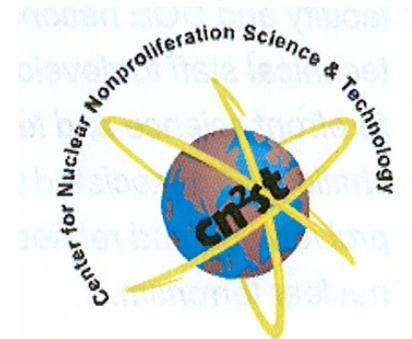


UNM Center for Nuclear Nonproliferation Science and Technology



***Ed Arthur
Dept of Chemical and Nuclear Engineering
University of New Mexico***

***NUC Meeting, Idaho Falls
May 21, 2008***

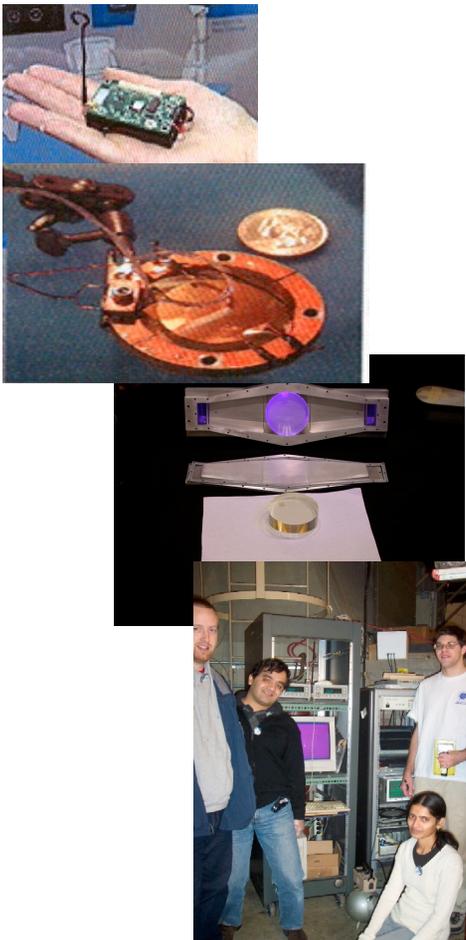
ChNE Students

***~ 80 undergraduates and 95 graduate students
(About 40 NE undergraduates and 40 NE graduate students)***



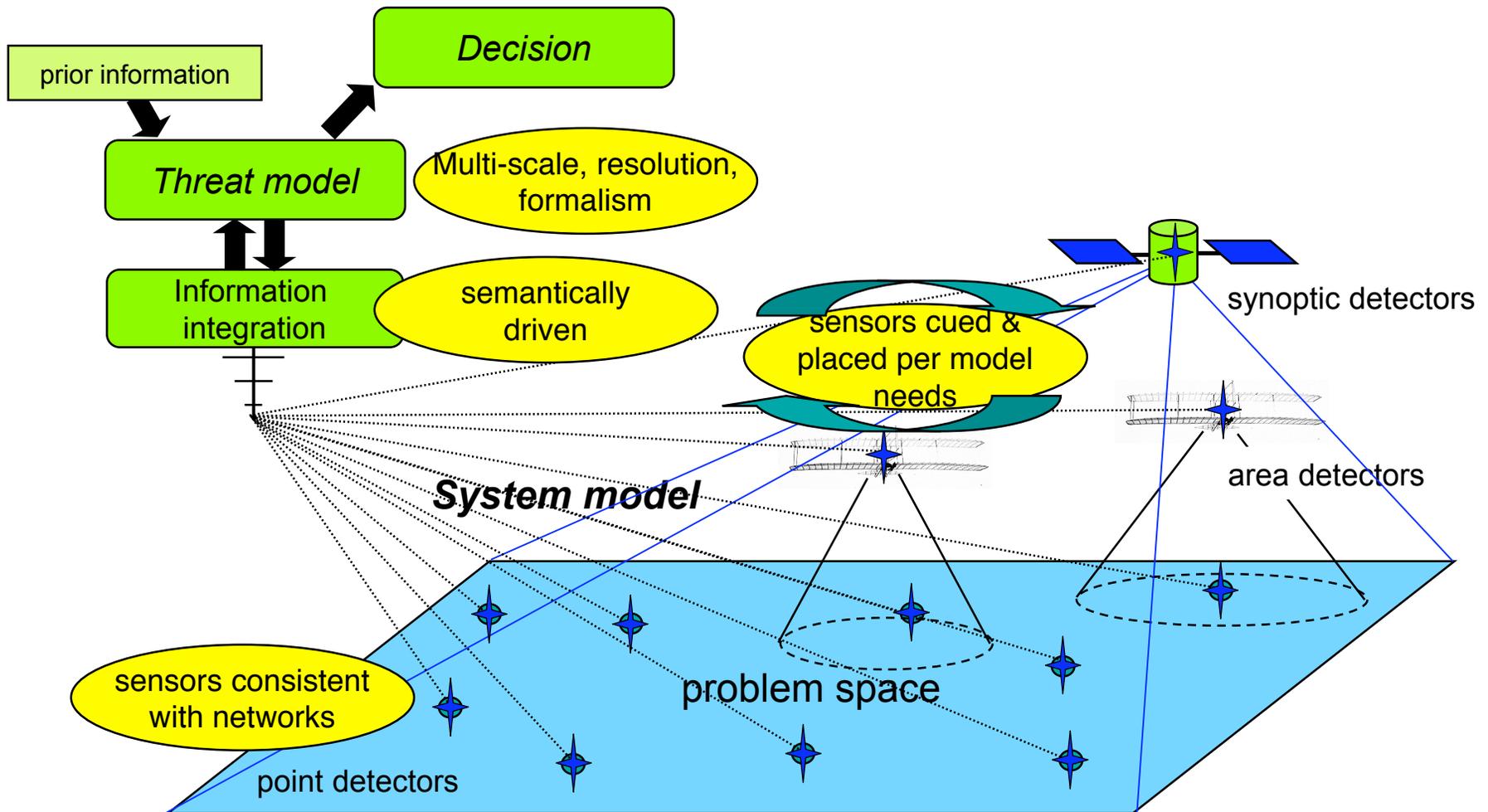
The UNM Center for Nuclear Non Proliferation Science and Technology

***Focus - Creation of funded collaborations among UNM faculty,
other universities, and DOE national laboratory scientists so
as***



- ***to develop and apply forefront science and technology to meet nuclear proliferation challenges:***
 - ***Resulting from the globalization of nuclear energy and nuclear technology***
 - ***Associated with clandestine nuclear materials***
- ***to train students in appropriate science and technology areas to ensure the future supply of scientists and engineers needed to meet tomorrow's needs and challenges***

CN²ST Located in the ChNE Department But Interactions Across Other Departments

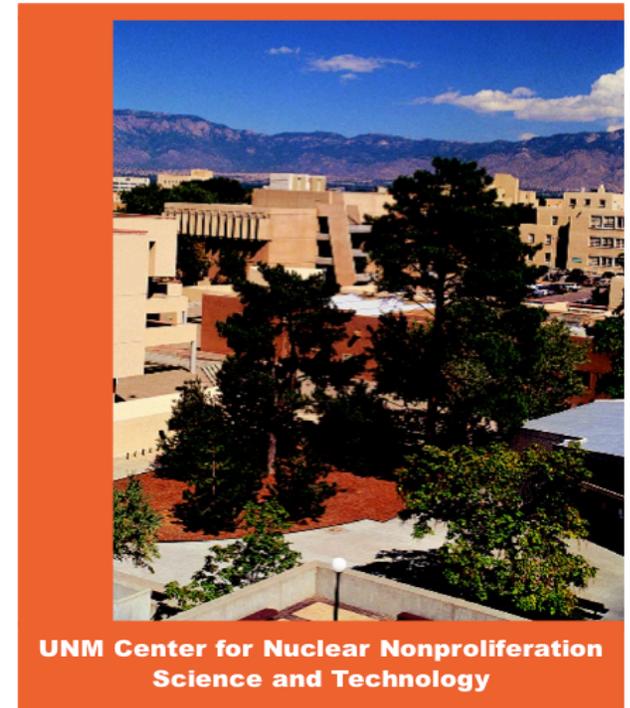


***Computer and Electrical Engineering, Mechanical Engineering,
Physics and Astronomy, Civil Engineering, Center for High-
Performance Computing, Political Science***

CN²ST Has Held Two Workshops with INL and NUCs

1) Introductory workshop - September 2006

- ***INL GNEP safeguards and INL nuclear WMD detection programs***
- ***Detector development and performance modeling***
- ***Sensor system networks***
- ***Advanced information processing and data mining***
- ***Nuclear computational modeling and simulation***
- ***Advanced visualization***
- ***Uncertainty characterization and fuzzy logic***
- ***Robotics***



CN²ST Has Held Two Workshops with INL and NUCs (Continued)

2) Workshop - INL-UNM Workshop on SESAME -

***Video Workshop on Needs and NUC Capabilities for Advanced
Development June 2007***

Topics

- ***SESAME Needs and Activities***
- ***Anomaly Identification***
- ***Signal Detection***
- ***Uncertainties and Model
Validation***
- ***Fuzzy Logic***



CN²ST Strategic Plan

Purpose - Steps to

- **Strengthen UNM capabilities in nuclear detection R&D and training**
- **Strengthen Center's support and linkage with INL's nonproliferation and national security initiatives and strategy**
- **Develop strong relationships with NNSA, DoD (DTRA), and DHS program offices in conjunction with other universities and laboratories**

Components

- **Strengthen CHNE's capabilities in nuclear detection science and education (GNEP readiness grant)**
- **Bring new faculty and post docs on board**
- **Implement a training and development detector laboratory within ChNE**

CN²ST Strategic Plan (Continued)

Components

- Increase faculty staff interchange between UNM and INL
- Partnership with INL in responding to new funding calls
- New collaborative initiatives with DTRA and other universities, labs
- Development of a graduate-level Certificate Program in nuclear nonproliferation science and technology
- Development of a non-proliferation policy area through UNM's Center for Science and Technology Policy

The Proposed UNM Graduate Certificate in Nuclear Non Proliferation Science and Technology

- ***Would be associated with Masters Degree in Nuclear Engineering***
- ***Certificate program would consist of course work and laboratory training***

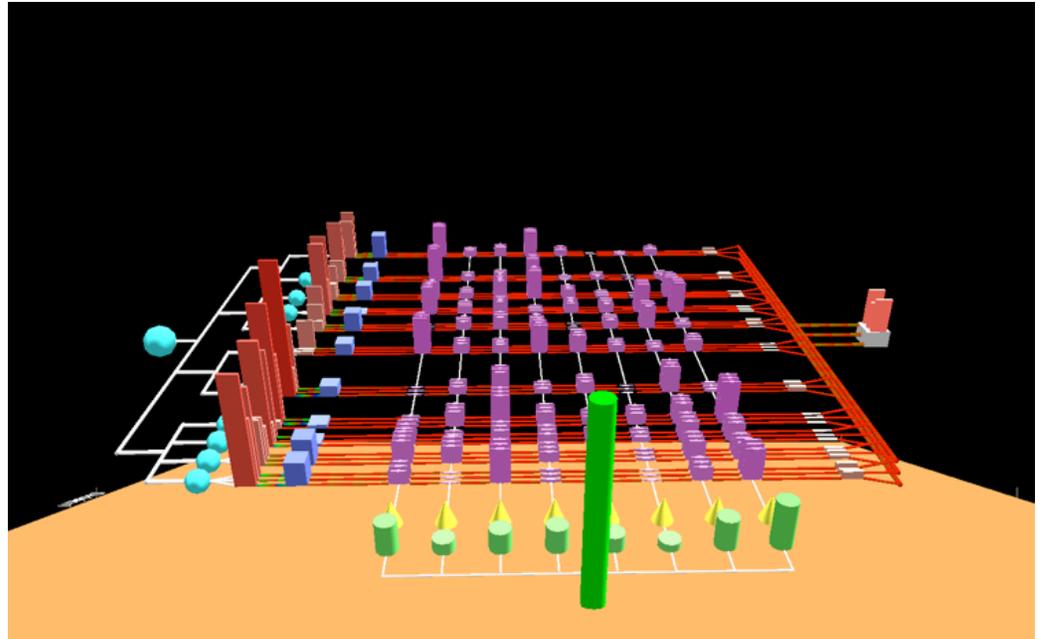
Possible courses

- ***Nonproliferation issues for weapons of mass destruction***
- ***Nuclear safeguards technology (including physical protection)***
- ***Radiation safety***
- ***Radiation detection***
- ***Nonproliferation policy***

Planning Workshop - Summer 2008, Input from user community

Anomaly Detection

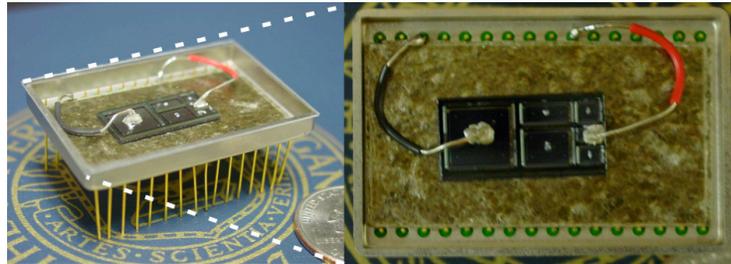
- ***Nuclear materials detection and diversion attempt identification involve interpreting data from a complex set of detectors and sensors***
- ***Can advanced visualization, neural nets, other advanced information technologies be a new tool for identifying key data correlations (“signatures”) and/or anomaly detection?***



Flat Land visualization and information interface system

UNM SWARM Concept Marries Robotics and Radiation Detectors

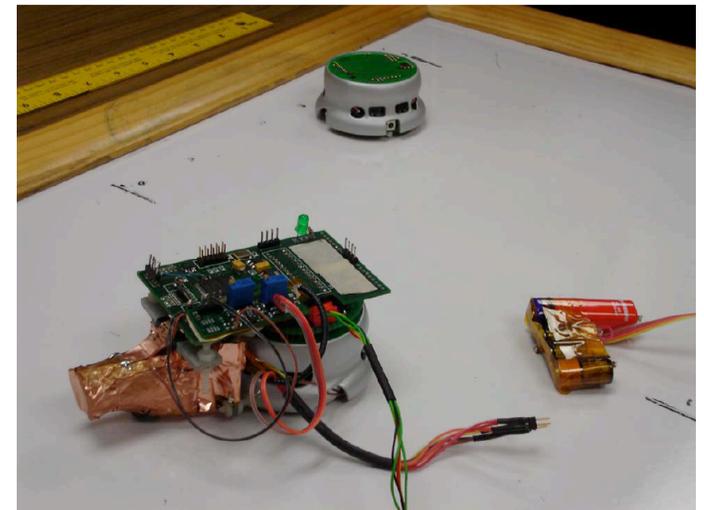
***A group of robots with radiation sensors autonomously work
to optimize radiation measurement of an unknown source***



***Mechanical Engineering - Robot
development, control systems***

***Manufacturing Center - MEMS
systems, radiation sensor***

***ChNE - “Noisy” environment
measurement optimization***



(carrying radiation sensor)