasing threats from erosion and flooding caused by chronic events like heavy rainfall, as well as discrete extreme events such as hurricanes. These events put people and properties, as well as the region's economies, in harm's way. It is through deliberate and strategic investments in STEM education, outreach and workforce initiatives, that the USDOT has the workforce to meet challenges, while advancing and maintaining our technological superiority.

The University of Miami is requesting to host the NSTI program to encourage the younger generations into the STEM disciplines and coastal transportation infrastructure. Activities will include lectures, laboratory hands-on activities, and fun competitions related to coastal transportation infrastructure. Participants will engage in science rich activities, and develop critical thinking, teamwork, and career development skills. The PI was the director of the 2024 CREATE UM NSTI as well as 2015-2017 UM NSTI funded by FHWA and has the experience and expertise in transportation outreach programs (see Figure 1).

Figure 1. An overview of the PI's ongoing and prior outreach activities.

The following points include the goals that the NSTI program at the University of Miami seeks to accomplish.

- Provide an exciting and effective summer program that will depict the principles, applications and challenges of the STEM fields through use of lessons, teamwork, group activities, competitions and field trips.
- Create awareness of the coastal transportation industry and its career opportunities
- Encourage high school students toward the STEM disciplines by educating them on transportation engineering career opportunities.

- Develop teamwork, problem solving, computer, writing and reporting skills to enable high school students to excel in their intended STEM field.

Recruitment

The University of Miami will conduct recruitment procedures through several media to select interested and enthusiastic high school students to participate in the summer program. The following media will be implemented to recruit students for the summer program: Flyers, Website, social media, school visits, information sessions.

Program Curriculum

Week 1: 2nd week of July

Weekly Objective: Students will be introduced to the fundamentals of engineering. As the week progresses, the components of transportation engineering will be explored. The focus of this week will be on the explanation of advanced and high-performance construction materials used in the various modes of coastal transportation infrastructure, the importance of safety in transportation engineering, the different types of transportation structures and vehicles, and the new technological advancements in the coastal transportation infrastructure engineering industry. In addition, this week will also discuss the engineering of airport terminals and airplanes.

Week 2: 3rd week of July

Weekly Objectives: Students will learn about the emerging technologies for enhancing safety and resilience in coastal transportation infrastructure. Students will become familiar with the other modes of transportation, including water, and continue to learn about the air transportation.

US DOT Priorities: *Section left blank until USDOT's new priorities and RD&T strategic goals are available in Spring 2026.*

Outputs:

- Participants will demonstrate increased interest in pursuing STEM career pathways.
- Participants will gain heightened awareness regarding transportation related STEM career opportunities.

Outcomes/Impacts: The activities aimed at personal and professional growth will prepare students for effective interactions in engineering and science, and encourage them to pursue a research-based or practicing professional career in coastal transportation infrastructure. A positive culture of science and engineering fostered in Miami can instill a sense of pride in local communities towards STEM careers where more STEM professionals are needed.

Final Research Report: URL to final Report will be provided upon completion.