



Letter from the Director - 2021 in review



Happy New Year! As we welcome a new year, I would like to thank our DHS, academic and industry partners for their support throughout 2021. This year continued to be a balancing act with managing CAO E's mission within the ongoing challenges of the pandemic. The CAO E 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 E team is thankful for the continual flexibility from those that support CAO E, 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.

Here are a few highlights of the accomplishments of the CAOE:

- **Over 130 undergraduate (+45) and graduate research students (+90)** were directly involved in research projects and over 40 students from Minority Serving Institutions participated in CAOE education activities through our summer program or as student researchers.
- **Two provisional U.S. patents were issued this year:** 1) Decision Support Tool, Dynamic Queue Analyzer (DQA) for airport checkpoint optimization, and; 2) Integrated Clustering of Darknet Data and Malware Samples for Enhanced Responses for Cyberthreats. Plus, over 60 algorithms, models and prototypes were created.
- **Over 40 articles were published by researchers, and over 45 presentations** were given at 30+ different conferences including the INFORMS Annual Conference, The Institute of Industrial Systems Engineers (IISE), and the 24th Annual Conference in Global Economic Analysis.
- **The TSA-CAOE Symposium was held virtually for the first time in June 2021 with over 400 DHS, industry and academic partners registered** with an average session attendance of over 100 people per session.
- **CAOE hosted two successful seminar series** including The Economic Impacts of COVID-19 and Operations Research for COVID-19 with an average attendance of over 100 people per seminar.

Looking back, I am amazed by the impact that the CAOE has achieved during these uncertain times and I look forward to all that is to come this year.

Thank you again for your support of the CAOE and I wish you a healthy and happy 2022.

Ross

New Videos



Improving Baggage Screening

The project “Improving baggage screening using collective intelligence and machine learning” being led by Adolfo Escobedo. Arizona State University (ASU) and Olac Fuentes, University of Texas, El Paso (UTEP) is working to improve the visual screening process by developing a tool to be used in major U.S. airports and border entry points.

In this video, Escobedo and Olac along with students from ASU and UTEP discuss the value and progress of the project and how the work of CAOE is making a tangible difference.



Predicting cross-border migration patterns

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. social-economic policies for countries experiencing surges in migration into the country.

In this video, CAOE researchers Anthony Stefanidis, Daniel Runfola, Heather Baier and student researcher Lauren Mills from the College of William and Mary describe the exciting developments of this project, “Modeling push-and-pull factors in cross-border migration with deep learning.”

DHS Centers of Excellence (COEs) hosted by CAOEE

Hackathon

Countering Emerging Threats
to Critical Infrastructure

When: Friday 2/25- Sunday 2/27
Where: Virtual via Zoom and Discord



Subject matter presentation by Dr. Stephen Flynn, leading expert on critical infrastructure

Registration is now open for the first multi-COE hackathon/design challenge led by CAOEE. This event presents students with several real-world problem statements impacting homeland security and gives students the opportunity to design, build and implement innovative solutions that will be presented to DHS leadership. In partnership with DHS Centers of Excellence, Critical Infrastructure Resilience Institute (CIRI), Maritime Security Center (MSC), National Counterterrorism Innovation, Technology and Education (NCITE) and Criminal Investigations and

Network Analysis Center (CINA), this hackathon will engage students from ASU, University of Illinois, Stevens Institute of Technology, George Mason University, University of Nebraska at Omaha and our MSI partner schools to develop solutions to protect our critical infrastructure. [READ MORE](#)



Save the Date
TSA-CAOE Symposium 2022
JUNE 22-23

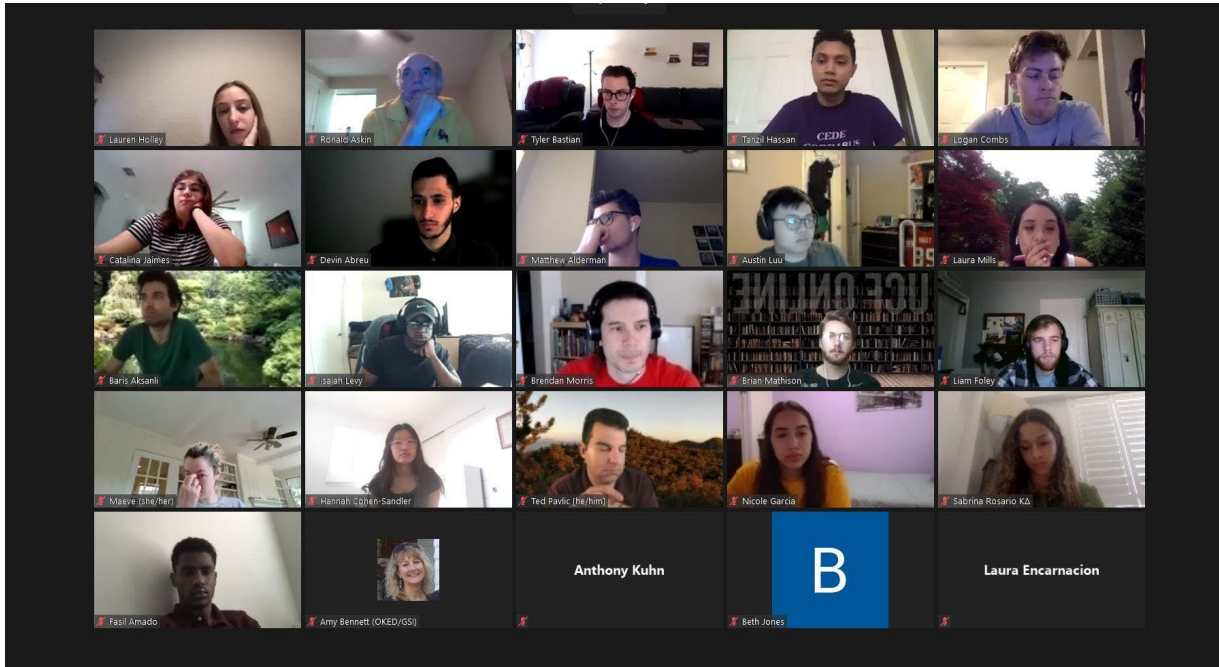
HYBRID EVENT
ASU IN WASHINGTON, D.C. & VIRTUAL



The CAO E is excited to announce the 7th-annual TSA-CAOE Symposium. This year the symposium will be a hybrid event with opportunities to attend in person at ASU D.C. or virtually, June 22-23, 2022.

We are looking for speakers, panelists and participants to discuss the innovative and collaborative initiatives in the transportation security space. Our in-person attendance will be limited to meet with COVID safety measures. If you are interested in more

information, including speaking opportunities at the symposium, please contact CAOE Communications Manager, Dawn Janssen at Dawn.Janssen@asu.edu. Registration for the event will open in early April.



CAOE Undergraduate Summer Experience (SEQAL) 2022 - June 6 - July 1, 2022

Application deadline: March 15, 2022

CAOE Summer Experience in Quantitative Analytics (SEQAL) is now accepting applications for our Summer 2022 session. This STEM-based paid program combines significant data analytics training and real-world problem-solving. The four-week research experience will be virtual with students engaging in live expert-led workshops and group interactive problem solving and data processes to solve real-world challenges faced by The Department of Homeland Security. Students from Minority Serving Institutions are encouraged to apply.

Program Details

- Time commitment of 6 hours each day, Monday through Friday, June 6- July 1, 2022
- \$3000 stipend for completing the entire program
- Work on real-world problems facing The Department of Homeland Security
- Learn new tools and methodologies including data analytics, decision analysis, simulation, and operations research including the development of a stochastic simulation model
- Opportunity to network with other students, faculty, and technology experts from around the country

Key Dates

Application Window: **January 17 - March 15, 2022**

Program Dates: **June 6 - July 2022**

To Apply

[Click here for application](#). Please attach your resume and unofficial transcript.

[Full Program Requirements](#)

Student researcher highlights



Andrew T. Kinoshita

**University of Southern
California**

**Field of study: Bachelor of Arts in
health and human services and
Master of public health**

Gaining a better understanding of policy research

The long-term economic impacts of COVID are uncertain. As a student researcher, Andrew T. Kinoshita was a key member of a project research team developing socioeconomic scenario modeling for the spread of COVID-19.

This experience has given Kinoshita a greater understanding of how policy research is conducted. He is also excited to be working directly in epidemiological modeling and cost-benefit analysis outside the classroom. "I hope this project informs future pandemic responses in ways that transmission can be successfully suppressed using interventions that are the least damaging to our communities, while saving lives and mitigating economic hardship." **[READ MORE](#)**



Nazlican Arslan

Northwestern University

Field of study: Doctorate in industrial engineering and management sciences

Developing a better understanding of epidemiology and disease dynamics

Unpredictable disasters from hurricanes to pandemics are threats to our national security. Student researcher, Nazlican Arslan is designing optimization models and algorithms to solve some of the key problems in pandemic response. These challenges include scenarios for vaccine prioritization, equalizing access to vaccines and safely relaxing social distancing measures as vaccines roll out.

In her role, Arslan expanded her knowledge of coding and modeling, while also developing a better understanding of epidemiology and disease dynamics. She credits this project with expanding her knowledge of data-driven analysis and solution methods while sharpening her critical and analytical thinking skills. "It was fascinating to see the methods, algorithms and technical knowledge I learned in her studies used in practice to make a direct impact on policy making."

[READ MORE](#)

Upcoming Events

February 25-27 - COE spring hackathon hosted by CAO E

June 6- July 1 - CAO E Undergraduate Summer Experience

June 22-23 - TSA-CAOE Symposium