

# Workforce Development: collaborative endeavor



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People Readiness Strategic Nuclear Workforce Campaign Summit  
Defense Threat Reduction University  
Damascus Room  
Thursday, 13 December 2007



# SNL Workforce Development

## Initiatives in support of Nuclear Weapon Capabilities

### People Readiness Portfolio

#### Critical Skills Development Programs

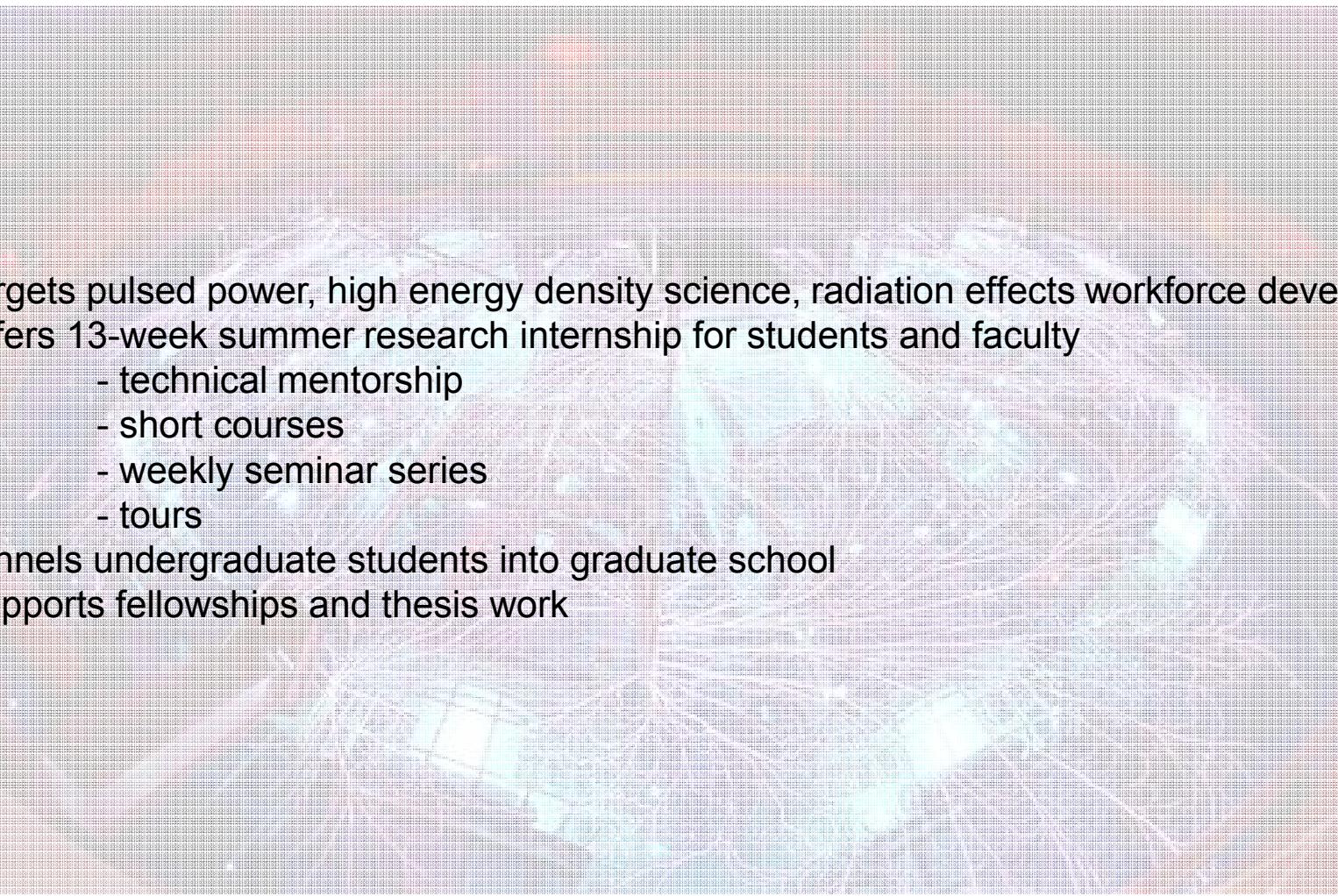
- Science of Extreme Environments Research Institute (SEERI)
- Center for Cyber Defenders Program (CCD)
- National Security Engineering Institute (NSEI)
- Enabling Predictive Simulation Research Institute (EPSRI)

#### Knowledge Management Program

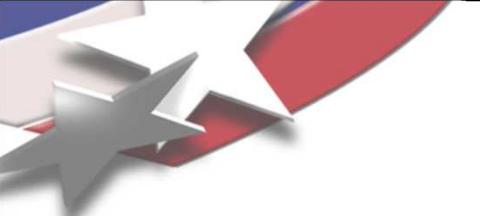
- Weapon Intern Program (WIP)



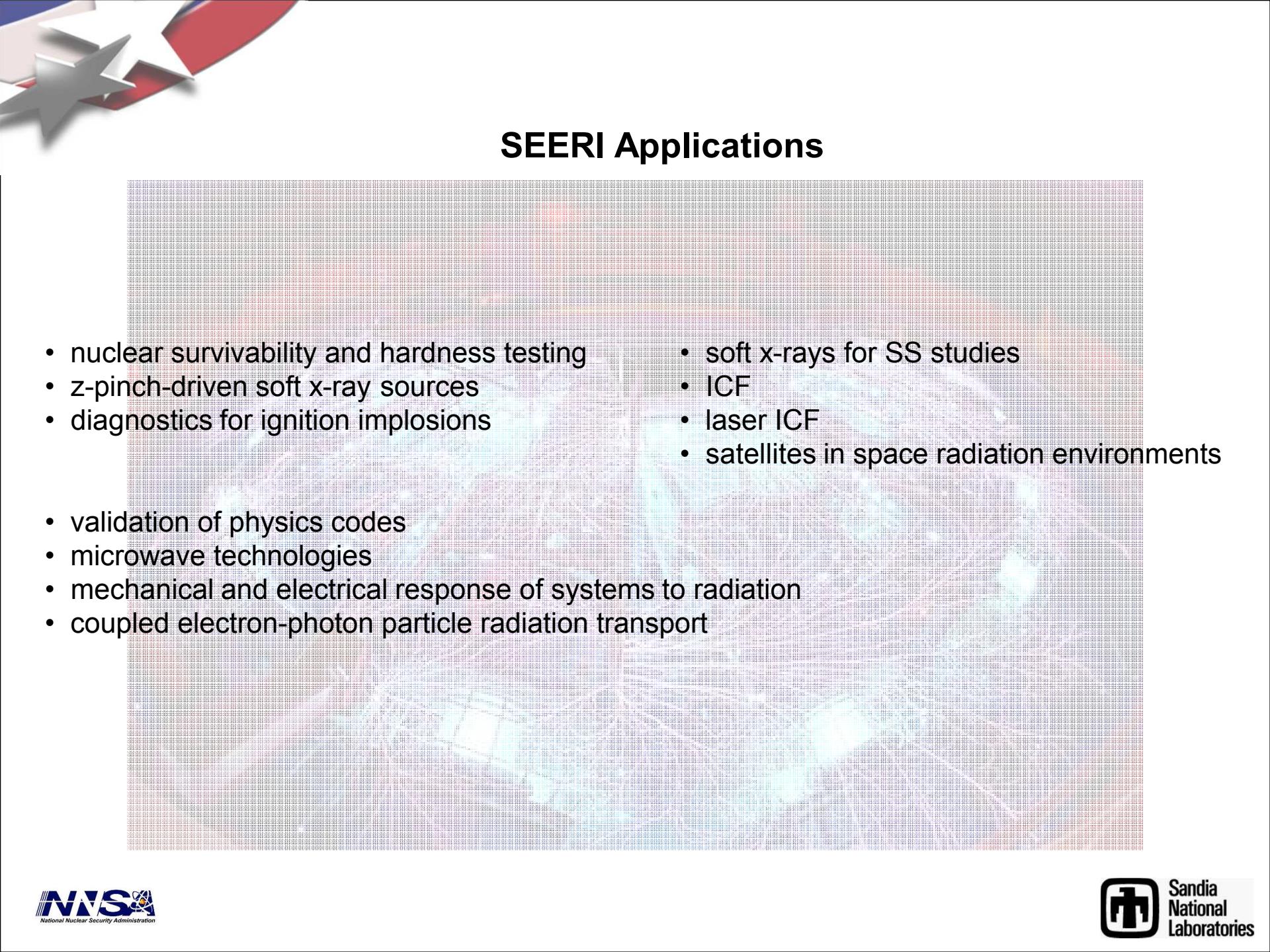
# Science of Extreme Environments Research Institute (SEERI)



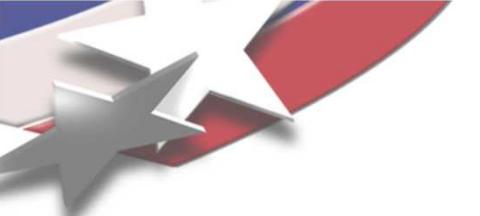
- targets pulsed power, high energy density science, radiation effects workforce development
- offers 13-week summer research internship for students and faculty
  - technical mentorship
  - short courses
  - weekly seminar series
  - tours
- funnels undergraduate students into graduate school
- supports fellowships and thesis work



## SEERI Applications

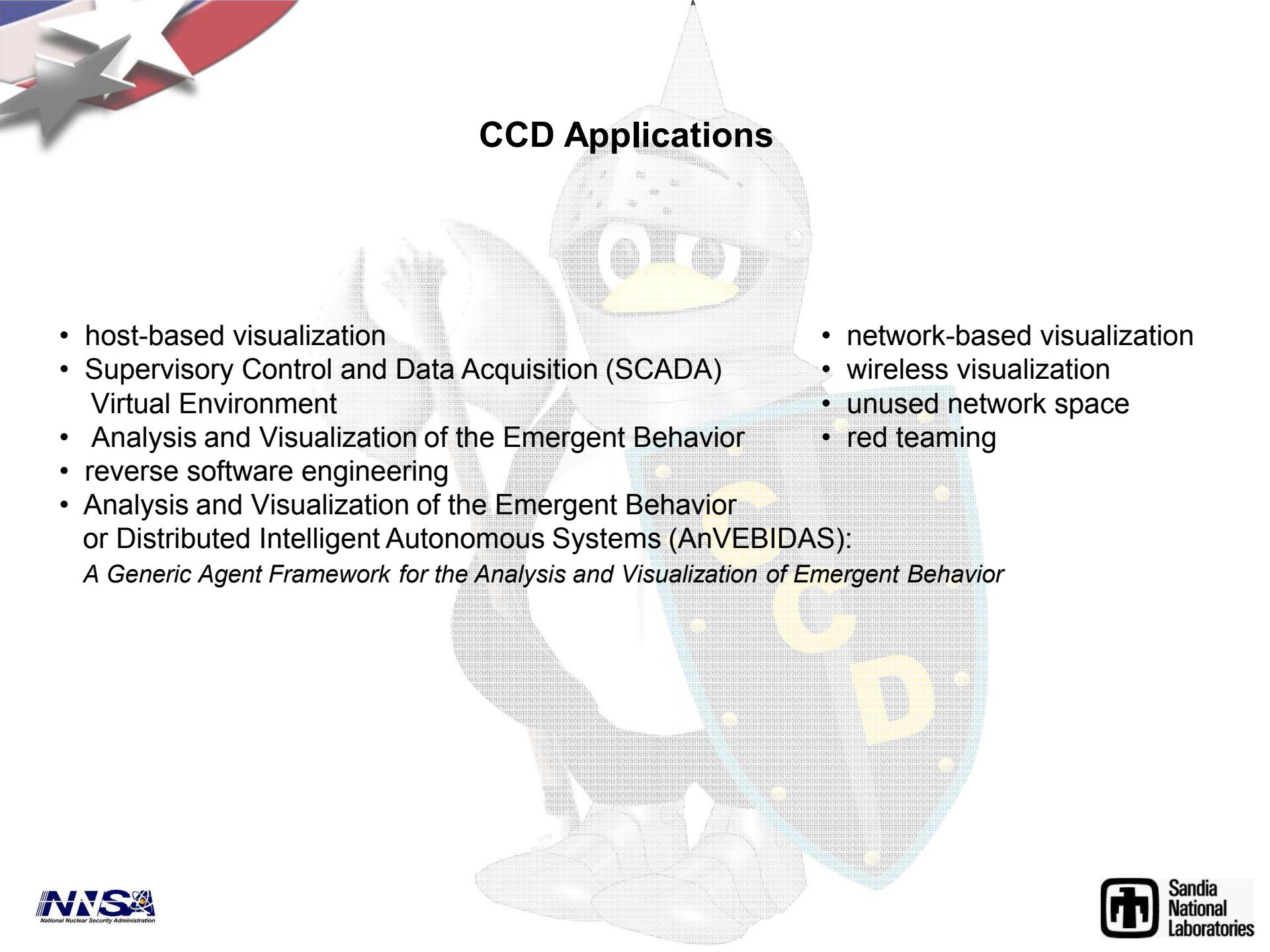


- nuclear survivability and hardness testing
- z-pinch-driven soft x-ray sources
- diagnostics for ignition implosions
- validation of physics codes
- microwave technologies
- mechanical and electrical response of systems to radiation
- coupled electron-photon particle radiation transport
- soft x-rays for SS studies
- ICF
- laser ICF
- satellites in space radiation environments



# Center for Cyber Defenders (CCD)

- targets cyber security and protection: IT, information protection, distributed computing
- offers 13-week summer research internship for students and faculty and year-round internship
- practical experience to facilitate knowledge
  - computer systems
  - network operations
  - information protection
  - computer security
- curriculum development



## CCD Applications

- host-based visualization
- Supervisory Control and Data Acquisition (SCADA) Virtual Environment
- Analysis and Visualization of the Emergent Behavior
- reverse software engineering
- Analysis and Visualization of the Emergent Behavior or Distributed Intelligent Autonomous Systems (AnVEBIDAS):

*A Generic Agent Framework for the Analysis and Visualization of Emergent Behavior*

- network-based visualization
- wireless visualization
- unused network space
- red teaming

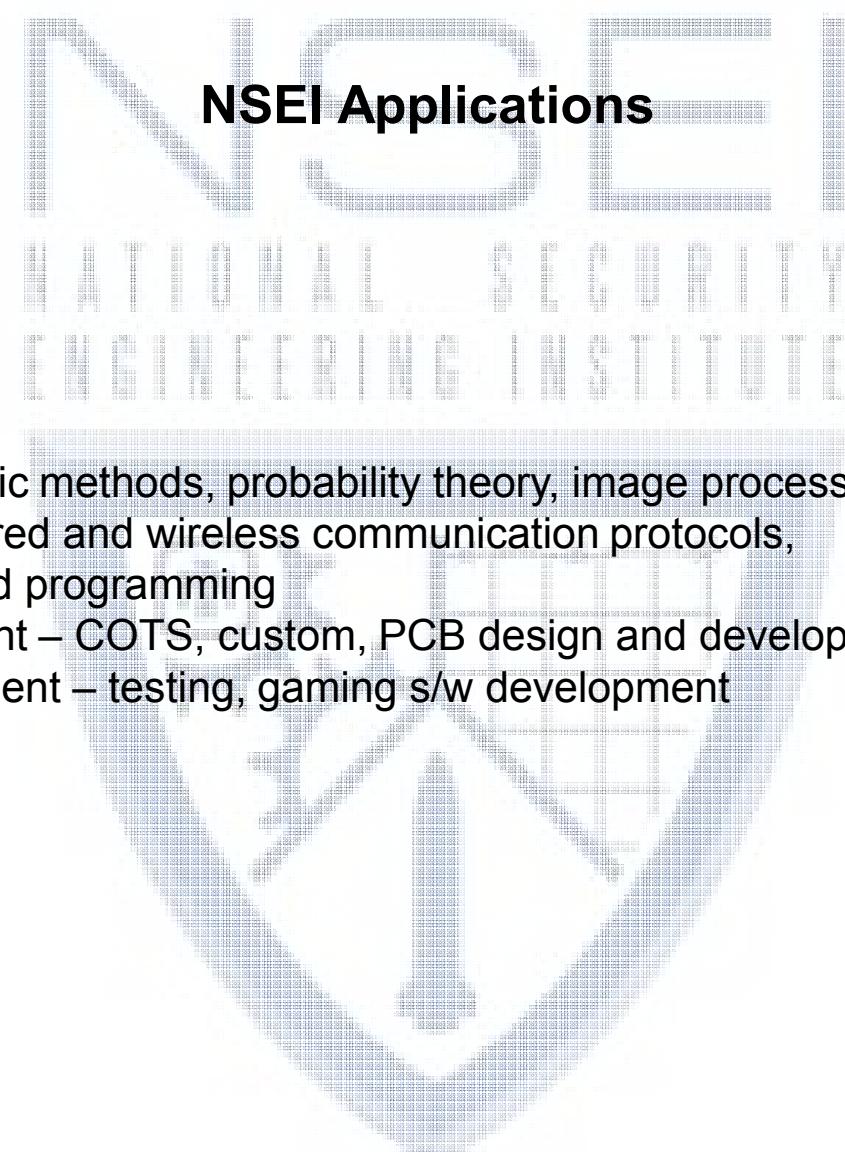


# National Security Engineering Institute (NSEI)

- targets protection of critical assets
- develops and integrates security systems involving h/w and s/w components
- expands knowledge in security arena
- cultivates new employees
- presents classified and unclassified work
- offers 13-week summer research internship for students



# NSEI Applications



- algorithms – stochastic methods, probability theory, image processing, AI
- communications – wired and wireless communication protocols, encryption, embedded programming
- hardware development – COTS, custom, PCB design and development, commercial sensors
- gaming test environment – testing, gaming s/w development

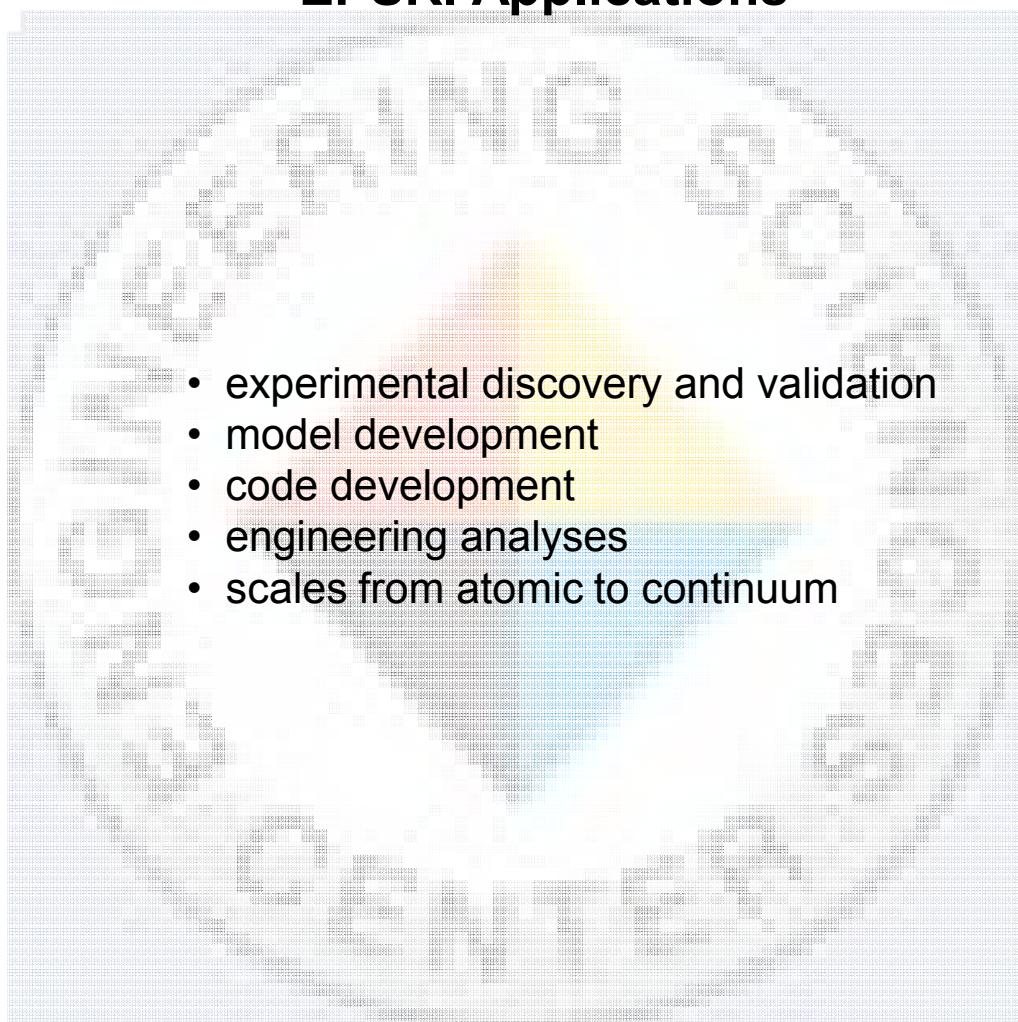


# Enabling Predictive Simulation Research Institute (EPSRI)

- fuses core engineering disciplines with phenomenological understanding and computer modeling and simulation
- targets thermal, fluid, and aerosciences; structural dynamics, solid mechanics, material mechanics; electromagnetics, electrical science
- offers 13-week summer research institute for students
- offers senior capstone program
- funnels undergraduate students into graduate school
- supports fellowships and thesis work



# EPSRI Applications



- experimental discovery and validation
- model development
- code development
- engineering analyses
- scales from atomic to continuum



# Weapon Intern Program (WIP)

- launched in 1998 to address DOE concern surrounding loss of relevant NW experience wrt SS
- knowledge capture, mentorship, accelerated program
- provides education on all aspects of the US NW program
- utilizes variety of SMEs and venues in DOE/NNSA/DoD
- project assignments, mentors, site visits, course work, classroom instruction, research time
- ~1 year commitment



# Opportunities for Partnership

- **SEERI**

NSERC  
Capstone projects  
Faculty externships

- **CCD**

DTRIAC?

- **NSEI**

internship  
faculty externship  
capstone

- **EPSRI**

NSERC  
Capstone projects  
Internships

- **WIP**

co-development  
DTRU