

**DOE NNSA
Nonproliferation and Verification
R&D
University Program**

Dr. Marco Di Capua

Chief Scientist

Defense Nuclear Nonproliferation R&D

Goals

- Build a stable pipeline of highly trained nuclear nonproliferation *technical* expertise for the NNSA laboratory system
- Sponsor *basic* research in nuclear nonproliferation
- *Bridge* the nuclear nonproliferation knowledge bases in academia and the NNSA Laboratory system

Vision

“To be an effective source of innovation and highly trained engineers and scientists that the Nation needs, our nuclear engineering programs must have sustained support for multiyear research projects with modern curricula.”

-- Energy and Water Appropriations Bill, 2009

DNN R&D Investment Strategy

- Project-based university research
 - Topically targeted, annual solicitations
 - Development of innovative technology
 - High-risk endeavors
 - Invest \$10M/year
- University consortium
 - Stable and long-term
 - Student and early career fellowships
 - Link one or more universities with strong nuclear science programs and one or more National Laboratories
 - Invest \$5M/year

**Support the
basics**

**Build a
pipeline**

Project-based Grants

- **FY11**
 - Received 67 Applications with 7 awards (corporate decision to fully fund grants)
 - Average award \$900K (over 3 years)
 - 10 M \$ per year steady state
- **Topics**
 - Remote Sensing
 - Radiation Detection
 - Nuclear Forensics
 - Simulation, Algorithms and Modeling
 - Global Safeguards
 - Radiological Replacement Sources

Project-Based Grants

- **FY12/13**
 - Upcoming solicitation
 - FOA Announcement Pending FY-12 Appropriation
 - Capping grants at \$750,000
 - Four months from FOA to selection
- **Eligibility restrictions**
 - Four-year degree granting institutions
 - U.S. citizen (requirement applies to direct funding recipient only)
- **Topics (reduced from previous years)**
 - Advanced Materials for Radiation Detection
 - Simulations, Modeling and Algorithm Development
 - Remote Sensing Techniques
 - Mass Spectroscopy
- **Will select grants for funding starting in FY12 and a second set for funding in FY13**
 - Expect 8-10 grants in FY12
 - Expect 10-15 grants in FY13

Grants Awarded FY11

Title	University	State
Quantifying Recombination Dynamics in SrI2:Eu2+ with Material Variations: Mechanisms and Scintillator	Fisk U	TN
3-D Intelligent Sensor System on a Chip" for Massive Deployment for Non-Proliferation Remote Sensing	USF	FL
Energy-Angle Correlations in Spontaneous-and Induced Fission Neutron Emissions	UMich	MI
Multi-Scale Separation and Analysis of Heterogeneous Trinitite Phases	UND	IN
High Sensitivity Detector for Nuclear Materials based on Doubled Pulsed Laser-Induced breakdown Spectroscopy	Purdue	IN
A Prototypical Ontology-supported Intelligent Geospatial Feature Discovery System (iGFDS) for Proliferation	GMU	VA
Compressive Sensing & Deep Learning for Analysis of Hyperspectral Imagery	Duke	NC

University Consortium

- **University/National Laboratory Multi-team Construct**
 - Non-mission-related work in Nuclear Security
 - Human capital development
 - Research fellowships/scholarships
 - Early career development support
 - Teaming with NNSA and DOE Laboratories
- **\$25M grant (\$5M/year for five years)**
- **Nuclear Science and Security Consortium (NSSC) awarded on Feb 2011 to:**
 - UC Berkeley (lead institution), UC Davis, UC Irvine, UC San Diego, UNLV, Washington University, Michigan State University
 - Teamed with: Lawrence Berkeley National Lab, Lawrence Livermore National Lab, Los Alamos National Lab, Sandia National Lab

Nuclear Science and Security (NSSC) Consortium Priorities

- **Produce graduates with a strong technical background in nuclear science and security**
- **Produce graduates with a desire to work in the NNSA laboratory system**
- **Integrate university research efforts with national laboratory areas of interest in nuclear nonproliferation and global security**
- **Partner universities with national laboratory PIs**

UC Consortium Research Areas

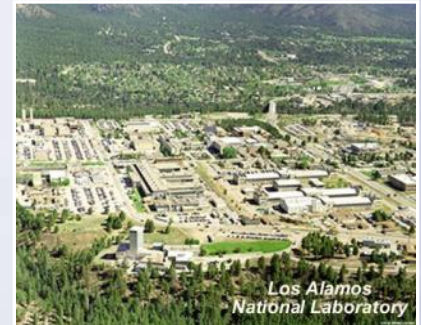
- **Nuclear and Particle Physics**
- **Nuclear Chemistry/Radiochemistry**
- **Nuclear Instrumentation, Radiation Detection Concepts and Technologies**
- **Nuclear Engineering**
- **Nuclear Security International Policy and Nuclear Security Program**

UITI Program Review

- *University Industry Technical Interchange*
- **DNN R&D's annual Program Review for University and Small Business Grants**
- **Review about 40 grants university altogether**
- **6-8 Dec 2011**
- **Oakland Marriott**
- **Expect 200+ attendees**
- **Invite grantees and stakeholders**

An Opportunity for Your Graduates

- **NNSA Graduate Fellows Program (NGFP)**
- **A full-time, 12-month appointment in Washington D.C.**
 - Fellows work directly alongside NNSA experts to implement global nonproliferation programs
- **Comprehensive training in nuclear technologies and nuclear nonproliferation at Pacific Northwest National Laboratory and at NNSA Headquarters**
 - PNNL orientation and training
 - NNSA HQ orientation and Training
 - Placement-specific orientation and training
- **Affords opportunities for additional training at DOE National Laboratories and other U.S. government agencies**



Program Objectives

- **Develop the next cadre of nuclear nonproliferation experts**
- **Provide participants with training and experience in nonproliferation**
- **Aid NNSA in achieving its national security mission**
- **Develop awareness of career opportunities**
- **Develop a talent pool**



Fellows Get Paid to Learn and Travel!

- **Annual salary of \$49,000 (\$59,000 for post-doctoral fellows)**
- **\$3,000 sign-on bonus**
- **Health and dental plan, paid vacation, paid holidays, and possible tuition reimbursement**
- **Unique combination of comprehensive training and practical application supporting major USG nonproliferation programs**
- **Opportunities for travel (domestic and international)**
- **Career mentoring and networking**
- **Extensive interaction with USG nonproliferation professionals and DOE National Laboratory experts**
- **Top-level security clearance**

Qualifications for the NGFP

- **Must be a U.S. citizen eligible for DOE security clearance**
- **Possess (or completing) post-graduate degree**
- **Career interest in national security and nonproliferation**
- **Demonstrated maturity, excellent communication and interpersonal skills, sound judgment, and strong self-motivation**
- **Highly desirable academic specializations include:**
 - **Nuclear science/engineering**
 - **Radiation health physics**
 - **Radiochemistry**
 - **Chemical sciences**
 - **Physics**
 - **Engineering**
 - **International relations**
 - **Security studies**
 - **Non-proliferation studies**
 - **Political science**
 - **Public administration**
 - **Economics**
- **Conversational fluency in a foreign language and program management and budget skills are a plus**



Contact

Dr. Marco Di Capua

Chief Scientist

Defense Non-Proliferation R&D

National Nuclear Security Administration

(202) 586-39437

Marco.DiCapua@nnsa.doe.gov