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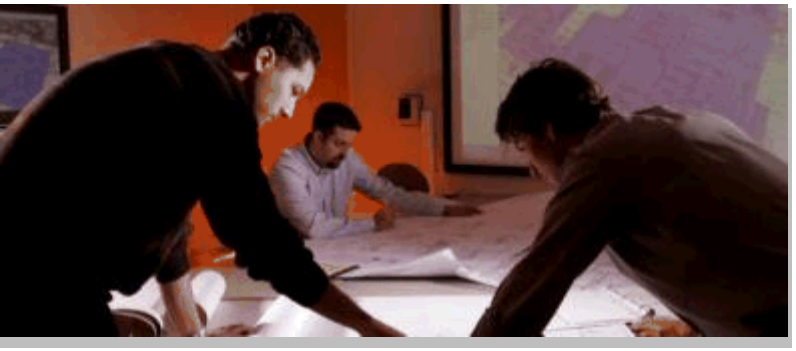


Computer Science Research at Sandia

Jina Lee

Center for Homeland Security & Defense Systems

Sandia National Laboratories

U.S. DEPARTMENT OF ENERGY | NNSA

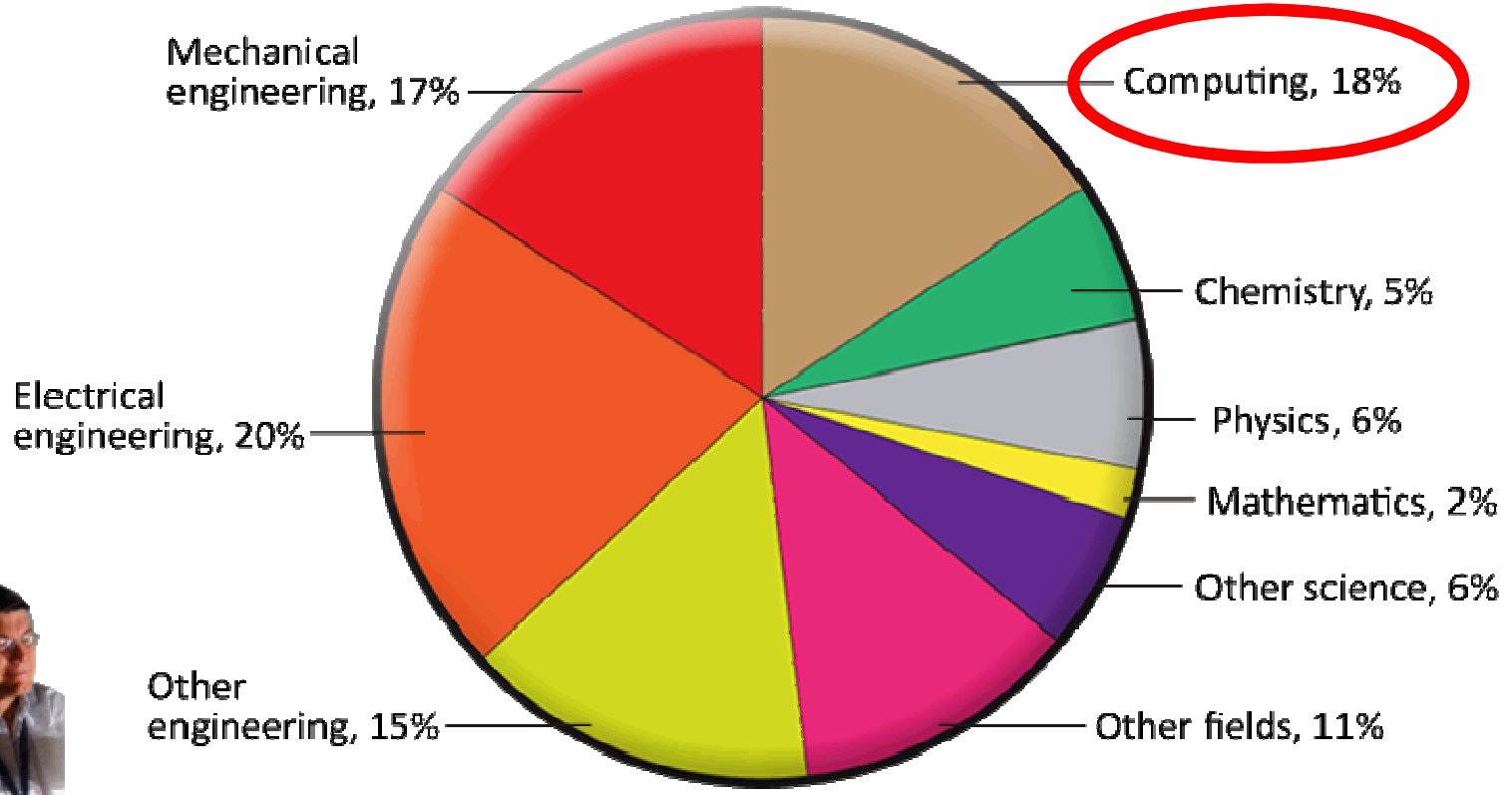
Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Our Workforce

- Onsite workforce: 11,554
- Regular employees: 8,949

Data for FY12 through the end of March

Technical staff (4,419) by discipline



Computer Science Research

Sandia National Laboratories

- Systems Modeling and Analysis
  - R&D in simulation, verification, validation and uncertainty quantification of complex problems
  - Electric grid resiliency, cyber security, bio-surveillance, energy security, homeland security
- Cyber Security
  - Networks and systems architectures and analysis, trusted hardware & software and systems, human factors methods
  - Center for Cyber Defenders: Internship program in NM & CA
- High Performance Computing
  - Extreme-scale computing, computer architecture, programming models, scalable algorithms
- Cognitive Science
  - Cognitive modeling, analysis, decision systems
- And many more!

Demonstrating Leadership in Homeland Security

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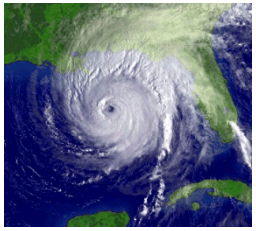

FEMA - Modern architecture for emergency public alerting and warning systems

Border & Transportation Security

Weapons of Mass Destruction (WMD) Decision Analysis and Support

Chem/Bio Detection Systems and Field Deployments

Rad/Nuc Countermeasures
- Architectures
- Detector Systems

Serious Gaming applied to HS Training: "Ground Truth"

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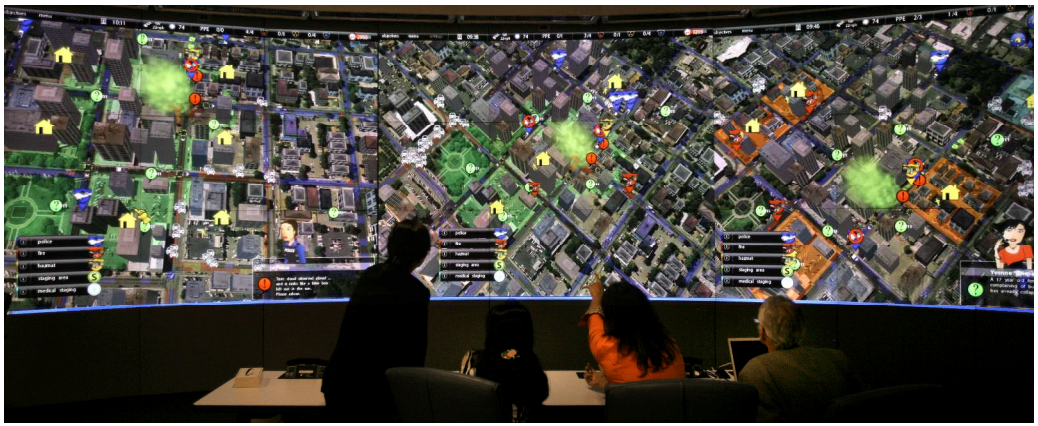
- "Toxic City" Scenario
- Threat: Chlorine release from a tanker truck

- Player Character: Abstracted Incident Commander
- Emotionally-driven NPCs:
  - Firefighters
  - Police officers
  - HazMat team

- Key Decisions:
  - Shelter-in-Place City Blocks
  - Evacuate City Blocks
  - Equip PPE
  - Manage Traffic Intersections



- Assessment:
  - Number of lives saved

High Level Model (HLM):
Serious Gaming in a Border Enforcement Context

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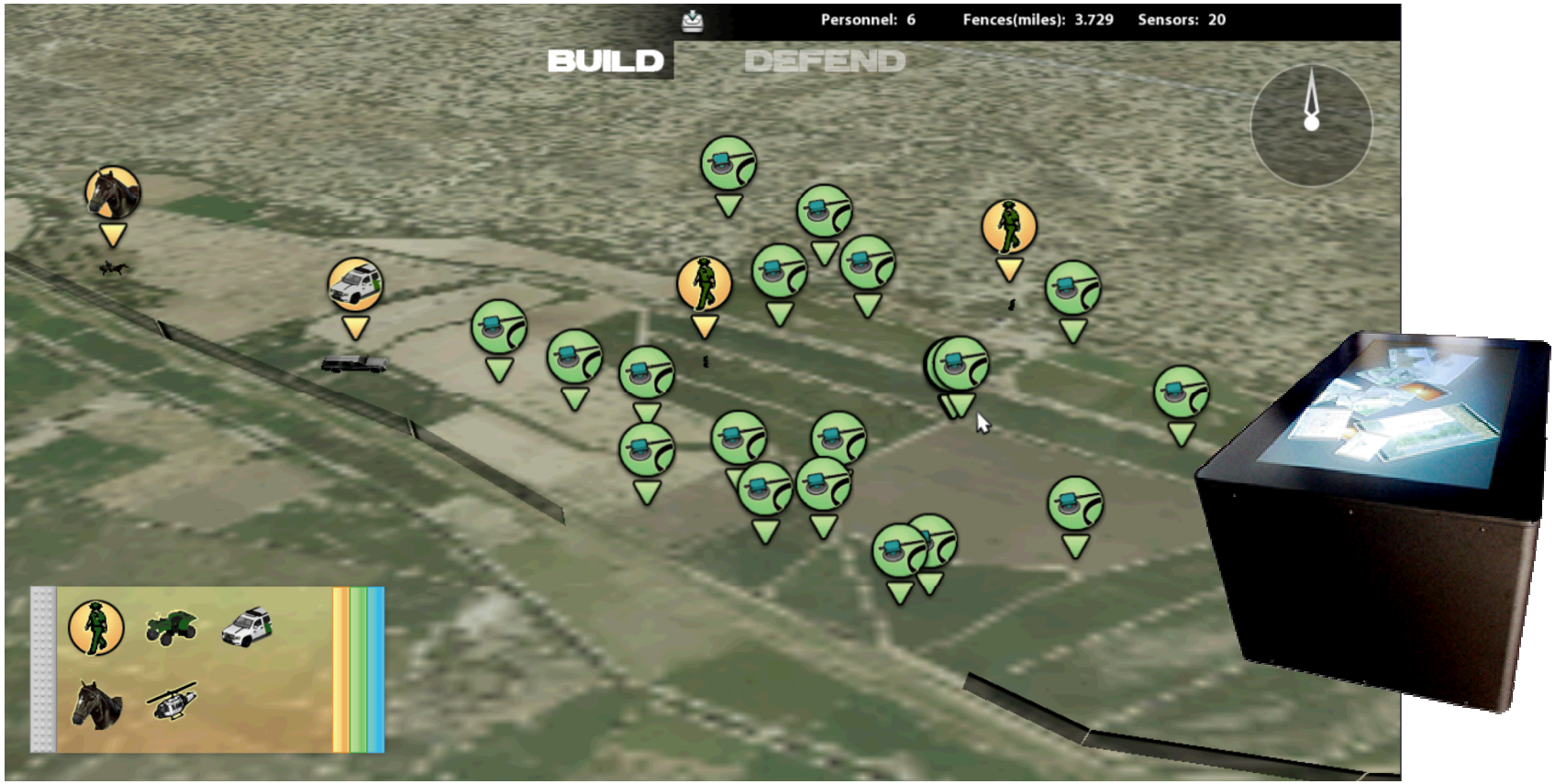

Goal: To facilitate critical thinking and analysis for border enforcement