



# KEYSTONE ALLIANCE

## A University-Based Research Center for Homeland Security

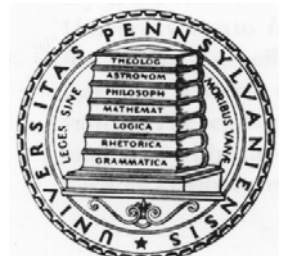
The **Keystone Homeland Security University Research Alliance (Keystone Alliance)** brings together the extensive expertise of The Pennsylvania State University, The University of Pennsylvania, The University of Pittsburgh and Carnegie Mellon University to meet the research and education needs of the new Department of Homeland Security (DHS). The DHS faces a myriad of challenges as it strives to protect the well being of the nation's people and its essential infrastructure. Our vision is to develop for DHS new technologies capable of monitoring the health status of the nation's population, its food supply and infrastructure, and to develop the necessary communication and information networks required for effective response to emergency situations.

The Keystone Alliance brings together four of the nations leading research universities, with complementary strengths ideally suited to meeting the diverse needs of the new Department of Homeland Security. The Keystone Alliance comprises:

- ❖ Three of the nation's most prestigious National Institutes of Health funded medical research colleges;
- ❖ Two of the nation's top ten Department of Defense funded research and development universities;
- ❖ One of the nation's largest Agricultural Science research colleges and its associated Cooperative Extension Program;
- ❖ Some of nations most prestigious Public Policy, Criminal Justice and Ethno-Political Institutes.
- ❖ One of the nation's top Public Health schools.

Resident within the Keystone Alliance are numerous nationally recognized R&D and education programs directly relevant to Homeland Security. Work related to **Biological Agents and Infectious Diseases** includes basic research on strategies to disrupt normal gene expression in bacteria which may lead to new broad-spectrum antibiotics, and programs to observe, model and manipulate the basic behavior of bacteria phages for use as mechanisms to destroy harmful biological agents. The Medical Colleges at Penn, Pitt and Penn State also host world-class programs in virology, including research on cytomegalovirus, vaccinia, tuberculosis, smallpox, HIV, DNA / RNA tumor viruses and more. These Medical Colleges house specialized containment facilities for isolating and treating highly infectious diseases. They are also directly connected to **Emergency Response** organizations through numerous ongoing partnerships with agencies such as PEMA, the PA State Police and other law enforcement agencies across the nation and around the world. **Information Systems and Communication Networks** are critical elements in identifying and responding to infectious disease outbreaks or bioterrorism attacks, and the Keystone Alliance can site numerous examples of important contributions made in this area. For example, the Realtime Outbreak and Disease Surveillance (RODS) software developed by the University of Pittsburgh monitors anomalies in reported symptoms of flu, respiratory illnesses, skin rashes, and the like, suggestive of serious disease outbreak or terrorist attack. The RODS software was employed at the 2001 Winter Olympics and is now in use at hospitals across Utah and Pennsylvania. Similarly, researchers at Penn State are, working with the Department of Defense to develop portable, real-time sensors capable of detecting chemical and biological agents at trace levels well below lethal concentrations. Sensor technologies being investigated range from surface Raman spectroscopy to genetic engineering of plants to serve as sentinels for detecting specific chem-bio agents.

**Protecting the Nation's Food and Water Supplies** is another vital element of overall public health security. To this end, the University of Pennsylvania's School of Veterinary Medicine, one of the nation's foremost research veterinary schools, has a renowned Pathobiology department which is currently studying the diseases such as



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Foot and Mouth, West Nile, and Avian Influenza, which constantly threaten our agricultural assets. Penn State's Food Processing Consortium conducts research on food processing and safety with Beatrice Foods, Kraft Foods, Hershey Foods and many other industry partners. Penn State, through its College of Agricultural Sciences, also maintains one of the premier repositories of pathogenic *E. coli* strains within its USDA sponsored *E. coli* Reference Center, while the *Fusarium* Stock Center is developing molecular diagnostic tools for and maintaining essential reference collections of the most serious strains of these fungal pathogens. In addition, Penn and Penn State are both key elements of the Pennsylvania Animal Diagnostic Laboratory System that provides diagnosis for a wide range of bacterial, viral, fungal and parasitic diseases.

**Engineering Programs** at CMU, Penn State, Pitt and Penn are among the top programs in the nation and their individual strengths are wonderfully complimentary for addressing the complex challenges facing the DHS. The Department of Defense draws heavily on Penn State and CMU, these institutions respectively serving as the second and ninth largest DoD funded universities in the nation. CMU is internationally renowned for research on **Information System Security and Survivability** as well as for research on **Autonomous Robotic Systems**. Complementing CMU's capabilities are Penn State's nationally recognized research programs in **Acoustic and Optoelectronic Sensors** and in **Wireless Communication Networks for Surveillance, Response and Recovery**. In addition, the University of Pennsylvania's GRASP lab is one of the premier research groups focusing on coordinated robotics, vision, and active sensory perception while Penn's engineering school also has a strong working relationship with its top ranked school of medicine. The **Institute for Research of Cognitive Science** is working to develop automated foreign speech and text deciphering techniques to autonomously search through large quantities of foreign surveillance data quickly. Penn State hosts important DoD sponsored programs in Protective Technologies conducting research on improved structural design and materials for blast survivability of buildings, ships, bridges and other essential infrastructure, as well as research for securing building air supply systems and for overall site protection.

The **Institute for Strategic Threat Analysis and Response (ISTAR)** at The University of Pennsylvania draws on faculty from all 12 graduate schools including the nation's premier programs in law, business (Wharton), nursing, and medicine, and has established itself as a leader in **Public Policy, Criminal Justice, and Interdependent Security** aspects of Homeland Security. At the University of Pittsburgh, the **Matthew B. Ridgway Center** analyzes security challenges facing the United States and the international community, such as international financial and crime networks. Programs within the University of Pittsburgh's **Center for Public Health Practice** complement the many Penn State partnerships with the Navy, the Marine Corps and the National Defense University on logistics, supply chain management, less-than-lethal weapons and defense policy. All of these programs help to make our Keystone Institutes uniquely suited to address the legal, criminal justice and risk management issues facing the new DHS.

A significant R&D effort will be required to successfully address the complex challenges facing the DHS, and large expenditures will be required to deploy the new technologies and information systems developed. Consequently, contributions to the missions of the DHS made by the Universities of the Keystone Alliance will have direct and **notable impact on local and regional economies**.

With proven track records of successful collaborations in Life Sciences, System on a Chip Technologies, Nano-technology and more, Penn, Pitt, Penn State and CMU will work together to apply their expertise in biology, biomedicine, agricultural sciences, engineering and public policy to the important human health, emergency response, food supply safety and surveillance challenges facing the new Department of Homeland Security. Successful integration of contributions from all of these diverse fields will be necessary to meet the national needs for Homeland Security. Our Keystone Alliance is ideally suited to meet both the diverse and the specialized **Education and Workforce** requirements of the nation's growing Homeland Security infrastructure.

