

OUTREACH AND TEACHER TRAINING FOR TRANSPORTATION ENGINEERING

OVERVIEW: Students and teachers in Region 6 are benefiting from using fun, fact-filled activities through the development of curricular materials for high school- and college-level students. A few of the activities associated with a project entitled “Technology-Rich Transportation Engineering Projects” are included in this brief.

ENGINEERING AND SCIENCE DAY: Approximately 500 students from 15 high schools attended Engineering and Science Day at Louisiana Tech University on April 15, 2015. Engineering and Science Day provides a venue where high school students can learn about engineering and science majors and careers. Groups of 25 to 35 students participated in an SPTC-sponsored activity focusing on transportation and traffic engineering. Dr. Norm Pumphrey talked with the students about various modes of transportation, the different focus areas that define the field of transportation engineering, and about the critical importance of safe and reliable transportation systems to support society. After the presentation, teams of four to eight students were invited to compete by racing remote controlled cars on a race track with various obstacles, including a steep slope, sharp turns, bumps and public safety hazards, as shown in Figure 1.



Figure 1: SPTC racing event at Louisiana Tech

PRE-COLLEGE ENRICHMENT AT PRAIRIE VIEW A&M: For many years Prairie View A&M University (PVAMU) has sponsored the Pre-College Enrichment Institute (PCI), a two-week residential summer program, for talented high school students. The mission for PCI is to assist students in making early plans to pursue a college education in an area that interests them most. Minority Introduction to Engineering and Science (MITES) is offered to highly competitive students interested in engineering, engineering technology, computer science, physics, chemistry and mathematics. MITES is co-sponsored by the Roy G. Perry College of Engineering at PVAMU.

On May 25, Dr. Sanjay Tewari from Louisiana Tech University, with the help of Dr. Raghava Kommalapati from PVAMU, was able to connect with PCI-MITES to introduce the students to transportation engineering as part of his SPTC-funded project. Dr. Tewari talked about career opportunities in transportation as well as what transportation might be like in the future. This interaction with the students provided the background needed for students to participate in a small scale simulation focused on transportation and traffic engineering fundamentals. They raced remote controlled cars on the track shown earlier in Figure 1. Afterwards students shared their experiences and participated in an interactive discussion on the role of science and engineering in overcoming societal challenges.

EXXON-MOBIL BERNARD HARRIS SUMMER SCIENCE CAMP: The Exxon-Mobil Bernard Harris Summer Science Camp (EMBSSC) was hosted during June 14-26 at Prairie View A&M University to provide activities, experiments, projects, and field experiences for students entering 6th, 7th, or 8th grade in the fall of 2015. The camp promotes science, technology, engineering, and mathematics education and supports historically underserved and underrepresented students with limited opportunities. Grade 5, 6, or 7 students who have an interest in science and mathematics and at least a B average in science and mathematics were eligible. The recruitment area of this camp covered 11 different counties in Texas (Austin, Burleson, Brazos, Colorado, Fayette, Lee, Grimes, Montgomery, Waller, Washington and Wharton).



Dr. Kommalapati was once again instrumental in connecting Dr. Tewari with EMBHSSC. Dr. Tewari interacted with approximately 60 students who were part of this camp and provided a presentation focused on transportation engineering, including career opportunities in transportation. These students also participated the racing activity shown in Figure 1.



Figure 2: Dr. Tewari talks to students at Prairie View A&M

TEACHERS TAKING ON TRANSPORTATION: Thirteen North Louisiana high school teachers took part in a three-day workshop at Louisiana Tech University this summer to gain hands-on experience in projects that could be implemented in the classroom to expose students to the fun and high-tech side of transportation engineering and related careers. The workshop team guided teachers through six activities designed to give context to fundamental topics and increase awareness of transportation engineering.

The teachers used radar guns to measure vehicle speeds from several different angles. This data was used to talk about vectors and trigonometry. The teachers also

used the radar guns to conduct a speed study, giving them another set of data and a context for looking at statistics. Other activities included a study of water runoff, experiments to determine friction coefficients of a tire on wet and dry pavement, an analysis of traffic noise using a digital sound level meter, and an egg crash car competition where the participants had to design a safe barrier to absorb the energy of an egg car crash. At the end of the workshop, the teachers developed plans for implementing the activities at their own schools. Each teacher received two radar guns, a digital sound level meter, a digital force sensor, and a variety of other supplies to help implement the projects at their school.



Figure 3: High school teachers use radar guns for math activity

About the Researchers

Four of the faculty members involved in this project are from Louisiana Tech University, including Drs. Sanjay Tewari and Norman Pumphrey (civil engineering) and Drs. Marisa Orr and David Hall (mechanical engineering). Dr. Raghava Kommalapati is a faculty member in civil and environmental engineering at Prairie View A&M University. Please send inquiries to stewari@latech.edu.

The Southern Plains Transportation Center is a consortium of eight universities in U.S. Department of Transportation Region VI: the University of Oklahoma, Oklahoma State University, Langston University, University of Arkansas, University of New Mexico, Louisiana Tech University, University of Texas at El Paso and Texas Tech University.



The SPTC provides a unique opportunity through multi-institutional initiatives to develop comprehensive, cost-effective, and implementable solutions to critical infrastructure issues facing the transportation systems of the region and the nation, and to prepare transportation professionals for leadership roles through *Research, Leadership, Collaboration, Education, Outreach, Tech Transfer* and *Workforce Development* activities.