Information Technology Laboratory

Dr. Susan Zevin

Acting Director

iTL INFORMATION TECHNOLOGY LABORATORY

March 2003

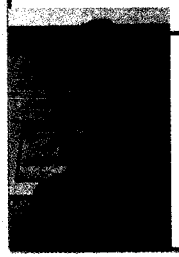
Outline

- The Organization
- The Environment
- Some ITL Programs
- The Resources

The Organization

ITL Organization

ACTING DIRECTOR
SUSAN ZEVIN



ACTING DEPUTY DIRECTOR
KAMIE ROBERTS

ASSISTANT DIRECTOR FOR BOULDER
JACK WANG, ACTING

LABORATORY STAFF
KAMIE ROBERTS

SENIOR MANAGEMENT ADVISOR
KENDRA COLE

MATH

RON BOISVERT

NETWORKING

DAVID SU

COMPUTER SECURITY

ED ROBACK

INFORMATION ACCESS

MARTY HERMAN

CONVERGENT INFORMATION SYSTEMS

VICTOR MCCRARY

SOFTWARE TESTING

MARK SKALL

STATISTICS

NELL SEDRANSK

iTL INFORMATION TECHNOLOGY LABORATORY

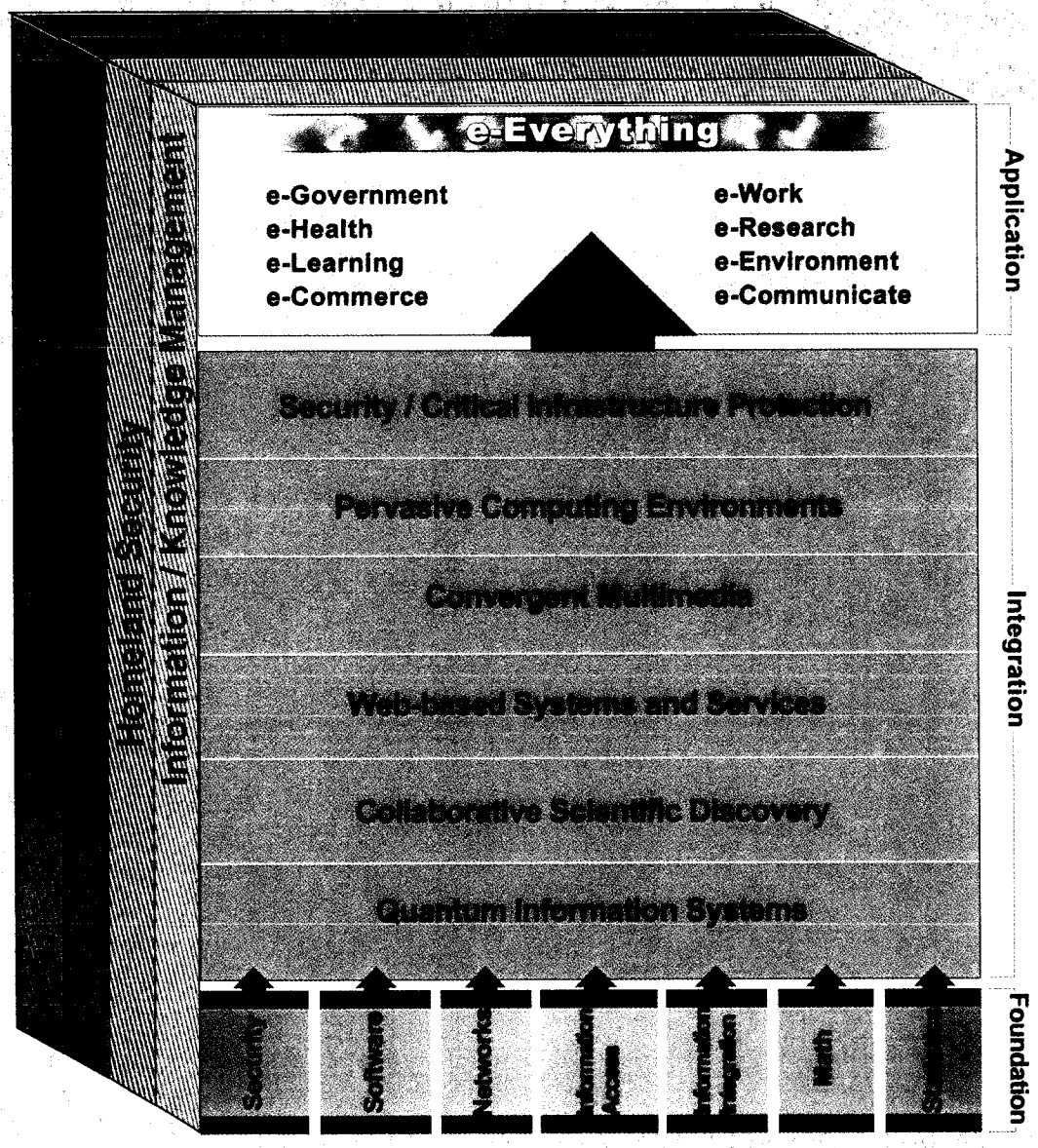
INFORMATION
TECHNOLOGY
LABORATORY

The Environment

ITL Mission

To develop and promote measurement science, standards, and technology for information technology in order to enhance productivity, facilitate trade, and improve the quality of life.

ITL Research Blueprint



INFORMATION TECHNOLOGY LABORATORY

What We Hear – Recurring Themes

New demands for information assurance

Need to enhance voting system integrity

The next revolution: nano- and quantum technology; high-end computing

Pervasive computing environments will be increasingly utilized

Health care data and IKM: critical to the future of the U.S. medical system

Virtual labs and new physical constructs: modeling and simulation

Cyber Security needs are paramount in the war on terrorism.

Biometrics standards: to ensure homeland security and privacy

Competencies

Selected Competencies:

Networks and Communications
- Service discovery
- Self-healing networks
- Agile switching
- Internet Infrastructure Protection
- Wireless Ad Hoc Networking

Information Access and Usability
- Retrieval
- Interoperability
- Human language
- Multimedia technologies

Software
- XML Conformance
- Computer forensics
- Electronic commerce
- Test method research

Cross Cut
- Biometrics
- Quantum
- Pervasive
- Healthcare

Security
- Critical Infrastructure Protection
- Encryption standards
- Cryptography
- Security Management
- Security Testing

Mathematics and Statistics
- Key comparisons
- Applied mathematics
- High performance computing
- Visualization
- Process characterization
- Bayesian metrology

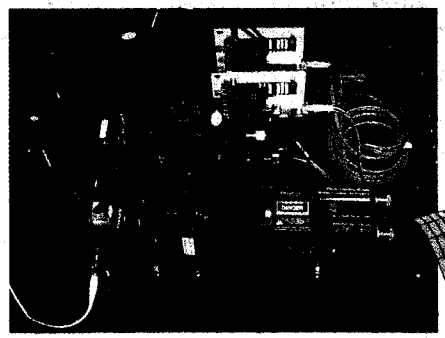
Convergence of hardware and software
- Content storage
- Content encapsulation

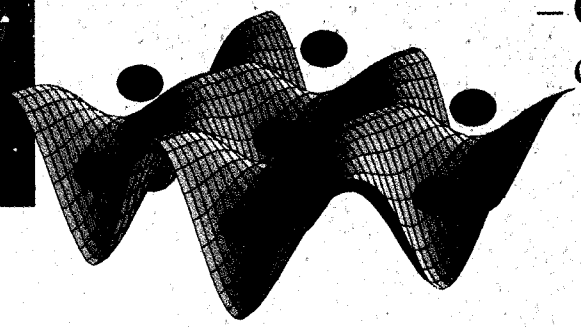
Some ITL Programs

Quantum Information Systems

Divisions 891, 892, 893, 895, 897, 898, PL, and EEL

- Quantum Communications Testbed
  - Developed testbed facility for technology assessment, integration
  - Devised protocols for cryptographic key exchange, authentication



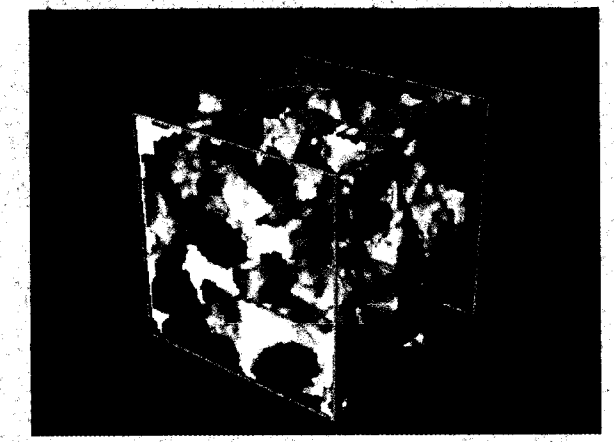


- Quantum Computation
  - Investigating low-level quantum state, device modeling
  - Modeling and analyzing programmable gate implementations, error propagation
  - Developing architectures for complete quantum computer systems
  - Continued algorithm development, analysis

iTL INFORMATION TECHNOLOGY LABORATORY

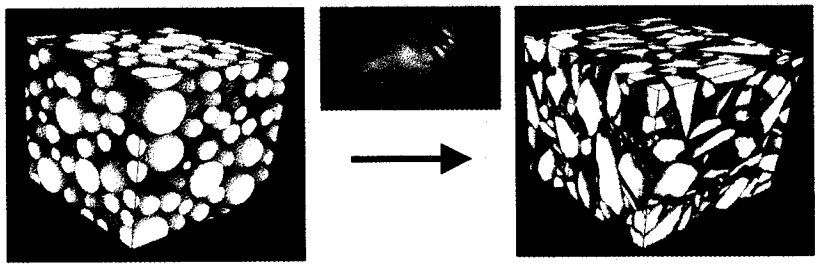
Modeling and Simulation

Divisions 891, 898 with all Laboratories



- Expansion of RAVE immersive visualization facility
- Developing a toolkit for immersive visualization
- Developed 3D version of OOMMF micromagnetics modeling software
- Developed OOF2 for materials microstructure analysis
- Developing state-of-the-art time series models for network traffic simulation
- Developing statistical modeling and tools for network performance, visualization, and anomaly detection

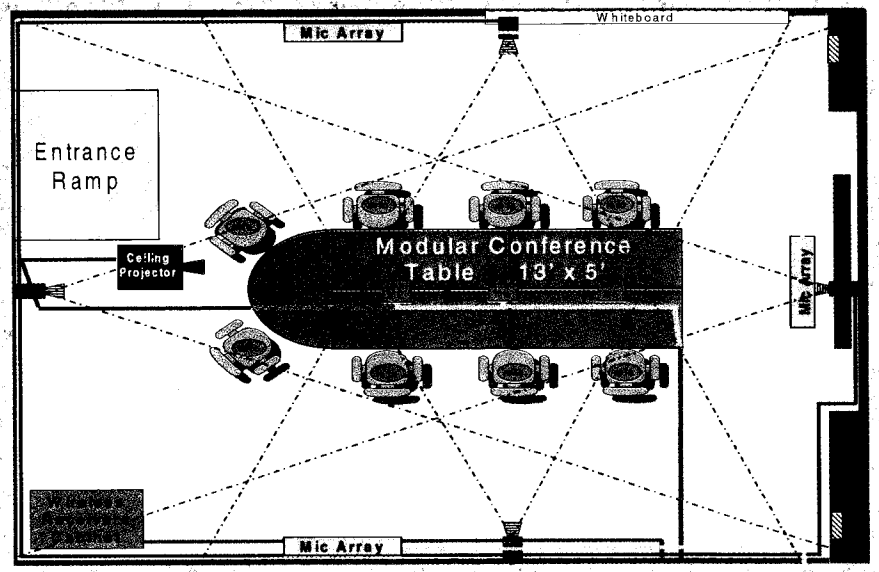
Modeling of aggregates for more realistic computations and visualization



Pervasive Computing

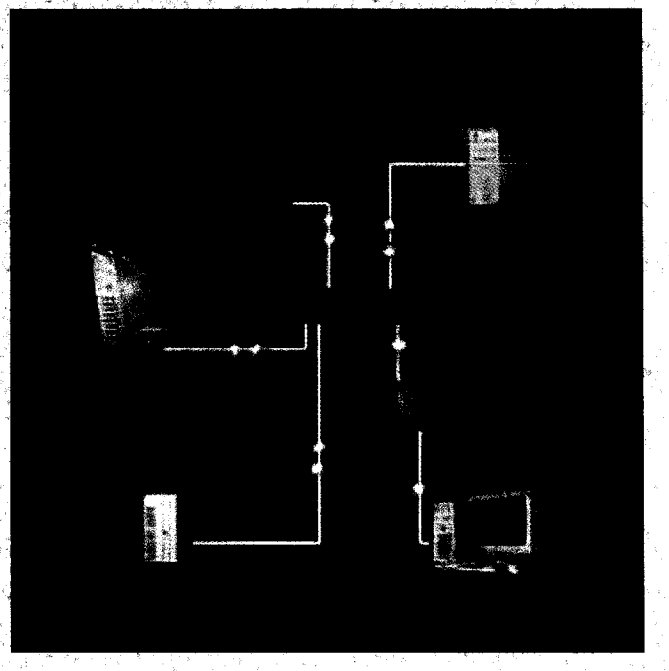
Divisions 892, 893, 894, 897

- Installed new microphone array in smart space
- Integrated face recognition and speaker identification
- Investigated consistency conditions in Jini and UPnP
- Redesigned the Existential Simulation Tool around XML
- Produced recommended practices document on coexistence
- Developed generic model for service discovery protocols
- Adapting Smart Flow system for Single Molecule Manipulation
- Analyzing robustness of Service Discovery Protocols during node failure



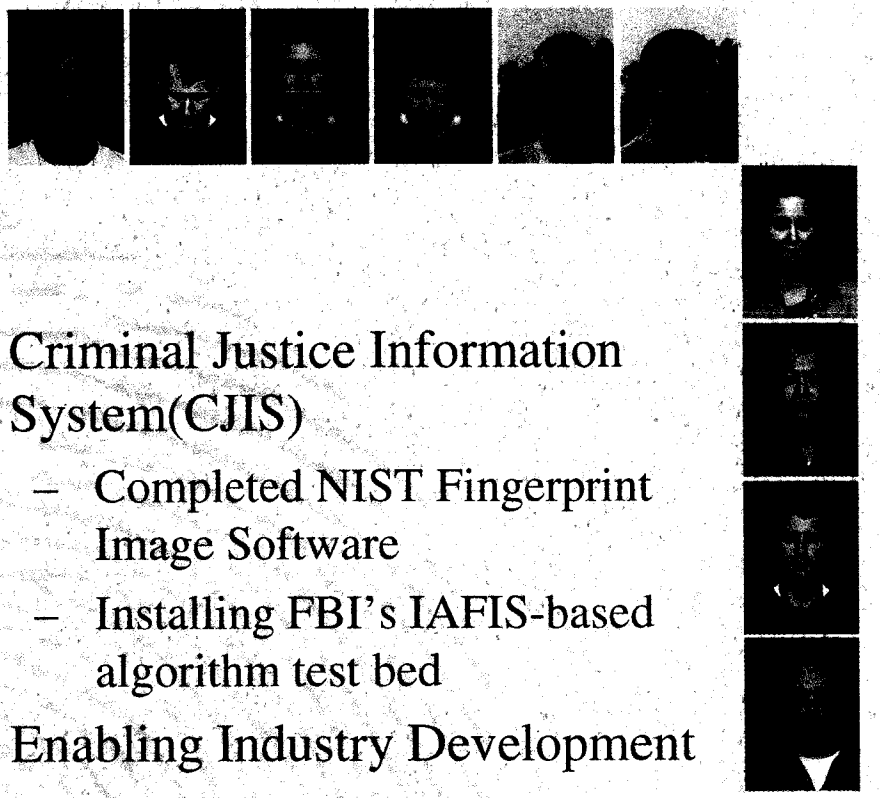
IT Security

- NIST's mandates:
  - Computer Security Act
  - Cyber Security Research and Development Act
  - Federal Information Security Management Act (FISMA)
- NIST's activities:
  - Cryptographic standards and applications (Advanced Encryption Standard)
  - Security testing and validation (National Information Assurance Partnership)
  - Guidelines, procedures, and best practices for federal and private sector IT security
    - Federal Information processing standards
    - Computer Security Expert Assist Team (CSEAT)



Biometrics

Divisions 894, 895, 898



- USA PATRIOT Act and Enhanced Border Security Act
  - Report to Congress
  - Developed measures to allow certification of systems for entry/exit programs
  - Obtained copies of large-scale data sets
  - Completed initial testing with face and fingerprint
- Human Identification at a Distance (HumanID)
  - Analyzed viability of gait as a biometric
- Criminal Justice Information System(CJIS)
  - Completed NIST Fingerprint Image Software
  - Installing FBI's IAFIS-based algorithm test bed
- Enabling Industry Development
  - BioAPI approved as ANSI/INCITS 358-2002
  - Fernando Podio named Chair of INCITS M1 Biometrics Technical Committee

Healthcare

Divisions 892, 893, 894, 895, 897

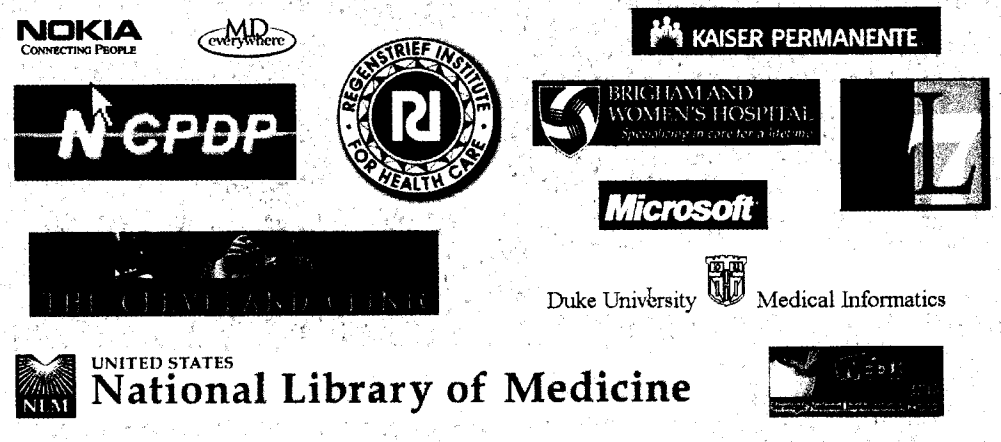
Clinical Applications

Developing:

- Healthcare standards roadmap
- Healthcare standards conformance testing project with HL7
- Profile development and conformance advisory project
- Security guidance for healthcare systems
- Mobility protocols for a healthcare infrastructure

Scientific Discovery

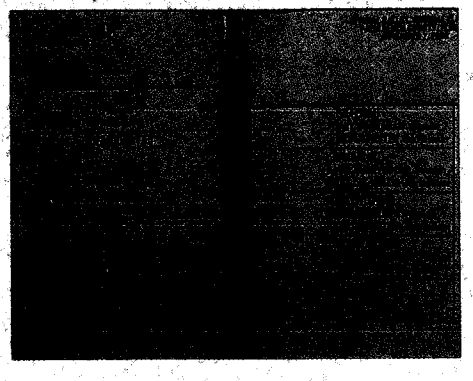
- ITL leadership role in health care standards
- Biomedical Information Science and Technology Initiative Consortium (BISTIC) workshop and follow-up
- Outreach to NIH (e.g. Post Docs)



ITL INFORMATION TECHNOLOGY LABORATORY

Voting System Standards

ITL, MEL, TS, OD



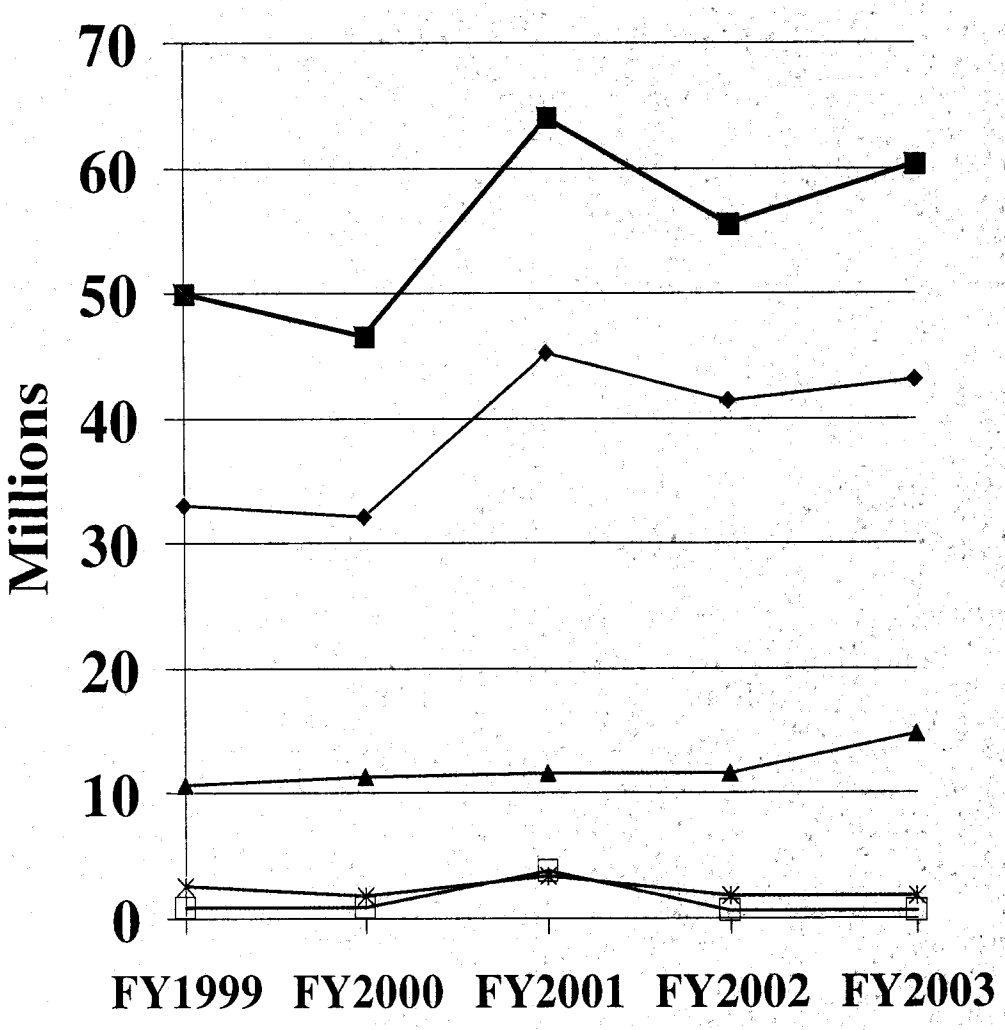
- Chair the Technical Guidelines Development Committee (TGDC)
- Grants program for
  - Research on voting technology improvements
  - Pilot Programs for testing of equipment and technology
- Human Factors Report
- Laboratory accreditation

- Develop intramural R&D program to include, but not limited to research in
  - Security of computers, networks, and data storage
  - Methods to detect and prevent fraud
  - Protection of voter privacy
  - Role of human factors in the design and application of voting systems
  - Remote access voting, including through the Internet

The Resources

ITL Funding Trends for Research

(As of 03/03/03)



Additional Authorizations

- Cyber Security R&D Act
  - –FY03 = $32.7M growing to $93M in FY07
- FISMA
  - –FY03-07 = $20M annually

INFORMATION TECHNOLOGY LABORATORY