

CCI COE Overview

The Command, Control and Interoperability Center of Excellence (CCI COE) seeks to empower decision makers by giving them higher-quality information and more usable tools to manage it. The CCI COE will create a foundation for swiftly sifting through a tsunami of information, in diverse forms, and getting early warning of potential threats. The Center's research and education efforts span the full spectrum of information analysis tasks, including data collection, distillation, management, sharing, and visualization. The COE strives to create methods and tools to help this nation's 2.3 million extended homeland security personnel, including first responders, perform their jobs safely and more effectively.

Led by Purdue University in visualization sciences and Rutgers University in data sciences, the Center will conduct research that will lead to faster ways to evaluate vital information before, during, and after a crisis situation. It will provide tools that enable first responders to more efficiently and safely perform their duties. The Center will examine theoretical foundations, develop algorithms and models, and build prototype demonstrations drawing from the following areas of research:

- Dynamic, on-Demand Data Processing and Visualization
- Hypothesis-driven Analysis
- Visualization of Structured, Unstructured, and Streaming Data
- Mathematics of Discrete and Visual Analytics
- Scalable Filtering and Dissemination
- Visualization and Simulation of Data
- Mobile and Lightweight Information Analytics and Sharing

The expected research outcomes of this center are diverse but reflect the needs of the broad stakeholder base that DHS Science & Technology serves, namely: innovation and science leadership in the areas of analytics, critical thinking, and decision making; information sharing and communication, including interoperability and privacy preservation; approaches for moving theory into technology and operations across Federal, state, tribal, and local governments and with international partners, such as Canada, the United Kingdom, and Germany; and education for the next generation of law enforcement, public safety, and emergency response communities, including curricula for all educational levels and continuing education and professional development.

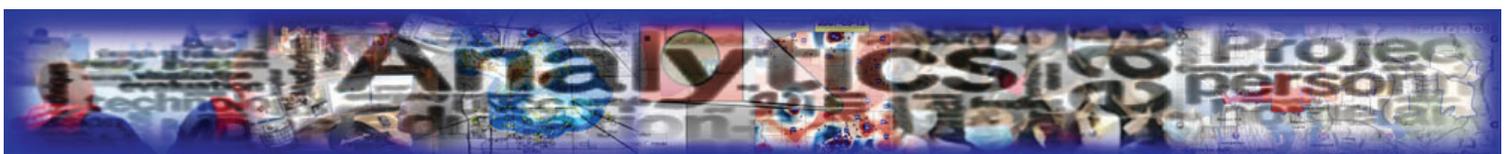


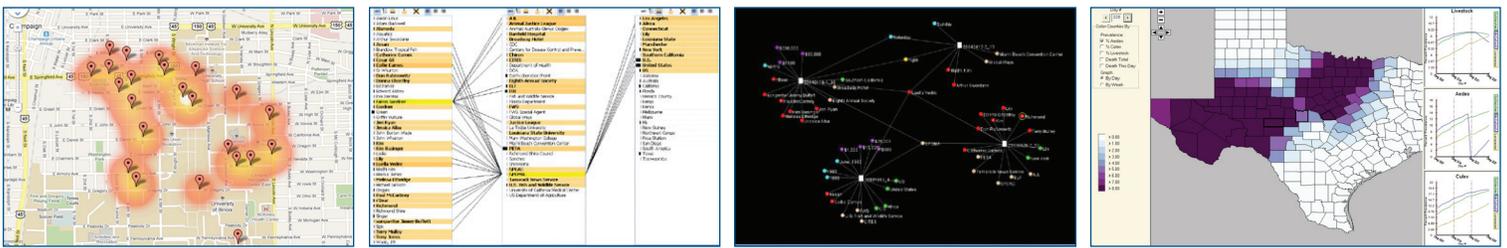
VACCINE Partners:

Purdue University (Lead) • Virginia Tech • Jackson State University • Georgia Institute of Technology • Pennsylvania State University • University of North Carolina at Charlotte • University of Washington • Stanford University • Simon Fraser University • University of British Columbia • University of Stuttgart • University of Houston, Downtown • Florida International University • University of Texas at Austin • Indiana University • University of Swansea • Navajo Technical College • Justice Institute of British Columbia

CCICADA Partners:

Rutgers University (Lead) • University of Massachusetts – Lowell • Alcatel-Lucent Bell Labs • Howard University • Princeton University • Carnegie Mellon University • Texas Southern University • Morgan State University • Rensselaer Polytechnic Institute • University of Illinois at Urbana/Champaign • University of Southern California • Tuskegee University • AT&T Labs, Research • Geosemble Technologies • The City College of New York • Regal Decision Systems • Telcordia Technologies • University of Medicine & Dentistry of New Jersey





Visualization Sciences Team (VACCINE)

The amount of information gathered during a crisis can be crushing if not managed correctly. DHS views VACCINE's research and education in visualization sciences as critical to the protection and security of America and its allies. In the event of a catastrophe, such as a chemical spill, natural disaster, disease outbreak or a terrorist attack, information will be coming from many sources, such as camera images, data from sensors and simulations, and text documents from police and health-care agencies. VACCINE focuses on education, research, development, and deployment of interactive visual analytic environments for communicating and disseminating information and deriving insight from the massive homeland security data deluge.

Collaborative programs will utilize their ability to obtain speakers and faculty for events, maximize promotional efforts, and share teacher and school contacts.

The long-term research plan of VACCINE includes three fundamental research areas that form the foundation for addressing homeland security mission directives through innovative and effective integrations of data and visual analytics environments: Interactive Visual Analytic Foundations, Visually-Adapted Analytical Techniques, and Investigative Analysis and Decision Making Environments. The goal is to not just derive ad-hoc solutions to problems, but to address fundamental research questions, advance the science of visual analytics, deliver solutions to homeland security professionals around the world, and create a solid theoretical foundation for future research.

For Further Information:

<http://www.VisualAnalytics-CCI.org>

DATA SCIENCES TEAM (CCICADA)

The data sciences component of the CCI COE, CCICADA, focuses its work on algorithmic methods for challenging problems in data analysis. CCICADA is developing the types of capabilities homeland security relies on to ferret out patterns and draw inferences from massive amounts of unstructured data contained in books, newspapers, reports, blogs, images, geospatial data, sensor readings, and audio and video streams.

CCICADA researchers are building the mathematical foundations for a new generation of computational methods being developed. Center research touches a wide variety of applications that include: container inspection in ports; sensor management for nuclear detection; syndromic surveillance for early warning of disease outbreaks; risk analysis; data management for law enforcement and emergency response; defense against attacks on cyber infrastructure; and resource planning for infrastructure protection. Through these and other applications, CCICADA partners with a wide variety of agencies in local, state, and Federal government, as well as in the private sector.

In addition to research, CCICADA is committed to building pioneering educational programs that are fully integrated with ongoing research, and designed to meet a broad spectrum of educational needs. CCICADA involves graduate students in all of its research projects and hosts a variety of summer programs tailored to the needs of graduate and undergraduate students, college faculty, homeland security professionals, and K-12 teachers. Programs for educators feature new courses, certificate programs, guidance for faculty who want to bring homeland security topics into their classrooms.

For Further Information: <http://ccicada.org>

CCI COE Educational Activities

To have the greatest impact on the DHS mission, the CCI COE partner centers, VACCINE and CCICADA, work together to identify potential collaborative efforts within the entire education pipeline. They leverage existing expertise within the network of partner schools for program development and dissemination, thereby reducing duplication of effort.

Collaborative programs that utilize their Center's ability to obtain speakers and faculty for events, maximize promotional efforts, and share teacher and school contacts are described below. These programs range from PK-12 programs through undergraduate and graduate level work, to professional education and training programs.