



Our World is **ENGINEERED**

Broadening Participation in Engineering

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Director of Diversity and Outreach
NSF Directorate for Engineering
Advisory Committee Meeting
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Who Am I?



- ◉ Former Assistant Dean and Executive Director for Diversity, Recruitment and Retention at Colorado State University (CSU) since 2003.
- ◉ Former Principal Investigator and Director of the State-Wide LSCO-AMP (Louis Stokes Colorado Alliance for Minority Participation) since 1996.
- ◉ Department Chair of Physics and Engineering, Fort Lewis College, Durango, CO, 1993-1996.
- ◉ Professor of Civil Engineering, joint appointment at CSU and Ft. Lewis since 1984.





Who Am I?

(cont.)



- Civil Engineering / Hydraulics and Irrigation, CSU, Doctor of Philosophy, 1984.
- PI and Co-PI on several NSF projects (~\$30M).
- Born and raised in Cairo, Egypt; lived in many cultures and places.
- Very passionate about diversity and broadening participation.





What Do Underrepresented Groups Bring?

- ◉ Talents and skills
- ◉ Unique experiences
- ◉ Invaluable research approaches
- ◉ Creativity and innovation
- ◉ Excellence in diversity





Challenges

- Awareness
- Confidence and trust
- Cultural understanding
- Environment
- Facilities
- Opportunities
- Support





My Role

- Provide vision for activities that increase the number of women, persons with disabilities, and minorities.
- Collaborate on outreach activities with professional organizations and industry.
- Visit colleges and universities in U.S. and abroad.
- Create and participate in Broadening Participation Workshops and Conferences.
- Collaborate with ENG and others (OISE and EHR) on activities that promote cultural and global diversity.
- Implement the current diversity programs.





My Role: Outreach

- ◉ **Outreach** activities at the annual meetings of engineering societies and schedule highly visible “NSF Sessions” that include solicitation information, panel content, career fair, and proposal writing.
 - > National Society of Black Engineers (NSBE)
 - > Society of Hispanic Professional Engineers (SHPE)
 - > American Indian Science and Engineering Society (AISES)
 - > Society of Women Engineers (SWE)
 - > Society of Mexican American Engineers
 - > Society for Advancement of Chicanos and Native Americans in Science (SACNAS)
 - > Hispanic Associations of Colleges and Universities (HACU)
- ◉ **Workshops** (see future activities)





NSF Broadening Participation Plan

- ◉ Prepare a diverse globally engaged STEM workforce.
- ◉ Expand efforts to broaden participation from underrepresented groups and diverse institutions in all NSF activities.
- ◉ Integrate research with education, and building capacity.
- ◉ Improve processes to recruit and select highly qualified panel reviewers.



AdCom Recommendations

October 2008

1. Faculty Research Advancement Program for individuals not eligible for BRIGE. (We are exploring.)
2. Establish workshop series.
3. Outreach Activities with the National Professional Societies.
4. Research Initiation Grants for Post-Docs. (We are exploring.)
5. Continue the GRS.
6. Expand the RET and REU. (We are exploring.)
7. Expand the Tribal College Initiative.



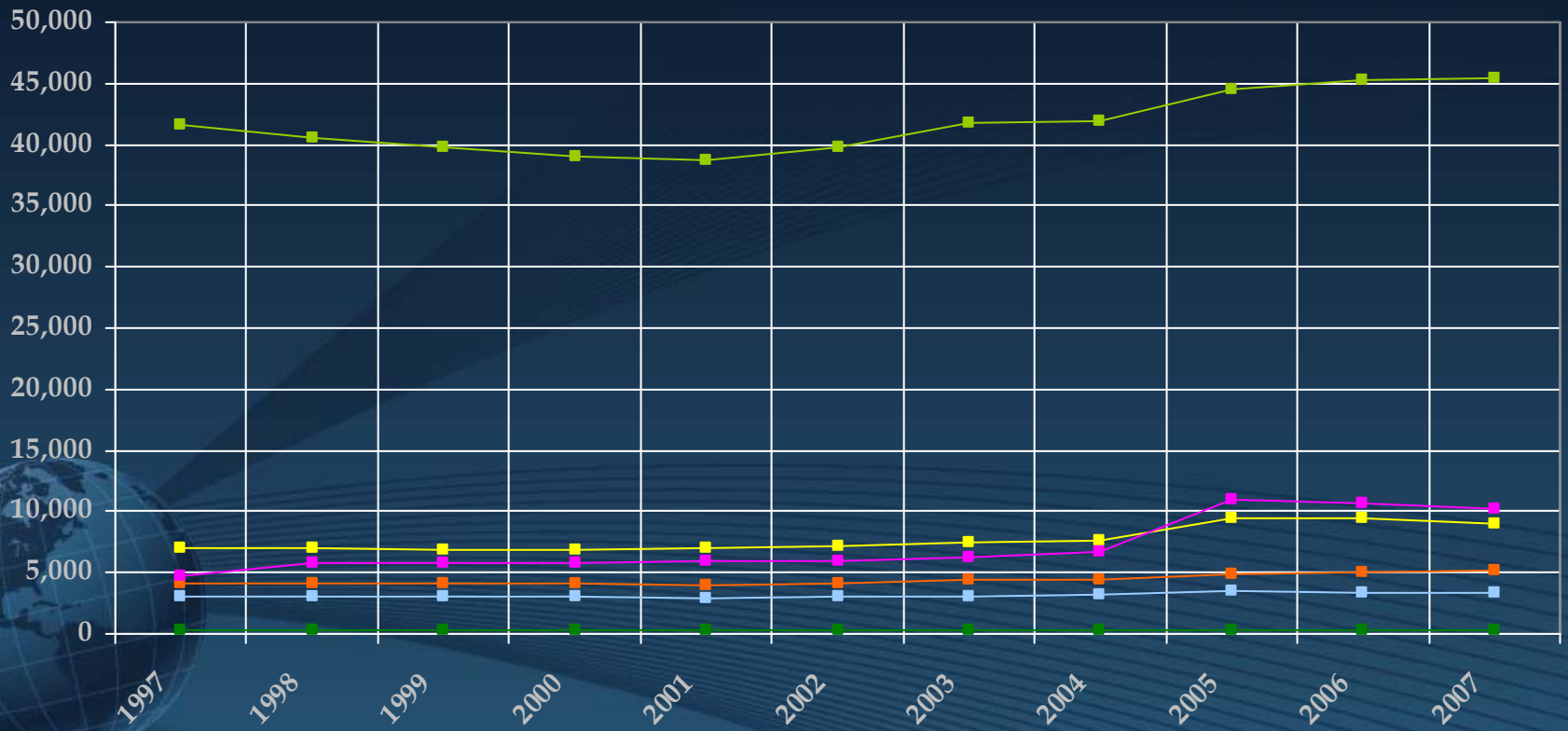
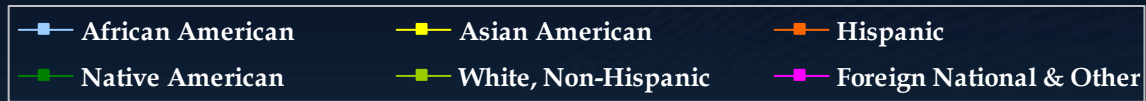
Opportunities: Broadening Participation in Engineering

- Broadening Participation Research Initiation Grants in Engineering (BRIGE)
- Graduate Research Supplements (GRS)
- Broadening Participation Workshops
- Tribal College Initiative
- Research to Aid Persons with Disabilities (RAPD)
- ERC Diversity Plan
- CAREER and REU
- ADVANCE: Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers
- Graduate Research Fellowships for Women



Demographic Data

ENG BS Degrees Granted 1997-2007

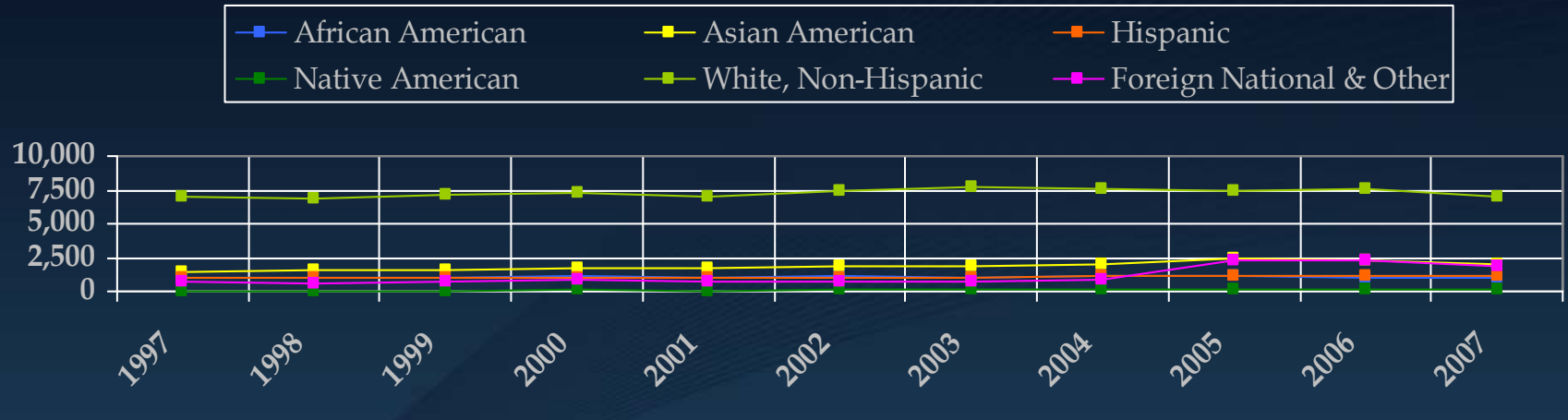


Data: NSF Science & Engineering Indicators; DoEd National Center for Education Statistics

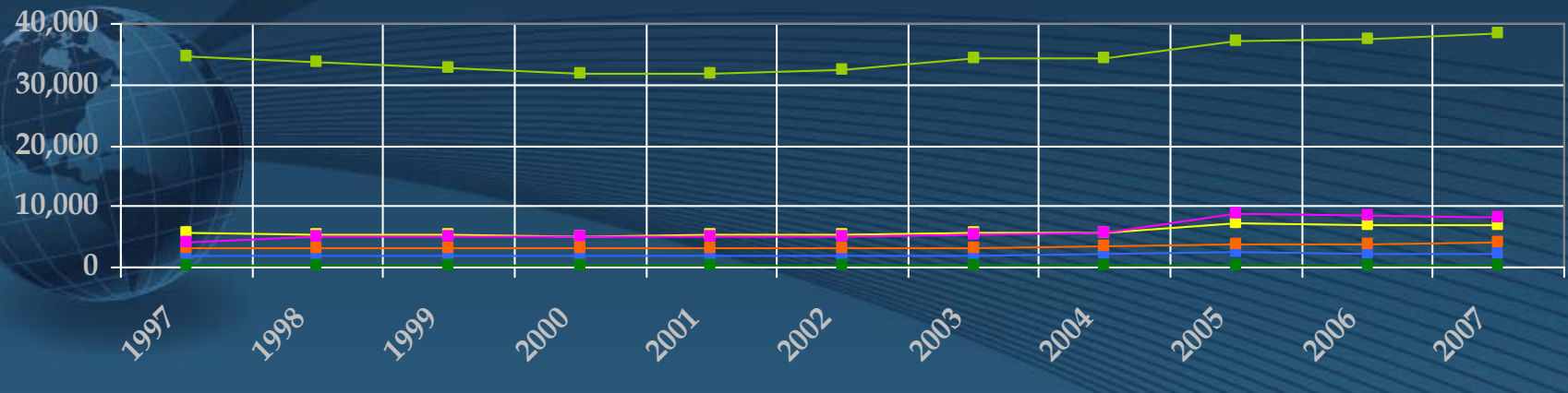


Degrees Granted (Gender)

Degrees Granted (Females) 1997-2007



Degrees Granted (Males) 1997-2007



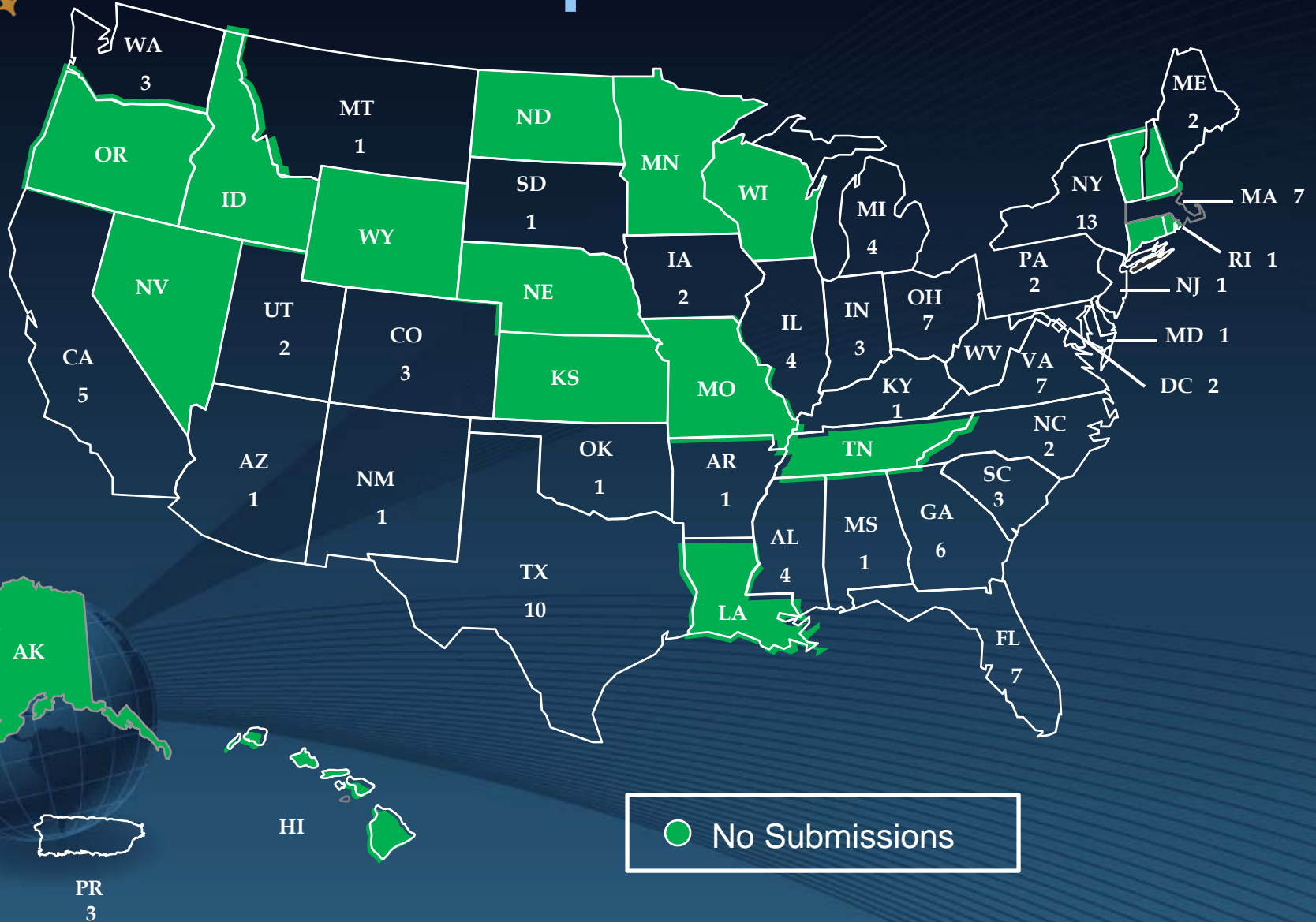


Recent Activities

- **BRIGE:** 130 proposals received; 5 returned without review.
 - › 125 in the review process until mid-May 2009.
 - › Grant by July 2009.
 - › Under ARRA: Hoping to award more grants (last year awarded 28.)
- **GRS:** Issued Dear Colleague Letter to increase the level of support from \$1.20 M last year to \$1.95 M this year (45-50 awards).
- **Workshops:** Increasing the number of workshops to reach out to more diverse communities and impact more women and underrepresented groups.



BRIGE Proposals in 2008





Workshops



- ◎ WIRES: Women's International Research Engineering Summit (Georgia Tech)
- ◎ Venue: Barcelona, Spain. June 2-4, 2009
- ◎ Theme: Enable sustainable research exchanges among female engineers in the world!





Tribal College Initiative

- ◎ **Goal:** To expand the engineering and pre-engineering capacities of tribal colleges and universities (TCUs) through curriculum development and partnerships.
- ◎ **Approach:** Develop a 3-year pre-engineering curriculum based on success-oriented student cohorts, distance education, relevant coursework and projects, and mainstream university participation.





Tribal College Initiative (cont.)

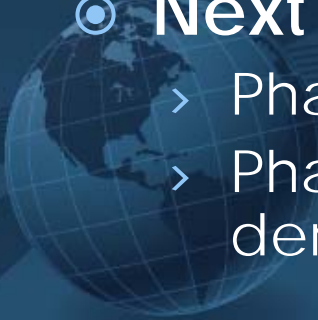
◎ Accomplishments:

- › Developed conceptual pre-engineering curriculum.
- › Visited tribal colleges and mainstream universities in AZ, MT, ND, NM, and SD.
- › Held workshop (Feb. 2009) to identify successful partnering, involving 11 universities and 12 tribal colleges.



◎ Next Steps:

- › Phase I project report.
- › Phase II: concept papers and a regional demonstration.





Future Workshops

- ◉ Mentoring workshop for undergraduates who are from underrepresented groups or have a disability, Fall 2009.
- ◉ Recruitment and Transition of Community College Students to Four Year Institutions, Fall 2009.
- ◉ Creating Partnerships and Pathways among Faculty and the Hispanic Community, UTEP, El-Paso, January 2010.
- ◉ Nanotechnology and Gender Issues: Addressing under representation of women and women minorities in nanoscience fields, Spring 2010.
- ◉ International Workshop on Water Quality, Desalination, Climate Change, and Impacts on the Environment, Spring 2010.
- ◉ Broadening Participation: Mechanisms, impacts and sharing best practices, Summer 2010.



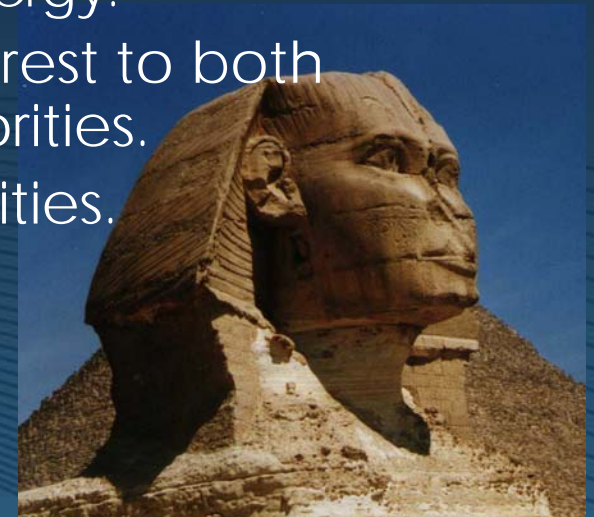
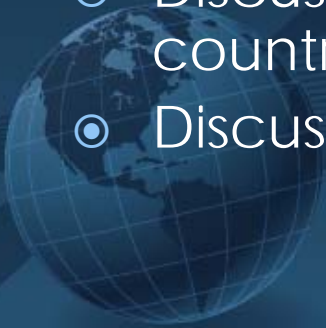
Global Collaboration via OISE

- ◉ Explore global activities and international workshops to involve women and minorities.
- ◉ Inform current PIs about opportunities for supplements to support international activities.
- ◉ International Planning Visits: travel to plan collaborative research with prospective foreign partners.
- ◉ International Workshops: hold meetings to identify common priorities and approaches for collaboration on specific, well-defined research areas.



Trip to Egypt and Turkey

- In Egypt: met with the Cairo University president, V.P., deans of Engineering, Agriculture, and Science, as well as the Ministry of Water Resources and Ministry of Higher Education.
- Discussed **Partnership** opportunities with U.S. universities.
- Discussed **Collaborative** research with U.S. universities.
 - › Water resources, climate change, renewable energy, alternative energy and sustainable energy.
- Discussed **Workshops** on topics of interest to both countries to include women and minorities.
- Discussed **Research** training opportunities.





Trip to Egypt and Turkey (Cont.)

- The Science and Technology Development Fund (STDF) in Egypt is willing to contribute funds towards the potential partnerships with U.S. universities.
- In Turkey: Met with the President and Vice President of Ozyegin University, as well as the director of the international office and the director of the Center of Entrepreneurship to explore opportunities.



CAREER and LSAMP Evaluation Process (External Evaluators)



Response to AdCom request from October 08

CAREER Impact on:

- Research and Education Productivity
- The Department
- Faculty Engagement and Outreach

LSAMP Focus:

- Understanding effective Broadening Participation and Constraints.
- Progress of participating students in science and engineering pipeline.
- Post BS studies and employment.
- Impact on the participating institutions.



Suggested Assessment for BRIGE

- ◎ Melding the CAREER and LSAMP approaches.

- ◎ **Impact on Awardees:**
 - Research and education productivity.
 - Time to tenure.
 - Outreach and Mentoring activities.

- ◎ **Impact on Departments/College:**
 - Recognition.

- ◎ **Impact on Students:**
 - Progression through the S&E pipeline.



We look forward for your input!

➤ Assessment, BRIGE, cultural and global diversity, other programs and workshops.

