



CAOE | CENTER FOR ACCELERATING
OPERATIONAL EFFICIENCY
A DEPARTMENT OF HOMELAND SECURITY CENTER OF EXCELLENCE

**Improving Homeland
Security Operations**

Year in Review
2021



CAOE Leadership

Ross Maciejewski, *CAOE Center Director*

Pitu Mirchandani, *CAOE Chief Scientist*

Beth Jones, *CAOE Managing Director*

Anthony Kuhn, *CAOE Associate Director of Education*

Dawn Janssen, *CAOE Communications Manager*

Amy Bennett, *CAOE Project Manager Senior*



Letter from the Director

I would first like to thank our DHS, academic and industry partners for their support throughout 2021. Established in 2017 and housed at Arizona State University, **Center for Accelerating Operational Efficiency (CAOE) – A Department of Homeland Security Center of Excellence** – is designed to enable the evolution of data-enabled analysis and decision-making practices within the Homeland Security Enterprise (HSE). The summer of 2021 began our fifth year of operation and the year continued to be a balancing act with managing CAO's mission amid the ongoing challenges of the pandemic. CAO has been able to continue impactful end-user focused research that will support critical decisions faced by the HSE as well as new research that has directly responded to conditions caused by the pandemic. This new research has included the development of economic modeling, optimization of disaster response processes and identification of biological weapons.

The CAO team is thankful for the continual flexibility from those who support CAO, and all the DHS Centers of Excellence, as we work to bridge the gap between research and practice by educating the next generation of homeland security professionals and deploying novel technologies into the Homeland Security Enterprise.

This Year in Review serves to provide an overview of CAO's current achievements highlighting some of our recent research, education and outreach activities over 2021. Looking back, I am amazed by the impact that CAO has achieved during these uncertain times and I look forward to advancing DHS's research and education agenda as part of our continued partnership.

Ross Maciejewski

Director

**Center for Accelerating
Operational Efficiency (CAOE)**

PO Box 878609

Tempe, AZ 85287

cao@asu.edu

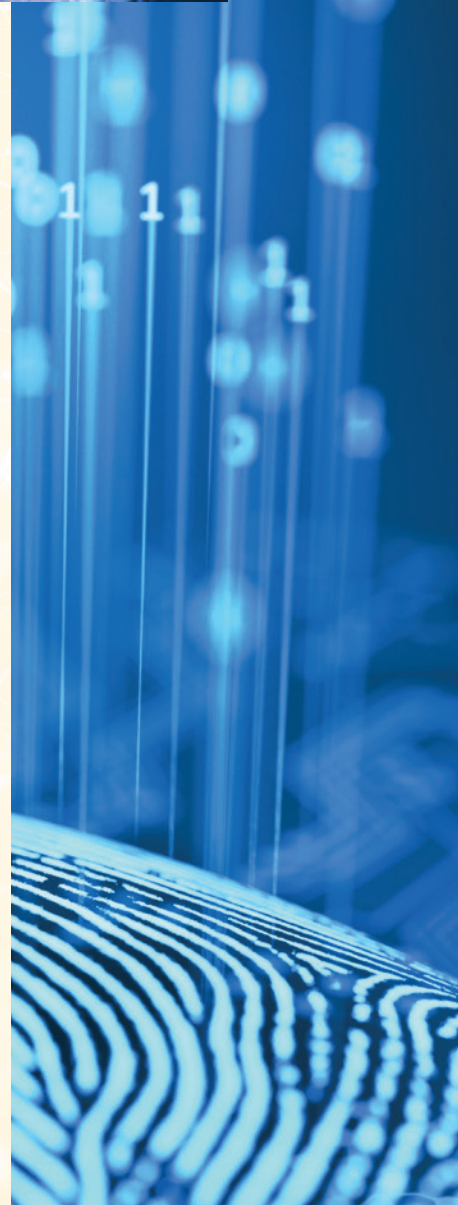
Disclaimer

The research and activities described in this document were supported by the Science and Technology Directorate of the U.S. Department of Homeland Security through the Office of University Programs in accordance with Grant Award No. 17STQAC00001-05-02.

The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied of the U.S. Department of Homeland Security.



Mission & Strategic Initiatives	2
Research Areas	3
Research Projects	
Flying Through Airports: Improving Travel Efficiency Without Compromising Security.	4
Going with the Flow: Learning to Forecast Migration Patterns	5
Being Prepared: What Current Disasters Can Teach Us About Improving Response	6
Trust Issues: Learning How to Evaluate Artificial Intelligence	7
Playing Risk: Using Data, Modeling and Game Theory to Validate Enemy Threats	8
Highlighted Researchers	9
Research Team	10
Education	
Students Develop Innovative Ways to Secure Crowded Places in Hardening Soft Targets Challenge.	12
CAOE Summer Research Experience 2021	14
Student Highlights	15
Transition Activities	17
Outreach	
Seminar Series	18
Workshops	19
Building a Resilient Transportation Future –TSA-CAOE Symposium 2021. . .	20



Our Mission & Strategic Initiatives

Center for Accelerating Operational Efficiency (CAOE) is developing innovative approaches to enhancing and streamlining homeland security operations. The research, systems and technology created at CAOE provide DHS with dynamic information and predictive tools to help resource and response planning, risk analysis and real-time decision-making. The vision of CAOE is to conduct end-user-focused research that will support decision-making to address critical decisions faced by the HSE.

Based on the strategic vision and core research strengths, CAOE has identified three key strategic initiatives that focus on the goals of accelerating operational efficiency across the HSE.



Screening For Threat Assessment and Resource Allocation

The broad landscape of threats from baggage and cargo screening, border crossing and illegal trafficking to cybersecurity and infrastructure threats require new approaches such as teaming artificial intelligence with human decision-making. Our researchers are developing novel methods to improve screening, threat assessment and resource allocations to improve homeland security operations.

Improving Baggage Screening Using Collective Intelligence and Machine Learning

PI: Adolfo Escobedo, *Arizona State University*
Co-PI: Olac Fuentes, *University of Texas at El Paso*

Deferring Decisions: Effects on Human-AI Team Performance

PI: Michelle (Micky) Mancenido, *Arizona State University*
Co-PI: Erin Chiou, *Arizona State University*

Dynamic Workforce Management at a Network of Screening Facilities

PI: Jorge Sefair, *Arizona State University*
Co-PI: Jose Espiritu, *Texas A&M University – Kingsville*

Towards a Computational Framework for Disinformation Trinity: Heterogeneity, Generation, and Explanation

PI: Jingrui He, *University of Illinois, Urbana-Champaign*
Co-PI: Ross Maciejewski, *Arizona State University*

A Simulation-Based Data Driven Approach to Manage the Allocation of Airport Security Screening Resources in Airport Terminal Checkpoints

PI: Eduardo Perez, *Texas State University*



Improving Predictions For Effective Decision-Making

Effectively predicting impacts of both man-made threats and natural threats requires complex models to capture real-time dynamic situations and determine the optimal policies and decisions. CAOE researchers are developing novel methods for high-performance analysis of real-time streaming data for modeling and decision making to provide near real-time solutions so that DHS operations can rapidly respond to emerging situations.

The Effects of COVID-19 on U.S. Agriculture and the Broader Economy

PI: James Giesecke, *Victoria University*
Co-PI: Peter Dixon, *Victoria University*

Value-Focused Robust Optimization for Disaster Response

PI: Pitu Mirchandani, *Arizona State University*
Co-PI: David Morton, *Northwestern University*
Co-PI: Lauren Davis, *North Carolina A&T University*

Modeling Push-and-Pull Factors in Cross-Border Migration with Deep Learning

PI: Anthony Stefanidis, *William & Mary*
Co-PI Daniel Runfola, *William & Mary*

Scalable Near-Real-Time Identification and Characterization of Malware Behaviors Using Darknet Data

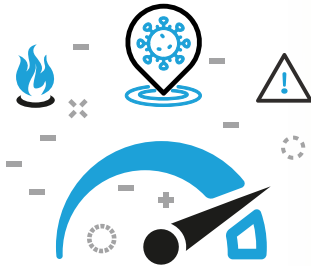
PI: John Yen, *Penn State University*
Co-PI Michalis Kallitsis, *Merit Network*

Simulation, Analytics and Modeling for Border Apprehension and Security (SAMBAS)

PI: Brandon Behlendorf, *University at Albany – State University of New York*
Co-PI: Catherine Lawson, *University at Albany – State University of New York*

Accelerating the Effectiveness of the Contractor Performance System

PI: Thomas Kull, *Arizona State University*



Risk Detection and Mitigation

A critical challenge for DHS is to analyze and manage the risks from adaptive adversaries who seek out our vulnerabilities and attempt to maximize damage to our nation. To meet this challenge, researchers at CAOE are focused on adversarial risk analysis, developing methods and strategies to assess risks to the HSE through new game theoretic approaches, applied red-teaming and artificial intelligence.

Threat Assessment for the ICT Supply Chain

PI: Fred Roberts, *Rutgers University*
Co-PI: Adam Rose, *University of Southern California*

Validating Adaptive Behavior Models of Adversaries for Risk Assessment (VABMARA) Framework

PI: Brandon Behlendorf, *University at Albany - State University of New York*
Co-PI: Gary Ackerman, *University at Albany - State University of New York*
Co-PI: Jun Zhuang, *University at Buffalo - State University of New York*

The Impacts of the Coronavirus on the Economy of the United States: In-Depth Considerations of Health Effects, Avoidance Behavior, Resilience, and International Trade Linkages

PI: Adam Rose, *University of Southern California*
Co-PI: Richard John, *University of Southern California*
Co-PI: Terrie Walmsley, *ImpactECON LLC*
Co-PI: Dan Wei, *University of Southern California*
Co-PI: Jakrub Hlavka, *University of Southern California*

Red Teaming the Post COVID-19 Biological Weapons Threat Landscape

PI: Gary Ackerman
Co-PI: Brandon Behlendorf, *University of Albany- State University of New York*
Co-PI: Doug Clifford, *University at Albany - State University of New York*

Trust in AI-Enabled Decision Support Systems

PI: Erin Chiou, *Arizona State University*
Co-PI: Mickey (Michelle) Mancenido, *Arizona State University*

Modeling the Impact of Complex, Multi-Vector Disruptions to the Marine Transportation Systems

PI: Fred Roberts, *Rutgers University*
Co-PI Adam Rose, *University of Southern California*

Research Areas



Data analytics



Operations research and systems analysis



Economic analysis



Homeland security risk sciences



Flying Through Airports: Improving Travel Efficiency Without Compromising Security

The increase in air travel often means long waits for passengers at security checkpoints. That's because the number of air travelers and bags that must be screened nationally is immense. In 2017, the Transportation Security Administration (TSA) reported daily screenings of more than 2 million passengers and approximately 1.4 million bags with an average passenger wait time of under 20 minutes.

However, current airport space constraints, projected increases in air travel and a rising number of security threats will put more pressure on Transportation Security Administration (TSA) staff and resources. To combat these changing needs, the Center for Accelerating Operational Efficiency (CAOE) is studying the development of new data-driven tools and training to assist TSA officials in fine-tuning processes, staffing and resource allocation. The results will maximize efficiency, increase safety and improve the passenger experience.

Principal Investigator, and Associate Professor at Arizona State University, Jorge Sefair worked closely with Eduardo Perez, an Associate Professor at Texas State University, as part of the Department of Homeland Security (DHS) Summer Research Program for Minority Serving Institutions. Perez is experienced in analysis, evaluation and optimization of large-scale service systems in healthcare. This allowed the team to leverage and apply knowledge of healthcare optimization models to airport security checkpoints.

In response to his contributions to the summer research, Perez was awarded a Follow-on Funding Award from DHS with additional funding from CAOE and his home institution, Texas State University. This research effort expands on his summer work and focuses on developing a simulation-optimization procedure to evaluate the waiting times and queue lengths along with equipment and staffing levels at airport security checkpoints. This stage of the project is also developing guidelines and/or protocols for the optimized operation of airport security check points under different passenger arrival rate scenarios.

This effort is led by Perez and includes one undergraduate student and one graduate student. The project team continues to collaborate with the CAOE research team led by Sefair and stakeholders at TSA.

Perez enjoys the opportunity to learn more about airport operations and understand the collaboration between DHS and CAOE. "Currently, decisions for checkpoint staff allocation are limited because they are based on basic tools," stated Perez, reflecting on the research experience so far. "I can definitely see how this project can make the operations of the checkpoints more efficient."



Going With The Flow: Learning to Forecast Migration Patterns

Human migration is the result of complex factors, including economic, social and environmental change. To assist the Department of Homeland Security (DHS), a Center for Accelerating Operational Efficiency (CAOE) project team is working to form a clear understanding of why, how and where migration occurs throughout these expansive areas.

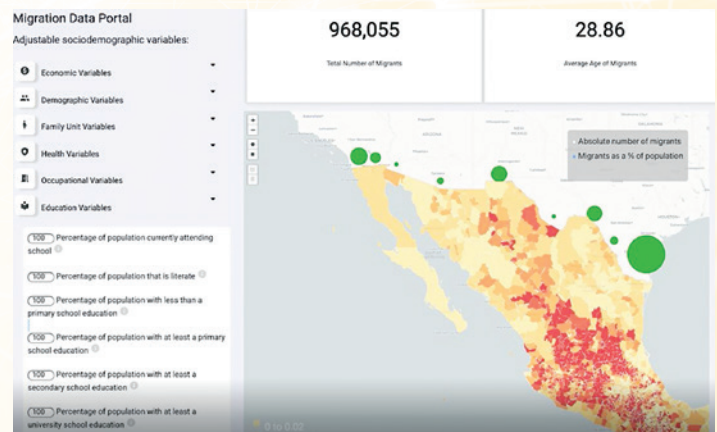
These researchers are identifying and analyzing potential interconnected challenges of cross-border migration. These include the study of regional economic conditions and gentrification/deterioration of neighborhoods in key cities to see how those conditions affect migration patterns.

This project compiles extensive census-derived socioeconomic data and proxy aggregators of socioeconomic conditions (in the form of satellite imagery). To combine this data, the project required the development of new techniques for data fusion in the context of deep learning. The resulting analysis is improved the overall accuracy of results, confirming the team's initial hypothesis.

Armed with this research, the team is developing a complex computational framework, innovative analytics and powerful software to assist DHS in the agency's mission. Agencies like the U.S. Customs and Border Protection (CBP) will use these tools to aggregate and better understand migration patterns. These tools will empower those officials with greater insights into resource allocation and adjustments to response measures.

The team's Principal Investigator, Professor, and Director of Data Science at William & Mary, Anthony Stefanidis, heads efforts to solve this challenging problem. "Migration is a very complex process that's driven by a variety of parameters, including personal, societal and other relevant factors. Developing a data-driven solution that makes use and sense of this information is a substantial academic challenge with the potential to significantly impact the real world," says Stefanidis.

The team credits their progress to the collaboration between researchers and project CBP stakeholders. With this added insight, the project team is advancing the understanding of migration to assist DHS in the prediction, planning and response to these events.





Being Prepared: What Current Disasters Can Teach Us About Improving Response

Preparing for natural disasters and national emergencies has been a focus of the Center for Accelerating Operational Efficiency (CAOE) for several years. With the emergence of COVID-19, the CAOE team realized their efforts could also be applied to pandemic response.

This project leverages prior research in ways to guide decisions on critical resources, processes and supply chains that could lessen the negative impacts of COVID-19. This includes the development of real-time decision support systems for proactive response, even under uncertain actively cascading emergencies, like a global pandemic.

Principal Investigator, Pitu Mirchandani, Professor of Computing and Augmented Intelligence at Arizona State University and Chief Scientist, CAOE leads the research team and their efforts to develop Value-Focused Robust Optimization (VFRO) for Disaster Response for the specific challenges of COVID-19. His team includes co-investigators Dave Morton at Northwestern University and Lauren Davis at North Carolina A&T University.

Morton's past work with Lauren Meyers at the University of Texas at Austin on mathematical epidemiology for the H1N1 pandemic led to a renewed collaboration with the UT COVID-19 Modeling Consortium, involving building new models and solution methods to address specific aspects of COVID-19. Their teams developed and deployed a staged-alert system in Austin Texas, in use since May 2020, and further developed models and solutions for ventilator deployment/redeployment, antiviral logistics and equalizing access to vaccines.

Mirchandani sees the immediate benefit of applying the team's previous work to the current pandemic. "Natural disasters can take many forms - from hurricanes and wildfires to floods and pandemics - but the ways we must address those challenges often take similar paths, and include everything from the critical resource allocation to the development of efficient supply chain processes."

As part of their findings, the team will assist policymakers with data supported recommendations to guide decisions reducing the pandemic's negative impacts on critical resources, processes and supply chains.

Desmar Walkes MD, Medical Director/Health Authority at City of Austin- Travis County sees the current value of the work. "This most recent model that incorporates waning immunity and susceptibility will be very helpful to the team as we move to address our future mitigation strategies."



Trust Issues: Learning How to Evaluate Artificial Intelligence

As artificial intelligence (AI), machine learning (ML) and autonomous systems become more integrated with our daily lives, a concerted effort is being made to develop technical standards to assess the trustworthiness of these technologies.

The Multisource AI Scorecard Table for System Evaluation (MAST) was developed as a standard checklist to promote understandable and trustworthy AI outputs. However, a critical gap remains as MAST has yet to be validated as a proven tool in specific AI-enabled applications. The Center for Accelerating Operational Efficiency (CAOE) put together a project team to study its potential.

This research is evaluating the viability of MAST as a standard checklist for assessing trust in AI-enabled decision support systems. This includes the testing and analysis of MAST criteria in human-AI decision-making. As part of their process, this team is objectively looking at the hundreds of decisions that go into translating relatively abstract constructs and requirements into design feature or workflows.

A recent cooperative effort between the Transportation Security Administration (TSA) and the U.S. Customs and Border Protection (CBP) piloted the deployment of AI technology for traveler identity matching tasks. The specific knowledge gap addressed in this research will clarify the ability of MAST to evaluate the trustworthiness of advanced AI decision support systems.

Principal Investigator and Assistant Professor at Arizona State University, Erin K. Chiou, sees the project as a natural scientific evolution of emerging technologies like AI and ML with a wide range of potential applications. "This project grouped industry representatives, agency stakeholders and students share the same goals, which are to make AI-enabled systems more inspectable and effective for people and organizations, and to do this in a scalable way."

This type of cost-effective evaluation of AI-based solutions gives the TSA much needed insight to the strengths and limitations of a potential solution before it is purchased and deployed. As a result, the agency can put efforts into the integration of technologies that have the highest probability for success in the pursuit of their mission.



Playing Risk: Using Data, Modeling and Game Theory to Validate Enemy Threats

The U.S. Department of Homeland Security (DHS) faces constantly evolving threats from our adversaries. To assist the agency in this ongoing challenge, the Center for Accelerating Operational Efficiency (CAOE) is developing a dependable validation method for tactical-level adversary behavior models, especially in highly dynamic environments, like those under the authority of the Transportation Security Administration (TSA).

This project uses course-of-action red teaming (COART) and comparative experimental analysis for the validation of models simulating novel circumstances not represented by historical or accessible data.

Objectives of the project “Validating Adaptive Behavior Models of Adversaries for Risk Assessment (VABMARA) Framework” establishes course-of-action red teaming (COART) as a viable, cost-effective validation framework for tactical- and operational-level adaptive adversary behavior models within the Homeland Security Enterprise (HSE). This project also provides validated adaptive adversary inputs to improve existing TSA risk assessment models and testing procedures.

Principal Investigator and Assistant Professor Brandon Behlendorf, also brings special insight to this position through his work as Homeland Security & Cybersecurity Deputy Director, Center for Advanced Red Teaming at University of Albany – State University of New York.

He leads a collaborative project team composed of scholars, students and practitioners, each inspired to make a lasting impact on complex and evolving security challenges.

Behlendorf confirmed the team's early success. “The simulated role-playing (red-teaming) matched so well against results from historical case studies, utilitarian decision models and game theory. You propose research because the potential is there, but until you complete the process you don't know how it will turn out.”

TSA official, Matt Barton can see this project's lasting impact on national security. “The HSE continues to face new perils from adversaries who will continue to adapt. This framework gives agencies like the TSA a powerful tool in preparing for tomorrow's threats,” he said.





Erin K. Chiou

*Assistant Professor of Human Systems Engineering
Arizona State University*

As automation technology becomes more prevalent in homeland security efforts, it's important to understand the challenges and benefits of human-automation interaction. Assistant professor Erin K. Chiou is focused on researching human factors and ergonomics, specifically a combination of cognitive systems engineering and macroergonomics.

"One of the greatest challenges facing homeland security is the potential overreliance on automation. As technology becomes increasingly sophisticated and robust, frontline workers are increasingly difficult to recruit and retain, and training becomes increasingly expensive," states Chiou. As lead PI on the CAOEE project "Trust in AI-Enabled Decision Support Systems," Chiou is directly helping to solve those challenges by studying the fundamental limitations of both human and automated agents in complex work systems, and understanding how

human capabilities fill system gaps that are left behind or unaccounted for by automation design.

"No automation is perfect, so understanding how the human systems surrounding them, including the operators and organizations are affected in off-nominal situations is central to the work that I do."

Chiou, directs the Automation Design Advancing People and Technology (ADAPT) lab at Arizona State University, which focuses on how automation can enhance cooperation to improve productivity, quality and safety. Her graduate degrees were funded by the National Science Foundation Graduate Research Fellowship Program and the Graduate Engineering Research Scholars advanced opportunity fellowship. From 2008 – 2011 she worked in a variety of industries, including as a human factors engineer at a medical device company, and as an advisor at an international education startup company.



Jingrui He

Associate Professor Jingrui He believes one of the greatest challenges facing Homeland Security is lone wolf terrorism, such as home-grown violent extremist attacks. Her research focuses on heterogeneous machine learning, rare category analysis, and semi-supervised learning with applications in social network analysis, security, healthcare, and finance.

For the CAOEE, He has led several projects in these research areas including her most recent project focused on disinformation. Through her CAOEE research, He has had the opportunity to work and collaborate with experts with diverse backgrounds and has valued her engagement with stakeholders within DHS agencies, stating that "the most surprising thing I learned as part of my work on CAOEE projects is how information and domain knowledge shared by the stakeholders can inspire new research directions, guide model construction, and inform the evaluation of various techniques."

He is the recipient of the 2016 NSF CAREER Award and a three-time recipient of the IBM Faculty Award, in 2018, 2015 and 2014 respectively, and was selected for an IJCAI 2017 Early Career Spotlight. She has published more than 90 refereed articles, and is the author of two books, *Analysis of Rare Categories* (Springer-Verlag, 2011) and *Social Media Analytics for User Behavior Modeling: A Task Heterogeneity Perspective*. (CRC Press, 2020).



Dave Morton

Professor Dave Morton has a long history of using operations research including developing models and methods in stochastic and large-scale optimization for decision making under uncertainty. At the start of the pandemic, Morton was Co-PI on the project "Value-focused Robust Optimization for Disaster Response," which was examining solutions to hurricane response and other natural disasters led by Pitu Mirchandani, Chief Scientist for CAOEE. Morton realized an opportunity to pivot the research on this project to better respond to the many challenges of the COVID pandemic in early 2020. The result was development of a COVID-19 staged-alter system in Austin Texas (<https://austin.maps.arcgis.com/apps/dashboards/0ad7fa50ba504e73be9945ec2a7841cb>). "Our work has been guiding policy in the Austin, Texas metropolitan area since spring of 2020. I believe that data-driven scientific models can, and should, continue to guide both policy and the understanding of the current risk by residents in cities like Austin."

Morton has done much past research using mathematical epidemiology including the utilizing the SEIR model (susceptible-exposed-infected-recovered). He noted that through this project, "The most surprising thing I have learned is that a well-calibrated and parsimonious SEIR model — that captures differences that truly make a difference — can perform remarkably well at the level of a large metropolitan area."

Dave Morton is the David A. and Karen Richards Sachs Professor and Department Chair of Industrial Engineering & Management Sciences at Northwestern University. He received his PhD in Operations Research from Stanford University. He was a Fulbright Research Scholar at Charles University in Prague, a National Research Council Postdoctoral Fellow in the Operations Research Department at the Naval Postgraduate School and is an INFORMS Fellow.

Research Team

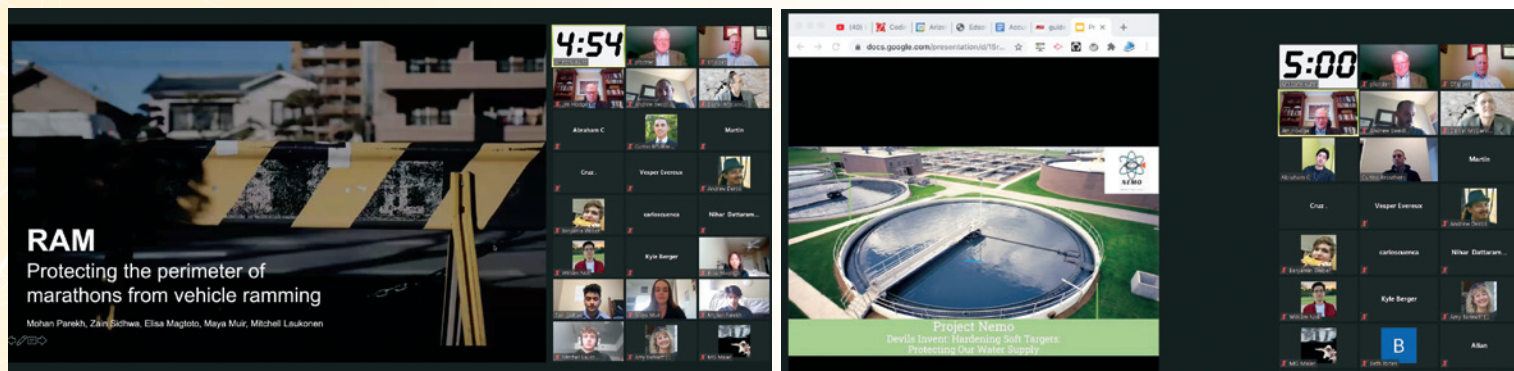
Researchers	Expertise	Institution
Principal Investigators		
Ackerman, Gary	Violent Groups and Movements; Individual Behavior; Chemical and Biological Threats; Radiological and Nuclear Threats; Radical Beliefs and Behavior	University at Albany (State University of New York)
Behlendorf, Brandon	Illicit Trafficking Networks; Violent Victimization across the Life Course; Geospatial Dynamics of Conflicts and their Effects on Individuals; International/Comparative Criminology; Quantitative and Mathematical Modeling of Violence; Policing	University at Albany (State University of New York)
Chiou, Erin	Human-automation Interaction; Trust in Automation, Human-agent Cooperation in complex systems; Resilience Engineering; Health Systems Engineering, Healthcare Human Factors; Medical Devices	Arizona State University
Escobedo, Adolfo	Theory and Application of Linear and Mixed Integer Programming; Design, Analysis, and Efficient Implementation of Optimization Algorithms; Power Systems Operations and Planning; Circular Economy; Computational Social Choice; Computational Linear Algebra	Arizona State University
Dixon, Peter	Economic modelling; Economic Policy Analysis	Victoria University, Melbourne
Giesecke, James	Economic Modeling; Large-Scale Multi-Regional and National Computable General Equilibrium (CGE) Models, and the application of these models	Victoria University, Melbourne
He, Jingrui	Heterogeneous Machine Learning; Rare Category Analysis; Social Network Analysis; Semiconductor Manufacturing; Traffic Analysis; Medical Informatics	University of Illinois at Urbana-Champaign
Holt, Thomas	Cybercrime; Subcultures; Computer Hacking; Malicious Software; Digital Piracy	Michigan State University
Kuhn, Anthony	Engineering; Circuits; Engineering Education	Arizona State University
Kull, Thomas	Behavioral Supply Chain; Sociocultural Issues; Supply Chain Risk	Arizona State University
Maciejewski, Ross	Visual Analytics; Predictive Analytics; Geographical Visualization; Information Visualization; Healthcare Informatics; Data Science	Arizona State University
Mancenido, Michelle (Mickey)	Mathematical and Natural Sciences; Optimal Design of Experiments; Mixture Experiment; Non-linear Responses; Quality Control; Machine Learning; Efficient Industrial Processes	Arizona State University
McCarville, Daniel	Quality Engineering; Industrial Statistics; Engineering Management with a General Focus on Continuous Improvement Methodologies	Arizona State University
Mirchandani, Pitu	Optimization, Decision-making Under Uncertainty, Real-Time Control and Logistics; Applications in Urban Service Systems; Transportation; Homeland Security	Arizona State University
Perez, Eduardo	Analysis; Evaluation and Optimization of Large-Scale Systems; Healthcare System Analysis; Humanitarian Logistics; Renewable Energy System Analysis	Texas State University*
Roberts, Fred	Applications of Discrete Mathematics; Graph Theory; Decision-Making; Measurement Theory	Rutgers University
Rose, Adam	Energy and Environmental Economics; Public Policy; Natural Hazards and Terrorism; Regional Science; Applied General Equilibrium Modeling	University of Southern California
Ruston, Scott	Narrative; Narrative Theory; Strategic Communication; Mobile Media; Cinema Television	Arizona State University
Sefair, Jorge	Network Optimization; Robust Optimization; Integer Programming; Applications of Optimization in Environment; Public Policy; Urban Planning; Finance	Arizona State University
Stefanidis, Tony	GeoSocial Analysis; Digital Image Analysis	William & Mary
Terrill, William	Policing; Use of Force; Culture	Arizona State University
Yen, John	Artificial Intelligence; Data Science; Health Informatics	Pennsylvania State University
Co-Principal Investigators		
Aguirre, Francisco	Computational Methods; Operations Research; Engineering Probability	University of Texas at El Paso*
Aksanli, Baris	Embedded Systems; Energy-efficient Systems; Internet of Things	San Diego State University*
Askin, Ronald	Production Logistics; Manufacturing Systems Analysis; Applied Operations Research; Applied Statistics	Arizona State University
Baier, Heather M.	Data Science; Applied Science; Machine Learning; Geospatial Data	William & Mary
Bauer, Johannes	Internet Economics; Digital Innovation; Media and Information Economics; Cybersecurity; Governance of Network Industries	Michigan State University

Research Team

Researchers	Expertise	Institution
Co-Principal Investigators		
Burns, William	Risk Perception; Deterrence; Inoculation Theory; Agent-Based; System Dynamics and Causal Modeling	California State University San Marcos*
Carpenter, Tamra	Discrete Mathematics and Theoretical Computer Science	Rutgers University
Chermak, Steven	Domestic Terrorism; Targeted Violence; Hate Crimes; Criminal Justice Organizations; Media and Criminal Justice	Michigan State University
Cheu, Ruey Long (Kelvin)	Applications of Artificial Intelligence in Transportation and Intelligent Transportation Systems (ITS); Cross Border Transportation; Transportation Security	University of Texas at El Paso*
Davis, Lauren	Humanitarian Logistics; Supply Chain Optimization; Emergency Preparedness/Response	North Carolina A&T State University*
Egan, Dennis	Data Analytics, Cyber Identity, Security Metrics, First Responder Training and Technologies, Human- Computer Interaction; Cognitive Science.	Rutgers University
Elsayed, E.A.	Systems Reliability Engineering; Accelerated Life Testing, Reliability Prediction Models; Design of Test Plans, On-Line Quality Engineering; Sheet Folding Theory and Technology, Aviation Research	Rutgers University
Espiritu, Jose	Sustainability Engineering; Transportation Funds Allocation; Electricity Distribution System Optimization	Texas A&M University - Kingsville*
Freilich, Joshua	Causes of and Responses to Terrorism; Environmental Criminology	John Jay College*
Fuentes, Olac	Artificial Intelligence; Computer Vision; Machine Learning; Robotics; Astronomy	University of Texas at El Paso*
Guo, Weihong "Grace"	Image Processing; Image Reconstruction; Optimization	Rutgers University
Hlavka, Jakub	Biotechnology; Economic Policy; Emerging Technologies; Health Economics; International Economic Relations; Modeling and Simulation; Science, Technology, and Innovation Policy	University of Southern California
John, Richard	Normative and Descriptive Models of Human Judgment and Decision-Making and Methodological Issues in Application of Decision and Probabilistic Risk Analysis	University of Southern California
Kallitsis, Michalis	Interface of Computer Networks; Large-Scale Internet Measurements; Algorithm Design; Machine Learning; Security and Privacy	Merit Network
Lawson, Catherine	Urban Transportation Data and Information Systems; Freight Planning; Travel Behavior; "Healthy" Infrastructure; Water Transport; Hazmat Transport; Microsimulation; GIS Applications	University at Albany (State University of New York)
Morris, Brendan	Computer Vision; Intelligent Systems; Pattern Recognition; Machine Learning; Intelligent Transportation Systems; Intelligent Vehicles	University of Nevada, Las Vegas*
Morton, David	Stochastic Optimization and its Application to Energy; Security and Health Systems	Northwestern University
Nelson, Christie	Operations Research; Mathematics	Rutgers University
Pavlic, Ted	Operations Research Modeling and Simulation; Autonomous Systems	Arizona State University
Pompelli, Gregory	Cross-Border Threat Screening and Supply Chain Defense	Texas A&M University
Rimmer, Maureen (Bleazby)	Applied Computable General Equilibrium (CGE) Modelling; CGE Model Development	Victoria University, Melbourne
Ross, Arun	Biometrics; Computer Vision; Pattern Recognition; Iris Recognition	Michigan State University
Runfola, Dan	Computational Geography; Human-Environment Relations; Geospatial Analysis	William & Mary
Shillair, Ruth	Human Factors in Cybersecurity; Digital Literacy; Cybersecurity Capacity; Digital Divide Issues	Michigan State University
Tong, Hanghang	Large Scale Data Mining and Machine Learning; Social Networks Analysis; Healthcare; Cybersecurity; e-Commerce	University of Illinois at Urbana-Champaign
Wei, Dan	Energy and Climate Policy; Energy and Environmental Economics; Economics of Natural and Man-Made Disasters	University of Southern California
Wittwer, Glyn	CGE Modelling; Regional Modelling, Water	Victoria University, Melbourne
Zhuang, Jun	Game Theory; Risk Analysis; Decision Analysis; Disaster Management; Big Data Analytics	University at Buffalo (State University of New York)

*Minority Serving Institution (MSI)

CAOE education program supports the U.S. Department of Homeland Security Enterprise (HSE) in fulfilling its mission through the creation of undergraduate, graduate and workforce development education opportunities. A special focus is placed on providing education in areas including artificial intelligence, machine learning and game theory. These skills will continue to develop the current DHS workforce and engage students to consider future careers within the HSE.



Students Develop Innovative Ways to Secure Crowded Places in Hardening Soft Targets Challenge

In the parlance of homeland security, soft targets are places that are easily accessible to the general public and relatively unprotected. Marathons, large gatherings, sporting events and shopping malls are considered soft targets. Soft targets are challenging to secure.

During the weekend of March 26–28, innovative students from both Arizona State University and the University of Nevada, Las Vegas competed in “Hardening Soft Targets” — a design challenge hosted by the Center for Accelerating Operational Efficiency, a DHS Center for Excellence led by ASU.

Hardening Soft Targets was organized as part of Devils Invent, a series of engineering and design challenges from ASU's Ira A. Fulton Schools of Engineering. During this three-day event, students worked directly with experts from the Department of Homeland Security and the Phoenix Police Department, as well as industry leaders and members of academia who participated as mentors and judges.

The students were given the choice of three timely soft target challenges to work on solving: 1) protecting the perimeter of a marathon from vehicle ramming; 2) designing city infrastructure to prevent vehicle ramming attacks; and 3) ensuring that municipalities' water systems are protected from cyberattacks.

Bill Bryan, undersecretary (acting) for DHS Science and Technology Directorate, provided opening remarks.

“Those places we call soft targets are usually accessible to a very large number of people, which makes it a real challenge to harden or protect these open and crowded locations such as transportation systems or neighborhood parks,” he said. He also stated that “bad actors select soft targets because

of the number of people in one location and the perceived value of the target.” Bryan discussed the need for data analytics and database management professionals to help counter the risks of soft targets.

“There's a growing need: the ability to collect, manage and share real-time information for the security of our citizens while protecting their privacy and civil liberties,” Bryan said.

He closed his remarks by emphasizing how much need there is for today's students to “reshape the homeland security workforce of the future.”

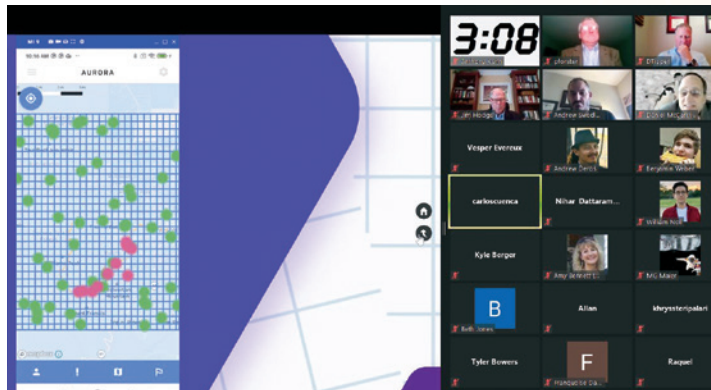
Former DHS presidential appointee and current adjunct professor at Seton Hall University Mohamad Mirghahari also kicked off the event. Mirghahari gave the students a real-world overview of possible attack scenarios, adversarial actors, security gaps and countermeasure strategies currently being deployed.

“Soft targets can be executed with little or no planning or expertise, and they're often able to remain undetected until operational,” Mirghahari said. “Together with the massive amount of soft target locations it presents a significant security challenge.”

He used the example of the Super Bowl to illustrate the substantial number of possible soft targets.

“Instead of potentially targeting the actual Super Bowl there are pregame and lead-up events around the city and near the site, which do not have the (same) security posture as the main event,” he said.

Mirghahari then discussed the importance of design challenges such as this one to give students the opportunities to “engineer the next solutions and ideas.”



The city of Phoenix Police Department and personnel from their Homeland Defense Bureau and Arizona Fusion Center provided technical expertise and resources for planning the event. Sgt. Chris Scranton from Phoenix PD's Homeland Defense Bureau led the planning efforts and acted as a mentor, providing a local law enforcement perspective to the challenge of soft targets.

At the beginning of the event, students organized themselves into hybrid teams of expertise across major academic disciplines and universities. They then named their teams, selected their scenario of choice and developed strategic approaches to the challenge statements.

Academic mentors were led by Ross Maciejewski, Center for Accelerating Operational Efficiency director and associate professor in ASU's School of Computing and Augmented Intelligence; Dan McCarville, Center for Accelerating Operational Efficiency associate director of education and professor of practice in School of Computing and Augmented Intelligence; and Mohamed Trabia, associate dean for research, graduate studies and computing at UNLV. They were joined by noted industry and government experts to provide the eight competing teams with hands-on guidance and feedback during the challenge.

Over 30 students and 15 judges and mentors worked hard over the three-day challenge to offer creative solutions to hardening soft targets.

The Winning Teams

First place: Team RAM, ASU

Elisa Magtoto, computer science; **Maya Muir**, computer science and math; **Mohan Parekh**, mechanical engineering; **Zain Sidhwa**, business data analytics; **Mitchell Laukonen**, computer science.

Team RAM developed a mechanical barrier device for marathon event protection. It was designed as a mobile, easily transportable, cost-effective layered system that allowed for future technological integration. The presentation included a prototype of their design.

Second place: SECURiVISION, UNLV

Janelle Domantay, computer science; **Yuria Mann**, computer science; **Dylan Obata**, computer science.

SECURiVISION proposed a solution addressing equipment and human factor vulnerabilities in securing water facilities from attack including insider threats using blockchain and machine learning capabilities.

Third place: Tie

Project NEMO, ASU and UNLV

Curtiss Brothurs, graduate student, learning sciences, ASU; **Abraham Castaneda**, electrical engineering, UNLV; **Zeinab Mohammed**, graduate student, engineering management, ASU; **Niranjana Venkatesan**, mechanical engineering, UNLV.

Project NEMO incorporated an environmental design approach as an ecosystem to protect municipal water facilities. Their concept spanned from employee credential validation to application and integrity of cyber firewalls.

BAWaN, ASU

Andrew Desos, mechanical engineering; **Alexander Hollar**, chemical engineering; **Nihar Masurkar**, graduate student, robotics and autonomous systems, mechanical and aerospace engineering; **Will Noll**, biomedical engineering; **Ben Weber**, aerospace engineering

BAWaN designed deployable vehicle barricades for marathon security, a strong steel structure with sensor ability for adapting to various vehicle sizes. The presentation included a prototype of their design.



CAOE Summer Research Experience 2021

The annual CAOE Summer Experience Quantitative Analytics (SEQAL) welcomed a new group of students in the summer of 2021. This four-week research experience combined significant data analytics training with real-world problem solving for TSA operational challenges. As our first virtual summer experience, the program included technology minded, innovative students from around the U.S. Twenty-five students from 11 academic partners were chosen from a competitive application process. The academic partners included 10 MSI partners: John Jay College of Criminal Justice, Morgan State University, San Diego State University, Texas Southern University, San Diego State University, Texas Southern University, University of California-Santa Cruz, University of Central Florida, University of Houston and University of Maryland Eastern Shore.

The experience was kicked off by Jerry Booker, Director, Special Operations Division, Inspection, TSA, who gave the students a real-world overview of the types of challenges TSA is currently facing. Booker stated, "The future of transportation security is a rapidly evolving landscape with challenges and opportunities regarding new technology and innovation. Now is the time for problem solvers to explore new ideas and better ways to protect the nation's transportation systems to ensure freedom of movement for people and commerce."

The program included both lessons and team assignments. The education components included lectures on statistics and decision analysis taught by faculty from ASU, UNLV and San Diego State University. Topic areas included: problem solving simulations and data analytics, data visualization and machine learning, stochastic simulation models, computer vision, internet of things and deterministic operations research.

The experience concluded with students presenting their simulation models for different TSA and airport operations to DHS leadership and a discussion on career opportunities within DHS.

Student Reactions

"Liked how technology is attached to Internet of Things (IoT) without us even realizing it. It was interesting to see the connections and I really enjoyed the way the section was structured. The hands-on work implementing the presentations after the lectures made it easier for me to understand the concepts."

"Loved the fact that we actually built an entire simulation on Arena that mimicked a TSA checkout simulation."

"Liked that we got to put a new simulation software to use that I have never used in the past. In addition, we also got to present to a higher up in DHS."

"Liked discussing how data can technically be authentic and accurate, but be displayed in ways that are misleading. Such concepts make you be on the lookout to evaluate the data presented and do further self-analysis to determine if what's being presented is "honest". It can be applied not only to school or the workplace but also to everyday life. This is what made the break-out activity of looking for examples of data manipulation "in the wild" both fascinating and alarming."



Enoch Bonsu

Graduate Student, North Carolina A&T State University

The COVID-19 pandemic had dramatic effects on every aspect of our society, including the country's food supply. Many workers in the food industry were impacted with illness, worker shortages and exposure to the disease.

Student researcher, Enoch Kwabena Bonsu is helping to determine if cultural practices in their homes impacted these workers and the productivity of food processing. He is working with the Center for Accelerating Operational Efficiency (CAOE) on a project titled "The Effects of COVID-19 on the Food Supply Chain as a Result of Living in Close Quarters."

This research is a subset of a larger CAOE project, "Optimization for Disaster Response," under the leadership of Principal Investigator, Pitu Mirchandani. In this focused study, Bonsu is researching the

effects of a disturbance like the pandemic has on the food supply chain, including workers, productivity and stress applied to the chain itself. He hopes to provide insight that could lead to an optimized response to future events.

In his role on the project, Bonsu is responsible for weekly individual and group presentations where fellow researchers share their opinions on the latest developments. "For me, this project is an exciting learning opportunity. Our team is adapting to new information, learning some new skills required to get results and working with new software tools to visualize and understand the results," Bonsu said.

This project revealed some information that demonstrates the pandemic's degradation of the national supply chain. From the infection rate among workers to the impact of propaganda campaigns denying the potency of the virus, Bonsu sees this study as a "wake up call" for everyone to follow safety measures, including vaccinations as the best path to restore the economy and our supply chains to normalcy.

He believes this work will be beneficial to his master's thesis, which centers on the public health supply chain - including the damage inflicted by COVID-19 - and how it can be restored and strengthened to withstand future pandemics.

Bonsu is currently a student at North Carolina A&T State University where he is in the process of earning a Master's Degree in Industrial and Systems Engineering.



Hayley Peterson

Graduate Student: University of Albany – State University of New York

In today's world, The United States receives numerous threats from adversaries. The U.S. Department of Homeland Security (DHS) is tasked with validating the risks of these tactical-level behaviors that continue to adapt and grow in complexity. This capability is critical for the agency's mission, especially for components like the Transportation Security Administration (TSA).

The Center for Accelerating Operational Efficiency (CAOE) has a project team currently studying the creation of a validation framework for these threats. This project is called "Validating Adaptive Behavioral Models of Adversaries Risk Assessments" (VAMBRA). Student researcher, Hayley Peterson is among those working toward the solution.

Peterson is a Research Associate and Exercise Designer at the Center for Advanced Red-Teaming working on creating a viable, low-cost validation framework solution to assist TSA risk assessment models and testing procedures.

Her role on this project is to analyze the data collected from the participants of the red-teaming exercises and develop operational reports of key findings from the study for use by various end-users. "For me, the most challenging part of the project was understanding the statistical analysis processes that were used. But I enjoy my role in analyzing the data we captured and turning it into written and graphical depictions that were easy to communicate to stakeholders," Peterson said.

This project has given Peterson some insight into her future career as a Research Associate and Exercise Designer at the Center for Advanced Red-Teaming, reinforcing her decision to pursue a career in Homeland Security. "I really enjoyed interacting with so many amazing women and men in the workforce who are deeply passionate about their work and dedicate their lives to their jobs," she added.

She believes the team will provide the validation for risk models in addition to operational guidance for organizations using them. With time, Peterson hopes their work will also instill confidence in prediction and deterrence methods, while increasing the long-run resilience of aviation and other critical infrastructures.

Peterson is currently working towards a Master in Business Administration (MBA) for Information Systems & Business Analytics at the University of Albany (SUNY).



Laura Mills

Undergraduate Student: William & Mary

Human migratory decisions are the result of a complex range of interacting factors, including economic, social and environmental vulnerabilities. Advancing our understanding of why, how, and where migration occurs across U.S. borders will help guide both U.S. government border operations and U.S. socioeconomic policies with countries experiencing surges in migration into the country.

Student Laura Mills is a key member of the CAOEE research team that is studying the push-and-pull factors that drive migration along the southern border. She is responsible for extracting socioeconomic information at the municipality level from the world's largest collection of census data, including cleaning datasets for each country of interest. Mills

also creates data visualizations using static map layouts.

These are challenging tasks, as each dataset contains over 80 variables related to income, occupation, education, health and other measures of economic conditions. "These raw datasets are not uniform, so constant adjustments are required to achieve the desired result, while the slightest coding error or oversight can cause cascading errors as the process moves along," Mills noted.

The team then uses these datasets to create baseline learning models to predict migration patterns using socioeconomic data. Those models are contrasted with satellite-imagery based models to predict migratory flows across the U.S. southern border.

As a student researcher, Mills credits the project with giving her valuable insights into how her education can be used in the field. "I am consistently putting my data science education from my classes into practice. I've grown more confident in my skills and I'm applying them to real world situations. It's been an incredible experience," she explained.

Mills is currently working toward a bachelor's degree in history and data science at William & Mary. She also participated in the CAOEE Summer Experience in Quantitative Analytics in 2021 in a project that focused on operational challenges of the Transportation Security Authority (TSA).

She hopes to continue to leverage her CAOEE student experiences on the project in her future career, working as part of the intelligence community, possibly as a data analyst for the federal government.





CAOE projects realized significant transition progress in 2021 and transition activity continued to evolve. Several key projects have successfully transferred novel academic research to deployable products that have progressed to IP review, provisional patent, patents issued and software delivery stages.

Provisional patent issued for Dynamic Queue Analyzer (DQA)

The Dynamic Resource Allocation for Predicted Demands at a Network of Screening Facilities project led by Dr. Jorge Sefair, Assistant Professor, Arizona State University advanced a decision-support tool, Dynamic Queue Analyzer (DQA) platform for TSA which resulted in the issuance of a provisional U.S. patent. Provisional U.S. Patent (63/081.026) – Issued September 21, 2020. In 2021, continued research and development led to further integration with TSA software planning tools at Phoenix Sky Harbor Airport.

Provisional patented issued for malware behavior tool

Dr. John Yen, Professor at The Pennsylvania State University School of Information Sciences & Technology, led the Scalable Near-Real-Time Identification and Characterization of Malware Behaviors Using Darknet Data project with research partner Merit Network, and a provisional U.S. patent was issued July 13, 2021. This project has direct end-user application interest by DHS CISA and DHS Intelligence & Analysis.

Tool to support TSA human-AI decision-making launches Prototype

The Deferring Decisions: Effects on Human-AI Team Performance project led by Dr. Michelle (Mickey) Mancenido, Assistant Professor, Arizona State University, initiated testing of its Emulator prototype during mid-2021. The Emulator is designed to test system performance and support TSA in human-AI decision-making with operational decisions across the security checkpoint environment.

IP review submitted for elicitation tool on threat assessment for ICT supply chain

An IP review was initiated through Rutgers University for the novel elicitation tool developed by Dr. Fred Roberts and team on the Threat Assessment for The ICT Supply Chain and COE Initiative on COVID-19 Supply Chain project. Research is evolving on a related simulation model.

SAMBAS software product deployed to CBP

The Simulation, Analysis and Modeling for Border Apprehension and Security (SAMBAS) project deployed a software product, a portable toolkit, to CBP in June 2021. Lead PI, Dr. Brandon Behlendorf, Assistant Professor, College of Emergency Preparedness, Homeland Security and Cybersecurity at University of Albany, has submitted for initial IP reviews, including provisional patent reviews for the project's models and algorithms related to these efforts,

Knowledge products delivered DHS Procurement Innovation Lab (PIL)

Accelerating Acquisition Excellence through a Supply-Base Improvement System project, led by Dr. Thomas Kull Arizona State University, delivered trend analysis coding and qualitative methodologies for Competing Values Framework CVF, a commercial tool/platform. They conducted training sessions and transitioned a corresponding suite of video productions for the DHS Procurement Innovation Lab (PIL).

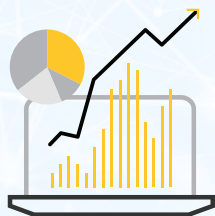
CAOE hosted three successful webinar series starting the summer of 2020 and continuing throughout 2021, and supported a number of researcher led workshops. The CAOE hosted seminars averaged 75-130 people per session with many DHS stakeholders attending. The seminar series falls in both our education and outreach objectives with topics of interest to both DHS professionals and our academic and industry partners. In-depth workshops were developed for our DHS component stakeholders.



Seminar Series

Truths and Myths of Decision Science

As the use of computational technologies has become ubiquitous in the Homeland Security Enterprise, questions regarding current capabilities and emerging trends dominate the news cycle. This series provided an overview of current computational “myths” followed by a presentation on emerging research with the goal to examine some of the hot topic computer science issues, focusing on truths and myths while showcasing research that can help move technology forward. Topics included biometrics, deep learning, misinformation, cybersecurity and more.



The Economic Impacts of COVID-19

Across the globe, countries are witnessing some of the steepest economic contractions in nearly one hundred years as a direct and indirect result of COVID-19. As such, numerous economic forecasts and analyses are being developed to support planning and decision-making as governments try to combat this crisis. This seminar series highlighted recent studies of the aggregate and distributional economic impacts of COVID-19, focusing on causal factors, mitigation measures and countervailing policies.

This six-seminar series was co-presented by the Center for Risk and Economic Analysis of Terrorism Events (CREATE) at the University of Southern California and the Center for Accelerating Operational Efficiency (CAOE) at Arizona State University in partnership with DHS Science and Technology Directorate (DHS S&T).



Operations Research for COVID-19

COVID-19 has posed unprecedented challenges to modern society, and the extent of the virus spread has become a great threat to the U.S., calling for timely decisions to prevent and mitigate further negative consequences. Many challenges have emerged related to vaccine roll-out logistics, healthcare capacity planning and personal protective equipment distribution, among others.

This seminar series was designed to provide a sample of ongoing works on operations research decision-making models related to multiple aspects of COVID-19. This five-seminar series was hosted to highlight the cutting-edge operational research being completed by both academic and industry partners to solve the supply chain challenges surrounding COVID-19.





Workshops

COVID-19 – Supply Chain Workshops

This series of workshops helped identify tools and technologies that would be useful to mitigate the impacts of the COVID-19 pandemic and prepare for future disasters. These CAO E funded workshops were a collaborative effort with ten current and emeritus COEs contributing. Participating COEs included: CINA, ADAC, CCICADA, CREATE, CBTS and CEEZAD



The topics for this series included:

- Enhanced Supply Chain Crime During the Pandemic
- Supply of Labor During the Pandemic
- Food Supply Chain During the Pandemic
- Supply Chain for Medicines, Vaccines, PPEs During the Pandemic
- COVID-19 Vaccine Efficacy and Safety
- COVID-19 Vaccine Distribution and Prioritization
- Suez Canal Incident: Implications for the Global Maritime Supply Chain

This series of workshops started a very successful dialogue between DHS and the private sector, and led to a variety of follow up collaborative efforts including workshops, panel sessions, white papers and project proposals.



Building a Resilient Transportation Future TSA-CAOE Symposium 2021

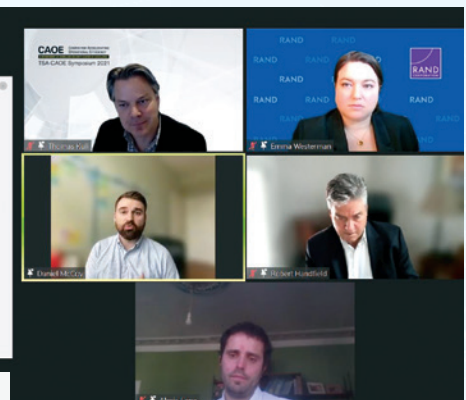
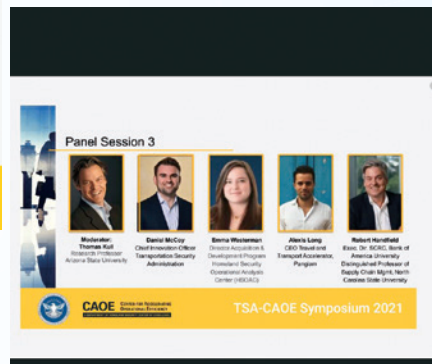
The theme and tone of the 6th annual TSA-CAOE Symposium was a positive look at how we as a nation move our transportation systems and structure forward after the challenging impacts of the COVID-19 pandemic.

The Center for Accelerating Operational Efficiency (CAOE) was honored to host the continuation of the Transportation Security Administration (TSA) Symposium in 2021 after a brief hiatus in 2020 due to COVID-19. The two-day virtual event featured keynote speakers and distinguished expert panelists representing thought leaders and senior executives from across TSA, academia and industry. The structure of the event featured four sessions with different focus areas: lessons of resiliency from COVID-19, building resilience through a diverse workforce, supporting resilience through innovative acquisition and building back better.

Lessons of resiliency from COVID-19

Ken Fletcher, President and CEO of Kestrel Hawk Consulting, began the first session with a keynote titled 'What the pandemic can tell us more broadly about risk.' Fletcher noted, "Governments as well as the private sector are beginning to recognize the need to balance the short-term and long-term consequences from the pandemic and other events into their earnings projections and their cost of doing business." Fletcher added that in light of the pandemic, we need to be thinking about short-term needs, as well as identifying long-term opportunities.

Fletcher's opening remarks were followed by a panel that included Chief Medical Officer Fabrice Czarnecki, who gave a high-level narrative on the timeline of the pandemic and the responses of TSA for continued travel during the pandemic. "Very quickly, it became obvious that this was a serious outbreak and internally we issued the first recommendation to avoid non-critical travel," explained Czarnecki as he recounted the early days of the pandemic.



Building resilience through a diverse workforce

Stacey Fitzmaurice, Senior Official Performing the Duties of the Deputy Administrator, TSA, delivered the keynote for the second session, describing the goals of TSA around diversity and inclusion. “We see inclusion as a collaborative, supportive and respectful environment that emphasizes and encourages the participation and contributions of all employees.” Fitzmaurice went on to outline the steps TSA is taking to be more inclusive.

Supporting resilience through innovative acquisition

Day two of the event shifted gears and covered supporting resilience through innovative acquisition with Soraya Correa, Chief Procurement Officer, DHS. “A lot of people think that compliance gets in the way of achieving mission — that is not true. We have to be clever, creative, innovative and understand what’s needed.” Correa discussed how DHS is using the procurement innovation lab to achieve the goals of being innovative and resilient. “My goal with the Procurement Innovation Lab (PIL) was to invite all of the members of my community in the acquisition community to bring me any good ideas and creative approaches that can help us improve procurement.”

The keynote was followed by a panel who continued the discussion on the tension between being innovative and mitigating risk and how academics, industry and government can work together to build more innovative organizational cultures.

Building Back Better

Darby LaJoye, Senior Official Performing the Duties of the Administrator, was the keynote for the final session of the event. LaJoye walked through a brief history of the TSA and explained how the agency is unique: “We are very much a part of the industry that we regulate. How we facilitate that is a very important indicator for how passengers are going to feel about the overall experience.” LaJoye also noted how TSA supported frontline workers that needed to travel during the peak of the pandemic. “TSA was there so that doctors and nurses could travel, so we are very much a part of the industry, a part of the country which we have to keep safe and secure.”

The 2021 TSA-CAOE symposium represents a tradition initiated in 2015 by CREATE, now a DHS Center of Excellence Emeritus, at the University of Southern California and continued by the CAOE in 2019. Subsequent symposiums are being planned, with 2022 slated as a hybrid in-person and virtual event.

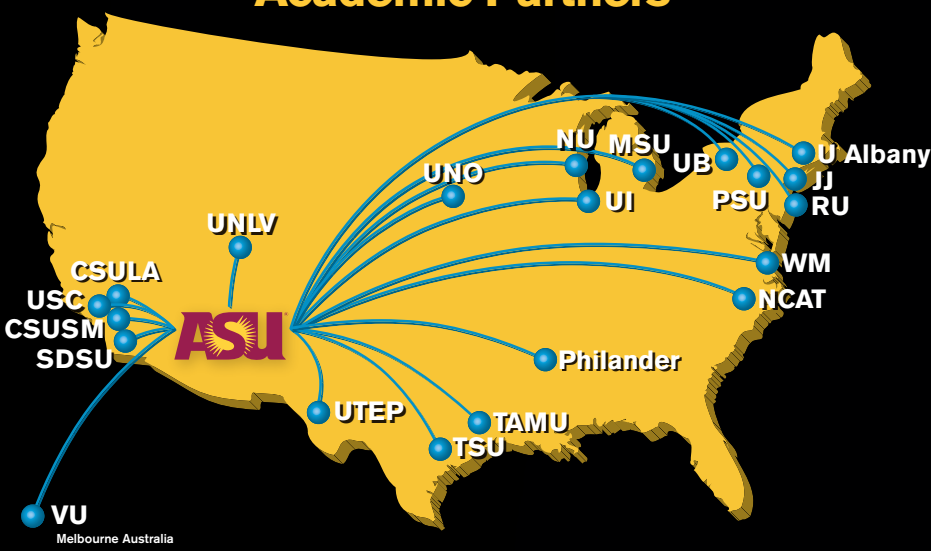


CAOE | CENTER FOR ACCELERATING OPERATIONAL EFFICIENCY

A DEPARTMENT OF HOMELAND SECURITY CENTER OF EXCELLENCE

Improving Homeland Security Operations

Academic Partners



Center for Accelerating Operational Efficiency
PO Box 878609
Tempe, AZ 85287-8609
cao@asu.edu

 @CAOE_ASU

cao.asu.edu