Texas Southern University

Department of Homeland Security

Scientific Leadership Award Program

Preparing Technically Savvy Homeland Security Professionals for Maritime Transportation Security

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CHAPTER 1: PROGRAM INFORMATION

1.1 Texas Southern University Department of Homeland Security Scientific Leadership Award Program

The DHS SLA program at Texas Southern University (TSU) aims to foster and broaden the existing Bachelor of Science program in Maritime Transportation Management and Security. To achieve this goal, this education program will have the following three specific objectives:

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. In Phase 1, the initial phase, TSU DHS SLA program will focus on:

- Recruiting students for the program;
- Identifying potential research projects on Maritime Transportation Security;
- Developing an interdisciplinary undergraduate curriculum and training programs;
- Developing an early career faculty exchange program for early career faculty.

In Phase 2, TSU will

- Conduct identified research projects with the involvement of faculty and students;
- Provide career development opportunities for students;
- Continue developing an interdisciplinary undergraduate curriculum based on research outcomes.

Figure 1.1 shows the overall project objectives.

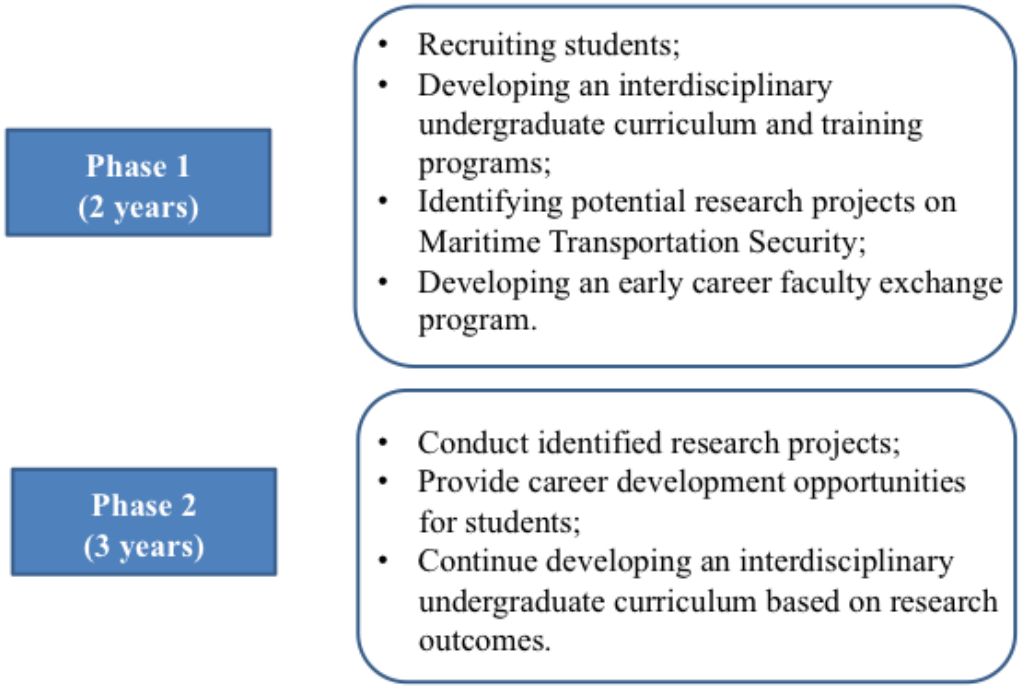


Figure 1.1 DHS SLA Program Objectives in Two Phases

1.2 TSU DHS SLA Faculty and Staff Team

The Texas Southern University Department of Homeland Security Scientific Leadership Award Program team is comprised of proficient and dedicated faculty and staffs who work as a cohesive unit to recruit students, develop an interdisciplinary undergraduate curriculum and training programs, identify potential research projects on Maritime Transportation Security, and develop an early career faculty exchange program. Faculty and staff members in TSU DHS SLA include:

Dr. Yi Qi, Principal Investigator & Program Director, Associate Professor and Department Chair, Department of Transportation Studies. Dr. Qi has a Ph.D. in Transportation Planning and Engineering from New York University at Polytechnic Institution. As Chair of the Department of Transportation Studies, Dr. Qi has significant administrative experience and excellent management skills, and she has led successful efforts to

develop new education and training programs. As a prestigious researcher, Dr. Qi has secured $2,251,142 in grants from various sources, including the U.S. Department of Transportation and the Texas Department of Transportation. Dr. Qi is responsible for the achievement of the program's goals and objectives, implementation of its strategies and plans, compliance of all research and education activities, and the day-to-day operation of the program. She also is responsible for relationships between the University (TSU) and the supporting DHS COEs.

Ms. Ursurla William, Program Coordinator, Department of Transportation Studies. Ms. Williams has a B.A. in Sociology from Huston-Tillotson College, Master's degree in City and Regional Planning (M.C.R.P.) from the University of Texas at Arlington, and a M.S. degree in Transportation Planning and Management from TSU. Ms. Williams has a track record of coordinating successful events and activities for Maritime students. Because of her stellar record and achievements, Ms. Williams received the College of Science and Technology's Distinguished Staff Award in 2012. Ms. William is the current Program Coordinator for the Maritime Transportation Management and Security program at TSU and also a Visiting Instructor. She provides direct administrative support for managing the scholarship awards and organizing all the training and internship programs. Furthermore, she is responsible for supervising undergraduate students supported by this grant as well as for planning and managing the conferences and Institutional Advisory Committee meetings. She also serves as the point of contact with external entities.

Dr. Pan Miao, Co-Principal Investigator, Assistant Professor, Department of Computer Sciences. As an early career faculty from the Department of Computer Science, Dr. Pan serves as Director of the research program. Dr. Pan received his Ph.D. degree in Electrical and Computer Engineering from the University of Florida in August 2012, and he joined the Computer Science Department at Texas Southern University as a tenure-track assistant professor in September 2012. His research on cognitive radio networks is supported by an NSF grant, i.e., CNS-1343361, EARS: Collaborative Research: Cognitive Mesh: Making Cellular Networks More Flexible (01/01/2014-12/31/2017, $286 K,

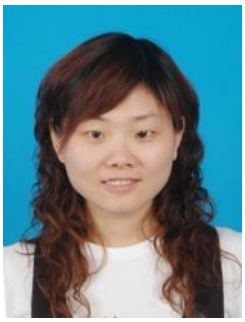
with the intellectual merits to develop a novel mesh-based CR network to improve spectrum utilization, increase the capacity of cellular systems, and create a better user experience. Dr. Pan has two book chapters, 19 journal publications, and 34 conference papers to his credit. He is well positioned to succeed in this proposed project due to his expertise in cyber security, cyber-physical systems, and wireless networks. He has conducted extensive research in those research areas. Dr. Pan is responsible for conducting research projects on the identified topics and developing new courses to integrate the research results into the educational programs.

Capt. Robert Morgan, Co-Principal Investigator, Visiting Professor, Department of Transportation Studies. Capt. Morgan has earned degrees from Southern University in Baton Rouge, LA, and Texas Southern University. He is currently pursuing doctoral studies in Business Administration and Educational Administration. At TSU, Capt. Morgan teaches undergraduate and professional graduate students in Marine Transportation, Ports/Waterways, and Logistics courses that are part of the Maritime Transportation Management and Security undergraduate degree and the Transportation Management's Master's degree program. Before joining the Department of Transportation Studies, he worked as Maritime Academy Manager at the Port of Houston Authority. Capt. Morgan also has held various top-level management and leadership assignments worldwide as an officer in the United States Navy. Capt. Morgan is a leading person for both the education program and one research program.

Dr. Yunjiao Wang, Co-Principal Investigator, Assistant Professor, Department of Mathematics. Dr. Wang received her Ph.D. in Mathematics from Zhejiang Normal University in 2006. From 2006 to 2013, she worked as a Research Associate at the University of Manchester and at Ohio State University, where she applied her mathematical skills (e.g., theory and applications of coupled ordinary differential equations) in her interdisciplinary teaching and research, including bioscience, chemistry, and engineering. Dr. Wang joined TSU in the Fall of 2013 and has been supervising students and received high teaching evaluations during her teaching at TSU. Dr. Wang is one of the leading person for the

education program. She is responsible for developing new interdisciplinary courses, which will integrate mathematical skills, MATLAB programming skills, wireless communication technologies, and cyber security technologies, into maritime transportation security.

Dr. Mehdi Azimi, Visiting Assistant Professor, Department of Transportation Studies. Dr. Azimi received his Ph.D. in Civil Engineering-Transportation Engineering from Texas A&M University. He has a Bachelor of Science in Civil Engineering and two Master of Science degrees, one in Civil Engineering-Earthquake Engineering and one in Transportation Planning and Management. Prior to his graduate studies, he worked for more than four years as a project manager in the private sector for consulting and construction firms. During his doctoral studies, Dr. Azimi worked in the Operation and Design Division at the Texas Transportation Institute (TTI) and engaged in various research projects related to transportation and traffic engineering. Dr. Azimi is responsible for conducting the research projects, supervising the students who serve as research assistants, and advising them on writing technical reports and research papers.



Ms. Qun Zhao, Research Associate, Department of Transportation Studies. Ms. Zhao has two Master of Science degrees, one in Transportation Planning and Management and one in Supply Chain Management. While pursuing her Master's degree at Texas Southern University, Ms. Zhao worked as a research assistant for several TxDOT projects. She has experience on planning and conducting field studies, the collection and analysis of traffic data, and technical report writing. Her research areas include traffic safety analysis, maritime transportation, and GIS in transportation.

1.3 TSU DHS SLA Student Team

In FY 2014, six undergraduate students were recruited to participant in the DHS SLA program, and more qualified students will be recruited and receive support from this program in the following years. 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
- Cherie Brown, Undergraduate student, Maritime Transportation Management and Security
- Micah Harper, Undergraduate student, Aviation Science Management
- Samuel Teferra, Undergraduate student, Computer Science
- FranChell J. Davidson, Undergraduate student, Mathematics
- Nazreen Kashiani, Undergraduate student, Computer Science

CHAPTER 2: MARITIME PROGRAM EVENTS AND ACTIVITIES

In academic year 2014-2015, the Department of Transportation Studies in TSU organized a number of events and training opportunities for the undergraduate students in Maritime program to enhance their learning outcomes. These key events provide students with necessary college requirements and connect them with industrial employers for future opportunities. By participating in these events, our students are motivated to successfully complete their education and start a career.

Except for arranging these events targeted to current enrolled undergraduate maritime students, the Department also offered various programs to high school students for recruitment purposes. During 2014-2015, three major activities were organized, i.e., visiting local high schools, hosting 2015 Summer Maritime Academy, and offering summer internships to Elkins High School Engineering Academy students.

The following parts introduce the detailed information of these events and activities the Department of Transportation Studies offered during academic year 2014-2015.

2.1 Maritime Undergraduate Student Development

Various workshops, seminars, conferences, and field trips were offered to maritime undergraduate students during academic year 2014-2015, including:

- Breakbulk Conference
- M/V Sam Houston Boat Ride and Visit to the Port of Houston
- National Transportation Week
- Stories of a Workforce: Celebrating the Centennial of the Houston Ship Channel
- Transportation Research Board 94th Annual Meeting

2.1.1 TSU Maritime and Transportation Students Attend Break bulk Conference

Capt. Morgan, Ms. Ursurla Williams, TSU undergraduate Maritime Transportation Management and Security students, and graduate Transportation Planning and Management students attended the Jerry Nagel Breakbulk Education Day on September 30, 2014, at the Breakbulk Conference in Houston, TX. Breakbulk Education Day is a day-long series of informative sessions about the break bulk industry and its challenges.

Designed to introduce the break bulk industry to university students and industry freshmen, Breakbulk Education Day is comprised of informational sessions, technology demonstrations, and case studies explained by leading industry executives. The day is capped off with success stories recounted by recent graduates who have found jobs in the Breakbulk industry, and a Career Fair, in which industry executives from leading Breakbulk companies explain potential career paths to students.

2.1.2 M/V Sam Houston Boat Ride and Visit to the Port of Houston

The Department of Transportation Studies arranged for Maritime students to visit the Port of Houston Authority and ride on the *M/V Sam Houston* along the Houston Ship Channel. On the field trip, students saw maritime related facilities firsthand along the Ship Channel, and they also had the opportunity to meet with Marcus Woodring, the Port of Houston Authority's (PHA)

Managing Director of Health, Safety, Security, and Emergency Management and a TSU Maritime Industry Advisory Board Member; Mrs. Linda Clary, PHA's Maritime Education Coordinator; and Anthony Flenoy (TSU Maritime Alumni 2012), PHA's Security Officer. The students relished the opportunity to hear Anthony Flenoy share information about his experience in the TSU Maritime program and his experience at the PHA, first as an intern and now as an employee.

2.1.3: National Transportation Week (Houston, TX)

National Transportation Week (NTW) is recognized and celebrated by the United States Transportation units worldwide. It provides an opportunity for everyone in Transportation to join together for greater awareness and appreciation of the transportation industry. It is also a time to celebrate the community of transportation professionals who keep our country on the move.

DHS SLA faculty member Capt. Morgan attended the 2015 NTW held in Houston, TX, during the week of May 11-17, 2015. The theme of 2015's National Transportation Week was "Veterans in Transportation – Still Serving America!" which emphasized the contributions - past, present, and future - of our military personnel in the transportation industry. Veterans continue to serve in this vital industry and contribute critical skills and talent in moving America's products.

2.1.4 Stories of a Workforce: Celebrating the Centennial of the Houston Ship Channel

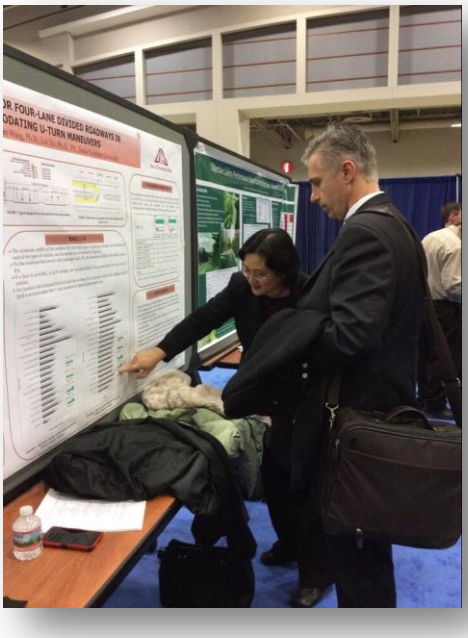
Students at Texas Southern University and their professors attended the Houston Arts Alliance's Folk life and Traditional Arts program on January 31, 2015. The exhibition *Stories of a Workforce: Celebrating the Centennial of the Houston Ship Channel* was an effort to make the Port of Houston better seen, better heard, and better known to the massive community that depends on it. The Port of Houston is the great hidden engine of the city's prosperity.

The exhibition was driven by interviews and stories collected through the Library of Congress-funded Working the Port project. Working the Port has documented the voices of the men and women who have made their living in the many occupations and industries found along the Ship Channel. It captures and explores the human experience of this massive complex through the words and experiences of individuals.

In addition to dramatic photo, audio, and video exhibits, *Stories of a Workforce: Celebrating the Centennial of the Houston Ship Channel* featured maps, signage, memorabilia, banners, painted portscapes, ship models, work gear, logs, and objects that enhance and illustrate the story of this unique and diverse workplace.

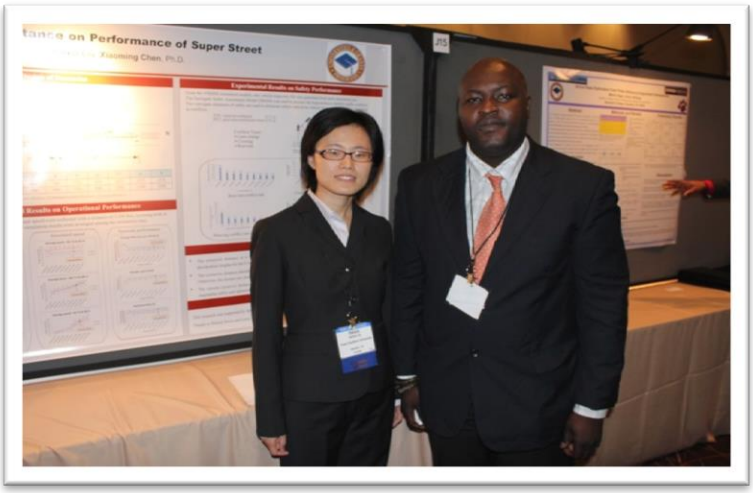
2.1.5 Transportation Research Board 94th Annual Meeting

TSU undergraduate students from the Maritime Transportation Management and Security program and graduate students majoring in Transportation Planning and Management attended the Transportation Research Board's 94th Annual Meeting in Washington, D.C., where the information-packed program attracted around 12,000 transportation professionals from around the world. The TRB Annual Meeting program covers all transportation modes, 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.

TRB is one of six major divisions of the National Research Council (NRC), which serves as an independent adviser to the federal government and others on scientific and technical questions of national importance. The NRC is jointly administered by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The mission of the Transportation Research Board is to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. Micah Harper, one of program-supported undergraduate students, attended this TRB meeting.



2.2 Recruitment Events

One key aspect of developing the DHS SLA program is to recruit students into the HS-STEM field. 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. Also, continued hosting of the Summer Maritime Academy and offering summer internship positions to high school students helps attract students to the Program.

2.2.1 High School Visits

During academic year 2014-2015, we have visited many high schools and other related activities, including:

- Austin High School

- Travis High School
- Yates High School
- High School for Law Enforcement
- Humble ISD College Fair
- HCC Southeast
- Fort Bend ISD College Fair
- Madison HS
- San Jacinto College

Visiting high schools provides an opportunity to introduce our Maritime program to high school students and attract more high quality students. The Department of Transportation Studies will continue to visit high schools in the Houston Area in the following years.

2.2.2 Summer Maritime Academy 2015

Department of Transportation Studies at TSU has hosted the Summer Maritime Academy (SMA) since 2010. This program is to motivate high school students (grades 9-12) to learn more about maritime transportation management and security in advance of their college studies. Most participants are students of color who may not have had exposure to the maritime industry as a career option. The weeklong SMA focuses on logistics, homeland security, and the environment, and it provides a general maritime overview. This program introduces students to the Maritime Transportation Management and Security (MTMS) degree program and scholarship opportunities at Texas Southern University. The SMA also serves as an outreach and recruiting program to recruit students to the MTMS degree program at TSU.

This year, from June 8 to June 12, 2015, the Department of Transportation Studies hosted its sixth installment of the SMA. For the past several years, the Department has partnered with Project GRAD, a non-profit organization designed to assist first generation college students in getting into and completing college. Project GRAD works in various high schools in the greater Houston area, and students have been recruited from the following schools to participate in the SMA, i.e., Jack Yates HS, Jefferson Davis HS, Phyllis Wheatley HS, John Reagan HS, and Sam Houston HS.

The SMA week was filled with much needed information regarding the field of maritime transportation. During this 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 the U.S. Coast Guard facility. Representatives from the U.S. Customs and Border Protection Agency visited with students and demonstrated cargo screening techniques to detect contraband items in cargo. During the week, students learned what the industry offered and acquired transferable skills through sessions on Leadership, Dealing with Change, and Effective Communication Strategies.

This year, SMA students had a rare opportunity to meet Homeland Security Secretary, Jeh Johnson, at a community engagement meeting arranged by Congresswoman Sheila Jackson Lee (18th Congressional District-Texas). Secretary Johnson encouraged the students to pursue higher education and careers in homeland security.

2.2.3 Summer Internship Program with Elkins High School

The Summer Internship Program with Elkins High School Engineering Academy is designed to attract high school students to the Maritime Management and Security Program. This two-week internship offers high school students the opportunity to work with professors and graduate students at TSU, enabling them to learn about many of the tools and software programs that our graduate students use regularly.

With all the recruitment efforts that have been exhibited, the Department has projected a total of 25 prospective new students to enroll in the Fall of 2015.

CHAPTER 3:

EDUCATION

3.1 Maritime Curriculum Development

The DHS SLA program, which specifically emphasizes maritime transportation security, is to enhance the existing Maritime Transportation Management and Security program at TSU with a new and updated interdisciplinary curriculum and courses.

Several new interdisciplinary courses will be developed through the combined efforts of the faculty of the Department of Transportation Studies, the Department of Mathematics, and the Department of Computer Science. The goal of these new courses is to introduce mathematical modeling skills, computer science wireless communication technologies, and cyber security topics into the maritime transportation security discipline. The following are the descriptions of new courses that have been developed in Phase I or will be developed in Phase II:

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

During academic year 2014-2015, one course was developed, including both the syllabus and content (Software for Scientific Computing). Three other courses were designed with syllabi. One course, Maritime Big Data Analytics and Security, will be developed in Phase II. (See the Appendix for the courses' syllabi.)

3.1.1 Software for Scientific Computing (online)

The purpose of this course is to improve mathematical modeling skills and MATLAB programming skills for students in the proposed Maritime Transportation Security program. It will develop students' computation ability through a sequence of projects on numerical methods, mathematical modeling, and simulations. This course aims to lead students from beginning programmers to fluency in MATLAB programming, which will be useful in conducting research on maritime transportation security. The course content includes: 1) Loops, matrices, and fractals; 2) Solving one real equation via bisection; 3) Solving one real equation via Newton's

method; 4) Solving one complex equation via Newton's method; 5) Boolean gene network; 6) Probability Boolean gene networks; 7) Stochastic simulation of reaction networks; 8) Deterministic chemical kinetics; 9) Modeling of fiber networks; and 10) Gaussian elimination. More importantly, during the classes or at the last class, a set of maritime transportation security-related problems will be proposed as case studies. Students will be asked to solve those problems with the mathematical modeling and MATLAB programming skills they learned during this course.

3.1.2 Introduction to Operations Research

Problems on how to use limited resources in an optimal way are ubiquitous. Students involved in the study and research of Maritime Transportation Security are required to have the ability to model and analyze such problems. This course will provide students with the tools for modeling and analyzing such problems. This course is focused mainly on linear programming and its applications. The aim of the course is to teach students how to formalize and analyze linear programming problems. The course content will include: 1) Introduction to linear programming; 2) Simplex method; 3) Duality theory and sensitivity analysis; and 4) Transportation and assignment problems and network optimization models. If time allows, integer programming and nonlinear programming also will be discussed.

3.1.3 Introduction to Maritime Cybersecurity

This course aims to help students understand cybersecurity issues and study potential solutions in the maritime sector. This course aims to provide students with the practical, experience-based, and proven knowledge to address fundamental cybersecurity problems in the commercial maritime sector. The course content will include: 1) Commercial seaports and modes of maritime transport; 2) Documentation, financial transactions, and business entities in commercial maritime transportation; 3) Vulnerabilities in the cargo supply chain; 4) Drug smuggling via maritime cargo, containers, and vessels; 5) Terrorism and commercial maritime transportation; 6) Port security management; 7) Threat mitigation strategies; and 8) Information security and assurance. If time allows, some of the following subjects also will be discussed, i.e., International and U.S.

maritime security regulations and programs, a strategic blueprint for world-class seaport security, and more information security models and protocols.

3.1.4 Maritime risk assessment and resiliency analysis

This 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. In order to develop this new course, the team has examined security measures and practices used in the industry, namely the movement of cargo both at the port and throughout the transportation logistics process. The team will then compare the tools, and technologies utilized. The results of research projects for the DHS SLA on maritime risk and threat analysis will be incorporated in this course.

Besides these new courses, four current security-related courses at the Maritime Transportation Management and Security Program will be updated, including:

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

In academic year 2014, MTMS 341-Maritime Security Management has been updated successfully, and three other courses will be updated in Phase II.

3.2 Training Program Development

In addition to the curriculum or coursework, the TSU DHS SLA program also provided several education and training programs. The major outcomes for training purposes were a series of seminars and the redesign of the USCG Maritime Certificate Course.

3.2.1 Series of Seminars Developed

The Department of Transportation Studies, in partnership with the Department of Homeland Security Scientific Leadership Award lecture series, was designed to prepare, engage, and

educate all undergraduate and graduate students on the various aspects of homeland security. In addition, the lectures allowed students the opportunity to meet and network with various industry professionals. These seminars have been critical in the growth of the students' and professors' knowledge of each topic presented. In Spring 2015 semester, three seminars were organized, i.e., "Homeland Security Research Projects and Needs & Career Development Advice," "Securing the Port of Houston," and "Secure and Efficient Maritime Data Storage and Retrieval in the Cloud."

Seminar 1: "Homeland Security Research Projects and Needs & Career Development Advice" by John Contestabile

On February 19, 2015, the College of Sciences, Engineering and Technology hosted John Contestabile, Assistant Program Manager for Homeland Security for the Johns Hopkins University/Applied Physics Laboratory at a luncheon seminar with several professors and a collection of both undergraduate and graduate students. Mr. Contestabile served the State of Maryland's Department of Transportation for more than 30 years, and he is Chair of the Committee on Critical Infrastructure Protection for the Transportation Research Board.

First, Mr. Contestabile gave a brief introduction of Johns Hopkins University's Applied Physics Laboratory (APL), and he explained that the Laboratory's first task was to develop a variable time proximity fuse for the United States. APL is a key player in developing technology to

strengthen the nation through transformative innovation and trusted technical leadership in national security and space.

Mr. Contestabile emphasized to the students the importance of cyber operations and homeland protection areas in the Asymmetric Operations Sector. Cyber operations is a huge emerging research area, and it isn't just a military focus or issue, it's also a domestic concern. Cyber operations and defense are key focuses at APL, the staff members of which consult with the National Security Agency (NSA). APL has worked with homeland security on projects that track the precursor to specific diseases outbreaks in the United States called "the Suite for Automated Global Electronic bioSurveillance" (SAGES), Real Time Evacuation Planning Model, and linking the video sharing capability among public safety and transportation agencies for Maryland, Virginia, and the District of Columbia. Mr. Contestabile also talked about one of the emerging research areas, social media. APL is currently working on how to use social media for Social Crisis Response and Management (SCRaM). Then, he went through a scenario on how they are able to geo-target a person's specific tweets based on their use of the word 'bomb'. They also were able to search 10% of all tweets for relative topics of research. This is an effort to increase the management of crisis response and identifying threats and its predecessor behavior.

Seminar 2: Capt. Marcus Woodring and Capt. Brian Penoyer speak on the importance of securing the Port of Houston

On February 26, 2015, the College of Sciences, Engineering, and Technology hosted Capt. Marcus Woodring (Ret), Port of Houston Authority's Managing Director of Health, Safety, Security and EM and Capt. Brian Penoyer, United States Coast Guard Captain of the Port of Houston, at our monthly lecture series with the numerous professors and a group of undergraduate and graduate students.

The lecture began with Capt. Woodring's statement, "As a student, you are in the right place with the right degree in the maritime community," stressing the importance of the field and its economic impact on the city of Houston. Capt. Woodring oversees eight ports in the port of Houston, and his duties include managing the port police department and port fire department, safety, emergency management, and port security. The administration sector highlights the security and safety component at the port, and it takes on the aphorism that all accidents are preventable. Also, he touched on emergency management, which is responsible for creating the framework within the port community to reduce the vulnerabilities and handle adversities effectively. Capt. Woodring expressed how the Port of Houston uses technology as a tool but stressed how nothing can replace human interactions. Technological advances in every aspect lead to importing findings and resources in the work place, but he stated that "our most valuable resource is the people." This coincided with the internship opportunities that the Port of Houston had available for students, and it showed us the successes of past students who participated in the security and emergency management internships.

Furthermore, Capt. Woodring spoke about interviewing. Then, he gave the students a fresh perspective on what employers look for in future employees. He continued with a story about how an employer checked every aspect of potential employees, including every social media account, the car they drove, and other personal information even before the interview began. He cautioned students to always be aware and prepared because their lives will be examined.

Capt. Brian Penoyer, with United States Coast Guard and the Port of Houston, led the second half of the lecture. Capt. Penoyer informed the students concerning how the security community works and how it fits into broad maritime commerce. He began with a question, "How do we protect the port?" He answered the question by taking a regulatory approach and looking at it as a system and providing follow-up protection of the systems that work together. Then, he made the connection of how everything relates to everything else, giving the scenario of "the waste product for some is also someone's feedstock."

Capt. Penoyer transitioned into talking about the Area Maritime security plan. This plan protects various areas and integrates the actions of the terminals and the vessels that are being received and discharged, so that they all move together for security reasons and unity of effort. Security plans are a shared responsibility needed in order to keep the port at its highest level of efficiency. The Federal Maritime Security coordinator's role is to achieve unity of effort, and that's done by working in unison with all parties involved, such as Customs & Border Protection, FBI, Immigration & Customs Enforcement, and TSA. In part of implementing the Area Maritime security plan, identifying risk is another issue. If the risk is too high, security zones are set up so that they can solve the issue. Capt. Penoyer also touched on the 96-hour screening process done for everything that comes into the port.

Capt. Penoyer finished his lecture with shared sentiments of Capt. Woodring; "Our biggest resource is not the toys we use, it's the people that operate them . . . helicopters are pretty, but they're only as good as the pilot's brain."

Capt. Woodring and Capt. Penoyer finished their joint lecture by answering the students' and professors' questions.

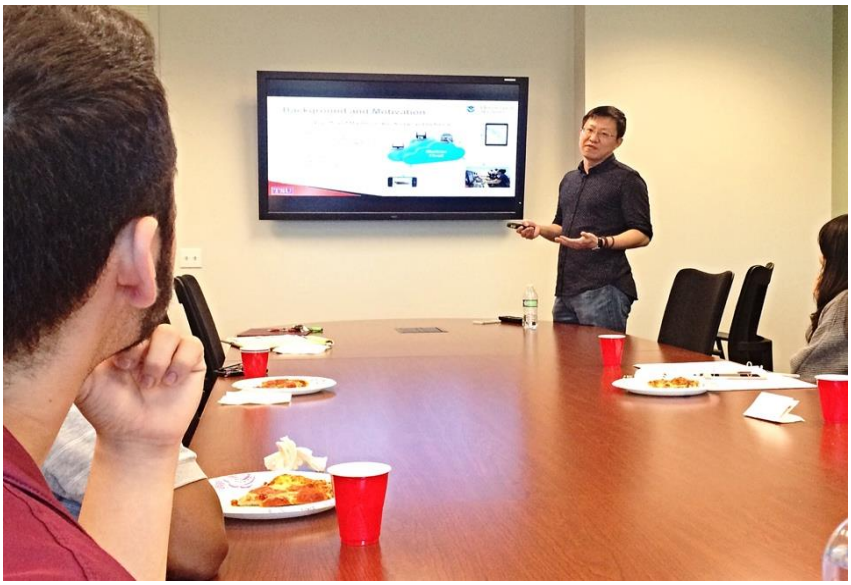
Seminar 3: Dr. Miao Pan educates students on Maritime Data Storage and Retrieval applications for the Cloud

On April 30, 2015, the College of Science, Engineering, and Technology hosted Dr. Miao Pan, Assistant Professor at Texas Southern University's Computer Science Department at a luncheon discussion with several professors and students. Dr. Pan is a member of IEEE and ACM, and he served as an Investigator for NSF CREST, PI for NSF CAREER, and Co-PI of the EARS projects for the DHS SLA project, and he received the NSF CAREER Award in 2014.

The focus of Dr. Pan's lecture was on a "Secure and Efficient Maritime Data Storage and Retrieval in the Cloud." Dr. Pan began the lecture with background information on data storage and retrieval properties and educated students on the motivation for the need for this revolutionary practice. He touched on the benefits of the cloud, activities in the cloud, potential attacks and risk, and some methodology of the trade. Later, he told the students about different encrypting and coding techniques that are used in the discipline of computer science, such as cryptography and steganography.

In addition, Dr. Pan emphasized to the students the importance of understanding cryptology and how it translates to ensuring safety in the arena of Maritime Data Storage. Dr. Pan stated that "Cryptography means secret writing . . . however, the term refers to the science and art of transforming messages to make them secure and immune to attacks." Upon identifying the importance of the overall knowledge, he went deeper to explore public key cryptography. Cryptography is an essential aspect in everyday life whether we know it or not. Public key cryptography keeps credit cards safe, and when operating software automatically updates over the Internet, this process is checked by a public key algorithm.

Last, he covered Homomorphic Encryptions, which are encryptions that allow computations to be conducted on cipher text. He explained the algorithmic concept of the Paillier Cryptosystem. He ended with the notion that "homomorphic techniques and the potential applications of it can be used in further research projects." Upon the completion of his seminar, he answered the students' and professors' questions.



3.2.2 Redesigned a USCG Maritime Certificate Course

"Tankship familiarization and dangerous liquids/Tankerman dangerous liquids/PIC" is 40-hour training course that covers loading, discharging, and carriage of dangerous liquids. This course aims to satisfy Tanker Familiarization, Tankerman Assistant, Tankerman Engineer, and Tankerman Person in charge of Dangerous Liquids (DL). This course satisfies STCW A-V/1, paragraphs 1-21 for Dangerous Liquids, including Petroleum and Chemical Transport, and it also satisfies the Cargo Training requirement for the renewal of a Tankerman endorsement.

Upon completion of this course, participants will have learned about:

- Tank Ships, Oil & Chemicals Carriage, Barge Terminology;
- MARPOL 73/78 Annex I and Annex II requirements;
- Load line, draft, trim & stability requirements;

- Load & Stability plan, cargo transfers and ballasting stresses;
- Vessel Emergency Response Plans, Emergency Procedures;
- Operational procedures, Pollution prevention Rules;
- Occupational health and safety, cargo-handling;
- Auxiliary & Instrumentation systems;
- Cargo Loading & Discharging operations, Bulk Liquids defined as Dangerous Liquids;
- Operating procedures and measures for controlling the cargo tank environment;
- Cargo-tank cleaning procedures, Inert gas systems, Vapor-Control Recovery Systems;
- Gas Freeing Cargo Tank & Confined Space Entry Procedures.

This course was redesigned last year and was approved by STCW/USCG.

CHAPTER 4:

RESEARCH

4.1 Research Activities

The DHS SLA program involves faculty members across different departments to develop an interdisciplinary and integrated research and education program that provides innovative technology solutions for the Homeland Security Enterprise (HSE), particularly for maritime transportation security. Based on interviews with security officers in Houston and at the Port of Houston Authority (PHA) and the areas of expertise of early career faculty and other researchers at TSU, three research topics were identified:

- *Maritime Risk Assessment and Management*
- *Maritime Cargo Security: Data Analysis and Intelligent Screening*
- *Secure and Efficient Maritime Data Storage and Retrieval*

Detailed work plans have been developed for each research topic, and the plans were sent to the COE partner for review. Also the Co-PIs for each project have started working on some of the tasks.

4.1.1 Maritime Risk Assessment, Management and Resiliency Analysis

Despite mandates by the International Maritime Organization (IMO) and the U.S. Coast Guard (USCG) to perform regular risk assessments at ports, onboard ships, and at the office to verify how incidents, accidents, injuries, or near misses are caused, companies are frequently reluctant or unable to identify potential risks, thus imposing a threat to their own systemic integrity. This research topic examines the industry's practices and the identification of systemic failures with the purpose of significantly improving corporate risk management and risk-assessment practices. It is expected to establish a systemic platform for the maritime industry by modeling and analyzing risk assessment and management. It will develop and validate the industry's regulatory requirements and standards by using established, measurable, and demonstrable measures that will improve the prevention and vulnerability reduction measurement in the shipping industry. The results of this research project will enhance the efficiency and functionality of the safeguard systems of the present maritime infrastructure.

Capt. Robert Morgan is the main professor working on this research topic. Together with an undergraduate research assistant, Captain Morgan has developed the key tasks for the topics of Maritime Risk Assessment and Management and Resilience Analysis, which include:

- Task 1: Literature research (finished)
- Task 2: Literature review (in progress)
- 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 the research findings.

A literature research was conducted in order to identify the existing research and information on the topic to guide the direction of the research. Currently, a literature review is underway to analyze, classify, and compare research studies and theories. Upon the completion of the literature reviews, the research team will synthesize the methods and measurements for maritime risk assessment and management.

The major research efforts that have been performed were qualitative research efforts, and they were used to investigative certain methodologies specific to our topic of interest. The in-depth research was executed on keywords, such as risk management, risk assessment, maritime security, port security, isps code, and security-related agencies, such as the Department of Homeland Security, the United States Coast Guard (USCG), the U.S. Customs and Border Protection, the International Maritime Organization, the United States Maritime Administration, and many more.

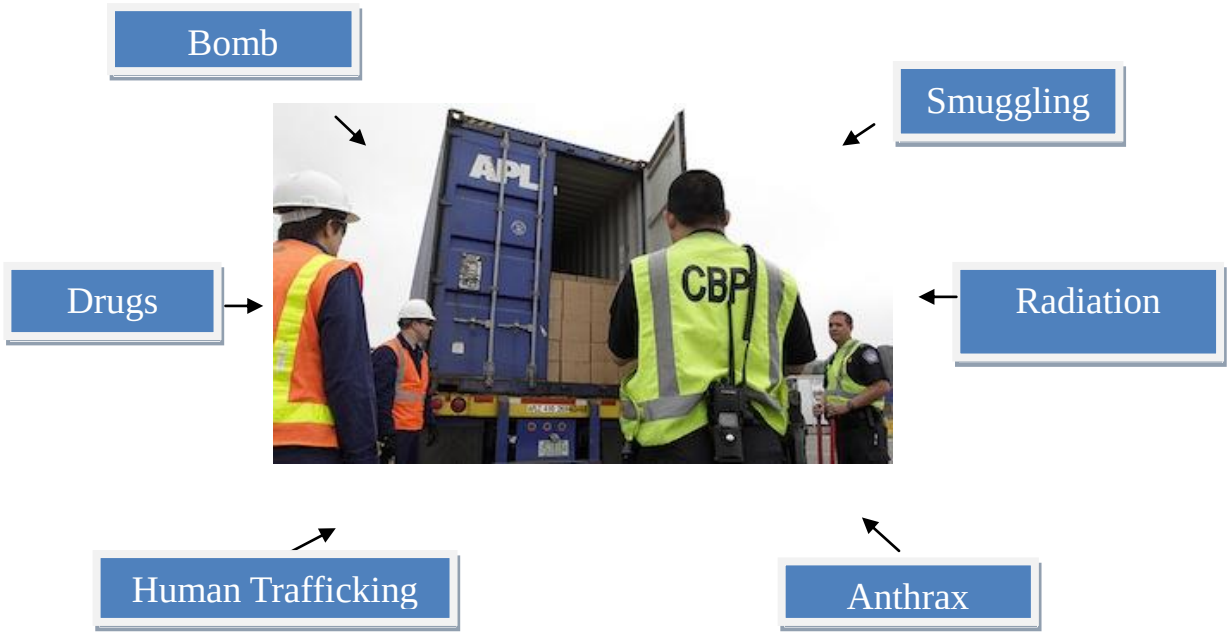
In conjunction with the talented staff working diligently to aid in the research effort, the undergraduate assistants assisted in completing literature reviews on over 30 scholarly articles to date.

4.1.2 Maritime Cargo Security: Data Analysis and Intelligent Screening

As is well known, a cargo container might be leveraged to conduct some criminal activities e.g., smuggling, human trafficking, and drug trafficking, or even to launch some terrorist attacks, e.g.,

bombs and the anthrax virus. Although CBP officers or the Coast Guard can detect most of these threats via special devices, it takes a lot of manual labor to check every possible container, since there are thousands of cargo containers entering ports, such as the Port of Houston. An intelligent screening design can help to reduce the workload of CBP officers/the Coast Guard significantly. Intelligent screening is able to classify the cargo containers into different risk levels (e.g., red, orange, or green). Instead of checking every possible container with the same level of effort, the CBP officers/Coast Guard can focus on the more risky containers and speed up the screening process of the less risky containers. Given that the profiles of cargo containers are provided by third-party companies, which are not trustworthy, the profile data must be pre-processed, and a good intelligent-screening design is required.

Given the extensive economic importance of the maritime supply chain, the vulnerability of maritime cargo to smuggling, terrorist attack, and other malicious attacks has long been a concern, and it was especially heightened after the 9/11 attacks. Since there are approximately 11.6 million maritime cargo containers entering U.S. ports each year, an efficient screening model should be constructed, and the U.S. Coast Guard (USCG) must have good tools to facilitate screening instead of traditional screening by hand. This project will use data mining techniques to create an intelligent screening model to strengthen the security of maritime cargo. Briefly, it will analyze the record data of cargo attributes and use these historical data as training data to build up a risk-based screening classifier. When there are new cargo containers entering the port, the Coast Guard need to input some attributes of the cargo into its online portable devices, assess the risk of the cargo, and single out high-risk cargo for further inspection. Both an intelligent screening model and a software prototype will be developed in this project. The results of this research will provide an effective, efficient, and feasible approach for 100% screening of U.S.-bound cargo, which may further ensure the security and prosperity of the maritime supply chain.



The goal of this research is to provide an effective, efficient, and feasible approach to improve the screening of U.S.-bound cargo, which may further ensure the security and prosperity of the maritime supply chain. The research efforts that went into this project are identifying key research thrusts for intelligent screening, proposing potential methodology for problem solving, and reviewing the literature on "Existing designs and best practices for intelligent screening for maritime cargo" and "Existing data mining algorithms for establishing screening classifiers." Key tasks for the Maritime Cargo Security topic include:

- Task 1: Literature review (finished)
- Task 2: Conducting maritime data collection and analytics (in progress)
- Task 3: Model the screening process and build up screening classifiers (in progress)
- Task 4: Test the screening classifiers and develop software prototype
- Task 5: Document research findings

The graduate students from the Computer Science Department at Texas Southern University participate in all of the major tasks of this research, including the literature review on one data-mining book and several related scholarly articles. Data collection played a major part in our research efforts because it helped to measure the information received. In addition, the students

worked on simplifying the intelligent screening model and supervised learning and artificial profile data. A result analysis was conducted to evaluate outcomes and all of the data collectively.

4.3 Secure and Efficient Maritime Data Storage and Retrieval

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, and the cost of server specialists). One way to effectively reduce these costs is to centralize all maritime data in large data centers, i.e., the cloud. Since maritime data are sensitive, this project will develop encryption schemes to maintain the integrity of the data and to ensure that the data are immune to attack by malicious hackers. Also, since maritime data are updated, stored, and retrieved frequently, this project also will use cryptography techniques to secure efficient data storage and retrieval. The attack model will be investigated, security and complexity analyses will be conducted for the proposed schemes, and the results of this research will help to secure efficient maritime data storage and retrieval.

There are five key tasks for the research topic 'Secure and Efficient Maritime Data Storage and Retrieval.' The tasks consist of a literature review, conducting maritime data collection and analytics, identifying potential attacks, developing authentication/encryption schemes and conducting analyses, and documenting the research findings. Task 1: Literature review is complete, and the research team is currently working simultaneously on Tasks 2 and 3.

Undergraduate Research Assistants' research efforts and achievements for this topic consist of a completed monthly technical report for the proposed research and conducting literature reviews on one network security book and some related scholarly articles. In addition, they have identified potential attacks for secure data storage and retrieval, such as intrusion attacks, jamming attacks, denial of services, eavesdropping, and data interception. Working on the threat-modeling and studying-cryptography algorithms also has been a concentration during this process.

4.4 New Research Proposals

Dr. Qi and Dr. Azimi have developed two tentative proposals for the Texas Department of Transportation's 2016 Fiscal Year budget, i.e., "Gulf Intracoastal Waterway Capacity Study" and "Traffic Safety Challenges and Strategies in the Eagle Ford Shale Area" (with UH).

Also, Dr. Pan is working on developing two new research proposals:

- National Cooperative Highway Research Program (NCHRP) 20-102: Impacts of Connected Vehicles and Automated Vehicles on State and Local Transportation Agencies (with Kimley-Horn and Associates, Inc.)
- NSF CyberSEES: Type 1: DARE U: Data Aggregation and Replenishing Energy via Unmanned Vehicles in Sustainable Wireless Sensor Networks, Collaborative Research with UH, Department of ECE

CHAPTER 5:

COLLABORATIONS

5.1 Collaboration with Partner DHS Center of Excellence (CREATE)

The Center for Risk and Economic Analysis of Terrorism Events (CREATE) is located at the University of Southern California (USC). It is the nation's first university-based Center of Excellence that supports research in response to the threat of terrorism and natural disasters. The Center is an interdisciplinary, national research center focused on risk and economic analysis of the U.S. Its mission is to improve the nation's security through the development of advanced models and tools for the evaluation of the risks, costs, and consequences of terrorism and to guide economically-viable investments in homeland security. CREATE develops predictive models that gauge how and where terrorist events might occur, estimate the economic consequences of such attacks, and identify where the country's vulnerabilities are. Collaboration with CREATE assists in the development of our faculty, provides an early-career faculty exchange program, and includes cooperative research projects.

5.1.1 Collaboration on DHS SLA Research Projects

CREATE researchers collaborate with early-career faculty and students from TSU on several key research projects, and they serve as mentors for their research work and share their research experience. In order to get the research program implemented in an efficient manner, three significant and related research collaboration topics have been identified based on the common areas of expertise between CREATE and the early-career faculty and other researchers at TSU. The three research topics are (1) Maritime Risk Assessment and Management: Modeling and Analysis; (2) Maritime Cargo Security: Data Analysis and Intelligent Screening; and (3) Secure and Efficient Maritime Data Storage and Retrieval.

Dr. Pan, one of the leading professors for the three identified research topics, has sent a research plan to CREATE for review. Based on the review of the research plan, 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 Dr. Pan and the research topic, “Secure and Efficient Maritime Data Storage and Retrieval.”

Dr. Tambe will provide advice, data, and technical support to the research team at TSU, and he also will provide comments on every critical task in the research program and review the key documents or deliverables when they are produced.

5.1.2 Early Career Faculty Exchange Program

As a COE partner institution for TSU's DHS SLA program, CREATE at the University of Southern California has agreed to host TSU on the USC campus during an appropriate summer period and provide consultation, collaboration, and work space.

Dr. Tambe hosted Dr. Pan's visit to CREATE and the University of Southern California during June 18-28, 2015. Detailed information is reported in the next chapter.

5.2 Other Collaborations

Besides working closely with partner COE, the Department of Transportation Studies also actively seeks collaborations with local universities and other agencies.

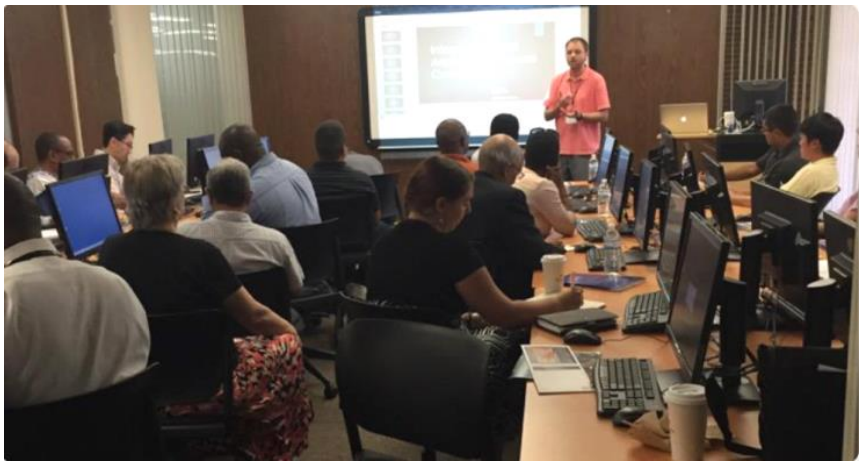
In the past years, we have built relationships with the University of Houston, the Port of Houston Authority (PHA), the U.S. Coast Guard (USCG), Houston Pilots, and others. On February 26, 2015, members of our Department met with the Risk Management Department Staff from Health, Safety, Security, & Emergency Management of the PHA.

Capt. Morgan collaborated with professors at the University of Louisiana at Lafayette on "Pirate vs. Privateer" lecture on March 12, 2015.

CHAPTER 6: FACULTY DEVELOPMENT

6.1 Faculty development

At Texas Southern University, there is an emphasis on professors' being well-equipped for their work, and investing in training is the key to achieving that. On June 18-19, 2015, Dr. Azimi attended a two-day Visual Analytics MSI Faculty Training Workshop organized by the DHS VACCINE Center and hosted by Bethune-Cookman University. This educational program was intended to expand the teaching of visual analytics at Minority Serving Institutions (MSIs). The program will focus on preparing MSIs' faculty to incorporate visual analytics courses into their programs. Learning topics and activities in this two-day workshop were focused on understanding the theory and foundation of visual analytics, integrating visual analytics into the 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.



6.2 Early Career Faculty Exchange Program

6.2.1 Program Introduction

As introduced in Chapter 5, the development of the early-career faculty's exchange program was one important objective of this program. As agreed, COE partner institutions will provide intermittent residency to the early career faculty at TSU during the summer and winter break periods. During their intermittent residencies, the early career faculty at TSU will be able to work closely with the COE researchers and will have the opportunity to use the advanced research facilities in the laboratories at the COE. The early career faculty members will have the opportunity to work with experienced faculty members at the COE to develop new courses based on collaborative research work. As part of the faculty exchange, the COE also will send some of its faculty or researchers to TSU to provide workshops or short courses during the summer and winter break periods.

Dr. Pan, a junior faculty member in the Department of Computer Science at TSU, participated in the early-career faculty exchange program.

Dr. Pan received his Ph.D. degree in Electrical and Computer Engineering from the University of Florida in August 2012, and he joined the Department of Computer Science at TSU as a tenure-track Assistant Professor in September 2012. Dr. Pan is a productive scholar and has published two book chapters, 19 journal papers, and 34 conference papers. His research interests include architectural design, cross-layer optimization, scheduling algorithms, resource management, protocol design, and security and privacy issues of interdisciplinary systems, such as cognitive radio networks, Radio-frequency identification (RFID) systems, cloud computing systems, big data, mobile social networks, and smart grids. His recent research on cognitive radio networks was funded by the NSF EARS program (PI, Cognitive Mesh: Making Cellular Networks More Flexible, 01/01/2014-12/31/2017) with intellectual merits to develop a novel, mesh-based cognitive radio network to improve spectrum utilization, increase cellular system capacity, and create a better user experience. His educational background and research experience make him a perfect fit for participating in the early career faculty exchange program and conducting interdisciplinary research on maritime transportation security, particularly on *Maritime Cargo*

Security: Data Analysis and Intelligent Screening and *Secure and Efficient Maritime Data Storage and Retrieval*.

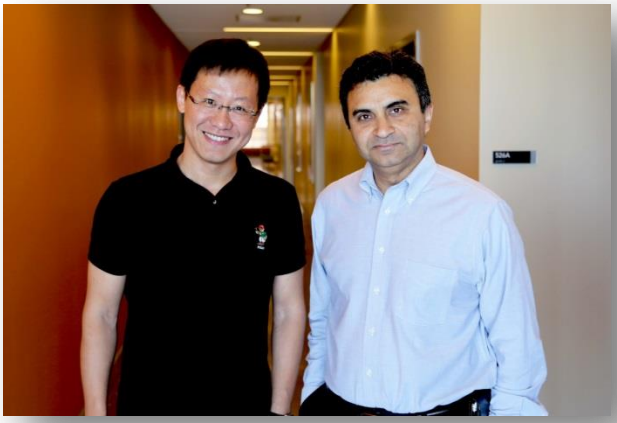
By participating in the faculty exchange program, Dr. Pan will have the opportunity to expand his research and teaching capabilities at CREATE at the University of Southern California. He will be involved in the research projects conducted at CREATE and have the opportunity to use the advanced research facilities in the laboratories at CREATE. He also will be able to develop new interdisciplinary courses by drawing on the expertise at COE partner institutions.

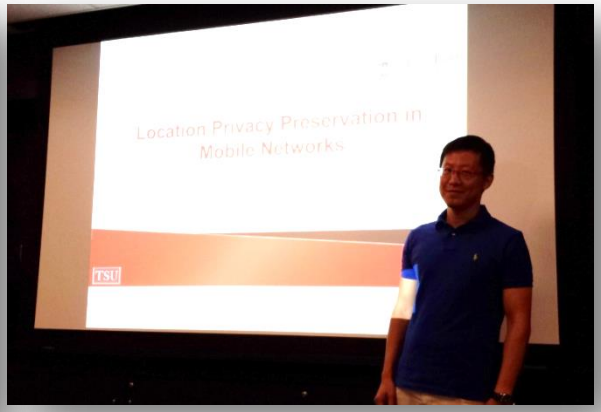
6.2.2 Dr. Miao Pan's summer visit to CREATE

In the summer of 2015, Dr. Miao Pan visited CREATE at the University of Southern California from June 18 to June 28.

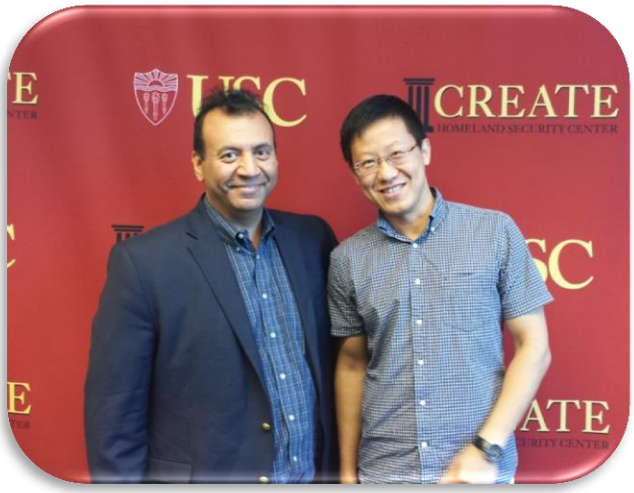
On June 19th, Dr. Pan attended an undergraduate student research seminar, where all the undergraduate students are from air force and were working with his mentor Dr. Tambe. Those undergraduate students gave a talk about how to exploit game theory to have a good design of patrolling routes and enhance the security of USC campus.

On June 22nd, Dr. Pan discussed with Dr. Tambe about open problems and potential collaboration opportunities between Dr. Tambe's team at CREATE and our DHS SLA program about maritime security research.





Dr. Pan gave a presentation with the title "Location Privacy Preservation in Mobile Networks" in Dr. Tambe's group at CREATE, USC.



Dr. Pan met Dr. Abbas, CREATE Director, to talk about potential collaboration between CREATE and DHS SLA, including continuing hosting summer faculty exchange at USC, holding some seminars for undergraduate students' research, visiting our program at TSU, etc.

Dr. Pan also met Dr. Ragusa, Director of Education at CREATE, and Dr. Ragusa introduced some valuable experiences about how to involve undergraduate student into research, how to attract undergraduate students to study STEM education, and how to do K-12 outreach.

On his last day of the visit, Dr. Pan had a meeting together with Dr. Tambe and his students including Dr. Matthew Brown, Dr. Arunesh Sinha, Ms. Sara Marie Mc Carthy, and Mr. Debarun Kar to talk about some specific future research directions about maritime security. Afterwards, he had an individual discussion with Dr. Matthew Brown about machine learning modeling for intelligent screening and TSA check.

CHAPTER 7: PROGRAM ACHIEVEMENTS

7.1 Student Achievements (Supported Students)

In academic year 2014, the DHS Scientific Leadership Award at Texas Southern University supported six undergraduate students. These students were from four different departments in the College of Science, Engineering, and Technology (COSET). During Spring 2015 semester, they all managed to keep their GPA above 3.3, and they earned many awards from college, university, and outside sources.

7.1.1 Summer internships

In the summer of 2015, all students participated in either an internship or a summer research program. One student did an internship with the Federal Aviation Administration (FAA) in Washington, D.C. from June 8 through August 30, 2015. Five other students were selected to participate in the TSU COSET Summer 2015 Undergraduate Research Program from May 26 through July 31, 2015. (See Appendix.)

7.1.2 Scholarships, honors and Awards

Six supported students were awarded many scholarships and honors from college, university, and off-campus agencies. A list of the wards follows:

- Alleen T. Johnson Memorial Scholarship (1)
- Dwight D. Eisenhower Transportation Scholarship (1)
- ITMA Houston Scholarship (1)
- TSU Honor Roll (3)
- COSET Dean's list (1)
- COSET undergraduate student award (1)
- TSU Academic Scholarship (1)

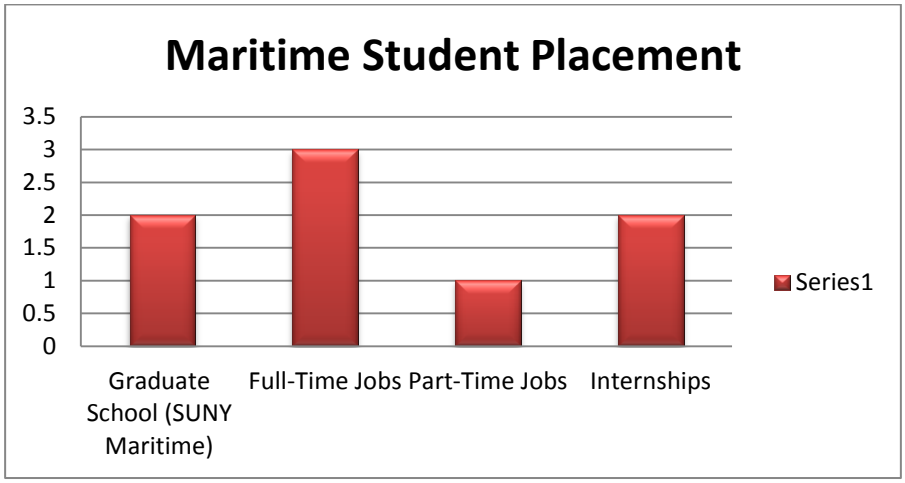
7.1.3 Conferences, seminars and lectures attended

Attending conferences, seminars, and lectures is important for our students to expand their knowledge and experience. In the last year, students attended the following meetings:

- DHS SLA seminars, TRB Annual meeting
- 2014-2015 National Technical Association Conference
- EEWSN Research Seminar

7.2 Student Placement (Maritime Students)

The Department of Transportation Studies is dedicated to helping students find well-suited majors and careers under the guidance of our well-established administrators and faculty. When students are exposed to much-needed educational components and industry insights, they are much more likely be well-trained and gainfully employed. A graph is provided below that indicates our maritime student placement rate in the Spring semester of 2014. The overall placement rate was 90%.



7.3 Other Program Achievements

During the academic year 2014-2015, TSU DHS SLA program benefited from the dedicated and talented faculty and staff who produced a surplus of achievements. A total of five journal papers were published or submitted for publication. In addition, seven conference publications were accepted.

As stated before, three seminars were organized on Homeland Security Research Projects and Needs & Career development Advice, Securing the Port of Houston, and a lecture on a Secure and Efficient Maritime Data Storage and Retrieval in the cloud. This was made possible by our partnership with the Department of Homeland Security Scientific Leadership Award lecture series, which was designed to prepare, engage, and educate all undergraduate and graduate students on the various aspects of homeland security.

Our professors were invited to give seven presentations at regional or national conferences.

In academic year 2014-2015, seven proposals were developed and submitted to other funding sources, and one project was funded.

Dr. Azimi participated in a two-day Visual Analytics MSI Faculty Training Workshop organized by DHS VACCINE Center and hosted by Bethune-Cookman University.

CHAPTER 8: PROGRAM MANAGEMENT

8.1 Institutional and External Advisory Committees

To ensure effective organization and smooth progress of this program, an institutional advisory committee and an external advisory committee were established. Both committees will meet annually to discuss the project's progress and make suggestions on the work plan for the coming years.

8.1.1 Institutional Advisory Committee

This Committee consists of the following experienced faculty from the College of Science and Technology:

- Dr. Wei Li (Professor and Interim Chair, Department of Computer Science)
- Dr. Azime Saydam (Associate Professor and Chair, Department of Mathematics)
- Dr. Oscar Criner (Professor and Interim Associate Dean, Department of Computer Science)
- Dr. Desiree Jackson (Assistant Dean)

8.1.2 External Advisory Committee

This Committee consists of the following experts who have extensive experience in DHS-related research and education:

- Ms. Jessica Thomas, Security Director, Port of Houston Authority
- Mr. Jeff Baldwin, Baldwin Liaison Consulting
- Mr. James Bryant, Independent Security Consultant
- Dr. Kelvin Cheu, Department of Civil Engineering, University of Texas at El Paso (UTEP)

The first external Committee meeting was the held on April 16, 2015. In the meeting, several agreements were reached, including an agreement that the TSU DHS SLA team will submit an annual report to the External Committee members every year. Based on the report, the External Advisory Committee will provide a summary report with detailed assessment results and

suggested improvements. Also, the external advisory committees agreed to serve as mentors for the students supported by this program.

8.2 Student Management

Once a week, the program has a meeting so that all parties can get updates on all activities that are occurring related to the program, initiatives, and proposals.

Each semester, the students are required to complete a semester report, which assists in communicating academic performance, internships, research opportunities, barriers, highlight awards, scholarships, poster illustrations, and much more. This serves as a gauge to determine a student's current status and how we can get them to the next level. The faculty's semi-annual report also serves as a gauge of the professors' strengths and weaknesses. In addition, it highlights research opportunities, proposals, grants, and workshops that were attended.

Appendix

Appendix 1. Course Syllabus: Introduction to Operations Research

Spring 2016

Instructor: Dr. Yunjiao Wang	**Office:** SB 116
Email: wangyx@tsu.edu	**Tel:** 713-313-7967
Office Hours: TBA	

Course description: Problems on how to use limited resource in an optimal way are ubiquitous. Operation research provides tools for modeling and analysis of such problems. This course gives a survey of operations research field. Namely, it introduces linear programming, decision analysis, queueing theory and inventor theory.

Prerequisite: College algebra

Course Materials:

- Lecture note for each week will be posted on Blackboard/CourseContent
- Homework Assignments will be in Blackboard/Assignments
- Quizzes will be posted in Blackboard/ Quizzes/Exams

Course Textbook: Introduction to Operations Research, Frederick S. Hiller and Gerald J. Lieberman, McGraw Hill Education, Tenth Edition.

Course Content:

Chapter 1: Introduction

Chapter 2: Overview of the operations research Modeling approach

Chapter 3: Introduction to Linear Programming

Chapter 4: Solving Linear Programming Problem: The Simplex Method

Chapter 16: Decision Analysis

Chapter 17: Queueing theory

Chapter 18: Inventory theory

Chapter 20: Simulation

Enjoy your study and have a great semester!

Appendix 2. Course Syllabus: Software for Scientific Computing: Introduction to Matlab, R language and Mathematica

Fall 2015

Instructor: Dr. Yunjiao Wang	**Office:** SB 116
Email: wangyx@tsu.edu	**Tel:** 713-313-7967
Office Hours: TBA	

Course description: This course introduces three pieces of scientific computing software that are widely used in industry and universities: Matlab, R Programmaing and Mathematica. Matlab is a high-level computing language and interactive environment with a focus on numerical computing and is extremely efficient on matrix operations. Matlab's relaxing syntax and many built-in functions allow users to pick up the language in a very short time and to focus on realizing their algorithms, model development, data analysis and so on without spending time on the language and low level computing. R is a programming language and environment for statistical computing and graphing. It becomes increasingly popular for its free access and powerful computing ability. Finally, Mathematica is another computational software with strength on symbolic computing (different from MATLAB). In this course, we focus on introducing MATLAB and R language, and give a briefly tour on Mathematica. The aim of the course is to have students to learn what these software can do and how they can use the tools for their own computing purpose.

Course Materials:

- Lecture note for each week is posted on Blackboard/CourseContent
- Homework Assignments are in Blackboard/Assignments
- Quizzes are posted in Blackboard/ Quizzes/Exams
- Matlab codes and R codes in the lecture notes can be found in Blackboard/Supplement Materials

Course textbook and References:

- Matlab: 1. MATLAB guide, Desmond J. Higham and Nicholas J. Higaham, SIAM, second edition. 2. Introduction to Computational Engineering, Steve Cox. Rice University. 2012.
- Textbook for R programming: R Programming for Data Science, Roger D. Peng, Leanpub, 2015
- Mathematica: 1. Programming with Mathematica®: An Introduction, Paul Wellin, Cambridge, 2013. 2.built-in help

Tips for effective learning:

- Work through the lecture note and textbook if there is any, try all commands you met.
- Try out commands that seem confusing, use built-in Help as needed.
- *Google* your question when you get stuck.

- Do homework and Quizzes

Course Content:

I. Introduction to MATLAB

A tour of MATLAB

Arithmetic and PreCalculus in MATLAB

Loops, vectorization and Mandelbrot Set

ODE solvers, Lorenz attractor

Random process and Brownian Motion

Realizing bisection method, Debugging

II. Introduction to R

Introduction

R Nuts and Bolts

Import and export data, data preprocessing

Control Structures

Functions

Scoping rules of R

Loop functions

Case study 1: Analysis of air pollution

Case study 2: Inference analysis of experimental data on binocular rivalry

III. Introduction to Mathematica

A brief tour of Mathematica

Enjoy your study and have a great semester!

Appendix 3. Course Syllabus: Maritime Risk Assessment and Resiliency Analysis (5-week)

INSTRUCTOR:

OFFICE:

OFFICE HOURS:

OFFICE PHONE:

E-MAIL ADDRESS:

WEB PAGE: http://transportation.tsu.edu/index.html

COURSE PAGE: http://texsu.blackboard.com

CLASS HOURS:

COURSE DESCRIPTION

This course provides students with the basic knowledge regarding the procedures and methods necessary to assess threats, vulnerability, and consequences of all facets of maritime risks and strategies to prevent these risks and minimize their consequences.

COURSE ORGANIZATION

Online Course

PREREQUISTE

MTMS 101 (Introduction to Maritime Transportation) with a grade of "C" or better.

SPECIFIC LEARNING OUTCOMES

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.

Specific objectives include:

- Understand the basics of the implementation, management and maintenance of an ongoing risk management program.
- Understanding the core components of the international maritime security operating environment.

- Understand the relationship between the information security risk management, the security controls and the compliance with the requirements of different stakeholders of an organization.
- Assesses the potential threats to ports in the maritime environment
- Examines approaches to maritime port security in the United States, European Union, and around the world
- Presents principles for effective, risk-based maritime and port security
- Provide supported opinions about current issues relating to maritime security, risk management, piracy, smuggling, terrorism, and international disputes

COURSE AGENDA

Week 1

- Introduction
- Program and
- Course Overview
- Maritime Security Introduction

Week 2

- Maritime Security relations to Seaports, Stakeholders and Shipping
- Security Vulnerabilities Impact to International Logistics
- Maritime International Organizations

Week 3

- Security Management and Regulations
- United States Approach to Security
- Diplomacy
- Other Countries' Approach to Security

Week 4

- Port Resiliency
- Technology
- Threat Assessment and Vulnerability
- Risk Mitigation

- Risk Management

Week 5

- Piracy
- Terrorism
- Smuggling
- Stowaways
- Future Issues in Maritime Security and Risk Assessment

REQUIRED TEXT AND SUPPLIES:

A Practitioner's Guide to Effective Maritime and Port Security by Michael Edgerton (Copyright 2013) ISBN: 978-1-118-09991-9

Recommended Reading:

- **Maritime Security: An Introduction** by Michael McNicholas (copyright 2008) ISBN: 978-0-12-370859-5
- **Guide to Maritime Security and the ISPS Code**: IMO (Copyright 2012) ISBN 978-92-801-1544-4
- **Maritime and Port Security** by Fred Evans, Captain Fred Evans (copyright 2004) ISBN: 0-7910-7614-8
- **Port and Maritime Security: Background and Issues** by John F. Frittelli (copyright 2003) ISBN: 1-59033-823-5
- Maritime Security: Substantial Work Remains to Translate New Planning Requirements Into Effective Port Security: Gao-04-838
- Port and Maritime Security by Jonathon P. Vesky
- American Psychological Association Publication Manual 6th edition

GRADING POLICY

Several components are used to determine the final grade. Grading chart is shown below:

Online Initial posting to Discussion Questions (10 points each)…….. 50 points

Online Follow-Up/Reply Substantive Posts (2 points each)……. 20 points

Paper……30 points

Full participation in the discussion is a key component of the learning experience of this online program. It enriches group interaction and enhances the student online learning environment.

Initial Posts must have at least one supporting scholarly reference. Do not reference the internet.

To be considered substantive, a participation post, bot initial and follow-up/reply should average 150 to 250 words in length.

You are not to include any quotes in your postings or assignments. You are to practice summarizing and synthesizing the material in a meaningful way. Quotes are only used only when something is so important it cannot be reduced such as a critical portion of a famous speech.

You are to comment to your classmates must be substantive. This means they include a reference (not found in the text or lesson) to support your arguments, statements, or opinions.

Grade Distribution Method

A	94.9% to 100%
A-	91.0% to 94.8%
B+	88.0% to 90.9%
B	84.0% to 87.9%
B-	80.0% to 83.9%
C	70.0% to 79.9%
D	60.0% to 69.9%
F	Below 60%

Appendix 4. Course Syllabus: Maritime Risk Assessment and Resiliency Analysis (8-week)

INSTRUCTOR:

OFFICE:

OFFICE HOURS:

OFFICE PHONE:

E-MAIL ADDRESS:

WEB PAGE: http://transportation.tsu.edu/index.html

COURSE PAGE: http://texsu.blackboard.com

CLASS HOURS:

COURSE DESCRIPTION

This course provides students with the basic knowledge regarding the procedures and methods necessary to assess threats, vulnerability, and consequences of all facets of maritime risks and strategies to prevent these risks and minimize their consequences.

COURSE ORGANIZATION

Online Course

PREREQUISTE

MTMS 101 (Introduction to Maritime Transportation) with a grade of "C" or better.

SPECIFIC LEARNING OUTCOMES

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.

Specific objectives include:

- Understand the basics of the implementation, management and maintenance of an ongoing risk management program.
- Understanding the core components of the international maritime security operating environment.

- Understand the relationship between the information security risk management, the security controls and the compliance with the requirements of different stakeholders of an organization.
- Assesses the potential threats to ports in the maritime environment
- Examines approaches to maritime port security in the United States, European Union, and around the world
- Presents principles for effective, risk-based maritime and port security
- Provide supported opinions about current issues relating to maritime security, risk management, piracy, smuggling, terrorism, and international disputes

COURSE AGENDA

Week 1	Program and Course Overview and Introduction
Week 2	Maritime Security Introduction, Seaports, Stakeholders and Shipping
Week 3	Security Vulnerabilities Impact to International Logistics
Week 4	Maritime International Organizations, Security Management and Regulations
Week 5	United States Approach to Security, Diplomacy and Other Countries' Approach to Security
Week 6	Port Resiliency, Technology, Threat Assessment and Vulnerability
Week 7	Risk Mitigation, Risk Management, Piracy, Terrorism, Smuggling, and Stowaways
Week 8	Future Issues in Maritime Security and Risk Assessment

REQUIRED TEXT AND SUPPLIES:

A Practitioner's Guide to Effective Maritime and Port Security by Michael Edgerton (Copyright 2013) ISBN: 978-1-118-09991-9

Recommended Reading:

- **Maritime Security: An Introduction** by Michael McNicholas (copyright 2008) ISBN: 978-0-12-370859-5
- **Guide to Maritime Security and the ISPS Code**: IMO (Copyright 2012) ISBN 978-92-801-1544-4
- **Maritime and Port Security** by Fred Evans, Captain Fred Evans (copyright 2004) ISBN: 0-7910-7614-8

- **Port and Maritime Security: Background and Issues** by John F. Frittelli (copyright 2003) ISBN: 1-59033-823-5
- Maritime Security: Substantial Work Remains to Translate New Planning Requirements Into Effective Port Security: Gao-04-838
- Port and Maritime Security by Jonathon P. Vesky
- American Psychological Association Publication Manual 6th edition

GRADING POLICY

Several components are used to determine the final grade. Grading chart is shown below:

Online Initial posting to Discussion Questions (10 points each)…….. 50 points

Online Follow-Up/Reply Substantive Posts (2 points each)……. 20 points

Paper…… 30 points

Full participation in the discussion is a key component of the learning experience of this online program. It enriches group interaction and enhances the student online learning environment.

Initial Posts must have at least one supporting scholarly reference. Do not reference the internet.

To be considered substantive, a participation post, bot initial and follow-up/reply should average 150 to 250 words in length.

You are not to include any quotes in your postings or assignments. You are to practice summarizing and synthesizing the material in a meaningful way. Quotes are only used only when something is so important it cannot be reduced such as a critical portion of a famous speech.

You are to comment to your classmates must be substantive. This means they include a reference (not found in the text or lesson) to support your arguments, statements, or opinions.

Grade Distribution Method

A	94.9% to 100%
A-	91.0% to 94.8%
B+	88.0% to 90.9%
B	84.0% to 87.9%
B-	80.0% to 83.9%

C	70.0% to 79.9%
D	60.0% to 69.9%
F	Below 60%

Appendix 5. Course Syllabus: Maritime Risk Assessment and Resiliency Analysis (15-week)

INSTRUCTOR:

OFFICE:

OFFICE HOURS:

OFFICE PHONE:

E-MAIL ADDRESS:

WEB PAGE: http://transportation.tsu.edu/index.html

COURSE PAGE: http://texsu.blackboard.com

CLASS HOURS:

COURSE DESCRIPTION

This course provides students with the basic knowledge regarding the procedures and methods necessary to assess threats, vulnerability, and consequences of all facets of maritime risks and strategies to prevent these risks and minimize their consequences.

COURSE ORGANIZATION

Online Course

PREREQUISTE

MTMS 101 (Introduction to Maritime Transportation) with a grade of "C" or better.

SPECIFIC LEARNING OUTCOMES

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.

Specific objectives include:

- Understand the basics of the implementation, management and maintenance of an ongoing risk management program.
- Understanding the core components of the international maritime security operating environment.

- Understand the relationship between the information security risk management, the security controls and the compliance with the requirements of different stakeholders of an organization.
- Assesses the potential threats to ports in the maritime environment
- Examines approaches to maritime port security in the United States, European Union, and around the world
- Presents principles for effective, risk-based maritime and port security
- Provide supported opinions about current issues relating to maritime security, risk management, piracy, smuggling, terrorism, and international disputes

COURSE AGENDA

Week 1	Program and Course Overview
Week 2	Maritime Security Introduction, Seaports, Stakeholders and Shipping
Week 3	Security Vulnerabilities Impact to International Logistics
Week 4	Maritime International Organizations
Week 5	Maritime Security Management and Regulations
Week 6	United States Approach to Security
Week 7	Diplomacy and Other Countries' Approach to Security
Week 8	Port Resiliency and Technology
Week 9	Piracy, Terrorism, Smuggling, and Stowaways
Week 10	Threat Assessment and Vulnerability
Week 11	Risk Mitigation
Week 13	Risk Management
Week 14	Future Issues in Maritime Security and Risk Assessment
Week 15	Assessment and Evaluation

REQUIRED TEXT AND SUPPLIES:

A Practitioner's Guide to Effective Maritime and Port Security by Michael Edgerton (Copyright 2013) ISBN: 978-1-118-09991-9

Recommended Reading:

- **Maritime Security: An Introduction** by Michael McNicholas (copyright 2008) ISBN: 978-0-12-370859-5

- **Guide to Maritime Security and the ISPS Code**: IMO (Copyright 2012) ISBN 978-92-801-1544-4
- **Maritime and Port Security** by Fred Evans, Captain Fred Evans (copyright 2004) ISBN: 0-7910-7614-8
- **Port and Maritime Security: Background and Issues** by John F. Frittelli (copyright 2003) ISBN: 1-59033-823-5
- Maritime Security: Substantial Work Remains to Translate New Planning Requirements into Effective Port Security: Gao-04-838
- Port and Maritime Security by Jonathon P. Vesky
- American Psychological Association Publication Manual 6th edition

GRADING POLICY

Several components are used to determine the final grade. Grading chart is shown below:

Online Initial posting to Discussion Questions (10 points each) …….. 50 points

Online Follow-Up/Reply Substantive Posts (2 points each) ……. 20 points

Paper……. 30 points

Full participation in the discussion is a key component of the learning experience of this online program. It enriches group interaction and enhances the student online learning environment.

Initial Posts must have at least one supporting scholarly reference. Do not reference the internet.

To be considered substantive, a participation post, bot initial and follow-up/reply should average 150 to 250 words in length.

You are not to include any quotes in your postings or assignments. You are to practice summarizing and synthesizing the material in a meaningful way. Quotes are only used only when something is so important it cannot be reduced such as a critical portion of a famous speech.

You are to comment to your classmates must be substantive. This means they include a reference (not found in the text or lesson) to support your arguments, statements, or opinions.

Grade Distribution Method

A	94.9% to 100%
A-	91.0% to 94.8%
B+	88.0% to 90.9%
B	84.0% to 87.9%
B-	80.0% to 83.9%

C	70.0% to 79.9%
D	60.0% to 69.9%
F	Below 60%

Appendix 6. Course Syllabus: Introduction to Maritime Security

Course Name	Introduction to Maritime Security
Course Number	
Credit hours	3 credit hours
Course Pre-requisites	Consent of the Instructor
Lecture Location	
Course Schedule	
Coordinator and Instructor	
Office Hours	
Course Catalog Description	This course provides an introduction to the basic concepts of maritime security and its applications. It covers basic security concepts, cryptography basics, computer security, network security, security analysis and selected maritime security applications. Required for computer science Track II majors. Three hours of lecture per week.
Contribution to CS Program Objectives	This course contributes to the following ABET goals: 1. In depth knowledge and skills needed in designing, implementing and managing Computer Science projects (CS2) 2. To communicate effectively in written and oral form. (CS6) 3. To produce graduates with the ability to analyze, investigate, understand, evaluate, appreciate and determine information and solutions to problems. (CS9)
Books	**1.** Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security: Private Communication in a Public World", 2nd Edition, Prentice Hall, 2002. ISBN-10: 0-13-046019-2. ISBN-13:978-0-13-046019-6 [**Textbook**]. **2.** Network Analysis, Architecture, and Design, by James D. McCabe, 2007 (3rd). Elsevier. ISBN: 978-0-12-370480-1 [**Reference book**] **3.** Cryptography and Network Security, by Behrouz A. Forouzan, 2008 (1st Edition), McGraw Hall.. ISBN:007-3-32753-0 [**Reference book**]
Course Website	TSU Blackboard website will be used to post the syllabus, announcements, lab assignments, tests, and any suggested reading material. Each student will be responsible for regularly checking the website for updates.

Grading Policies Assignments, one midterm exam, one final exam will be calculated using the following weighted scale:

10%	Attendance
20%	Assignments
30%	Midterm Exam
40%	Final Exam

- **There are no make-up tests**. If you miss a test and have a legitimate excuse, your grade will be based on your other work.
- Missing the final with a legitimate excuse will get you an **I** (Incomplete) and cause you to retake the final the following semester.
- If you do not have a legitimate excuse, you get F.
- The submitted homework before the due date is counted fully. The later homework within 48 hours will be counted half. No homework or delayed homework submission for more than 48 hours will be counted as zero.

Course Topics

Basic security concepts	*Confidentiality, integrity, availability, etc.*
Cryptography basics	*Symmetric key cryptography*
Cryptography basics	*Hashes and message digests*
Cryptography basics	*Public key cryptography*
Computer security	*Vulnerabilities and exposures*
Network security	*Authentication mechanisms and standards (Kerberos, public key infrastructure)*
Network security	*IPsec*
Network security	*SSL/TLS*
Network security	*Firewalls and IDS*
Network security	*Web security*
Selected maritime security applications	*Secure maritime transportation, secure maritime data storage and retrieval, secure cargo container screening protocol, etc.*

Expected Work

You will be expected to research subjects related to each assignment. Homework is to be returned upon your arrival to class. There are no make-up tests.

Grading Scale

98%-100%: A+	88%-89%: B+	78%-79%: C+	68%-69%: D+	0%-59%: F
93%-97%: A	83%-87%: B	73%-77%: C	63%-67%: D	
90%-92%: A-	80%-82%: B-	70%-72%: C-	60%-62%: D-	

Attendance Policy

This class will adhere to the Class Attendance Regulations as outlined in the TSU Undergraduate Bulletin (2005-2007). Student attendance is checked and reported to the Student Academic Affairs.

Scholastic Dishonesty

At Texas Southern University, we are strongly committed to upholding standards of academic integrity. All forms of academic dishonesty are prohibited. Cheating during a test will earn you an F.

ADA Policy

Texas Southern University maintains a policy for students with disabilities in accordance with the American with Disabilities Act of 1990, and Section 504 of the Rehabilitation Act of 1973. Under these federal guidelines, the University is obligated to: 1) Protect the civil rights of students with disabilities; 2) Protect the confidentiality and privacy of students with disabilities; 3) Provide reasonable accommodations and services to students with known disabilities, who are qualified to meet the requirements of the academic program, apart from the handicapping condition. The burden of proof is on the student to demonstrate the need for requested accommodations. If you feel you are qualified to receive services, please contact the Office of Disabled Students Services at 713-313-4210 or visit the office in the Fairchild Building, Room 147 between the hours of 8am--5pm, Monday through Friday.

Appendix 7. DHS Scientific Leadership Award Student Internship Placement (Summer 2015)

Texas Southern University

Currently, six undergraduate students are supported by our DHS Scientific Leadership Award at Texas Southern University. These students were from 4 different departments in the College of Science, Engineering and Technology (COSET). They are all students with GPA above 3.3 and work with us as Undergraduate Research Assistants. For summer 2015, they will all participate in internship or research programs sponsored by other funding sources. These six students and their summer plans are summarized in the following table:

Student Name	***Major***	***Internship Position***	***Time Period***
Micah Harper	**Aviation**	Internship with the Federal Aviation Administration (FAA) *	June 8-August 30
Samuel Teferra	**Computer Science**	College Summer 2015 Undergraduate Research Program **	May 26-July 31
Nazreen Kashani	**Computer Science**	College Summer 2015 Undergraduate Research Program	May 26-July 31
Jnae Davis	**Math**	College Summer 2015 Undergraduate Research Program	May 26-July 31
Cherie Brown	**Maritime**	College Summer 2015 Undergraduate Research Program	May 26-July 31
Reese D. Selman	**Maritime**	College Summer 2015 Undergraduate Research Program	May 26-July 31

* Internship with the Federal Aviation Administration (FAA): student will be located at the FAA headquarters in Washington D.C. He will be working in the Office of the Associate Administrator for Aviation Safety.

** College of Science, Engineering and Technology (COSET) Summer Undergraduate Research Program 2015: COSET supported about 20-30 qualified students for a 10-week (May 26-July 31) research program. Students selected for this program will receive a $2,000 stipend. They are required to

- attend weekly seminars designed to learn how to better prepare resumes, posters, manuscripts, and others
- work about 25 to 30 hours per week with their research advisors.
- submit biweekly progress reports.
- give both oral and poster presentations on their research results at the symposium scheduled for July 30-31.
- submit a 3-4 pages' research manuscript for publication in the 2015 Proceedings of TSU COSET SURP.

Appendix 8. DHS Scientific Leadership Award Student Report

Student Information

Name: Cherie Brown L.
Major: Maritime Transportation Management and Security
Current GPA: 3.38 Cumulative GPA: 3.66

Student Review

Have you participated in a research project(s)? Yes
If so, list them?
I assist in the 2014 Department of Homeland Security (DHS) Scientific Leadership Awards (SLA) for Minority Serving Institutions (MSI) research projects in Transportation Studies Department.
Have you participated in Internship(s)? No
Have you attended any relevant conferences, seminars and lectures? Yes
If so, please list them.

1. Connecting Petroleum and Natural Gas with Texas Southern University featuring Jack Gerard
2. Lecture:" Homeland Security Research Projects Needs Career Development Advice" Featuring John M. Contestabile
3. Lecture: "Securing the Port of Houston featuring Capt. Marcus Woodring & Capt. Brian Penoyer
4. Greater Houston Procurement Breakfast
5. Lecture: "Secure and Efficient Maritime Data Storage and Retrieval in Cloud" featuring Miao Pan

Describe your academic progress during this current semester?

During this current semester my academic progress has been consistently well in all my classes. I have gained more knowledge and understanding of my field of study. I have received all A's on my midterm exams and to the best of my ability I plan to do the same for finals. I am dedicated to my academics and use any assistant or help that is needed for me to successfully complete the semester.

Describe your accomplishments you have attained throughout this semester (Publications, awards, internal and external scholarships, poster sessions, etc.)

I have received 2015 Honors award for academic achievement in Fall and Spring 2014 semesters, Maritime Transportation Management and Security Scholarship, Texas Southern University Academic Scholarship and I have gained acceptance in the 2015 COSET Summer Undergraduate Research Program.

List the issues and barriers that you have encountered during this semester?

I have not had many issues or barriers; however it has been slightly difficult to find relevant internship opportunities for my preferred interest of study and the necessary support needed to acquire them.

Describe your experience this semester.

This semester has been very intense and productive experience where I was able to lean about other industries within the Maritime industry related to technology. Also I enjoy being a

part of a group of research students interested in the field and want to develop innovate ways of expanding important topics for education and the industry as a whole.

Do you plan on furthering your education?

Yes

What will be your projected major?

I haven't made a final decision.

Are there any Universities that you are currently interested in? if so, please list them.

Texas A&M University Galveston, Texas Southern University, University of Houston and University of Texas at El Paso

What career fields are you interested in?

Homeland Security, Environmental Toxicology, Supply Chain Management and Logistics.

Student Information

Name: FranChell J. Davidson
Major: Mathematics Minor: Computer Science
Current GPA 3.75 Cumulative GPA 3.83

Student Review

Have you participated in a research project(s)?

Yes

If so, list them?

Explore numerical methods for solving differential equations

Have you participated in Internship(s)? No

If so, list them.

Explain briefly what your principle duties were during your internship

What did you gain from your internship?

Are there any new skills and knowledge acquired?

- I have learned how to programming in MATLAB
- I have also learned how to write report in Latex – that is a widely used software for writing mathematics related documents.
- I have also learned several numerical methods for solving differential equations

Have you attended any relevant conferences, seminars and lectures? Yes

If so, please list them.

1. Lecture: "Homeland Security Research Projects and Needs & Career Development Advice" by John Contestabile, John Hopkins University, Feb 19, 2015.
2. Lecture "Securing the Port of Houston", by Capt. Marcus Wooding (Port of Houston) and Capt. Brian Penoyer (Port of Houston), Feb 25, 2015.
3. Lecture "Secure and Efficient Maritime Data Storage and Retrieval" by Dr. Miao Pan, April 30, 2015.

Describe your academic progress during this current semester?

- I was introduced to algebraic structures in my Foundations of Algebra class, which included studies on groups, subgroups, and rings.
- I learned some about Topology, countable and uncountable sets in Advanced Calculus I.
- I learned about logic and how to program in Visual Basic in Fundamentals of Machine Computation.
- I took a continuation course about C++, which focused on object oriented programming.

Describe your accomplishments you have attained throughout this semester.

My accomplishments would include learning material on numerical methods for solving differential equations, MatLab and Latex.

List the issues and barriers that you have encountered during this semester?

Not applicable

Describe your experience this semester.

My experience this semester was very rewarding. I was able to perform things with computers that I never even believed was possible. It opened my eyes to how much technology has and will continue to affect our lives in positive ways. This semester made me want to dig deeper into research and hopefully discover something myself.

Do you plan on furthering your education?

Yes

What will be your projected major?

Mathematics

Are there any Universities that you are currently interested in? if so, please list them.

- Rice University
- Arizona State University
- University of Arizona

What career fields are you interested in?

- Mathematician
- Computer programming
- Pilot

Student Information

Name: Micah Harper E
Major: Aviation Science Management
Current GPA: 3.72 Cumulative GPA: 3.72

Student Review

Have you participated in a research project(s)? Yes

If so, list them?

Summer Undergraduate Research program at TSU. 6/1/2014-7/20/2014

Have you participated in Internship(s)?

Yes

If so, list them.

1. Currently doing an Internship with William P Hobby Airport as a Landside Operations Intern
2. Internship with Texas Southern University as a Research Student in the Summer Undergraduate Research Program (SURP)

Explain briefly what your principle duties were during your internship

As a Landside Operations Intern at William P Hobby Airport, I am tasked with creating a matrix for a passenger processing system; this system will be used to track the flow of passenger traffic through the terminal. My duties for this internship include: conducting surveys on passengers, calling other airports to see if anyone else is using a passenger tracking system, reading ACRPs and other pertinent research reports related to my project, and shadowing airside operations to get a taste of the airside spectrum of airport operations

What did you gain from your internship?

From my internship I have gained three valuable life lessons, those lessons are:

1) The importance of networking with other professionals in the workplace

2) Understanding professionalism and the etiquette of dressing in business attire

3) The importance of teamwork. You can be the most knowledgeable person in the room, but you will be of no value if you cannot work successfully with others

Are there any new skills and knowledge acquired?

No, as far as the knowledge base is concerned for my internship, my four years of school has prepared me well for my internship with the Houston Airport System

Have you attended any relevant conferences, seminars and lectures?

Yes

If so, please list them.

1. 2015 annual transportation research board (NTRB) meeting in Washington D.C
2. 2014-2015 National Technical Association conference in Cleveland Ohio.

Describe your academic progress during this current semester?

My academic progress during this semester is very good at this point, I am completing the last 12 credit hours of my degree plan. During this semester, I have made both the honor roll and the dean's list.

Describe your accomplishments you have attained throughout this semester (Publications, awards, internal and external scholarships, poster sessions, etc.)

1) On April 11th, I was awarded the Allen T Johnson Memorial Scholarship at William P Hobby Airport for competing in the "call for abstracts" component of the festival. That award is totaled at $1000.00

2) I wrote a research paper called "the struggle between endangered wildlife and airport operations". The research paper focuses on the challenges that airport operations personnel face when federally listed species access airport property, and what forms of mitigation are successful with removing these forms of wildlife

3) On February 1st, I received the Dwight D Eisenhower transportation scholarship, which was an award that totals $7000.00

4) I was honored at the TSU honor's day convocation for being on the Dean's List, and the Honor Roll.

List the issues and barriers that you have encountered during this semester?

One of the biggest issues that I have face this semester is learning how to work with others on complex assignments. I prefer to work alone, and it has been quite an experience working with others on group assignments

Describe your experience this semester.

This semester, my experience so far has been "interesting". I have been occupied with work and school this entire semester. I have been balancing school; work with the department of maritime studies, my internship with Hobby Airport, and my personal life. Managing my time wisely has been quite an obstacle that has made my senior year more complicated than my previous three years at TSU.

Do you plan on furthering your education?

Yes

What will be your projected major?

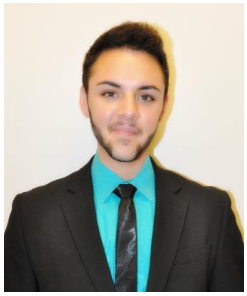
Transportation Planning and Management

Are there any Universities that you are currently interested in? if so, please list them.

Embry Riddle Satellite campus in Houston
Texas Southern University

What career fields are you interested in?

1) Working with the FAA in aviation safety
2) Air traffic control
3) Airport management



Student Information

Name: Reese Selman
Major: Maritime Transportation
Current GPA: 4.0 Cumulative GPA: 3.61

Student Review

Have you participated in a research project(s)? Yes
If so, list them?

Department of Homeland Security Risk Assessment Framework

Have you participated in Internship(s)? No
If so, list them. N/A
Explain briefly what your principle duties were during your internship. N/A
What did you gain from your internship? N/A
Are there any new skills and knowledge acquired? N/A
Have you attended any relevant conferences, seminars and lectures? Yes
If so, please list them.

5/4 – Offshore Technology Conference
2/19 – "Homeland Security Research Projects & needs & Career development device"
2/26 – "Securing the Port of Houston"
4/22 – "MARAD"

4/30 – "Secure and Efficient Maritime Data Storage and Retrieval in Cloud"

Describe your academic progress during this current semester?

My academic progress was very progressive and forward. Throughout the semester I have maintained above a 3.6 GPA and strive to end with a 4.0.

Describe your accomplishments you have attained throughout this semester (Publications, awards, internal and external scholarships, poster sessions, etc.)

One accomplishment would be attaining the COSET undergraduate student award; this award is granted to only one undergraduate student within the entire college. Another accomplishment would be my qualification to compete in a forensic & dialectical symposium in Barcelona, Spain with the International Forensics Association and making it to finals in my event. Other accomplishments would include: 1st Place Duo interpretation @ Florida State Star Speech & Debate Invitational, 1st Place Pentathlon, 1st Place Prose interpretation, 1st Place Duo Interpretation, and 1st Place Dramatic Interpretation @ Laramie Community College Speech & Debate Invitational.

List the issues and barriers that you have encountered during this semester?

Some issues would include finical barriers. I commute to school because I am currently not able to afford an apartment closer to the university. Gas and apartments are expensive so I find myself at a huge struggle trying to maintain a balance of good grades and income to support my transportation. I currently live with my best friend at her house on the opposite side of town. Studying is hard because I do not have my own room so I struggle to find places of different solitude.

Describe your experience this semester.

My experience this semester is satisfactory. I worked hard and will continue to work hard so that I may be able to achieve the goals I have established for myself. In school I feel very successful. I have maintained a good grade and strived in my extracurricular activities.

Do you plan on furthering your education? Yes

What will be your projected major?

Law

Are there any Universities that you are currently interested in? if so, please list them.

Baylor school of Law

What career fields are you interested in?

Maritime / Transportation Law

Student Information

Name: Samuel Teferra M
Major: Computer Science
Current GPA: 3.83 Cumulative GPA: 3.58

Student Review

Have you participated in a research project(s)? Yes

If so, list them?

I have had the opportunity to participate in a research project for DHS involving the data security for the Port of Houston with Dr. Pan.

Have you participated in Internship(s)? Yes
If so, list them.
I will be participating in the summer 2015 SURP internship hosted by TSU
Explain briefly what your principle duties were during your internship
What did you gain from your internship?
Are there any new skills and knowledge acquired?
Have you attended any relevant conferences, seminars and lectures? Yes
If so, please list them.
DHS Scientific Leadership Award Advisory Committee meeting
Homeland Security Research Projects and Needs & Career Development Advice, presented by John M. Contestabile.
EEWSN Research Seminar
Describe your academic progress during this current semester?
I am doing very well in my current semester and I am expecting to get an A grade in almost all my classes.
Describe your accomplishments you have attained throughout this semester (Publications, awards, internal and external scholarships, poster sessions, etc.)
I had a chance to do a poster presentation in one of my classes; I am hoping to publish publications in the SURP internal scholarship program I'll be participating in over the summer.
List the issues and barriers that you have encountered during this semester?
I fortunately have had no barriers that I have encountered thus far.
Describe your experience this semester.
It was fun and exhilarating. I had gained a lot of knowledge about internet security and cryptography. I have also learned a lot from Dr. Pan. He is an amazing instructor and one of the best on campus.
Do you plan on furthering your education? Yes
What will be your projected major?
My major would be a Computer Science Major specialized in Cybersecurity. (PhD)
Are there any Universities that you are currently interested in? if so, please list them.
University of Houston, University of Florida, University of Texas
What career fields are you interested in?
Software engineer, software developer, database designer and administrator

Student Information

Name: Nazreen Kashani
Major: Computer Science
Current GPA: 3.3 Cumulative GPA: 3.3

Student Review

Have you participated in a research project(s)? Yes
If so, list them?
Department of Homeland Security Scientific Leadership Award
Have you participated in Internship(s)? No

If so, list them.
Explain briefly what your principle duties were during your internship
What did you gain from your internship?
Are there any new skills and knowledge acquired?

I learned about existing designs in cryptography like the famous Paillier Cryptosystem as well as forms of analyzing data. I brushed up on Java in order to understand Paillier and gained a great foundation on public and private key cryptography. I learned how to properly present these topics using proper vocabulary and power-point presentations to show my progress.

Have you attended any relevant conferences, seminars and lectures? Yes
If so, please list them.

Department of Homeland Security Scientific Leadership Award
Dept. of Homeland Security Scientific Leadership award Advisory Committee meeting

Describe your academic progress during this current semester?

As a participant in the Scientific Leadership Award, I was given the opportunity to work with Dr. Pan on the project of securing maritime data storage and retrieval efficiently. As part of the 1st year of this project my duties were to review literatures and obtain knowledge about existing designs and best practices for designing secure cloud storage as well as existing designs and best practices for designing secure and efficient data retrieval from the cloud.

Describe your accomplishments you have attained throughout this semester (Publications, awards, internal and external scholarships, poster sessions, etc.)

University Honors

List the issues and barriers that you have encountered during this semester?

The only issue I would say I encountered was having difficulties understanding new topics when first reviewing them on my own. It took my time to really look over things multiple times to grasp the concepts and analyze what I was reading and learning.

Describe your experience this semester.

This experience has been the best I ever had. I feel very fortunate and grateful to have the opportunity to work with such intelligent individuals. Dr. Pan has inspired me to keep pursuing my goals and has really given me a great deal of confidence in my studies. I feel very capable of accomplishing anything I put my mind to. I've learned that anything that I do may take a lot of time and a lot of effort but that it is worth it in the end. I am looking forward to continuing to be a part of this program and to continue expanding my knowledge and working with Dr. Pan.

Do you plan on furthering your education? Yes
What will be your projected major?

Masters in Information Systems

Are there any Universities that you are currently interested in? if so, please list them.

Portland State University
University of Washington

What career fields are you interested in?

Computer Science is the main career field that I am interested in. I want to eventually work my way up to a high-level management position. I know it will take time but I am willing to put my best foot forth and give it all I have to make my goals and dreams become a reality.