

# Building the Science and Technology Workforce of the Future

*Scott Bronson*  
*Office of Educational Programs*

**BROOKHAVEN**  
NATIONAL LABORATORY

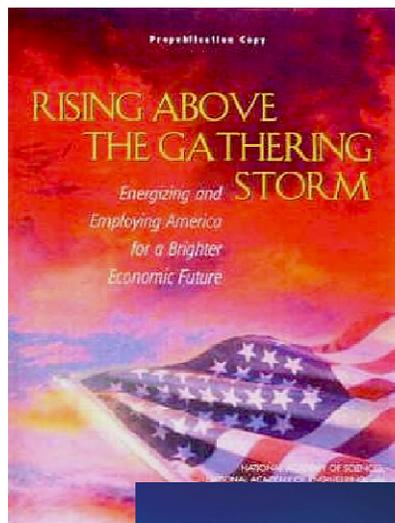
*a passion for discovery*



U.S. DEPARTMENT OF  
**ENERGY**

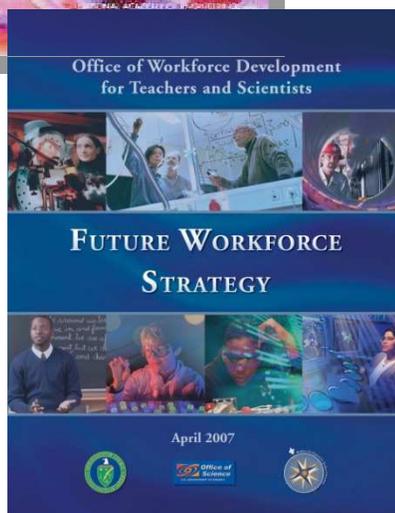
Office of  
Science

# A National Challenge



## Department of Energy (DOE)

## Office of Workforce Development For Teachers and Scientists (WDTs)



- Prepare a diverse workforce of scientists, engineers, and educators
- Utilize DOE's unique intellectual and physical resources
- Implement a proactive, data-driven, and results-focused model



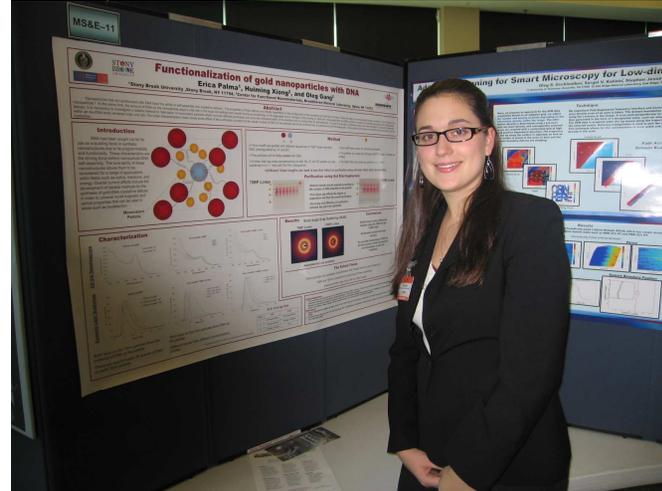
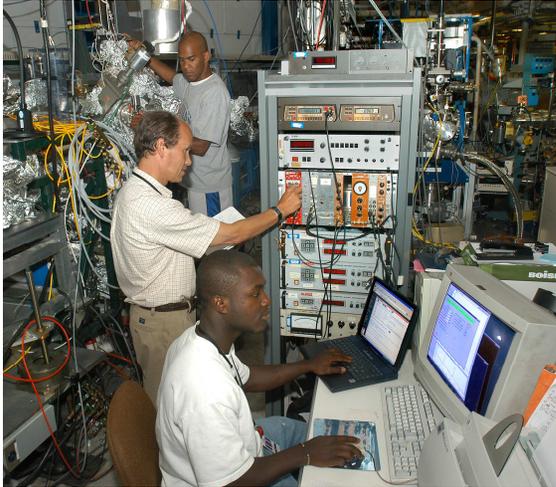
# BNL Office of Educational Programs

The mission of the Office of Educational Programs  
... initiatives will:

- Educate new generations of scientists, engineers, technicians, and teachers
- Encourage and promote science literacy
- Assist the scientific staff in achieving their goals
- Support and celebrate diversity
- Maintain BNL as a local, regional, national, and international educational asset

The Office of Educational Programs will fulfill this mission safely ...

# DOE Funded Programs



- Funded by DOE's Office of Workforce Development for Teachers and Scientists (WDTS)
  - Science Undergraduate Laboratory Internship (SULI)
  - Faculty and Student Teams (FaST)
  - Community College Institute (CCI)
  - Academies Creating Teacher Scientists (ACTS)
  - Pre-Service Teacher Program (PST)

# BNL's Science Learning Center



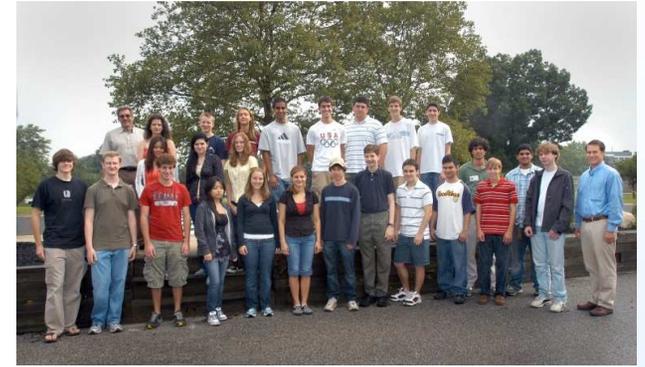
- Funded by Brookhaven Science Associates (BSA)
  - Visited by over 40,000 local students each year
  - Serves grades 1 through 6
  - Programs introduce students to basic scientific concepts while connecting to BNL's large facilities /
    - RHIC- Superconducting Magnets / Magnetism
    - NSLS- Light / Spectroscopy
    - NSRL- Mars Exhibit
  - Programs are offered at no charge to the schools

# Middle School and High School Exploration Laboratories



- **A partnership between BNL's Office of Educational Programs and the Boards of Cooperative Education Services (BOCES) of New York State.**
  - Field trips to BNL and/or outreach to local school districts
  - Hands-on laboratory experiences in genomics, structural biology, physics, chemistry, nanoscience, energy sciences, and environmental science
  - Lab activities developed in collaboration with BNL scientists, users, post-docs, and graduate students

# Summer High School Programs



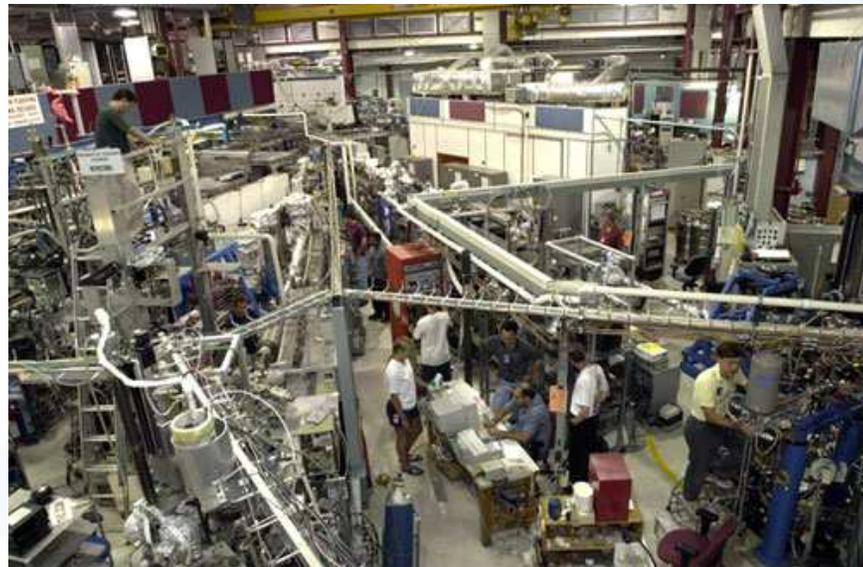
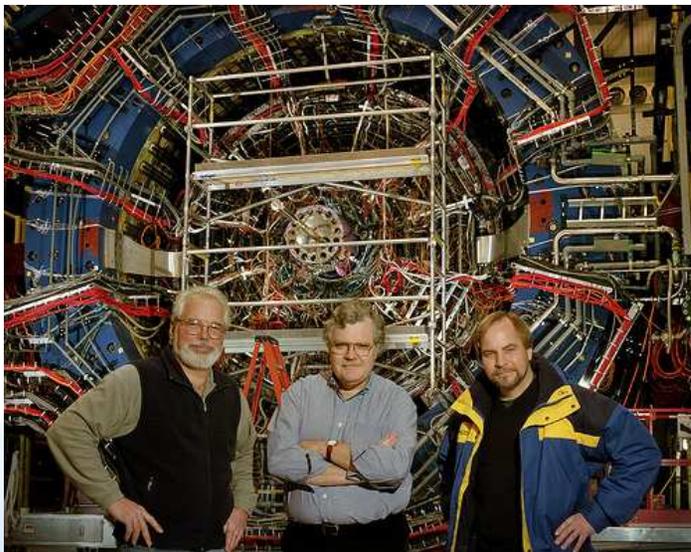
- High School Summer Programs for Local Students.
  - Minority High School Science Apprenticeship Program (MHSAP)
  - Community Summer Science Program (CSSP)
  - High School Research Program (HSRP)

# INCREASE



- Interdisciplinary Consortium for Research and Educational Access in Science and Engineering (INCREASE)
  - organization to promote research in Historically Black Colleges and Universities (HBCUs) and other minority-serving institutions (MSIs)
  - Outcome of DOE-FaST
  - INCREASE Faculty members represent 11 different HBCUs/MSIs
  - NSLS, CFN, RHIC (PHENIX)

# Challenges for User Facilities



# Cyber-Enabled Access to User Facilities

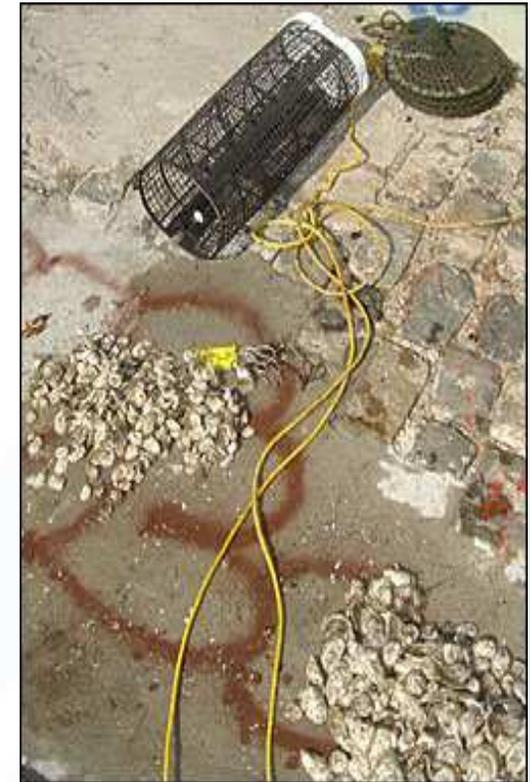
The screenshot displays a remote control interface for a user facility. On the left, a video feed shows three individuals in a control room. The main area is divided into several panels:

- Top Left:** A plot titled "713b FC73 IP 3 plaques" showing a distribution of data points.
- Top Right:** A "Shared part of your desktop" window showing a plot of "713b FC73 IP 3 plaques" with a Y-axis from 0.0 to 0.3 and an X-axis from 0.0 to 0.5 (mm).
- Bottom Left:** A control panel for "Motors" with two motor configurations:

| Motor   | Motor name | Current position |
|---------|------------|------------------|
| Motor 1 | X27AA.m1   | 13.3700          |
| Motor 2 | X27AA.m2   |                  |
- Bottom Right:** A data plot showing a distribution of data points with a peak at approximately 154.831.

The interface includes various control buttons and a status bar at the bottom showing the time as 2:24 PM.

# Cyber-Enabled Access to User Facilities



# Cyber-Enabled Access to User Facilities

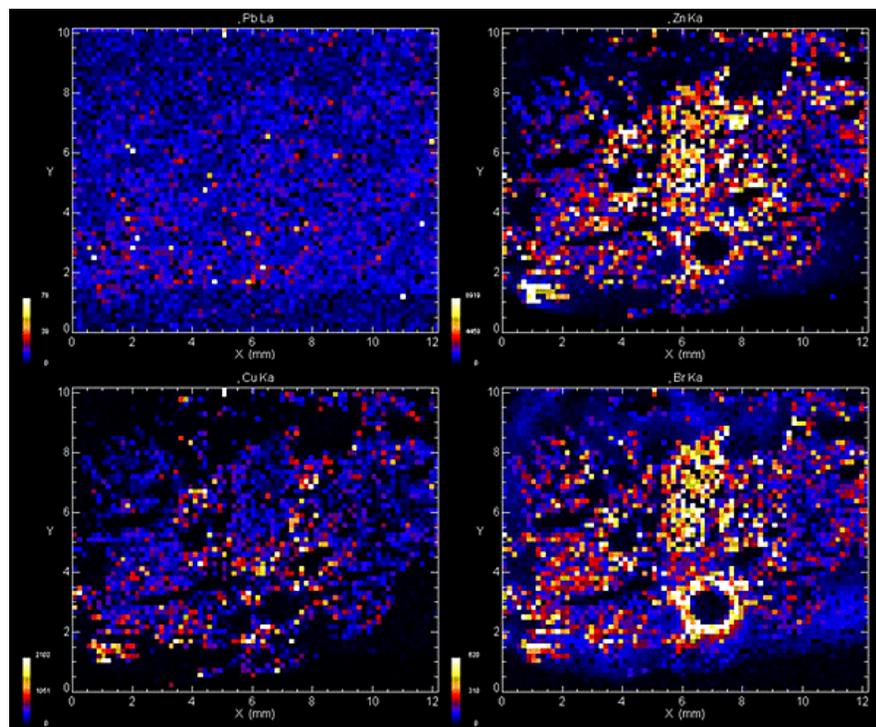


# Cyber-Enabled Access to User Facilities

The image displays a remote access interface. On the left, a video call window shows three participants: a woman in the foreground wearing a headset, and two other women in the background. Below the video call is a smaller window showing a man in a lab setting, also wearing a headset. The main area of the interface is a shared desktop window titled "Shared part of your desktop". This window contains several panels:

- A plot titled "713b FC73 IP 3 plaques" showing a 2D intensity map with axes X (mm) and Y.
- A histogram plot showing a distribution of data points.
- A control panel for "Motor 1" and "Motor 2" with fields for "Sam. Height Y (mm)", "Start (abs)", "Stop (abs)", "Step", "Start (rel)", "Stop (rel)", and "# points".
- A "Regions of Interest" table with columns for "Add", "Delete", and "Clear All".
- A "KLM markers" section with a "Display" button and a "Zoom" button.
- A "Vertical scale" section with a "Logarithmic" checkbox.
- A "Channel Counts" table with columns for "Channel", "Cursor", "Left marker", "Right marker", "Centroid", and "FWHM".
- A "Z" position control with a value of 66,8850 and buttons for "Stop", "Pause", "Move", and "Go".
- A "Repeat Scan" section with a "Use Scan List" checkbox and a "Wait for Stable Beam" section with an "XRD SecFrame" field.
- A "Pause on LN2 Fill" and "Delayed Start" section with a "Delay by Minutes" field.

# Cyber-Enabled Access to User Facilities



# Brookhaven National Laboratory's Office of Educational Programs



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