Mission: The Borders, Trade, and Immigration Institute, led by the University of Houston, conducts and transitions research, develops innovative solutions, and provides education that enhances the Nation's ability to secure the borders, facilitate legitimate trade and travel, and ensure the integrity of the immigration system.

Vision:  Through a multi-disciplinary team of national and international experts, the Institute delivers transformational technology-driven solutions, data-informed policies, workforce development opportunities for today's Homeland Security Enterprise, and trans-disciplinary education for the next generation of homeland security experts.

## Institute Facts
- Federally funded through a competitive grant from the Department of Homeland Security Science and Technology Office of University Programs (established in June 2015)
- Consortium (including past partnerships)
  - Led by the University of Houston
  - 16 Academic
  - 7 Enterprise
- 5 current research projects; 1 education project
- Primary Customer – Customs and Border Protection with a Trade focus

## Impact Statements (Project Summary)
CURRENT PROJECTS

Project: Venezuela and Nicaragua: Regional Migration Crisis in the Making
PIs: Drs. Andrew Selee and Randy Capps
Affiliation: Migration Policy Institute
Status: Current
**Forecasting migration trends to inform policy**
To help Customs and Border Protection prepare for a potential migration crisis, BTI Institute researchers are exploring the dimensions of the Venezuelan and Nicaraguan migration outflow. The results will help inform policies to prevent a broader hemispheric crisis.

Project: Transforming Trade and Ensuring Global Supply Chain Security with Blockchain and Smart Contracts
PI: Dr. Weidong "Larry: Shi
Affiliation: University of Houston
Status: Current
**Evaluating the use of blockchain to facilitate legitimate travel**
Because of the significant cost of supply chain disruption, BTI Institute researchers are exploring innovative opportunities provided by blockchain and other relevant technologies for transforming the entry data collection process in order to facilitate the timely analysis of supply chain risk and to ensure trade compliance.

Project: Exploring Homeland Security Applications for Unmanned Autonomous Systems at Maritime Ports
PI: Ben Rohrbaugh
Affiliation: Lantern UAS, LLC
Status: Current
**Securing trade into U.S. seaports with sensors deployed via UAS**

Each year, more than 11 million maritime containers arrive at U.S. seaports. BTI Institute researchers are evaluating the feasibility of using unmanned autonomous systems (UAS) mounted with cameras, thermal imaging cameras, or other potential sensors to enhance cargo container screening.

Project: Border Management, Trade, and Transport Security Course Curriculum
PI: Dr. Tony Ambler
Affiliation: University of Houston
Status: Current
**Provide DHS personnel educational opportunities for career advancement**
Through University-based education systems and online certificates, the BTI Institute is developing new degrees in Border Management, Trade, and Transport Security and new certificate programs in Border Operations Management and Security.

Project: EDGE: The "Eye in the Woods" Image-based Human Detection and Recognition System: Phase II
PI: Dr. Ioannis Kakadiaris
Affiliation: University of Houston
Status: Current
**Developing improved identification technology**
Accurate and timely identification of people crossing the border, whether authorized or unauthorized, is necessary for establishing effective border management. BTI Institute researchers are developing software solutions based on biometric identifiers that remain effective in a variety of distances, aspects and illuminations.

Project: Validating Deterrence Models for Scanning Technologies
PI: George Thompson
Affiliation: ANSER Inc.
Status: Current
**Measuring deterrence models**
Quantifying deterrence in notoriously difficult. With limited resources, it is essential that U.S. Customs and Border Protection deploy their scanning assets to their utmost effectiveness. BTI Institute researchers are conducting research to enable policymakers to make decisions about scanning technologies, screening rates, and other deployment issues.

COMPLETED PROJECTS (HIGHLIGHTS)

[THIS PROJECT IS BEING PRESENTED IN THE INNOVATION SHOWCASE]
Project: Central America's Immigrant and Refugee Crisis: Limiting Unauthorized Migration through the Alliance for Prosperity and Reintegration Efforts
PI: Dr. Randy Capps
Affiliation: Migration Policy Institute
Status: Complete
**Exploring strategies to reduce unauthorized migration**
BTI researchers produced briefs which detailed promising initiatives in Central America and the challenges to reintegration efforts, thus assisting the Department of Homeland Security in understanding emigration pressures and developing long-term strategies to reduce unauthorized migration.

Project: Modeling Methodology and Simulation of Port-of-Entry Systems
PI: Dr. Ben Melamed

Affiliation: Rutgers University
Status: Complete

**Facilitating legitimate flows across U.S. borders through modeling methodology and simulation models**

With over 42 million pedestrian crossings and nearly 105 million vehicle crossings per year, the need to facilitate the flow of traffic without compromising security is paramount. BTI Institute researchers worked with leadership at Ports of Entry to detail "what if" scenarios and reduce congestion leading to shorter wait times and better utilization of inspection personnel.

Project: Participatory Operational Assessment: Evaluating and Predicting the Operational Effectiveness of Cargo Security Processes at Ports-of-Entry
PI: Maria Burns
Affiliation: University of Houston
Status: Complete

**Securing trade into U.S. seaports through risk and operational assessments**

Each year, more than 11 million maritime containers arrive at U.S. seaports. BTI Institute researchers have developed a risk assessment tool and an operational assessment of seaports to evaluate current security risk management and cargo screening processes.

Project: Modeling International Migrant Flows
PI: Dr. David Leblang
Affiliation: University of Virginia
Status: Complete

**Improving resourcing decisions for border security through improved forecasting of migration flows**

BTI Institute researchers are collecting data directly related to the push and pull factors impacting migration. The researchers are building forecasting and estimated flow models to allow multiple DHS component agencies to make better informed decisions on how to utilize resources and personnel.

Project: A Systematic Process for Vulnerability Assessment of Biometric Systems at Borders
PI: Dr. Bojan Cukic
Affiliation: University of North Carolina at Charlotte
Status: Complete

**Determining vulnerabilities and countermeasures for biometric security**

With an increase in the utilization of biometric identification to manage travel, migration and refugees, there comes an increased effort to spoof or exploit those systems. Institute researchers have produced reports detailing biometric attack risks and severities, leading towards resources that can help develop a defense strategy.

Project: Uncovering Human Smuggling Patterns from Guatamala to the U.S.
PI: Gary Hale
Affiliation: Voir Dire International LLC
Status: Complete

**Determining human smuggling patterns**

In order to better assess the flows of human smuggling and assist the Department of Homeland Security to utilize resources more effectively, BTI researchers analyzed critical nodes in the human smuggling "supply chain" and developed maps and estimates of migrants in the smuggling network.

<div align="center">Questions for COE Summit</div>

**Why is participating in the COE Summit important to you?**
The COE Summit affords the opportunity to strengthen the existing partnerships between the Centers of Excellence while discovering new opportunities for collaboration and problem-solving. It is a means to both showcase the work our researchers are already accomplishing and to identify new problems to solve.

**Please describe the mission/vision of your COE AND What is the homeland security challenge you are trying to solve?**
The BTI Institute is a consortium of researchers focused on developing solutions to homeland security challenges in the areas of Border Security, Facilitating Legitimate Trade and Travel, and Immigration Policy. Aligned primarily with Customs and Border Protection, the Institute focused our early years on Border Security in areas such as Facial Recognition, biometric spoofing, and push-pull factors driving migration. We have recently honed in our efforts to trade, including the feasibility of blockchain for entry data collection or the potential use of UAS-based sensors at Maritime Ports.

**How does your COE provide value to DHS, its stakeholders, and the general public?**
As all the COEs do, BTI is bringing the brightest minds in the academic community to bear to solve challenges that put our nation at risk. This risk could be physical safety but it is also our economic security.

**What accomplishments from the past year are you most proud of?**
The BTI Institute was aligned under the University of Houston College of Technology this past year. As a result we have rapidly expanded the amount of unique expertise we can provide to DHS. Additionally, we have begun the process of developing curriculum for Border Operations Management, Trade, and Transport Security degrees and certificates. These will provide DHS personnel educational opportunities for career advancement. Finally, we are particularly excited about having laid the ground work for a Port of the Future conference at the University of Houston in March 2020.

**What is your biggest challenge in the year(s) to come?**
I think the biggest challenge will be ensuring the research we are conducting has an application and use for DHS, and CBP in particular. If you look at the technical, economic and social aspects that DHS personnel have to work through, it makes you appreciate the role you can play in helping secure our homeland.