



Texas Southern University



**Department of Homeland Security
Scientific Leadership Award Program**

DHS-15-ST-062-001

***Preparing Technically
Savvy Homeland Security
Professionals for Maritime
Transportation Security***

AWARD NUMBER: 2014-ST-062-000057-02

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1 EXECUTIVE SUMMARY

Texas Southern University's DHS SLA program was launched in September 2014. It is a five-year program aims to increase the Pipeline of Science, Technology, Engineering, and Mathematics (STEM) majors in MSI for Maritime Transportation Security through interdisciplinary Undergraduate Research and Education.

To achieve this goal, this program has three specific objectives, which are: 1) Develop an integrated research and education program to provide innovative technology solutions for the Homeland Security Enterprise (HSE), particularly for maritime transportation security. 2) Develop an interdisciplinary undergraduate curriculum to prepare a technically savvy workforce in Maritime Transportation Security. 3) Increase the number and quality of students who graduate in a STEM discipline within Minority Serving Institutions (MSI).

These three objectives will be achieved in two phases. By August 2016, the Phase 1 has successfully completed. All the proposed tasks were accomplished, and some tasks originally proposed for Phase 2 have also been carried out. Following are some highlights of our progress made in FY 2016:

- We started a new collaboration with **Maritime Security Center of Excellence (MSC)** at **Stevens Institute of Technology (SIT)**. Since last year, TSU have collaborated with MSC at SIT on different aspects, including
 - TSU supported MSC on winning a NSF funding award titled “Maritime Cybersecurity - Building Capacity in Critical Infrastructure Protection”. In this project, TSU collaborate with Stevens Institute of Technology faculty on the development of maritime cybersecurity curricula to enhance the knowledge, technical skills and research capabilities of our students and our partners in the maritime domain.
 - Our supported undergraduate student Mr. **Samuel Tefferra** has participated in a highly collaborative eight-week intensive program hosted by **Maritime Security Center**. This program focused on critical issues in maritime domain awareness, emergency response and maritime system resilience.
- **Two** new research projects led by **Dr. Yi Qi** and Dr. **Mehdi Azimi** have been awarded by Texas Department of Transportation (TxDOT).
- **Two** online courses have been developed completely and a proposal for adding these new courses has been send to the College and University Curriculum Committee for approval.
- Program supported students made great progress on their study and research and multiple honors have been awarded to our students.
- Program involved faculty members have been very productive in last year and **13** papers have been published or submitted for publication. **All** faculty members were invited to present their research on various meeting, seminars or workshops.
- For program outreach and recruiting student purposes, we successfully hosted the 2016 **Summer Maritime Academy** to high school students in Houston, and collaborate with Elkins High School on a **Summer Internship Program**.

- Our program continued providing learning and networking opportunities to Maritime undergraduate students by organizing numerous events and encouraging students to participate program related off-campus activities.

This report presents the program progress and achievements we made during FY 2016 (from September 2015 to August 2016). It consists of following nine parts: maritime curriculum development, research progress, collaborations with COE partners, other collaborations, maritime events and activities, program achievements, supported students report, program management and challenges.

2 COURSE DEVELOPMENT

Developing an interdisciplinary maritime undergraduate curriculum is one important objective TSU DHS SLA program. As proposed, this objective would be the focus of Phase 1, and will be continually worked on through Phase 2. By the end of this program, 5 new interdisciplinary courses will be developed, including:

- Software for Scientific Computing (online),
- Introduction to Operations Research (online),
- Introduction to Maritime Cybersecurity,
- Maritime Big Data Analytics and Security, and
- Maritime risk assessment and resiliency analysis.

Besides new developed courses, 4 existing security-related courses for maritime program will be updated, including:

- MTMS 341-Maritime Security Management,
- MTMS 342-Maritime Security Technology,
- MTMS 424 - Containerization and Modern Cargo Storage, and
- MTMS 443 - Maritime Transportation Security.

In the last year, great progress has been made in course development. By now, two new courses were developed completely. Both are online courses and a proposal for adding these new courses has been sent to the College and University Curriculum Committee for approval. In addition, a third course is developing with most of the course contents being developed. In addition, significant improvements have been made in one course. The following part will introduce each newly developed or improved course.

2.1 New Course 1: Software for Scientific Computing

The purpose of this course is to improve mathematical modeling skills and MATLAB programming skills for students in the Maritime Transportation Security program. It will develop students' computation ability through a sequence of projects on numerical methods, mathematical modeling, and simulations.

This course has been well developed and all lecture notes and some lecture videos have been uploaded to the Blackboard (an online learning management system). Materials available on Blackboard include:

- Syllabus
- A complete set of lecture notes and programming codes
- A complete set of Assignments
- A complete set of Quizzes and Exams

Following figures are some screenshots of Blackboard.

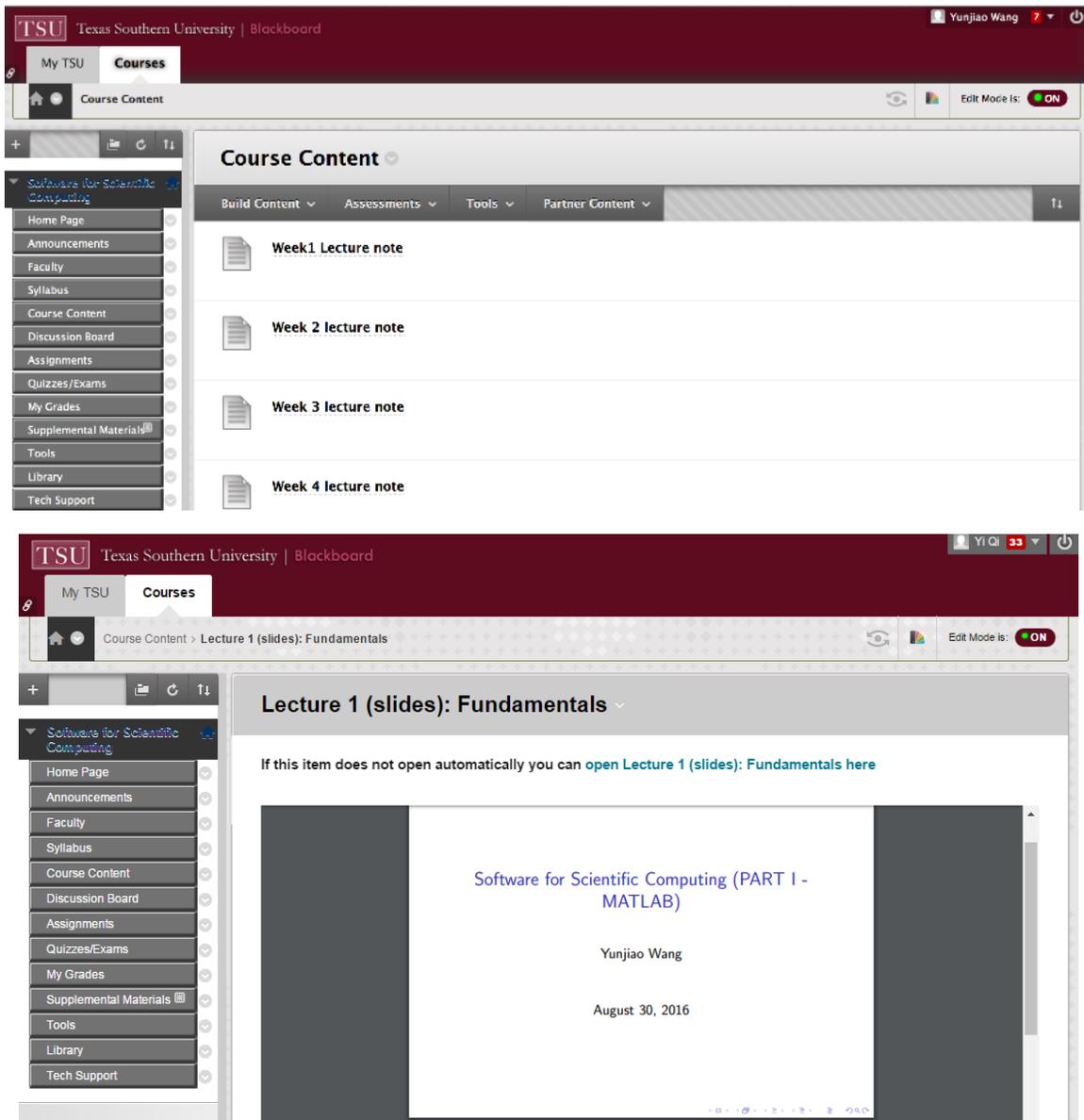


Figure 2-1 Blackboard Screenshots of Course Content

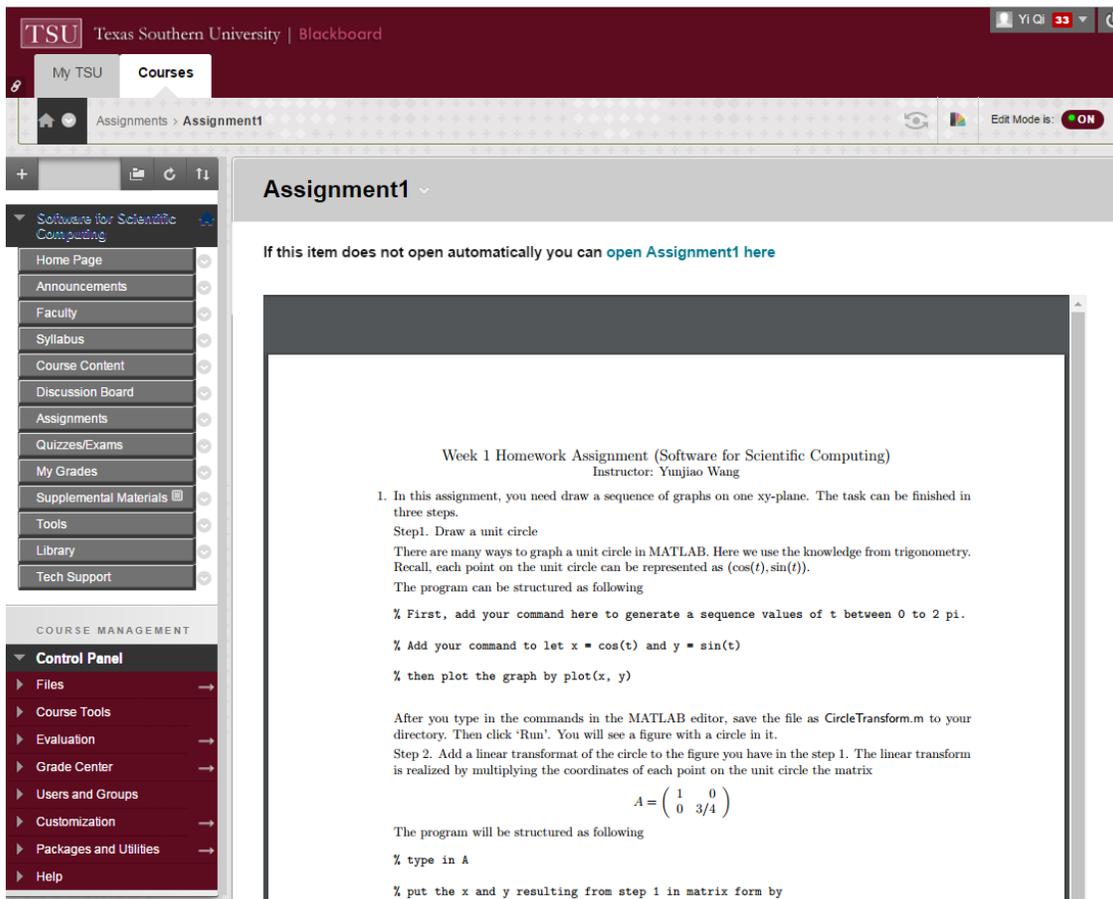
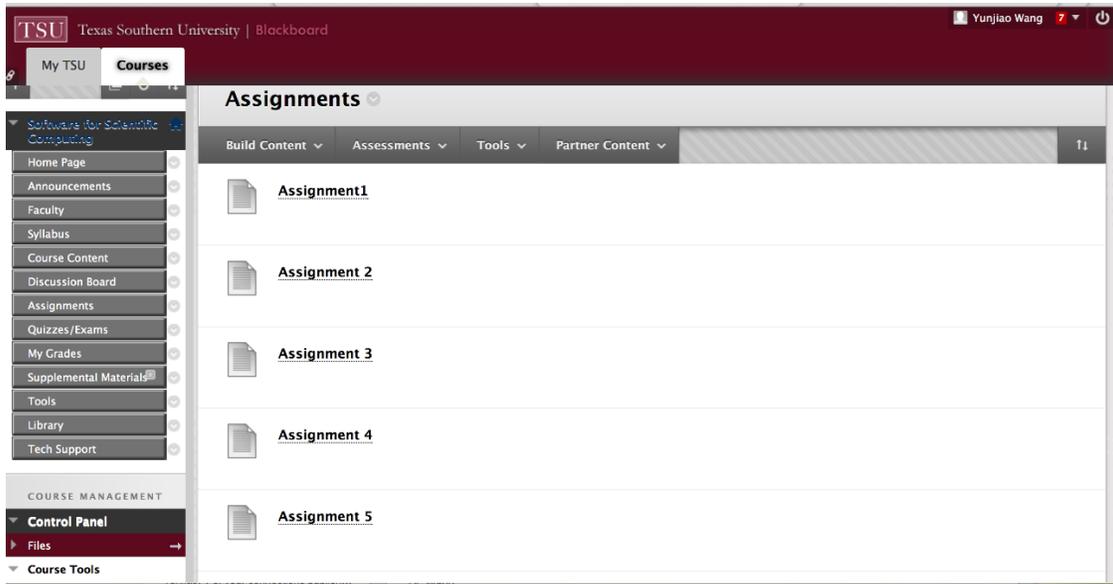


Figure 2-2 Blackboard Screenshots of Assignments

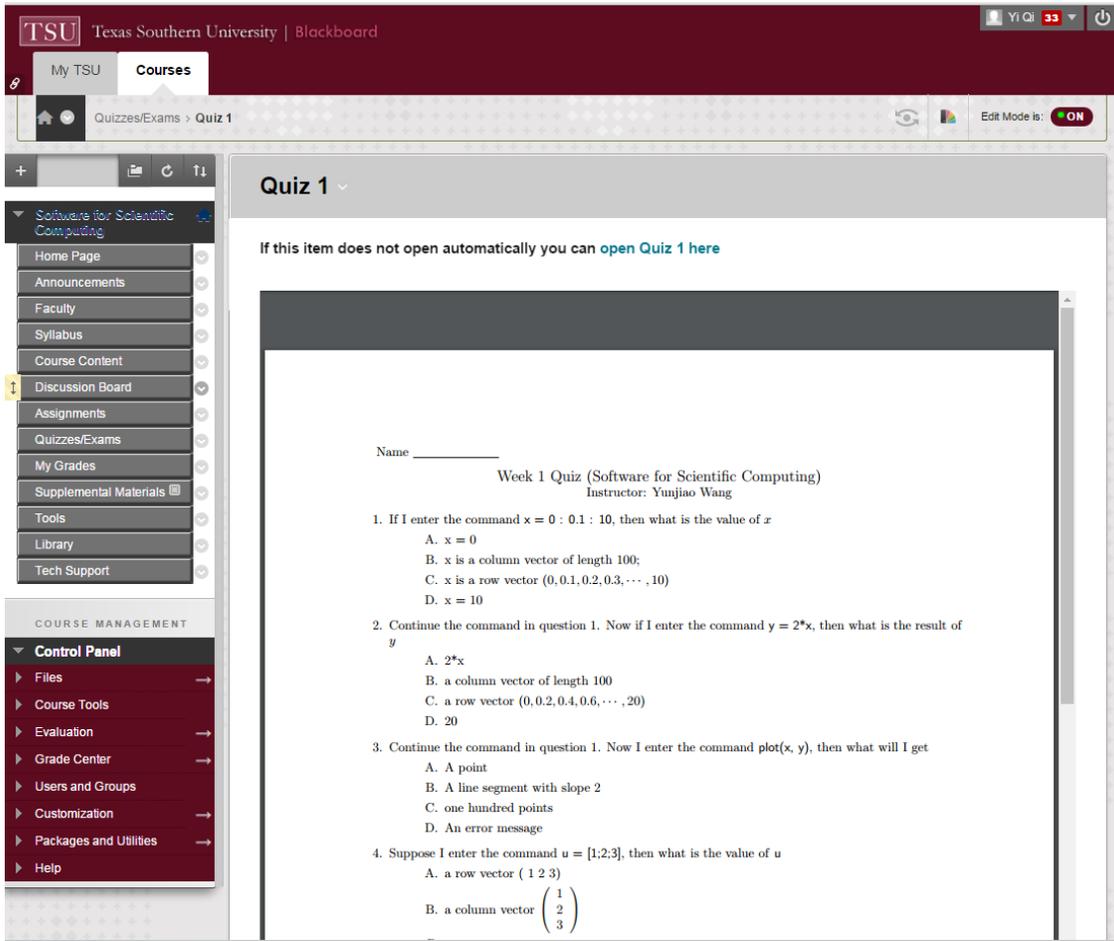
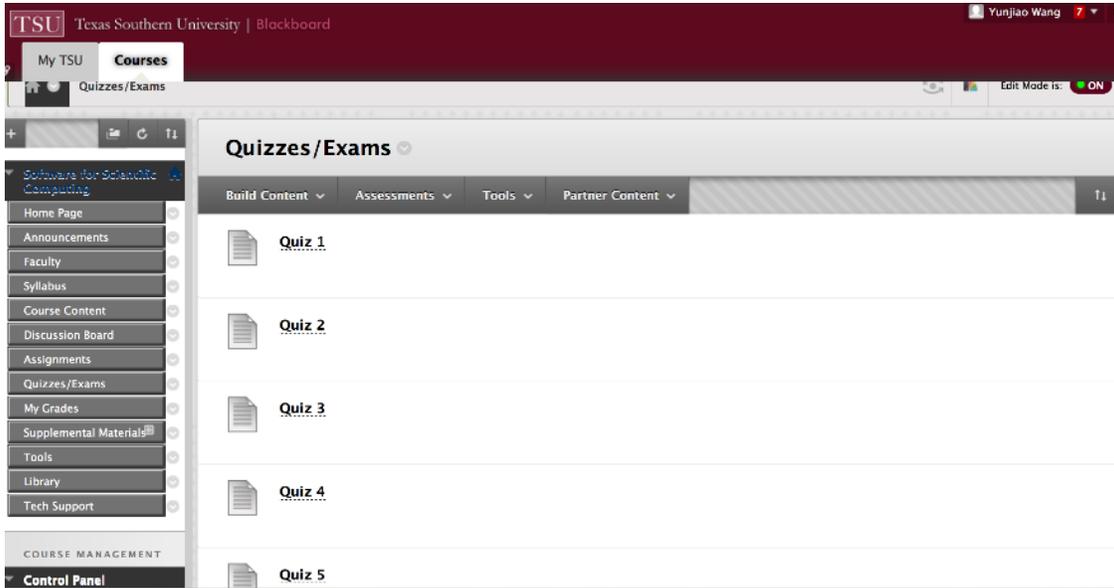


Figure 2-3 Blackboard Screenshots of Quizzes/Exams

Note that, part of the developed class content has been used in a workshop in the College summer research program on statistics.

2.2 New Course 2: Introduction to Operations Research

Students involved in the study and research of Maritime Transportation Security are required to have the ability to model and analyze problems using limited resources in an optimal way. This course, *Introduction to Operations Research* will provide students with the tools for modeling and analyzing such problems. The course is focused mainly on linear programming and its applications. The aim of the course is to provide students knowledge and skills on formalizing and analyzing linear programming problems.

This course also has been successfully developed, course syllabus, all lecture notes and some lecture videos are available on Blackboard.

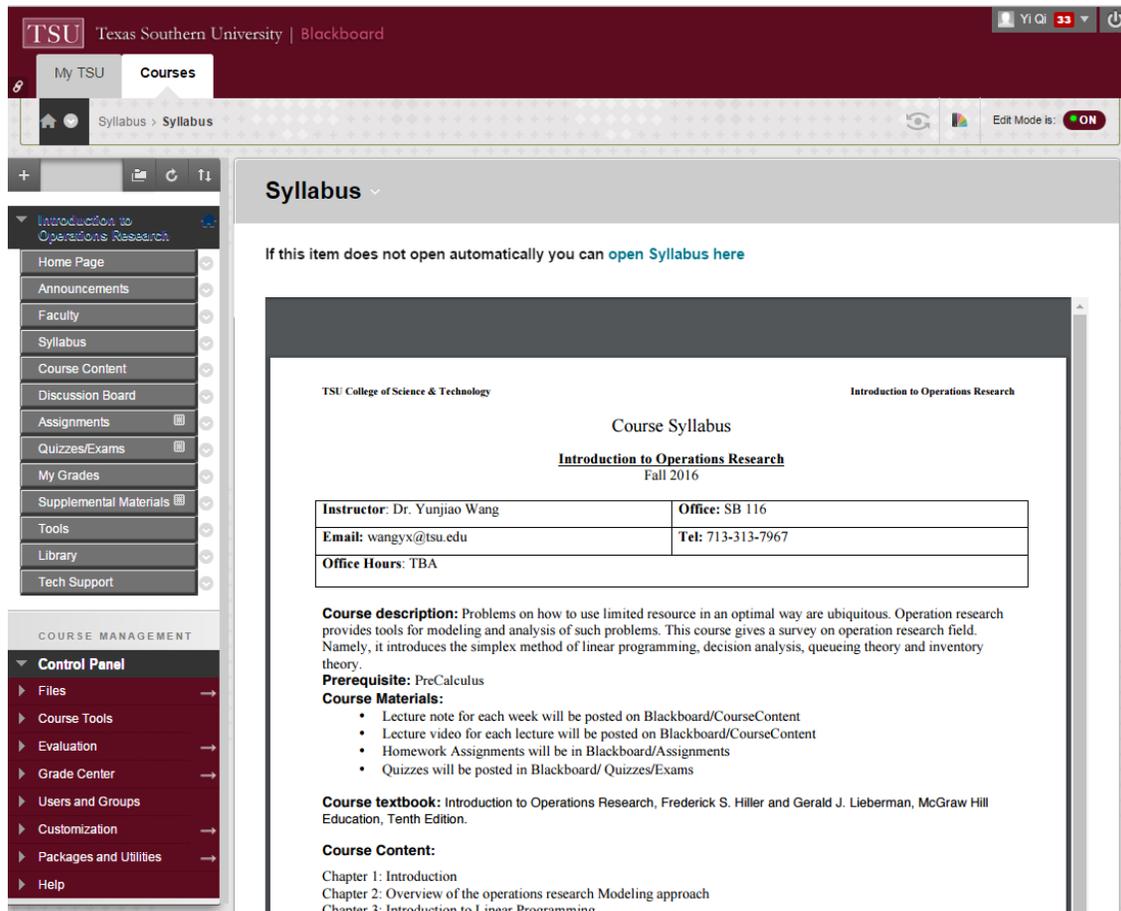


Figure 2-4 Blackboard Screenshots of Syllabus

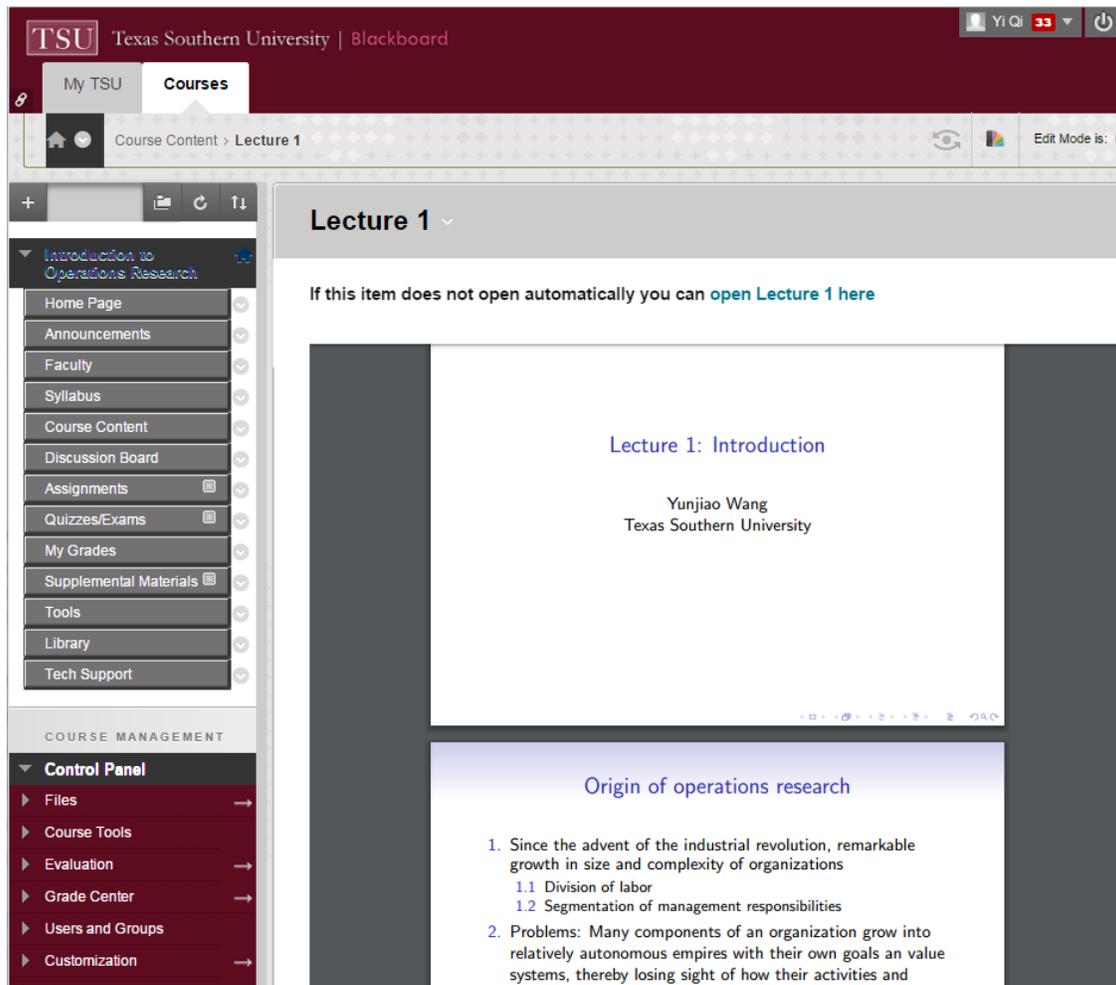
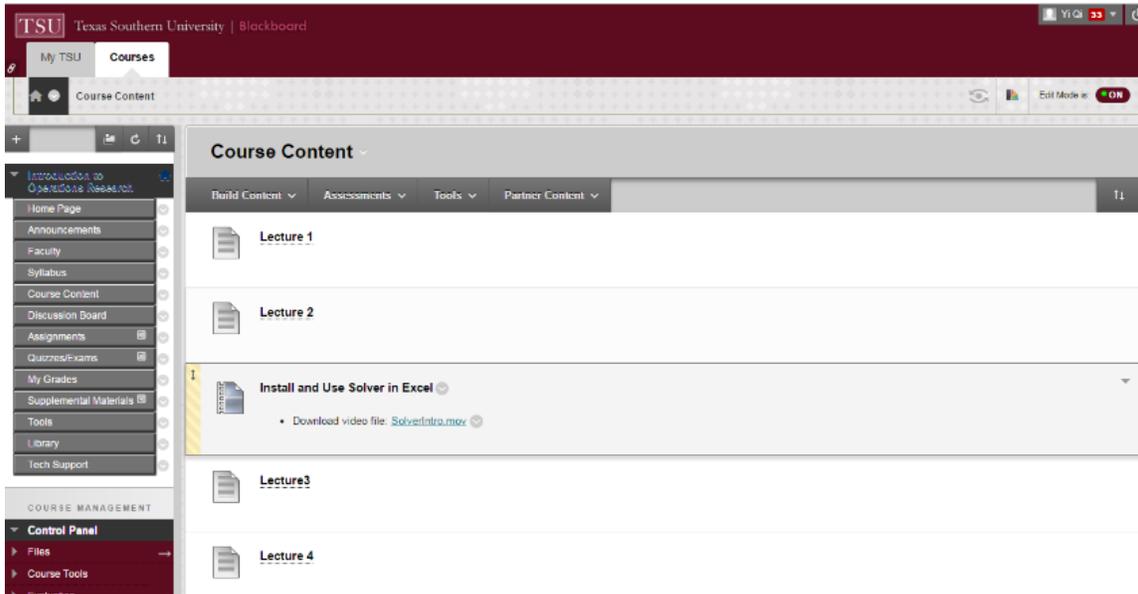


Figure 2-5 Blackboard Screenshots of Course Content

2.3 New Course 3: Maritime Risk Assessment and Resiliency Analysis

This online 15-week course will provide information regarding the procedures and methods necessary to assess threats, vulnerability, and consequences of all facets of maritime risks, as well as strategies to prevent these risks and minimize their consequences. By taking this course, students will understand the factors affecting the security of port and maritime operations, including risk management, risk assessment, shipping, politics, economics, crime, piracy and terrorism. They will review the vulnerabilities in today's practices; evaluate proven and tested recommendations that recognize the role and interests of both government and the private sector in enhancing security and risk management while ensuring the flow of international trade.

The course development is still in the progress, and will be completed in Phase II. Following materials have been completed and uploaded to Blackboard:

- Full Syllabus with detailed week-by-week agenda
- 10 Lectures
- 12 PowerPoint slides
- 15 Discussion Questions
- Instructions for the students for posting to the “Discussion Question” section.

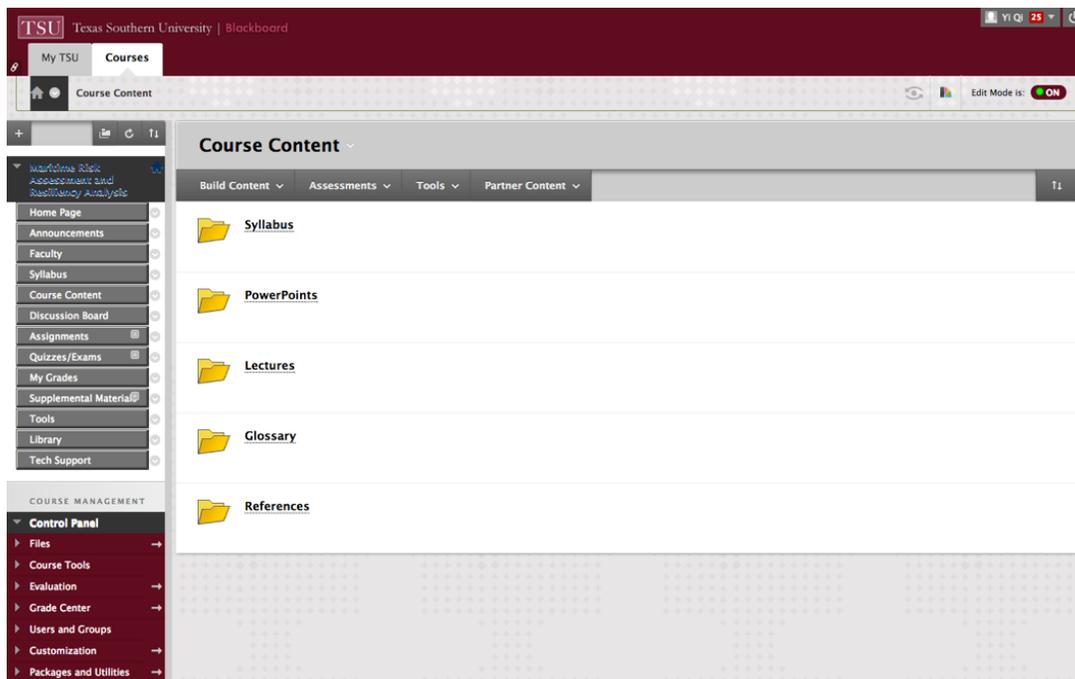


Figure 2-6 Blackboard Screenshots of Course Content

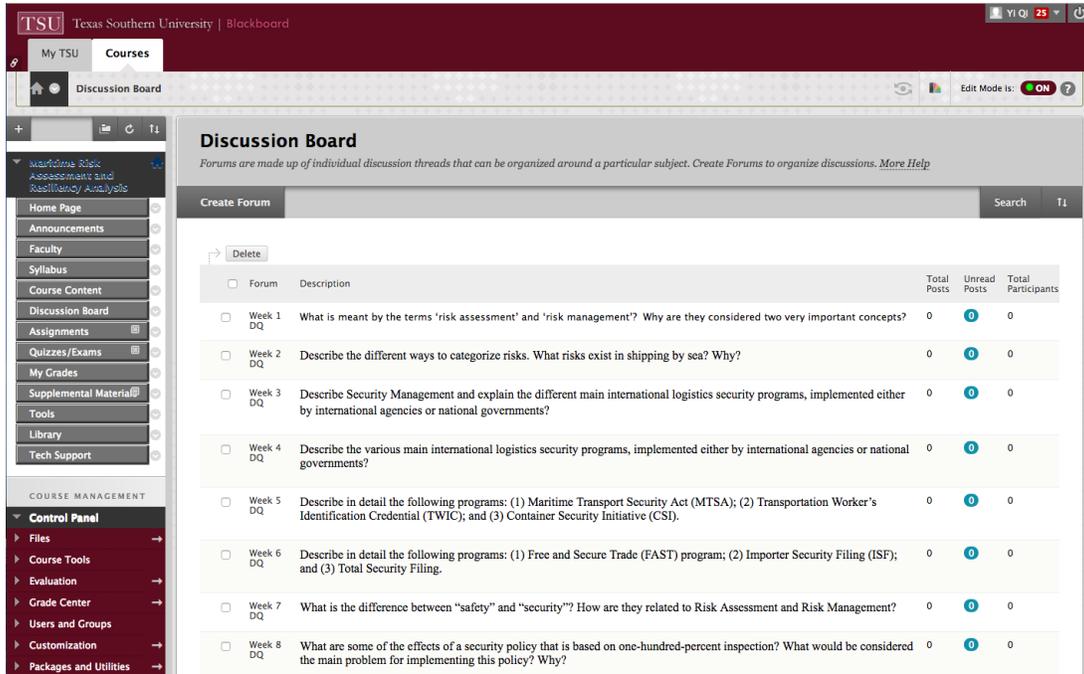


Figure 2-7 Blackboard Screenshots of Discussion Board

2.4 Improved Course 1: MTMS 341-Maritime Security Management

In academic year 2014, MTMS 341 Maritime Security has been improved immensely through collaboration with other government agencies such as the Port of Houston Authority and various supply chain management organizations. The following depicts various improvements, which also have been developed to PowerPoint slides for reference materials.

- Maritime Safety and Security
- Marine Terminal Safety and Security
- Shipboard Safety and Security
- Maritime Security Port of Entry and Documentation Requirements
- Maritime Security Management
- Maritime Security Agencies
- The Role and Mission of the USCG
- Personal Security
- Houston Ship Channel Security District
- Vessel Tracking System
- Ethics and the Human Elements in Maritime Security
- Pirates and Piracy: Past and Present

2.5 Development of USCG Maritime Certificate Courses

TSU offers certified training program for maritime, oil and gas. This program is designed to create high performers and enhance the skills of maritime and oil & gas professionals. The suite of nine advanced training courses was developed in response to the increasing job market needs

for mandatory certification and required training in the maritime, transportation, logistics and oil and gas/offshore industries. During the past year, lots of efforts have been made to improve this certificate course. In 2016, a program coordinator was appointed to oversee the whole certificate training program. Three instructors were approved by the US Coast Guard enabling coverage of nine Program courses offered by the Department. In addition, program information and linkage to Continuing Education's registration site for the course have been updated on the website of Department of Transportation Studies at TSU. (<http://transportation.tsu.edu/maritime-certification-programs/>)

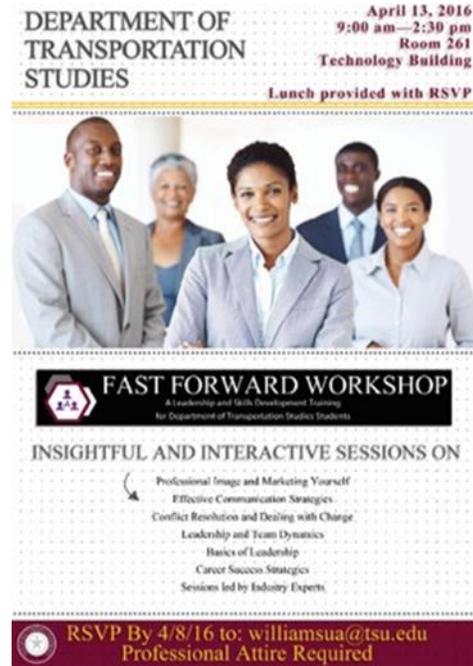
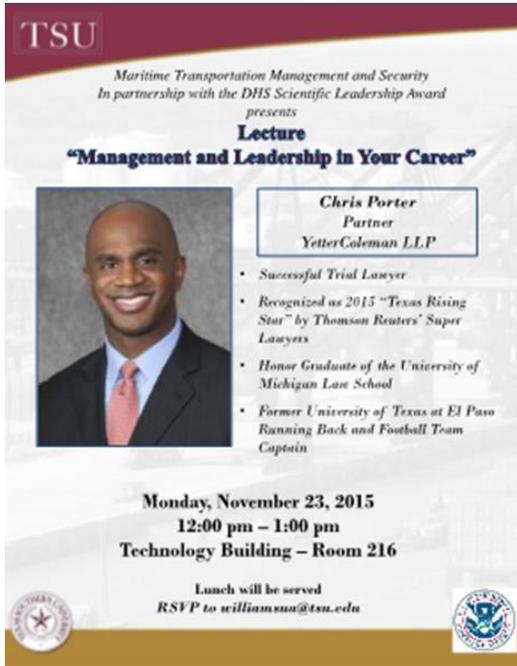
Course materials continue to originate from the International Maritime Organization's (IMO) course models for consistency. However, course content are modified by instructors in anticipation of instructing a course, which includes use of current data, creation of slide packs, new handouts and use of videos. A systematic review of all required US Coast Guard approvals and processes was completed in February 2016.

For marketing purpose, a database was created with Houston area companies and unions whose employees or members might require US Coast Guard certification via the courses offered in the Program. Program information via email and flyers were sent to over 200 contacts. Additionally, more detailed and specific contact is being made by the Coordinator and students hired to support the Program.

To date, the training course has completed two sections. Challenge has been to register a sufficient number of students for the classes. Coordinating classes, dates and students continue to be work in process.

2.6 Development of Seminars and Workshops

Since FY2015, the TSU DHS SLA program designed and organized a series of seminars on various topics of homeland security. These seminars not only expose students to knowledge outside their classroom, but also provide network opportunities with industry experts. In FY2015, three seminars were organized and widely welcomed by students. So in FY2016, the program hosted another two training events, "Management and Leadership in Your Career" and "Fast Forward Workshop".



Management and Leadership in Your Career –11/23/2015

Attorney Chris Porter, Partner with Law Firm Yetter Coleman, LLP spoke to students about management and leadership in their careers. Mr. Porter is a successful trial lawyer and spoke openly about how developing leadership skills through athletics and academic extracurricular activities have helped him in his career. He encouraged the students to engage in research at the undergraduate level, especially if they have ambitions of entering into the legal profession.

Fast Forward Workshop – 04/13/2016

TSU Department of Transportation Studies students participated in the second annual “Fast Forward” Workshop. The workshop was a soft skills and leadership development workshop. Topics discussed at the workshop included: Conflict Management and Dealing with Change; Effective Communication Strategies; and Leadership 101. Speakers included Marcus Woodring with the Port of Houston Authority; Jeff Baldwin, the former U.S. Customs and Border Protection Field Director; Dr. Johnella Bradford with Houston Community College; and Mrs. Dawona Miles with the Port of Houston Authority.

3 COLLABORATIONS WITH DHS CENTER OF EXCELLENCE (COE)

The Center for Risk and Economic Analysis of Terrorism Events (CREATE) located at the University of Southern California (USC) is the first COE we collaborate with. The collaboration between TSU DHS SLA with CREATE started from 2015. Dr. Milind Tambe, Professor of Computer Science & Industrial Systems Engineering at the University of Southern California, was recommended by CREATE and accepted to serve as mentor for our research topic, “Secure

and Efficient Maritime Data Storage and Retrieval.” In addition, Dr. Tambe also hosted Dr. Miao Pan’s visit to CREATE during June 18-28, 2015.

Dr. Tambe provided advice and technical support to the research team at TSU, and he also provided comments on critical tasks in the research program and reviewed the key documents or deliverables.

This year, to expand the collaboration with other COEs, also recommended by CREATE, we started a new collaboration with the Maritime Security Center of Excellence (MSC) at Stevens Institute of Technology (SIT). The MSC conducts innovative research, develops new tools and technologies and provides relevant maritime security-focused educational programs to enhance our nation's maritime domain awareness, the resiliency of our Marine Transportation System (MTS) and the technical skills and leadership capabilities of our current and prospective maritime security workforce. The mission and activities of MSC are more related to our maritime program.

Our first collaborating is on application for an NSF proposal title “Maritime Cybersecurity - Building Capacity in Critical Infrastructure Protection”. For this award, TSU will collaborate with MSC in developing an interdisciplinary program in Maritime Cybersecurity in order to bridge the current knowledge gap between the two disciplines, i.e. Maritime Systems and Cybersecurity. As an academic partner, TSU will participate in the proposed faculty workshops and engage in relevant outreach activities to include building maritime cybersecurity awareness within the Port of Houston and to hosting faculty and guest lectures focused on cybersecurity concerns in the maritime transportation domain. Please see Figure 3-1 for the NFS award announcement.

The screenshot shows the NSF Award Abstract page. The header includes the NSF logo and the text "National Science Foundation WHERE DISCOVERIES BEGIN". Below the header is a navigation menu with options: RESEARCH AREAS, FUNDING, AWARDS, DOCUMENT LIBRARY, NEWS, ABOUT NSF. The main content area is titled "Award Abstract #1623714" and "Maritime Cybersecurity - Building Capacity in Critical Infrastructure Protection". The abstract text states: "The U.S. Department of Homeland Security considers the Maritime Transportation System (MTS) to be among the 16 most critical infrastructure sectors in the U.S. whose assets, systems, and networks if disrupted or rendered incapacitated would have crippling effects on the nation's economy and the safety and security of its citizens. Over the past five years, an increasing number of reported maritime cybersecurity incidents have highlighted the vulnerabilities of the MTS to cyber threats, including vessel navigation, cargo scanning and port facility operations. The evolving complexity of these occurrences, together with the many components that comprise the maritime environment require that maritime professionals must be well prepared in the emerging science and technologies needed to inform, support, and implement maritime and critical infrastructure security policies and directives. To effectively enhance the security of our nation's maritime borders, ports and inland waterways, maritime professionals must possess the skills needed to address cyber threats, must be well adept at developing and evaluating new methods and tools for efficient and effective response and system resilience, and must be able to define new strategies for mitigating cyber threats." The abstract also mentions that the project will develop two interdisciplinary programs in Maritime Cybersecurity in order to bridge the current knowledge gap between the two disciplines Maritime Systems and Cybersecurity. The abstract is signed by Susanne Wietzel and Beth DeFares. The footer of the abstract page includes the text "Please report errors in award information by writing to: awardsearch@nsf.gov."

NSF Org:	DGE Division Of Graduate Education
Initial Amendment Date:	July 1, 2016
Latest Amendment Date:	July 1, 2016
Award Number:	1623714
Award Instrument:	Standard Grant
Program Manager:	Dongwon Lee DGE Division Of Graduate Education BHR, Direct For Education and Human Resources
Start Date:	September 1, 2016
End Date:	August 31, 2019 (Estimated)
Awarded Amount to Date:	\$499,419.00
Investigator(s):	Susanne Wietzel swietzel@stevens.edu (Principal Investigator) Beth DeFares (Co-Principal Investigator)
Sponsor:	Stevens Institute of Technology CASTLE POINT ON HUDSON HOBOKEN, NJ 07030-5991 (201)216-8762
NSF Program(s):	FED CYBER SERV; SCHLAR FOR SER
Program Reference Code(s):	7254, 7434, 9178, 9179, SMET
Program Element Code(s):	1660

Figure 3-1 NSF Award Abstract

In Addition, TSU also collaborates with MSC on student development. In Summer 2016, MSC provided an opportunity for our undergraduate student, Samuel Teferra, to enroll in the Summer Research Institute (SRI) at Stevens Institute of Technology. SRI is a highly collaborative eight-week intensive program hosted by MSC. This program focused on critical issues in maritime domain awareness, emergency response and maritime system resilience. Throughout the program, TSU student, Mr. Samuel Teferra, worked closely with MSC researchers and with each other. He also met with maritime industry and government experts, engaged in hands-on research, and participated in field visits to local ports and DHS component agencies.

Through the continuing collaborations, we will send more students to attend summer training or workshop programs at MSC. It would greatly benefit our maritime program and our supported students.

4 RESEARCH

In the past years, TSU DHS SLA program continued involving faculty members across different departments to conduct integrated research pertain to maritime transportation security. Based on interviews with security officers in Port of Houston Authority and the areas of expertise of early career faculty and other researchers at TSU, the following research activities have been identified as research projects:

- 1) Maritime Risk Assessment and Management
- 2) Maritime Cargo Security: Data Analysis and Intelligent Screening
- 3) Secure and Efficient Maritime Data Storage and Retrieval

The objective of Phase 1 is to identify research topics, which has been successfully completed. In addition, our faculty members in charge of each research topic have made detailed plans for each research projects. Together with their student assistants, they have started working on some tasks, and made certain progress. This chapter will introduce each research topic as well as the research progress we made during the last year.

4.1 Maritime Risk Assessment and Management

This project will systemically examine the current practices in maritime risk assessment and management. It will synthesize and compare the methods and measurements for maritime risk assessment and management, and for maritime resiliency analysis. The results of this research project will be used for developing the new maritime security courses and enhancing the existing courses. The key tasks for this topic include:

Task 1: Literature search

Task 2: Literature review, analyze and synthesize the reviewed literatures

Task 3: Synthesize the methods and measurements for maritime risk assessment and management

Task 4: Synthesize the methods and measurements for maritime resiliency analysis

Task 5: Document research findings

The research team is currently working on task 1 and task 2. Efforts have been made on searching and reviewing research on the following key words:

- Risk Management
- Risk Assessment
- Maritime Security
- Port Security
- ISPS Code
- Security Related Agencies (i.e. DHS, USCG, CBP, IMO, MARAD, etc.)
- Cybersecurity
- Human Element

Our undergraduate assistants have conducted literature reviews on scholarly articles, including published government and non-government document. The results of their work have led to a completed research report for a summer undergraduate research program sponsored by College of Sciences, Engineering & Technology (COSET) at TSU, and a poster presentation for the same program.

4.2 Maritime Cargo Security: Data Analysis and Intelligent Screening

There are approximate 11.6 million cargo containers entering U.S. ports each year, therefore, efficient tools are needed to help U.S. Coast Guard to facilitate screening to ensure cargo containers security. This project will employ data mining techniques to create an intelligent screening model to strengthen maritime cargo security. Briefly, it will analyze the record data of cargo attributes (e.g., the ports of origin of cargo containers, the shipping company, crew information, the content of cargo containers, etc.), and employ this historical data as training data to build up a risk-based screening classifier. When new cargo containers enter port, the Coast Guard just needs to input some attributes of the cargo into its online portable devices (e.g., tablet, iPad, smart phones, etc.), assess the risk of the cargo, and single out high-risk cargo for further inspection.

An intelligent screening model and software prototype will be developed in this project. The results of this research will provide an effective, efficient, and feasible approach to the screening of U.S.-bound cargo, which will enhance the security and prosperity of the maritime supply chain. The key tasks for this topic include:

Task 1: Review literatures

Task 2: Conduct maritime data collection and analytics

Task 3: Model the screening process, and build up screening classifiers

Task 4: Test the screening classifiers and develop software prototype

Task 5: Document research findings

Major Research Efforts have made for the research include:

- Identified key research thrusts for intelligent screening
- Reviewed the literature
 1. existing designs and best practices for intelligent screening for maritime cargo
 2. existing data mining algorithms for establishing screening classifiers
- Proposed potential methodology for problem solving

More literatures related to the topic were reviewed by the research team. A Naïve-Bayesian algorithm was tested on a synthetic data and the results were analyzed. The data had been generated based on the assumptions on the cargo attributes that mattered to the objectives of the project. Dr. Mehdi Azimi and his undergraduate student, Sammuell Teferra (who was working on this project), presented a poster on the research in the DHS MSI LEAP Workshop in Washington D.C. (March 30, 2016).

4.3 Secure and Efficient Maritime Data Storage and Retrieval

To enhance maritime cybersecurity, secure data storage and retrieval are essential. Due to the massive amount of maritime cargo containers entering U.S. ports, it costs too much to store all the cargo records in the servers at local ports (e.g., the cost of adding servers, data maintenance costs, the cost of server specialists, etc.). One way to effectively reduce these costs is to centralize all maritime data in large data centers, i.e., the cloud. The benefits of the cloud include unlimited storage capacity, powerful computational capability, infrastructure-free port setup, et.al. Lot of activities could be performed in cloud, such as profile searching, data storage, and parallel computation.

Since maritime data are sensitive, this project will develop encryption schemes to maintain data integrity and ensure the data are immune to attack by malicious hackers. Meanwhile, since maritime data are frequently updated, stored, and retrieved, this project will also employ cryptography techniques to secure efficient data storage and retrieval. The attack model will be investigated, security analysis and complexity analysis will be conducted for the proposed schemes, and the results of this research will help to secure efficient maritime data storage and retrieval. The key tasks for this topic include:

Task 1: Review literatures

Task 2: Conduct maritime data collection and analytics

Task 3: Identify the potential attacks

Task 4: Develop authentication/encryption schemes and conduct analysis

Task 5: Document research findings

Undergraduate Research Assistant was continuing to conduct literature review on related books, reports and scholarly articles. Some potential attacks for secure data storage and retrieval have been identified and others will be discovered by reviewing more literatures.

5 MARITIME PROGRAM EVENTS AND ACTIVITIES

In FY 2015, the department of Transportation Studies at TSU continued to provide learning and networking opportunities to Maritime undergraduate students by hosting numerous events and encouraging our students to participate various maritime security related conferences and events. In addition to the student development events, we also host events designed to attract high school students to our maritime undergraduate program, such as Summer Maritime Academy (SMA) and Summer Internship Program with Elkins High School Engineering Academy. This chapter listed some major events our faculty and students have participated in the past year, as well as our recruitment efforts.

5.1 Conferences and Field Trips

- *Conferences Students attended*

Petrochemical and Maritime Outlook Conference - 08/27/2015

TSU Department of Transportation Studies students attended the Petrochemical and Maritime Outlook Conference in Pasadena, TX hosted by the Economic Alliance. The Petrochemical and Maritime Outlook Conference is an event dedicated to the upstream and downstream petrochemical, manufacturing and related industries for the next 15 to 20 years. TSU students also attended a breakfast at the conference specifically for high school and college students.

International Trade Center Monthly Industry Luncheon – 09/23/2015

The International Trade Center (ITC) is dedicated to promote International business opportunities for U. S. based businesses and foreign trade delegations. ITC brings together business leaders, government policy makers, legal practitioners, and international companies to facilitate trade opportunities for import and export.

On September 23, 2015, the supported faculty member, Capt. Robert Morgan, served as the keynote speaker at ITC monthly industry luncheon. Ms. Ursula Williams, together with undergraduate and graduate students from TSU also attended the luncheon.



**Figure 5-1 TSU Faculty and Students on ITC Luncheon
(From Middle to Right: Capt. Robert Morgan, Ms. Ursula Williams, and Tyrie Goodman)**

Break-bulk Education Conference - 10/6/2015

TSU Department of Transportation Studies students attended the Jerry Nagel Breakbulk Education Day at the Breakbulk Conference in Houston, TX on October 6, 2015. Breakbulk Education Day is a day-long series of informative sessions about the breakbulk transportation industry and its challenges.



Figure 5-2 TSU Faculty and Students on Breakbulk Conference

95th Transportation Research Board (TRB) Annual Conference – 01/11-14, 2016

Our faculty members and student research assistants attended the Transportation Research Board’s 95th Annual Meeting in Washington, D.C. from Jan. 11 to 14, 2016. More than 12,000 transportation professionals from around the world attended the conference which covers all transportation areas, with more than 5,000 presentations in nearly 750 sessions and workshops addressing topics of interest to all attendees, i.e., policy makers, administrators, practitioners, researchers, and representatives of government, industry, and academic institutions.

In this year’s meeting, Tyrie Goodman, a program supported student, presented his poster “Implementation of Transit Oriented Development”.



Figure 5-3 Program Supported Student Tyrie Goodman (second from right) at 2016 TRB Annual Meeting

- *Field trips and visits*

CSCMP Tour of Texas Terminals LP - 02/18/2016

Students from the Department of Transportation Studies attended the tour of the Texas Terminals in Houston. Texas Terminals, LP is a full service, non-union Terminal Operator and Stevedoring Company that provides expertise in all sectors of Marine Terminal freight handling. With a 65-acre Gulf Coast facility on the Houston ship channel, the terminal provides clients with a wide variety of professional, value added services such as; the handling of Break-Bulk, Dry-Bulk, Project cargo and Heavy-Lifts.

Students visited 65-acre facility on the Houston Ship Channel, offering discharge and load out services for a wide variety of vessels and cargo. This tour exposed students to the day-to-day operations of shipping and freight handling industry, and also let students learned about career opportunities.



Figure 5-4 Students from the Department of Transportation Studies Visited Texas Terminals LP Port of Houston Authority Partners in Maritime Education Counselor’s Boat Tour – 04/01/2016

Representatives from the TSU Maritime program attended the Port of Houston Authority’s Partners in Maritime Education Counselor’s Luncheon aboard the *M/V Sam Houston* boat. On the boat ride, the high school counselors from various school districts within the Gulf Coast region learned about the TSU Maritime program and its scholarship opportunities.

- ***Other events***

U.S. Coast Guard CSPI Information Day - 10/21/2015

Several U.S. Coast Guard officers from Sector Houston visited with the Department of Transportation Studies to inform the U.S. Coast Guard’s CSPI scholarship opportunity. CSPI is a scholarship with the following benefits: up to two years’ paid tuition, books, and fees; approximately \$3,600 monthly salary as a Coast Guard active duty member while serving as a full time student; guaranteed job after graduation; starting salary of approximately \$60,000 annually, upon graduation and successful completion of Officer Candidate School.

J.B. Hunt's Visit to TSU Maritime Transportation Management and Security program - 02/04/2016

J.B. Hunt Southwest Regional Human Resources Manager Tiffany Smith visited students in the TSU Maritime Transportation Management and Security program recently. Ms. Smith provided a presentation to MTMS students on Professor Morgan's class. The purpose of Ms. Smith's visit was to introduce students to the opportunities at J.B. Hunt for entry level professional positions and for internships.

During the visit, the students learned about J.B. Hunt's primary business and its position as the #2 Transportation/Logistics Company in the U.S. Students were encouraged to apply for internships and entry-level positions.

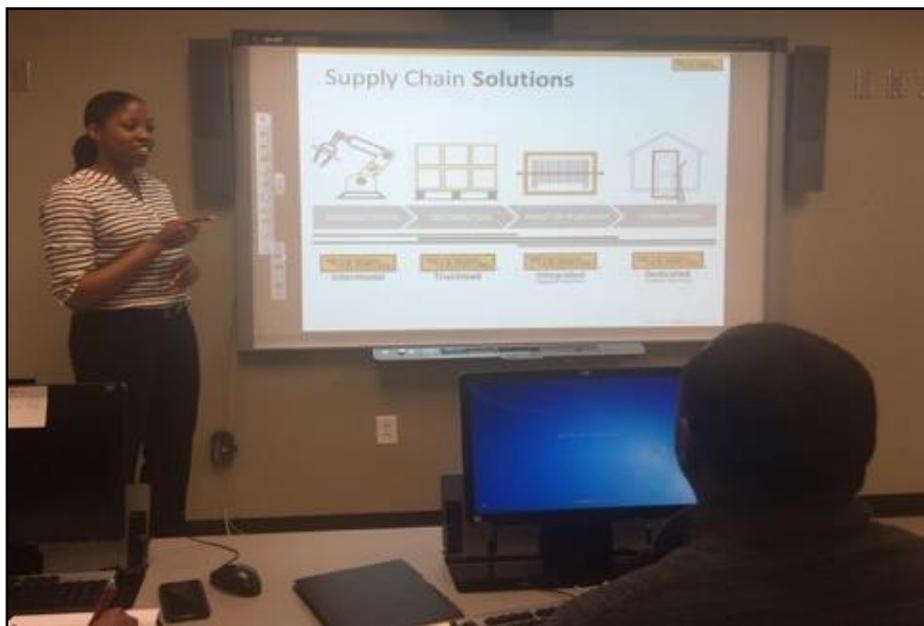


Figure 5-5 J.B. Hunt's visit to TSU

Nigerian Delegation Visit to TSU – 05/04/2016

TSU Maritime in partnership with the U.S. Department of Commerce and the West Gulf Maritime Association (WGMA) hosted a delegation from the Nigerian Maritime Administration and Safety Agency (NIMASA). The NIMASA delegation was visiting Houston for the Offshore Technology Conference and wanted to learn about TSU's Maritime program. At the meeting, TSU faculty presented information about how TSU could help NIMASA improve efficiency in its operations.

Naval Opportunities Awareness Workshop – 05/11/2016

Representative from US Naval introduced Funding, Internship and Employment Opportunities in The Department of the Navy's HBCU/MI Program. Topics will include:

- Current Faculty research funding opportunities at the Navy.

- Paid Student and Faculty Internships and Fellowships at Naval Research Labs
- Current Employment Opportunities at the Naval Science and Technology Center.
- How to effectively write white papers and proposals when responding to Department of Defense (DOD), Department of the Navy (DON) and Office of Naval Research (ONR) Funding

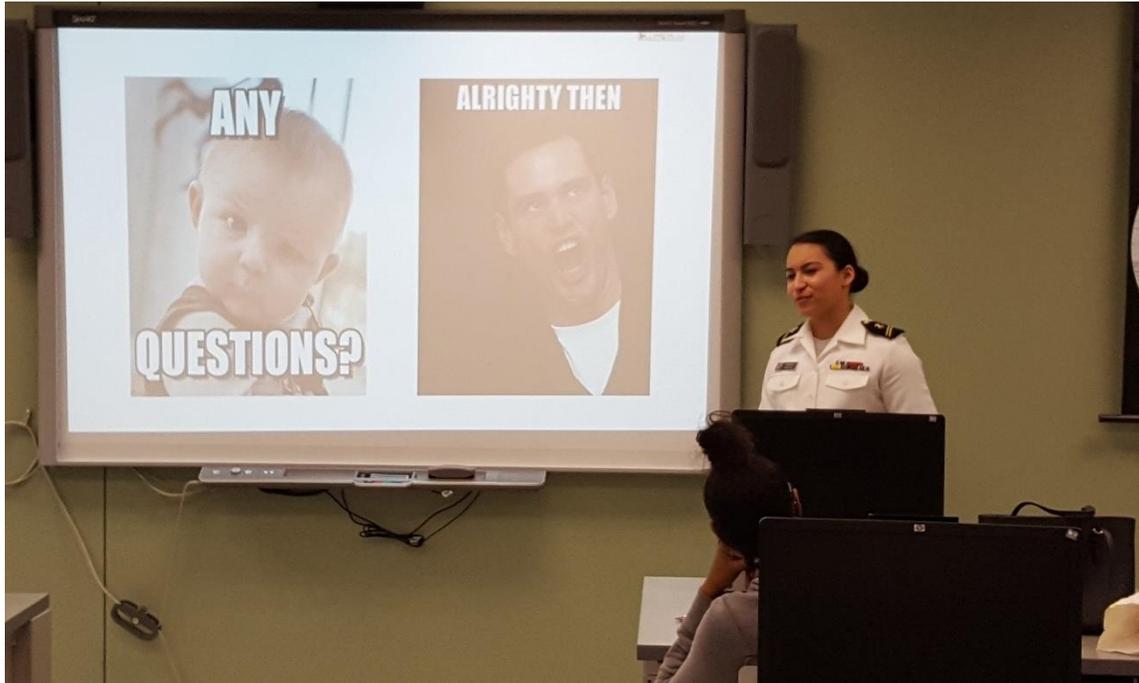


Figure 5-6 Naval Opportunities Awareness Workshop

5.2 Recruitment Events

One important objective of TSU DHS SLA program is to *increase the number and quality of students who graduate in a STEM discipline within minority-serving institutions (MSI)*. Therefore, recruiting more students into the HS-STEM field is a key aspect of this program. To attract more students to the Maritime Program at TSU, the Department of Transportation Studies frequently visits local high schools during their college day and other occasions. In summer 2016, department of Transportation Studies at TSU hosted seventh Summer Maritime Academy to high schools in Houston Area. Also, in cooperation with Elkins High School Engineering Academy, TSU department of Transportation Studies hosted the summer internship program for the second year.

Summer Maritime Academy 2016

The Department of Transportation Studies hosted its seventh installment of the Summer Maritime Academy (SMA), a five-day non-residential program designed to introduce students to the maritime industry. The program also introduced students to the Maritime Transportation Management and Security degree program and scholarship opportunities at TSU. During the

week the topics of logistics, security, and the environment (vehicle emissions) were covered and students enjoyed field trips to the Port of Houston Authority and U.S. Coast Guard facility. U.S. Customs and Border Protection Agency officials also visited with students and demonstrated cargo screening techniques to detect contraband items in cargo. Students also learned transferable skills through sessions on Leadership, Dealing with Change, and Effective Communication Strategies.



Figure 5-7 Ms. Ursula Williams with SMA Students

For the fourth year, TSU Maritime partnered with the Project GRAD Houston organization to recruit students who will be first generation college students from the following high schools: Jack Yates, Sam Houston, John Reagan, and Jeff Davis. Other students that attended the SMA were from the following Houston area high schools: Lamar, Mickey Leland Prep, Westside, Yes Prep, Provision Academy, Elkins, Northshore, Willowridge, and Kipp Generation.



Figure 5-8 Student Activities during SMA

2016 Summer Internship Program with Elkin High School Engineering Academy

Since summer 2015, Department of Transportation Studies at TSU started the Summer Internship Program with Elkins High School Engineering Academy. This program was designed to attract high school students to the Maritime Management and Security Program. This two-week internship program offers high school students the opportunity to work with professors and graduate students in our research labs, enabling them to participate in various research projects and learn about many of the tools and software programs that were used for transportation research purpose.

In summer 2016, two students from Elkin High School, Mr. Sahil Shah and Mr. Jaylyn McGuire, were selected for this year’s internship program. They were mentored by Dr. Yi Qi and graduate students. Both students worked on Dr. Yi Qi’s newly awarded TxDOT project.

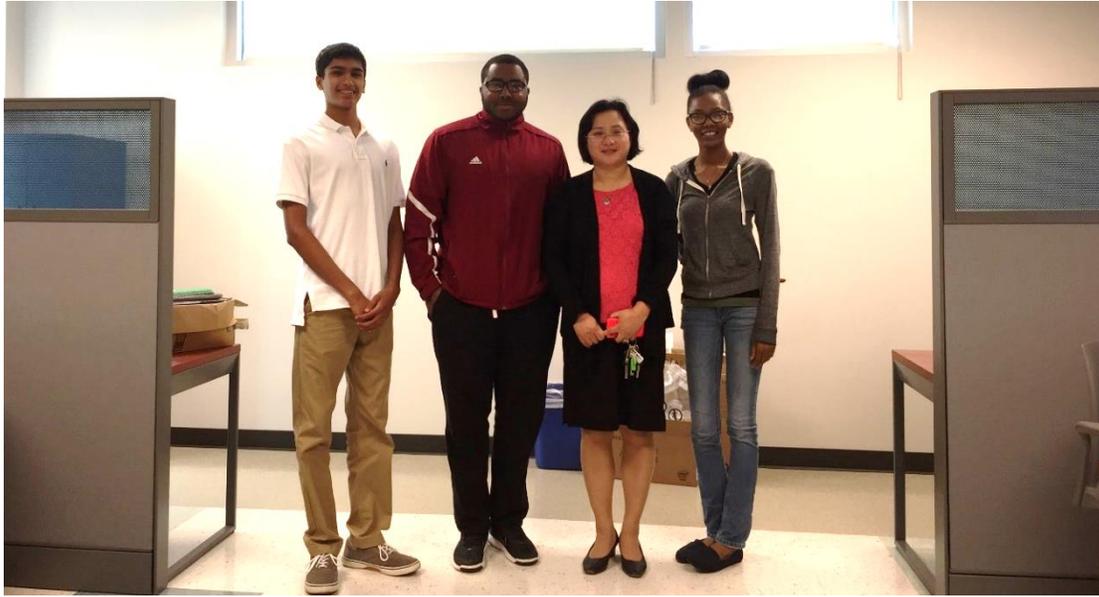


Figure 5-9 Summer Intern Mr. Jaylyn McGuire (first from left) with Dr. Yi Qi (second from right), Graduate Student Tyrie Goodman (second from left), and Undergraduate Student Cherie Brown (first from right)

Jack Yates High School Students Visit TSU Maritime – 01/21/2016

Twenty Maritime students from Jack Yates HS visited TSU on January 21, 2016. The purpose of the visit was to get acquainted with the TSU Maritime program and the scholarship opportunities. During the visit, students viewed the TSU Recruiting video, learned about TSU Admissions, and the Maritime scholarship program. The students heard from current TSU Student and Jack Yates Maritime Alumni Brianna Ferrier and TSU Grad Student Tyrie Goodman. Both TSU students talked openly about the key to college success.



Figure 5-10 Ms. Ursula Williams and Tyrie Goodman with Jack Yates HS Students

Port of Houston Authority Maritime High School Events – April 2016

The undergraduate students in the Department of Transportation Studies at TSU volunteered at various events sponsored by the Port of Houston Authority's Partners in Maritime Education Committee. The purpose of these events is to recognize the graduates of local maritime programs at high schools throughout the Houston area. High schools includes: Jack Yates HS; Stephen F. Austin HS; and Galena Park ISD. During these events, TSU students introduced the high school students about the maritime program at TSU.

6 PROGRAM ACHIEVEMENTS

During the past year, program supported faculty researchers and students have made lots of achievements in term of their publications, presentations and grant awards. Many high-quality papers were developed by our faculty researchers and students. They also attended various meetings and workshops to present their research. Moreover, two new projects led by Dr. Yi Qi and Dr. Mehdi Azimi were funded last year as a result of this DHS grant. In addition to the funded projects, several new proposals have been submitted. This chapter summarizes all program achievements made during the past year.

6.1 Publications

Paper accepted for publication

1. **Qi, Y.**, A. Padiath, **Q. Zhao** and L. Yu. "Development of Operating Mode ID Distributions for Different Types of Roadways under Different Congestion Levels for Vehicle Emission Assessment Using Moves", Journal of the Air & Waste Management Association, 2016. DOI:10.1080/10962247.2016.1194338
2. **Qi, Y.**, Y. Wang, X. Chen, and K. Cheu, "Methods of Dropping Auxiliary Lanes at Freeway Weaving Segments", accept for presentation and publication in the proceedings of the 94th Annual Meeting of Transportation Research Board, Washington, DC, Jan 10-14, 2016, TRB 16-6748
3. **Qi, Y.**, B. Mao, **Q. Zhao**, X. Sun and P. Tang, "Use of Advanced Traffic Signal Status Warning Systems for Improving Intersection Safety", accept for presentation and publication in the proceedings of the 94th Annual Meeting of Transportation Research Board, Washington, DC, Jan 10-14, 2016, TRB 16-6640
4. **Qi, Y.**, Y. Wang, X. Chen and G. Liu, "Safety Impacts of Directional Median Openings at Downstream U-turn Locations", accept for presentation and publication in the proceedings of the 94th Annual Meeting of Transportation Research Board, Washington, DC, Jan 10-14, 2016, TRB 16-6761
5. Sun, X., X. Chen, **Qi, Y.**, B. Mao and L. Yu, "Analyzing Effects of Different Advanced Traffic Signal Status Warning Systems on Vehicle Emission Reductions at Signalized Intersections", accept for presentation and publication in the proceedings of the 94th

Annual Meeting of Transportation Research Board, Washington, DC, Jan 10-14, 2016 , TRB 16-5294

6. Tang, P., **M. Azimi**, F. Qiao, L. Yu, “Impact of Eco-driving Advising Strategies on Vehicle Emissions for Vehicles Traveling within Intersection Vicinities”, accept for presentation and publication in the proceedings of the 94th Annual Meeting of Transportation Research Board, Washington, DC, Jan 10-14, 2016, TRB 16-2410
7. **Y. Wang**, B. Omidiran, F. Kigwe and K. Chilakamarri. Relations between the conditions of admitting cycles in Boolean and ODE network systems, Involve, 2016, in Press.
8. A. Jacot-Guillarmod, **Y. Wang**, C. Pedroza, H. Ogmen, Z. Kilpatrick, K. Josić. Extending Levelt’s Propositions to perceptual multistability involving interocular grouping. Accepted for publication to Journal of Vision Research, 2016.

Paper submitted for publication

1. **Qi, Y.**, P. Liu and Q. Zhao, Determination of Freeway Acceleration Lane Length for Safe Merging, submitted to ASCE’s Journal of Transportation Engineering for publication. JRNTEENG-S-15-00645
2. Liu, P., **Q. Zhao** and **Y. Qi**, Analysis of the Severity of Large Truck Crashes Using the Ordered Probit Model, submitted for presentation and publication in the proceedings of the 95th Annual Meeting of Transportation Research Board, Washington, DC, Jan. 2017, TRB 17-02358
3. **Qi, Y.**, X. Chen, L. Yu and H. Teng, Impacts of Signal Phasing Sequence on Left-Turn Operation for Protected/Permissive Left-Turn Control Mode, submitted for presentation and publication in the proceedings of the 95th Annual Meeting of Transportation Research Board, Washington, DC, Jan. 2017, TRB 17-00416
4. **Qi, Y.**, and A. Gou. “Pedestrian Safety under Permissive Left-Turn Signal Control”, submitted for publication in *International Journal of Transportation Science & Technology*.
5. Munni, J., **M. Azimi**, F. Qiao, L. Yu. “Dilemma Zone Driving Behavioral Analysis at Signalized Intersections under Foggy Weather Condition with In-Vehicle Advanced Warning Message”, submitted for presentation and publication in the proceedings of the 95th Annual Meeting of Transportation Research Board, Washington, DC, Jan. 2017, TRB 17-03893

6.2 Seminar/Conference/Workshop Presentations

1. **Dr. Yi Qi**, invited to give a presentation titled “Active Learning Strategies for Transportation Courses at Texas Southern University” in a workshop for Transportation Engineering Educators sponsored by the Southern Plains Transportation Center.
2. **Dr. Yunjiao Wang**, invited to give a presentation at a session of “Differential Equation Modeling and Analysis for Brain and other complex bio-systems” in the 11th AIMS International Conference on Dynamical Systems, Differential Equations and Applications

held at Orlando, Florida, July 1 - July 5, 2016. Talk title: Extending Levelt's Propositions to multistable Perceptual rivalry involving interocular grouping.

3. **Dr. Yunjiao Wang**, invited to give a presentation in Workshop 1: Dynamics in Networks with Special Properties held at Mathematical Biosciences institute, Ohio State University, held from January 25, 2016 to January 29, 2016. Talk title: Extending Levelt's Propositions to multistable Perceptual rivalry involving interocular grouping.
4. **Capt. Robert Morgan**, speaker at Houston Community College Annual Maritime Logistics Education Conference, October 23, 2015
5. **Capt. Robert Morgan**, speaker for International Trade Center Seminar, September 23, 2015

6.3 Posters

1. **Tyrie Goodman**, "Implementation of Transit Oriented Development", 2016 TRB Annual Meeting, Washington D.C., Jan. 11-14, 2016
2. **Qun Zhao**, "U-Turn Crossover Distance for Super Street Design", Texas Southern University Research Week, Mar. 29-30, 2016
3. **Tyrie Goodman**, "Implementation of Transit Oriented Development", Texas Southern University Research Week, Mar. 29-30, 2016
4. **Sammuel Teferra**, "Cargo Risk Detection Using Naive-Bayesian Algorithm", DHS MSI LEAP Workshop in Washington D.C., March 30, 2016

6.4 Funded Projects

1. PI: **Dr. Yi Qi** and Co-PI: **Dr. Mehdi Azimi**, Development of Systemic Large Truck Safety Analysis, (Texas Department of Transportation research project 0-6911, \$118,036, 2016-present)
2. PI: **Dr. Mehdi Azimi** and Co-PI: **Dr. Yi Qi**, Identify Project Criteria for ITS Deployment in Work Zone (Texas Department of Transportation research project 0-6915, \$108,667, 2016-present)

6.5 Submitted proposal

Supported faculty researchers submitted seven proposals to *University Transportation Center (UTC) Program* sponsored by the U.S. Department of Transportation Research and Innovative Technology Administration. The grants provided by the UTC program are to operate National, Regional and Tier 1 University Transportation Centers. The purpose of these Centers is to advance U.S. technology and expertise in the many modes and disciplines comprising transportation through the mechanisms of research, education, and technology transfer; and to address vital workforce needs for the next generation of transportation leaders. Following are the proposals submitted by our faculty members:

1. Dr. Yi Qi and Dr. Mehdi Azimi, Tier 1 University Transportation Center (UTC) Center for Advancing Transportation Leadership and Safety (ATLAS Center) led by the University of Michigan (U-M), Transportation Research Institute (UMTRI).

2. Dr. Yi Qi, Regional Transportation Center (UTC) Center, Southern Plains Transportation Center led by University of Oklahoma
3. Dr. Yi Qi and Dr. Mehdi Azimi, Tier I University Transportation Center for reducing congestions on Ports-to-Plains Corridors led by Texas Tech University.
4. Dr. Yi Qi and Dr. Mehdi Azimi, National Transportation Center on Global Competitiveness” being submitted to the by Northwestern University.
5. Dr. Yi Qi and Dr. Mehdi Azimi, Tier I Center for Advanced Multimodal Mobility Solutions and Education (CammSE) led by the University of North Carolina at Charlotte.
6. Dr. Yi Qi and Dr. Mehdi Azimi, Tier 1 University Transportation Center (UTC), Center for Transportation Real-world Emission Measurement and Modeling (TranREMM)led by Texas Southern University
7. Dr. Yi Qi, Tier 1 University Transportation Center (UTC), Center for Transit and Roadway Automated Network Systems (CTRANS) led by Texas Southern University

6.6 Student Awards

- Tyrie Goodman, Dwight D. Eisenhower Transportation Fellowship from FHWA, Jan 2016
- Tyrie Goodman, College of Science, Engineering and Technology (COSET) Scholarship, 2016
- Cherie Brown, Department of Homeland Security Scholarship for Maritime Students, 2015-2016
- Cherie Brown, Honors award for academic achievement in Fall and Spring 2016 semesters,
- Cherie Brown, Texas Southern University Academic Scholarship, 2016
- Cherie Brown, Outstanding Undergraduate Achievement Award for Transportation Department, 2016
- Reese Selman, Department of Homeland Security Scholarship for Maritime Students, 2015-2016
- Reese Selman - International Transportation Management Association Scholarship, 2015
- David Utaegbulam, COSET Faculty and Staff Scholarship, Spring 2016

6.7 Faculty and Staff Awards

- Dr. Yi Qi, TexITE Best Technical Paper Award, 2015 for the technical paper” Safety Impacts of Using Short Left-Turn Lanes at Unsignalized Median Openings”(<http://www.texite.org/2015-recipients/>)
- Qun Zhao, 1st Place of staff poster section, Texas Southern University Research Week, April 2016.

7 REPORTS OF SUPPORTED STUDENTS

In FY 2015-2016, one graduate student and four undergraduate students were recruited to participant in the DHS SLA program. The current students who are participating in the program are listed below:

- Tyrie Goodman, Graduate student, Transportation Planning and Management
- Reese D. Selman, Undergraduate student, Maritime Transportation Management and Security (graduating)
- Cherie Brown, Undergraduate student, Maritime Transportation Management and Security (graduating)
- Samuel Teferra, Undergraduate student, Computer Science (graduating)
- David Utaegbulam, Undergraduate student, Chemistry

There are three students graduated in Spring 2016 or Summer 2016, who are Reese D. Selman, Cherie Brown and Samuel Teferra. Reese D. Selman received full ride scholarship into Thurgood Marshal School of Law, and he will study maritime/transportation law. Samuel Teferra was also admitted to Graduate program at Texas Southern University, majoring Computer Sciences. Please check Appendix for their resumes.

According to the program management requirement, each student submits one report per semester. The report is designed to collect individual activities of the supported students, including courses completed, GPA, internships completed, and career development. Following part listed the key information collected from the each student.

7.1 Tyrie Goodman

Courses completed:

<i>Fall 2015 Semester</i>	<i>Spring 2016 Semester</i>
TMGT 810 Fundamental of Transportation Engineering	TMGT 812 Princ Trans & Design
TMGT 823 Economics of Transportation	TMGT 815 Computer Apps in Trans
TMGT 870 Freight & Log Management	TMGT 819 Transportation Seminar

Cumulative GPA: 3.92

Internship Activities: N/A

Career development activities:

- Transportation Research Board Conference 2016 (Poster Presentation) - The conference will cover all transportation modes, with more than 5,000 presentations in nearly 750 sessions and workshops, addressing topics of interest to policy makers, administrators,

practitioners, researchers, and representatives of government, industry, and academic institutions.

- ITE State Conference in Galveston, TX – A conference where the top Texas universities come together for the purpose of students engaging with the professional communities. The conference features research showcases that allows students to learn about the most cutting-edge transportation. In addition, there is research mock speed interviews to prepare for the job market and strengthen communication skills.
- Fast Forward skills development workshop Texas Southern University – A training workshop that provides valuable lessons on skills that the student can apply in any work situation or environment. The workshop covered effective communication strategies, professional image and marketing, career success strategies and industry led session on various topics.
- Presentation on Advanced Transport Technologies by J. Sam Lott, P.E., Kimley-Horn and Associates – This seminar was led by an industry professional where he talked about advanced transportation: which is being developed to provide an open platform for hardware and software for a wide variety of ITS applications for automated vehicles.
- Texas Terminals Tour and Information Session - The tour of the Texas Terminals covered the industry of transportation and freight, safety. This tour gave valuable information on how to be effective, efficient, safe, and observant on the job with a discussion on how to recognize potential threats, and how to handle them professionally according to the federal regulations.
- Traffic Impact Analysis Lecture by Dr. Azimi - Dr. Azimi presented on Vistro and Traffic Impact Analysis on the development on a single family residential development. He also covered every step necessary to effectively complete this process.
- Designing Great Streets for People on Bike and Foot by James Llama –This was informative seminar on designing great walkable streets for people on bike and foot. He covered why bikes & pedestrians matter, how to design for walkability and bike ability.

7.2 Reese D. Selman

Courses completed:

<i>Fall 2015 Semester</i>	<i>Spring 2016 Semester</i>
MGMT 301 – Foundations of Human Resource Mgmt.	ITEC 412 – Senior Seminar
MIS 304 – Information Technology	MGMT 402 – International Mgmt.
MTMS 322 – Ports & Terminal Operation Mgmt.	MTMS 443 – Maritime Trans. Security
MTMS 424 – Container & Modern Cargo Storage	MTMS 490 – Independent Study
MTM 425 – International Intermodal Transportation	MTMS 495 – Field Work Practicum

Cumulative GPA: 3.65

Internship Activities: N/A

Career development activities:

- Fast Forward skills development workshop Texas Southern University – A training workshop that provides valuable lessons on skills that the student can apply in any work situation or environment. The workshop covered effective communication strategies, professional image and marketing, career success strategies and industry led session on various topics.
- Texas Terminals Tour and Information Session - The tour of the Texas Terminals covered the industry of transportation and freight, safety. This tour gave valuable information on how to be effective, efficient, safe, and observant on the job with a discussion on how to recognize potential threats, and how to handle them professionally according to the federal regulations.
- Port of Houston Authority Maritime Youth Expo – Maritime students had the opportunity to hear mariners talk about opportunities on tow boats, harbor tugs and barges, learn about maritime salvage and see salvor equipment in action, and watch state-of-the-art Coast Guard helicopters and small boats perform on-water demonstrations.
- Offshore Technology Conference (OTC) – OTC provided access to leading-edge technical information, the industry’s largest equipment exhibition, and valuable new professional contacts from around the world. Its large international participation provided excellent opportunities for global sharing of technology, expertise, products, and best practices. OTC brought together industry leaders, investors, buyers, entrepreneurs, and students to develop markets and business partnerships.
- International Transportation Management Association (ITMA) Monthly Meetings – Through its monthly luncheons and workshops, ITMA brought together students and logistics professionals who covered the latest transportation issues, and gave back to the community by awarding college scholarships to qualified students actively pursuing a career in international logistics.

7.3 Cherie Brown

Courses completed:

Fall 2015 Semester

- CS 116 | Intro to Computer Science
- ITEC 331 | Technical Writing
- ITEC 412 | Senior Seminar
- MTMS 425 | Int’l Intermodal Transport
- MTMS 490 | Indep Study in Marit Transp

Spring 2016 Semester

- CS 117 | Intro to Computer Science II
- MATH 231 | Elementary Statistics
- MGMT 402 | International Management
- MIS 304 | Information Technology

Cumulative GPA: 3.61

Internship Activities:

Summer 2016: I served as an undergraduate research assistant working on Development of Systemic Large Truck Safety Analysis. I analyzed large truck accident reports to gain information on the cause and location of the accidents. The information acquired is designed to improve large truck safety. I gained skills on location mapping, accident types, and report analysis.

Career development activities:

- Breakbulk Education Day 2015- Breakbulk conference designed to address new developments in the logistics, transportation, and breakbulk projects.
- TSU Fast Forward Workshop- Designed to provide leadership skills for students entering their professions. Focus on effective communication, professional image, conflict resolution, and team building.
- TSU Career and Resume Building Workshop- Insight on interview behavior and resume building for potential employers.
- Management and Leadership in Your Career Seminar, 11/23/2015- it is about developing leadership skills through athletics and academic extracurricular activities.

7.4 Samuel Teferra

Courses completed:

<i>Fall 2015 Semester</i>	<i>Spring 2016 Semester</i>
CS342 – Prog Lang & Design	CS444 – Operating Systems
CS343 – Assembly & Com Archi	CS451 – Intro to Wireless & Mobile Nets
CS456 – Soft Eng	CS499 – Capstone Proj
CS583 - Data Mining	CS541 – Operating Systems
MATH473 – Probability & Statistics I	

Cumulative GPA: 3.62

Internship Activities: *Integrated Corrosion Companies 4411 Navigation Blvd, Houston, TX 77011*

Career development activities:

- Summer Research Institute (SRI) at Stevens Institute of Technology – in summer 2016, Mr. Samuel Teferra admitted in a highly collaborative eight-week intensive program hosted by Maritime Security Center. This program focused on critical issues in maritime domain awareness, emergency response and maritime system resilience
- DHS MSI Leverage Expertise in Academia for Placement in the DHS Enterprise Workshop- On March 2016, Mr. Samuel Teferra with his advisor Dr. Mehdi Azimi

attended the one-day DHS MSI Leverage Expertise in Academia for Placement in the DHS Enterprise Workshop.

- Fast Forward skills development workshop Texas Southern University – A training workshop that provides valuable lessons on skills that the student can apply in any work situation or environment. The workshop covered effective communication strategies, professional image and marketing, career success strategies and industry led session on various topics.

7.5 David Utaegbulam

Courses completed:

Fall 2015 Semester

BIOL 245 – Human Anatomy and Physiology

CHEM 211 – Organic Chemistry 1 lab

CHEM 231 – Organic Chemistry 1

HIST 232 – Soc & Pol History US since 1877

MATH 241 – Calculus 1

MUSI 131 – Introduction to Music

Spring 2016 Semester

CHEM 212 – Organic Chemistry 2 lab

CHEM 232 – Organic Chemistry 2

MATH 242 – Calculus 2

SC 135 – Speech Communication

SOC 157 – Introduction to Sociology

Cumulative GPA: 3.80

Internship Activities: N/A

Career development activities:

- Workforce Development seminar Houston, Texas - Workforce Development is a holistic and integrated approach to preparing youth to successfully enter the workforce and maintain employment. This workforce development program offers students opportunities in vocational and skills development through career and technology education and workforce development links. The Career and Technology Education programs are responsible for creating and implementing vocational training programs that provide youth with basic skills and beginning knowledge in various types of occupations.
- Texas Southern University Resumé/Career Counseling- A resumé counseling workshop that assists students in creating an effective and competitive resumé. The workshop advised students on career options and assisted us on how to effectively compete with other graduates in our fields.
- Fast Forward skills development workshop Texas Southern University – A training workshop that provides valuable lessons on skills that the student can apply in any work situation or environment. The workshop covered effective communication strategies, professional image and marketing, career success strategies and industry led session on various topics.

- Presentation on Transportation Engineering by Dr. Moinul Hossain – This seminar focused on the phase of transportation engineering that deals with the planning, geometric designs and traffic operations of roads, streets and highways, their networks, terminals, abutting lands, and relationships with other modes of transportation.

8 OTHER COLLABORATIONS

Our faculty members have collaborated with other faculty members at different universities through attending various conferences or workshops, especially those organized by DHS.

DHS MSI Leverage Expertise in Academia for Placement in the DHS Enterprise Workshop

On March 2016, Dr. Mehdi Azimi attended the one-day DHS MSI Leverage Expertise in Academia for Placement in the DHS Enterprise Workshop with his student Mr. Samuel Teferra. The workshop included more than 100 attendees, including MSI faculty and students from 16 Minority Serving Institutions (MSIs) affiliated with the DHS Centers of Excellence (COEs), DHS Component representatives and higher education association representatives. The workshop addressed a recommendation from the Homeland Security Academic Advisory Council (HSAAC) that DHS should promote COE technologies and research projects by encouraging and expanding the use of activities that showcase COEs' technologies and research projects. Dr. Azimi had a presentation on the progress on TSU SLA program and showcased the accomplishments. Also Samuel had a poster presentation on the research project conducted by him and Dr. Azimi that has been developed through the support of S&T OUP.



Figure 8-1 Student Samuel Teferra at DHS Enterprise Workshop

Visual Analytics for Command, Control and Interoperability Environments (VACCINE) Center's 2016 Visual Analytics MSI Faculty Training Workshop

The VACCINE Center, a U.S. Department of Homeland Security Science and Technology Center of Excellence, hosted the 2016 MSI Visual Analytics Faculty Training Workshop at

Florida International University in Miami, Florida on May 11 and 12, 2016. Dr. Yunjiao Wang from our program attended this two-day workshop.

This workshop focused on preparing Minority Serving Institutions (MSI) faculty to incorporate visual analytics courses into their programs. Learning topics and activities in this two-day workshop included: understanding the theory and foundation of visual analytics, integrating visual analytics into course curriculum, developing learning communities for interdisciplinary courses, hands-on instructor-supported tutorials on extracting various forms of big data, and a unique group-designed application learning assignment.



Figure 8-2 Dr. Yunjiao Wang (third from left) with other participants at Visual Analytics MSI Faculty Training Workshop

The 5th Annual SCMI Spring Symposium

In April 2016, Robert Morgan Jr., Visiting Professor in the Texas Southern University Transportation Studies Department and 209 attendees from 65 different organizations and Universities participated in the 5th Annual Supply Chain Management Institute (SCMI) Spring Symposium held at the University of San Diego in the Kroc Institute for Peace & Justice (KIPJ). Among all University representatives including Harvard and Stanford University, Professor Morgan was the only Instructor from a Historically Black University, providing Expert knowledge in the field of Supply Chain Management, Transportation and Logistics.

In addition to actively participating in the various workshops, Professor Morgan collaborated with Joel Sutherland, Managing Director of SCMI at University of San Diego School of Business Administration Center to share unique ideas and action in support of his research study on Risk Analysis and Resiliency work for TSU Department of Homeland Security (DHS) Scientific Leadership Award Grant. The Master Degree in Supply Chain program at University

of San Diego SCMI School of Business is ranked in 9th in the nation accordance to U. S. News. Throughout this Symposium, vital information from current logistics professionals were given. Professor Morgan plans to disseminate this information to his classes this current semester, giving his students recent relevant knowledge in the area of Supply Chain Management, Transportation and Logistics.



Figure 8-3 Professor Morgan (middle) with Joel Sutherland, Managing Director, SCMI (left), and symposium participant

4th Biennial TRB-CMTS Research and Development Conference

Dr. Mehdi Azimi attended the 4th Biennial Research and Development Conference organized by Transportation Research Board - Committee on Marine Transportation Systems (TRB-CMTS) on June 21st to 23rd. CMTS is a Federal Cabinet-level, inter-departmental committee chaired by the Secretary of Transportation, with purpose of creating a partnership of Federal departments and agencies with responsibility for the Marine Transportation System. The name of this year conference was “From Sail to Satellite – Delivering Solutions for Tomorrow’s Marine Transportation Systems” and covered different areas related to maritime. Manson K. Brown, Assistant Secretary of Commerce for Environmental Observation and Prediction, opened the conference with his talk and also on behalf of Norman Y. Mineta (14th U.S. Secretary of Transportation) who couldn’t make it to attend the opening session. Then, the conference was started in different sessions including Security, Resilience – Tools and Needs, Inland Resilience, Resilience – Seaport and Climate, Data and Data Management, Future of Navigation, Infrastructure Investment, Emissions Management, Environmental Stewardship, Innovative Materials, Innovative Technologies, Marine Transportation Systems Performance Measures, Asset Management, Arctic Marine Transportation, System Management RSM and EWN, and Student Honor Panel. Also, three plenary sessions were held during the conference with the following topics:

- Marine Transportation System: Our Next-Century Marine Transportation System
- Technology Innovations for a Next-Generation Marine Transportation Systems
- Data Requirements for a Next-Generation Marine Transportation Systems

The keynote speakers of the second day and the third day were Bill Cassidy (Senior Editor in Trucking and Domestic Transportation, Journal of Commerce) and General Darren McDew (Commander, U.S. Transportation Command, U.S. Air Force). During the conference, Dr. Azimi had the opportunity to meet and talk to several professors from University of Rhode Island, Rochester Institute of Technology, University of Delaware, University of Arkansas, University of Kentucky, Stevens Institute of Technology, and the Lamar University in Beaumont, TX. He also talked to the attendees from Environmental Defense Fund (a non-profit environmental advocacy based in Austin), RightShip (a company which provides tool to improve maritime safety and environment), Greater Houston Port Bureau, U.S. Army Corps of Engineers, Maritime Administration of the U.S. DOT, Environmental Protection Agency (EPA), and also talked to the director of MarTREC (Maritime Transportation Research and Education Center, a tier 1 UTC center led by the University of Arkansas and in partnership with Jackson State University, Louisiana State University, and University of New Orleans).

Southern Plains Transportation Center' workshop for Transportation Engineering Educators

In July 2016, Dr. Qi was invited to attend a three-day workshop for civil and transportation engineering educators hosted by the Louisiana Tech University and sponsored by the Southern Plains Transportation Center (SPTC). In this workshop, Dr. Qi met with transportation engineering educators from 15 different universities across the nation, including Virginia Tech University, Texas A&M University, Seattle University, etc. They shared their own ideas and/or experiences in implementing active learning strategies in civil and/or transportation/traffic engineering courses, focusing on technology-rich approaches when possible. Dr. Qi gave a presentation titled “Active Learning Strategies for Transportation Courses at Texas Southern University” to share the active learning strategies that have implemented in our Transportation courses such as “traffic signals and signal control” and “Geographic Information Systems for Transportation for transportation”.

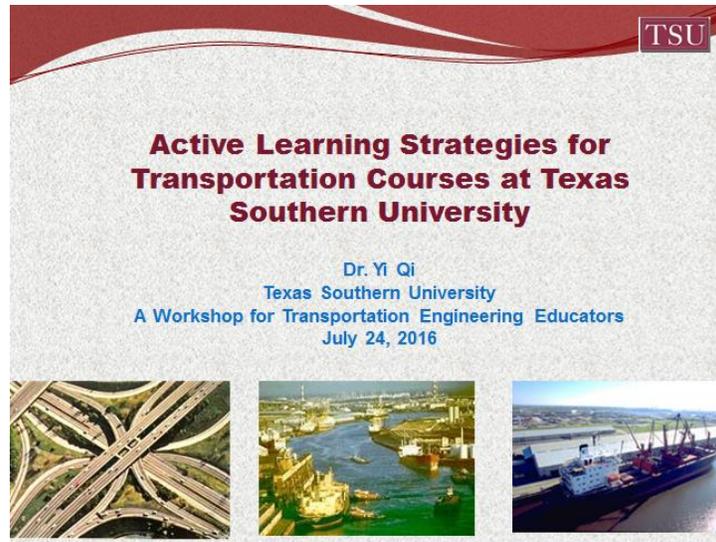


Figure 8-4 Dr. Qi's Presentation at the SPTC workshop for Transportation Engineering Educators

9 PROGRAM ASSESSMENT

On April 14, 2016, the External Advisory Committee and the Institutional Advisory Committee of TSU Department of Homeland Security (DHS) Scientific Leadership Award (SLA) Program met to conduct a bi-annual program assessment review to ensure that the progress of the program is on track with the identified goals and objectives. The following committee members were present:

- External Advisory Committee: Ms. Jessica Thomas (Security Director, Port of Houston Authority), Mr. Jeff Baldwin (Baldwin Liaison Consulting), Mr. James Bryant (Independent Security Consultant), and Dr. Kelvin Cheu, (Professor Department of Civil Engineering, University of Texas at El Paso)
- Institutional Advisory Committee: Dr. Azime Saydam (Associate Professor and Chair, Department of Mathematics) and Dr. Desiree Jackson (Assistant Dean)

Industry expert, Mr. Bonar Luzey (director/security consultant at Alvarez and Marshal), also attended this meeting, participated in the discussion and provided his valuable comments.

After the research team gave a presentation of program progress, the committee members had a discussion. The following comments and recommendations were made by the committee as a whole.

Overall Comments

The progress and outcome of this program are very impressive. The program engaged the involvement of many students, hosted numerous events for student development purposes and provided multiple research opportunities for the students in the field. In addition, the number of field trips that were taken shows that the program is connected to the industry.

Recommendations

Industry Involvement

Expand the industry component of the field trips. Look into having speakers from other sectors of the industry such as shipping companies and manufactures. This is vital to give students a well-rounded perspective on all aspects of management, logistics, and shipping, in both the private and public sectors of the freight industry.

For example, partnering with the Wal-Mart Distribution center in Pasadena, TX could aid in showing students the complete process of logistics through the system and the trucking industry.

Internship

In addition, key networks need to be formed with partners in all areas of the industry, which could lead to internship opportunities for students and valued relationships for the department.

Student Development

The committee suggested that more industry support and involvement are needed. Companies in the area of focus could be identified and then involved in partnering on research initiatives. A company could test methods identified in a research study, which would bring research, education and real world experience together. In turn, the relationship between the company and the program serves as an active recruitment tool for students that desire to work in that company. In turn, this can also contribute to a company's workforce development program. Placement of graduates is vital to both the program and the industry players.

Recommendations for identifying industry partners

The Greater Houston Partnership (GHP), which comprises more than 1,200 member companies, attracts community-minded business leaders who want to be involved in and influence Houston's positive growth. Partnering with this group would be invigorating to the growth of this program. The committee suggested that students and faculty alike attend some of the GHP meetings to see how discussions and operations take place at a higher level in an organization.

Other Possible Partnerships: Wal-Mart Distribution, HEB, Port of Houston and Baldwin Consulting

Education/Curriculum Development

The goal of an education program is eventually to place the graduates in careers where they can become positive contributors to society. The committee suggested that the program identify the job descriptions and requirements of employers for their employees. It would provide our program cutting edge tools to place students in careers and also show the students the relevance and impact of what they're studying and how it translates to career potential.

The committee also highlighted the importance of incorporating currently available technology that is used in the maritime industries into both the existing curriculum and new courses to be

developed. The committee suggested that industry experts be invited as guest lecturers to link the theoretical aspect of learning to the practical components of real world industry. In addition, alumni of our maritime program were also identified as potential guest speakers, who could come back to the classroom to share their experience and give advice to current students. The invitation also was extended to the committee members to lecture classes related to their expertise.

The committee suggested that the program include more real world case studies in the curriculum. The students would be given real world problems and asked to develop solutions. This would serve as an alternative teaching method that engages the students in the learning process and allows them to develop teamwork, analytical, and critical thinking skills.

Early Career Faculty Development

Early career faculty development supports junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations. Activities of this nature should build a firm foundation for a lifetime of leadership in integrating education and research. The committee recognized the importance of continuing to partner with other COE Centers in developing additional early career faculty members.

Marketing

The committee also suggested having marketing material for the DHS SLA program at TSU (i.e. brochures, presentations) to distribute to the industry partners, and to assist in highlighting the program's goals and initiatives.

10 CHALLENGES

To ensure the success of this program, recruiting more qualified students to participate in the program is very important. As a historical HBCU, it is not easy to recruit many students with GPA greater than 3.3. In addition, most of our freshmen and sophomores are still in the transition period from high school to college students and need more time to adjust themselves. As a result, we don't have many qualified freshmen and sophomores with 3.3 GPA. So, currently, our program supported students are all junior and senior students.

On the other hand, we have many freshmen and sophomores with GPAs between 3.0 -3.3. Those students have great potentials, and they are improving year by year. If we could lower the GPA requirement to 3.0, we will be able to support more students, which will benefit both students and our program.

APPENDIX: RESUMES OF GRADUATING STUDENTS

Reese D. Selman

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Objective

Seeking employment in the maritime transportation and/or law field that will improve my skills, increase practical experience, expand knowledge, and fulfill personal ambitions so that I may be able to benefit myself while at the same time, benefiting the company to which I am employed.

Summary of Qualifications

Over 5 years of administrative experience and technical Proficiency. Over 7 years of rhetoric, dialectic, speech, debate, critical thinking, collaboration, creativity, and public speaking experience. Estimable communication skills including multi-line telecommunication proficiency. Over 3 year of ship handling and maneuvering, ships, ship routines, and construction, cargo handling and storage, vessel search and rescue, shipboard personnel management, basic marine engineering, ship management systems, radio communication, stability and trim, collision regulation, basic safety, maritime laws, and marine pollution and prevention experience. Transportation Worker Identification Credential (TWIC) Card.

Education

Juris Doctor Candidate – May 2019

Thurgood Marshall School of Law – Houston, Texas

Bachelor of Science in Maritime Transportation & Security Management – May 2016

Texas Southern University – College of Science, Engineering, and Technology - Houston, Texas

- *Graduated Magna Cum Laude*

Work Experience

Texas Southern University, Houston, Texas – February 2015 - Present

U.S. DHS Undergraduate Research Assistant

- Conduct literature reviews, collect and analyze data, prepare materials for submission to U.S. Department of Homeland Security and other grant giving foundations. Provide ready access to all experimental data for the faculty researcher and/or supervisor, manage and respond to project related email, attend project meetings, and attend area seminars and other meetings as necessary. Summarize project results, prepare progress reports for the PI and funding agency, prepare other articles, reports, and presentations.

The Thomas F. Freeman Center for Forensic Excellence, Houston, Texas – August 2012 - Present

Dialectical Symposium Administrative Assistant

- Organizing, coordinating, and maximizing forensic tournaments and student travel. Checking and distributing documents and correspondence. Compiling records of office activities. Photocopying, scanning and faxing. Preparing outgoing mail, typing documents, and entering data. Organizing meetings, events and appointments. Coordinating and maximizing work flow.

Law Office of Scott Link, Houston, Texas – May 2011 - May 2012

Office Legal Assistant

- Assisted attorneys in preparing for trials and court proceedings. Supported attorneys in a legal office. Investigated legal literature stored in computer databases and on CD-ROM as well as the facts of cases to ensure that all relevant information is considered. Compiled, analyzed, and organized information to allow easy accessibility to attorneys. Prepared written reports and legal arguments for lawsuits. Drafted pleadings and motions filed in court. Secured affidavits. Maintained financial records and hours billed to clients.

Associations, Affiliations, & Accomplishments

- *President*, Maritime Student Association – August 2014 - Present
- *Vice President*, Texas Southern University Debate Team – August 2013 - Present
- *Student Ambassador*, College of Science, Engineering, & Technology – August 2013 - Present

- *Council Chair*, Deans Advisory Board – August 2014 – Present
- *President*, Sigma Pi Alpha Forensic & Dialectical Symposium – August 2013 - June 2014
- *Member*, Golden Key International Honour Society – August 2013 – Present
- *Member*, National Society of Collegiate Scholars – August 2012 – Present
- U.S. Department of Homeland Security Scientific Leadership Award – August 2015
- International Transportation Management Association (ITMA) Scholar Award – June 2015
- Port of Houston Partners in Maritime Education (PHPME) Scholar Award – June 2015
- The College Of Science, Engineering, & Technology Distinguished Student Award – April 2015
- 1st Place Pentathlon – Laramie Community College Speech & Debate Invitational – December 2014
- 1st Place Duo Interp. – Florida State Star Speech & Debate Invitational – October 2014

Cherie Brown

4135 WestBellfort, Houston, TX 77025 – [281-818-6760] – Cherieb08@gmail.com

Objective

To gain a position with a growing company where I can apply my experience to increase the company's reputation and profitability.

Experience

MS Office, RFID Handheld Scanner, TWIC Credential License

Summer Undergraduate Research Program Participant, Texas Southern University, June-July 2015

Conducted qualitative research on marine accidents in the Houston Ship Channel and created manuscript of work for publication.

Undergraduate Research Assistant, Texas Southern University Houston, TX, Fall 2014

Assist in the 2014 Department of Homeland Security Scientific Leadership Awards for Minority Serving Institutions research projects in Transportation Studies Department.

- Analyze and synthesize maritime risk management research and port security; land and waterside.
- Assist with the development of new course material in support of a new online course on maritime risk assessment and resiliency analysis. Conduct literature review and data analysis on risk assessment and management project proposal. Assist with improving existing maritime security courses.

Security Officer, Greenway High Rise Condominiums, Houston, TX, September 2012- Current

- Maintain a safe and secure environment for residents and guest by monitoring premises and personnel via computer monitors.
- Organize daily activity log sheets for contractors, mail, guest and visitors.

Team Member, Macy's, December 2007-December 2012, Houston, TX

- Provide customer service/ clean and stock replenishing duties.
- Assist with customer questions and complaints about products, services, and store personnel.
- Warehouse/ Inventory/ stockroom logistical duties
- Training new hire sales associates.
- Managed to increase in store fulfillment center sales every monthly scorecard.

Education

Bachelor of Science in Maritime Transportation Management and Security, Texas Southern University, Houston, TX, August 2016

Current >Program GPA 3.66

Associates of Art in Human Services **Houston Community College**, Houston, TX, Spring 2013

Program GPA 3.84

Awards

- | | |
|---|-----------|
| • Outstanding Undergraduate Student Award Maritime Studies | 2016 |
| • Honors Academic Achievement | 2014-2016 |
| • Department of Homeland Security (DHS) Scientific Leadership Award | 2015 |
| • Texas Southern University Academic Scholarships | 2014-2015 |
| • Maritime Transportation Management and Security Scholarships | 2013-2015 |

Volunteer

Port of Houston Youth Expo, Fall 2014

Served as a representative for Texas Southern University Maritime Transportation Management and Security program. Informed visiting high school students about the industry and opportunities at the university.

Houston Food Bank, Spring 2014

Help produce meal packages for hungry kids, seniors and others by sorting, processing and pack food.

Organizations

Texas Southern University El Club Espanol, served as Treasurer., Fall 2014

Maritime Student Association (MSA), Fall 2013- Current

Samuel M. Teferra

11339 Bayou Place Lane, Houston, TX 77099, (832)-918-6282, smteferra@uh.edu

EDUCATION

B.S. in Computer Science Texas Southern University, Houston, Texas Major GPA: 3.89	May 2016
B.S in Computer Science University of Houston, Houston Texas Associates Degree in General Sciences	(August - December 2012)
Northern Virginia Community College GPA: 3.86/4.0	Jan 2011

SKILLS

- Understanding of the concept of Software as a Service RESTful web services.
- Using MVC framework like ruby on rails to build scalable and reusable code.
- Familiarity with WAMP/LAMP stack, MEAN stack frameworks to develop web applications.
- Familiarity with agile and scrum sprints, pushing code frequently and working with the product owner to satisfy their ever changing requirements.
- Knowledge of the software development lifecycle and its different phases.
- Writing different test cases in line with development using Rspec gem and Selenium.
- Occasionally performing TDD and BDD when build apps.
- Deploying to Heroku and other hosting sites converting from sqlite3 to PostgreSQL in production, adding puma for better concurrent request handling and configuring the asset pipeline.
- Knowledge of building big relational databases, and familiar with the concept of NoSQL with implementations like mongoDB.
- Git source control, creating branches and integrating to a master repo on github or bitbucket.
- Implementing the MV* framework of ember-cli with handlebars to build fast one page applications and integrating this framework using a gem ember-cli-rails in rails. (using rails as a back end to build a fast loading single page app)
- Using Node.js to build fast connections between clients like web sockets in a non-blocking fashion for a much smoother user experience.
- Building iOS apps backed by ruby on rails backend.
- Almost always using HTML5, CSS/SASS and javascript in apps.
- Interacting with third-party JSON api.
- Experience with data mining algorithms and using rapid miner and Weka data miner written in java to model different scenarios and mining information.
- Familiar with object oriented languages like Java, C/C++ and non-object oriented like Visual Basic.
- Familiarity with different ERP systems like SAP and Epicor.
- Experience working with moderately complex, small to medium-scale data sets in a data mining analytic role.
- Practical knowledge and experience of statistical models and methods using R.
- Ability to work as a team member towards a common vision
- Bilingual.

GITHUB PROJECTS

- <https://github.com/smt2466/foodies1>

WORK EXPERIENCE

The Meda Group, Houston, TX

Summer 2014

Data Analyst Internship

- Structured and managed a plethora of investment related data entering the systems using python.
- Analyzed new data sources that will maximize analytic capabilities for the various business units.
- Documented the analysis and identifying courses of action in order to determine the best outcomes.

RESEARCH

Undergraduate Research Assistant at Texas Southern University

Jan 2015- Current

- Researching different ways to encrypt/decrypt data, weighing the advantages and flaws of crypto systems in line with networking.
- Research on data mining algorithms for prediction of risk related to cargo related entering into ports.

Summer Undergraduate Research Project (SURP) at Texas Southern University

Summer 2015

- Worked on different data mining algorithms to predict the probabilities and outcomes using attributes and classes.
- Technologies used- Weka, rapid miner, wrote some dynamic naïve Bayes codes in C++