

Diversity, Innovation and Competitiveness

*“Building a Diverse Scientific Workforce: Collaboration for a
Competitive and Healthy Nation”*

Collaborative for Enhancing Diversity in Science
Congressional Briefing

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Innovation Ecosystems

The background of the slide is a blue-tinted image of a globe, showing continents and oceans. The globe is centered and occupies most of the frame. The text is overlaid on the globe in white.

- Creativity
- Inventiveness
- Innovation

Innovation Ecosystems

Intellectual Capacity Building

- STEM talent development for *all* Americans
- Scientists/technologists/engineers; technicians; instructional workforce, literate citizenry

Research

- Creation of knowledge environments
- Diversity as innovative ability

Research Infrastructure

Collaborations

Capacity Building: NSF Strategies to Broaden Participation

Focused Programs 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 Programs 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)



Broadening Participation

EHR Manages 31 of NSF's 60 Programmatic Efforts to Broaden Participation



Examples

MSP

ATE

- *LSAMP*

- *IGERT*

- *CREST*



Newer Directions

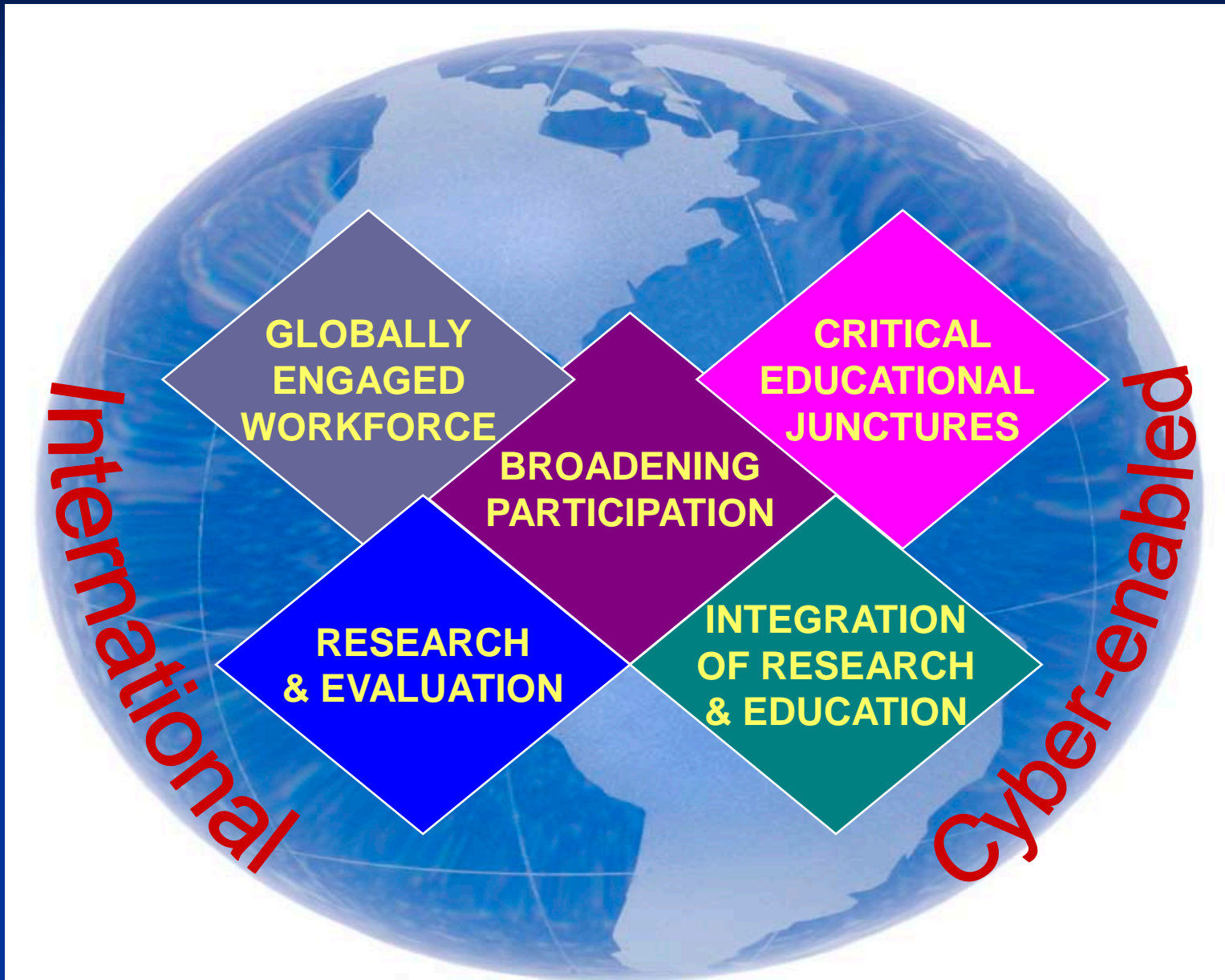
- A More Integrated Approach: I³

- International
- Engagement

Innovation through Institutional Integration (I³)

- Challenges faculty and administrators in institutions of higher education to think strategically about the creative integration of NSF-funded awards towards a whole that exceeds the sum of its parts
- Focus can be:
 - **Intra-Institutional**
 - **Inter-Institutional**

Innovation Through Institutional Integration (I³)



2008 I³ Examples

Six awards were made in 2008

- University of Colorado at Boulder
 - **CCLI, Noyce, TPC, Reese, REU, other NSF awards from ENG, EEC**
- University of Florida
 - **AGEP, GK-12, IGERT, REUs, other NSF awards from ENG, SBE, etc.**
- University of Washington
 - **STEP, CCLI, RDE, ADVANCE**
- Kapiolani Community College of the University of Hawaii
 - **TCUP, STEP, LSAMP subaward, EPSCOR subaward**
- Louisiana State University
 - **GK-12, LSAMP, S-STEM, AGEP, Noyce, other awards from MPS**
- Georgia Institute of Technology
 - **GK-12, AGEP, IGERT, RET, Noyce, ADVANCE, REU**

2008 I³ Examples:

University of Florida

Builds on:

- **AGEP**
- **GK-12**
- **IGERT**
- **REUs**
- **Other NSF awards from ENG, SBE, etc.**

- Brings together existing NSF projects for underrepresented groups and engages more students from those groups to broaden participation and foster atmosphere of collaboration and peer support among students
- Encourages youth and incoming college students to consider STEM disciplines and careers

2008 I³ Examples:

University of Washington



Builds on:

- **STEP**
- **CCLI**
- **RDE**
- **ADVANCE**
(created Center
for Institutional
Change)

- **PEERS** (Promoting Equity in Engineering Relationships) undertakes both student-centered and engineering transformation interventions and creates new tools and resources.
- Addresses issues relevant to students who identify with more than one underrepresented group

2008 I³ Examples:

Kapiolani Community College
of the University of Hawaii



Builds on:

- **TCUP**
- **STEP**
- **LSAMP Subaward**
- **EPSCoR Subaward**

Develops new Associate of Science in Natural Science degree and engages in faculty development needed to increase quantity and quality of STEM faculty, thus supporting a pipeline for more Native Hawaiian and other students to complete STEM degrees

2008 I³ Examples:

Louisiana State University



Builds on:

- **GK-12**
- **LSAMP**
- **S-STEM**
- **AGEP**
- **Noyce**
- **Other NSF awards from MPS**

Assists students in their professional development towards advanced degrees, creates an interdisciplinary curriculum in materials engineering and science, and develops Hierarchical Mentoring Ladder system involving faculty members, graduate/undergraduate students, and high school teachers/students

2008 I³ Examples:

Georgia Institute of Technology

Builds on:

- GK-12
- AGEP
- IGERT
- RET
- Noyce
- ADVANCE
- REU

- *Tech to Teaching* includes pathways towards state teacher certification through cooperation with Kennesaw State University's Master of Arts in Teaching program.

- Increases collaboration with partners Spelman College and Georgia Perimeter College through engagement of Tech's graduate students as instructors in partner classrooms



International Activity by Type

Collaborative Work

- Draws on international resources, and supports international activity and research with a high global impact.
- Exemplary programs: *IGERT*, *GRF*, *GSE*

Conference, Seminar & Workshop

- Supports international conferences participation and fosters international dialogue through workshops and scholarly meetings.
- Exemplary programs: *ITEST*, *LSAMP*

Internship & Study Abroad

- Prepares a vibrant, engaged workforce by offering academic and industrial experiences abroad.
- Exemplary programs: *IGERT*, *LSAMP*



International Activity by Type

Outreach & Dissemination

- Promotes high-impact projects and facilitates informal science learning in international settings.
- Exemplary programs: *IGERT*, *RDE*

International Exchange

- Promotes academic exchange and collaboration, and provides cross-cultural learning experiences.
- Exemplary programs: *CREST*, *IGERT*, *LSAMP*


Other Support Activity

- Provides a range of support in the areas of human resources, facilities, and instrumentation to facilitate international endeavors and help students gain international perspective in learning and research.
- Exemplary programs: *IGERT*, *ATE*



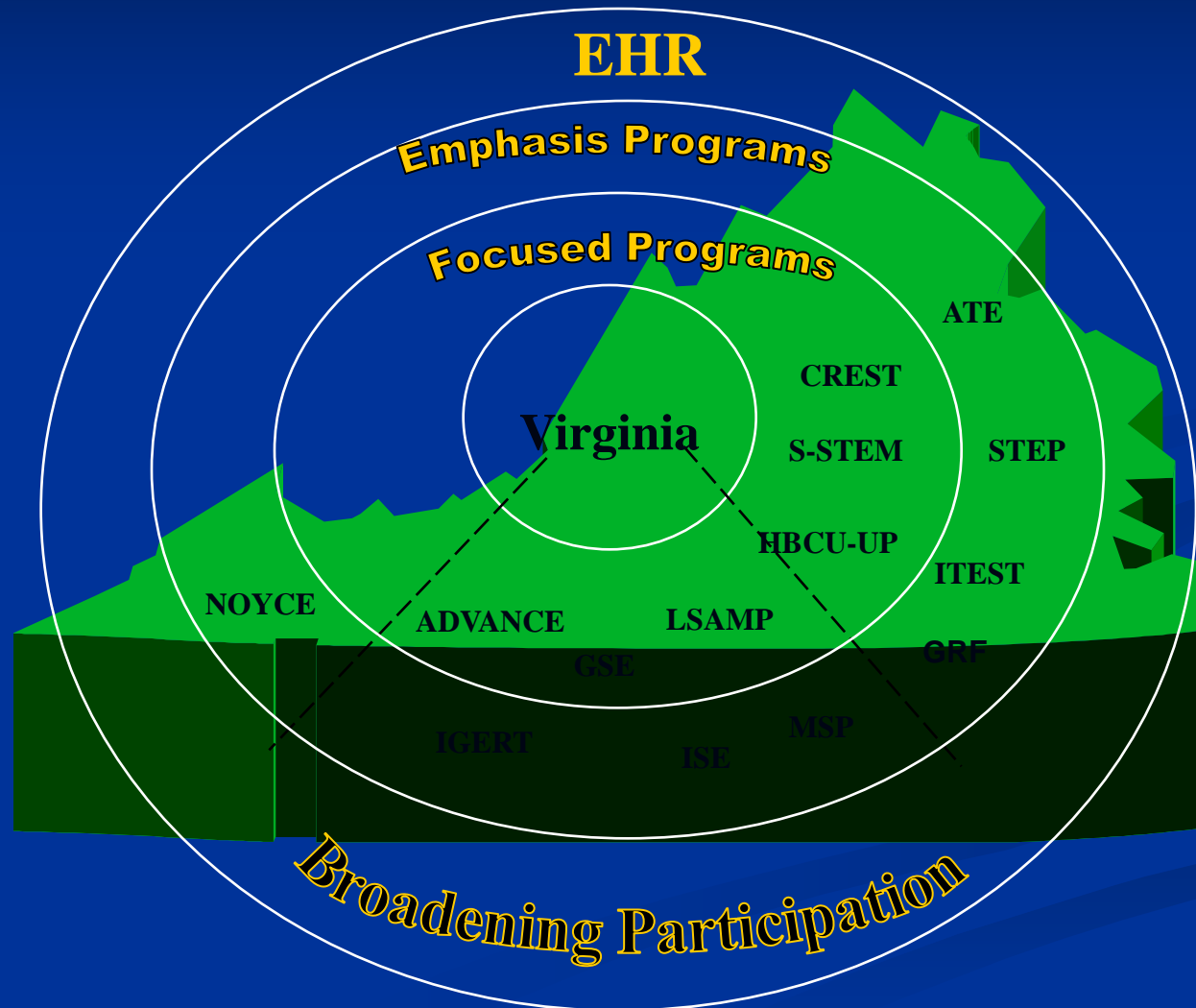
Future Directions

Broadening Participation across Seamless Transitions (BPaST), including the engagement of professional associations, private sector

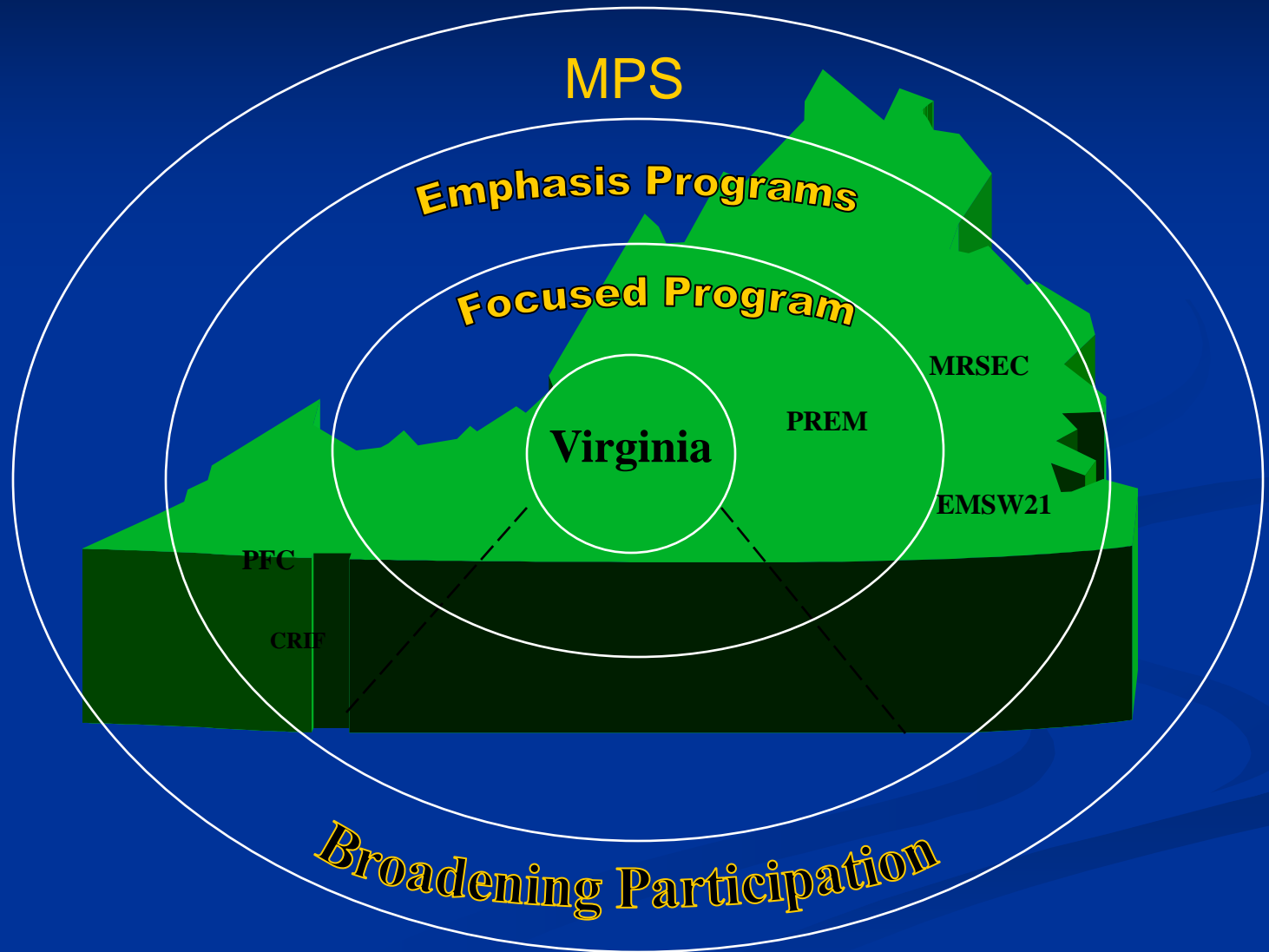


A more expanded NSF-wide emphasis on broadening participation across critical transitions, including explicit attention to HSI

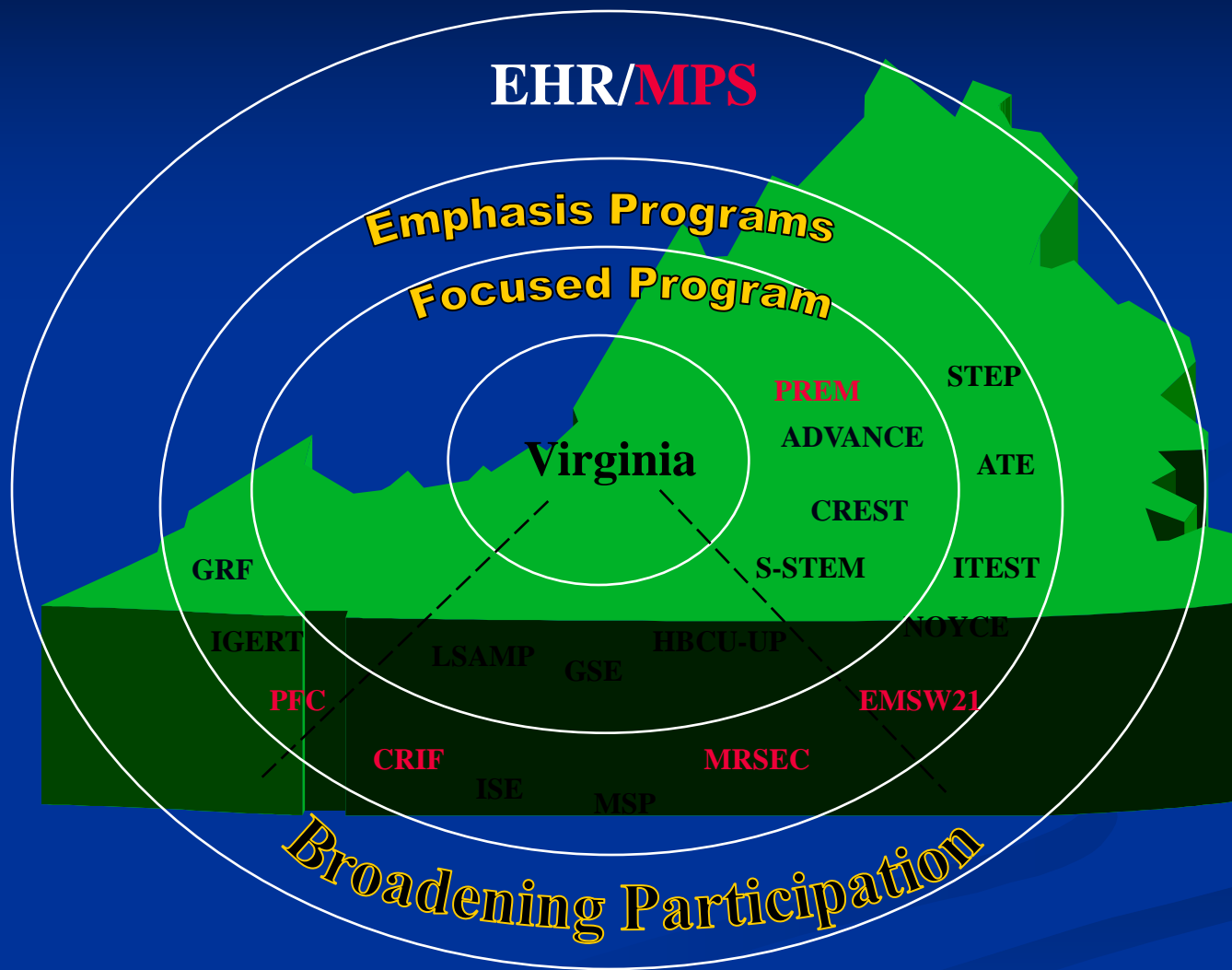
EHR Broadening Participation Programs in Virginia



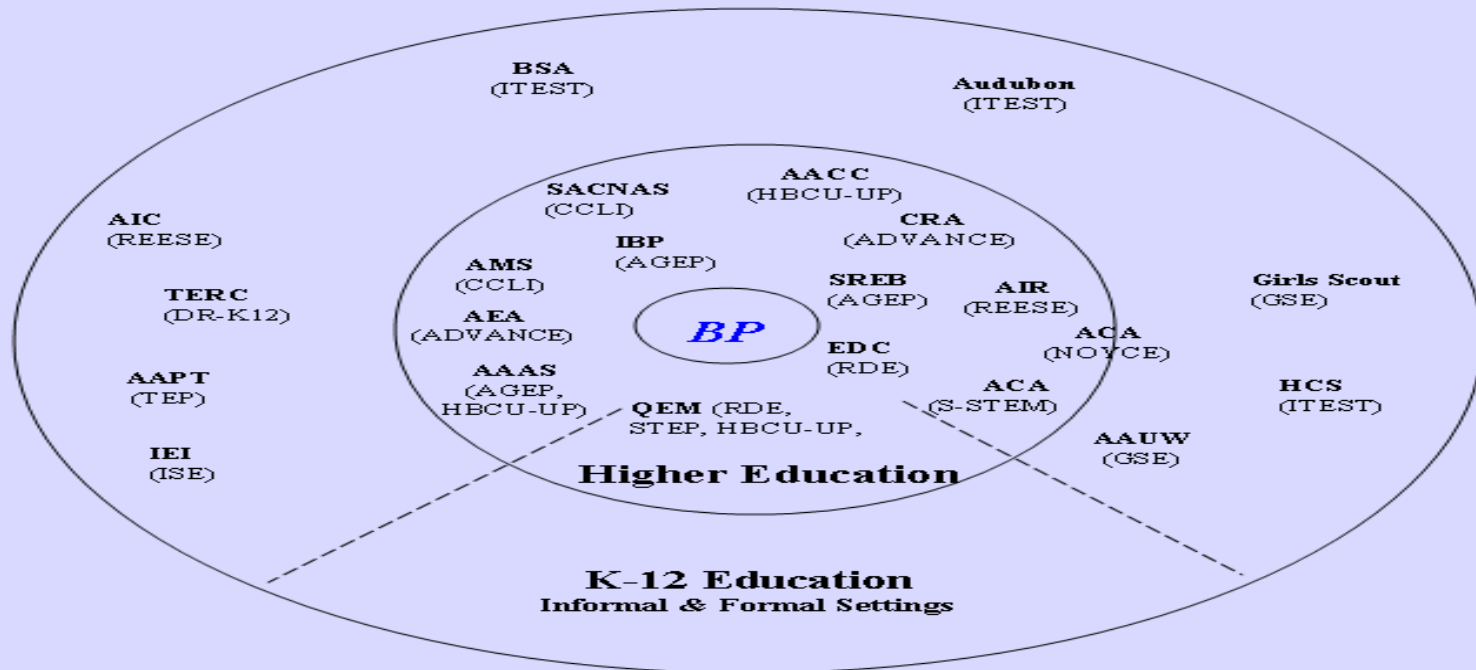
ENG Broadening Participation Programs in Virginia



EHR/MPS Broadening Participation Programs in Virginia



Participation (*BP*) Efforts in STEM Education



AAAS: American Association for the Advancement of Science
AACC: American Association of Community Colleges
AAPT: American Association of Physics Teachers
AAUW: American Association of University Women
AEA: American Economic Association
AIC: American Indian Center of Chicago
QEMN: Quality Education for Minorities Network
EDC: Education Development Center
TERC: TERC Inc
HCS: Harlem Children Society
Girls Scout: Girls Scouts of the USA

AMS: American Meteorological Society
ACA: Appalachian College Association
AIR: Association for Institutional Research
BSA: Botanical Society of America
CRA: Computing Research Association
Audubon: National Audubon Society
SCANAS: Society for Advancement of Chicanos & Native Americans in SCI
SREB: Southern Regional Education Board
IBP: Institute for Broadening Participation
IEI: Indigenous Education Institute

The Global Context



....Collaboration for a Competitive and Healthy Nation....