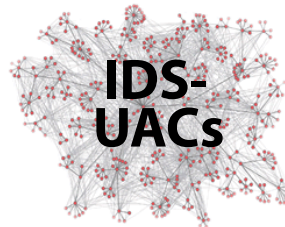


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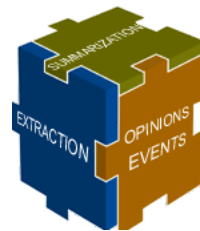
The Institute for Discrete Sciences (IDS) perfecting the science of information discovery and analysis through publicly available sources



In July 2006, DHS selected four universities to establish Centers of Excellence for research on advanced methods

for information analysis. The purpose behind the Centers is the development and extension of computational technologies for deriving knowledge and understanding from the vast amounts of publicly available data. The new centers, based at Rutgers University, the University of Pittsburgh, the University of Illinois at Urbana-Champaign, and the Information Sciences Institute of the University of Southern California, are led by Rutgers.

representation of massive data sets in all formats (www.dydan.rutgers.edu).

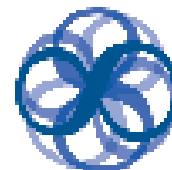


CERATOPS: The Center for the Extraction and Summarization of Events and Opinions in Text at the University of Pittsburgh focuses on information extraction

from text (www.cs.pitt.edu/mpqa/cera-tops).



CKID: The Center for Knowledge Integration and Discovery at the University of Southern California focuses on discovery and extraction of information from multiple media and integration of this information into a single knowledge repository (www.ckid.org).



MIAS: The Center for Multimodal Information Access and Synthesis at the University of Illinois at Urbana-Champaign

focuses on information extraction from various media (www.mias.uiuc.edu).

These centers are part of a larger nationwide collaboration based at Lawrence Livermore National Laboratory called the Institute for Discrete Sciences (IDS) that includes DHS and several national laboratories. IDS studies selected

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Key questions being addressed by the IDS consortium:

- Can we identify a common author writing under different aliases?
• Can we quickly distinguish between a bioterror attack and a flu outbreak?
• Can we analyze text to ascribe author motives or beliefs?
• Can we determine which containers to inspect at a port of entry?

The Centers which comprise the IDS consortium are:



DyDAn: The Center for Dynamic Data Analysis at Rutgers University focuses on information analysis and

This article is an excerpt from the U.S. Department of Homeland Security Student and Alumni Network Newsletter.

The Network serves students and alumni who are current and past recipients of DHS funding and participants in DHS Student Programs. This includes DHS Scholars and Fellows, Summer Faculty Research Team Program members, student researchers at the DHS Research and Education Centers, AAAS Fellows, and Post-doctoral Research Associates.

The value of the Network is in facilitating professional and social collaboration, as well as communicating DHS and homeland security-relevant news and events, and employment and funding opportunities.

Please visit the DHS Network at www.DHSNetwork.org



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**On location:**

## **The Institute for Discrete Sciences (IDS) perfecting the science of information discovery and analysis through publicly available sources**

topics in computer science, the data sciences, and discrete mathematics, collectively labeled “discrete sciences.”

Homeland security relies on the types of data analytic capabilities that fall under the broad umbrella of discrete sciences to ferret out patterns and draw inferences from massive amounts of unstructured data contained in books, newspapers, reports, blogs, temporal and spatial data, images, and audio & video streams. Researchers at the IDS centers are developing new capabilities for absorbing and analyzing the potentially massive amounts of information contained in such media, and they are building the mathematical foundations for the computational methods being developed.

The potential for the technologies that the IDS centers develop lies not only in national security applications, but also in applications from other fields that must reconcile large amounts of data from a variety of sources. These fields include medical informatics/health care, environmental protection, and natural hazard prediction. DHS is looking to the new centers to offer information analysis support across a wide range of applications from protection against invasive species to border security.

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**The broad mission of the four centers is to develop fundamental theories, algorithms and tools that enable deriving knowledge from data, including:**

- Novel technologies to identify patterns in massive graphs & datasets that are changing rapidly
- Robust methods to extract, summarize, and track information about events from unstructured text
- New capabilities for knowledge discovery and information integration across media
- Computationally efficient methods to fuse and represent information in graphs
- Trainable learning algorithms to identify events like infectious disease outbreaks
- Trustworthy methods to preserve privacy

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In addition, the centers are committed to building pioneering educational programs that nurture the homeland security workforce of the future and are developing curricular materials for all academic levels. The IDS centers are developing educational programs that include: intensive summer courses and research for undergraduates; programs for K-12 faculty, undergraduate faculty, and government & industry researchers; new courses and degree programs for graduate and undergraduate students; as well as focused workshops, seminars, and tutorials for students and researchers in related disciplines.

