

Biennial Review 2020: CIRI Overview

David Nicol, PhD

Director

UIUC

10-11 June 2020

Three Missions:

- Innovative, outputs-oriented research
- Sustainable technology transition
- Scalable education & workforce development



One Goal: Deliver Impact!



Background, Context, Drivers:

- Broad mandate over a complex and interdependent domain
- Private sector focus
- Support multiple DHS components, .gov domain, other government
- Multi-disciplinary research with focus on impactful outputs
- Large number of *active* projects (9 research + 8 tech trans/WFD)
- Mix of academic and private sector partners
- Need for tech transition and workforce development

Target Impacts:

- Greater awareness of the **need** for secure and resilient critical infrastructure
- Greater understanding of **how** to make it secure and resilient
- Develop and **transition** to use/market impactful solutions
- Stimulate increased **investment** in resilience
 - Stimulate and leverage market forces
 - Craft sound, complementary policies and standards
- Help fill a growing **pipeline** of professionals entering the homeland security enterprise

Legacy Projects:

- Resilience Governance - NEU
- Insurance and Resilience (casualty & cyber) — Wharton, UIUC
- Flood Risk — Washington
- Regulatory Options for Managing Systemic Risks — Stanford/Cornell
- Quantifying Interdependencies of the Logical/Physical Internet Topologies — UCSD
- Community Resilience & Disaster Costs — PRI
- Resilience in Manufacturing through Digital Threading — UIUC

Current Projects (Research):

PROJECT	PI	INSTITUTION	CUSTOMER
Empirical Security Analysis of the Wireless Emergency Alerts System	Ha	Colorado University Boulder	CISA; Multiple private sector and government
Characterizing End-to-End Risk of the Telecommunications Supply Chain	Tien	Georgia Tech	CISA; Multiple private sector and government
Protecting the Nation's 911 System from Cyber Threats Present and Future	Balasubramanian	Karthik Consulting	CISA; Multiple private sector and government agencies.
EMP Risk Assessment and Mitigation Prioritization	Salo	Heartland	CISA; Multiple private sector and government agencies.
Hybrid Quantum-Classical Reinforcement Learning in Controlled Quantum Networks	Siopsis	University of Tennessee	CISA, USCG, FEMA, owners and operators of maritime ports

PROJECT	PI	INSTITUTION	CUSTOMER
Reliable Extraction of Emergency Response Networks from Text Data and Benchmarking with National Emergency Response Guidelines	Diesner	UIUC	FEMA
Leveraging AI for Disaster Response: scalable and effective algorithms for strategic planning	Dilkina	University of Southern California	FEMA; State, Local, Tribal government
Multi-Layer Cyber-Physical Supply Chain risk analysis for Improving the Resilience of IOT-Enabled Critical Infrastructures	Memon	New York University	CISA
NG911 Interoperability testing Program	Magnussen	Texas A&M University	CISA, FCC, First Responders Group

Current Projects (Tech transition):

PROJECT	PI	INSTITUTION	TRANSITION OUTPUT	CUSTOMER
National Scale Delivery of Cybersecurity Education by Integration of LMS and the Cyber Secure Dashboard	Medina / Whitesell	UIUC	Education delivery platform	Multiple 2-year and 4-year academic institutions
Supply Chain Cybersecurity Assurance for Critical Infrastructure	Jaskolka	Carleton University	Cybersecurity assessment tool/framework	CISA; Multiple private sector and government
Towards Community Resilience through Comprehensive Risk Assessment for Business Continuity	Shetty	Old Dominion University	Vulnerability scanner	CISA; Multiple private sector and government agencies.
Measuring Business and Economic Resilience in Disasters	Rose	University of Southern California	Data set; resilience self-assessment tool; economic consequence analysis & resilience tool	CISA; FEMA; NIST; Multiple private sector and government agencies.
Assessment and Measurement of Port Disruptions	Weaver	UIUC	Best practices guidance for risk analysis and threat planning; software platform for planning, simulation, response	CISA, USCG, FEMA, owners and operators of maritime ports
Understanding and Improving Cybersecurity of Manufacturers	Sandone / Salo	UIUC/Heartland	Recommendations for improvement of NIST standards; software platform for compliance with DFARS and NIST CSF	CISA; NIST; manufacturing industry
LEFT: An LTE-Oriented Emulation-Instrumented Fuzzing Test Bed	Yan	Binghamton	Analysis of research and test results; techniques for testing LTE-capable devices; fuzzing test bed	CISA; Mobile communications industry – phones and IoT devices
Mapping Infrastructure Interdependencies for Improved Emergency Management and Resilience Investment Decisions	Tien	Georgia Tech	New methodology for modeling interdependent infrastructure systems; recommendations for improving planning and risk assessment; software tool to automate system modeling and analysis	CISA; FEMA; Municipalities and their infrastructure suppliers; infrastructure owners and operators

Five-year Summary Stats:

- Total number of research projects: 29
- Total number of CIRI partners:
 - Academic: 24
 - Industry: 28
 - Federal & SLTT Government: 12
- Total number of students engaged: 327
- Total number of outreach event attendees: 787
- Total number of events supported: 44
- Total tech transition initiatives: 10