

BTI hosts annual meeting focused on solutions

The Borders, Trade, and Immigration (BTI) Institute, a Department of Homeland Security (DHS) Center of Excellence (COE), held its 2019 Annual Meeting on June 26, 2019, in Washington, D.C., at the Customs and Border Protection (CBP) Office of Training and Development. The meeting, titled *From Challenge to Solution*, gathered participants from academia and government to hear about current BTI projects, current challenges faced by DHS, and potential solutions to some of those challenges.

After introductions from Anthony Ambler, Ph.D., Director of BTI and Dean of the College of Technology at the University of Houston, and Theophilos Gemelas, Program Manager in DHS Science and Technology Office of University Programs, the meeting kicked off with a keynote from Michael Dougherty, Assistant Secretary for Border, Immigration and Trade Policy, DHS.



“The caliber of the studies proposed is very high,” said Mr. Dougherty. “We are very pleased with them. The Institute is going to have the ability to find things out that you wouldn’t from the government perspective.”

The audience then heard from DHS stakeholders on some of the challenges that their respective offices face and the solutions that researchers through BTI are providing.

Paul Baker, Ph.D., Deputy Assistant Commissioner for Office of Training and Development, CBP, spoke to the Institute’s curriculum development project and the positive value that providing more avenues for advanced studies for Customs and Border Protection agents would add to the Homeland Security workforce.



Additional stakeholder perspective was provided by Melissa Herrera, Assistant Chief, U.S. Border Patrol. She highlighted the partnership between the Institute and Border Patrol and the methodology in which the Institute is working towards meeting a specific need expressed by Scott Luck, Deputy Chief of U.S. Border Patrol.

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Matt Schneider, Director of Land Border Initiatives and Entry/Exit Transformation, spoke on the value of partnerships between academia, government and private industry.

“University assistance has been extremely helpful in helping us in some of our missions,” said Mr. Schneider. He elaborated on a few vignettes in which research funded through BTI has helped transform the Entry/Exit process to include a phone-based application for self-reporting and the ability for an automated system to detect a shape and follow through various locations.



Vincent Annunziato, Director of Business Transformation & Innovation for CBP, gave an overview of his office’s evaluation of Blockchain as it impacts the supply chain and the process of Importing and Exporting goods across the U.S. Border.

“This study is actually giving us a view of what the world could look like another ten or fifteen years away,” said Mr. Annunziato. “What Blockchain has done...is the opportunity to re-engineer processes.”

George Zouridakis, Ph.D., BTI Research Committee Chair and Associate Dean for Research and Graduate Studies in the College of Technology at the University of Houston, presented an overview of the activities of the Institute during the past year. This involved efforts in customer discovery, stakeholder engagement, and the Institute’s response to DHS challenges that included 22 new White Papers and 7 research proposals addressing questions related to the Conference on Prosperity and Security in Central America.



Additionally, Dr. Zouridakis discussed in detail the Border Management, Trade, and Transport Security education programs that the Institute is developing with the University of Houston. The purpose is to establish a pathway for post-secondary graduates to pursue a career with the Homeland Security Enterprise as well as provide current DHS personnel educational opportunities for career development.

Current BTI projects were introduced, with each researcher detailing the current status of milestones, deliverables and projected timelines. Project champions, DHS personnel assigned to each research project with the purpose of facilitating transition, were present to provide input. The following projects were presented:

- *Transforming Trade and Ensuring Global Supply Chain Security with Blockchain and Smart Contracts*, Weidong “Larry” Shi, Ph.D., University of Houston; Eleftherios Iakovou, Ph.D., Texas A&M University.
- *Exploring Homeland Security Applications for Unmanned Autonomous Systems at Maritime Ports*, Ben Rohrbaugh, Lantern UAS LLC
- *Validating Deterrence Models for Scanning Technologies*, Dennis Wagner, ANSER

- *EDGE: The 'Eye in the Woods' Image-based Human Detection and Recognition System*, Ioannis Kakadiaris, Ph.D., University of Houston
- *Venezuela and Nicaragua: Regional Migration Crisis in the Making*, Randy Capps, Ph.D., Migration Policy Institute

Additionally, two invited researchers presented potential solutions to DHS challenges identified in the Institute's customer discovery efforts.



Ramanan Krishnamoorti, Ph.D., Chief Energy Officer of the University of Houston System, presented *Operational Means for Forensic Characterization of Imported Crudes*. According to the presentation, the project proposes to fingerprint and identify origins of different crudes being imported into the US and therefore secure the supply chain of all imported crudes. Dr. Krishnamoorti emphasized the unique opportunity that the University of Houston has as Houston's Energy Leader and the already established education programs and private industry partnerships.

Jeronimo Cortina, Ph.D., Faculty Senate President-elect at the University of Houston, presented *The Impact of Indirect Remittances on Development*. His proposed project will look at means to facilitate economic development of the Northern Triangle, specifically to manage migration flow.



In a further effort to discover challenges and develop solutions, Abria Magee, Ph.D., Manager of Research and Development for BTI, facilitated a Roundtable. Each table had a thematic topic (Migration, Technology, or Trade) in which participants identified a problem statement, future impacts of that problem, and the stakeholders that would most benefit from a solution.



"It has been fascinating to have everyone here," said Dr. Ambler in closing, "and to hear about the diversity of work we are supporting at BTI. We mentioned technical, economic and social...and it shows the complexity of what DHS has to deal with as a whole."

More information on each ongoing research project can be found by selecting the Research tab at the Institute's website. Each project presentation is also available under their respective project links. The education presentation can be found under the

Education tab.

End of Program Year 4

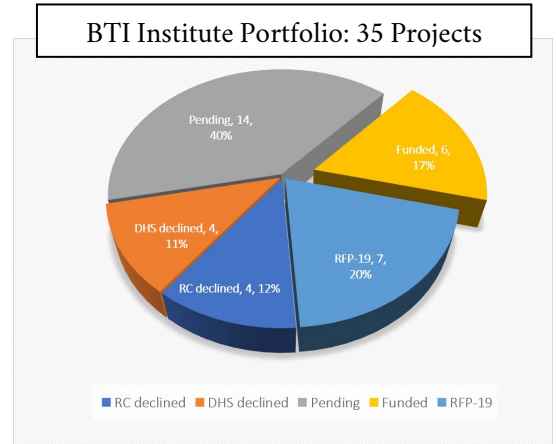
The BTI Institute concluded Program Year 4 on June 30, 2019. What follows is a brief highlight of Institute activities and efforts.

The Research Effort

The research effort for this program year focused on customer discovery in an attempt to fully understand the challenges faced in order to develop research solutions that address those challenges. As a result, BTI Institute leadership met with a number of DHS agencies to include:

- CBP Office of Trade
- CBP Office of Field Operations
- US Border Patrol Strategic Planning and Analysis Directorate
- CBP Office of Human Resources Management
- Office of Citizenship
- CBP Office of Training and Development

These meetings resulted in the production of 22 White Papers, four of which were declined by the Research Committee, four declined by DHS, and six progressed to Work Plans during Program Year 4.



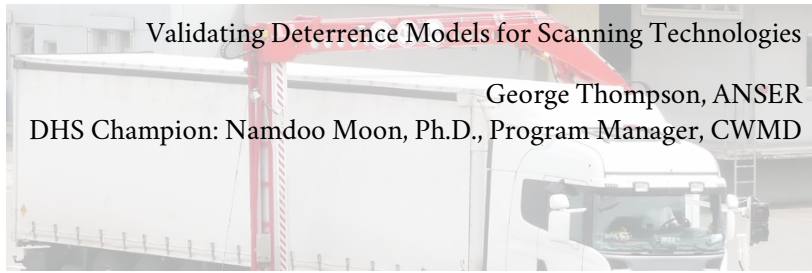
RFP 19-01

Additionally, the Institute invited proposals that addressed research questions related to the Conference on Prosperity and Security in Central America as part of the BTI Institute RFP 19-01. The questions focused on economic and social development in the Northern Triangle countries as a means to manage migration push factors. Seven proposals through the BTI Institute are currently under review by DHS.

Current Funded Projects

At the end of PY4, the Institute had five funded research projects:

<p>Transforming Trade and Ensuring Global Supply Chain Security with Blockchain and Smart Contracts</p> <p>Weidong “Larry” Shi, Ph.D., University of Houston Eleftherios Iakovou, Ph.D., Texas A&M University DHS Champion: Vincent Annunziato, Director, Business Transformation & Innovation, CBP</p>	<p>Leverage new technologies around blockchain to improve the mission of CBP in facilitating global trade and ensuring compliance with trade law and regulations.</p>
<p>Exploring Homeland Security Applications for Unmanned Autonomous Systems in Maritime Ports</p> <p>Ben Rohrbaugh, David Hansell, and Brian Henderson, Lantern UAS LLC DHS Champion: Namdoo Moon, Ph.D., Program Manager, CWMD</p>	<p>Systems based on UAS technology have the potential to contribute to several aspects of port security with minimal impact on current port operations.</p>



Enabling policy makers to make decisions about scanning technologies, screening rates, and other deployment issues with full understanding of the deterrence impacts.



Successful detection and recognition of person-of-interest insight to the whereabouts and activity patterns of human crossers.



Examine the current and potential impact of migration, assess current regional responses, and suggest steps that the U.S. government can take to prevent a broader hemispheric crisis.

The Education Effort

The Education Effort of the BTI Institute merged academic subject-matter expertise with the current and future DHS workforce.

Curriculum Development

The BTI Institute initiated a project this program year, championed by Paul Baker, Ph.D., Deputy Assistant Commissioner, CBP Office of Training and Development, to develop curriculum that would provide current DHS personnel educational opportunities for career advancement and establish a pathway for post-secondary graduates to pursue a career within the Homeland Security Enterprise. The plan will result in new degrees in Border Management, Trade, and Transport Security at the Bachelor of Science, minor, and Master of Science levels. Additionally, a new certificate program will be created in Borders, Trade, and Transport Security and Border Operations Management and Security. As of the end of the program year, one course, “Introduction to Homeland Security,” is developed and under review, and a second course, “Introduction to Borders Management,” is under development.

Lunch-and-Learns

The BTI Institute conducted three Brown Bags. Presentations and videos are available for each under the Education tab on the BTI Institute’s website. They were:

- *Combating Human Trafficking: The Roles of the Legal and Medical Professions*. Presenters: Juhi Jain, M.D., Fellow at Emory/Children’s Healthcare of Atlanta; Edward Gallagher, J.D., Adjunct Professor at the University of Houston Law Center; Sherri Lynn Zack, J.D., Human Trafficking Coordinator for the Southern District of Texas; and Alfonso Lopez de la Osa Escribano, Ph.D., L.L.M., J.D., Director of the Center for U.S. and Mexican Law at the University of Houston Law Center.
- *Blockchain: Transforming Global Supply Chain Security*. Presenter: Weidong “Larry” Shi, Ph.D., University of Houston.
- *Policy in Cybersecurity and Critical Infrastructure*. Presenter: Chris Bronk, Ph.D., University of Houston



Chris Bronk, Ph.D., Assistant Professor in Computer and Information Systems at the University of Houston, gave a presentation on the security of critical infrastructure of the United States from a cybersecurity perspective on April 17, 2019, in Houston, TX.

Dr. Bronk spoke briefly on the history of computers as a control mechanism for many of the world’s nation’s critical infrastructure. Critical infrastructure includes communication networks, energy infrastructure, emergency services, and financial services.

Dr. Bronk spoke to the agencies that shape the policies for cybersecurity in the United States. Currently, the Department of Homeland Security stood up the Cybersecurity and Infrastructure Security Agency (CISA) which has the mission to partner with industry and government to understand and manage risk to the Nation’s critical infrastructure, according to the DHS website.

“However,” said Dr. Bronk, noting the ten other U.S. government agencies responsible for a piece of critical infrastructure, “this is the space that all of these policies have to come from...to establish standards, guidelines, and frameworks.”

Dr. Bronk’s full presentation and video can be found under the Education tab of the BTI Institute website.

Academy Summer Internship

The Institute hosted Cadet Sarah Donaldson, United States Military Academy at West Point, as part of the BTI Institute’s Academy Summer Internship program. Cadet Donaldson worked with Weidong “Larry” Shi, Ph.D., Associate Professor at the University of Houston, and Chris Bronk, Ph.D., Associate Professor at the University of Houston, on an overview of cybersecurity.



MSI Summer Research Team

The Institute hosted Dr. Nursen Zanca, Economics Coordinator at the University of the Incarnate Word, and graduate student Nicholas Randol as part of the U.S. Department of Homeland Security Minority Serving Institutions Summer Research Team program. They are working with Maura Pereira de Leon, Ph.D., Manager of Education and Training for BTI, and Luis Torres, Ph.D., Associate Dean of Research and Strategic Partnerships at the Graduate College of Social Work.

Dr. Zanca and Mr. Randol are researching the methodology and meaning behind the Global Terrorism Index. The GTI is estimated from the Global Terrorism Database collected by the National Consortium for the Study of Terrorism and Responses to Terrorism (START) DHS Center of Excellence. The GTI ranks nations according to terrorist activity based on number of terrorist incidents, number of fatalities associated with terrorist incidents, number of injuries associated with terrorist incidents, and the approximate level of property damage from terrorist incidents.



Their research will investigate the methodology behind the index, past and present trends in the GTI score for the U.S., and the economic cost of terrorism on the U.S. economy.

Dr. Zanca will present her final paper in July 2019 and Mr. Randol will present a poster at the 2019 DHS COE Summit on July 31, 2019 in Arlington, VA.



DHS COE Summit 2019

Homeland Security Challenges: Evolving Threats and Dynamic Solutions

The BTI Institute invites you to join us for the 2019 DHS Centers of Excellence Summit on July 31 – August 1, 2019, in Arlington, VA. Registration closes Tuesday, July 16, 2019.

Subject matter experts from across academia, industry, and government will discuss “Homeland Security Challenges: Evolving Threats and Dynamic Solutions.” The presentations will be broken into two tracks, “Gray Zone Threats” and “Homeland Security Challenges in a Highly Networked World.”

The event will also include a Student Grand Challenge and Poster Presentation. Three students associated with the BTI Institute will be presenting:

- Ha Le; *EDGE: ‘The Eye in the Woods’ Image-based Human Detection and Recognition System*; PI: Ioannis Kakadiaris, Ph.D., University of Houston
- Keshav Kasichainula; *Transforming Trade and Ensuring Global Supply Chain Security with Blockchain and Smart Contracts*; PI: Weidong “Larry” Shi, Ph.D., University of Houston
- Nicholas Randol; *Global Terrorism Index: Methodology & Meaning*; PI: Nursen Zanca, Ph.D., University of the Incarnate Word

The Innovation Showcase will be open throughout the summit and provide an opportunity to hear from each DHS Center of Excellence. The BTI Institute will have Randy Capps, Ph.D., Migration Policy Institute, presenting his recently completed project, *Central America’s Immigrant and Refugee Crisis: Limiting Unauthorized Migration through the Alliance for Prosperity and Reintegration Efforts*.

Information and registration is available at coesummit.org. Registration closes Tuesday, July 16, 2019.

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