Purdue Homeland Security Institute

J. Eric Dietz, PhD, PE
Director, Purdue Homeland Security Institute
Professor, Computer and Information Technology
Mission

Aggressively grow interdisciplinary research to develop future leaders and inform policy that will enhance Homeland Security.

Set the pace for:

• Validating Homeland Security technology policy & practice
• Establishing a Homeland Security career development pipeline
• Developing business security processes to protect critical infrastructure
• Being a chosen partner for Purdue and statewide faculty

Vision

Resource

Resources

• Close partnership with Purdue Public Safety, Fire and Police
• Over 2200 Faculty
• Discovery Park – an organized interdisciplinary research program
• Research expertise from critical infrastructure to influenza prevention
• PHSI Exercise Management Team
• Proven visualization and modeling capability for homeland security
• Research partners in command and control, planning, biological detection, sensors, forensics, communications, robotics and infrastructure assessment

www.purduehomelandsecurity.org
Select Homeland Security Courses

• 5 Homeland Security Courses in sequence that leads to the Certified Emergency Manager Certification
  – Fundamentals, Managing Resources, Large Events, Continuity of Operations, Seminar Topics

• Large Event Security Planning at Indianapolis Motor Speedway
  – Class project developing principles for managing large event security applications
  – Lectures at the Indianapolis Motor Speedway and participated in security for the 2012 race

• Continuity of Operations Planning
  – Class project with Purdue Federal Credit Union and Verizon
  – Business Continuity and security

• Homeland Security Seminar
  – Selected topics
  – AnyLogic modeling and optimization

• Fundamentals of Homeland Security
• Resource Management in Homeland Security
• Over 50 other related Purdue Courses
Student Veteran Initiatives

- **OBJECTIVE:** Advancing Purdue’s student veteran initiatives
- **ACCOMPLISHMENTS:**
  - Veteran Coordinator position
  - Learning Community for new to Purdue student veterans
  - Mentoring program
  - Student Veteran Advisory Team
  - Increased growth in the Student Veteran Organization (SVO)
  - Purdue Student Government (PSG) Advocacy
  - Expanded recruiting of veterans for State-wide Technology
  - Graduate School partnership
Select Homeland Security Research

• City of Chicago Catastrophic Event Planning
  – Evacuation planning and training for Indiana, Illinois and Wisconsin

• Energy Security Workforce Development and Education
  – University partnerships, including international and distance learning methods
  – Electric vehicle and Smart Grid

• 2012 Indianapolis Super Bowl
  – Developing methods for using social networking tools for public safety

• Emergency Management in Higher Education and Schools
  – Emergency preparedness on Purdue Main and Calumet campuses

• Pandemic Flu Preparedness
  – Statewide exercises to validate plans and improve readiness
  – Planning tools and models to emphasize policy development
CHICAGO: REGIONAL HUB RECEPTION CENTER PROJECT

- Awarded $1.5M from the City of Chicago for mass evacuation planning initiatives

- Part of Federal Department of Homeland Security/FEMA’s Regional Catastrophic Preparedness Grant Program (RCPGP)

- Deliverables included:
  - Regional Hub Reception Center (RHRC) Planning Guide
  - RHRC Operational Plan Templates
  - Regional Hub Reception Center Training Program
  - Regional Mass Care & Sheltering Outreach Strategy

- Currently modeling RHRC operations using AnyLogic simulation software to optimize evacuation RHRC location and resources
Energy Security

Crossroads Smart Grid Training Program – $9 million DOE Grant

• Partnership with Ivy Tech Community College
• Smart Grid connects electricity distribution grid with two-way communications, monitoring and management
• Similar to the Internet or “Energy Highway” to replace the aging U.S. power grid

Workforce Development
• Work With Industry to Develop Degree/Certificate Programs in Technology & Engineering
  (Design, Manufacture, Maintenance, Emergency Response - Electric vehicles and Smart Grid (BS/MS))

Education
• Produce web courses on batteries, fuel cells, electric motors/controls, hybrid engines, smart grid technology & promote consumer acceptance
• Establish the SmartEnergyHub - EV, PHEV, FCV and SMART GRID technologies
• Develop educational modules for secondary schools

Economic Development
• Develop active industry & government partnerships (electric vehicles/Smart Grid)
• Manage power peaks/spikes & work on innovative methods to keep price of electric power affordable
• Develop an Electric Vehicle Grand Prix go-kart race to inspire students to commit to a career in electric vehicle technology
Current Activity

• Battery State of Health, SOC, Drive Cycles, Aging
  Residual value/future value (Battery performance/treatment)
• EV Charging Stations - Project Plug-In: (4 + 3) WL Campus + Ivy Tech (4) + 4 Local
• EV and Smart Grid BS & MS Classes/Certificate Program
• Integrated Smart Energy Technology (INSET) Lab
  ✓ Batteries – SOH/second life/grid storage/recycle
  ✓ Electric Vehicles – integrated systems/on-board charging
  ✓ EV Charging – technologies/data collection/commerce/AB modeling
  ✓ Vehicle-2-Grid- power sharing/communication/grid storage
  ✓ Distributed Automation- energy integration/micro-grids/AMI/security
• Continuity Of Operations – Emergency Power
SOCIAL MEDIA ANALYSIS OF SUPER BOWL XLVI

Goal: Monitor, capture and analyze “chatter” and information pertaining to Super Bowl XLVI and general “situational awareness”

Tools: Radian6 and Visible Technologies

Social media platforms monitored: Facebook, twitter and public blogs

Results: Provided IOT and the Super Bowl Planning Committee with insights on relevant perceptions/trends of issues surrounding event management:

- Public safety
- Event perception (before, during, after)
- Hospitality
- Marketing effectiveness
- General accommodations
- Traffic analysis
U.S. Department of Education
Emergency Management for Higher Education Grant
FY-2008: “Secure Purdue”
FY-2010: “Secure Purdue-Calumet”

- **OBJECTIVES:** To develop sustainable practices and procedures for campus emergency; Mitigation, Preparedness, Response and Recovery operations.

- **ACCOMPLISHMENTS:**
  - Multi-campus risk assessments, gap analysis and mitigation planning
  - NIMS/ICS facilitated instruction for higher education faculty & staff
  - Emergency notification & timely warning plans
  - Full-scale & table-top emergency exercise development
  - Access & functional needs plan w/access mapping
  - Emergency preparedness training for access & functional needs populations training
  - Integrated emergency management plan development
Pandemic Influenza Emergency Preparedness

• Indiana State Department of Health (ISDH) contractor of choice to develop and execute pandemic influenza training exercises for all of Indiana’s 10 Homeland Security Districts and 92 counties

• Training and exercise program ran from 2007 through 2011:
  ✓ Included tabletop and functional exercises to all Indiana counties
  ✓ On-site tabletop exercises for 4 districts and a complex on-site tabletop exercise for state agencies

• Trained over 5000 fire, police, emergency medical service responders, emergency managers, public health officials, hospital staff and administrators, and local/state politicians
Exposed: Combining Hand Washing and Recognizing Flu Symptom vs. Worse Case

![Graph showing the comparison between Handwashing & Recognizing Flu and No Intervention.](image-url)
Substitute Teacher Cost Per Day

Day of Pandemic Wave

- "Strongly Disagree" to both Hand-Washing and Recognizing Symptomatic Students
- "Agree" to both Hand-Washing and Recognizing Symptomatic Students
- "Strongly Agree" to Hand-Washing; "Strongly Disagree" to Recognizing Symptomatic Students
- "Strongly Disagree" to Hand-Washing; "Strongly Agree" to Recognizing Symptomatic Students
- "Strongly Agree" to both Hand-Washing and Recognizing Symptomatic Students
Cumulative Cost of Substitutes During Pandemic

- "Strongly Disagree" to both Hand-Washing and Recognizing Symptomatic Students
- "Agree" to both Hand-Washing and Recognizing Symptomatic Students
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J. Eric Dietz, PhD, PE

Director, Purdue Homeland Security Institute
Mann Hall, Room 166
203 S. Martin Jischke Drive
West Lafayette, IN 47907-1971
Phone: (765) 494-9793 (Secretary) Ginny Stewart
jedietz@purdue.edu

Professor, Computer and Information Technology
Knoy Hall of Technology, Room 259
401 N. Grant Street
West Lafayette, IN 47907-2021
Phone: (765) 494-8130
Cell Phone: (765)-337-7770