



## BTI Institute

Borders • Trade • Immigration

A Department of Homeland Security Center of Excellence

### University of Houston

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**Mission:** *To enhance the nation's ability to secure our borders, facilitate legitimate trade and travel, and ensure the integrity and effectiveness of our immigration system.*

### Quick Facts

- Established in June 2015 through a competitive award by the U.S. Department of Homeland Security (DHS) Science and Technology Directorate.
- The BTI Institute is a consortium with more than 25 academic, industry, and government experts.
- The BTI Institute delivers transformational technology-driven solutions, data-informed policies and workforce development opportunities for today's current and future homeland security experts.
- The BTI Institute aligns with DHS Missions #1-#3 in the Quadrennial Homeland Security Review: Prevent Terrorism and Enhance Security, Secure and Manage Our Borders, and Enforce and Administer Our Immigration Laws.

### Partners

- Led by the University of Houston.
- A multi-disciplinary team of experts: 10 university partners, including four Minority Serving Institutions, and one industry partner.
- Partners in seven states: Arizona, California, Minnesota, North Carolina, New Jersey, Texas, West Virginia.

### Research Focus Areas

#### Border Security

- Policies
- Technologies
- Concepts of Operations
- Other Impacts

#### Legitimate Trade and Travel

- Policies
- Technologies
- Concepts of Operations
- Export Control

#### Immigration

- Policies
- Concepts of Operations
- Other Impacts



## Research Partners

Middlebury Institute of International Studies at Monterey  
Rutgers University - Newark\* and New Brunswick  
Texas A&M International University \*  
Texas A&M Transportation Institute  
University of Arizona  
University of Houston \*  
University of Minnesota  
University of North Carolina, Charlotte  
University of Texas at El Paso \*  
VoiDire, LLC  
West Virginia University

\* Denotes a Minority Serving Institution

## Core Capabilities

- Biometrics
- Criminal Justice, Human Trafficking
- Export Control and Nonproliferation
- Supply Chain Security Technology Transfer

## BTI Institute Highlights

### Transnational Flows of People

#### Biometric Systems

Researchers at the BTI Institute are improving face matching performance and will rigorously test the technology for operational environments. To do this, they are developing algorithms that can match unconstrained face images (or faces in public) against a gallery of reference images (normally captured in a controlled environment from individuals enrolled in the study). The aim is to develop accurate, robust, and efficient 2D face recognition algorithms from image and/or video for verification or identification in adverse outdoor conditions or from different mobile devices using their extensive expertise in 3D face recognition.



### Transnational Flows of Goods

#### Modeling Methodology and Simulation of Port of Entry Systems

The principal objective of this BTI project is to provide Customs and Border Protection and its components with tools that will speed up and streamline the flow of vehicles and pedestrians across U.S. points-of-entry without compromising security. The challenge is formulating a standard model with adequate metrics that compensate for storage space and time.

#### Cargo Security

Through the Participatory Operational Assessment project, researchers at the BTI Institute will work closely with U.S. port authorities and global logistics companies to improve processing times at ports of entry. They will develop a security risk assessment model capable of identifying high-risk parameters and improving cargo processing times while maintaining security.



### BTI Education and Workforce Development

#### Security Technologies Kitchen: Project-Based STEM Learning



The Security Technologies Kitchen (STK) at the BTI Institute helps build America's future homeland security science and engineering workforce by informing current STEM students of the critical missions of DHS and engaging them in real-world problems that have a direct and obvious impact on our nation's security. Project-based learning allows students to work through an entire semester on one engaging and complex question, problem, or challenge. This way, STK

provides students with hands-on training to prepare them for the current and emerging challenges relevant to border security, legal trade and immigration.