

Cultivating a Talented, Diverse R&D Workforce of the Future

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Newswise — Building a diverse, highly-skilled, technical workforce for the homeland security enterprise and beyond is a top priority for the Department of Homeland Security (DHS) [Science and Technology Directorate \(https://www.dhs.gov/science-and-technology\)](#). (S&T). Tapping into the best and brightest minds of academia, and more specifically focusing on the unique value students and faculty from Minority Serving Institutions (MSI) offer, will usher S&T toward the workforce of the future. Students from a variety of backgrounds bring talent, insight and understanding to complex homeland security challenges; engaging them early in their academic pursuits, and opening doors to hands-on research and internship opportunities, plants the seeds for a lifetime pursuit of solving the nation's most challenging problems using science and technology.

“The work we do here at S&T can only benefit from including a variety of perspectives and insights and looking at issues from all angles. We live in a country with people from many different backgrounds from all over the world—our country's diversity is one of its defining strengths. We want to tap into all the wealth of talent, skill, and insight our society has to offer,” said Rebecca Medina, Director, Office of University Programs. “The experience and background that each person brings to the work fosters innovative solutions to some of our nation's greatest and most challenging issues. It also helps to enhance decision making by providing a wider range of perspectives. Having a diverse workforce will allow us to have better debates that lead to better strategies and better outcomes.”

Through workforce development initiatives like the [MSI Program \(https://www.dhs.gov/science-and-technology/minority-serving-institutions-program\)](#), S&T is creating a cadre of students and faculty from different backgrounds who are well-qualified, eager and ready to begin careers in homeland security science and engineering. The MSI Program, through its initiatives that are closely aligned with the DHS [Centers of Excellence \(https://www.dhs.gov/st-centers-excellence\)](#) (COEs), provides the greater homeland security community—academia (including Asian American and Native American Pacific Islander Serving Institutions, Historically Black Colleges and Universities, Hispanic Serving Institutions, and Tribal Colleges and Universities), federal government agencies, non-governmental organizations, industry, and more—with access to some of the country's best and brightest minds and the vision they bring with them. For the MSI participants, they gain invaluable experience contributing in real time to DHS's science and technology efforts.

One MSI Program initiative, the [Summer Research Team \(SRT\) Program \(https://www.dhs.gov/homeland-security-careers/summer-research-team-program\)](#), engages early career faculty, undergraduate, and graduate students in research related to the key mission and research needs of DHS. SRTs consist of one early career faculty advisor and one or two students who commit to 10 weeks of study with one of the active COEs. This year's [SRT Program participants \(https://www.dhs.gov/science-and-technology/news/2021/05/17/news-release-st-selects-2021-minority-serving-institutions-summer-research-teams\)](#) will begin working on their research projects in early June. Research projects center on everything from risk and economic analysis to food and agriculture security, preparedness and resilience, terrorism and violent extremism, maritime security and compliance with maritime law, and information analysis and visualization.

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In summer 2020, an SRT team developed a low-cost, handheld sulfur emission detection device for U.S. Coast Guard marine inspectors. The team conducted research in collaboration with the [Maritime Security Center \(https://www.dhs.gov/publication/st-msc-fact-sheet\)](https://www.dhs.gov/publication/st-msc-fact-sheet), COE, led by the Stevens Institute of Technology. They used nanotechnology applications to develop a prototype of a handheld sensor platform that can be used to efficiently and effectively monitor compliance and enforce the International Maritime Organization's global cap on vessel sulfur emissions. The prototype of the team's Sulfur Emission Detection handheld device has been recommended for an invention disclosure and potential patent by Stevens Institute of Technology's Office of Technology Commercialization.

Another SRT team used advanced analytical tools to develop a prediction model to help optimize passenger flow in crowded airports; the team found that by effectively placing security officers, the throughput rate of passengers could be improved during peak times. This research, conducted at the [Center for Accelerated Operational Efficiency \(https://www.dhs.gov/publication/st-caoe-fact-sheet\)](https://www.dhs.gov/publication/st-caoe-fact-sheet), (CAOE) COE at Arizona State University, tapped into historical and current data to develop predictive timelines of peaks and dips at Phoenix Sky Harbor International Airport. Through data mining and analysis, the team successfully created a process to determine aircraft load capacity. This information feeds into the Passenger Arrival Estimator (PAE), which provides insight into the total number of passengers in the airport at any given time. Estimates from the PAE integrate into a Dynamic Queue Analyzer (DQA), which optimizes the deployment of transportation security officers across operational lanes to increase throughput. Together, the PAE and DQA serve as input data for the scheduling system for these officers.

A third team worked with the CAOE on a project that focused on emergency response and recovery. The project explored Puerto Rico's experience with Hurricane María to determine how to solve the complex problem of better decision-making during crises. This team's goal was to develop a decision support tool, an inventory theory-based model of individual decision-making, that could help individuals make important life-saving decisions during hurricanes. Last summer, the team developed a prototype of the tool—a mobile application coded in Microsoft Power Apps—with the capacity to work online and offline during disasters.

"The SRT Program gives students practical experience with research that they won't get in a lab. When we speak to students who have participated in the program, we often hear that the experience was challenging but fun and that they benefited from having hands-on experience. And they often recommend the summer program to other students who want to pursue graduate research and post-graduate careers in homeland security," said Gregory Simmons, MSI/Workforce Program Manager, Office of University Programs.

The [Scientific Leadership Award Program \(https://www.dhs.gov/science-and-technology/minority-serving-institutions-program\)](https://www.dhs.gov/science-and-technology/minority-serving-institutions-program), (SLA), is another important component of the MSI Program, one that focuses on developing long-lasting research and education programs that are driven by emerging homeland security needs. For nearly a decade and a half, SLA has supported MSI teaching initiatives, developed curricula, and provided scholarships and funding. In March 2021, grants were awarded (<https://www.dhs.gov/science-and-technology/news/2021/03/10/news-release-dhs-awards-scientific-leadership-grants-five-minority-serving-institutions>) to five minority serving institutions—Texas A&M University Kingsville, University of the District of Columbia, Jackson State University, Tennessee State University, and University of Texas Rio Grande Valley—to develop homeland security course content and to creatively engage students and faculty in research relevant to the complex challenges faced by DHS and the homeland security enterprise.

In short, both SLA and SRT help S&T to cultivate a workforce of the future that is driven by science and innovation. Providing students and faculty access to real hands-on experience, exposing them to the key players in homeland security science and engineering, and developing long-lasting research and education programs within MSI institutions are all essential for engaging our nation's vast and diverse pool of talent. Getting this group involved early ensures that the workforce of the future benefits from the valuable talent and insight that MSI communities have to offer.

"When we seek out the talent that MSI communities offer and celebrate what is both common and different, we become a better Department that is ready to take on the nation's most challenging issues," said Medina.

For more information about the S&T Office of University Programs, visit: <https://www.dhs.gov/science-and-technology/office-university-programs> (<https://www.dhs.gov/science-and-technology/office-university-programs>). For more information about the SRT Program for Minority Serving Institutions, visit: <https://orise.orau.gov/dhseducation> (<https://orise.orau.gov/dhseducation>). For related media requests, contact STMedia@hq.dhs.gov.

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