# CBTS Efforts to Address the Impacts of COVID-19 on the U.S. Agricultural Sectors

The Cross-Border Threat Screening and Supply Chain Defense Center of Excellence (CBTS) was established to help stakeholders prevent, prepare, respond, and recover from incidents that affect human, animal or plant health and supply chains.

Starting in March 2020, CBTS worked closely with a Project Champion in the DHS Countering Weapons of Mass Destruction Office (CWMD) to initiate a series of studies assessing the impacts of the pandemic on U.S. agricultural sectors. The paring matched the CBTS mission with CWMD's obligations under the Securing Our Agriculture and Food Act to coordinate the DHS's efforts to defend the country's food, agriculture, and veterinary systems against high-consequence events, such as COVID-19.

The disruptions caused by the COVID-19 pandemic, and the actions taken to mitigate its impacts presented serious challenges to food and agricultural sectors and demonstrated how such events could affect the nation's security. Because the pandemic's impacts were still unfolding at the time, CBTS employed a mix of approaches to fully capture the impacts on the food and agricultural sectors. Each project provided insights to expand understanding of the risks we face beyond the horizon of the current pandemic.

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**Researchers at Victoria University use Computable General Equilibrium (CGE) Model yielding insights to impacts on agricultural sectors and U.S. economy.**
By May 2020, CBTS contracted with researchers at Victoria University through the Center for Accelerating Operational Efficiency (CAOE) at Arizona State University to utilize a CGE model called USAGE to examine the direct and indirect impacts of COVID-19 on major U.S. agricultural sectors and the reduced economic activity. Using an expanded agricultural sector model, researchers assessed the impacts of labor and transportation constraints in the sectors. Their initial results pointed to the importance and influence of federal stimulus efforts and provided insights into possible trends economic growth, employment and trade would yield due to the economic disequilibrium caused by the pandemic.



**Food and Agricultural Policy Research Institute at the University of Missouri (FAPRI-MU) utilized Partial Equilibrium Modeling System to study the market impacts of COVID-19 on agricultural commodities and trade.**
In late June 2020, a second effort was approved to provide commodity market simulations provided by FAPRI-MU. Their analyses quantified the pandemic's impacts on crop, livestock, and biofuel markets in the U.S. and international markets.

This modeling effort helped serve as the basis for examining how post-COVID-19 markets might recover across major U.S. agricultural commodity markets, producers, consumers, and federal policy expenditures in the near and long-term. FAPRI discovered:

- Market outcomes in 2020 were driven by factors other than the pandemic, such as a surge in crop exports and weather disruptions.
- Three of the largest direct impacts of COVID-19 were on fuel markets, meat supply chains, and consumer demand patterns. Demand for fuels fell by 5-10% and margins between meat retail prices and livestock prices widened.
- Certain impacts of COVID-19 are partly due to policy responses, including sector-specific actions targeting agriculture, fiscal policy, monetary policy, and lockdowns.

Combined, these analyses gave us some of the earliest estimates of the aggregate economic impacts of the pandemic on our economy and our major food and agricultural sectors.

**Anneal Initiative, Inc. develops needs assessments evaluating other risks including the spread of disinformation amid the pandemic.**
In early June 2020, CBTS kicked-off a study with the Anneal Initiative, Inc. to assess other global supply chain threats and risk analysis capabilities, particularly for inputs related to pre-harvest livestock and crop production. The project developed needs assessments that could be used to better understand supply chain risk. This work included:

- The development of Analytical Requirements and Threat Identification Reports that looked at how U.S. adversaries could potentially manipulate scientific publication processes to negatively impact the U.S. COVID-19 response.

- How foreign government efforts could influence operations and information warfare strategies that ultimately affect U.S. and global ag and food sectors.
- How issues with contamination in China-based pharmaceutical production could affect human health and livestock pharmaceuticals.

This project differed from the other economic studies because while it examined global supply chains, it concentrated on the risks associated with disinformation in critical input supply chains.

**CBTS and National Bureau of Economic Research (NBER) look at emerging risks associated with extended supply chains.**
Late in September 2020, CBTS and NBER kicked-off a series of projects looking at potential risks to the U.S. economy associated with the global supply chains. The collaboration was designed to examine the consequences of longer supply chains and identify possible risk-reducing strategies.

The pandemic and associated shutdown of economic activity in the U.S. drew attention to the consequences of long supply chains, but the focus of this study was not on the pandemic's impacts. Instead, this project examined the potential risks associated with global supply chains on which U.S. economy depends. While the initial plan proposed to draw on insights from DHS and some its operational partners to identify areas of concern, and the primary source of insights is coming from the researchers funded through a joint NBER and CBTS competition.

Once completed, the six sub-projects will help identify key aspects of our global production networks that are sources of vulnerability for essential goods and services and identify supply chains that place the nation's economic health at possible risk in the future.

Initial findings from these studies will be presented at a December 10, virtual conference hosted by NBER where an industry and academic panel will share their insights and thoughts on lessons learned about the fragility and resilience of critical supply chains.
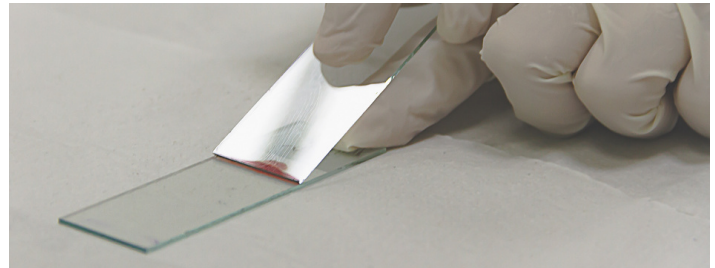


**Lessons learned**
While these COVID-19-initiated projects were never intended to fully assess the pandemic's impacts or identify all the emerging issues related to fragile or extended global supply chains, these projects have generated valuable insights and findings.

Yet, perhaps the most pivotal lesson gained along the way was the recognition of the importance of sustained interactions between DHS thought leaders and researchers. In many ways interactions between stakeholders and researchers are often the difference between findings having a significant impact or resting on the shelf for someone to find in the future.

**Looking for more information on the CBTS/CWMD pandemic projects?**
Visit our website https://cbts.tamu.edu/ or the publication pages of our research teams
FAPRI: https://www.fapri.missouri.edu/
USAGE: https://www.vu.edu.au/centre-of-policy-studies-cops
ANNEAL: https://annealinitiative.com/
NBER: https://www.nber.org/

# CBTS Summer Programs Develop Students Through Hands-On Learning



*"Tell me and I forget. Teach me and I remember. Involve me and I learn."*
*-Benjamin Franklin*

This past summer, the Center worked with teams from Bethune-Cookman University in Florida (B-CU) and the University of Nevada at Las Vegas (UNLV) as part of the U.S. Department of Homeland Security Science and Technology Directorate's 2021 Summer Research Team (SRT) program. The SRT program provides quality research experiences for students and early-career faculty at U.S. Minority Serving Institutions. This year's virtual program effectively fostered research relationships for its participants.

The "Geospatial Data Investigations for Food Supply Chain Solutions" project led by Dr. Baraka Mapp at B-CU taught her students how to critically review existing knowledge about methods for the control and removal of microbial biofilms in food processing environments. Students gained hands-on experience presenting data using visual analytic tools on geospatial investigations of food safety events in the food supply chain.



The "Evaluation of Various Spectroscopic Detection Methods of Biological Threats" project led by Dr. Michael Pravica at UNLV presented his students the opportunity to perform trial spectroscopic experiments on biological threats (viral, bacterial, chemical, drug, and mold) using representative samples like TMV and K12 E. coli. They performed Raman, UV/Vis, fluorescence, cyclic voltammetry, and infrared studies to better understand the challenges associated with each method and experimented with ways to increase detection at further distances with the goal to help protect frontline personnel.

After the summer's successful program, Pravica proposed the development of a hybrid spectroscopic system for efficient detection of biological threats at the border. CBTS has offered support to Pravica's team to develop a platform for a rapid, affordable, and dependable process to detect as many biothreats as possible.

# Working with CBTS
## *What We Do, How to Start a Project and How to Connect with Us*

**CBTS Supports Critical Research Opportunities**
Every year, the Cross-Border Threat and Supply Chain Defense Center of Excellence (CBTS) Center of Excellence at Texas A&M University funds research and education/workforce development projects that develop solutions, protocols, and capabilities to detect, assess, and respond to biothreats and hazards. The best projects are the result of close collaborations with offices across DHS and researchers across the country that deliver solutions, develop novel processes and tools, and enhance the capabilities to support meet specific DHS needs or fill gaps in larger research programs.

**Collaboration is the Key**
Successful projects are the result of active interactions that foster an understanding of research needs and guides the development of the funded research project. It all starts with good communication and collaboration between CBTS and DHS stakeholders because it enables CBTS to attract talented researchers to design projects that deliver results and support the transition of those results into useful applications. The best CBTS funded research projects are built on a foundation of strong working relationships with DHS stakeholders.

**Great Projects Start with an Expression of Need**
You are invited to share your research ideas and needs with CBTS. CBTS can only fund research once the team is aware of a need and can build a working relationship within the appropriate DHS office. A typical project might have a 2-year period of performance with a funding level of roughly $250K/year, but the actual level of funding is determined by the scope of the project. The projects listed on the CBTS website https://cbts.tamu.edu/ illustrate the scope of the CBTS research portfolio and the diversity of our research partners.

**Let's Make a Connection**
If you want to discuss a research idea, need, or have a question, please contact us at CBTS@AG.TAMU.EDU

CROSS-BORDER THREAT SCREENING AND SUPPLY CHAIN DEFENSE
*A Department of Homeland Security Center of Excellence*