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**University Transportation Center for Mobility**

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# **Promoting Workforce Development for the Transportation Profession Through a Multi- University/Agency Partnership**

## ***Final Report***

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Jasek, William Stockton and Robert Benz**

***Performing Organization***

University Transportation Center for Mobility™  
Texas Transportation Institute  
The Texas A&M University System  
College Station, TX

***Sponsoring Agency***

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**UTCM Project # 08-45-07**

University Transportation Center for Mobility™  
Texas Transportation Institute  
College Station, TX 77843-3135

## **FINAL REPORT**

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**December 15, 2010**

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**Table of Contents**

Disclaimer ..... 2

Acknowledgment ..... 2

Table of Contents ..... 3

Executive Summary ..... 5

Introduction..... 6

Objectives ..... 6

Methodology ..... 7

    Task 1: Review and Develop Curricula for the STI and STI Scholars programs ..... 7

    Task 2: Develop Former STI Student Network ..... 10

    Task 3: Develop Academic Pathway ..... 11

    Task 4: Develop and Implement STI Scholars program..... 13

    Task 5: Develop Network for Sustainability ..... 14

Performance Measures..... 14

Appendix: 2010 STI and STI Scholars program at PVAMU Report ..... 17





## Executive Summary

The objective of this multi-university/agency partnership between Prairie View A&M University (PVAMU), Texas Transportation Institute (TTI), and Texas A&M University (TAMU) is to continue the efforts initiated under the short-term seed funding to produce high-quality transportation professionals from underrepresented groups through research and other real-world experiences. This partnership strengthened the existing pipeline between local high schools and PVAMU by attracting bright young minds for summer program experiences during students' last two summers before graduation from high school. One program is the existing Federal Highway Administration (FHWA) sponsored Summer Transportation Institute (STI), and the second is the STI Scholars program that was developed as part of this project. The newly developed curriculum for the STI Scholars program is challenging and introduces the transportation engineering concepts. This program also provides opportunity for the Scholars to mentor new STI participants as well as gain invaluable experience working with transportation professionals at TTI. In addition, STI Scholars are encouraged to pursue an existing 4-year civil engineering program at PVAMU. The individuals were provided with a unique combination of mentoring and real-world experiences through TTI, TAMU, and other partnerships with governmental agencies and private and public corporations. Some other opportunities that are currently available, such as the Eisenhower Transportation Fellowships for juniors and seniors, are leveraged to increase the quality of experiences for the participants. The project produced a network of (i) former students, (ii) educational professionals (counselors and teachers), and (iii) public and private agencies including academia to ensure long-term sustainability of the program. This program can serve as a model to similar outreach programs at other locations across the nation.

As part of this project, an advisory board for STI consisting of school teachers and counselors was established to increase the outreach of our program to schools. A database containing more than 1,000 school teachers and counselors at more than 160 schools across Texas was developed and used to communicate news about the STI program. A database of the past STI participants was updated, and communication links were established. Our team developed a strong presence for STI on the World Wide Web for our alumni and other friends to interact with us and with each other. We used social network sites such as MySpace and Facebook to accomplish this goal. These web pages are updated frequently and serve as a key link between the current and former students and the university. The STI Scholars program has been implemented for 3 consecutive years, with two students in 2008, three in 2009, and three in 2010. This program also supported the original STI program in 2010 when the funding for STI from FHWA fell through at the last minute. The current grant was able to fully fund the modified two-week residential 2010 STI program. The 2010 STI program graduated 17 students.

The success of this project is having a positive impact on the civil engineering programs at PVAMU and TAMU, and efforts are being made to expand this partnership to other universities in the TAMU system as well as to community colleges and other universities. We are seeking additional funding to promote these activities.

## Introduction

The U.S. Department of Labor forecasts that more than 165 million jobs will be available in the year 2012. However, just 162 million people will be in the workforce during that same time period. This shortage of workforce is not unique to the United States. Many of the current industrialized countries will also be facing shortages in the workforce in the future. These stats are alarming, and strong efforts are needed to develop the workforce, particularly from underrepresented groups, to meet this growing demand. One program that addresses this issue is the Federal Highway Administration (FHWA) sponsored National Summer Transportation Institute (NSTI). STI program was started at Prairie View A&M University (PVAMU) in 2000. This program also administered at multiple locations across Texas through the Texas Transportation Institute (TTI). Over the last 10 years, the highly successful Summer Transportation Institute (STI) Program at PVAMU graduated an average of 16-18 participants each year. These programs have directly educated approximately 200 middle and secondary school students and indirectly educated many others through program participants. Though this program focuses on the broader transportation profession, the transportation/civil engineering workforce is a major part of this effort. The development of these types of outreach programs creates a pipeline for future transportation professionals and civil engineers that is crucial for long-term sustainability of the transportation workforce. This project has expanded and built upon the success of these existing programs by creating new partnerships with the ultimate goal of producing transportation professionals with strong research and other real-world transportation engineering experiences.

## Objectives

This project is aimed at generating a pool of qualified transportation professionals from underrepresented groups. The project will also generate a network of (i) former students, (ii) educational professionals (counselors/teachers), and (iii) public and private agencies including academia to ensure long-term sustainability of the program. This program can serve as a model to similar outreach programs at other locations across the nation. The success of this project is having a positive impact on the civil engineering programs at PVAMU and TAMU, and efforts are made to expand this partnership to other universities in the TAMU system as well as to community colleges and other universities. The progress and the success stories are publicized through websites, presentations, and reports.

The objectives of this project are achieved through a series of tasks as follows:

1. Develop the new paradigm (i.e. academic path with relevant connectors) for high school student with the two summer programs during the last two years of high school and the subsequent undergraduate and graduate experiences before entering the transportation engineering workforce.
2. Create a database of all the STI participants who graduated from PVAMU in the last 10 years and establish communication links.
3. Prepare marketing resources (brochures, other promotional materials).

4. Review/develop admission criteria, identify potential high schools to target including magnet schools and charter schools, and engage four to six teachers/counselors from the identified schools to work with the program in advisory roles.
5. Seek corporate partners to work with PVAMU and TTI on this long-term effort. Our relationship with TTI should help in attracting major sponsors that have established connections to TTI.

The project team set the following performance measures over the duration of this project.

1. The number of high schools solicited for participation in the STI program will increase from 100 to 110.
2. The number of applications received for new STI students will increase from 30 to 35.
3. At least two STI students will apply and return to the STI Scholars program for a second year. (Currently, the program does not allow for multiple years of participation.)

## Methodology

The following sections explain in detail the project tasks and the performance measures.

The specific tasks are as follows:

1. Review and develop curricula for the existing STI program and the STI Scholars programs.
2. Develop former STI student network.
3. Develop academic pathway for STI and STI Scholars
4. Develop and implement STI Scholars program.
5. Develop network for sustainability.

### *Task 1: Review and Develop Curricula for the STI and STI Scholars Programs*

The current STI program was revised to enhance hands-on engineering applications and projects to generate excitement and curiosity. The STI Scholars program was developed and directed toward a more challenging environment with exposure to research and other real-world experiences. The graduates of the Scholars program are then fed into an existing 4-year undergraduate civil engineering program at PVAMU.

The STI program is an FHWA-funded program and was offered at PVAMU as a four-week program since 2000. The FHWA has mandated certain curricula to be included in the four-week program. These include air, water, and land transportation and transportation safety. The program also incorporates several enhancement activities such as preparations for the SAT, time management, public speaking, mathematics and English, and other career-planning activities such as college admission and résumé preparation. The four-week residential program further includes recreational activities during the evening hours and on weekends. For the year 2010, FHWA did not renew funding. This nonrenewal of funding was announced very late, so the

funding from this grant was used to modify the STI program to a two-week residential program. A detailed report of the STI program is included in the Appendix.

Students who complete the STI program are evaluated, and the top students are invited to participate in the STI Scholars program. The STI Scholars program provides a combination of education, exposure, and the opportunity to mentor the younger STI students. The curriculum for the STI Scholars is designed in a manner that it will better transition participants into an undergraduate program. They gain invaluable real-world experience by working with the transportation professionals. Hands-on activities and projects constitute the key areas of the STI Scholars program. The STI report presented in the Appendix includes activities of the STI Scholars program as well.

Two brochures and a website ([www.pvamu.edu/STI](http://www.pvamu.edu/STI)) were developed for the STI and STI Scholars programs. More details can be found on the website. A snapshot is presented in Figure 1 below.

### **Curriculum for the STI and STI Scholars Programs**

We developed and implemented some new modules in the 2008 STI and STI Scholars programs. We recruited Dr. Chris Hunter, a transportation faculty member from the University of Rhode Island, to develop a few modules. Below is list of some of the new modules developed as part of this project. These new modules were developed first for the STI Scholars program, however many of them were used for STI program as well.

- Introduction to Transportation and Transportation Engineering—Transportation Challenges and Transportation Jeopardy
- How Fast Are You? Reaction Time and How It Links to Transportation
- How Long Should the Yellow Light Last?
- Signalized Intersection Data Capture and Reduction: What Is Really Happening?
- Does the Signal Timing Really Meet Your Approval?
- Freeway Capacity and How Well Does It Operate? Give It a Grade
- Transportation Safety Issues—Red Light Running, Speeding, Introducing Traffic Programming Logic
- Demonstrating the Impact of Thicker Beams—Interactive Lecture
- Building the Most Efficient Truss Bridge through Simulation
- Building a Bridge (Balsa Wood)
- Testing a Bridge
- Building the Most Cost-Effective Rigid Pavements for Roads
- Roadway Sample Testing
- Roadway Layout: A Look at Alignment and Elevation Changes
- Making Your Bus Route Effective
- Providing the End Point: Creating a Great Parking Lot
- Water Ferry Service
- Airport Runway Capacity

Summer Transportation Institute - Mozilla Firefox  
 http://www.pvamu.edu/sti

PANTHERTRACKS | Give to PVAMU | A-Z INDEX

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 What is STI?  
 Sample Calendar of Activities  
 People Involved  
 Pictures  
 Sample Annual Report  
 Links  
 STI Scholars Program

Home » Summer Transportation Institute


## Summer Transportation Institute

### STI Update

Congratulations to all STI 2010 graduates.

Information on STI 2011 program will be updated when it becomes available.

**Updated July 12, 2010**




Department of Civil and Environmental Engineering at Prairie View A&M University is hosting 2010 Summer Transportation Institute (STI) from June 20- July 2, 2010. This program is modified into a two-week residential program for rising 11th and 12th grade students with funding from [University Transportation Center for Mobility \(UTCM\)](#). This program in the past (2000-2009) was a 4-week residential program and was sponsored by [Federal Highway Administration \(FHWA\)](#) through [Texas Department of Transportation](#). STI recruits 15-18 bright students and exposes them to various exciting activities and field trips that provide them an understanding of the engineering and broader civil engineering with a special focus on transportation industry and careers. The students selected for this program will be offered a scholarship of \$2000, which will cover all the expenses for the program. Thus the program has no out of pocket expenses for the participants. The program includes class room lectures, hands on activities, educational and recreational field trips in addition to evening and weekend enhancement and recreational activities. The participants will develop professional skills, experience college life, interact with like-minded peers and learn the college admission and financial aid procedures. The participant will also receive a certificate of completion in addition to other merit awards during the closing ceremony for which the parents and family are invited.

STI 2010 is scheduled to start on Sunday June 20, 2010. The application deadline is May 21, 2010. To apply for admission download the [application package](#). Discuss the program with your parents/guardian and your science or math teacher and counselor. Parents or teacher/counselors must nominate the student for this program. Students must complete the application materials and attach the required documentation (two page application, teacher recommendation form, letter of nomination, essay, school transcript and other standardized test scores if available) and send to us before the deadline. The selected applicants will be notified in the first week of June, 2010.

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Now: Cloudy and 72°F | Today: 76°F | Fri: 69°F

Figure 1. Snapshot of STI Web Page

## STI Advisory Board

We identified several schools and then chose specific science and math teachers and counselors from these schools to serve on the PVAMU STI Advisory Board. We sent out invitation emails to approximately 1,000 math teachers, science teachers, and counselors in March 2008. From the responses received, approximately 12 teachers and counselors from 10 schools were targeted for their enthusiastic replies and interest. We requested the resumes of these 12 individuals, reviewed them carefully, and selected six candidates for the STI Advisory Board. These six individuals (see Table 1 below) were sent a congratulatory letter with a list of their duties and responsibilities as a PVAMU STI Advisory Board Member for the years 2008 to 2010. They were also asked to complete time-sensitive paperwork to receive their \$500 honorarium. These members did an excellent job promoting the program on their campuses and in their communities. They attended one campus meeting, and the majority of the other communications were in the form of telephone calls and emails.

Table 1. PVAMU STI Advisory Board Members for Years 2008-2010

Name	Position	High School	Location
Cheryl Craven	Math Teacher, Head Swim Coach, Assistant Varsity Softball Coach	Thurgood Marshall HS	Houston, TX
Bertha Cedillo Valle	Chemistry Teacher	Memorial HS	Houston, TX
Jimia L. Baker	Counselor	Pearland HS	Pearland, TX
Brandy Dean	Chemistry Teacher	Clifton J. Ozen Magnet HS	Houston, TX
Yolanda D. Foster	Magnet Coordinator	James Madison HS	Houston, TX
Shaniquwa Finley-Carter	Counselor	Forest Brook HS	Houston, TX

### *Task 2: Develop Former STI Student Network*

A student network was formed by creating a database of all PVAMU STI program graduates from the last 10 years, which helped in establishing communication links. We then contacted all previous student participants of the PVAMU STI program from 2000 through 2010. Also, a follow-up survey was conducted in order to update the contact information. The purpose of the survey was to i) get feedback on the value of the STI program for the participants, and ii) determine what career choices the participants had made after the STI program. This helped us determine whether STI is achieving its goal. A matrix was developed for the survey in Microsoft Excel, and addresses, phone numbers, and other personal information of each participant were recorded. Table 2 shows the number of participants whose contact information was updated and the number of participants that agreed to a follow-up survey.

One of the goals of this project was to initiate and sustain regular communication with the former STI students. It was decided to use the existing social networking sites, specifically MySpace

and Facebook. We developed “STI pages” on these two sites. A sample page from Facebook is shown in Figure 2 on the next page. Though attempts were made to communicate with the former students through these media sites, our team was not very successful in this area. After a careful review, it was pointed out that we need to solicit help from people familiar with this kind of media and utilize their services to aggressively promote and update the content on these sites.

Table 2. Update of Past STI Participant Data

STI Participating Year	Provided Updated Contact Information	Agreed to Complete Follow-up Survey
2000	6	6
2001	2	3
2002	3	13
2003	3	11
2004	2	12
2005	2	12
2006	4	14
2007	15	17
2008	16	16
2009	16	16
Totals	69	120

### *Task 3: Develop Academic Pathway*

The academic pathway will create means for successful STI participants to enter civil engineering and other relevant technical disciplines. This pathway will include opportunities during the academic year as well as hands-on summer experiences utilizing the partnerships among PVAMU, TTI, and TAMU. Opportunities during the academic year will include mentoring, research, and other real-world experiences in transportation professions. The students will enhance their academic learning by participating in summer internships. Dr. Perkins and Dr. Stockton provided guidance and identified potential partnerships and Mr. Benz identified opportunities for students in the Houston area. Dr. Kommalapati coordinated this effort with the co-PIs and other transportation professionals to develop and implement this academic pathway.

As pointed out in Task 1, the current STI program is was revised and enhanced to include more hands-on engineering applications and projects to generate excitement and curiosity, and the STI Scholars program was developed and directed toward a more challenging environment with exposure to research and other real-world experiences. Students from these two programs are then encouraged to join the existing 4-year undergraduate civil engineering program at PVAMU. Students experience a unique combination of mentoring and skills through TTI, TAMU, and other government agencies and private and public corporations. Other programs such as the





Figure 2. Snapshot of STI Facebook Page

Eisenhower Transportation Fellowships for juniors and seniors are leveraged to increase the magnitude and value of the experiences for the participants. Upon successful completion of the 4-year civil engineering degree, students will be encouraged to pursue graduate education at TAMU with research assistantships through TTI or pursue careers in the transportation field.

The conceptual pipeline diagram of the program is presented in Figure 3. The majority of the components identified in this diagram (marked in blue) exist already. The STI and the STI Scholars programs have established relationships with TTI and other private and public entities (marked in red) involved in the transportation field to provide opportunities in research and real-world experiences. Both these projects have also helped in developing strong relationships with many high schools in Texas and other states.

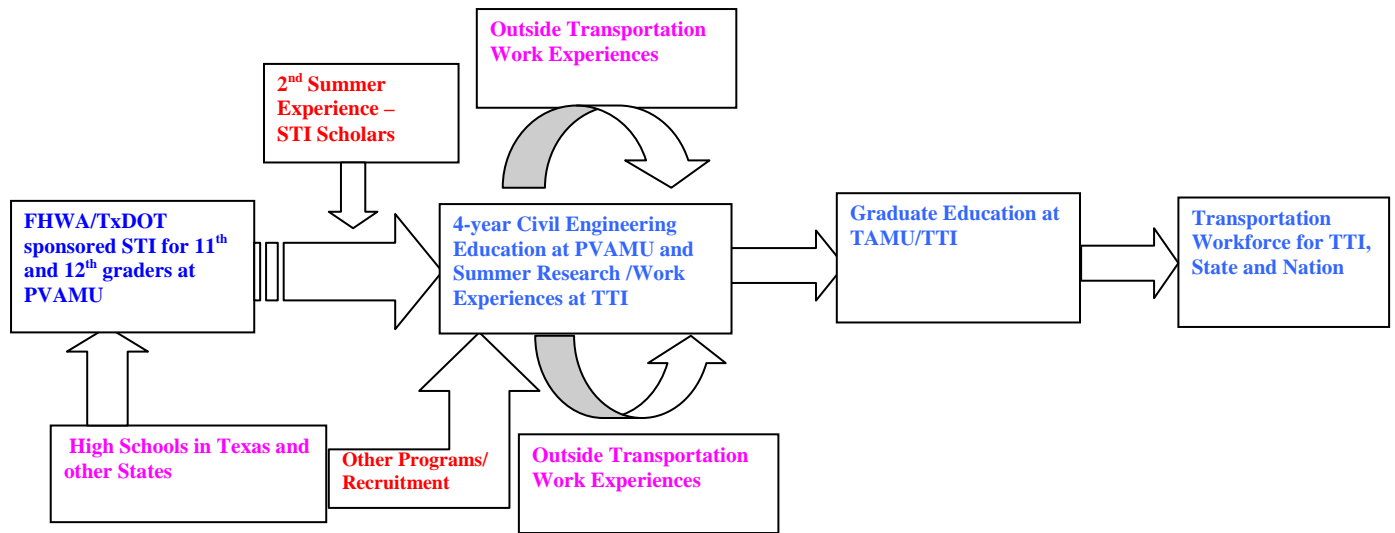


Figure 3. Conceptual Diagram for the Proposed Academic Pathway

#### *Task 4: Develop and Implement STI Scholars Program*

As part of this project, we developed the STI Scholars program and worked with the existing STI program to develop the curriculum. Some of the curricula and topics included in the STI Scholars program are discussed in Task 1. We recruited two students from the 2007 STI program for the 2008 Scholars program and three students for each of the next 2 years. This project also funded the 2010 STI program, which was modified to 2 weeks from 4 weeks, as the FHWA funding for the STI program was cut for 2010. A detailed 2010 STI and STI Scholars program report is included in the Appendix.

### *Task 5: Develop Network for Sustainability*

In order to ensure the long-term sustainability of these programs, it is critical that we develop a network of public and private partnerships and support. Thus, the project team has continued its efforts to develop partnerships within TTI, PVAMU, and TAMU. The team has also solicited support from governmental agencies and private corporations. These relationships were intended to generate funds and support for the long-term sustainability of the program. Though we did not receive funding for the 2010 STI program, we submitted a new proposal to host the 2011 STI program. We are hoping that the STI program will receive funding for 2011 and beyond. The funding amount is about \$65,000 per year.

As part of this effort, we collected names and contact information for numerous corporations and foundations for soliciting financial support for the long-term sustainability of these programs. Though our efforts did not yield any direct financial support, we were able to receive in-kind support for our programs in the form of guest lectures by experts, meals, transportation, and resources for recreational activities. The bad economy is partially the reason for lack of financial support. Our efforts to solicit funds are continuing.

### **Performance Measures**

Following is a review and detailed description of the performance measures set by the project team.

- Advance and expand the STI program and develop the STI Scholars program with a rigorous curriculum at PVAMU.
  - We developed an academic pathway in which a student who attends the STI after completing the 10<sup>th</sup> grade will be brought back to attend the STI Scholars program after the 11<sup>th</sup> grade and join a PVAMU civil engineering program after graduation from high school. Students were mentored and provided transportation engineering exposure along with transportation internship opportunities. Students were encouraged to pursue graduate degrees in transportation. We brought two STI students to the STI Scholars program in 2008 and increased this number to three for each of the next 2 years (2009 and 2010). We have one of the two 2008 STI Scholars in the civil engineering program at PVAMU and another pursuing engineering at Texas Tech University.
- Increase the number of high schools solicited for participation in the program from 100 to 110.
  - We finalized two brochures, one for the students and the other for teachers and parents, along with a post card that provides information on the STI program. The brochures are printed in hardcopy and are also made available on the STI website.
  - We developed a website ([www.pvamu.edu/STI](http://www.pvamu.edu/STI)) for the STI and STI Scholars programs.
  - We developed MySpace and Facebook pages to promote STI among youth.
  - We contacted 160 schools, exceeding the goal of 110.
  - We emailed 1,000 school teachers and counselors from the above-listed 160 schools, informing them of the STI program and directing them to the STI website.

- We formed the STI Advisory Board consisting of six teachers and counselors from high schools in Texas.
- Increase the number of applications received for new STI students from 30 to 35.
  - We received an average of more than 50 applications for the last 3 years, exceeding the goal of 35.
- Have two STI students apply to return to the STI Scholars program for a second year. (the STI program does not provide for multiple years of participation prior to this project.)
  - The STI Scholars program started in 2008 with two STI students coming back for second year of experience and expanded to three students in each of the next two years (2009 and 2010).



**Appendix:**  
**2010 STI and STI Scholars Program at PVAMU Report**



**2010 SUMMER TRANSPORTATION INSTITUTE  
AND  
2010 STI SCHOLARS PROGRAM  
AT  
PRAIRIE VIEW A&M UNIVERSITY**



**REPORT**

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## Table of Contents

ABSTRACT.....	23
SECTION I: STI PROGRAM.....	24
INTRODUCTION .....	24
OBJECTIVES OF STI AT PVAMU .....	25
PARTNERS/SPONSORS.....	25
PARTICIPANT RECRUITMENT AND SELECTION.....	26
Recruitment.....	26
Selection.....	26
Participant Profile .....	28
Participant School Information .....	29
PROGRAM FACULTY AND STAFF.....	30
Program Director and Program Coordinator.....	30
Instructors .....	31
Male and Female Counselors.....	31
DEMOGRAPHIC SUMMARY.....	32
STI ACADEMIC PROGRAM .....	33
Classroom Activities.....	33
Speakers/Presenters.....	35
Hands-on and Enhancement Activities.....	36
Projects.....	37
Field Trip .....	37
STI Program Schedule and Activities.....	39
STI Detailed Daily Activities.....	41
RESIDENTIAL LIFE .....	43
SPORTS AND RECREATION .....	44
STI EVALUATIONS .....	45
Staff Evaluation .....	45
Speakers Evaluation.....	46
Academic Field Trip Evaluation.....	47
Sports and Recreation Evaluation.....	47
Enhancement Program Evaluation.....	48
Classroom Session Evaluation.....	49
Overall Program Evaluation .....	50

SECTION II: STI SCHOLARS PROGRAM .....	51
INTRODUCTION .....	51
PARTICIPANT DETAILS .....	51
Participant Profile .....	51
Participant School Information .....	51
DEMOGRAPHIC SUMMARY .....	52
STI SCHOLARS ACADEMIC PROGRAM .....	53
Classroom Activities .....	53
Special Curriculum for STI Scholars .....	55
Special Scholars Projects .....	56
STI Scholars Program Schedule .....	57
STI SCHOLARS PROGRAM EVALUATIONS .....	59
Staff Evaluation .....	59
Academic Field Trips Evaluation .....	60
Sports and Recreation Evaluation .....	60
Enhancement Program Evaluation .....	61
Overall Program Evaluation .....	62
SECTION III: OTHER PROGRAM RELATED INFORMATION .....	63
ORIENTATION .....	63
AWARDS/CLOSING CEREMONY .....	63
RECOMMENDATIONS .....	65
SECTION IV: SUPPLEMENTARY MATERIAL .....	66
PHOTOGRAPHS OF STI AND STI SCHOLARS PROGRAM ACTIVITIES .....	67
SAMPLES OF STI STUDENT WORK .....	88
2010 STI AND STI SCHOLARS PROGRAM AWARDS CEREMONY .....	97

## ABSTRACT

In existence for almost a decade, the Summer Transportation Institute (STI) at Prairie View A&M University (PVAMU) is in its eleventh year. The Prairie View A&M University Summer Transportation Institute benefits high school students, particularly underrepresented minority students. STI exposes eleventh- and twelfth-grade students to various aspects of the transportation industry. Ultimately, this exposure is intended to enhance their interest in pursuing a college education and joining the transportation workforce. This year, the Prairie View A&M University Summer Transportation Institute received 50 applications from across Texas. Seventeen participants who completed 10<sup>th</sup> and/or 11<sup>th</sup> grade and expressed an interest in science and technology and/or transportation-related careers were admitted to the program. The participants were primarily from the Houston area, with students also from the cities of Dallas, Missouri, Mansfield, Amarillo, and Rockwall. There were 10 boys and 7 girls. The racial makeup of the participants was varied (e.g., African American, American Indian, Hispanic, Caucasian, and Asian American). This year's program was conducted from June 20, 2010, through July 2, 2010, and required that students remain in residence on the campus of Prairie View A&M University throughout the entirety of the program. The academic component of the Summer Transportation Institute is twofold: (1) introduce the participants to interdisciplinary aspects of transportation; and (2) develop an interest in students for higher education and careers in the transportation industry. The specific topics discussed with this year's participants include but are not limited to (1) Mathematics (e.g., Solving Equations, Factoring, Quadratic Equations, Parent Functions, System of Equations, and Functional Notations); (2) Yellow Light Timing; (3) Traffic Signal Survey and Data Collection; (4) Building Bridges; (5) Recycled Materials and the Importance of Recycling; (6) Construction; (7) Aluminum Foil Boat; (8) Building Towers; (9) Transportation Issues Affecting the Public; (10) Life Success; (11) Space Transportation; (12) Road Transportation; (13) Pavement Design and Testing; (14) Design of Rockets; and (15) Computer and Information Technology and its Applications in the Transportation Industry. Approximately six guest speakers from various organizations including the Texas Department of Transportation visited Prairie View A&M University and talked to the participants, while others enlightened the students during academic field trips.

Three applications were received for the STI Scholars program. These three students (2 boys and 1 girl), who had participated in the 2009 STI, were selected. The STI Scholars program exposed these students to in-depth research and activities in the transportation field. The opportunity provided to these students to return again to the PVAMU campus in 2010 increased their self-esteem and enabled them to explore all activities more enthusiastically.

The Closing Ceremony was held on July 2, 2010, with Dr. William Stockton, PE, the executive associate director of the Texas Transportation Institute in College Station, Texas, as the keynote speaker. Three students were recognized for individual merit (the STI Director's Award for the best overall performance, followed by the Excellence Award and Meritorious Award). Two students were given special recognition for their congeniality and model behavior throughout the program (Mr. and Miss STI). Three group awards were presented to the teams that did well in all of the assigned projects. One student from each team was recognized as the lead engineer of the team.

# **2010 Summer Transportation Institute At Prairie View A&M University**

## **SECTION I: STI PROGRAM**

### *INTRODUCTION*

Prairie View A&M University (PVAMU) conducted the Summer Transportation Institute (STI) Program on its campus for the eleventh year from June 20, 2010, through July 2, 2010. The Prairie View A&M University Summer Transportation Institute is sponsored this year by the University Transportation Center for Mobility (UTCM). This program was funded for the last decade (2000-2009) by the Federal Highway Administration. It is hard to fathom that the program is almost a decade old, as we can still remember the smiles of the very first students we hosted in the program on our campus. The Prairie View A&M University Summer Transportation Institute works diligently to attract a broad and diverse selection of bright minds to our campus. We are determined to acquaint and stimulate them with various aspects of the transportation industry. The Prairie View A&M University Summer Transportation Institute recruits students from underrepresented minority groups and exposes them to various aspects of the transportation industry. It is our intention to enhance their interest in pursuing a college education and eventually joining the transportation workforce.

This year's program admitted 17 high school students who completed 10<sup>th</sup> or 11<sup>th</sup> grade by June 2010. Students who showed interest in science and technology and/or transportation-related careers were given higher percentage points in the quantitative selection process. The Prairie View A&M University Summer Transportation Institute was conducted from June 20, 2010, through July 2, 2010, and required students to reside on the campus of Prairie View A&M University throughout the entirety of the program. The academic component of the Summer Transportation Institute holds two primary interests: (1) to introduce students to interdisciplinary aspects of transportation; and (2) to develop an intense interest in students to pursue higher education and careers in the transportation industry. The specific topics discussed with this year's participants include but are not limited to (1) Mathematics (e.g., Solving Equations, Factoring, Quadratic Equations, Parent Functions, System of Equations, and Functional Notations); (2) Yellow Light Timing; (3) Traffic Signal Survey and Data Collection; (4) Building Bridges; (5) Recycled Materials and the Importance of Recycling; (6) Construction; (7) Aluminum Foil Boat; (8) Building Towers; (9) Transportation issues affecting the public; (10) Life Success; (11) Space Transportation; (12) Road Transportation; (13) Pavement Design and Testing; (14) Design of Rockets; and (15) Computer and Information Technology and its Applications in the Transportation Industry.

## *OBJECTIVES OF STI AT PVAMU*

The objectives of the Summer Transportation Institute at Prairie View A&M University are (i) expose the high school students to and allow them to participate in a series of academic and practical experiences designed to motivate them toward professions in the transportation industry; (ii) attract a broad and diverse selection of bright minds and acquaint and stimulate them with the various aspects of the transportation industry; (iii) provide secondary and high school students with mathematics, science, and technological enrichment to assist them in the pursuit of a career in the transportation industry; and (iv) increase the number of students who choose a career in the transportation industry.

The Prairie View A&M University Summer Transportation Institute is designed to stimulate and sustain interest in transportation at the high school level in order to increase the number of youth, particularly a diverse group of talented youth, to pursue careers in the transportation industry. Specifically, the Prairie View A&M University Summer Transportation Institute provides the participants with tools so that they will:

- become aware of the occupations and career opportunities in the transportation industry
- identify methods of moving people and cargo
- be able to identify consumers and providers of the transportation system
- be introduced to many devices and methods used to manage transportation systems
- be introduced to local, state, and federal regulations as they relate to the transportation industry
- explore the many areas of transportation safety
- become aware of intermodal transportation
- explore the importance of construction engineering issues as they relate to the transportation industry
- be introduced to alternative sources of energy and their environmental impact
- identify current research, technology, and their application in the transportation industry

The Prairie View A&M University Summer Transportation Institute achieved the above objectives through a series of classroom lectures, various guest speakers, and off-campus field trips covering the aforementioned topics and other topics. The class lectures, guest speakers, and field trips were evaluated regularly to assist in addressing these objectives. The specific STI activities, guest speakers, and field trips are summarized in later sections under the *academic component*.

## *PARTNERS/SPONSORS*

The following partners and sponsors were very instrumental in making the 2010 STI program a success: The dean of engineering provided a matching salary that was necessary to be able to execute this program, though there was no requirement from the sponsor. The Department of Civil and Environmental Engineering provided the basic administrative support in the form of secretarial services and routine office supplies and facilities. The PVAMU Office of Student Affairs provided in-kind support in excess of \$6,000 in the form of counselors and evening and recreational programs. We also recognize help from Texas Department of Transportation

(TxDOT) and Houston TranStar in coordinating field trips. TxDOT provided half a dozen speakers to travel to our campus from Austin and Houston to engage our participants in various transportation-related activities in addition to coordinating a field trip to their district office in Houston. The support of these agencies/individuals is very much appreciated.

## *PARTICIPANT RECRUITMENT AND SELECTION*

### **Recruitment**

Students enrolled in public and private high schools in the state of Texas were invited to participate in the 2010 Summer Transportation Institute at Prairie View A&M University. PVAMU STI officials researched every high school in Texas and decided to reduce the recruitment list to high schools (including magnet schools and charter schools) within 200 miles of Prairie View A&M University. The high school database contains the name, address, telephone number, and county for over 160 schools. Approximately two math teachers, two science teachers, and two counselors were identified for each school and placed in the database. With few exceptions, an e-mail address is listed for each contact. PVAMU administrators in the Roy G. Perry College of Engineering were asked to provide a list of high schools from which most of their engineering students come. They provided a list of 12 schools from which they have received the most students in the state of Texas. We compiled similar contact information for these 12 schools as that for the 160 other schools in our database. More than 1,030 teachers and counselors were contacted during the months of April 2010 and May 2010. Additionally, a mass e-mail was sent to all employees of Prairie View A&M University alerting them of the deadlines for the 2010 STI admissions process.

Applicants were required to submit an application, a written statement expressing their interest in transportation, a letter written by a parent, teacher, or counselor nominating them for the program, and a letter of recommendation from one of their school's mathematics, technology, or science faculty or a guidance counselor on or before May 1, 2010. All the selected students for the 2010 STI program had a GPA of 3.2 or higher. Upon completion of the quantitative selection process, the staff assistant notified the successful applicants during the first week of 2010. More than 50 candidates applied for admission to the STI program, and admission was offered to 17 students. Only a few of the applicants did not qualify, and some were missing information from their application packages. The PVAMU STI could not accommodate more than 17 students due to financial constraints. All 17 students who were selected based on qualifications accepted the offer and attended the program and represented 15 cities, 9 counties, and one state. The selection criteria used is given below.

### **Selection**

The selection committee was comprised of the director, the STI program coordinator, and the staff assistant. The criteria used for selecting the participants are given below:

- Students must have passed 10<sup>th</sup> or 11<sup>th</sup> grades before they are admitted to the STI.
- Student must have completed algebra or be qualified for enrollment in algebra for the coming school year.
- Students must have a minimum cumulative grade point average of 2.25 on a 4.0 scale.

- Students must have an expressed interest in engineering, science, transportation, or technology careers.
- Students must provide at least one letter of recommendation.
- Students must provide a copy of their standardized test scores and transcript.
- Student must provide a written statement from student regarding his/her reason for wanting to participate in the program.
- Student must provide a letter written by a parent, teacher, or counselor nominating the student for the program.

Students were given a score number between 0 and 5 for each item of the qualification criteria for admission. The director, the program coordinator, and the staff assistant evaluated all applications. The scores were tabulated and analyzed in an Excel database. The top-ranking applicants were selected for admission to the STI program. The seventeen selected participants were notified by a phone call followed by an email, which included the entire notification package. Detailed information about the Prairie View A&M University Summer Transportation Institute and required forms such as a participant profile, waiver of liability, medical release, permission to photograph, etc. were sent to the participants as part of the notification package. The participants were required to contact STI and confirm their interest in attending the program. The parents were required to sign and obtain notarization for the Waiver of Liability form, Medical Release form, and Permission to Use Photograph form. Additionally, parents were required to provide STI officials with a copy of the medical insurance card for the student. We also provided the participants with information on things they should bring with them when they come to reside on the campus of PVAMU and what not to bring on campus. The participants' profile and information about their school is provided in the following two tables.



## Participant Profile

Name	Gender	Address	City, State	Zip	Prim Phone	Alt Phone	E-mail
Adams Asya	F	4450 Dapple Dr #1220	Keller, TX	76244	817-300-4862	817-657-3976	asya_adams@yahoo.com
Barajas Jocelyne	F	1655 Western Park Ct	Dallas, TX	75211	214-339-5818	214-704-2822	jocelyne_barajas@hotmail.com
Engmann Cyril Yannick	M	1500 Hickory Creek Lane	Rockwall, TX	75032	214-948-4001	972-670-5737	nickengmann_2@yahoo.com
Evans Michael	M	1525 Aberdeen Dr	Lancaster, TX	75134	972-228-0006	214-243-8799	mevans08@tx.rr.com
Fernando Christian P	M	7807 Camden Hollow Ln	Humble, TX	77396	440-667-3438	281-973-9405	macfernando@comcast.net
Hawkins Stenisha	F	3613 Sparrow Street	Houston, TX	77051	713-734-1182	713-443-7858	stenisha@hotmail.com
Jimenez Evelyn	F	3713 Royal Crest Dr	Fort Worth, TX	76140	817-528-6650	817-528-6650	jimenezfort@aol.com
Lugo Daniel	M	6530 Bellaire Blvd # 101S	Houston, TX	77074	832-978-6766	832-978-6766	daniel.lugo13@gmail.com
Lysford Kaci	F	1321 Klein Ave	Dumas, TX	79029	806-922-5917	806-922-5917	kacib_3000@yahoo.com
Moses Christopher	M	6015 Biltmore Court	Rosenberg, TX	77488	979-532-6882	281-239-5957	candkmoses1@att.net
Muhammad Tariq	M	3902 Glen Cove Circle	Missouri, TX	77459	713-539-8977	832-250-9287	sonyolagranola@att.net
Richard Alyssa	F	5930 Whitewell Dr	Katy, TX	77449	832-355-3092	832-259-0060	pinkdancer2505@hotmail.com
Ross Ashley	F	PO Box 201	Milford, TX	76670	469-285-9138	972-493-2105	ross.ashley_11@yahoo.com
Ragston Devonte	M	P O Box 4527	Prairie View, TX	77446	936-857-9570	832-367-4543	ragstonfocus@sbcglobal.net
Reddy Merlin	M	7114 Dekadine Ct	Spring, TX	77379	281-875-4732	707-225-7656	jpillai@sunstonehotels.com
Saracho Jose Carlos	M	8814 Llona Ln #1	Houston, TX	77025	713-432-7576	713-292-4678	jc_saracho@hotmail.com
Washington Treveyon	M	5010 Balkin St	Houston, TX	77021	713-741-5818	832-524-9589	treyday1021@yahoo.com

## Participant School Information

Name	Grade	School	School Address	City/ST	Zip	Counselor	Counselor E-mail
Adams Asya	12 <sup>th</sup>	Fossil Ridge High School	4101 Thompson rd.	Fort Worth, TX	76244	Molly Haffner	molly.haffner@kellerisd.net
Barajas Jocelyne	12 <sup>th</sup>	Skyline High School	7777 Forney Rd	Dallas, TX	75227	Maria Hernandez	Mhernandez2@dallasisd.org
Engmann Cyril Yannick	12 <sup>th</sup>	Rockwall-Heath High School	801 Lawrence Dr	Heath, TX	75032	Mrs. Foster	dwilt@kleinisd.net
Evans Michael	11 <sup>th</sup>	Bishop Dunne Catholic School	3900 Rugged Dr	Dallas, TX	75224	Alexis Stern	astern@bdhs.org
Fernando Christian P	11 <sup>th</sup>	Summer Creek High School	14000 Weckford Blvd	Houston, TX	77044	Danell Kite/ Sarah McDonald	danell.kite@humble.k12.tx.us/ sarah.mcdonald@humble.k12.tx.us
Hawkins Stenisha	12 <sup>th</sup>	Jack Yates High School	3703 Sampson St	Houston, TX	77004	Ms Broussard	
Jimenez Evelyn	11 <sup>th</sup>	Everman High School	#1 Bulldog Dr	Everman, TX	76140	Mr. Carl Stoneman	cstoneham@eisd.org
Lugo Daniel	11 <sup>th</sup>	Bellaire High School	5100 Maple St	Bellaire, TX	77401	Varlene Rubin	mrubin@houstonisd.org
Lysford Kaci	11 <sup>th</sup>	River Road High School	101 W Mobley Ave	Amarillo, TX		Michelle Mayfield	michelle.mayfield@rrisd.net
Moses Christopher	11 <sup>th</sup>	Wharton High School	1 Tiger Avenue	Wharton, TX	77488	Amanda Toman	atoman@wharton.isd.tenet.edu
Muhammad Tariq	12 <sup>th</sup>	Parkview Baptist HS	4151 Southwest Fwy	Houston, TX	77027	Tara Castellanos	tara@parkviewhomesschool.org
Richard Alyssa	12 <sup>th</sup>	Cypress Springs High School	7909 Fry Rd	Cypress, TX	77433	Simmons	deanna_scott.simmons@cfisd.net
Ross Ashley	12 <sup>th</sup>	Milford High School	205 3rd Avenue	Milford, TX	76670	Alton Chambers	achambers@milfordsd.ednet10.net
Ragston Devonte	12 <sup>th</sup>	Waller High School	Field Store Rd	Waller, TX	77446	Mrs. Payne	
Reddy Merlin	12 <sup>th</sup>	Klein Oak High School	22603 Northcrest Dr	Spring, TX	77389	Cheri Gardner	cgardner1@kleinisd.net
Saracho Jose Carlos	12 <sup>th</sup>	Bellaire High School	5100 Maple St	Bellaire, TX	77401	Marlene Rubin	mrubin@houstonisd.org
Washington Treveyon	12 <sup>th</sup>	Jack Yates High School	3703 Sampson St	Houston, TX	77021	Ms. Jeffery	

## *PROGRAM FACULTY AND STAFF*

The STI at PVAMU was conducted under the leadership of the project director, Dr. Raghava Kommalapati, associate professor of civil and environmental engineering. To address all components of the STI program, the following faculty and staff positions were filled.

Dr. Raghava Kommalapati	Program Director
Dr. Ramalingam Radhakrishnan	Program Coordinator
Dr. Ethelbert Opara	STI Scholars Coordinator
Ms. Samantha Glover	Instructor
Ms. Usha Anthony	Graduate Assistant
Ms. Bianca Young	Peer Female Counselor
Mr. Ezra Sidney	Peer Male Counselor
Mrs. Sharon Evans	Staff Assistant, Dept. of Civil & Environ Eng.
Mr. Herb Thomas	Coordinator for Recreational Programs, PCI, and Career Services

### **Program Director and Program Coordinator**

Dr. Kommalapati, interim department head of civil and environmental engineering is the director of STI. The program director was responsible for interfacing with the University Transportation Center for Mobility™ (UTCM) on all aspects of the STI. Dr. Ramalingam Radha, the program coordinator, assisted in developing and implementing all phases of the Summer Transportation Institute including but not limited to daily instruction; orientation to participants; curriculum development; planning and scheduling activities (day, evening, and weekend); managing the budget; and evaluation of the program. The director and the program coordinator are also responsible for supervising the academic program faculty and staff, and implementing, evaluating, and revising the academic curriculum. Dr. R. Radha had been the director for STI until 2005 and has been the program coordinator for the 2010 STI. Duties for the program director of STI at PVAMU include:

- Direct all aspects of the project.
- Serve as the STI contact with university administration and the sponsor, the Texas Department of Transportation, and UTCM.
- Perform review of the program periodically.
- Administer and keep track of the budget and expenditures associated with STI.
- Recommend and, where appropriate, approve all personnel and contracts for services.
- Evaluate the students' progress.
- Provide final evaluations of products, all expenditures, etc.
- Prepare all reports and forward to program sponsor(s).

## **Instructors**

Ms. Samantha Glover, who has many years of experience as a mathematics teacher at Waller High School, was appointed as faculty instructor. Ms. Glover has a B.S. degree in electrical engineering from Prairie View A&M University. She taught STI enrichment classes. The weekend and evening enrichment and recreational activities were coordinated by the instructor, who was responsible for periodic academic instruction and related activities and for supervising support activities and support personnel. She coordinated, evaluated, and revised all non-academic activities as required and was responsible for all extra-curricular and support affairs as they related to problem resolution and discipline. She was also responsible along with the academic aid for planning, organizing, and implementing all sports and recreational activities for weekday evenings as well as weekends.

Dr. Ethelbert Opara, STI Scholars coordinator, assisted the STI program coordinator, the director, and all other STI personnel. Dr. Opara also drove students to various field trips, helped prepare reports, and assisted the instructors and the director with classroom activities and other duties as needed, including program closeout activities.

Mr. Herbert Thomas is the coordinator for the Institute for Pre-College Enrichment (PCI) at Prairie View A&M University, and PCI administered the residential part of the PVAMU STI program by providing staff, counselors, and administrative staff to coordinate boarding, lodging, and needed logistics for the success of the program. Mr. Thomas's services were in-kind support from the PCI program, and the STI program appreciated all of his services.

## **Male and Female Counselors**

Ms. Bianca Young and Mr. Ezra Sidney, peer female and male counselors respectively, were hired by STI to help the 2010 PVAMU STI. These counselors were responsible for the 2010 PVAMU STI residential program. These counselors are undergraduate students and were hired as staff members who lived within the residence hall and assisted with out-of-class, evening, and weekend activities. Counselor responsibilities included:

- Maintaining reasonable order in the residence hall.
- Reporting all incidents in and around residence hall to director of residence hall.
- Counselors were directly responsible to the STI director.
- Cooperation with the director and professional STI staff.
- Promotion of effective study and living habits.
- Enhancement of proper respect for college and private property.
- Implementation of college and residence hall policies.
- Assistance with check-in/check-out.
- Weekend duties as assigned by the program director.

## DEMOGRAPHIC SUMMARY

The 2010 Summer Transportation Institute at Prairie View A&M University was conducted from June 20, 2010, thru July 2, 2010, for rising 11<sup>th</sup>- and 12<sup>th</sup>-grade high school students. The program required students to reside on the campus for the two-week duration of the program. The demographic data summary is presented below:

Dates of Institute: June 20, 2010 - July 2, 2010  
Program Classification: High School (11<sup>th</sup> and 12<sup>th</sup> grades)  
Residential Program: Yes  
Number of Applicants: 50  
Number of Participants: 17  
Number Completing the Program: 17

### **Ethnic Background by Number:**

  1   American Indian                        1   Caucasian                        2   Asian American  
 10  African American                        3   Hispanic                           Other

### **Gender:**

 10  Male                        7   Female

### **Geographic Representation**

Number of Cities: 15

Number of Counties: 9

Number of States: 1

## *STI ACADEMIC PROGRAM*

The 2010 Summer Transportation Institute focused on activities and projects that would give the participants a better understanding of transportation and civil engineering. Even though these concepts were the main focus of the program, the program also enlightened the participants of their expectations for higher education and a sense of life after high school. The program was able to instill the participants' knowledge through classroom activities: mathematics, writing, and individual and group activities; speakers/presenters; and hands-on and enhancement activities through projects and data collection. A routine schedule was followed daily, starting with the computer lab, class discussion, class assignments, and "Road to become an Engineer" (projects and hands-on/enhancement activities). A brief description of each will be explained below. Each activity was evaluated by the participants and will be reported later in the report. The main focus of the program was to give the participants an understanding of transportation, engineering, and how to handle and survive the college environment. These categories are classroom activities, hands-on and enhancement activities, projects, field trips, recreational activities, and residential life. In the following pages few highlights from each of the above activities are listed. The majority of these activities are evaluated by the students, and these evaluations are reported elsewhere in the report.

### **Classroom Activities**

#### **Mathematics/Writing**

A pre-test was given to the participants to determine their level of mathematics ability. Each concept taught in this program was a result from the pre-test.

The following topics were taught to some, reviewed with others, and all were given an exam for mastery: Solving Equations, Factoring, Quadratic Equations, Parent Functions, System of Equations, and Functional Notations.

Mathematics plays a very important role in engineering. With that in mind, mathematics lessons were given on a daily basis to prepare the participants for success in the transportation industry and engineering field.

Mathematics lessons were also taught to prepare students for great success on all state exams, such as the Texas Assessment of Knowledge and Skills Test (exit-level exam – a graduation requirement); college admittance exams: SAT, ACT, and Composite; and college entrance exam: Texas Higher Education Assessment (THEA).

Also, the Nelson Denny test was given to the participants to assess their writing and language abilities. Several of our participants' scores were higher than college-level students.

## **Individual Activities/Group Class Activities (Brainstorming-Planning)**

Worksheets were given on a daily basis to give the participants exposure to the transportation field and engineering.

- Transportation – definition of types of transportation.
- Transportation jobs and industry.
- Bridge Worksheet – this worksheet asked questions about different types of bridges, location of bridges, and purpose of each type of bridge.
- Recycled material activity–participants walked around the campus to collect items that could possibly be used for recycling. Each participant presented what he or she collected to the class, and the class made a decision on whether it was recyclable and, if so, how can it be recycled.

Quizzes and tests were given as an assessment of mastery in the mathematics lessons taught.

### Yellow Light Time

In this activity, the participants were paired up. The purpose of the activity was to calculate the yellow light time according to the intersection length, vehicle length, distance, speed, deceleration, and braking distance. Each group was given the same intersection and vehicle length, speed, deceleration, and braking distance to calculate the yellow light time. Once this process was completed, each group was given different lengths, deceleration, braking distance, and reaction time to calculate the new yellow light time.

### Tower Design Planning

Participants learned the importance of working together and collaborating as a group in order to provide the best solution to any challenge. First they had to establish a name for their group. Next the group had to assign roles and duties to each team member, such as project manager, project engineer, construction supervisor, construction engineer/estimator, and accountant. The final step was to prepare a preliminary design for their tower considering the materials used and the cost.

### Building a Highway

Participants had to imagine where they would like to build a road, considering:

- The cost.
- What materials to use and why.
- Purpose of the highway.

### Reliant Park Problem

Participants had to plan how they would fix the parking problem at Reliant Stadium in Houston, Texas. They had to develop a plan that would fit 80,000 people in the parking lot by a certain time of the day, considering street capacity and the light rail system.

## **Speakers/Presenters**

### **Mr. Stuart Corder – Director of Transportation Operations (TxDOT)**

Topic: Intelligent Transportation

- Explained to the participants that they must be passionate about what they are doing so that they can create good work/designs.
- Explained the objectives of good engineering: safety, efficiency, and traffic flow (good traffic flow).
- Stated that engineers use math to make things safer and get people places quicker and also more efficiently.
- Talked about the signal operations.
- Explained Yellow Light Timing and assigned a group activity.
- Discussed Traffic signal survey and data collection.
- Gave an introduction to building bridges.
- Explained formulas used to calculate braking distance and yellow light time.

### **Dr. Opara – Prairie View A&M University**

Topic: Pavement

- Explained the two types of pavement: flexible and rigid.
- Explained sieve analysis.
- Explained to the participants when the type of pavements should be used and where.

### **Mr. Michael Smith – TxDOT – Austin**

Topic: Engineering Materials and Testing

- Participants were given a presentation on different materials used for roads, highways, and other structures.
- Participants were taught how to test their materials.
- Participants were able to perform calculations on how to mix the accurate amount of water and cement together to make concrete.
- Participants made their own concrete models.

### **Mr. Frederick Sunderman and Ms. Hien Pham – Houston TxDOT District Bridge Design Team**

Topic: Bridge Design and Modeling

These presenters explained how to design and build a good bridge.

- Explained the different types of bridges.
- Explained which shape produces the strongest bridge.
- Participants were then divided into groups to design a bridge that will be tested for the heaviest load.
- Participants tested their bridges, and 2 out of the three groups had really strong bridges.
- Besides learning how to design and build a bridge, the participants were given college tips.
- Mr. Sunderman talked about the steps needed to get to college.
- Co-op opportunity.
- Explained to the participants the EIT – Engineering in Training Test.
- PE – Professional Engineering test.
- How to pick the colleges you apply for admittance.



**Mr. Woody Raine – TxDOT – General Services Division**

**Mr. David Johnson – TxDOT intern – Texas State University student**

Topic: Environmental Issues

- Mr. Raine gave a presentation on things that have been recycled and the importance of recycling.
- Talked about the variety of materials recycled.
- Explained why they use recycled materials.
- Participants played Jeopardy game based on the information learned through the presenters' presentation.
- Participants were given an assignment on whether they wanted a compost facility built in their city. Participants had to assume the embodiment of their selected character and come up with value and arguable points, comments, and questions to petition the mayor and city officials and creator of the company.
- The participants really enjoyed this activity.

## **Hands-on and Enhancement Activities**

### Traffic Signal Light

The purpose of this project was to collect data on the number of cars entering Prairie View A&M University at the intersection of University Drive (known as FM 1098) and Anderson/Owens Road. Each group had different directions that they were to observe and collect data (some from the south, north, east, and west). Each group also had to time the length of the red, yellow, green, and rare of red light periods. Each group then had to draw a sketch supporting their data. Completion of this activity is listed under the project section of this report.

### The Effect of Intersection on Yellow Light Times

As listed in the classroom activities, once the participants calculated yellow light times algebraically, another task was given. Each group had to then input the formulas into Microsoft Excel to have the software calculate the braking distance and yellow light periods. A table was formed from this data. Participants then made a chart (design of their choice) to show the calculated values between the speed and yellow light period. The same process was repeated with the change of deceleration time, reaction time, and length of the intersection or speed. New charts and graphs were created to show the changes.

### Concrete Beam

Participants had to construct a concrete beam using only water and cement. After the beam was constructed and dried, each group tested its beam for strength.

## **Projects**

### Bridge Model

Participants constructed a bridge using only balsa wood and wood glue. Each group was given 15 balsa wood pieces and one tube of glue. The following dimensions were used: bridge length 250 to 300 mm, width 50 to 75 mm, and the height less than 100 mm. The roadbed must be able to allow a car to pass through. The bridge that held the most weight won.

### Building Towers

Participants were divided into groups. Purpose was to build a tower. The tower had to be at least 10 ft, but less than 12 ft tall. They could only use paper clips and index cards. The tower must hold a brick for about 20 seconds without falling down. Each index card and paper clip cost a certain amount of money, so cost was considered when determining the best tower.

### Sports Complex

Participants were divided into groups. Each group had to design a basketball court for a company of its choice. The final design had to be in AutoCAD.

### Aluminum Foil Boat

Each group had to design and build two boats. Materials that were used: only aluminum foil. Each group was given 2 squares that measure 12 cm. Each boat had to be able to float in water by loading different cargo.

### University Drive and Anderson Road Traffic Signal Project

Once data was collected, the participants enter the data into the computer. Participants used AutoCAD or Microsoft Drawing to construct a picture of the intersection. Created a poster for the results on this project.

### Poster for Yellow Light Activity

Participants constructed charts and graphs to model the data, then entered data from Excel to Word document. The Word document was then input into a Microsoft PowerPoint program (to create a poster for display). Large (34"/48") posters were printed for each group.

## **Field Trips**

The STI program was only two weeks this year; thus, only one field trip was arranged.

### TxDOT Houston Office/Construction Site Field Trip

Mr. Salinas gave the participants a tour of the construction site @ I-10 and Studemont Drive. Participants wore their hard hats and orange vests. Participants were able to see what a real bridge construction site looks like. Mr. Salinas explained the steps to put the columns into the ground and the process taken after that to support and lay the cement. Participants were hot and sweaty, but they enjoyed the construction site visit.

### Houston – TranStar

The STI participants were first greeted by Mr. Ben Gilis as they approach the entrance of the Houston TranStar Building. Mr. Gillis explained the purpose of the Building and which organizations utilize the building. The participants were able to get inside information, and they were very amused by all that transpired in the building.

In conclusion, even though the program was only two weeks, the 2010 Summer Transportation Institute participants were engaged in active and passive learning activities during their stay on the campus of Prairie View A&M University. The participants enjoyed the class activities, hands-on activities, and the speakers. The projects were well liked by most but were a bit challenging for some, especially the AutoCAD. The intersection signal traffic activity was really hot, but the participants enjoyed wearing the hard hats and vests. From the excitement and the smiles on the participants' faces, we can surely conclude that the participants were exploding with knowledge and enjoyed being a part of the 2010 Summer Transportation Institute.

Tables on the following pages show the STI program schedule as well as the detailed hourly activities for two weeks of the STI program.

## STI Program Schedule and Activities

Sunday June 20	Monday June 21	Tuesday June 22	Wednesday June 23	Thursday June 24	Friday June 25
	<p><b>8 – 9</b> Welcome/Group /Team Building</p> <p><b>9-11:30</b> Nelson Denny Test</p> <p><b>11 – 1</b> IDs and Lunch <b>1:00 – 2:30</b> Who Am I/ Rules and Expectations</p> <p><b>2 – 4:30</b> Pre-THEA Test</p>	<p><b>8:00 – 8:30</b> Computer Lab</p> <p><b>8:30 – 10:30</b> S. Corder Intelligent Transportation</p> <p><b>10:30 – 10:45 Break</b></p> <p><b>10:45 – 11:30</b> S. Corder Intelligent Transportation</p> <p><b>11:30 – 1</b> Lunch <b>1-1:30</b> Computer Lab</p> <p><b>1:30 – 4:30</b> Road to becoming an Engineer</p>	<p><b>8:00 - 9:30</b> <b>Team Work (Tower) Mathematics</b></p> <p><b>9:30 – 10:30</b> M. Smith Materials Testing</p> <p><b>10:30 – 10:45 Break</b></p> <p><b>10:45 – 11:30</b> M. Smith Materials Testing</p> <p><b>11:30 – 1</b> Lunch <b>1-1:30</b> Computer Lab</p> <p><b>1:30 – 4:30</b> M. Smith Materials Testing</p>	<p><b>7:30 – 8:30</b> Road to becoming an Engineer (Intersection) <b>8:30 – 10:30</b> Bridge Design Sunderman/Pham</p> <p><b>10:30 – 10:45 Break</b></p> <p><b>10:45 – 11:30</b> Bridge Design</p> <p><b>11:30 – 1</b> Lunch <b>1-1:30</b> Computer Lab</p> <p><b>1:30 – 4:30</b> Bridge Model</p>	<p><b>Field Trip to Texas Department of Transportation construction site, Houston</b></p>
<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner
STI Social & Recreational Activities	STI Social and Recreational Activities	Recreational Activities/Homework Night	STI Social and Recreational Activities	STI Social and Recreational Activities	Recreational Activities

Saturday June 26	Sunday June 27	Monday June 28	Tuesday June 29	Wednesday June 30	Thursday July 1	Friday July 2
		<b>8:00 – 8:30</b> Computer Lab	<b>8:00 – 8:30</b> Computer Lab	<b>8:00 – 8:30</b> Computer Lab	<b>8:00 – 8:30</b> Computer Lab	
<b>Family Fun Day</b>	<b>10:00</b> Religious Activities	<b>8:30 – 10:30</b> Road to becoming an Engineer	<b>8:30 – 10:30</b> Road to becoming an Engineer	<b>8:30 – 10:30</b> Road to becoming an Engineer (Aluminum Foil Boats)	<b>8:30 – 10:30</b> POST Test	<b>10:15 am Closing Ceremony</b>
	<b>Projects</b>	<b>10:30 – 10:45</b> <b>Break</b>	<b>10:30 – 10:45</b> <b>Break</b>	<b>10:30 – 10:45</b> <b>Break</b>	<b>10:30 – 10:45</b> <b>Break</b>	
		<b>10:45 – 11:30</b> Road to becoming an Engineer	<b>10:45 – 11:30</b> TXDOT Woody Raine – Environmental Issues	<b>10:45 – 11:30</b> Mathematics/W riting Essay/College Prep	<b>10:45 – 11:30</b> Closing Ceremony Rehearsal	
		<b>11:30 – 1</b> Lunch <b>1-1:30</b> Computer Lab	<b>11:30 – 1</b> Lunch <b>1-3:30</b> TXDOT – Environmental Issues	<b>11:30 – 1</b> Lunch <b>1-1:30</b> Computer Lab	<b>11:30 – 1</b> Lunch <b>1-1:30</b> Computer Lab	
	<b>1:30 – 4:30</b> Road to becoming an Engineer		<b>1:30 – 2:30</b> Road to becoming an Engineer	<b>1:30 – 3:30</b> Project Display Preparation	<b>After award ceremony</b>  <b>students will go home with parents</b>	
		<b>3:30 – 4:30</b> Computer lab	<b>2:30 – 4:30</b> Group Project Presentations	<b>3:30 – 4:30</b> Final Evaluation		
<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	
	STI Social and Recreational Activities	STI Social and Recreational Activities	<b>6 to 8:30</b> Homework Night	STI Social and Recreational Activities		

## STI Detailed Daily Activities

Week 1: Week of June 21, 2010

<u>Time</u>	<u>Activity</u>	<u>Room</u>
<b><i>Monday, June 21, 2010</i></b>		
8-8:30	Computer Lab	106
8:30 – 9:00	Welcome/College of Engineering	109K
9:00 – 11:30	Nelson Denny Writing/Reading Test	109K
1 -1:30	Computer Lab	109k
1:30 – 2:30	Rules/Expectation/Who Am I	109K
2:45 – 4:30	Pre-THEA Test	109K
<b><i>Tuesday, June 22, 2010</i></b>		
8-8:30	Computer Lab	106
8:30 – 11:30	Intelligent Transportation (Mr. Corder)	109K
1-1:30	Computer Lab	109K
1:30 – 4:30	AutoCAD/Sports Complex	106
	<b>*Homework Night</b>	<b>6-8:30 109K</b>
<b><i>Wednesday, June 23, 2010</i></b>		
8-9:15	TOWER Design (TEAM)	109K
9:15 – 9:30	Computer Lab	106
9:30 – 11:30	Pavement/Dr. Opara & Mr. Smith	109K
1-1:30	Computer Lab	106
1:30 – 3:30	Testing/Structure/Concrete Beam	109K/Cement Lab
3:30 – 4:30	Rocket Building/Math	109K
<b><i>Thursday, June 24, 2010</i></b>		
7:30 – 8:15	Intersection Signal Timing	Flag Pole
8:30 – 11:30	Bridge Design Lesson (Sunderman & Pham)	109k
1:-1:30	Computer Lab	106
1:30-4:30	Bridge Model & Test	109 k
<b>*Mathematics Assignment is due before you leave today!!!!!!!</b>		
<b><i>Friday, June 25, 2010</i></b>		
8 – 8:15	Role Call for Field Trip	109K
8:30	Load Vans	Parking Lot
9:30 – 3:00	<b>Texas Department of Transportation Construction Site Houston</b>	
3:15 -4:30	Mathematics	109K

**Week 2: Week of June 28, 2010**

<b>Time</b>	<b>Activity</b>	<b>Room</b>
<b><i>Monday, June 28, 2010</i></b>		
8-8:30	Computer Lab	106
8:30 – 9:30	Mathematics/Essay Writing	109K
9:45 – 11:30	Pavement Design	109K
1:30 – 4:30	Bridge w/Basal Wood	109K
<b><i>Tuesday, June 29, 2010</i></b>		
8-8:30	Computer Lab	106
8:30 – 10:30	Yellow Light Reaction Time	109K
10:45 – 11:30	Environmental Issues (Mr. Raine)	109k
1:30 – 3:30	Environmental Issues (Mr. Raine)	109k
3:30 – 4:30	Yellow Light Reaction Time	109K
	<b>*Homework Night - Project Completion 6-8:30</b>	109K
<b><i>Wednesday, June 30, 2010</i></b>		
8-9:30	POST TEST	106
9:30 – 11:30	Projects Presentation	
1:30 – 4:30	Aluminum Foil Boat	109K
<b><i>Thursday, July 1, 2010</i></b>		
9-9:30	Essay Writing/College Prep	
9:30 – 11:30	Program Rehearsal	
1:30 – 3:30	Project Display Preparation	
3:30 – 4:30	Final Evaluation	

**\* Breaks – Morning 10:30 – 10:45; Afternoon 2:30 – 2:45**

**\*Breaks may change – but will be announced by Ms. Glover**

## RESIDENTIAL LIFE

Welcome to Prairie View A&M University – 2010 Summer Transportation Institute Participants, Scholars and Parents. These were the words (along with the name of each participant and Scholar) on a big banner that was displayed as the participants and their families arrived for check-in. At the time of check-in, participants were assigned their rooms and given the key to their rooms. This year the participants resided in building 36 (males) and building 41 (females) of University College. The participants were accompanied by a male and female counselor who resided in the dormitory with them throughout the duration of the program.

Abiding by the rules set by University College, the STI staff tried to make the stay on campus more like home. Each room was equipped with two twin beds, a restroom with a shower, a microwave, and a refrigerator. The STI staff wanted the participants to socialize with each other as much as possible and not be in their rooms on the phone or watching television, so they did not allow TVs or phones in the rooms. The dorm had a TV room on each floor so that the participants could socialize with each other. Cell phones and other electronic devices were allowed only during recreation and quiet time. Those devices were prohibited during class time.

After a delicious dinner and a few hours of icebreakers, card games, and video games, it was obvious the students started creating bonds and friendships that would last for years to come. These friendships and bonds were not limited to only STI participants, but also participants of the Pre-College Institute, a program that is done in conjunction with STI. The STI participants really enjoyed their stay and, of course, some had to make adjustments to sharing rooms with other people. Overall, dormitory living gives students the chance to meet new people, develop friendships, and learn about other cities, states, and cultures.

The daily schedule for the dormitory:

<b>Wake-up</b>	<b>Depart for Breakfast</b>	<b>Report to Room in Dormitory</b>	<b>Room Check</b>	<b>Lights out</b>
6:00 am	6:45 am	9:00 pm	10:30 pm (or any time after 9:30 'til morning or when necessary)	11:00pm

The students were required to be in their rooms at 9:00 pm every night to make the necessary preparations for the next day. These preparations included but were not limited to showering, ironing, studying, etc. “Lights out” is when all the preparatory tasks for the next day should be completed and the lights in the room were to be turned off and the students were to have a good night sleep. Much like lights out, there was a time for the students to wake up to jump-start their day.

### Daily schedule:

<b>Breakfast</b>	<b>Class Time</b>	<b>Lunch</b>	<b>Class Time</b>	<b>Dinner</b>
7:00am – 7:50am	8:00am – 11:45am	11:45am – 12:50pm	1:00pm – 4:45pm	5:00pm – 6:00pm



## *SPORTS AND RECREATION*

The first night that the participants were on campus, they had an exciting and fun social with the PCI Program – high school students attending another program on campus. This social included mingling and getting to know other STI participants, dancing, playing basketball and soccer at the PV court, and enjoying some good Blue Bell ice cream. Activities for sports and recreation were typically done between 6:30 pm to 9:00 pm daily. This was the time for students to release stress and tensions and just really have a good time with their fellow participants and those of other programs. There were various activities that the students participated in, such as basketball, card games, video games, ice cream socials, movie nights, etc. For the most part, participants enjoyed recreational time. Every event was exciting because all the students participated in the activities. Some evenings the students just had social gatherings where they were allowed to watch movies, play cards, play dominoes, eat ice cream, and just sit and talk.

The STI participants had several social hours with other summer program groups that were at Prairie View A&M University. The STI participants also enjoyed movies with other groups in the Theatre Room at the University College. The participants enjoyed playing cards, dominos, listening to music, making jokes, and of course dancing in the Panther Room. Participants had cookies and drinks during some of these activities. To end the social activities for the program, the participants had a talent show and a dance. Only one of our participants participated on stage, but all were having a good time with the different acts and music. Every evening the participants looked forward to the evening activities.

### *Weekend Activities*

Weekend activities were planned and implemented. Whether it was watching movies on Friday nights or loading up the vans to travel to Houston, the participants were ready to enjoy their weekend. One of the events was going to the Main Event in Houston, Texas, with PCI students. The participants were able to play laser tag, bowling, go cart riding, and enjoy playing arcade games. To top off the evening, the participants arrived back on campus for dinner and then of course the fun started all over again. Family Day was Saturday, June 26, where participants could invite members of their families to come and enjoy some family time and obstacle course games. Nachos, snow cones, and popcorn were snacks for the evening. The students were still talking about this event until the last day they were on the campus. On Sunday, June 27, the participants attended a religious activity at the chapel on campus with motivational speaker Dean Lewder IV.

Our goal here at the Prairie View A&M University Summer Transportation Institute was to make sure that the students had very little time to be idle. It was not only a wonderful experience for the students but also for the peer advisors who interacted with the students. The memories shared with the students and staff, as a whole, are truly immeasurable.

## STI EVALUATIONS

The STI program at PVAMU had weekly STI evaluations for staff members, classroom sessions, enhancement programs, and recreational programs. The evaluation data was transferred to Microsoft Excel, and the summary data was extracted and is presented in the tables below. All the guest speakers were evaluated, and their results are presented in the following tables. Sports and recreational activities were evaluated every week, and also some specific activities were evaluated. Of the recreational outings, the trip most enjoyed this year was the travel to Main Event in Houston, Texas. Enhancement programs were evaluated for each activity. Classroom sessions were evaluated for each activity. These evaluations were completed either immediately after the event or at the end of the week. A 4-point scale was used for these evaluations. A rating of four indicates strong agreement with the statement and 1 indicates strong disagreement, while 3 indicates agreement and 2 indicates disagreement. These evaluations were used to improve the quality of the program and also the quality of the speakers and other activities. The evaluation forms that were provided by the National Resource Center at South Carolina State University in the past were used this year also. The overall program evaluation was conducted on the final day of the program and reported here.

### Staff Evaluation\*

	Week 1	Week 2
The staff was very interested in my career awareness.	3.63	3.69
The staff was very helpful when I had problems.	3.75	3.75
The staff encouraged students to strive for excellence in all their academic pursuits.	3.81	3.81
The staff was always available when I had a question or needed assistance.	3.50	3.50
The staff was very friendly at all times.	3.69	3.63
The staff was very knowledgeable on transportation-related careers.	3.38	3.38
The staff was very enthusiastic about transportation-related careers.	3.81	3.81

\*On a 4-point scale with 4 being strong agreement and 1 strong disagreement

## Speakers Evaluation\*

<i>Topic</i> →	Bridge Design	Pavement	Environmental Issues & Recycling	Material Testing	Intelligent Transportation
<i>Speaker's Name</i> →	Mr. Sunderman	Dr. Ethelbert Opara	Mr. Woody Raine (TxDOT)	Mr. Michael Smith	Mr. Stuart Corder (TxDOT)
The presentation objectives were made clear to me.	3.50	3.69	3.69	3.44	3.63
The concepts presented were sufficiently related to the field of transportation.	3.63	3.63	3.63	3.50	3.63
The speaker presented materials in an organized manner.	3.75	3.81	3.75	3.56	3.81
The speaker used examples to clarify the material presented.	3.69	3.75	3.69	3.50	3.44
The speaker used audio/visual aides to enhance the presentation.	3.81	2.06	3.56	3.50	3.44
I felt free to ask questions.	3.81	3.81	3.75	3.75	3.81
Adequate time was allotted for audience participation.	3.69	3.75	3.50	3.50	3.75
The number of speakers was appropriate.	3.81	3.75	3.69	3.56	3.69

\* On a 4-point scale with 4 being strong agreement and 1 strong disagreement

### Academic Field Trip Evaluation\*

	TxDOT Houston	Houston TranStar
Field trips were informative.	3.81	3.81
Concepts from the field trips were related to the field of transportation.	3.75	3.75
Field trip activities helped me understand transportation careers better than before.	3.75	3.75
Generally, adequate time was allotted for project activities.	3.38	3.38
Adequate time was allotted for questions.	3.56	3.56
Transportation to and from the site was comfortable.	3.69	3.69
Transportation to and from the site was safe.	3.56	3.56
Transportation to and from the site was clean.	3.81	3.81
The number of field trips was appropriate.	3.63	3.63

### Sports and Recreation Evaluation\*

	Week 1	Week 2
A good variety of sports and recreation activities were provided.	3.07	3.07
Facilities were adequate for the activities provided.	3.50	3.50
Sports and recreation activities were well organized.	2.93	3.00
Sports and recreation activities were well supervised.	3.29	3.43
Sports and recreation activities encouraged teamwork and spirit.	3.14	3.21
Generally, I enjoyed the sports and recreation activities provided.	3.21	3.50

\*On a 4-point scale with 4 being strong agreement and 1 strong disagreement

## Enhancement Program Evaluation\*

	Computer Input on Yellow Signal Intersection	Bridge Design	Concrete Cylinders	Tower Design with Basal Wood
Activities were well organized.	3.82	3.71	3.76	3.65
I was academically challenged by program activities.	3.71	3.65	3.59	3.59
Computer training activities were very stimulating.	3.71	3.65	3.24	3.41
Computer training activities were very enlightening.	3.47	3.41	3.12	3.12
Adequate time was allotted for the activities.	3.71	3.65	3.53	3.18
I felt free to ask questions.	3.59	3.47	3.59	3.41
All enhancement activities were educational and beneficial.	3.94	3.94	3.88	3.82

\*On a 4-point scale with 4 being strong agreement and 1 strong disagreement

## Classroom Session Evaluation\*

	Mathematics & Writing	Classroom Sessions
Class activities were well organized.	3.53	3.07
Class activities were logically sequenced such that simpler activities preceded more complex activities.	3.47	3.00
Participants were able to ask questions and discuss related issues during the course of class activities.	3.60	3.80
Subjects and topics discussed in class were related to the purpose of the project.	3.53	3.60
Faculty and presenters provided sufficient explanation of the concepts covered.	3.47	3.60
Faculty and presenters provided valuable assistance to participants.	3.60	3.73
The classroom area(s) were adequate to carry out the activities.	3.53	3.53
Enough time was spent discussing the subjects and topics of the project activities.	-	3.40
The number of projects was appropriate.	-	3.60
Enough time was allowed for most students to adequately understand what was being taught.	-	3.40

\*On a 4-point scale with 4 being strong agreement and 1 strong disagreement

## Overall Program Evaluation\* (Done at the conclusion of program)

<b>SPEAKERS</b>	Rating
Speakers were well organized.	3.73
I was academically challenged by the activities the speakers provided.	3.80
Speakers responded well to the questions posed to them.	3.87
<b>STAFF</b>	
The staff was very interested in my career awareness.	3.73
The staff was very helpful when I had problems.	3.47
The staff encouraged students to strive for excellence in all their academic pursuits.	3.67
The staff was always available when I had a question or needed assistance.	3.67
The staff was very friendly at all times.	3.47
The staff was very knowledgeable of transportation-related careers.	3.80
The staff was enthusiastic about the transportation-related careers.	3.67
Counselors were helpful in the dormitories.	3.73
<b>ACTIVITIES</b>	
Project activities helped me understand transportation careers better than before.	3.67
Generally, adequate time was allotted for project activities.	3.47
Generally, adequate time was allotted for audience participation.	3.60
Project activities gave me some practical experience related to transportation.	3.73
Generally, adequate time was allotted for audience participation.	3.67
Project activities often included competition between groups.	3.73
<b>CAMPUS LIFE</b>	
Life in the dormitory was fun.	3.47
The food in the dining hall was nutritional.	3.07
Enhancement activities were educational.	3.53

\*On a 4-point scale with 4 being strong agreement and 1 strong disagreement

## SECTION II: STI SCHOLARS PROGRAM

### INTRODUCTION

PVAMU conducted the STI Scholars program on its campus in 2009 for the first time. This year, in the summer of 2010, the Scholars program was offered again.

Three applications of 12<sup>th</sup>-grade students who participated in the 2009 STI were received for the STI Scholars program. These three students (2 boys and 1 girl) were selected. The STI Scholars program exposed these students to in-depth research and activities in the transportation field. The opportunity provided to these students to return again to the PVAMU campus in 2010 increased their self-esteem and enabled them to explore all activities more enthusiastically.

The Scholars' participant profiles and school information are shown in the tables below.

### PARTICIPANT DETAILS

#### Participant Profile

Name	Gender	Home Address	City, State	Zip	Prim Phone	Alt Phone	E-mail Address
Conway Assata	F	1943 Tower Bell Lane	Missouri City, TX	77489	832-865-7034	832-865-7034	lilliconw2@aol.com
Golden Jonathan	M	5425 Bataan Rd	Houston, TX	77033	713-308-2553	832-283-2449	jgolden412@yahoo.com
Toriono Lavender	M	2212 Primrose Trail	Mansfield, TX	76063	817-449-4116	214-277-2802	torilav@gmail.com

#### Participant School Information

Name	Grade	School	School Address	City, State	Zip	Counselor	Counselor E-mail
Conway Assata	12 <sup>th</sup>	Westside HS	14201 Briar Forest Dr	Houston, TX	77077	L Nguyen	<a href="mailto:lnnyugen@houstonisd.org">lnnyugen@houstonisd.org</a>
Golden Jonathan	12 <sup>th</sup>	B.T. Washington HS	119 E 39 <sup>th</sup> Street	Houston, TX	77018	Theresa Oliver	<a href="mailto:teolivers@sbcglobal.net">teolivers@sbcglobal.net</a>
Toriono Lavender	12 <sup>th</sup>	Mansfield Tigers HS	2272 Primrose Trail	Mansfield, TX	76063	Dede Crockett	<a href="mailto:doctsh@mansfield.org">doctsh@mansfield.org</a>



## *DEMOGRAPHIC SUMMARY*

The 2010 Summer Transportation Institute Scholars program at Prairie View A&M University was conducted from June 20, 2010, thru July 2, 2010, for 12<sup>th</sup>-grade high school students. The program required students to reside on the campus for the two-week duration of the program. The demographic data summary is presented below:

Dates of Institute: June 20, 2010 - July 2, 2010

Program Classification: High School (12<sup>th</sup> Grade)

Residential Program: Yes

Number of Applicants: 3

Number of Participants: 3

Number Completing the Program: 3

### **Ethnic Background by Number:**

    American Indian          Caucasian          Asian American

  3   African American          Hispanic          Other

Gender:

  2   Male        1   Female

### **Geographic Representation**

Number of Cities: 3

Number of Counties: 3

Number of States: 1

## *STI SCHOLARS ACADEMIC PROGRAM*

The 2010 Summer Transportation Institute Scholars program focus was on providing activities and projects that would give the three Scholars (who participated in the 2009 STI and returned as Scholars to the 2010 STI) an in-depth understanding of transportation and civil engineering and give Scholars exposure on research activities in the transportation area. The opportunity provided to these three Scholars to return again to the PVAMU campus in 2010 increased their self-esteem and enabled them to explore more enthusiastically all classroom activities planned for STI students on mathematics, writing, and individual and group activities. Scholars participated in numerous classroom lectures and presentations by industry speakers/presenters. They also worked on various hands-on and enhancement activities and projects. A routine schedule was followed daily, starting with the computer lab, class discussion, class assignments, and “Road to become an Engineer” (projects and hands-on/enhancement activities). The Scholars showed leadership and provided guidance to first-time participants in group projects. In addition to participation with first-time STI students on all activities, the Scholars program included visits to the Texas Transportation Institute (TTI) in College Station on June 22, 2010, and on June 29, 2010, to learn and observe on-going research activities.

A brief description of each activity is explained below. Activities that are common to both STI students and Scholars focused on giving an understanding of transportation, engineering, and how to handle and survive the college environment. These are classroom activities, hands-on and enhancement activities, projects, field trips, recreational activities, and residential life. In the following pages, a few highlights from each of the above activities are listed. The majority of these activities are evaluated by the students, and these evaluations are reported elsewhere in the report.

### **Classroom Activities**

#### **Mathematics/Writing**

A pre-test was given to the participants to determine their level of mathematics ability. Each concept taught in this program was a result from the pre-test.

The following topics were taught to some, reviewed with others, and all were given an exam for mastery: Solving Equations, Factoring, Quadratic Equations, Parent Functions, System of Equations, and Functional Notations.

Mathematics plays a very important role in engineering. With that in mind, mathematics lessons were given on a daily basis to prepare the participants for success in the transportation industry and engineering field.

Mathematics lessons were also taught to prepare students for great success on all state exams, such as the Texas Assessment of Knowledge and Skills Test (exit-level exam – a graduation requirement); college admittance exams: SAT, ACT, and Composite; and college entrance exam: Texas Higher Education Assessment (THEA).

Also, the Nelson Denny test was given to the participants to assess their writing and language abilities. Several of our participants' scores were higher than college-level students.

## **Individual Activities/Group Class Activities (Brainstorming-Planning)**

Worksheets were given on a daily basis to give the participants exposure to the transportation field and engineering.

- Transportation – definition of types of transportation.
- Transportation jobs and industry.
- Bridge Worksheet – this worksheet asked questions about different types of bridges, location of bridges, and purpose of each type of bridge.
- Recycled material activity – participants walked around the campus to collect items that could possibly be used for recycling. Each participant presented what he or she collected to the class, and the class made a decision on whether it was recyclable and, if so, how can it be recycled.

Quizzes and tests were given as an assessment of mastery in the mathematics lessons taught.

### Yellow Light Time

In this activity, the participants were paired up. The purpose of the activity was to calculate the yellow light time according to the intersection length, vehicle length, distance, speed, deceleration, and braking distance. Each group was given the same intersection and vehicle length, speed, deceleration, and braking distance to calculate the yellow light time. Once this process was completed, each group was given different lengths, deceleration, braking distance, and reaction time to calculate the new yellow light time.

### Tower Design Planning

Participants learned the importance of working together and collaborating as a group in order to provide the best solution to any challenge. First they had to establish a name for their group. Next the group had to assign roles and duties to each team member, such as project manager, project engineer, construction supervisor, construction engineer/estimator, and accountant. The final step was to prepare a preliminary design for their tower considering the materials used and the cost.

### Building a Highway

Participants had to imagine where they would like to build a road, considering:

- the cost
- what materials to use and why
- purpose of the highway

### Reliant Park Problem

Participants had to plan how they would fix the parking problem at Reliant Stadium in Houston, Texas. They had to develop a plan that would fit 80,000 people in the parking lot by a certain time of the day, considering street capacity and the light rail system.

## Special Curriculum for STI Scholars

As stated earlier, STI Scholars participated in a number of hands-on and classroom activities and projects to help them learn more about the civil and environmental engineering fields during the 2010 STI program. Activities and projects included participating in several presentations by professionals in various fields of civil and environmental engineering; in-class instructions in math, reading, writing, comprehension, science and engineering; and several hands-on projects.

The STI Scholars learned about transportation, traffic flow and congestion problems, pavement design, environmental issues, bridge design, intelligent transportation systems, materials testing, and a lot more. They worked in groups to complete projects in model bridge design and how much they cost, tower design, concrete beam design, and boat floatation.

Two field trips to TTI in College Station, Texas, were scheduled specially for the STI Scholars as part of the Scholars program. During the first trip to TTI on June 22, 2010, the STI Scholars visited the TTI TransLink facility in College Station (which is a mini-TranStar and a part of TranStar in Houston, Texas) and the traffic visibility laboratory in the morning, and the roadside safety and the environmental safety units at the TTI Annex in the afternoon. While at TTI they gained a brief but good introduction and knowledge about traffic control and how to come up with appropriate speed limits, traffic signs, and road-side cameras for the freeways. They also learned about the structural aspects of TTI. Structural research at TTI covers infrastructure and constructed facilities as well as the design and use of roadside safety structures. They learned from the experiences of instructors during the TTI visit about the value of education and what it can do for the future later in life.

During the second trip to TTI at College Station on June 29, 2010, the STI Scholars visited the pavement and materials laboratories and learned about the different materials and pavements that are used in the construction of roadways. At TTI's materials lab, the students were introduced to many devices that are used to help produce the most accurate test results possible.

### Pavement Cross Section Details, Design, and Construction Information to Scholars

The STI Scholars were introduced to pavement types, pavement materials, and design. The Scholars were taught differences between asphalt and concrete and their material characteristics and behavior. In addition, information was provided on roadway cross section, construction methods, and ways asphalt is mixed with aggregate for use in constructing road. Common damages to pavement surfaces due to traffic and how to perform pavement repairs were also briefly introduced to Scholars.

The STI Scholars also participated in the evaluation of their peers' projects as well as the work of the instructors and other professionals who participated in their training and presented their research projects during the Awards Ceremony on July 2, 2010.

Residential life, recreational, and weekend activities were common for both STI students and Scholars. Therefore, these details are not repeated in this section.

## Special Scholars Projects

The following project work was assigned to STI Scholars. The project statement and a detailed description of the assignment is given below:

The PVAMU Facilities and Planning Division is planning to build a warehouse for its materials to be completed by December 1, 2010. You work for AGC National Corporation, an engineering, construction, and management company that is involved in capital improvement projects, commercial, residential, and industrial construction. Your company just won the contract to develop the project, and you were assigned to verify the cost of roofing and wall structures for the project by your supervisor, who has to present the report to the president of the company. The roof is 100 feet long, 75 feet wide, and has a 3:12 slope on the front and back sides, and 1:1 slope on both ends. How much would be invested on 30-year corrugated roofing sheets if a 4' x 12' sheet costs \$30.00? Do not include the cost of nails/screws, gutters, hip roof, labor, insurance, and other materials. Draw the roof with dimensions (testing for outcome "e", 60 points). How much would it cost to build two 94' x 10' x 1' walls and two 69' x 11' x 1' walls if a cubic yard of concrete wall material costs \$200.00? Draw the front and side walls with dimensions (testing for outcome "e", 40 points).

## STI Scholars Program Schedule

Sunday June 20	Monday June 21	Tuesday June 22	Wednesday June 23	Thursday June 24	Friday June 25
	<p><b>8 – 9</b> Group/Team Building</p> <p><b>9 – 10:30</b> STI Overview Dr. Kommalapati Dr. Radha</p> <p>Rules/Expectations, Ms. Glover and STI Staff</p> <p><b>10:30 - 11</b> Complete Necessary Paper Work/Brain Teasers</p> <p><b>11 – 1</b> ID's and Lunch <b>1:00 – 2:00</b> Who Am I?</p> <p><b>2 – 4:30</b> Pre- THEA Test</p>	<p><b>8:00 – 8:30</b> Computer Lab</p> <p><b>8:30 – 10:00</b> Travel to Texas Transportation Institute (TTI), College Station, TX <b>10:00-10:30</b> Meet Debbie Jasek and go to CE/TTI Building <b>10:30 – 11:30</b> Meet with Emad Kassem for tour of Materials Lab</p> <p><b>11:30 – 1:30</b> <i>Lunch</i></p> <p><b>2</b> Visit George Bush Library <b>3:00-4:30</b> Return to PVAMU</p>	<p><b>8:00 – 8:30</b> Computer Lab</p> <p><b>8:30 – 9:30</b> Writing/Computer Lesson</p> <p>9:30 – 10:30 Research Projects</p> <p><b>10:30 – 10:45</b> <b>Break</b></p> <p><b>10:45 – 11:30</b> Research Projects</p> <p><b>11:30 – 1</b> <i>Lunch</i> <b>1-1:30</b> Computer Lab</p> <p><b>1:30 – 4:30</b> Research Projects</p>	<p><b>8:00 – 8:30</b> Computer Lab</p> <p><b>8:30 – 10:30</b> Bridge Design</p> <p><b>10:30 – 10:45</b> <b>Break</b></p> <p><b>10:45 – 11:30</b> Bridge Design</p> <p><b>11:30 – 1</b> Lunch <b>1-1:30</b> Computer Lab</p> <p><b>1:30 – 4:30</b> Road to becoming an Engineer</p>	<p><b>Field Trip to Texas Department of Transportation construction site, Houston</b></p>
<p><b>2 to 4</b> Welcome and check-in <b>4-4:30</b> Orientation</p>	<p><b>4:30</b> Dinner</p>	<p><b>4:30</b> Dinner</p>	<p><b>4:30</b> Dinner</p>	<p><b>4:30</b> Dinner</p>	<p><b>4:30</b> Dinner</p>
<p>STI Social and Recreational Activities</p>	<p>STI Social and Recreational Activities</p>	<p>STI Social and Recreational Activities</p>	<p>STI Social and Recreational Activities</p>	<p>STI Social and Recreational Activities</p>	<p>STI Social and Recreational Activities</p>

Saturday June 26	Sunday June 27	Monday June 28	Tuesday June 29	Wednesday June 30	Thursday July 1	Friday July 2
<b>FIESTA (SAN ANTONIO)</b>	<b>10:00 Religious Activities</b>  <b>Group Projects</b>	<b>8:00 – 8:30</b> Computer Lab	<b>8:00 – 8:30</b> Computer Lab	<b>8:00 – 8:30</b> Computer Lab	<b>8:00 – 8:30</b> Computer Lab	<b>Closing Ceremony</b>  <b>10:15</b>
		<b>8:30 – 10:30</b> Road to becoming an Engineer	<b>8:30 – 10:00</b> Travel to Texas Transportation Institute (TTI), College Station, TX	<b>8:30 – 10:30</b> Research Projects	<b>8:30 – 10:30</b> POST Test	
		<b>10:30 – 10:45</b> <b>Break</b>	<b>10:00 – 10:30</b> Meet Debbie Jasek and go to CE/TTI Building	<b>10:30 – 10:45</b> <b>Break</b>	<b>10:30 – 10:45</b> <b>Break</b>	
		<b>10:45 – 11:30</b> Road to becoming an Engineer	<b>10:30 – 11:30</b> Meet with Emad Kassem for tour of Materials Lab	<b>10:45 – 11:30</b> Research Projects	<b>10:45 – 11:30</b> Closing Ceremony Rehearsal	
		<b>11:30 – 1:1:30</b> <b>1Lunch</b> <b>1-1:30</b> Computer Lab	<b>11:30 – 1:1Lunch</b>	<b>11:30 – 1:1Lunch</b> <b>1-1:30</b> Computer Lab	<b>11:30 – 1:1Lunch</b> <b>1-1:30</b> Computer Lab	<b>After award ceremony</b>
		<b>1:30 – 4:30</b> Road to becoming an Engineer	<b>2</b> Visit George Bush Library <b>3:00-4:30</b> Return to PVAMU	<b>1:30 – 2:30</b> Research Projects		<b>students will go home with parents</b>
				<b>2:30 – 4:30</b> POST Test		
				Project Presentations	Project Presentations	
<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	<b>4:30</b> Dinner	
	STI Social and Recreational Activities	STI Social and Recreational Activities	STI Social and Recreational Activities	STI Social and Recreational Activities		

*STI SCHOLARS PROGRAM EVALUATIONS*

**Staff Evaluation\***

	Week 1	Week 2
The staff was very interested in my career awareness.	3.33	3.33
The staff was very helpful when I had problems.	4.00	4.00
The staff encouraged students to strive for excellence in all their academic pursuits.	4.00	4.00
The staff was always available when I had a question or needed assistance.	3.00	3.00
The staff was very friendly at all times.	3.67	3.67
The staff was very knowledgeable on transportation-related careers.	3.67	3.67
The staff was very enthusiastic about transportation-related careers.	4.00	4.00

\*On a 4-point scale with 4 being strong agreement and 1 strong disagreement



### Academic Field Trips Evaluation\*

	TTI College Station	Houston TranStar
Field trips were informative.	4.00	4.00
Concepts from the field trips were related to the field of transportation.	4.00	4.00
Field trip activities helped me understand transportation careers better than before.	4.00	4.00
Generally, adequate time was allotted for project activities.	4.00	4.00
Adequate time was allotted for questions.	4.00	4.00
Transportation to and from the site was comfortable.	3.33	3.33
Transportation to and from the site was safe.	3.67	3.67
Transportation to and from the site was clean.	3.67	3.67
The number of field trips was appropriate.	3.33	3.67

### Sports and Recreation Evaluation\*

	Week 1	Week 2
A good variety of sports and recreation activities were provided.	4.00	4.00
Facilities were adequate for the activities provided.	4.00	4.00
Sports and recreation activities were well organized.	4.00	4.00
Sports and recreation activities were well supervised.	4.00	4.00
Sports and recreation activities encouraged teamwork and spirit.	4.00	4.00
Generally, I enjoyed the sports and recreation activities provided.	4.00	4.00

\*On a 4-point scale with 4 being strong agreement and 1 strong disagreement

## Enhancement Program Evaluation\*

	Computer Input on Yellow Signal Intersection	Bridge Design	Concrete Cylinders	Tower Design with Basal Wood	Boat Sinking Project
Activities were well organized.	4.00	4.00	4.00	3.67	3.67
I was academically challenged by program activities.	4.00	4.00	4.00	4.00	4.00
Computer training activities were very stimulating.	3.67	4.00	3.67	3.67	3.00
Computer training activities were very enlightening.	3.67	4.00	4.00	4.00	4.00
Adequate time was allotted for the activities.	3.00	4.00	3.67	3.67	3.67
I felt free to ask questions.	4.00	4.00	3.67	3.00	3.67
All enhancement activities were educational and beneficial.	4.00	4.00	4.00	4.00	4.00

\*On a 4-point scale with 4 being strong agreement and 1 strong disagreement

## Overall Program Evaluation\* (Done at the conclusion of program)

<b>SPEAKERS</b>	Rating
Speakers were well organized.	3.67
I was academically challenged by the activities the speakers provided.	3.67
Speakers responded well to the questions posed to them.	3.67
<b>STAFF</b>	
The staff was very interested in my career awareness.	4.00
The staff was very helpful when I had problems.	3.67
The staff encouraged students to strive for excellence in all their academic pursuits.	3.33
The staff was always available when I had a question or needed assistance.	4.00
The staff was very friendly at all times.	4.00
The staff was very knowledgeable of transportation-related careers.	4.00
The staff was enthusiastic about the transportation-related careers.	3.67
Counselors were helpful in the dormitories.	3.67
<b>ACTIVITIES</b>	
Project activities helped me understand transportation careers better than before.	3.00
Generally, adequate time was allotted for project activities.	4.00
Generally, adequate time was allotted for audience participation.	4.00
Project activities gave me some practical experience related to transportation.	3.33
Generally, adequate time was allotted for audience participation.	3.67
Project activities often included competition between groups.	4.00
<b>CAMPUS LIFE</b>	
Life in the dormitory was fun.	4.00
The food in the dining hall was nutritional.	3.00
Enhancement activities were educational.	4.00

\*On a 4-point scale with 4 being strong agreement and 1 strong disagreement

## **SECTION III: OTHER PROGRAM RELATED INFORMATION**

### *ORIENTATION*

June 20, 2010, was the check-in date for the beginning of something great on the campus of Prairie View A&M University – the 2010 Summer Transportation Institute. Check-in started at 2:00 p.m. in the University College Conference Room. As parents and participants arrived, they were greeted and welcomed by the director of STI and all of his staff members (including peer counselors and instructors). Cold water and soda were available for the parents and participants to enjoy because this was a very hot day. Ms. Glover checked in all the participants and issued them their room keys. Pictures of each participant and his or her family were taken as they entered the conference room. The students were then escorted by members of the STI staff and counselors to their buildings where they would be lounging for the next two weeks. After the participants were settled in their rooms, they were to report to the PV Panther Room for orientation. Once all the participants were checked in, the students and parents were greeted by the director of STI, Dr. Kommalapati, and the STI staff. The staff members include Dr. Radha; Ms. Glover, instructor; Ms. Anthony, graduate assistant; and Dr. Opara, Mr. Sidney, and Ms. Young, the male and female counselors, respectively.

Dr. Kommalapati welcomed the participants and the parents and provided them with an overview of the program, its goals, and expectations. Ms. Glover briefly discussed the rules and regulations that the participants were to follow while attending the program. She ensured the parents that the STI staff will take good care of their children and they will be exploding with knowledge and eager to be an engineer. Mr. Tori (building manager) reviewed the dorm rules and expectations for the participants for the next two weeks. Parents were given a packet that included staff contact information, calendar of projects, field trips, classroom activities, and other planned activities for the two-week period. The participants were also provided a copy of the rules and expectations. Dr. Kommalapati also encouraged the participants and the parents to consider PVAMU for attending college when they graduate and asked them to spread the good word about the university. Parents were given the opportunity to ask questions and explain any other concerns they had. Dr. Kommalapati invited all the family members to attend the closing ceremony on July 2, 2010. In conclusion of the orientation and check-in, the 2010 STI participants were escorted to dinner. The orientation was very successful and set the tone for an exciting, fun-filled two weeks of success

### *AWARDS/CLOSING CEREMONY*

This year, the Closing Ceremony was Friday, July 2, 2010, in the New Electrical Engineering Building, starting with a reception and continental breakfast in Room 115 and the ceremony in Room 139. The participants started arriving around 9am, while the parents arrived at 9:30am. As the parents entered the building they were asked to sign in and were given a thank you gift bag on behalf of the STI staff. Breakfast was available for the parents, students, and other guests to enjoy. Parents were immediately delighted to see the work of their children's hands being displayed on the walls and tables for all to see in Room 115.

As everyone entered the closing ceremony room, they enjoyed a PowerPoint presentation. This presentation included all the work and activities the participants were engaged in while attending the STI program. After parents and the head table guests were seated, Ms. Glover asked the audience to stand and applaud the 2010 STI participants and Scholars as they entered the room. Mr. Cyril (Nick) Engmann, 11<sup>th</sup>-grade student at Rock Wall Heath in Heath, Texas, served as Master of Ceremony for the program.

Ms. Stenisha Hawkins and Mr. Treveyon Washington, both from Jack Yates High School in Houston, Texas, delivered the Invocation and the Welcome with great sincerity, which set the tone and the atmosphere for the rest of the ceremony. Dr. Kommalapati, department head of civil and environmental engineering and STI director, gave a warm welcome from the department and introduced the STI program, including the history, statistics, and objectives of the program. Dr. Kommalapati also introduced the staff members, which included Dr. Radha, STI coordinator; Ms. Glover, instructor and math teacher at Waller High School; Dr. Opara; Ms. Anthony, graduate assistant; Ms. Young, peer female counselor; Mr. Sidney, peer male counselor for both PVAMU undergraduate students; and Mrs. Evans, staff assistant of the Civil and Environmental Engineering Department. Dr. Tooley, director of the University Transportation Center for Mobility, spoke about the relevance of STI.

Ms. Ashley Ross introduced the keynote speaker for the morning. The keynote speaker was Dr. William Stockton, PE, executive associate director of the Texas Transportation Institute in College Station, Texas. Several STI participants made presentations on what they learned during the two weeks of the program. The presentations included *Classroom Activities & Projects*, by Alyssa Richard, *Field Trips*, by Kaci Lysford, and *Dorm Life and Recreational Activities*, by Evelyn Jimenez.

Next, it was time to award those who had worked so diligently to make the 2010 Prairie View A&M University Summer Transportation Institute a success. All the 2010 STI participants were given a completion certificate. The special recognition awards included three awards for meritorious individuals and two for participants that exhibited model behavior. The three academic awards included (1) Meritorious Award (3<sup>rd</sup> place), given to Daniel Lugo of Bellaire High School in Bellaire, Texas; (2) Excellence Award (2<sup>nd</sup> place), given to Kaci Lysford of River Road High School in Amarillo, Texas; and (3) the top award, The Director's Award, given to Mr. Cyril (Nick) Engmann of Rockwall Heath High School in Heath, Texas. These students excelled at their classroom activities, projects, and other educational activities of the 2010 STI program. The other two awards, Mr. Young Gentleman (Mr. STI) and Ms. Congenial Pantherette (Ms. STI), were awarded to two students who were always involved, served as leaders in their groups, exhibited model behavior, and were truly outstanding when speakers were visiting. Mr. Treveyon Washington of Jack Yates High School in Houston, Texas, was chosen as Mr. Young Gentleman (Mr. STI), and Ms. Stenisha Hawkins of Jack Yates High School in Houston, Texas, was selected for the Ms. Congenial Pantherette (Ms. STI) award. These awards were given based on recommendations from peers, counselors, and STI staff members.

Dr. Kendall T. Harris, Dean of the Roy G. Perry College of Engineering, offered comical yet lasting closing remarks.

## *RECOMMENDATIONS*

The 2010 Prairie View A&M University Summer Transportation Institute was conducted very well. The program was a great success in exposing high school students to all aspects of transportation and in enhancing their initial interest in a career in transportation. The following are some observations and comments to help us to improve program activities in the future programs:

- Continue the good work that we did this year in contacting many schools and establish ongoing relationships, which should help us to continue receiving quality students from many schools across the state.
- Continue increasing laboratory experiences and hands-on projects in the program.
- The funds provided by UTCM are not sufficient to run this residential program for 2 weeks. As listed in the partnerships section, the true cost of the program is double that of the actual funding received. It is not practical to be able to generate these funds on a yearly basis. In the future, it is necessary either to increase funding or reduce the duration of the program.
- We should continue to explore external sources of funds for providing students with some stipend.
- It should be noted that PVAMU VP's office has brought all summer camp programs under their organization review and approval, requiring registration and payment of fees for classroom usage. This puts additional burden on the STI program budget.
- The 2010 STI and Scholars enrichment programs at PVAMU have been very valuable to the high school students and must be continued.

**SECTION IV: SUPPLEMENTARY MATERIAL**

*PHOTOGRAPHS OF STI AND STI SCHOLARS PROGRAM ACTIVITIES*

*SAMPLES OF STUDENT'S WORK*

*2010 STI AND STI SCHOLARS PROGRAM AWARDS CEREMONY*

*PHOTOGRAPHS OF STI AND STI SCHOLARS PROGRAM ACTIVITIES*



STI Director, Dr. Kommalapati and Staff members: Dr. Radha, Ms.Glover & Dr. Opara speaking to parents and participants during orientation



STI participants and parents at the orientation





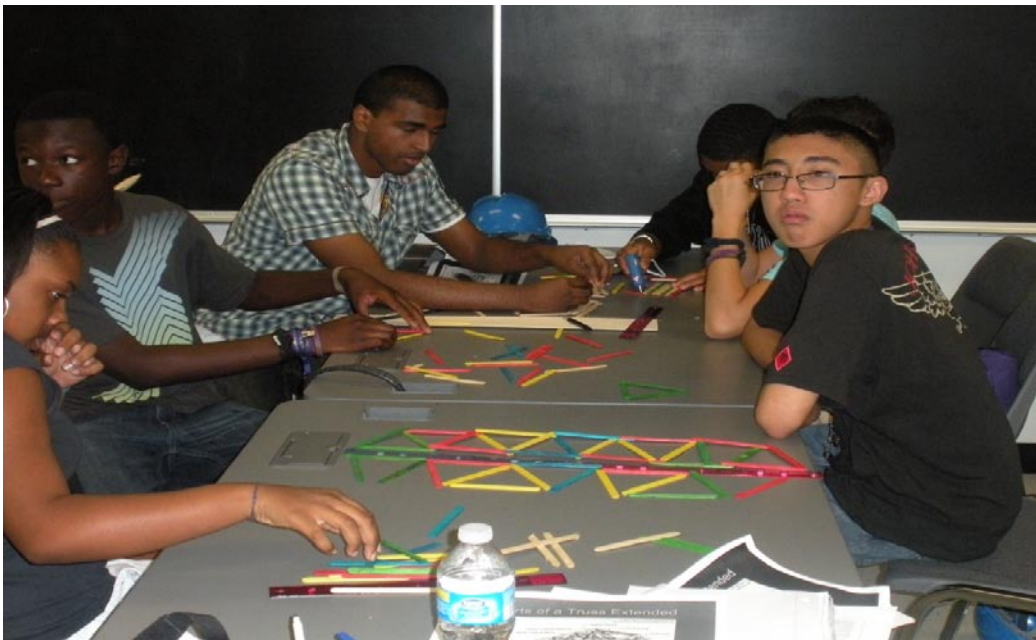
STI participants brainstorming their bridge model design



STI Scholar Jonathan Golden assists the 2010 STI Students with AutoCAD  
– Sports Complex Project



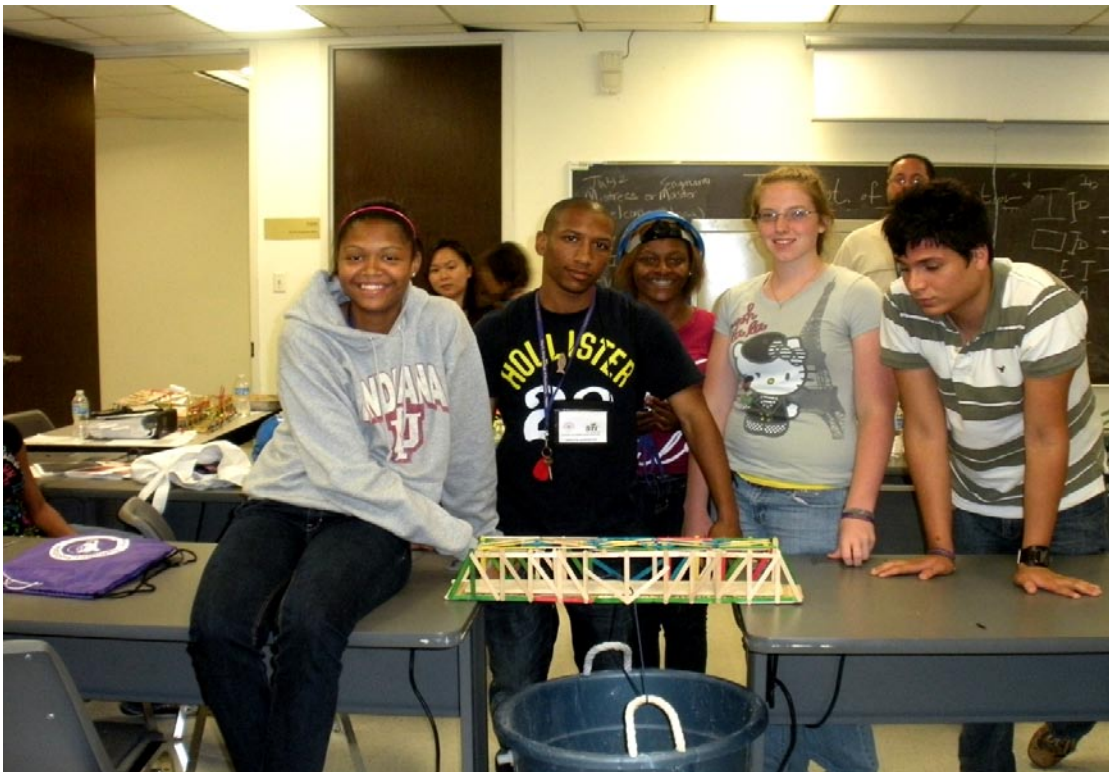
STI participants working on bridge design



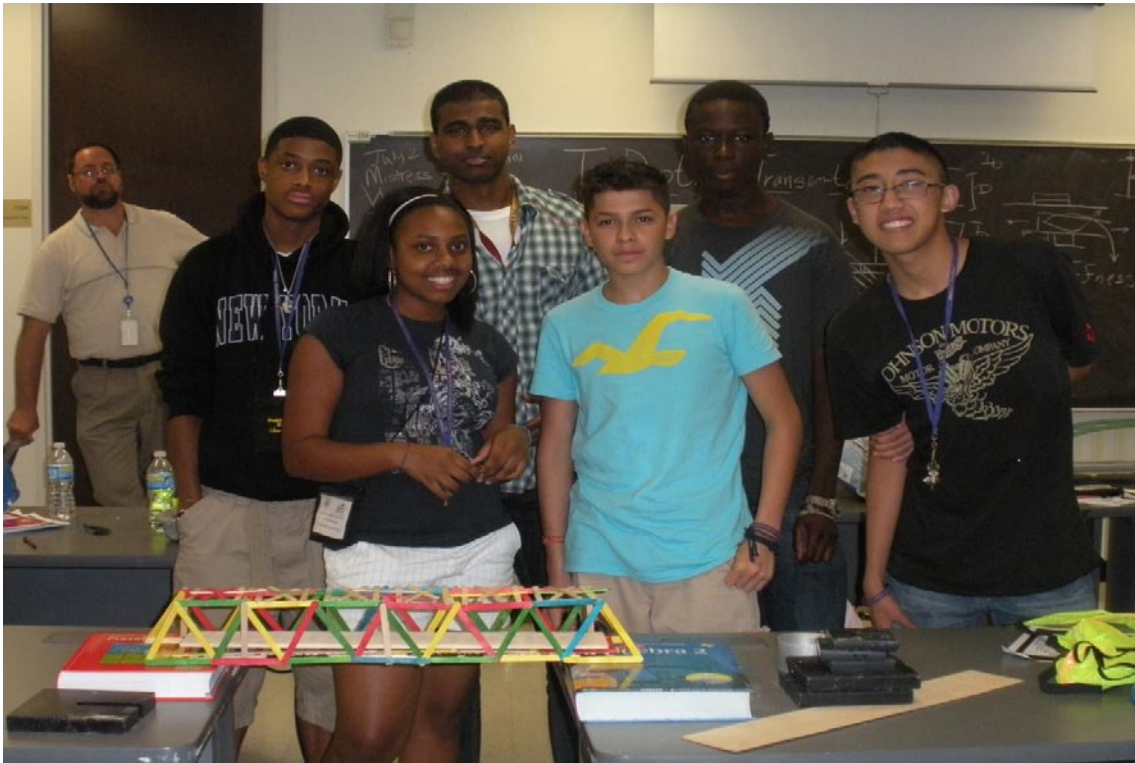
STI participants constructing the bridge model



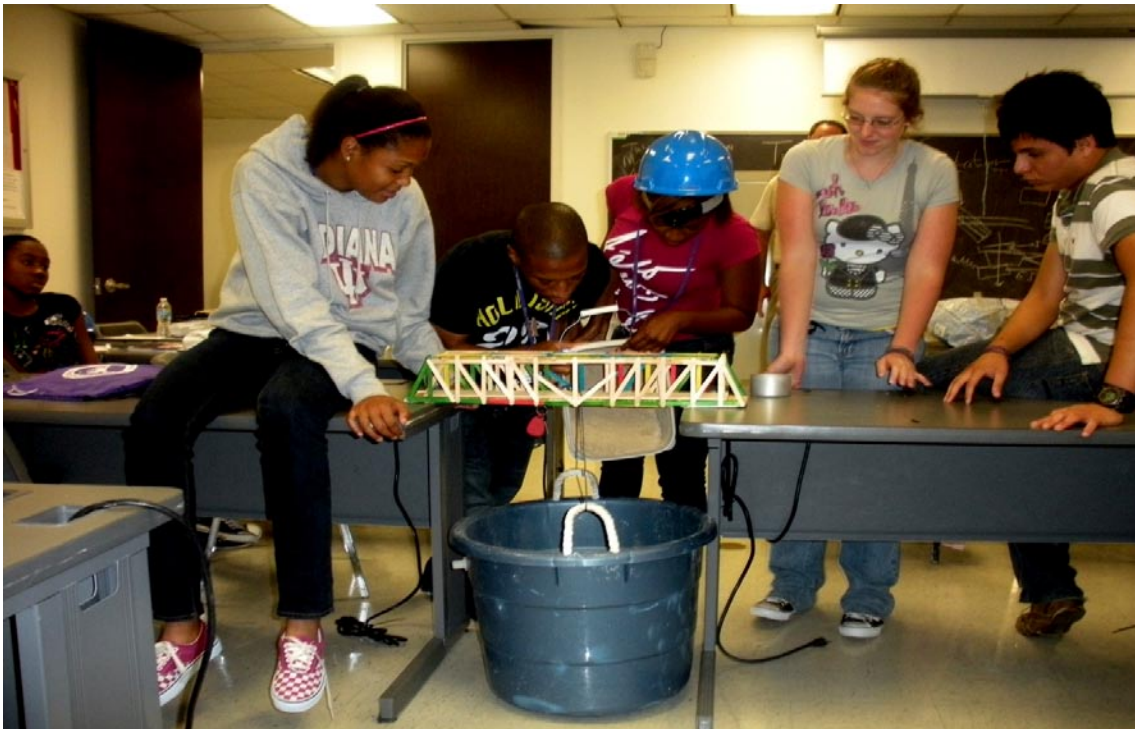
STI participants with their bridge model – Group 1



STI participants with their bridge model – Group 2



STI members of Group 3 with their bridge model



STI Participants testing the strength of their bridge while others watch



STI participants smiling instead of crying as their bridge collapses



STI participants at the I-10 and Studemont Drive Construction Site in Houston, Texas



STI participants at the I-10 and Studemont Drive Construction Site in Houston, Texas



STI participants at Houston TranStar Building in Houston, Texas



STI participants at Houston Transtar Building in Houston, Texas



STI participants planning and designing their aluminum foil boat



STI members of Group 3 loading cargo to their aluminum foil boat model



STI Members of Group 1 loading weight to their aluminum foil boat model





STI members of Group 2 loading weight to their aluminum foil boat model



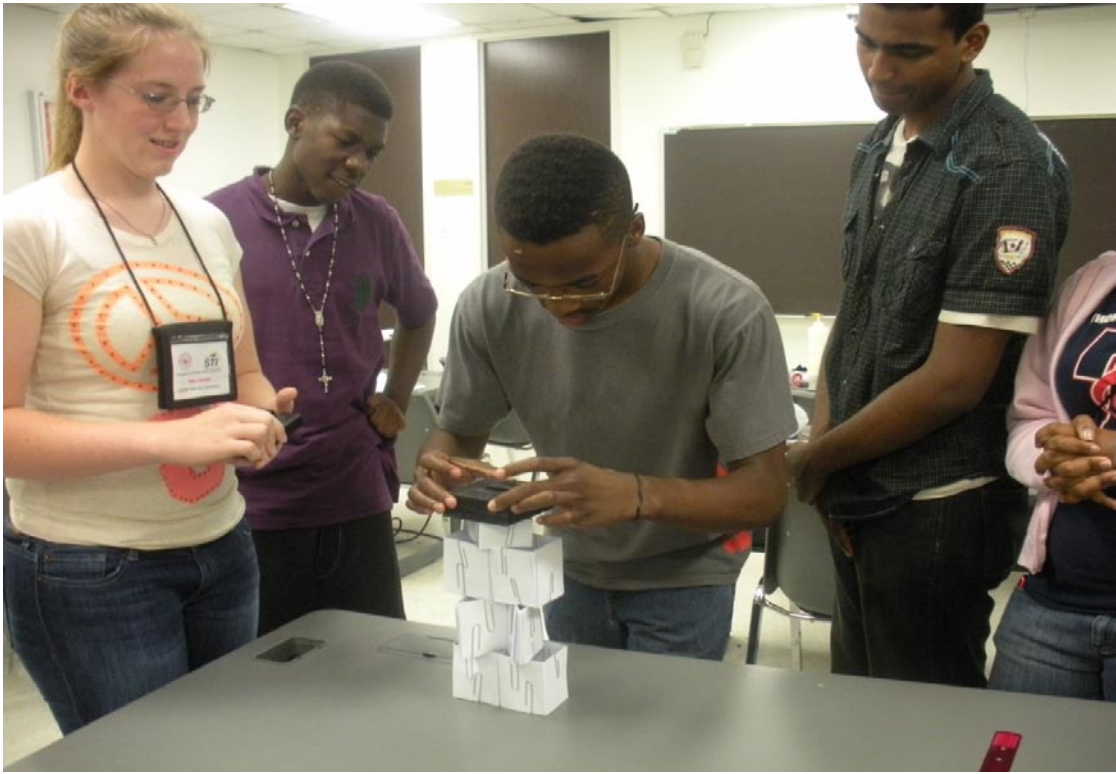
STI members of Group 1 presenting their bridge model to the judges



Group 3 measures the height of their tower model



Group 2 testing their tower model



Group 1 testing their tower model



Group 3 adding weights to a bucket to test the strength of their concrete beam



Group 1 adding weights to a bucket to test the strength of their concrete beam



Group 2 testing the strength of their concrete beam



2010 STI Scholars in the lobby of TTI's Gibb Gilchrist Building with TTI hosts



2010 STI Scholars working with Mr. Eugene Booth of TTI's Structural Safety Division at the TTI Annex.



2010 STI Scholars with Mrs. Martha Raney Taylor (TTI) and Ms. Debbie Jasek (TTI) at the TTI TransLink facility



STI Scholars with Mr. Eugene Booth of TTI's Structural Safety Division at the

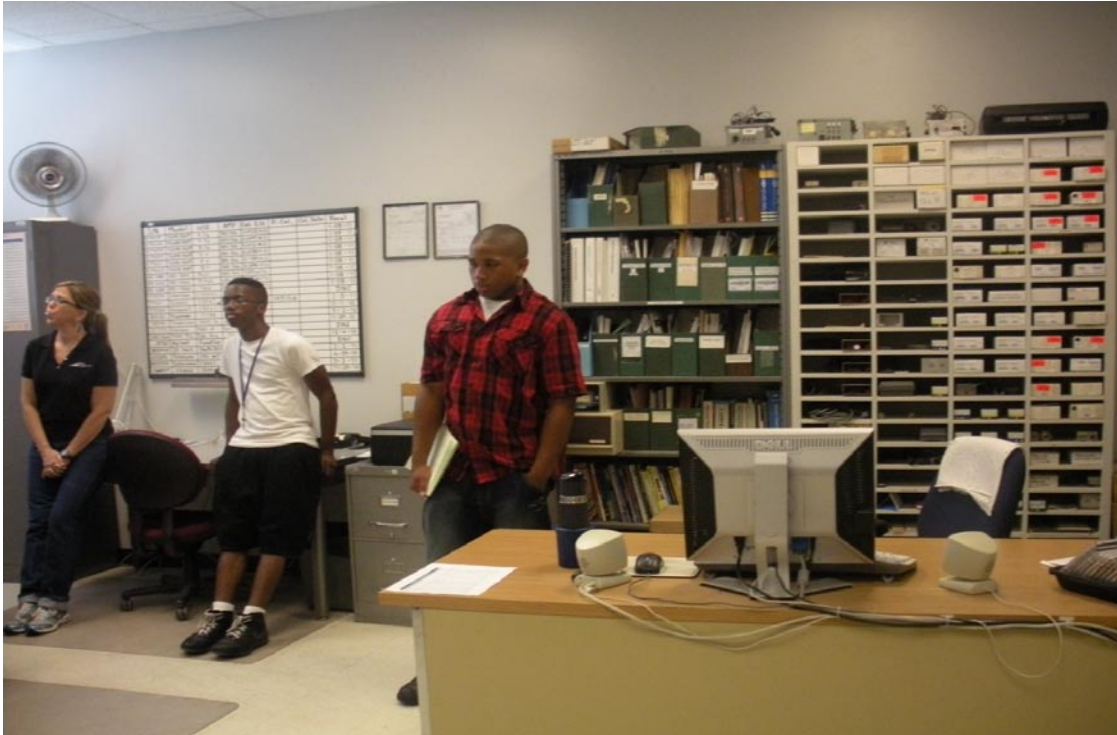
2010



Annex.  
2010 STI Scholars with Mr. Eugene Booth of TTI's Structural Safety Division at the Annex getting to know how the truck and the mounted equipment are used to collect data for TTI safety researchers



2010 STI Scholars with TTI researchers discussing rusting, toxicity, expansive soils, scour and erosion at the TTI Environmental and Water research facility



2010 STI Scholars with Mrs. Martha Raney Taylor listening to a TTI researcher about safety



2010 STI Scholars in downtown Bryan, TX





2010 STI and STI Scholars participants



STI participants, Scholars, parents and family Members enjoying the closing ceremony



Audience applauding the 1st place Group Award Winners at the Closing Ceremony



Excellence Award is presented to Kaci Lysford



Daniel Lugo receives the Meritorious Award for academic performance



2010 Mr. & Ms. STI  
Gentleman – Mr. Treveyon Washington  
Congenial – Ms. Stenisha Hawkins



2010 STI Lead Project Engineers

SAMPLES OF STI STUDENT WORK

**STI Traffic Signal Intersection @ University Drive and FM 1098**

Group 1: Geometric Rubik Numerdraticzz

Alyssa Richard, Merlin Reddy, Kaci Lysford, DJ Ragston, Jonathon Golden

**Introduction:**

Around 7:45 am to around 8:00 am on a weekday morning in rainy weather, our group went out and took data using a traffic clicker and manually counting cars and seeing which direction they were going in a 5 minute cycle. With the clicker we counted cars that were going left right and straight. We did this to see where most cars entered and which direction they were coming from. We also had each group member go North, South, East, and West. They counted how many cars went through a green light through a five minute period. How many times the light changed from red, green, and yellow were also counted in a five minute cycle.

The factors that affect the light sequence are traffic, breaking distance, weather, and time of day.

**Charts:**

Data Collection Manually				
Cycle/ Direction	North	South	East	West
	L, S,R	L,S,R	L,S,R	L,S,R
Cycle 1	0,6,0	3,64,1	3,0,2	7,4,2
Cycle 2	0,4,0	5,35,1	2,1,3	0,1,2
Cycle 3	0,0,0	6,20,2	0,1,0	0,0,1

Data Collection via Clicker				
Cycle/ Direction	North	South	East	West
	L,S,R	L,S,R	L,S,R	L,S,R
Cycle	3,4,5	0,2,3	7,5,4	2,4,1

Data collection for light changing			
5 minute cycle	RED	YELLOW	GREEN
1	5	5	6
2	7	6	6
3	6	6	7

**Questions:**

Accuracy between two data types? Yes

Time Collected? 7:45 am to around 8:00 am

What could be changed to give you a better data analysis? Change hours to peak hours

Did the light turn green enough to keep the traffic moving? Yes

Was the light held long on a certain color, if so why do you think that was done that way? To keep the traffic moving

What change could make this intersection better? Make green lights coming out coming North shorter.

**Observations:** They were little to no cars coming North (leaving campus) in the morning. Most cars were coming into campus

**Conclusion:** Even though traffic only flowed steadily from the South direction we still need a stop light to keep all the traffic flowing at a steady pace. The data was also inconclusive because it was not done at the traffic high points. If it was done at 7:30 am or 5:00pm the data would be more accurate because more people traveled through the road at those times.

## The Effect of Intersection Length on Yellow Traffic Light Times

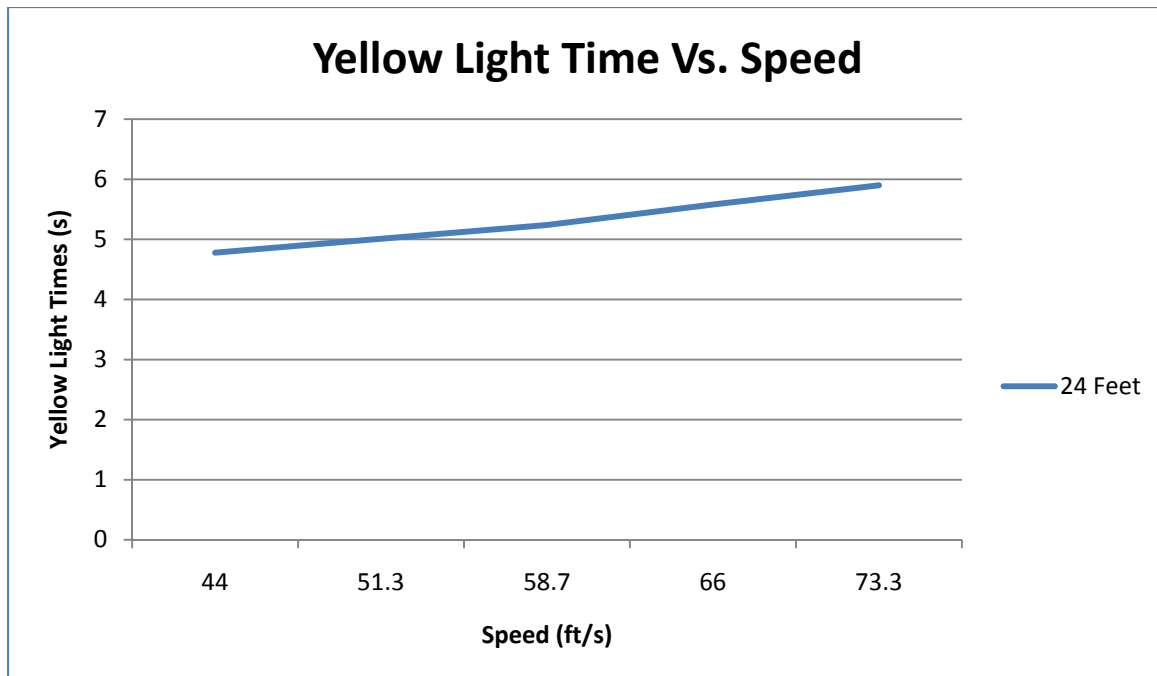
Geometric Rubik Numerdraticzz: Alyssa Richard, Merlin Reddy, Kaci Lysford, DJ Ragston, Jonathon Golden

**Abstract:** How do stop lights change when they're supposed to? Are they programmed? Is it a clock? Or even a little man pressing buttons? The answer is all three, or at least it was at one point in time. Although, in this report, we did what the engineers in our day and age have done before. We found the length of the yellow light by using mathematical equations to determine the factors used in figuring out when a stop light needs to turn from green, to yellow, and finally, to red.

### Introduction:

The goal of this scientific lab was to “provide the factors involved in determining the time associated with the yellow light at a signalized intersection”. The factors were Reaction time, Deceleration, and Intersection Length. To get to this conclusion we had to apply equations dealing with braking distances, reaction time, approach speed, and distance to determine how long the yellow light should last.

Calculated Values					
Speed (mph)	Speed (ft/s)	Deceleration (ft/s <sup>2</sup> )	Braking Distance (ft)	Reaction Time (s)	Yellow Light Period (s)
30	44.0	9.66	100.21	1.5	4.78
35	51.3	9.66	136.22	1.5	5.01
40	58.7	9.66	178.35	1.5	5.24
45	66	9.66	225.47	1.5	5.58
50	73.3	9.66	278.10	1.5	5.90



**Graph:**

**Explanation of Graph:** Our graph shows that the longer a yellow light lasts the faster a car will accelerate. A car going at a certain speed needs a longer distance to stop because of the wetness of the roadway, the reaction time of the driver, and the rate of deceleration. Therefore, the car will accelerate instead of decelerate because of the fact that the car won't have enough time to stop before the car reaches the intersection.

**Formulas Used:** Yellow Light time, Breaking Distance, Velocity

**Methods:** To start our process we first decided that we wanted our reaction time to be 1.5 seconds and we wanted to make the intersection 24 feet. We chose the breaking effect to be at 0.3g. We transformed the speed from M/H to Ft/S. First we found the deceleration value by multiplying the value of the road (0.3) and the value they gave us ( $g=32.2\text{ft/s}^2$ ). Next we used  $V_0$  as speed of Ft/S and substituted that into the breaking distance formula. After we did that we solved the yellow light period using the given values and found that the car going the speed it was and having the deceleration it did that the yellow light period should be between 4.78 and 5.90.



## **2010 Summer Transportation Institute Scholars program – Student Report**

by

Assata Conway (STI Scholar)

STI Scholars participated in a number of hands-on and classroom activities and projects from June 20, 2010 thru July 2, 2010 which helped to learn more about the civil and environmental engineering fields and profession during the PVAMU 2010 Summer Transportation Institute program. Activities and projects included participating in several presentations by professionals in various fields of civil and environmental engineering, in-class instructions in math, reading, writing, comprehension, science and engineering, several hands-on projects, recreational activities and field trips. Hands-on projects include: Computer input on yellow signal intersection, Bridge Beam Design, Concrete Cylinders and cubes, Tower Design with Basal Wood, Boat Sinking Project, two visits to the Texas Transportation Institute and Texas A&M University campus in College Station, Texas with Dr. Ethelbert Opara, the STI Scholars program Coordinator.

We learned about transportation, traffic flow and congestion problems, pavement design, environmental issues, bridge design, intelligent transportation systems, materials testing and a lot more. We worked in groups to complete projects in model bridge design, estimate the cost of the bridge, tower design, concrete beam design and boat floatation.

During our first trip to TTI on June 22, 2010, we visited the TTI TransLink (a mini TranStar in Houston, Texas) and the Traffic Visibility laboratory in the morning, the Roadside safety and the Environmental Safety units at the TTI Annex in the afternoon. We had a brief overview of the different jobs that are available at TTI. Dr. Opara (PVAMU) and Mrs. Debbie (TTI) taught us that anyone does not necessarily end up with the straight path to the job of his/her dream and that the person may very well be working as a draftsman or assisting in research to open up to the world of engineering. We learned that it would be very wise to intern during college summers to gain experience. Apparently, the people that hire entry level engineers look to see how much experience the applicants have including those gained through internship opportunities.

While at TTI we gained brief knowledge about traffic control and how they come up with appropriate speed limits, traffic signs, and road-side cameras for the freeways. There is a Traffic Signal control box that allows the street lights to turn the necessary color that it must turn. The TTI researcher, who had lectured about traffic control said, “Despite what one may see on television, it is impossible for all traffic lights at an intersection to go green at the same time.” Inside the traffic control box is a device that causes the lights to contrast if one goes green. However, it is very likely for all lights to turn red.

We also learned about the structural aspects of TTI. Structural research at TTI covers infrastructure and constructed facilities as well as the design and use of roadside safety structures. Researchers at TTI develop innovative methods to analyze, design, construct, maintain, and manage large structural components of the nation's transportation network. In addition, TTI research has resulted in products that have been deployed nationwide to improve roadway safety and enhance travel such as: crash cushions, breakaway sign supports, guardrails and treatments, barrier systems, and improved pavements and materials. TTI's structural engineers and researchers study supporting structures fundamental to transportation, focusing on design and analysis of constructed facilities, dynamic loading and structural behavior, modeling and analysis, natural hazards, probabilistic and stochastic modeling, and rehabilitation and renewal of infrastructure. In addition to other structural topics, TTI research encompasses the design and evaluation of bridges along with studies of expansive soils, scour and erosion, construction quality control, and seafloor characteristics.

TTI's roadside safety experts have extensive experience in finite element analysis, simulation, structure analysis and design, vehicle dynamics, and safety. Research on roadside devices encompasses the influence of roadside geometric features such as driveways, slopes, ditches, shoulders, and medians. Although we didn't get to see the crash test that we so patiently longed for, we still got the information that we needed. We saw videos of several crash tests as part of our graduation and award ceremony program here at Prairie View A&M University presented by Dr. William Stockton, the Executive Associate Director of TTI, College Station, Texas.

We learned from the experiences of our instructors during our TTI visit the value of education and what it can do to our future later in life. “Education is the great Equalizer,” says Ms. Debbie Jasek. “It doesn’t matter what your race is, if you have the knowledge and the right education, you are just as great as anyone else”, added by Debbie and Dr. Opara. Dr. Opara also shared with us how working for Texas A&M University professors and TTI researchers enabled him to learn a great deal about engineering research and also helped him pay his way through college at Texas A&M University without financial aid or taking out student loans. He also added that a good attitude is very important to getting help from professors and others. I someday hope to be able to pay for my own education just as Dr. Opara did. He taught us about how the federal government helps to create jobs in Houston and other cities by funding the transportation improvement projects (TIP) and how environmental engineering and air quality impact transportation decisions. In fact, he taught us more about lifelong learning lessons.

During our second trip to TTI on June 29, 2010, we visited the pavement and materials laboratories and learned about the different materials and pavements that are used on our roadways. TTI researchers were developing test facilities to measure pavement loading and mixture characteristics. TTI's pavement and materials experts have amassed a wealth of experience in practical and theoretical knowledge. Professionals from disciplines in engineering, planning, computer science, natural sciences and business team up and contribute extensive expertise to achieve state-of-the-art and state-of-the-practice results.

TTI projects teams study roadway management, fundamental physical and chemical characteristics of asphalt and aggregates as well as flexible and rigid pavement mixtures and structures, different types of pavement, soil influences, repair and rehabilitation, fracture mechanics, and other materials issues. TTI researchers are recognized worldwide for their expertise and are frequently invited to present educational seminars and workshops. Innovative research paves the way for use of recyclable materials and educates future transportation professionals.

TTI researchers collaborate with specialists in the industry, as exemplified by multi-agency project teams and partnerships such as the International Center for Aggregates Research headquartered at TTI, which serves as a forum for research and discussion into industry concerns.

At the TTI's materials lab we were introduced to many devices that are used to help produce the most accurate test results possible. We saw a huge box in the lab called the Microstructure Characterization using X-ray Computed Tomography known as the X-LEK VENLO or an X-RAY Machine. The TTI researchers made it very clear that it was not the same kind of X-RAY machine used in the medical field. This machine produces rays that can be much more violent to humans and could cause death if not properly shielded. TTI uses their X-RAY machines to view the inside of cylinder block and to check the amount of air inside the cylinder. Too much air can cause cracking in cement and cause asphalt to fatigue earlier than when it is expected. Concrete blocks have less air bubbles on the inside than asphalt blocks. We also learned from Dr. Opara and the TTI researchers that about 90% of the roads in the United States are built with asphalt because it is a relatively cheaper material than concrete pavements.

Dr. Opara and TTI researchers taught us that lately researchers have found that putting fiber inside of pavement helps to prevent cracks from going all the way to the top of the pavement. Air bubbles are necessary because both concrete and asphalt expand when hot, and contract when cold. If there is water in the cracks it freezes. Air bubbles in fact reduce the formation of cracks and therefore air bubbles are beneficial.

We also participated in the evaluation of peers' projects as well as the work of the instructors and other professionals who participated in our training during the STI program. We also presented our research projects during the Awards Ceremony on July 2, 2010.

On behalf of the STI Scholars, we thank our sponsors, the STI administrators and staff who helped to make this program possible and hope that they will find resources to continue the program for the benefit of future generations.

**PVAMU 2010 SUMMER TRANSPORTATION PROGRAM PROJECT**  
Individual Assignment by Dr. Ethelbert Opara

The PVAMU Facilities and Planning Division is planning to build a building a warehouse for its materials to be completed by December 1, 2010. You work for AGC National Corporation, engineering, construction and Management Company that is involved in capital improvement projects, commercial, residential and industrial construction. Your company had just won the contract to develop the project and you were assigned to verify the cost of roofing and wall structures for the project by your supervisor who has to present the report to the President of the company.

The roof is 100 feet long, 75 feet wide and has a 3:12 slope on the front and back sides, and 1:1 slope on both ends. How much would be invested on 30-year corrugated roofing sheets if a 4'x12' sheet costs \$30.00? Do not include the cost of nails/screws, gutters, hip roof, labor, insurance and other materials. Draw the roof with dimensions.

How much would it cost to build 2-94'x10'x1' walls and 2-69'x11'x1' walls if a cubic yard of concrete wall material costs \$200.00? Draw the front and side walls with dimensions.

2010 STI AND STI SCHOLARS PROGRAM AWARDS CEREMONY

2010 SUMMER TRANSPORTATION INSTITUTE AND STI SCHOLARS PROGRAM PARTICIPANTS



Name of Student	Grade	High School	City
Hawkins, Stenisha	12	Jack Yates High School	Houston, TX
Jimenez, Evelyn	11	Everman High School	San Antonio, TX
Ashley, Ross	12	Milford High School	Milford, TX
Evans, Michael	11	Bishop Dune Catholic	Dallas, TX
Reddy, Merlin	12	Klein Oak High School	Spring, TX
Adams, Asya	12	Fossil Ridge High School	Fortworth, TX
Barajas, Jocelyne	12	Skyline high School	Dallas, TX
Lysford, Kaci	11	River Road High School	Amarillo, TX
Engmann, Cyril Yannick	11	Rockwall Heath HS	Heath, TX
Lugo, Daniel	11	Bellaire High School	Bellaire, TX
Saracho, Jose Carlos	12	Bellaire Senior HS	Bellaire, TX
Ragston, Devonte	12	Waller High School	Waller, TX
Muhammad, Tariq	12	Packview Baptist HS	Houston, TX
Washington, Treveyon	11	Jack Yates High School	Houston, TX
Richard, Alyssa	12	Cypress Springs HS	Cypress, TX
Fernando, Christian	11	Summer Creek HS	Missouri City, TX
Moses, Christopher	11	Wharton High School	Wharton, TX
<b>2010 STI Scholars</b>			
Conway, Assata	12	Westside HS	Houston, TX
Golden, Jonathan	12	B.T. Washington HS	Houston, TX
Toriono, Lavender	12	Mansfield Tigers HS	Mansfield, TX

**Prairie View A&M University**  
(A Member of the Texas A&M University System)

**2010 SUMMER TRANSPORTATION INSTITUTE  
&  
2010 STI SCHOLARS PROGRAM**



Hosted by  
**Department of Civil & Environmental  
Engineering**

*Awards Ceremony*  
Friday, July 2, 2010

**Room 139  
New Electrical Engineering Building  
10:15 A.M.**

**Dr. George C. Wright  
President**



## PROGRAM OVERVIEW

The Summer Transportation Institute (STI) is a two-week program that introduces promising 11<sup>th</sup> and 12<sup>th</sup> grade students to the transportation industry. STI is funded by University Transportation Center for Mobility (UTCM). This program in the past (2000-2009) was a 4-week residential program and was sponsored by Federal Highway Administration (FHWA) through Texas Department of Transportation. Since one in seven jobs in the United States relates to the transportation industry, a career in transportation field is worth considering. The STI program offers participants the opportunity to engage in a wide range of activities that are both educational and enriching. PVAMU has been offering this program since year 2000 and graduated over 180 students so far from this program.

The STI Scholars program is specifically developed for previous STI program participants to explore the Civil Engineering profession further. They work side by side with faculty and researchers from Prairie View A&M University and Texas Transportation Institute.

### STAFF

Dr. Raghava R. Kommalapati, PE, BCEE, Director  
 Dr. Ramalingam Radhakrishnan, P.E., Program Coordinator  
 Ms Samantha R. Glover, Instructor  
 Dr. Ethelbert Opara, STI Scholars Coordinator  
 Ms. Usha Anthony, Graduate Assistant  
 Mr. Ezra Sidney, Peer Male Counselor  
 Ms. Bianca Young, Peer Female Counselor

#### *Special Acknowledgment to the Supporters:*

*Texas Transportation Institute (TTI) Texas Dept. of Transportation  
 Roy G. Perry College of Engineering, PVAMU  
 University Transportation Center for Mobility (UTCM)*

#### *Special Thanks to:*

*Dr. Kendall Harris, Dean, College of Engineering, PVAMU  
 Mrs. Sharon Evans, Staff Asst., Department of Civil & Environ Engr.  
 Mrs. Glenda Jones, Director and Mr. Herbert Thomas and other Staff at  
 Career and Outreach Services  
 Dr. Melissa Tooley and Mrs. Martha Raney Taylor, (UTCM)  
 Dr. William Stockton and Ms. Debbie Jasek, TTI*

***“Making a Difference in the Lives of Youths”***

## CLOSING CEREMONY

**Cyril (Nick) Engmann**

*PRESIDING*

### PRELUDE

Invocation .....	Stenisha Hawkins
Welcome .....	Treveyon Washington
Introduction & Welcome.....	Dr. Raghava Kommalapati STI Director & Interim Dept. Head of Civil & Environmental Engineering
Relevance of STI .....	Dr. Melissa Tooley Director, University Transportation Center for Mobility (UTCM)

### PARTICIPANTS' PRESENTATIONS

Classroom Activities & Projects.....	Alyssa Richard
Field Trips .....	Kaci Lysford
Dorm Life & Recreational Activities.....	Evelyn Jimenez
Scholars Program Activities.....	STI Scholars
Introduction of Speaker .....	Ashley Ross
Keynote Address:	<b>“Your Future Matters to Us”</b> Dr. William Stockton, PE, Executive Associate Director Texas Transportation Institute, College Station, TX
Presentation of Certificates & Awards .....	Dr. Raghava Kommalapati, Ms. Samantha Glover
Closing Remarks .....	Dr. Kendall T. Harris Dean, Roy G. Perry College of Engineering