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Title:	Overview of Science, Technology and Engineering Portfolio
Author(s):	Duncan W. McBranch and Janet A. Mercer-Smith
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Los Alamos
NATIONAL LABORATORY
EST. 1943

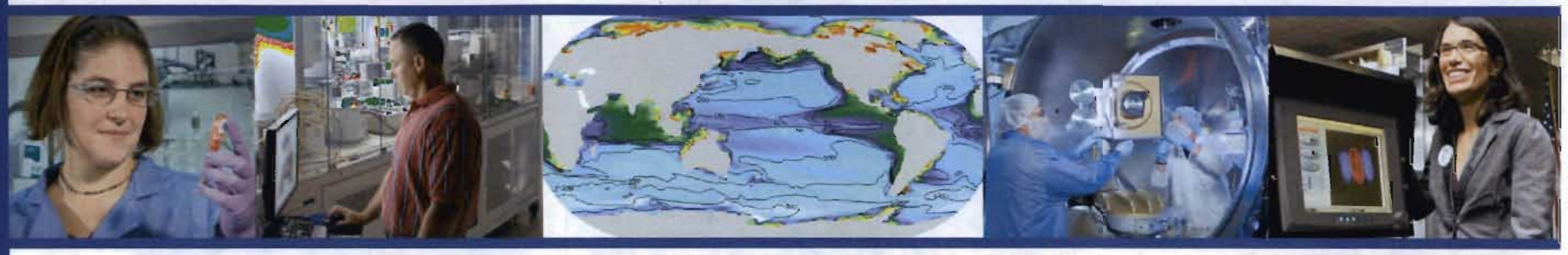
Form 836 (7/06)

Overview of Science, Technology and Engineering Portfolio

Duncan W. McBranch, and Janet A. Mercer-Smith

The Laboratory provides science solution to the mission areas of nuclear deterrence, global security, and energy security. The capabilities support the Laboratory's vision as the premier national security science laboratory. The strength of LANL's science is at the core of the Laboratory. The Laboratory addresses important science questions for stockpile stewardship, global security, and energy security. The underpinning science vitality to support mission areas is supported through the Post Doc program, the fundamental science program in LDRD, collaborations fostered through the Institutes, and the LANL user facilities. LANL fosters the strategy of Science that Matters through investments, people, and facilities.

Science at Los Alamos



Overview of Science, Technology and Engineering Portfolio

Duncan W. McBranch
Deputy Principal Associate Director for
Science, Technology and Engineering

August 4, 2011

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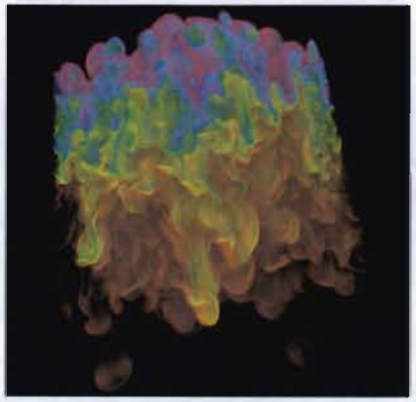
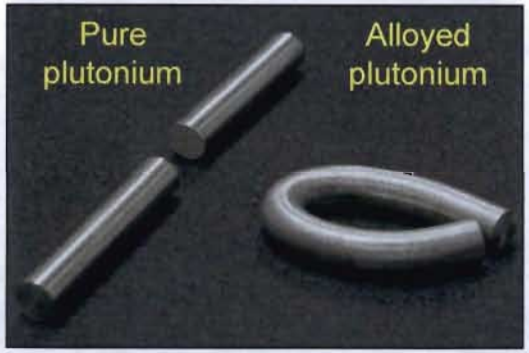
Science at Los Alamos National Laboratory

Mission Areas

Stockpile Stewardship

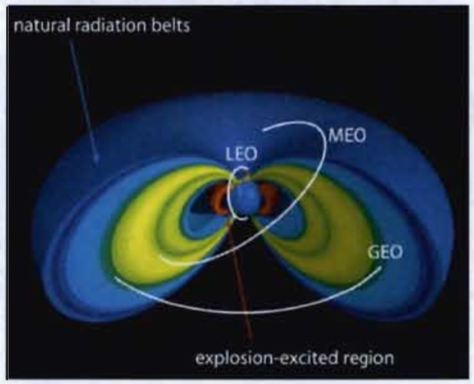


Hydrodynamics: Turbulence

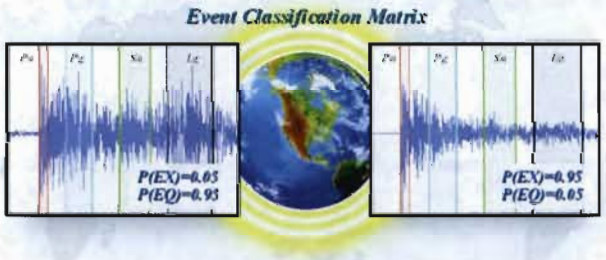


Plutonium Science: Metallurgy

Global Security

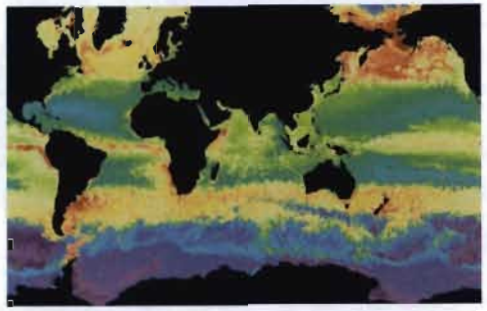


Threats from Space: Dynamic Radiation Environment Assimilation Model



Seismic Detection of Nuclear Explosions

Energy Security



Climate/Energy Impacts: Measurement, simulation, prediction

Materials: Energy generation and transmission

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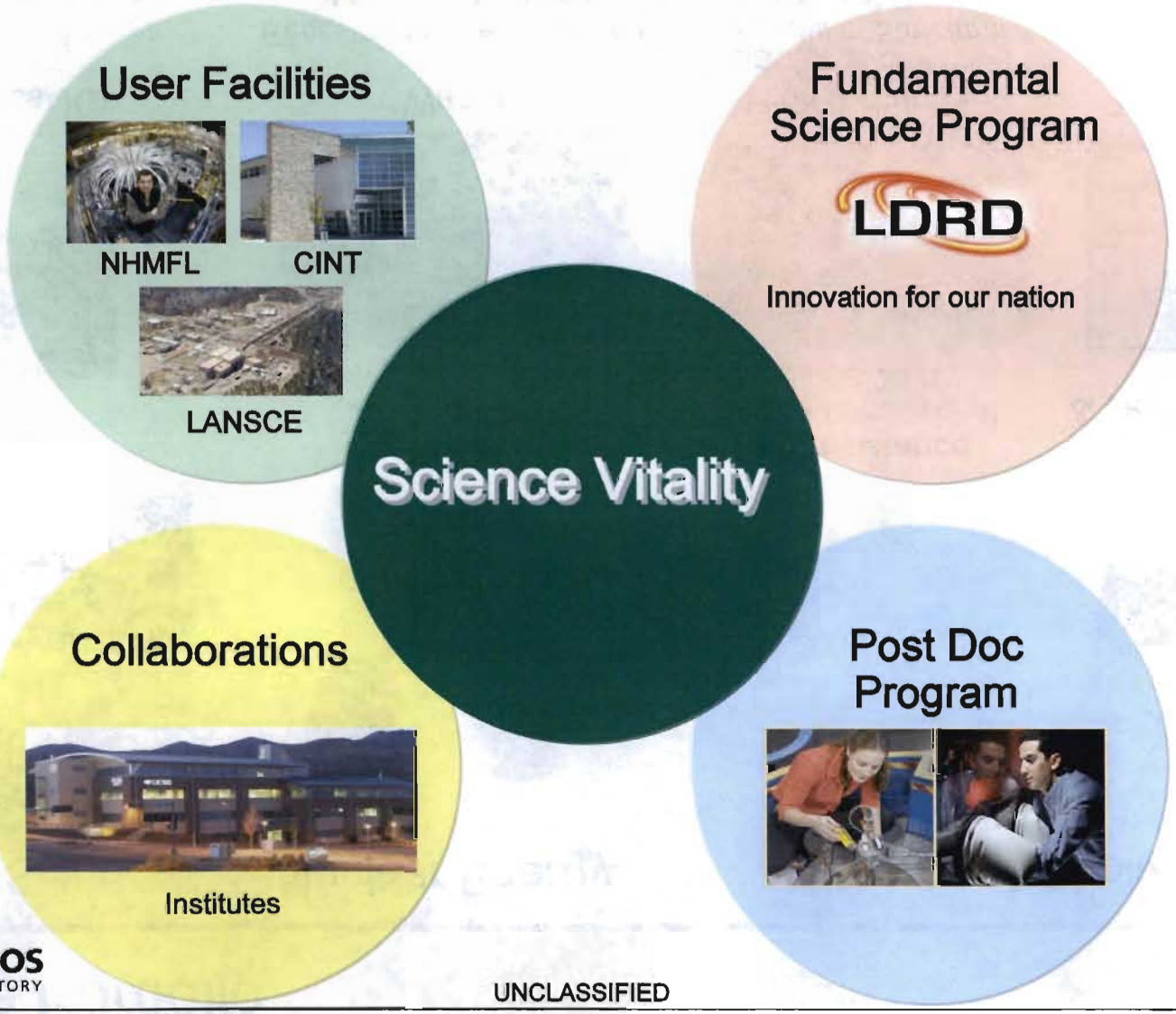
Science vitality underpins the Lab's mission areas.



Strategy to Sustain Science: Sponsors

Science Portfolio

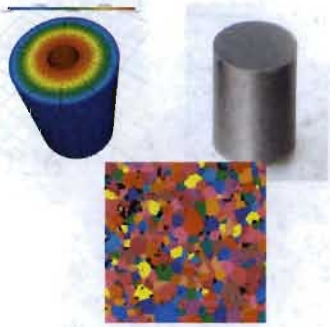
Office of Science

User Facilities

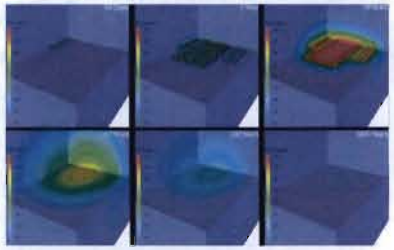
Genomics/JGI

Genomic Encyclopedia of Bacteria and Archaea, Nature (2009)

Nuclear Energy



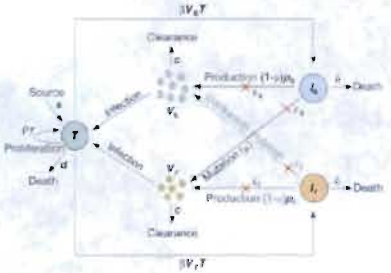
Fuels



Waste

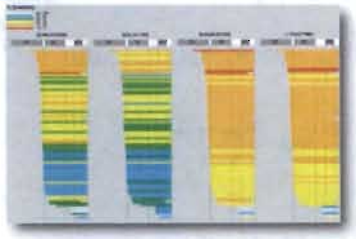
Repository-scale simulation of thermal response

NIH



Drug resistance

Science Translational Medicine (2010)

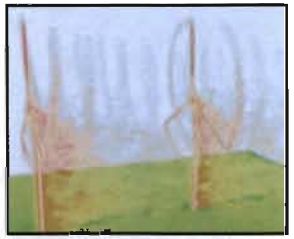


High throughput bacterial cell lysis

Journal of Structural & Functional Genomics (2010)

Applied Energy

Carbon capture & sequestration



Turbine/wind interactions

Energy

Industrial Partnerships: strong focus on energy

Chevron CRADA

Alliance for Advanced Energy Solutions (6 years, 19 projects, $53 M funding)

New technologies to find, extract, refine conventional and unconventional fuels

Projects in deep water exploration, modeling ultra deep bore stresses, advanced well performance

Alliance projects have reached commercial success much faster than internal R&D at either organization

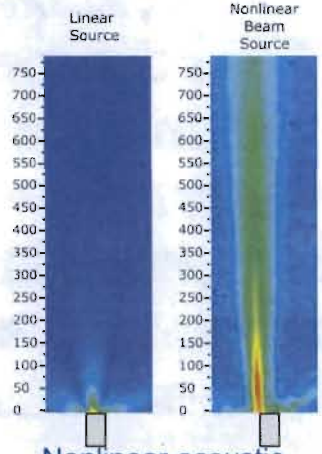
P&G Procter & Gamble CRADA

18 technical projects over 16-year history of collaborative R&D ($34 M)

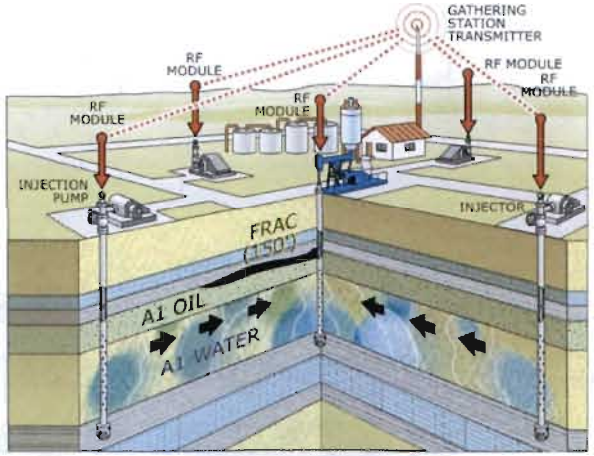
Currently: non-petroleum materials for packaging

Collaboration is credited for $1.7 B in business value to P&G to date

Trapped annular pressure prevention



Nonlinear acoustic imaging



INFICOMM: wireless data communication

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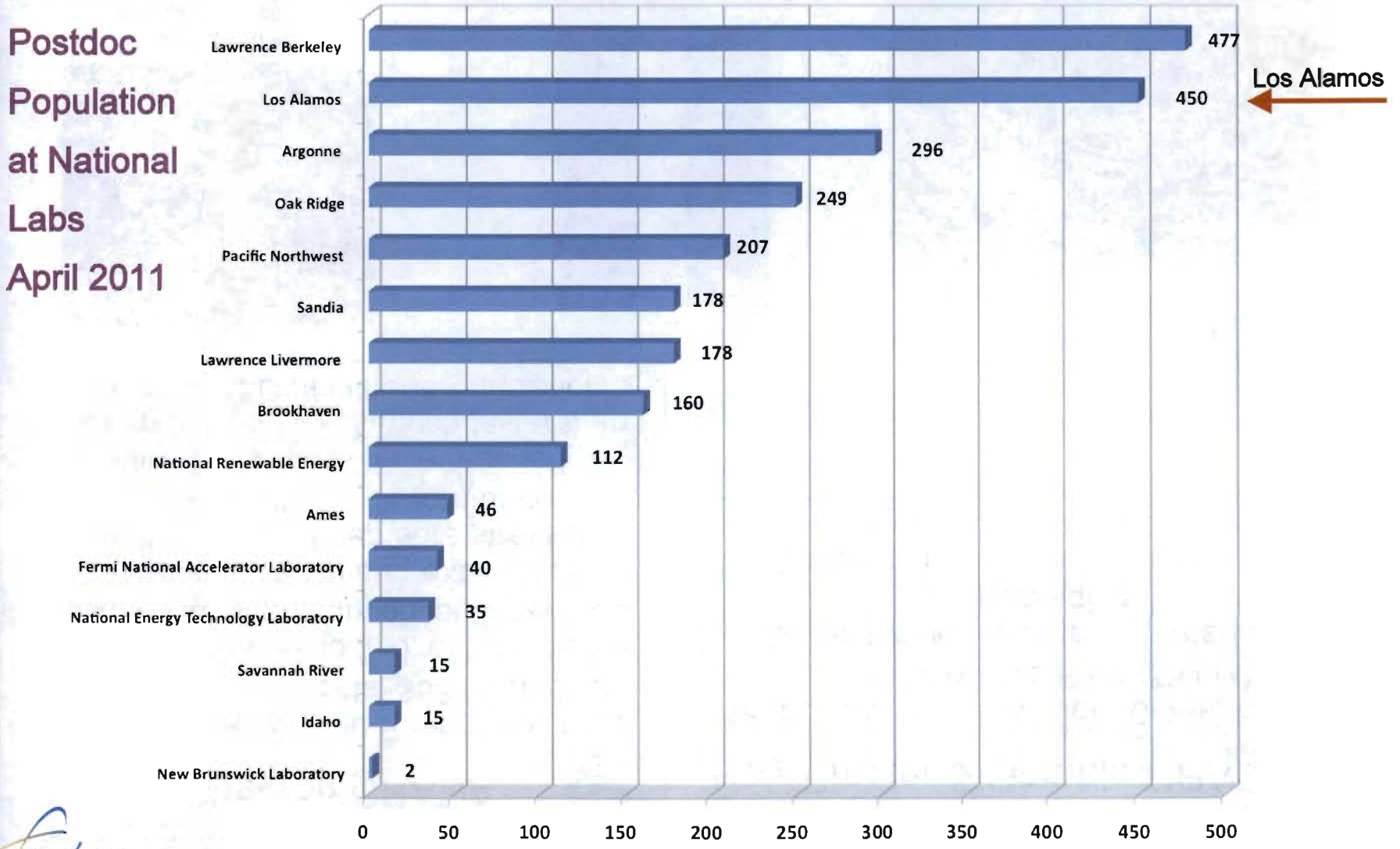
UNCLASSIFIED

Los Alamos is a national leader for postdoc programs.



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LANSCE provides the US and international research communities a diverse set of premier facilities.

Unique, highly-flexible beam delivery to multiple facilities 6 mo/yr @ 24/7 with ~ 1200 user visits

Lujan Center

- *Materials science and condensed matter research*
- *Bio-science*
- *Nuclear physics*
- *A National BES user facility*

WNR

- *Nuclear physics*
- *Semiconductor irradiation*

Ultra-cold Neutron Facility

- *Fundamental nuclear physics*

Proton Radiography

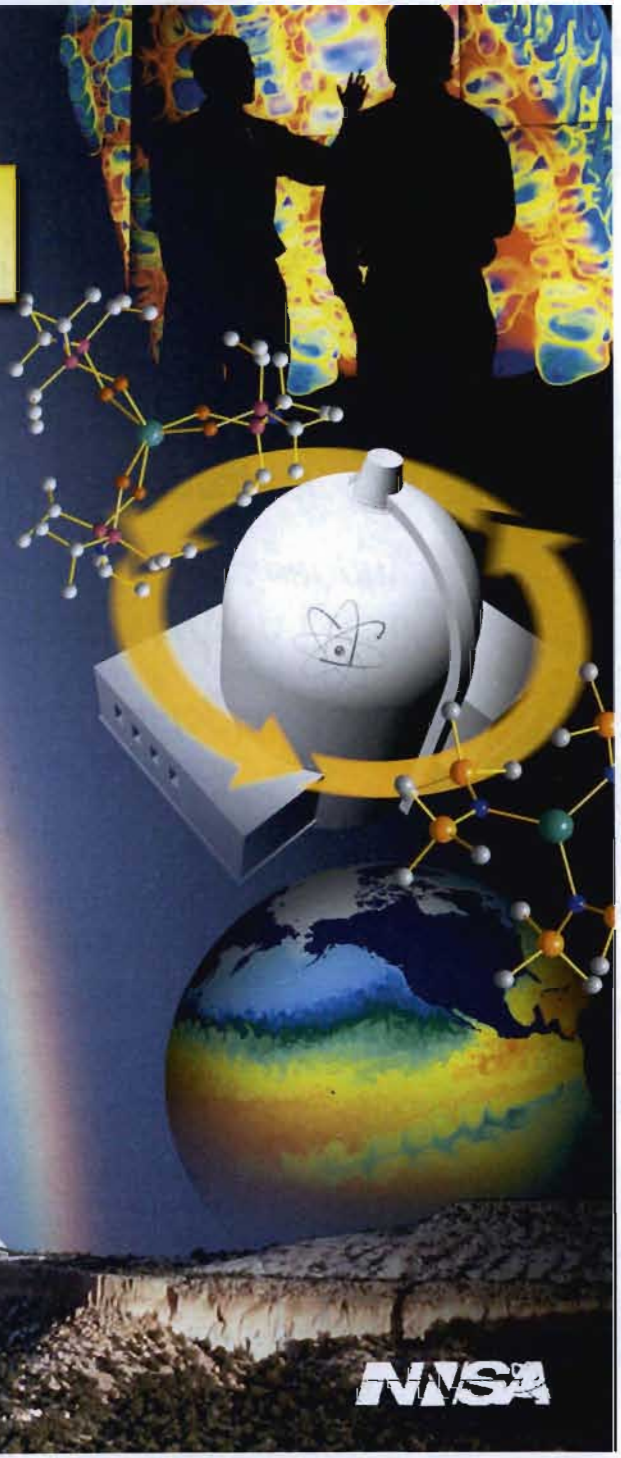
- *HE science, dynamic materials science, hydrodynamics*

Isotope Production Facility

- *Nuclear medicine*
- *Research isotope production*

Los Alamos Science in the 21st Century

The nation's investment in Los Alamos has fostered scientific capabilities for national security missions.



As the Premier National Security Science Laboratory, Los Alamos tackles:

- Multidisciplinary science, technology, and engineering challenges
- Problems demanding unique experimental and computational facilities
- Highly complex national security issues requiring fundamental breakthroughs

MaRIE builds on the LANSCE facility to provide unique experimental tools to meet this need.

First x-ray scattering capability at high energy and high repetition frequency with simultaneous charged particle dynamic imaging

(**MPDH**: Multi-Probe Diagnostic Hall)

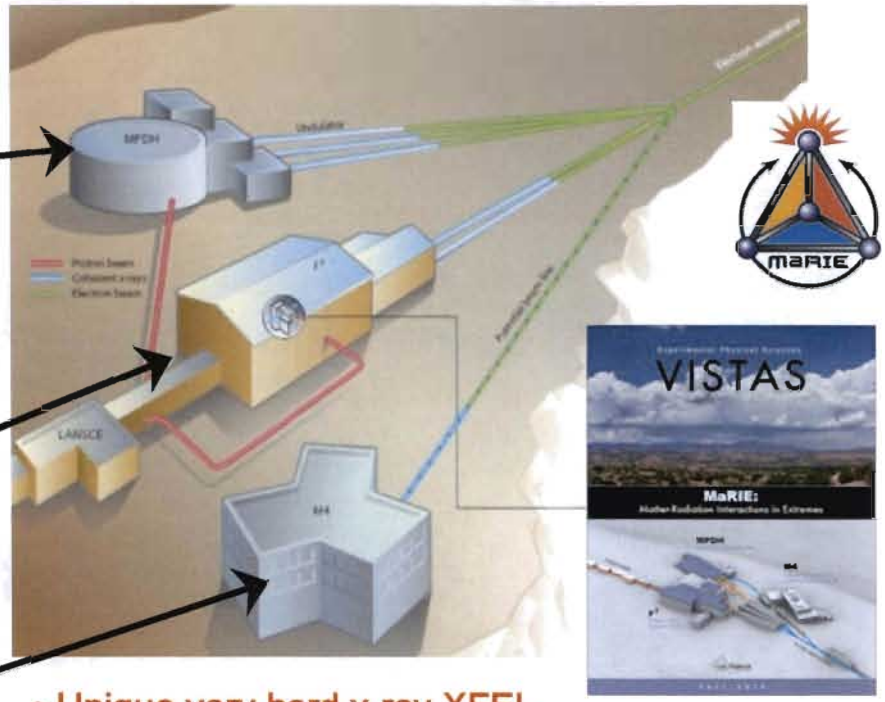
Unique in-situ diagnostics and irradiation environments beyond best planned facilities

(**F^3**: Fission and Fusion Materials Facility)

Comprehensive, integrated resource for materials synthesis and control, with national security infrastructure

(**M4**: Making, Measuring & Modeling Materials Facility)

MaRIE will provide unprecedented international user resources.



- Unique very hard x-ray XFEL
- Unique simultaneous photon-proton imaging measurements
- Unique spallation neutron-based irradiation capability
- Unique in-situ, transient radiation damage measurements
- Unique materials design and discovery capability