



**THE INSTITUTE FOR CIVIL INFRASTRUCTURE SYSTEMS (ICIS)** was established in 1998 with initial funding from the National Science Foundation. ICIS engages in research, education, and outreach in infrastructure, including energy, transportation, communication and environmental protection. Agencies that have funded current and recent research include the U.S. EPA, the U.S. DHS (through university centers at NYU, USC, and Dartmouth), the NYS Department of Transportation, and the Fund for Public Health in NY. ICIS researchers have also engaged in studies of global climate change impacts on public infrastructure.

### **CURRENT AND RECENT RESEARCH PROJECTS**

**CENTER FOR INTERDISCIPLINARY STUDIES IN SECURITY AND PRIVACY, (CRISSP)**, funded by NYU-Poly. 2009-ongoing. Project Sponsor: NYU-Poly. Project Title: Critical Infrastructure Policy and Information Security.

Relationships between information technology and critical infrastructures for energy, transportation and water can increase the vulnerabilities of these critical infrastructure sectors to attack in the information domain. The research identifies areas of IT and critical infrastructure interconnections, the functions of these connections, measures to capture them, and standards and policies that may govern them. Related activities include:

- ASPIRE: A Scholar for Service (SFS) Program for Interdisciplinary Research and Education, funded by the NSF
- Workshop on Collaborative Research in Information Security and Privacy, May 7, 2009

**MOBILE SOURCE AIR TOXICS (MSATs) MITIGATION MEASURES.** Led by the NYU Rudin Center for Transportation Policy and Management. Project Sponsor: NYS Department of Transportation. 2009-2010.

The evaluation of mobile source air toxics (MSATs) is part of federal and state environmental impact assessment procedures. The purpose of the project is to tailor MSATs guidance and feasible mitigation strategies (for seven priority MSATs) to New York State's transportation system for the National Environmental Policy Act and the NY State Environmental Quality Review Act.

**WASTE CONTAINERIZATION PROJECT**, 2008-2009. Project Sponsor: Fund for Public Health in NY for the NYC Department of Health and Mental Hygiene.

Roll-on roll-off trash compactors compress waste prior to collection and ultimate disposal, and are an alternative waste management approach to curbside pickup of bagged refuse and the use of waste containers. The assessment of the feasibility of Roll-Off Trash Compactor Technology in reducing rat infestations in New York City was conducted for schools and large residential buildings. The assessment covered criteria for the adoption of the technology in terms of site layout and design, capacity to accommodate the operational needs of the facilities, and volume of waste generated. Overall benefits of the technology over other methods were also evaluated.

**SOUTH BRONX ENVIRONMENTAL HEALTH AND POLICY STUDY.** Project Sponsor: Office of Congressman Jose E. Serrano and the U.S. Environmental Protection Agency. 2000-2009.

The main goal of the South Bronx Environmental Health and Policy Study was to evaluate environmental and health issues affecting the South Bronx community, emphasizing relationships among air quality, transportation, waste transfer activity, demographic characteristics and public health. It has been a collaborative research project of the NYU School of Medicine's Nelson Institute of Environmental Medicine (NIEM), the NYU Wagner Graduate School of Public Service Institute for Civil Infrastructure Systems (ICIS), and four community groups: The Point Community Development Corporation, We Stay/Nos Quedamos, Inc., The Sports Foundation, Inc., and Youth Ministries for Peace and Justice, Inc. The research included the use and modeling of environmental databases to assess traffic, air quality and other environmental conditions in the South Bronx; green technology reviews; environmental justice analyses; decision tools; and a youth participation and leadership program. *See [http://www.icisnyu.org/south\\_bronx/index\\_001.html](http://www.icisnyu.org/south_bronx/index_001.html).*

**CRITICAL INFRASTRUCTURE PROTECTION.** Project Sponsor: U.S. Department of Homeland Security through the University of Southern California, **Center for Risk and Economic Analysis of Terrorism Events (CREATE).** 2004-2010.

The nation's critical infrastructures have key life-saving and quality of life roles, contribute to the Gross Domestic Product, and have estimated assets of trillions of dollars. Infrastructure systems are vulnerable to disruption since they are large and have centralized production systems. Global terrorist attacks on infrastructure often show catastrophic effects with potential cascading effects exacerbated by interdependencies among infrastructure systems. The U.S. government has placed a very high priority on infrastructure security.

The NYU team focuses on the development and application of statistical models and Geographic Information Systems (GIS) to identify associations between causes and consequences (and explore predictions of those consequences) for accidents, natural hazards, and other disruptions of U.S. public services. Risk management areas such as resource allocation policies, cost estimation, and other issues related to infrastructure disruption are part of the scope. Electricity, transportation and water infrastructure have been application areas, and hazard areas include terrorism (recovery estimates); accidents; and natural hazards. Specific projects include:

- Using Infrastructure Density for Resource Allocation Policy
- Determinants of Spatial Infrastructure Concentration as Inputs to Resource Allocation; Infrastructure Asset Security
- Resource Allocation Based on Critical Infrastructure; and Risk, Consequences and Economic Analyses for Terrorist Attacks on Electricity.

New York University first conducted an electrical power outage analysis to examine consequences of potential Terrorist attacks, including economic costs. Regression models using non-terrorist outage data estimated outage characteristics such as duration and customers lost used to analyze consequences of potential terrorist attacks on these systems. *See [www.usc.edu/CREATE](http://www.usc.edu/CREATE) for CREATE participants and activities.*

**RISK COMMUNICATION FOR LARGE SCALE EMERGENCIES**, funded as part of the Large Scale Emergency Readiness (LaSER) project: A Public Health Approach. Project Sponsor: U.S. Department of Homeland Security through the **NYU Center for Catastrophe Preparedness and Response**. 2005-2009.

Understanding risk communication principles is critical to building effective capacity to reduce consequences of terrorism. Under crisis conditions, communication should be planned based on message content, characteristics and needs of message senders and recipients, and technologies to convey messages in order to minimize response delays. These factors differ for pre-disaster, during disaster, and post-disaster conditions. The overall goal of the risk communication task of LaSER is to develop and test critical communication strategies and plans via scenarios for community public health preparedness, response, and mitigation of event consequences before, during and after a large scale, urban terrorist event. An interdisciplinary approach is adopted drawing on social psychology, communication technology, and risk communication for health threats. The project initially targets a large scale, biological or chemical terrorist act in the NYC Region, scalable to other U.S. cities. This work is a part of and supports other components of LaSER, directed by the NYU School of Medicine. See [www.nyu.edu/ccpr](http://www.nyu.edu/ccpr) for LaSER project information.

**PUBLIC INFRASTRUCTURE SUPPORT FOR PROTECTIVE EMERGENCY SERVICES**. Project Sponsor: U.S. Department of Homeland Security through the **NYU Center for Catastrophe Preparedness and Response**. 2004-2009.

Protective emergency services, such as emergency management, health, police and fire protection, routinely depend upon a wide range of traditional infrastructure support services to provide and deploy human resources, goods, and information in times of crisis. These infrastructures include transportation, energy, water, environmental protection, and communication. This project identifies relationships between traditional infrastructure services and emergency services, and vulnerabilities that can occur at interconnection points, creating choke points between these two kinds of services during emergencies. This provides a foundation to prepare managers and operators of traditional infrastructure services and emergency services to coordinate their needs. The project goal is to help develop easily communicated emergency procedures for infrastructure managers that focus on the key interconnections between traditional infrastructure and protective services and the vulnerabilities in these linkages created by emergency conditions.

**EMPIRICALLY BASED ANALYSIS OF PROCESS CONTROL SYSTEMS (PCS) AND CRITICAL INFRASTRUCTURES** part of the PCS Vulnerabilities and Infrastructure Interdependencies project. Project Sponsor: U.S. Department of Homeland Security, Office of Domestic Preparedness/Office of Justice Programs through the Institute for Information Infrastructure Protection (The I3P) at **Dartmouth College**. 2005-2008. Computerized detection and control systems provide both opportunities and risks for the protection and management of critical infrastructures. Recent large-scale accidents exemplify their potential effect on infrastructure. Process Control Systems (PCS) are a type of computerized information technology and process control system. This research is an empirical event-focused statistical analysis of (1) global trends in attacks on oil and gas infrastructure as a context for investigating PCS vulnerability; (2) economic cost and other consequence measures of incidents and accidents in hazardous liquid and natural gas pipelines in the U.S.; and (3) interdependencies between oil and gas and other infrastructures such as water and electricity. Oil and gas infrastructure, a particular target of terrorist attacks internationally, is a key research focus. Users of this work

include designers, managers, and operators of PCS and infrastructure. *See [www.thei3p.org](http://www.thei3p.org) for consortium and project information.*

**URBAN INFRASTRUCTURE IN A TIME OF CRISIS: Lessons from September 11<sup>th</sup>.**

**Project Sponsor:** National Science Foundation. **NYU-Wagner, ICIS.** 2001-2005.

Urban infrastructure services such as transportation, electric power, water, waste management, and communications were resilient in the manner and speed with which they rebounded after the September 11<sup>th</sup> 2001 attacks on the World Trade Center. This resiliency is traced before, during and after the attacks as a basis for future planning of these services.

A list of publications from these projects is available on the ICIS web page at [www.nyu.edu/icis](http://www.nyu.edu/icis).

Click on the listing of “our publications, presentations and other ICIS information” link on the home page or go directly to:

<http://www.icisnyu.org/assets/documents/PubsListforICIS2003to0310NYUICIS040610.pdf>

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