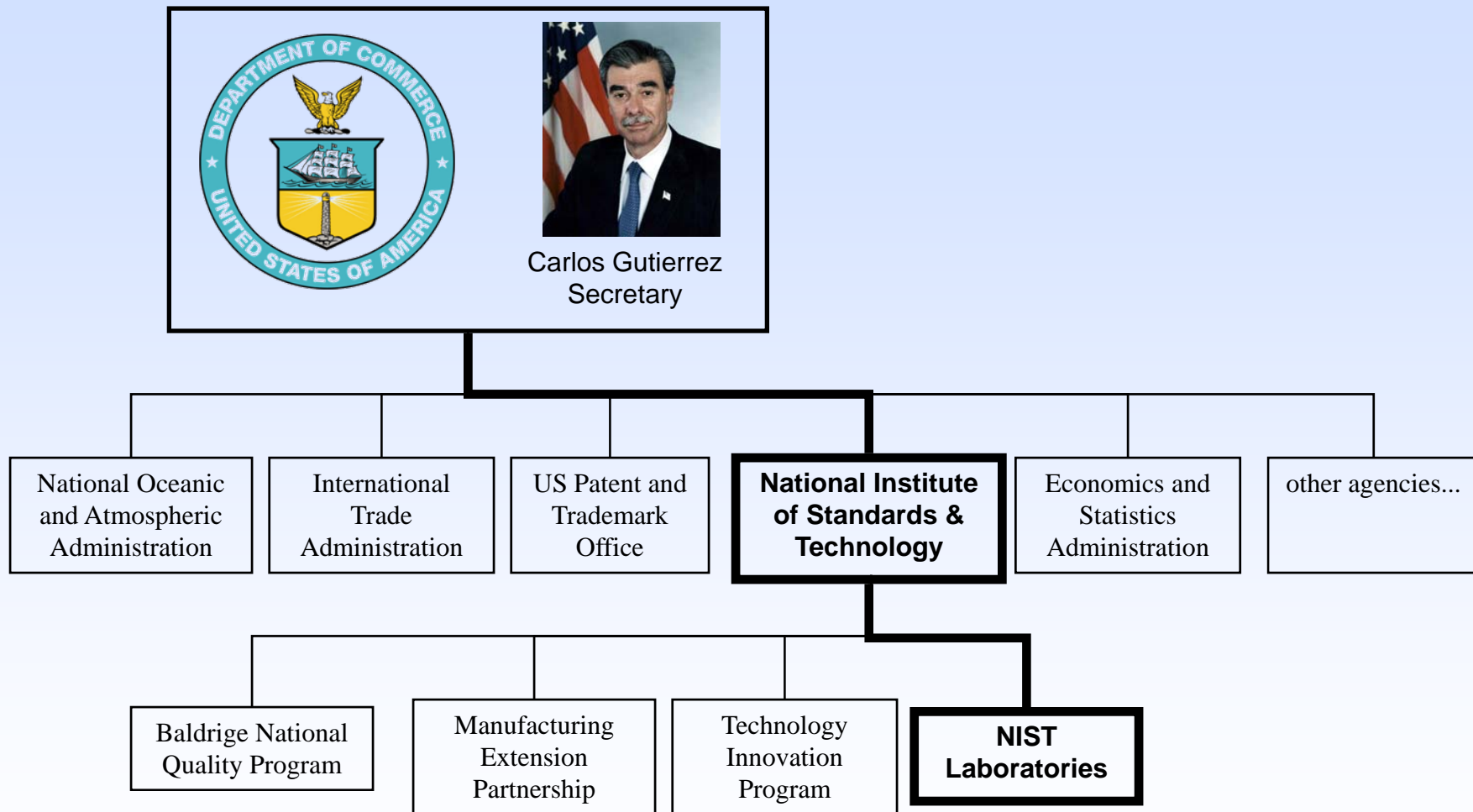


***Welcome***  
to the  
**Metallurgy Division**  
and the  
**NIST Workshop on**  
**Diffusion Challenges Associated with**  
**Sustainable Energy Applications**

May 12 - 13, 2008

Frank W. Gayle  
Division Chief

# NIST is part of the Department of Commerce



# NIST Snapshot

- 2,800 employees; 1,500 technical
- 1,000 associates
- \$670 million FY 2007 budget
- NIST Laboratories — National measurement standards
- Manufacturing Extension Partnership — 350 locations nationwide to help small manufacturers
- Baldrige National Quality Award
- Technology Innovation Program — authorized FY07 (replace ATP)



To promote U.S. innovation and industrial competitiveness

by advancing

**measurement science**

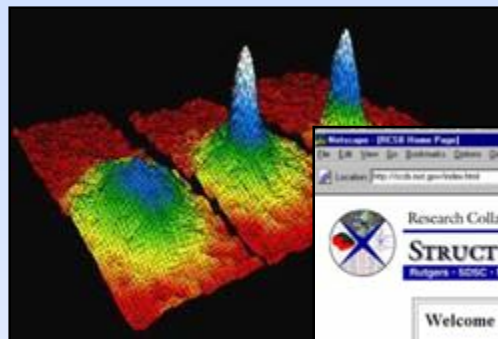
**measurement standards**

**measurement technology**

in ways that enhance economic security and improve our quality of life.

# NIST Products and Services Include

- **Measurement Research**  
*2,200 publications/year*
- **Standard Reference Data**  
*100 types available*  
*130 million datasets downloaded/year*
- **Standard Reference Materials**  
*1,300 products available*  
*33,000 units sold/year*
- **Calibrations and Tests**  
*16,000 calibrations/year*
- **Laboratory Accreditation**  
*800 accreditations*
- **Technical Workshops**  
*8,000 participants/year*
- **Standards Committees**  
*400 members, 1000 committees,*  
*150 (co)chairs, 100 SDOs*



# Core Program - The NIST Laboratories

Manufacturing  
Engineering

Building and  
Fire Research

Chemical  
Science and  
Technology

Materials Science  
and Engineering

Electronics and  
Electrical Engineering

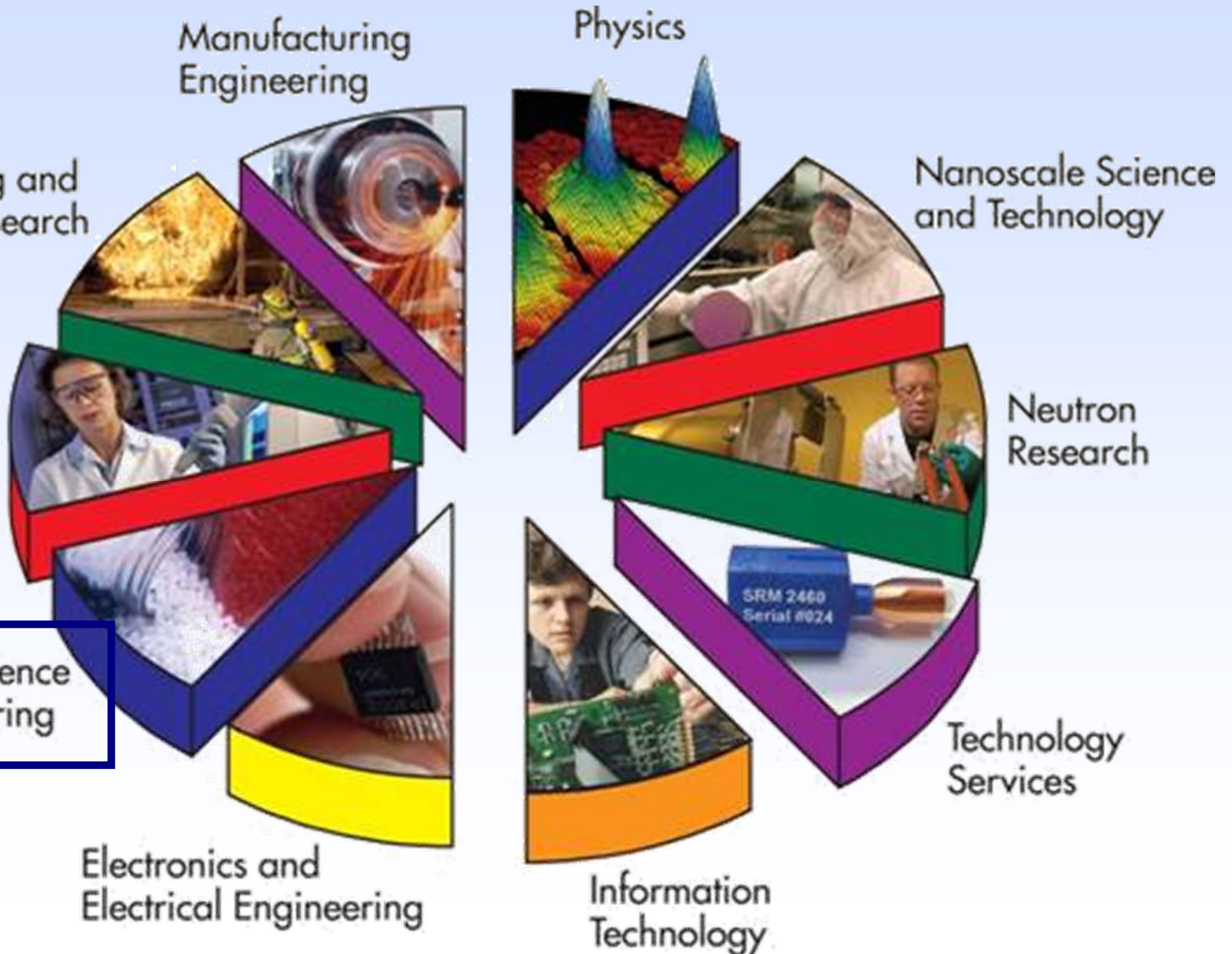
Physics

Nanoscale Science  
and Technology

Neutron  
Research

Technology  
Services

Information  
Technology



# Materials Science and Engineering Laboratory (MSEL)



**R.F. Kayser, Director**



**E.J. Amis, Deputy Dir.**

111 technical staff  
256 guest researchers  
\$41.5M STRS Budget  
\$50.6M Total Budget

## Ceramics



**D.L. Kaiser, Chief**

Electronic & Optoelectronic  
Materials  
Characterization Methods  
Data and Standards  
Technology  
Nanomechanical Properties

## Materials Reliability



**S. Hooker, Chief**

Nanoscale Reliability  
Structural Materials  
Cell and Tissue Mechanics

## Metallurgy



**F.W. Gayle, Chief**

Thin Film and Nanostructure  
Processing  
Magnetic Materials  
Materials Performance  
Thermodynamics and Kinetics

## Polymers

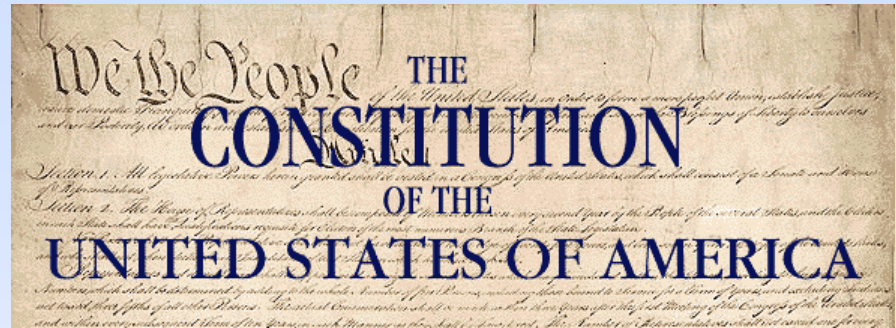


**E.K. Lin, Chief**

Characterization and  
Measurement  
Electronics Materials  
Biomaterials  
Nanostructured Materials  
Processing Characterization  
Combinatorial Methods

# NIST History

- Founded in 1901 as National Bureau of Standards (NBS)
- NBS became NIST in 1988
- Non-regulatory agency within U.S. Department of Commerce
- U.S. National Metrology Institute



Article I, Section 8: The Congress shall have the power to ...*coin money, regulate the value thereof, and of foreign coin, and **fix the standard of weights and measures***





# Early drivers for standards and measurements



**1904**

**Out-of-town fire companies arriving at a Baltimore fire cannot couple their hoses to the hydrants. 1526 buildings razed.**

**1905**

**Standard samples program begins with standardized irons.**



**1912**

**41,578 train derailments in the previous decade lead to NBS measurement and test program.**