Research at Georgia Tech

presentation to the

Board of Regents
University System of Georgia

Dr. Wayne Clough, President

February 4, 2003

Strategic Goals

- Discover and expand knowledge
- Enhance Georgia's image as center of innovation
- Integrate research and education
- Build strong linkages with industry
- Facilitate technology transfer in Georgia
- Build partnerships with outstanding research universities
- Align research with emerging inter-disciplinary issues important to the future

Discover and expand knowledge

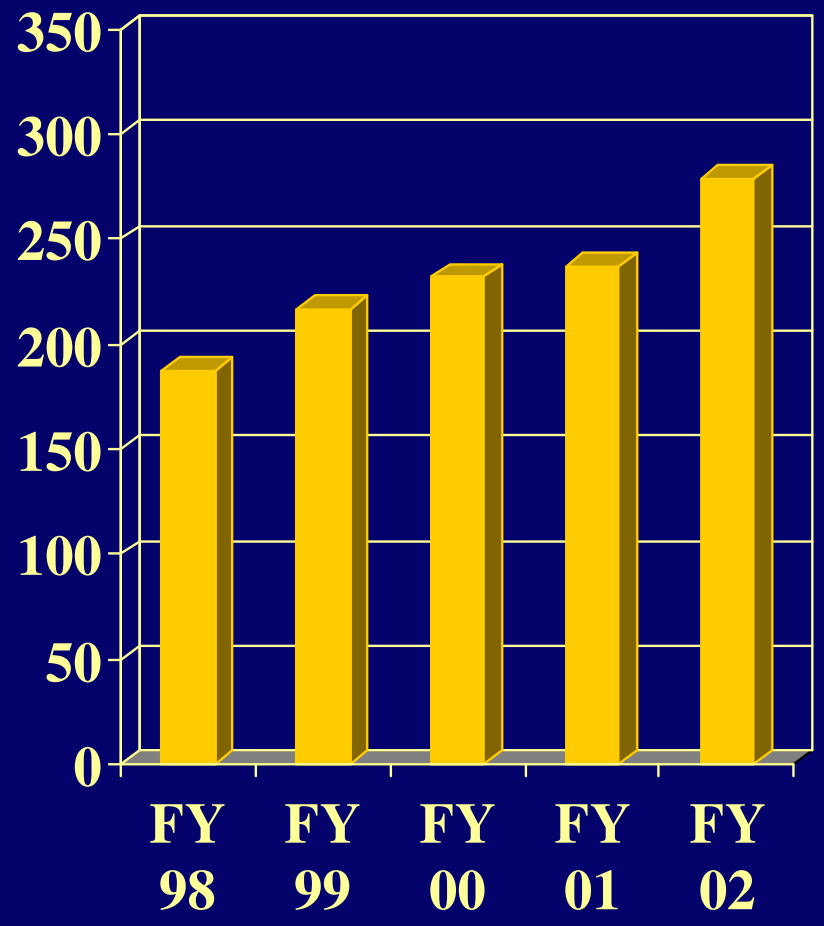
(FY 2002)

- 27th nationally in research expenditures among public and private universities
- 2nd in the nation in engineering research
- 179 invention disclosures filed
- 187 patent applications filed
- 40 patents issued

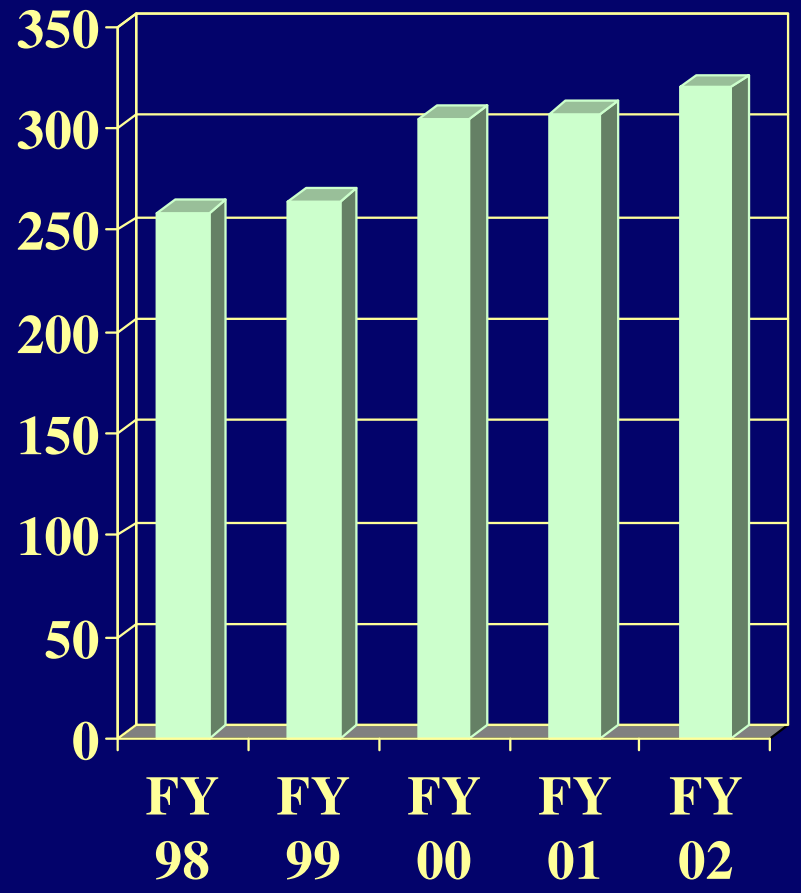


Expanding research enterprise

Awards



Expenditures



Georgia as center of innovation

- 15 national centers of excellence
- 26 members of National Academies, 74 NSF CAREER Award winners
- Managing partner for Oak Ridge National Laboratory with Duke, U Va , Virginia Tech, NC State, and Florida State
- Recently selected as one of 5 universities to administer NASA-Langley research programs

Integrating research and education

- 2,000 undergraduates participate in research; 10% of undergrads receive academic credit for supervised research activities.
- 225 students received funds from President's undergraduate research initiative since 2001.
- Website alerts undergrads to research opportunities: **www.undergradresearch.gatech.edu**

Strong linkages with industry

"Virtually every combination of industry relationship or economic development activity can be found at Georgia Tech."

Innovation U.: New University Roles in a Knowledge Economy
A national study by the Southern Technology Policy Board that named GIT best in the nation in technology transfer.

- 3rd in the nation in research performed for/with industry
- 200 companies have ongoing research interests with GIT, including IBM, H-P, BellSouth, Ford

Facilitating technology transfer

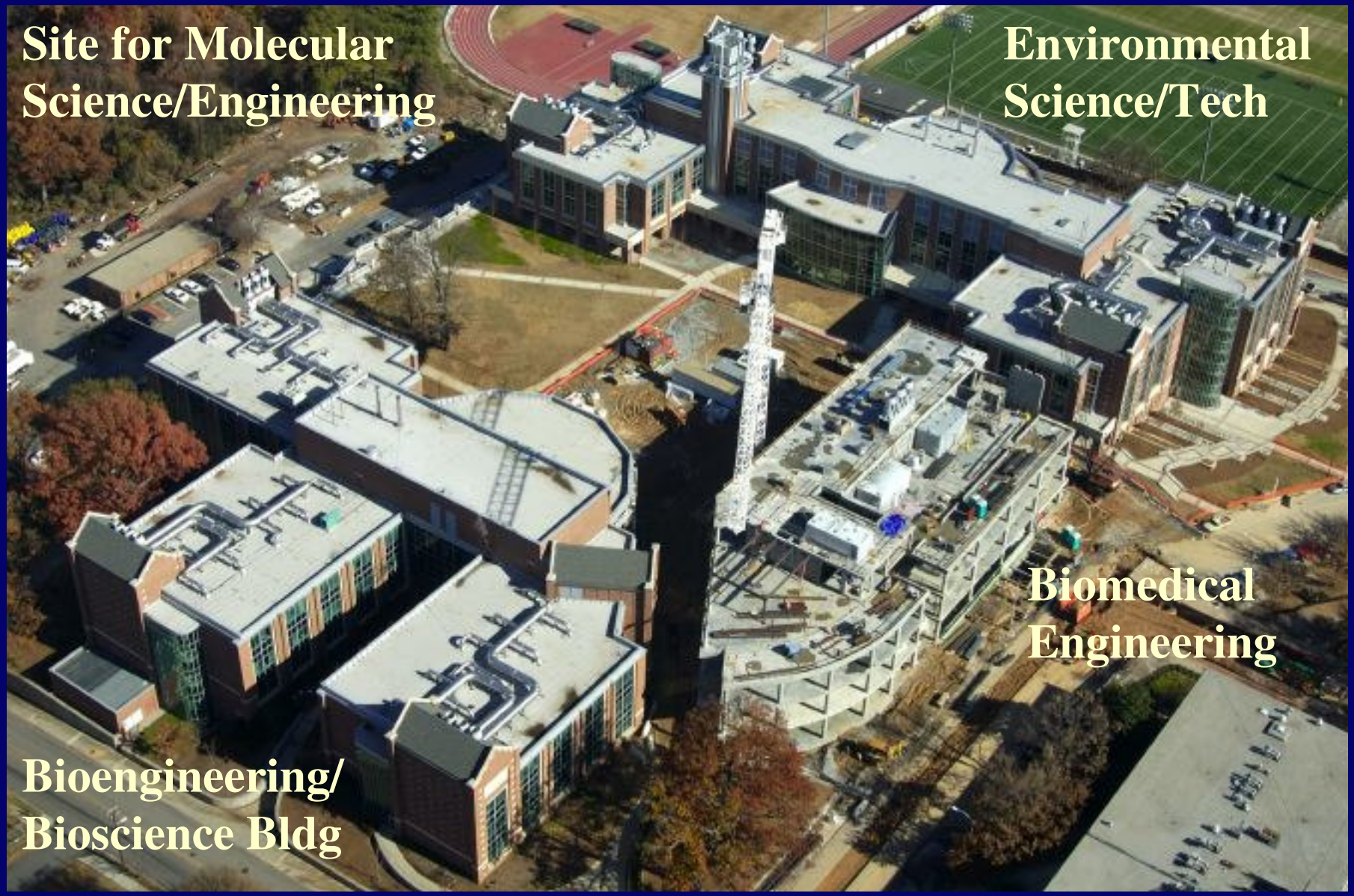
- VentureLab encourages commercialization
- ATDC incubators:
  - 10th Street, 5th Street
  - GCATT, EmTech Bio
  - Warner Robins, Savannah, Columbus

- 56% of GIT inventions licensed for commercial development
- Accepted 17 new companies for incubation in the campus ATDC in 2002
- 9 start-ups based on GIT technology in 2002

Partnerships with outstanding universities

- Global partnerships:
  - Georgia Tech-Lorraine in Metz, France
  - National University of Singapore
  - Imperial College in London and South Africa
- With Emory University:
  - Joint Petit Institute of Bioengineering/Bioscience
  - Joint Coulter School of Biomedical Engineering
  - Joint NSF Tissue Engineering Center

Interdisciplinary issues of the future



Areas of emphasis

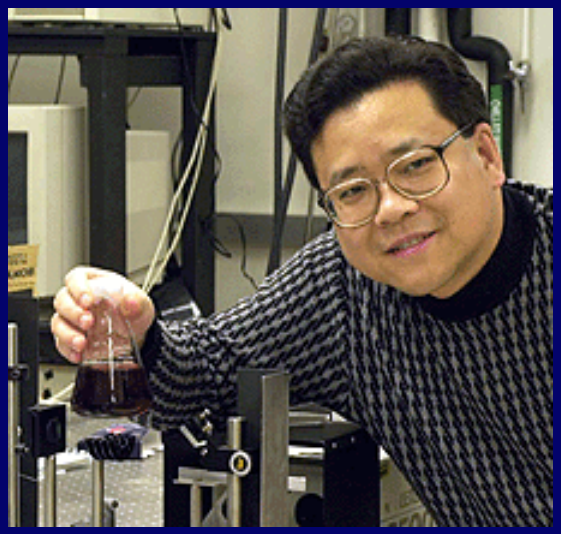
- Telecommunications, semi-conductors
- Nanoscience, nanotechnology
- Micro-electronic mechanical systems (MEMS)
- Biotechnology
- Logistics
- Sustainable technology
- Energy
- Global technopreneurship

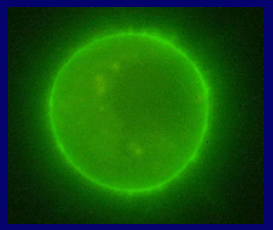
Telecommunications and semiconductors

GIT engineer Joe Long worked with California company Canoga Perkins and BellSouth to develop unique telecom equipment that speeds up wide area Ethernet services to customers.

An original partner in Internet 2, GIT is the Internet 2 hub for the southeast. GIT is directly connected to "Cheetah" – the 8th fastest computer in the world – with a link 200,000 times faster than normal dial-up speed.

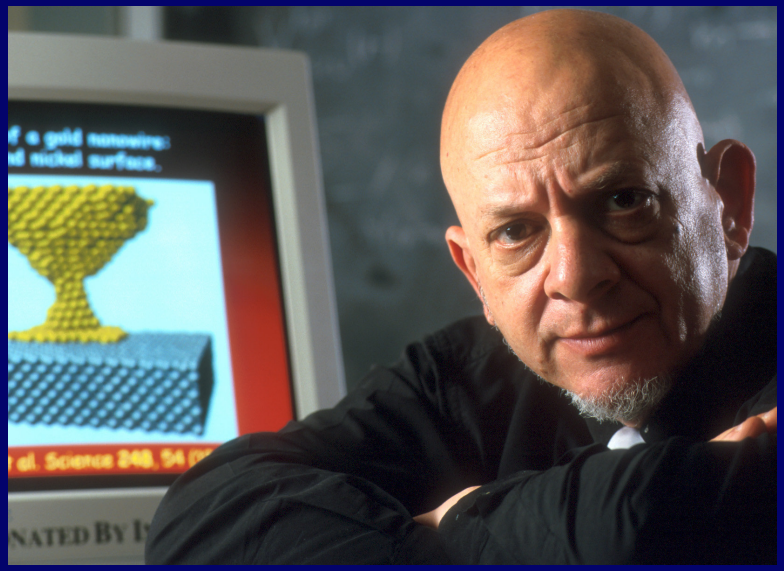
Nanoscience and nanotechnology





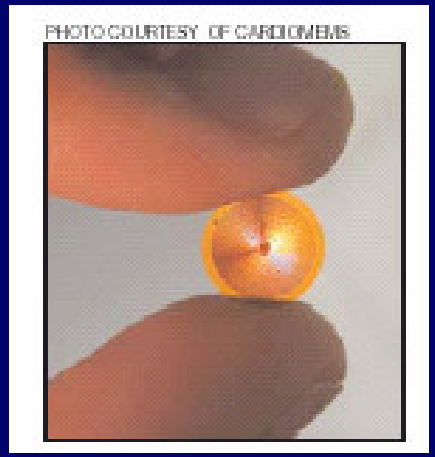
Prof. Shuming Nie's color-coded quantum dots attach to particular molecules like genes or proteins, providing an early alert to cancerous cells like this one colored green by a dot.

Award-winning Prof. Uzi Landman uses powerful computer simulations to model friction and lubrication in nano-scale mechanical systems.



Microelectronic mechanical systems (MEMS)

Prof Mark Allen used MEMS technology to develop this implantable sensor that continuously measures blood pressure within the hearts of cardiovascular patients.



The Epsilon group develops future microelectronic systems that are faster and integrate mixed signals from MEMS, digital, and optical functions on the same module.

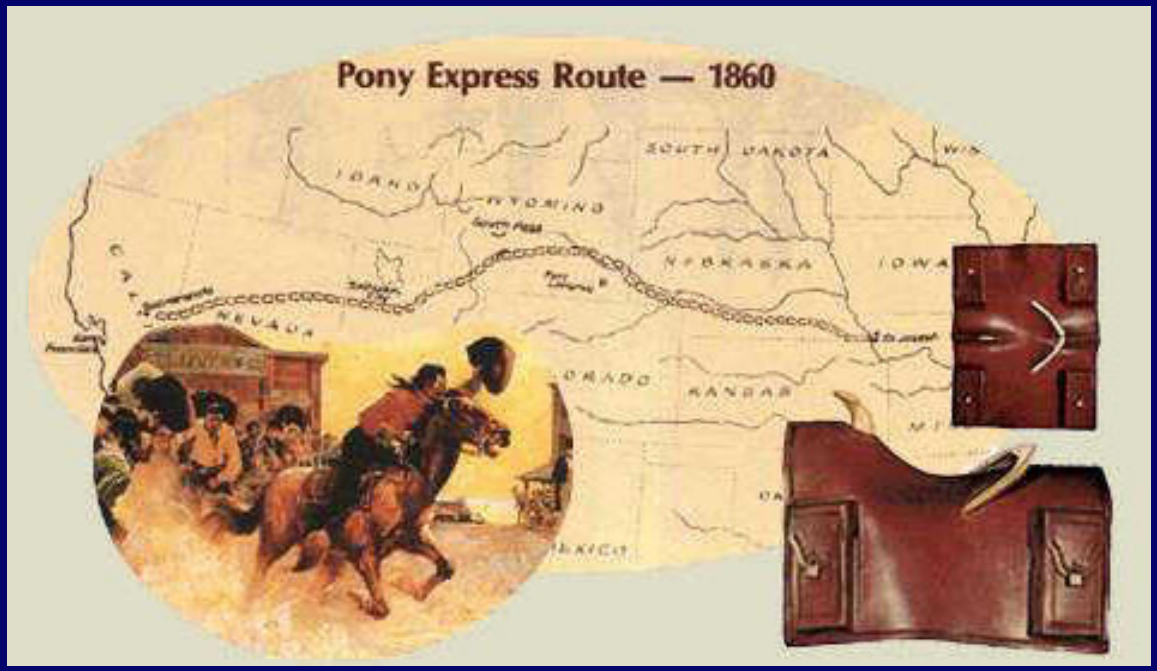
Biotechnology

Prof. Joseph Schork's biogel forms a transparent skin barrier that protects and treats wounds for up to 2 weeks.

Robert Guldberg is developing tissue-engineered constructs made of living cells and porous biomaterial that stimulate repair of bone defects from injury or diseases like osteoporosis or osteoarthritis.

Logistics

- GIT produces largest number of logistics-oriented engineering graduates at all degree levels of any university in the world.



- GIT's Keck Virtual Factory developed iDEAs, an innovative online tool for factory efficiency assessment. Scores tell manu-facturers how they stack up against the ideal best practice warehouse.

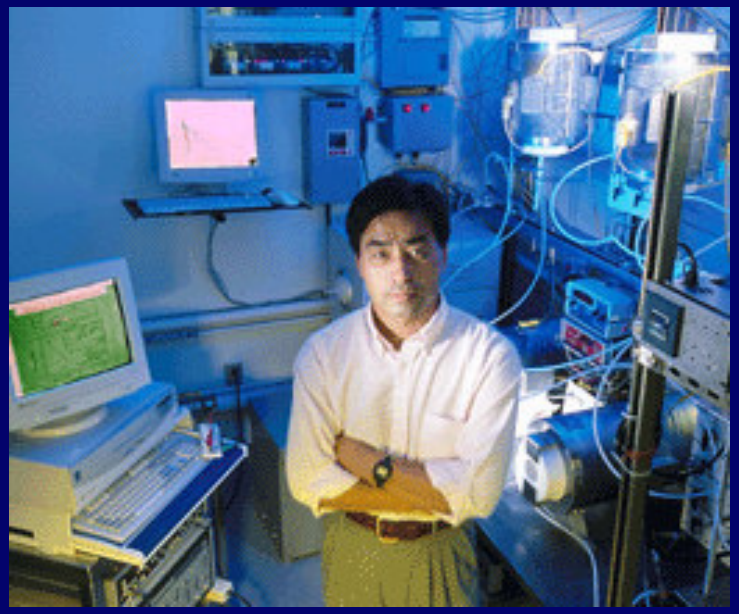
Sustainable technology

Prof. Aris Georgakakos is developing a $10-million computer-based water management system for the Nile River Valley.

Prof. Mark Hay studies the complex chemical signals that govern marine eco-systems at SkIO.

Automated air pollution sensors developed at GIT are now in use around the world.

Energy



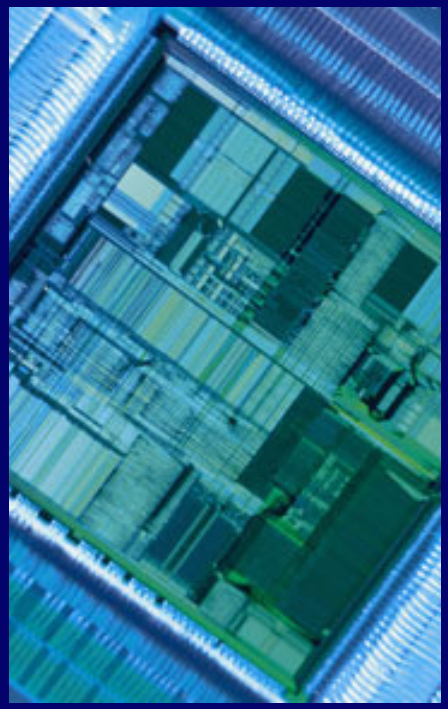
Prof. Meilin Liu is part of a 10-year, $500-million initiative by the U.S. Department of Energy to develop inexpensive fuel cells for mainstream energy markets.

GIT researchers study methane gas hydrates, a solid form of methane and water under the sea floor. It is a potential energy source and a potential hazard if warming oceans cause it to melt.

Global technopreneurship

European Union Center
University System of Georgia

GIT is home to the European Union Center on behalf of the University System – one of only ten centers in the United States.



GIT's Information Security Center develops and tests systems and strategies.

Georgia Tech CIBER

Georgia Tech CIBER provides data about business standards, technological opportunities, and threats in the global marketplace.

Applications for research

- Homeland security
- More responsive medical and diagnostic tools
- Energy independence
- Defense technology
- Environmental protection
- Enhanced communication networks
- High-speed movement of products and people

We don’t wait for the times to change us; we change the times.