

LANL STEM Workforce Development Programs

FLC Mid-Continent & Far West Regional Meeting
Denver, September 11, 2008

Dave Foster

Education & Postdoc Office Program Manager

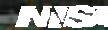
Los Alamos National Laboratory (LANL)



Operated by Los Alamos National Security, LLC for DOE/NSA

UNCLASSIFIED

LA-UR-08-05700



LANL STEM Workforce Development “Pipeline” Programs

- **Science Education Outreach Initiatives** to Inform/Motivate/Engage Students, Teachers and Community Members in the Science, Technology, Engineering and Mathematics (STEM) Disciplines
- **Regional K-20 Science Education Infrastructure Enhancement Programs** to Improve STEM Expertise and Teaching Capacity in NM Schools
- **Major Workforce Development Programs** to Attract, Develop, Engage Students and Postdocs to enter the LANL “Pipeline” of Future Potential Employees
- **See “Science Education Opportunities at Los Alamos National Laboratory”** brochure available online at <http://www.lanl.gov/education/>



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED

Slide 2



LANL Science Education Outreach Initiatives...to feed the workforce development “pipeline”

- **Over 25,000 students, teachers, families, and other community members participated in LANL sponsored science education outreach programs in 2007. Key programs include:**
 - **Science on Wheels and Science Museum Visits** - 11,779 participants
 - **Other Museum Education Outreach Programs** - 1,830 participants
 - **Pueblo Education Outreach Programs** - 526 students/41 teachers
 - **New Mexico Supercomputing Challenge** - 331 students/42 teachers
 - **Expanding Your Horizons in Math and Science** - 106 female students/14 teachers
 - **Earthwatch Student Challenge** Summer High School Internships
 - **Frontiers in Science Public Lectures** - 1,050 attendees
 - **Science Education Community Service Time Volunteers** - 488 employees interacted with 8,960 students & teachers



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED

Slide 3



Supercomputing Challenge, 1990-2008

- **7500 participants since 1990; 2008 - 331 students, 42 teachers, 33 schools, 5th-12th grades, 39% female**
- **Both a competition and a project based learning experience**
- **Skills developed: teamwork, time management, report writing, presentation, web development, research and programming**
- **Graduate level work reports, <http://challenge.nm.org/finalreports>**
- **Alumni return as mentors and judges; 100+ employed at labs**
- **Summer Teacher Institutes held since 1995**



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED

Slide 4



Regional K-20 Science Education Infrastructure Enhancement Programs

- LANL invests over \$4M annually to facilitate the enhancement of Northern NM's education infrastructure. Key programs include:
 - **Northern New Mexico Math & Science Academy (MSA) Professional Development Program** - 250+ teachers & 5000+ students impacted
 - **Master of Arts in Teaching Math & Science Degree Program with NM State University** - 61 MSA teachers enrolled, 27 graduated in FY07
 - **Los Alamos Space Science Outreach Teacher Institute** - 11 middle and high school teachers in 2007; funding from NASA programs
 - **Los Alamos National Security LLC Community Commitment Plan** - provides ~ \$3M/yr for education & economic development programs
 - **Institutional Agreements** with three Northern NM colleges in support of undergraduate programs in teaching, nursing, technicians, computing
 - **LANL Foundation** provides fiscal management for investments of \$3.7M in regional STEM education initiatives and scholarships in FY08
 - **Los Alamos Education Equipment Gift Program** donations of \$1.6M excess equipment to non-profits in FY07



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED

Slide 5



New Mexico's "Encanto" Supercomputing Center

Founding Partners:

NM Tech, NM State Univ., Univ. of NM, Los Alamos and Sandia National Labs

Goal:

Draw on strengths at Labs and universities in applications of supercomputing to issues of importance to New Mexico.

Primary Directions:

- High-tech business development
- **Education and workforce development**
- Community assistance

Current Status:

- \$18.6M state investment to date
- 3rd fastest computer in the world @127 TFLOPS
- 1792 node SGI/Intel Altix cluster
- Will install gateways (w/3D visualization) on every public college campus in NM
 - **44 gateways will serve as portals to surrounding schools and communities**
- Working to establish business partnerships



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED



Northern New Mexico Math and Science Academy

- **Program Overview**
 - **An intensive three-year teacher professional development program** designed to refocus and improve teacher education in math and science
 - **Teachers invest 200+ hours/year**
 - **Optional MA in Teaching Math and Science degree program** via Internet with NM State University
 - **Model K-12 “best practice” teacher professional development programs** for America COMPETES legislation
 - **250+ participants from 2000-2008**
 - **Partnership of lab, business, govt**
- **Program Components**
 - **Three week Summer Institutes**
 - **Online discussion groups**
 - **Reflective portfolios**
 - **School-year interactions**
 - **Cognitive coaching**
 - **Community Celebrations of Learning**
 - **Formal annual assessments**
- **Results**
 - **Significant improvements in math proficiency scores** are being realized by over 5000 MSA-taught students
 - MSA program received 2007 DOE Secretary **EEO/Diversity Best Practices Award**



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED

Slide 7



Major Workforce Development “Pipeline” Programs

- **Major Workforce Development “Pipeline” Programs: ~\$65M annually invested**
 - **HS/JGS/GRA Student Internships** - 1119 in July 2008 ~ **\$24M**, funded by hosting divisions
 - **Student Affiliate Guests in Schools & Institutes** - 179 in July 2008, all externally funded and participants in schools, institutes, other short term programs
 - **Postdoctoral Appointments** - 339 in July 2008 ~ **\$31M**, funded by LDRD and hosting divisions
 - **Technician Training Programs** - two year work study programs included in internships above conducted with regional colleges; ~100 participants, 75 hires over nine years
 - **National Security Education Center** ~**\$10M** in 2007; 5 institutes with UC & NM universities which provide summer schools, institutes, online courses
- **Return on “Pipeline” Investments:**
 - **Student Interns & Postdocs contribute significantly** to programmatic work, publications, citations, conference presentations, inventions, technology transfer, science education outreach, technical expertise and LANL international recognition
 - **29%** of all employees were former students or postdocs; **27%** of all managers
 - **41%** of all hires & **59%** of technical staff member hires in FY07 were former students or postdocs, **90%** of all non-management PhD technical staff hires



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED

Slide 8



Funding Sources, Contracts, Fiscal Management

- Programmatic Direct & Indirect Funds - Student Interns and Postdocs
- DOE Office of Science - Science Undergraduate Laboratory Interns
- Department of Homeland Security - DHS Interns
- NNSA Office of Diversity & Outreach - Minority Serving Institutions Interns
- NASA Education Outreach - Los Alamos Space Sciences Outreach
- Los Alamos National Security Community Commitment Plan - \$3M/year
- NM Legislature - Math & Science Academy, Supercomputing Challenge
- Private Businesses and Foundations - Math & Science Academy



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED



Thank You!

Dave Foster, dfost@lanl.gov, 505-667-8680

- Student Internship Programs: <http://www.lanl.gov/education/>
- Postdoc Programs: <http://www.lanl.gov/science/postdocs/>
- Teacher Programs: <http://www.lanl.gov/education/teachers/>
- National Security Education Center: <http://institutes.lanl.gov/>



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED

