

HS-STEM disciplines and research areas

Award Recipients will be responsible for establishing courses of study related to DHS S&T areas of research and development as described below. Since homeland security (HS) technology needs are broad, DHS welcomes applications from MSIs with interest in any area of science (including social science), technology, mathematics and engineering, provided they are building enduring capabilities in the following homeland security priority research areas:

1. **Advanced Data Analysis and Visualization:** information extraction, knowledge management, and visualization of large quantities of data to enhance data fusion, situational awareness, and threat detection. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Biology, Computer Science, Engineering, Health Sciences, Mathematics, and Psychology

S&T Division: Infrastructure Protection & Disaster Management; First Responders GroupCyber

DHS COE: Command, Control and Interoperability (C2I) Rutgers University and Purdue University
<http://ccicada.rutgers.edu/>
<http://www.purdue.edu/discoverypark/vaccine/>

2. **Biological Threats & Countermeasures:** assessment, characterization and prioritization of chemical-biological threats; detection and warning systems; agro-defense and food security; biological countermeasures; and decontamination, restoration and medical response to biological threat events. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Biology, Veterinary Science, Emergency Medicine, Chemistry, Agriculture, Computer Science, Economics, Engineering, Health Sciences, Mathematics, Physics, and Planetary Science.

S&T Division: Chemical/Biological

DHS COEs: Food Protection and Defense, University of Minnesota
<http://www.ncfpd.umn.edu/>

Foreign and Zoonotic Disease Defense, Texas A&M University
<http://fazd.tamu.edu/>

Center for Advancing Microbial Risk Assessment, Michigan State University
<http://www.camra.msu.edu/>

3. **Border Security:** technologies to monitor and inspect cargo that cross our land, maritime borders and ports of entry; tools to monitor people who cross our land, maritime borders and ports of entry; evaluation of the policies and procedures designed to secure the border while welcoming legitimate visitors and trade. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Computer Science, Engineering, Social Science, and Aeronautics.

S&T Division: Borders & Maritime

DHS COE: Border Security and Immigration, University of Arizona and University of Texas at El Paso

4. **Chemical Threats and Countermeasures:** assessment, characterization and prioritization of chemical-biological threats; detection and warning systems; agro-defense and food security; chemical countermeasures; and decontamination, restoration and response to chemical threat events. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS research area: e.g. Chemistry, Chemical Engineering, Materials engineering/Science, Biochemistry, and Meteorology.

S&T Division: Chemical/Biological

DHS COE: Food Protection and Defense, University of Minnesota
<http://www.ncfpd.umn.edu/>

5. **Communications and Interoperability:** interoperable communication for emergency responders. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Engineering

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DHS COE: Command, Control and Interoperability (C2I) Rutgers University and Purdue University
<http://ccicada.rutgers.edu/>
<http://www.purdue.edu/discoverypark/vaccine/>

6. **Community, Commerce and Infrastructure Resilience:** multidisciplinary research to develop approaches to improve community resilience across the United States, improving community resilience and determining ways where public investments can foster resilient communities. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS research area: e.g. economics, social sciences, psychology, public health, urban planning, environmental studies, engineering etc.

S&T Division: Infrastructure Protection & Disaster Management

DHS COE: Preparedness & Catastrophic Event Response, Johns Hopkins University; Natural Disasters and Coastal Infrastructure and Emergency Management
<http://hazardscenter.unc.edu/>
<http://www.jsucoee.org/>
<http://www.jsums.edu/cset/or/centers/centndciem.htm>

7. **Explosives Detection, Mitigation and Response:** the detection, mitigation, and response to explosives in a wide variety of contexts. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Chemistry, Engineering, Computer Science, Mathematics, Physics, and Social Sciences.

S&T Division: Explosives

DHS COE: Explosives Detection Mitigation, and Response at Northeastern University and the University of Rhode Island
<http://www.northeastern.edu/alert/>
<http://energetics.chm.uri.edu/>

8. **Emergency Preparedness and Response:** decision support tools to aid in the preparation or response to catastrophic events; studies of public risk communication; medicine and public health; business technology for first-responders; The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Computer Science, Economics, Engineering, Physics and Quantitative Political Science.

S&T Division: Infrastructure Protection & Disaster Management

DHS COE: Coastal Hazards Center, University of North Carolina, Chapel Hill, Jackson State University; Center for Risk and Economic Analysis, University of Southern California, University of Southern California
<http://hazardscenter.unc.edu/>
<http://www.jsucoe.org/>
<http://www.jsums.edu/cset/or/centers/centndciem.htm>
<http://create.usc.edu/>

9. **Food and Agriculture Security:** assessment, characterization and prioritization of chemical-biological threats; detection and warning systems; agro-defense and food security; biological or chemical countermeasures; and decontamination, restoration and medical response to biological or chemical threat events. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Agriculture, Bio-Chem, Epidemiology, Veterinary Science, Biology, Chemistry, Computer Science, Economics, Mathematics, Engineering, Physics, Planetary Science, and Health Sciences.

S&T Division: Chemical/Biological

DHS COE: Food Protection and Defense, University of Minnesota
<http://www.ncfpd.umn.edu/>

Foreign and Zoonotic Disease Defense, Texas A&M University
<http://fazd.tamu.edu/>

10. **Human Factors:** integration of human factors concerns into homeland security technologies to improve utility and operator safety; assessments of public acceptance of homeland security technologies; use of technology to discern critical aspects of human behavior. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Computer Science, Engineering, Health Sciences, Psychology, and Social sciences.

S&T Division: Human Factors/Behavioral Sciences

DHS COEs: Explosives Detection Mitigation & Response Northeastern University;
<http://www.northeastern.edu/alert/>

Border Security and Immigration, University of Arizona, and University of Texas at El Paso <http://www.borders.arizona.edu/>

Center for Maritime, Island and Remote and Extreme Environment Security (MIREES) - Stevens Institute of Technology and University of Hawaii
<http://www.cimes.hawaii.edu/>

11. **Immigration Studies:** studies of the integration of new immigrants into U.S. society and the consequences of successful/failed assimilation. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Computer Science, Economics, Social Science, and Political Science

S&T Division: Borders & Maritime

DHS COE: Border Security and Immigration, University of Arizona and University of Texas at El Paso
<http://www.borders.arizona.edu/>

12. **Infrastructure Protection:** assessment of relative threats and vulnerabilities of critical infrastructure; estimation of consequences of natural disasters or terrorist attacks to critical infrastructure; application of engineering technologies or tools to enhance DHS' ability to prepare, predict, and minimize or prevent damage to critical infrastructure from natural hazards. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Computer Science, Economics, Engineering, Physics, Meteorology, Oceanography, Hydrology, Marine Science, and Business Administration.

S&T Division: Infrastructure Protection & Disaster Management

DHS COE: Center for Maritime, Island and Remote and Extreme Environment Security (MIREES) - Stevens Institute of Technology and University of Hawaii
Risk and Economic Analysis, University of Southern California
<http://www.cimes.hawaii.edu/>
<http://create.usc.edu/>

13. **Maritime and Port Security:** technologies and tools to secure national maritime borders and U.S. maritime interests, support global maritime awareness, defend maritime commerce and global supply chains, minimize damage and expedite recovery from attacks or catastrophic events impacting maritime interests, and protect coastal population centers. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Economics, Chemistry, Operations Research, Computer Science and Engineering, Maritime Engineering and Shipping Supply Chain (MBA), Maritime Meteorology, Remote Sensing.

S&T Division: Borders & Maritime

DHS COE: Center for Maritime, Island and Remote and Extreme Environment Security (MIREES) - Stevens Institute of Technology and University of Hawaii
<http://www.cimes.hawaii.edu/>

14. **Natural Disasters and Related Geophysical Studies:** assessment of relative threats and vulnerabilities of critical infrastructure; estimation of consequences of natural disasters or terrorist attacks to critical infrastructure; application of engineering technologies or tools to enhance DHS' ability to prepare, predict, and minimize or prevent damage to critical infrastructure from natural hazards. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Computer Science, Economics, Engineering, and Physics.

S&T Division: Infrastructure Protection & Disaster Management

DHS COE: Coastal Hazards Center, University of North Carolina, Chapel Hill; Jackson State University
<http://hazardscenter.unc.edu/>
<http://www.jsucoe.org/>
<http://www.jsums.edu/cset/or/centers/centndciem.htm>

15. **Risk, Economics, and Decision Sciences:** applications of advanced methods and techniques to support decision making; quantitative analysis. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Biology, chemistry, Agriculture, Computer Science, Economics, Mathematics, and Engineering.

DHS Division: Operations Research

DHS COE: Risk and Economic Analysis of Terrorist Events at the University of Southern California
<http://create.usc.edu/>

16. **Social and Behavioral Sciences:** social and behavioral analyses of terrorist threats; community preparedness, response and recovery from catastrophic events; economic assessments of terrorism and catastrophic events; and economic and mathematical decision models of terrorist behavior. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Engineering, Health Sciences, Economics, and psychology.

S&T Division: Human Factors/Behavioral Sciences

DHS COE: Terrorism and Responses to Terrorism at University of Maryland; Risk and Economic Analysis of Terrorist Events at the University of Southern California
<http://www.start.umd.edu/start/>
<http://create.usc.edu/>

17. Transportation Security: applications of advanced methods and techniques to support decision making; quantitative analysis; improving the Nation's preparedness in the event of a high consequence natural or man-made disaster, and developing best practices to alleviate the event's effects. The following are HS-STEM disciplines that could be necessary to support research associated with this DHS S&T area: e.g. Chemistry, Computer Science, Engineering, Mathematics, Physics, Economics, and Business Supply Chain.

S&T Divisions: Infrastructure Geophysical; Explosives, Borders & Maritime

DHS COEs: Explosives Detection Mitigation & Response Northeastern University;
<http://www.northeastern.edu/alert/>

Border Security and Immigration, University of Arizona, and University of
Texas at El Paso
<http://www.borders.arizona.edu/>

Center for Maritime, Island and Remote and Extreme Environment
Security (MIREES) - Stevens Institute of Technology and University of
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<http://www.cimes.hawaii.edu/>