Overview of the Presentation

- NSF Framework to Broaden Participation
- The Influence of ACA
- The Influence of ARRA
- New & Future Directions for Accelerating NSF BP Efforts

NSF Broadening Participation Program Portfolio

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Focused Program Examples

BIO: Research Initiation Grants and Career Advancement Awards to Broaden Participation in the Biological Sciences (RIG CAA BP)

CISE: Broadening Participation in Computing (BPC)

EHR: Centers for Research Excellence in Science and Technology (CREST)

GEO: Opportunities for Enhancement of Diversity in the Geosciences (OEDG)

MPS: Partnerships in Astronomy and Astrophysics Research and Education (PAARE)

Emphasis Program Examples

ALL: Research Experiences for Undergraduates (REU) Sites

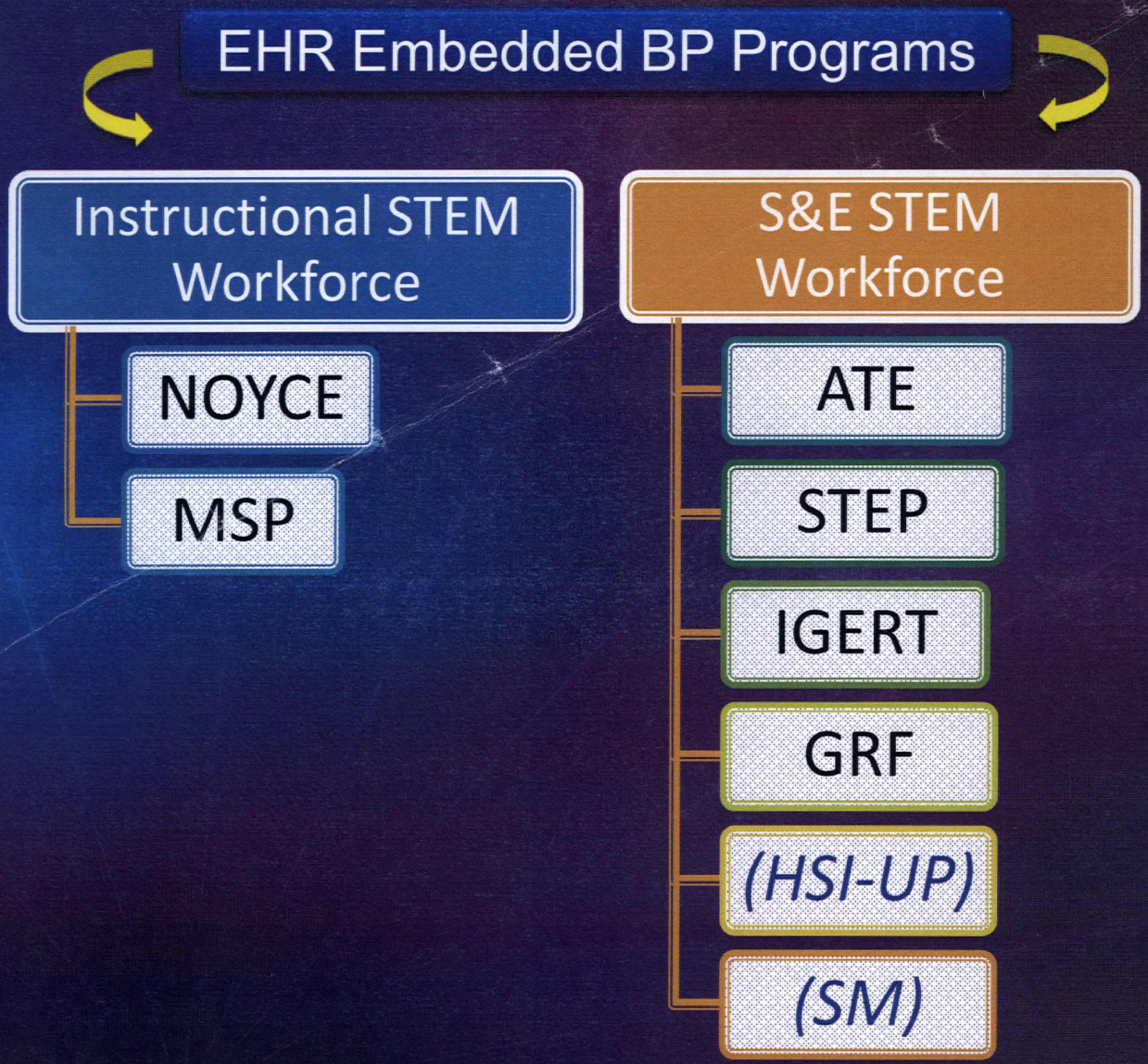
CISE: CISE Pathways to Revitalized Undergraduate Computing Education (C-PATH)

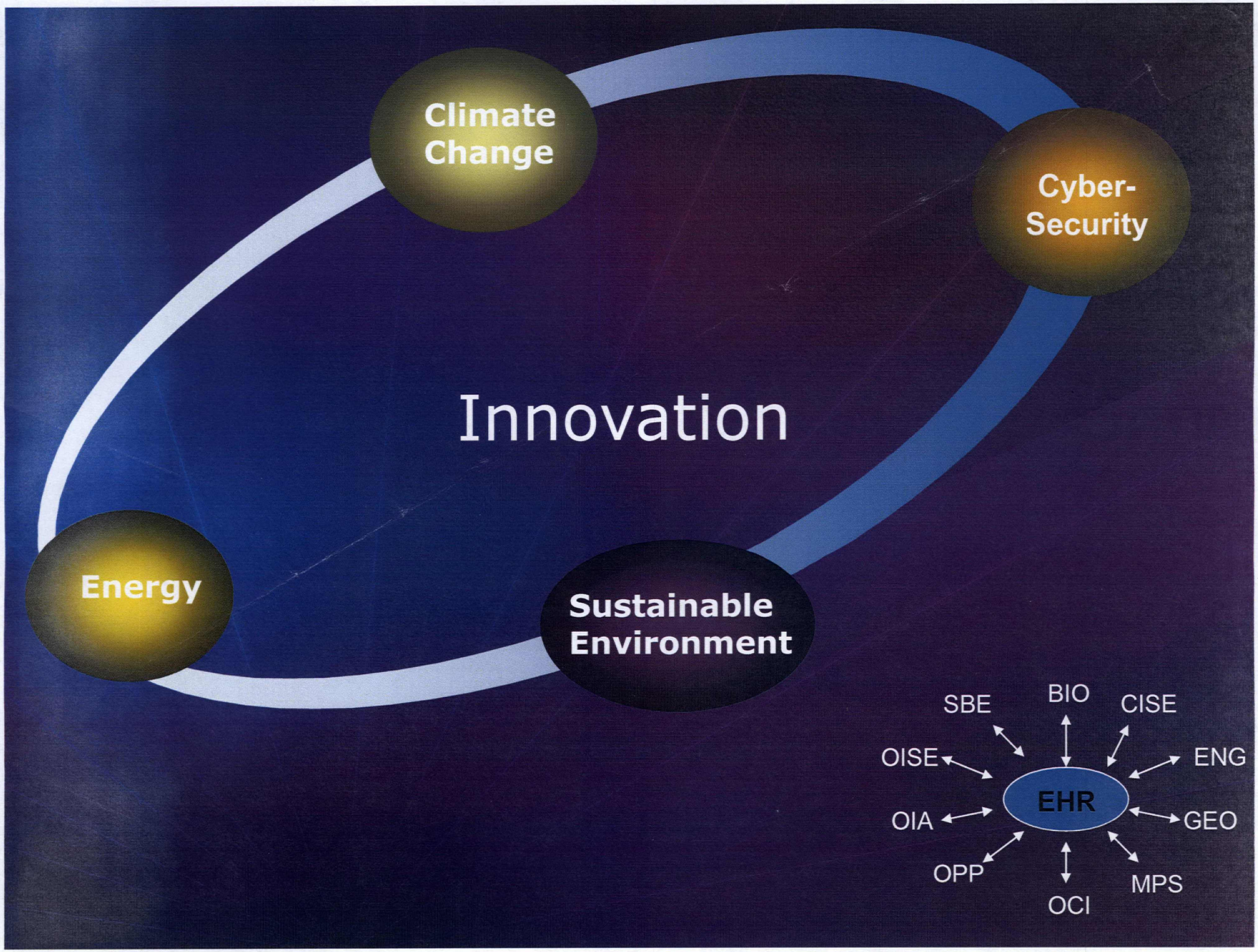
EHR: Informal Science Education (ISE)

MPS: Enhancing the Mathematical Sciences Workforce in the 21st Century (EMSW21)

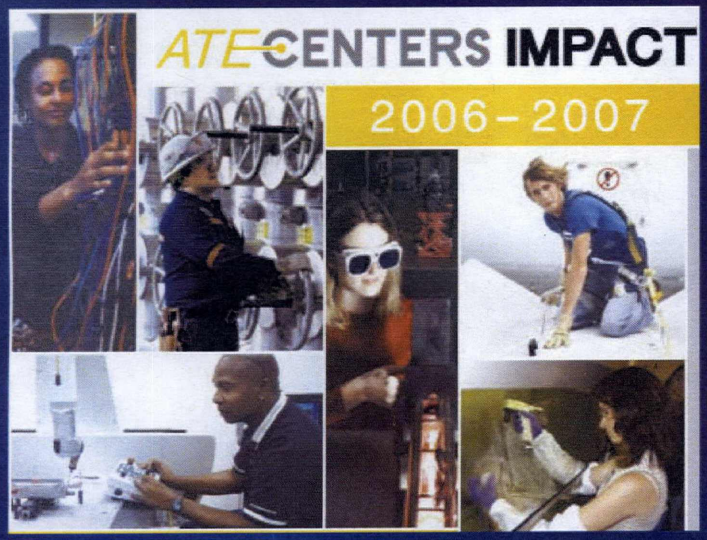
OD: Science and Technology Centers (STC)

ACA Highlighted Programs




Climate Change
Cyber-Security
Innovation
Energy
Sustainable Environment
SBE
BIO
CISE
OISE
ENG
EHR
OIA
GEO
OPP
MPS
OCI

Broader Impacts of ATE



- ATE instruction and student experiences are tailored to industry and company requirements
- ATE-trained technicians are highly qualified and need little additional training other than company specific training provided to all employees
- ATE centers and projects have collaborated with over 7,800 business and industry partners, and 2,200 educational institutions

ATE Outcomes

- Developed > 7,600 different educational materials aligned with workforce needs and industry standards
- Created > 2,000 two-year college programs
- Created 16,800 two-year college courses, 1500 secondary school courses, 150 baccalaureate programs with 800 courses
- Concluded 2,000 articulation agreements
- Programs offered at 4,900 locations reaching
  - 320,000 two-year students
  - 48,000 secondary students
  - 6,000 students at baccalaureate institutions
  - 80,000 educators

The Evaluation Center, Western Michigan University 2008 Survey

Young Investigators

Mandated by Congress that the trainees must be citizens or permanent residents, a critical part of review criteria for all IGERT proposal is the recruiting and retention plan, not only for the best students, but explicitly for women and underrepresented minorities.

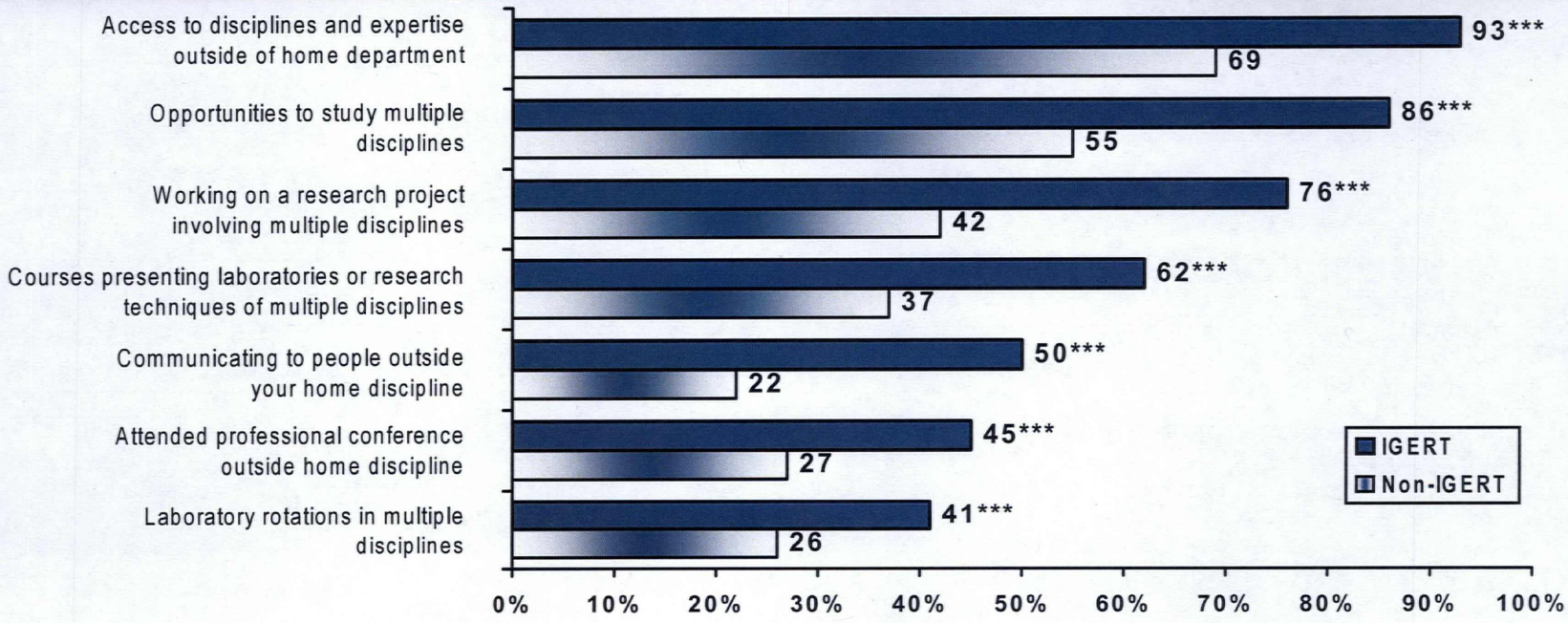
-----IGERT Annual Report 2006-2007

GRF provides support to women who intend to pursue graduate research degrees in Engineering or Computer Information Science and Engineering. Additional funding for these awards is provided by the Directorate for Computer and Information Science and the Directorate for Engineering. Eligibility and review criteria are the same for applicants in other fields.

----GRF 08 Program Solicitation

ACA & ARRA Priorities

Interdisciplinary Graduate Education Experiences/Opportunities



IGERT N ranges from 303-306. Non-IGERT N ranges from 559-566. Range is due to missing responses.

Significance denoted as: *** ($p < .0001$)

Source: *Initial Impacts Survey of Students 2004.*

Questions: "Which of the following benefits or opportunities have you received as part of your graduate program?" "Have the following interactions been part of your graduate program?" "Have the following research experiences been part of your graduate training?" "Have you ever attended a professional conference in a field outside your home discipline?"

Future Directions

A more expanded NSF-wide emphasis on broadening participation across critical transitions, including explicit attention to HSIs & Community Colleges

Focus will be:

- Community Colleges
- HSIs

Why Community Colleges?

Largest single sector of higher education

- 1,200 accredited two-year colleges
- Enroll 6.5 million students annually for credit courses (another 5 million for noncredit)

Enroll 46% of all U.S. undergraduates

- **46% of African American Students**
- **46% of Asian or Pacific Islander Students**
- **55% of Hispanic Students**
- **55% of Native American Students**
- **39% of First Generation to attend college**

Award 800,000 Associate Degrees and Certificates annually

Report of The National Commission on Community Colleges, College Board, January 2008
American Association of Community Colleges, January 2008.

Why Community Colleges?

44% of all Science & Engineering Graduates in1999 & 2000 attended a community college (more than 50% of bachelor's and 35% of master's degrees)

- 42% of computer science & math degrees
- 46% of life & related sciences
- 37% of physical & related sciences
- 45% of social & related sciences
- 40% of engineers

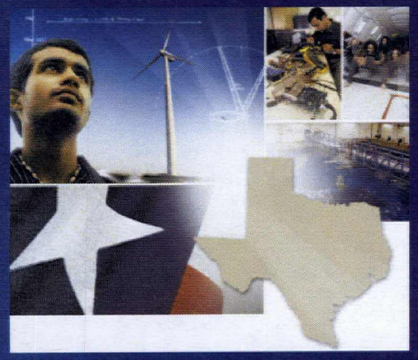
42% of the four year college graduates who had a GPA between 3.75 and 4.00 attended a community college

NSF InfoBrief (NSF 04-315) http://www.nsf.gov/sbe/srs/infbrief/nsf04315/start.htm

Promoting a Diverse Scientific Workforce: Hispanic Serving Institutions (HSIs)

Career ADVANCE Institutional Transformation Award *New Mexico State University*	**High School** Computer Science, Engineering, and Mathematics Scholarships *Florida International University*
Graduate Engineering Education To Serve the Aerospace Industry in Urban Los Angeles and the Antelope Valley *California State LA University Auxiliary Services, Inc.* **Graduate**	TAMUK STEP: A Model for Student Success and Persistence *Texas Engineering Experiment Station* **Undergraduate**

Critical Transition Examples Led by Hispanic Serving Institutions (HSIs)



- **Alliances Among Higher Education Institutions**

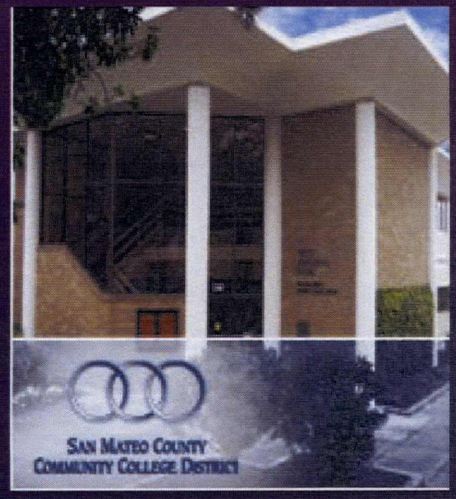
LSAMP Project: Texas LSAMP Phase IV

Institution: Texas Engineering Experiment Station with Texas A&M University-Corpus Christi, other 4-year institutions, and HSI Community Colleges

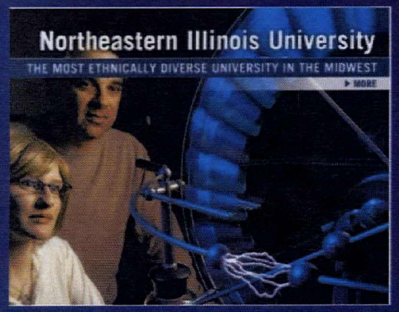
- **Pre-College/Post-Secondary Partnerships**

ATE Project: Chemistry: A Pipeline to 21st Century Careers

Institution: San Mateo County Community College District



Critical Transition Examples Led by Hispanic Serving Institutions (HSIs)



- **Community College Articulation with Feeder High Schools and 4-year Transfer Institutions**

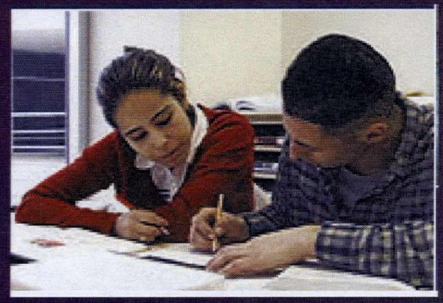
ATE Project: Biotechnology Education and Training Sequence Investment

Institution: Southwestern College

- **Bridging to Doctoral Programs**

S-STEM Project: A Mathematics and Physical Sciences (MaPS) Cohort of Scholars Program

Institution: **Northeastern Illinois University**



Broadening Participation Through Partnering, Leveraging and Integrating

- Partnerships for vertical connections
- Partnerships for horizontal connection
- Greater roles for community colleges
- Minority-serving institutions, including Hispanic-serving institutions

Broadening Participation Through Partnering, Leveraging and Integrating (Cont'd)

- Cyber-enabled resources to promote networking among individuals and institutions and connectivity to outside resources
- Scholarship on BP
- Sustained assessment/continuous feedback

NSF Focused Broadening Participation Programs

- RAHSS - BIO supplements
- RIG CAA BP
- URM
- Minority Postdoctoral Research Fellowships (BIO and SBE)
- BPC
- ADVANCE
- AGEP
- CREST
- HBCU-UP
- LSAMP
- PAESMEM
- RDE
- GSE
- S-STEM
- TCUP
- GRS Dear Colleague Letter
- BRIGE

- RAHSS - SBIR/STTR Phase II Supplements
- George E. Brown, Jr. Network for Earthquake Engineering Simulation Research (NEESR Payload Proposals only)
- SBIR/STTR & EHR Dear Colleague Letter: Minority-Serving Community College Research Teams
- SBIR/STTR & EHR Dear Colleague Letter: Diversity Collaborations
- GeoEd - Track 2
- OEDG
- PREM
- PAARE
- CI-TEAM
- EPSCoR Research Infrastructure Improvement Grant Program
- EPSCoR: Workshop Opportunities
- EPSCoR
- FASED
- SBIR/STTR Supplemental Funding for Community College Research Teams

*as of August 2008

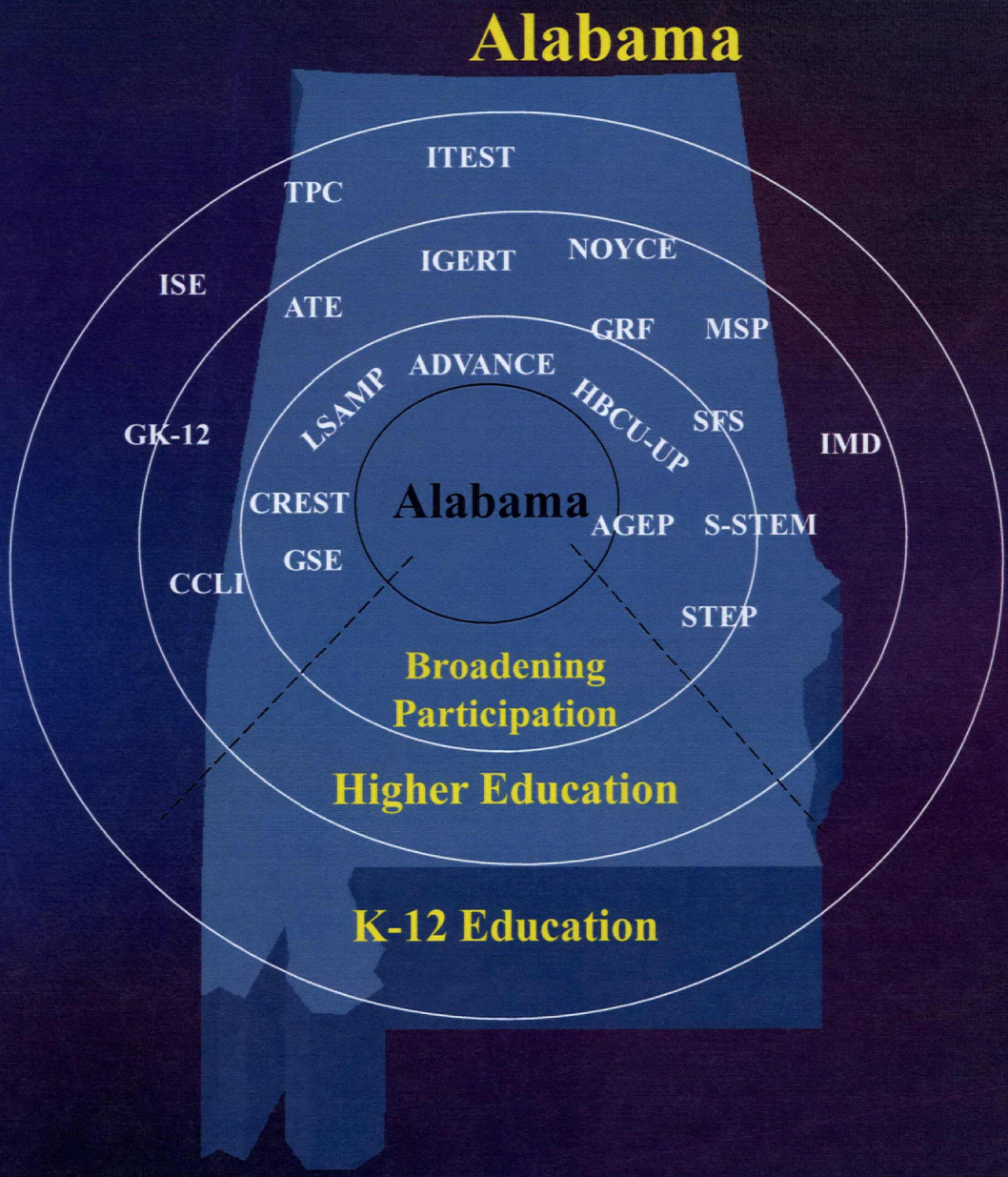
NSF Embedded Broadening Participation Programs

- REU Sites
- PFI
- C-PATH
- ISE
- ITEST
- IGERT
- NSFAYS
- NOYCE
- STC
- ACC-F

- ERC
- Chemical Bonding Centers-Phase 2
- Undergraduate Research Collaboratives
- CRIF
- EMSW21
- MRSEC
- Physics Frontiers Centers
- NSE (NSEC only)

*as of August 2008

Potential for Vertical Connections in an EPSCoR State:



Source: Program information attained from the NSF Fastlane database in 2007

EHR/MPS Broadening Participation Programs in Virginia

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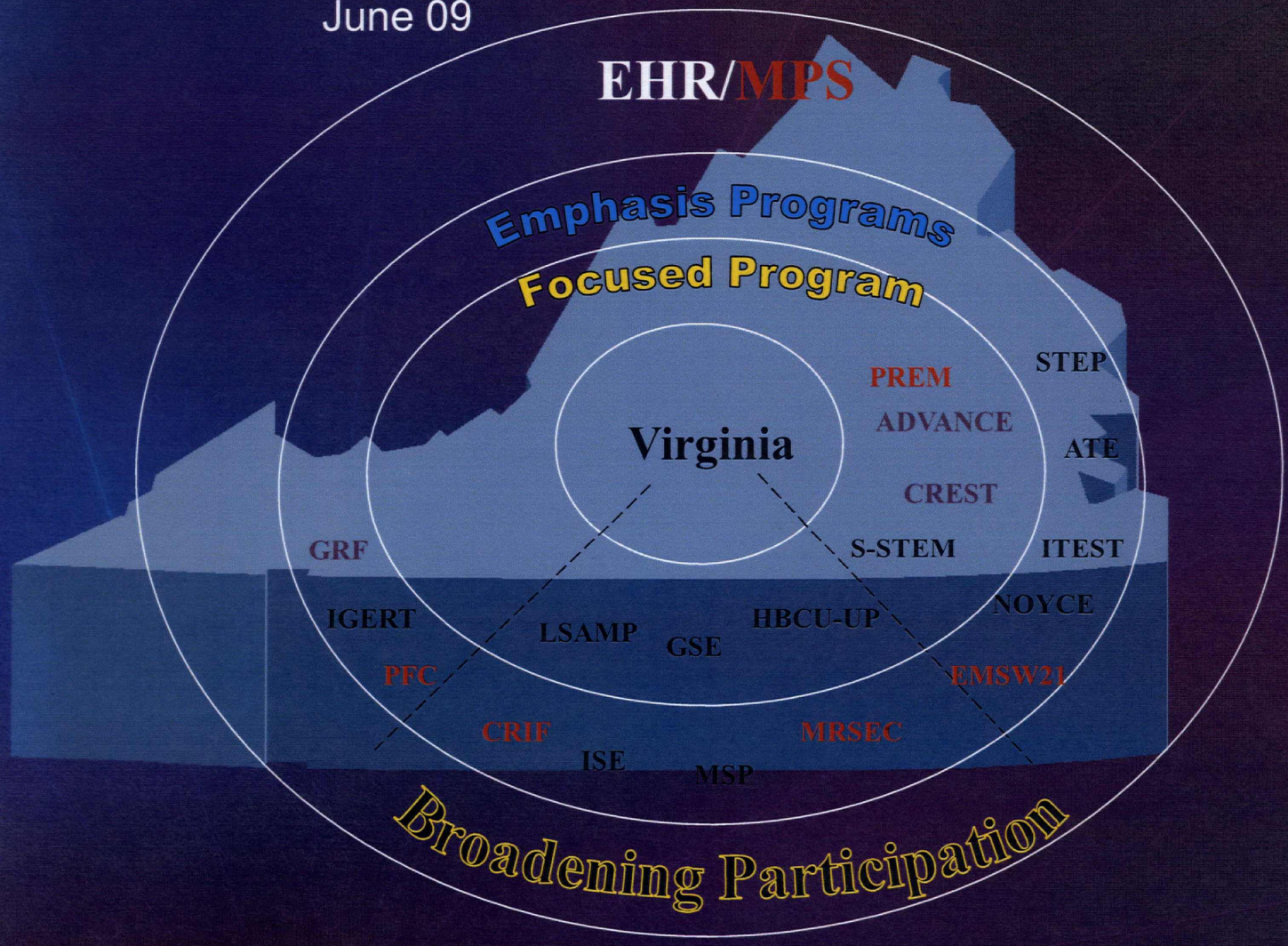
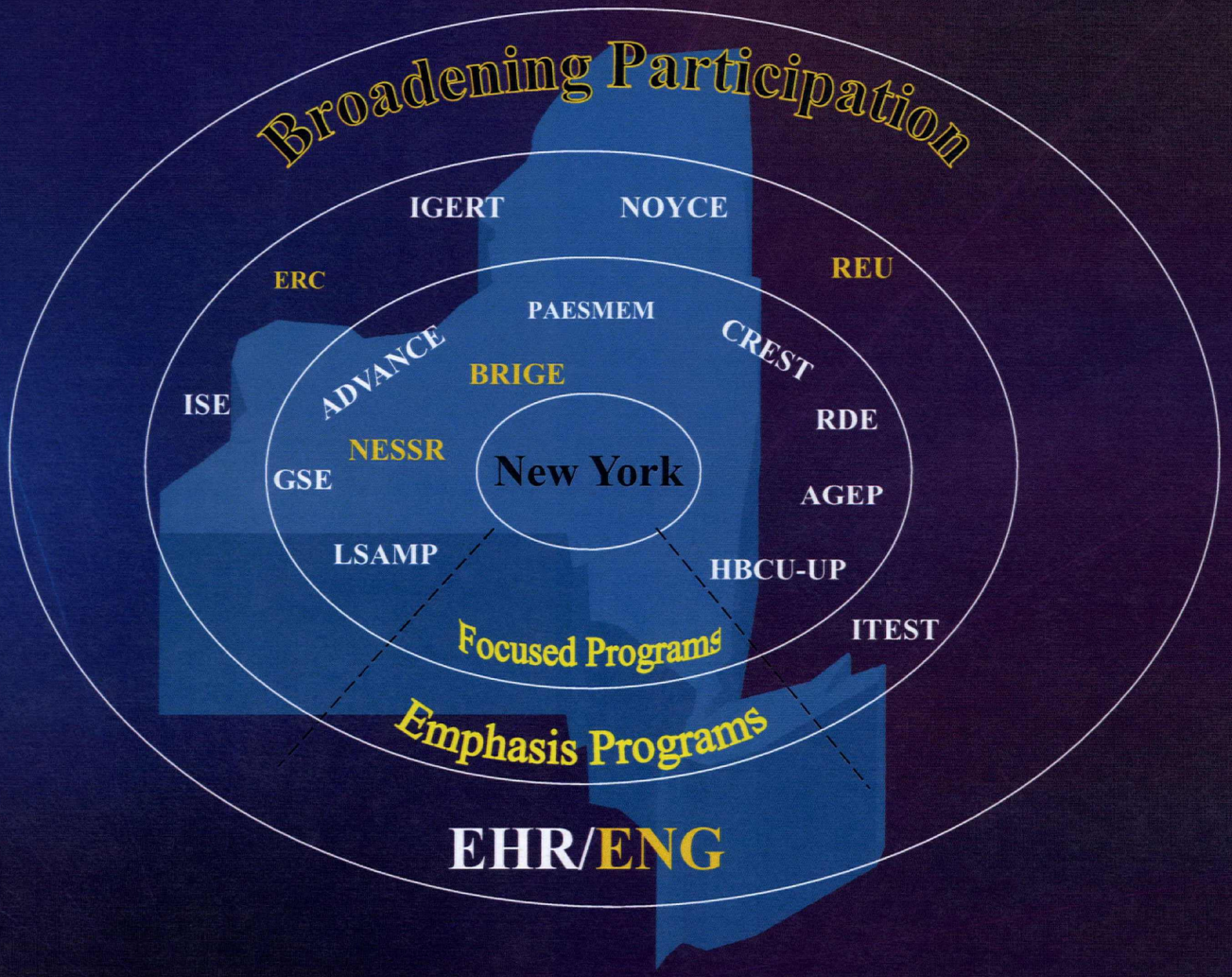
June 09



Source: Program information attained from the NSF Fastlane database on March 9, 2009

EHR/ENG Broadening Participation Programs in New York



Source: Project information attained from the NSF Fastlane database on October 8, 2008

The Global Context

….Collaboration for a Competitive and Healthy Nation….

Science is more essential for our prosperity, our security, our health, our environment, and our quality of life than it has ever been.

--- President Barack Obama

April 27, 2009