



CBTS Cybersecurity Summer Research Institute 2023

- **COE Purpose:** “The DHS COEs are university consortia that work closely with DHS Components and their partners to conduct research, develop and transition mission-relevant science and technology, educate the next generation of homeland security technical experts and train the current workforce in the latest scientific applications.”
- **Long-term relationships:** 5 to 10-year cooperative agreements
- **Nationwide: 7** active COEs and 13 emeritus COEs
 - Two at Texas A&M!!!
 - <https://www.dhs.gov/science-and-technology/centers-excellence>

Background

- **DHS was established by the Homeland Security Act of 2002 –**
Consolidated 22 diverse agencies and bureaus into DHS
Mandate of preventing and responding to natural and man-made disasters
- **DHS Science and Technology Directorate (DHS S&T) –**
“Science Advisor” to the DHS Secretary and serves as the research and development arm of DHS
- **DHS Office of University Programs (DHS S&T OUP) –** Harnesses the intellectual power of America’s universities to provide innovative research, development and education to the Homeland Security Enterprise
 - Centers of Excellence
 - Minority Serving Institutions Program
 - Workforce Development Initiatives



Science and
Technology



Countering Weapons
of Mass Destruction



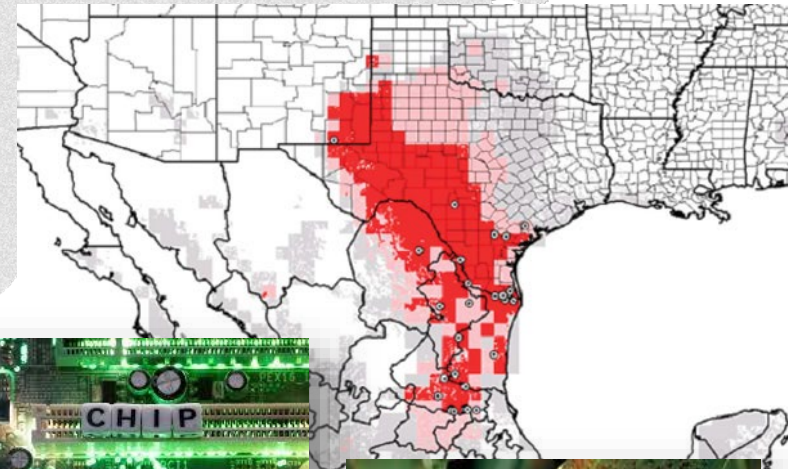
“New biological threats and hazards have the potential to significantly affect the health and well-being of DHS personnel. These threats may also spread to people, animals, plants, and negatively affect the Nation’s economy and critical infrastructure.”

- **What:** “Prevent, detect and respond to biological threats and hazards...strengthen global supply chains and increase resilience”
- **Why:** “Invasive species, novel biological agents and materials, infectious human and zoonotic diseases, counterfeit goods, transnational agro- and bio-terrorism, pandemics, and transboundary animal diseases”
- **Where:** “...at borders, ports of entry (land, air, sea)...and within the global supply chain”

Threats...

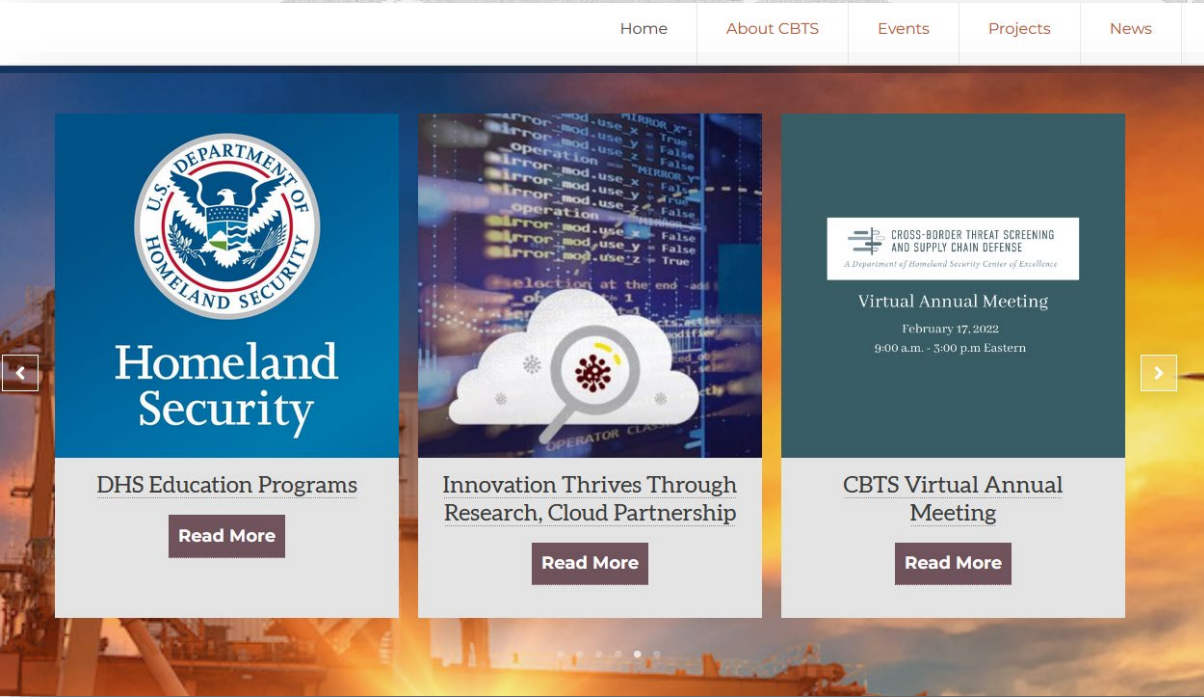
Threats to...people, animals, plants that negatively affect the Nation's economy and critical infrastructure.”

- **Critical Infrastructure** – 16 critical sectors
- **Human Health** – Workforce and public health, bacterial or viral pathogens, insect pests, toxic chemicals and substances
- **Agricultural Health** – Agricultural plants, livestock, agricultural products, bacterial or viral pathogens, insect pests, fertilizer
- **Supply Chains** – Precursor materials, finished products, transportation



<https://cbts.tamu.edu>

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U.S. DEPARTMENT OF HOMELAND SECURITY
Homeland Security
DHS Education Programs
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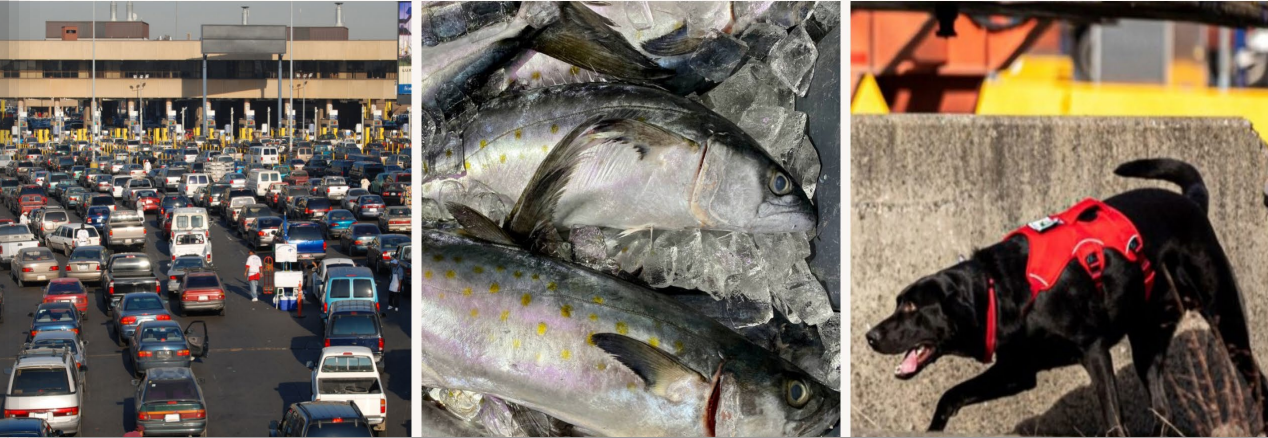
INNOVATION THRIVES THROUGH RESEARCH, CLOUD PARTNERSHIP
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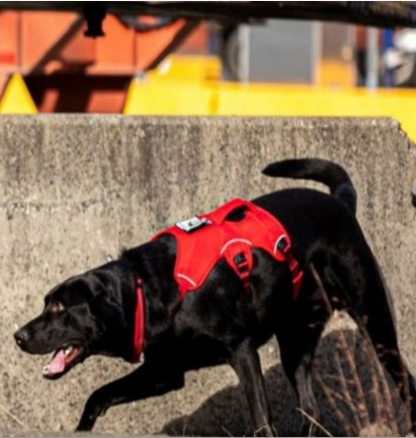


CROSS-BORDER THREAT SCREENING AND SUPPLY CHAIN DEFENSE
A Department of Homeland Security Center of Excellence
Virtual Annual Meeting
February 17, 2022
9:00 a.m. - 5:00 p.m. Eastern
[Read More](#)

Projects

The following are ongoing projects of the Cross-Border Threat Screening and Supply Chain Defense Department of Homeland Security Center of Excellence, Led by Texas A&M University.

Novel Tools & Technologies





Program Details

Summary:

- 10-week program: **May 22 – July 28, 2023**
- Student Stipend offered
- Hands-on work in the laboratory with faculty mentors
- Guest Lectures
- Professional development
- Field trips
- Engagement with Department of Homeland Security

Application

Application criteria:

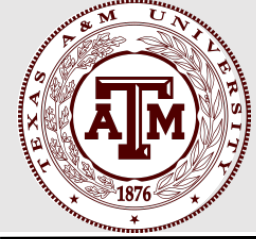
- Must be a U.S. Citizen
- Open to Junior and Senior STEM majors

How to Apply:

- Three documents must be submitted –
 - **Application form** found on our website; it includes applicant information and name of a professional reference who can speak to your strengths and abilities <https://cbts.tamu.edu/cbts-summer-research-institute/>
 - **Resume** – Resume should be professional, complete, and succinct. Emphasize information useful for evaluation (e.g., achievements, research activities, extracurricular activities, awards, internships, and other experiences)
 - **Cover letter** – include a statement of purpose that describes *why* you would like to participate and expected benefits of this program to your career goals. Please include plans for after graduation and why you should be considered (~500-1,000 words).

Application deadline:

- **April 11, 2023, no later than midnight (central time) – for ALL materials**



TEXAS A&M
AGRI LIFE
RESEARCH



TEXAS A&M UNIVERSITY
COMMERCE



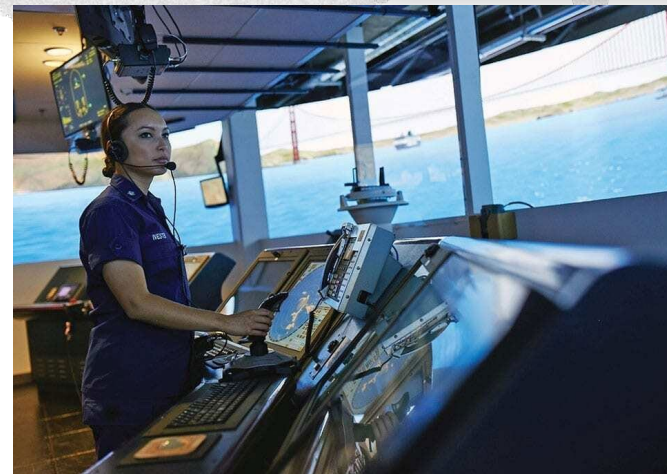
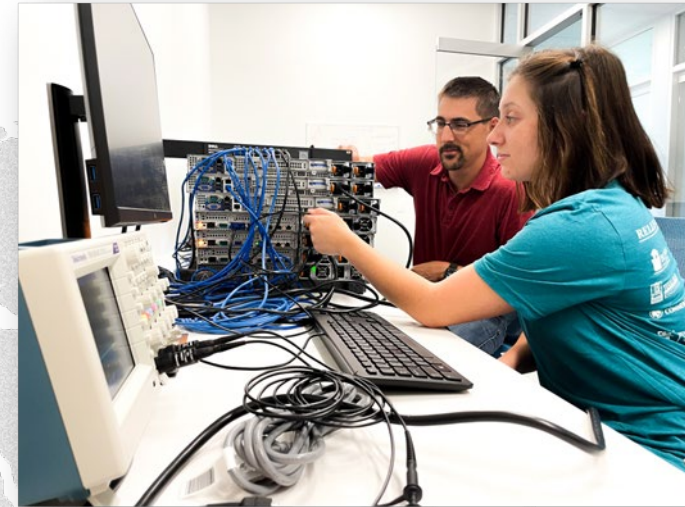
TEXAS A&M
RELLIS



CROSS-BORDER THREAT SCREENING
Center of Excellence

CBTS Cybersecurity

Summer Research Institute



TAMU Commerce Faculty Mentors



TEXAS A&M
RELLIS



TEXAS A&M UNIVERSITY
COMMERCE



- Dr. Eman Hammad
- Assistant Professor,
Computer Science &
Information Systems
- Office: ACB2-208
- Email:
Eman.Hammad@tamuc.edu
- Location: RELLIS Campus,
Bryan, TX



- Dr. Yuehua Wang
- Associate Professor,
Computer Science &
Information Systems
- Office: Jour 230
- Email:
Yuehua.Wang@tamuc.edu
- Location: Jour 101/102,
Commerce, TX

A SYSTEMS ENGINEERING APPROACH FOR VITAL SHIP SYSTEMS' CYBERSECURITY RISK ASSESSMENTS

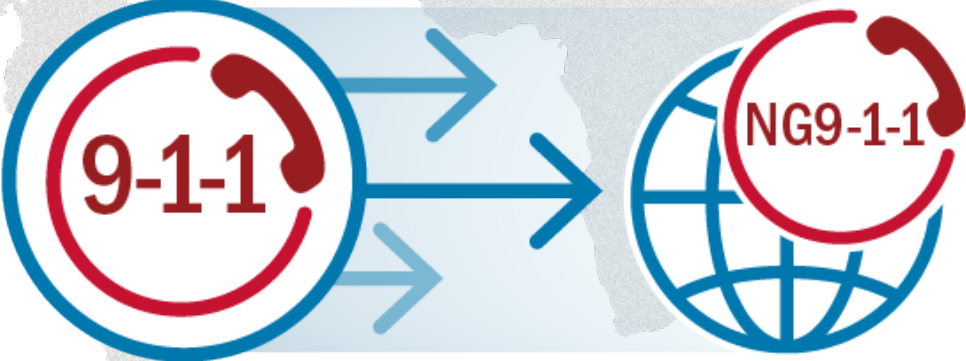


Summary

- Vital ship systems/automation is heavily reliant on IT/OT systems which are easily compromised by cyber attacks.
- Vital ship systems must be designed in a manner to protect critical functions from existing and emerging threats and proactively prepare for the next generation of cyber attacks.
- In this project, students will research a systems engineering approach that guides ship designers in identifying vital systems/functions, documenting impacts, and mitigations to prevent catastrophic failures from cyber attacks.



NEXT GENERATION 911 CYBERSECURITY THREAT MODELING & RISK ASSESSMENT



Summary:

- NG911 is a nationwide, standards-based, all-IP emergency communications infrastructure enabling voice and multimedia communications between a 911 caller and a 911 center, and on to responders in the field.
- Successful cyber attacks against NG911 could cause significant negative consequences. A better understanding is required of the potential impacts of existing and emerging threats enabled by technologies such as quantum computing & AI/ML.
- In this project, *student will adopt a systems approach to identify NG911 functional components and protocols, perform threat modeling of existing and emerging threats, conduct paper-based risk assessments, documenting impacts, and recommend mitigations to reduce the cyber risk.*

Summary:

