



# MissionSTEM

21st Century Civil Rights Technical Assistance for Science, Technology, Engineering, and Mathematics

### What's New?

- + Administrator's Letter on Sexual Harassment
- + Deputy Administrator's Blog on Harassment Policies
- + Chief Scientist's Blog on Data Collection

Message from the Administrator  
+ Watch video



- + Home
- + About Mission STEM
- + Filing a Complaint
- + Compliance Requirements
- + Civil Rights Compliance Reports
- + Promising Practices (NASA)
- + Promising Practices (Colleges)
- + Promising Practices (Museums)
- + Diversity and Inclusion Leadership
- + NASA Innovations Impact the World
- + Unconscious Bias in STEM: Addressing the Challenges
- + Related Links
- + Media Gallery
- + Reading Room
- + FAQs



+ Age



+ Disability




+ Gender



+ Race/Ethnicity

## Office of Diversity and Equal Opportunity

The MissionSTEM Web site is designed to assist NASA grant recipients with their civil rights compliance efforts. The Agency strives to provide a broad scope to its technical assistance in this arena. [+ Read More](#)



**Compliance Requirements**  
For NASA Grantees



**Promising Practices**  
For Colleges and Universities



**Promising Practices**  
For Science Centers and Museums



### Student Corner

Career advice for STEM students and NASA student funding opportunities.





# STEM for All

Jo Handelsman

Associate Director For Science

White House Office of Science and Technology Policy

**NASA MissionSTEM Summit**

**August 8, 2016**

# STEM for All

- **Overview of Goals**
- **Active Learning**
- **Course Access**
- **Bias and Image**



# Priorities in the FC-STEM 5-year Strategic Plan

- Evidence-based practice
- Community colleges
- Research experiences
- Mathematics success



# Presidential Goals

- Produce 1 million more STEM college graduates who reflect the demographics of the college population by 2022
- Train 100,000 more excellent STEM teachers for K12

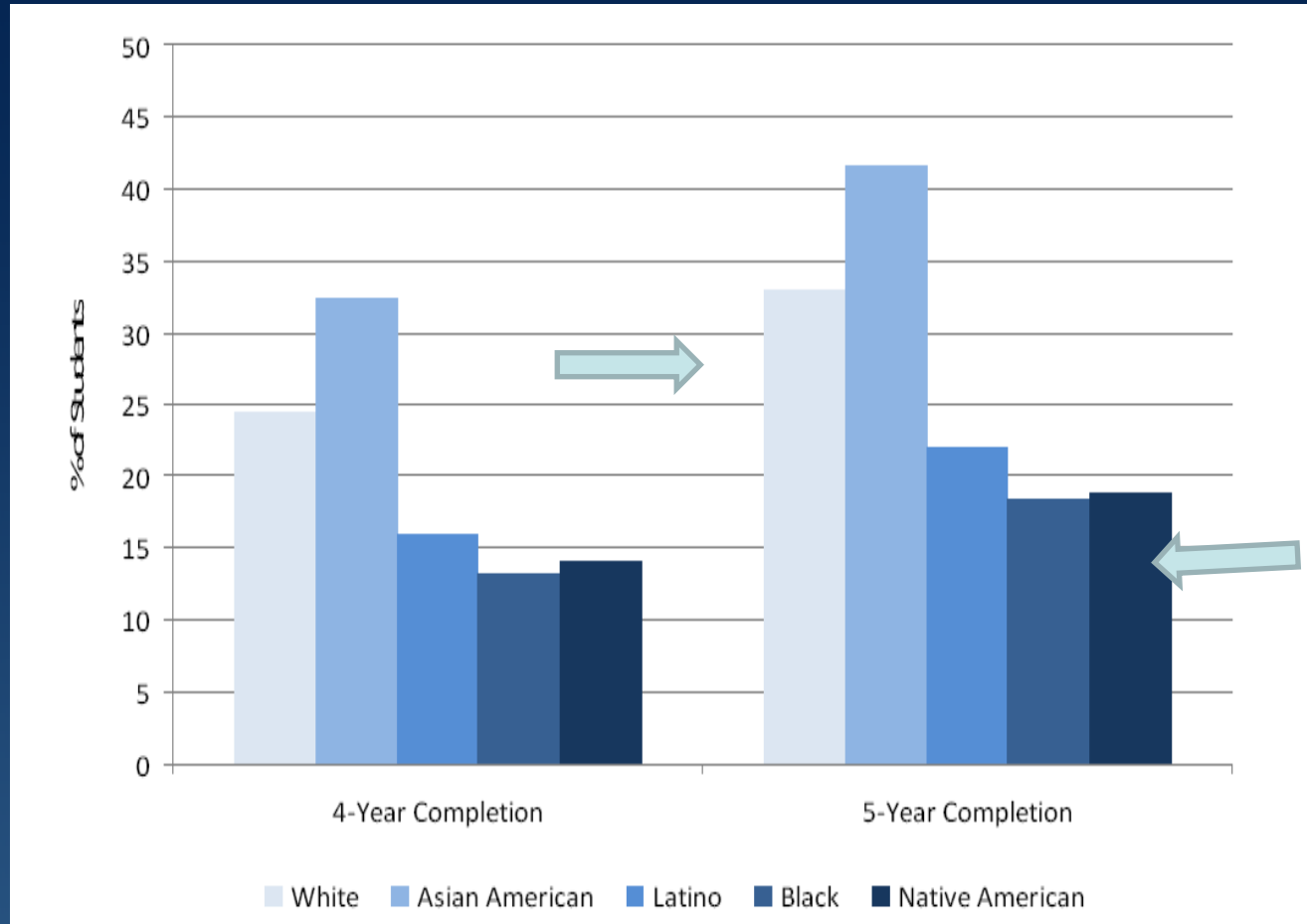


# A Challenge and Opportunity

>60% of the students who start college intending to major in STEM graduate with degrees in STEM



# Retention of Members of Some Ethnic Minorities in STEM Majors is Below 20%



Source: University of California Los Angeles, Higher Education Research Institute



# STEM for All

**Goal:**

**Increase STEM college graduates by increasing retention of all students in STEM majors**





# STEM for All

- Overview of Goals
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# Active Learning

## active engagement of students in the learning process

Fast = Rapid

Fast = R\_\_p\_\_d



# Diverse active learning methods enhance learning

Case studies

Problem-based learning

Problem sets in groups

Concept mapping

Writing w/peer review

Testing

Clickers

Group tests

Small group discussion & peer instruction

Analytical challenge before lecture

Computer simulations and games



# College Research or Design Courses in 1<sup>st</sup> or 2<sup>nd</sup> Year

- Increase retention in STEM majors
- Reduce frequency of poor grades (D or F)
- Reduce rate of withdrawal from college
- Improve higher order thinking skills
- Generate student identity as scientist
- Make students part of a science community



# Active Learning Day

- NSF-White House Collaboration
- Back to school effort
- Follow with action in colleges and universities



# STEM for All

- Overview of Goals
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- **Bias and Image**



# Expand Access to Advanced STEM Courses

- Complete training 100,000 new STEM teachers by end of Administration
- Support NSF's efforts to recruit & train CS teachers in evidence-based curriculum
- Replicate Joining Forces pilot to expand math and science AP courses
- Recognize bipartisan bill that made computer science a STEM subject
- Public-private partnerships >\$1 billion



# STEM for All

- Overview of Goals
- Active Learning
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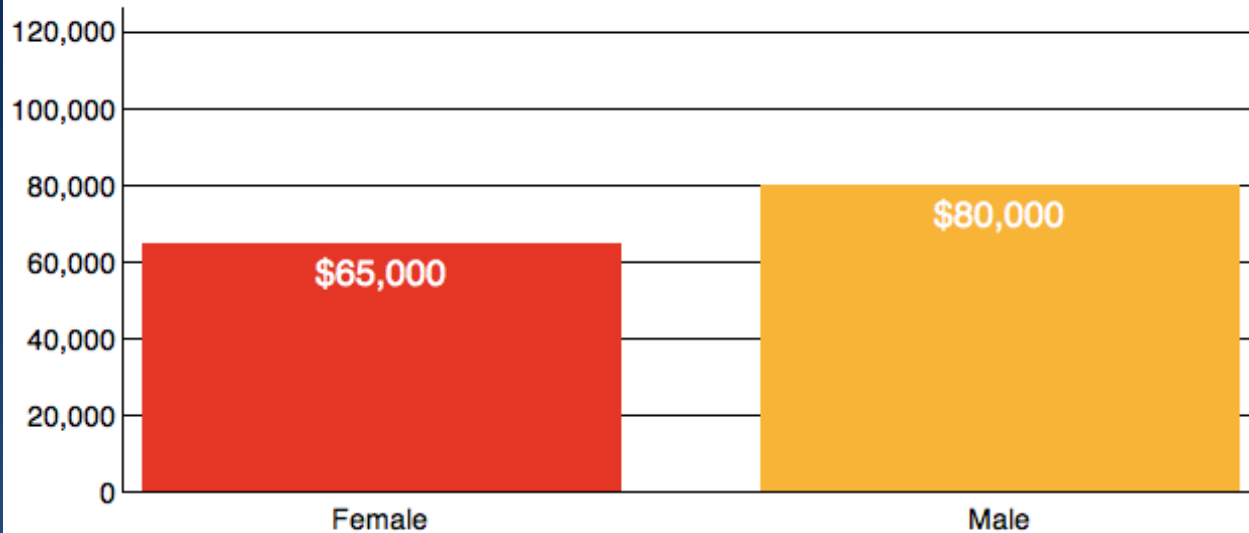
# Evidence of Bias in STEM

- Employment data
- RCT studies
- Effects of bias reduction
- Imagines in mass media



# Salaries of Men with Bachelor's Degrees are 18% Higher than Women's **ALL AGES**

MEDIAN ANNUAL SALARY OF US SCIENTISTS AND ENGINEERS EMPLOYED FULL TIME IN 2008

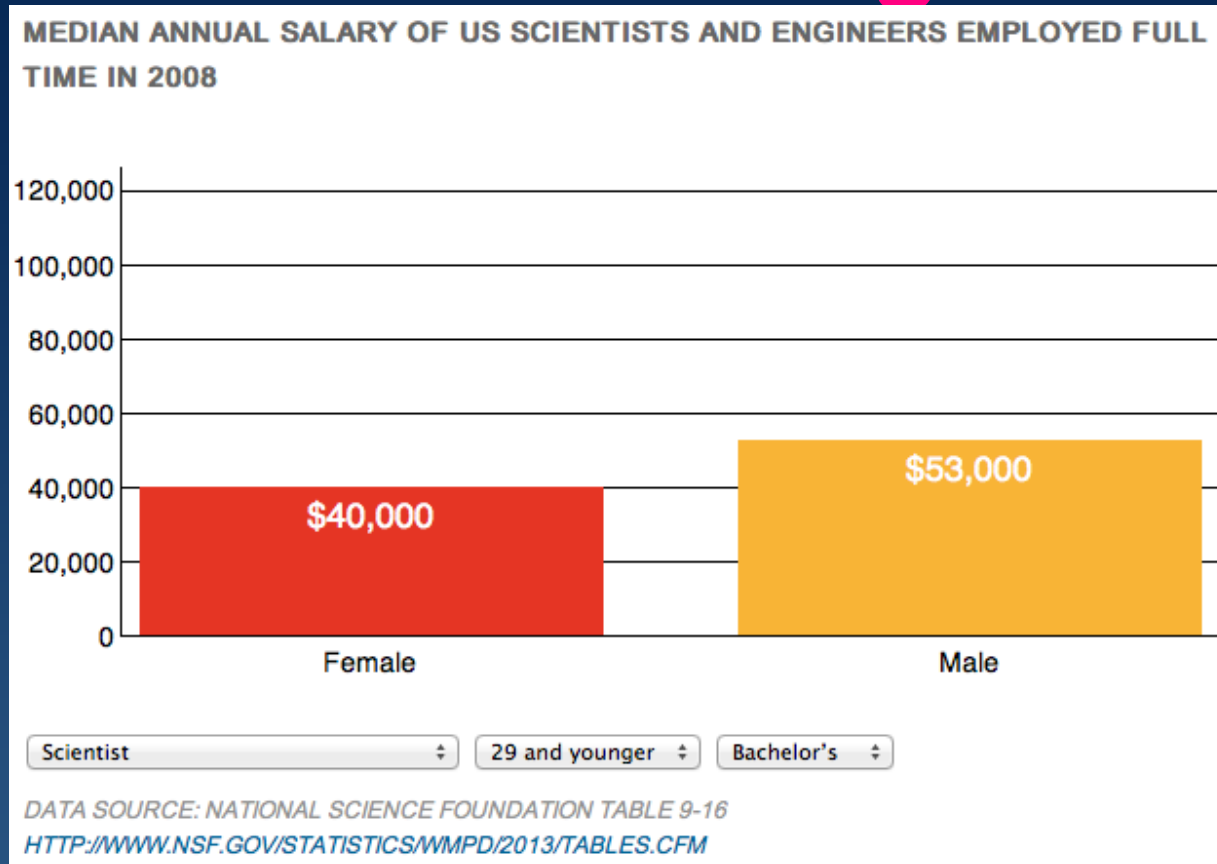


Scientist ▾ All ages ▾ Bachelor's ▾

DATA SOURCE: NATIONAL SCIENCE FOUNDATION TABLE 9-16  
[HTTP://WWW.NSF.GOV/STATISTICS/WMPD/2013/TABLES.CFM](http://www.nsf.gov/statistics/wmpd/2013/tables.cfm)



# Salaries of Men with Bachelor's Degrees are 26% Higher than Women's **29 and Younger**



# Research on Bias

- Reviewers rate candidate's verbal skills based on text
- Rated skills **lower** if they were told an **African American** wrote the text than if a they were told a white person wrote it
- a **man** wrote it than when told a woman wrote it

# Randomized and Controlled Hiring Studies

- Identical applications assigned male or female name – each evaluator sees only one version with either the male or female name on it
- Substantially more likely to hire a given applicant if there is a man's name on application
- Same result over 40 years even though explicit or conscious bias has diminished



# Research on Bias

- CVs of a real professor were assigned a male or female name, randomly, and sent to 238 academic psychologists
- CV at time of job application
- CV at time of early tenure decision
- Respondents more likely to hire if male name on job application
- Gender of applicant had no effect on respondents' likelihood of granting tenure

*Steinpreis et al., 1999*



# However.....

CV's were returned to researchers

There were “cautionary comments” in margins of tenure package four times more often on those with woman's name:

“We would have to see her job talk.”

“It is impossible to make such a judgment without teaching evaluations.”

“I would need to see evidence that she had gotten those grants and publications on her own.”

*Steinpreis et al., 1999*



# Research on Bias

- In every study, there is a significant effect of the gender or race of person being evaluated
- NO significant effect of gender or race of person doing the evaluation





# Study of Bias in Scientists

- 127 biologists, chemists, and physicists
- Six top research universities
- Sent participants a student description
- Randomly assigned name “Jennifer” or “John”
- Questions about student

Hire as lab manager?

Competence?

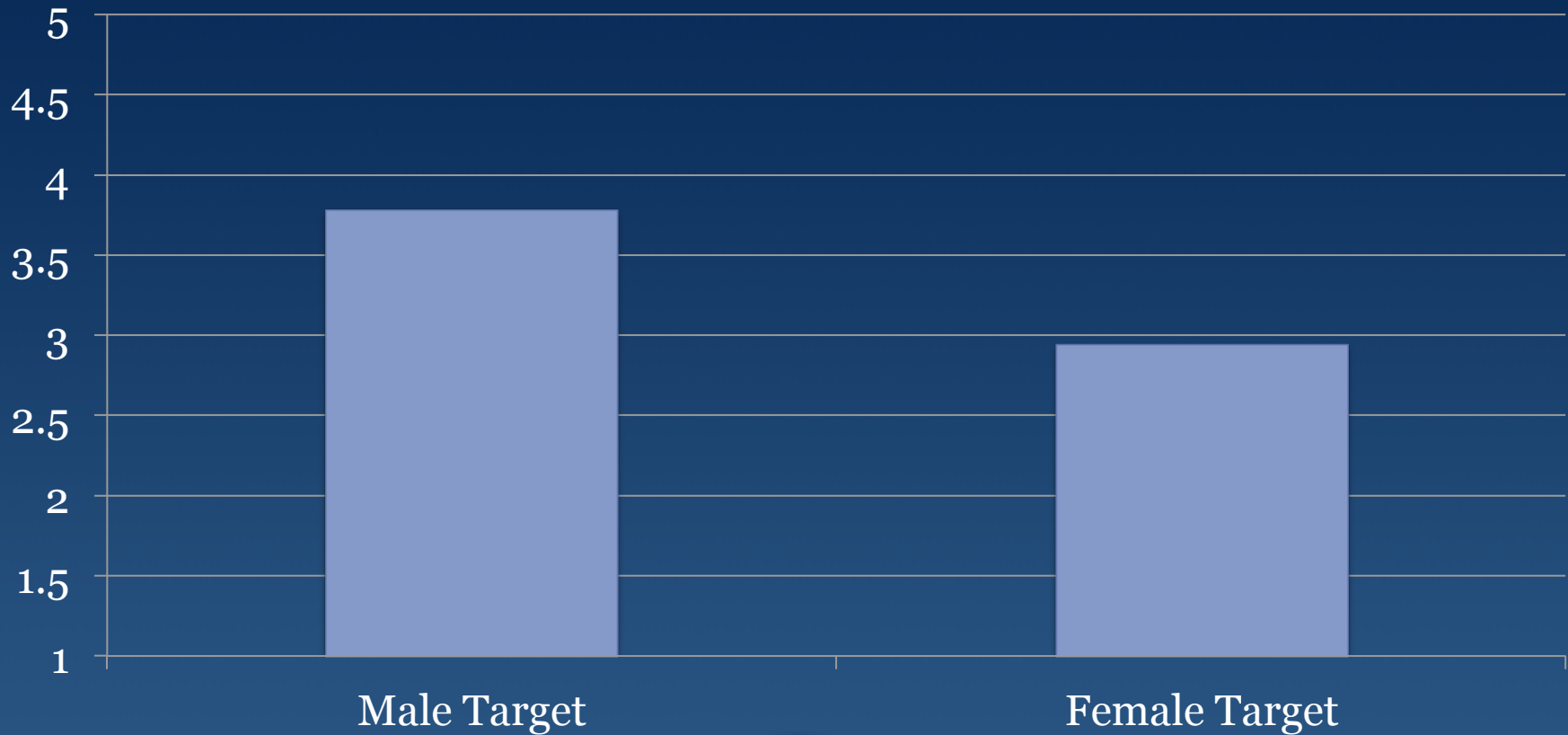
Provide mentoring?

Salary?



# Results: Would Jennifer or John Be Hired?

## Hiring

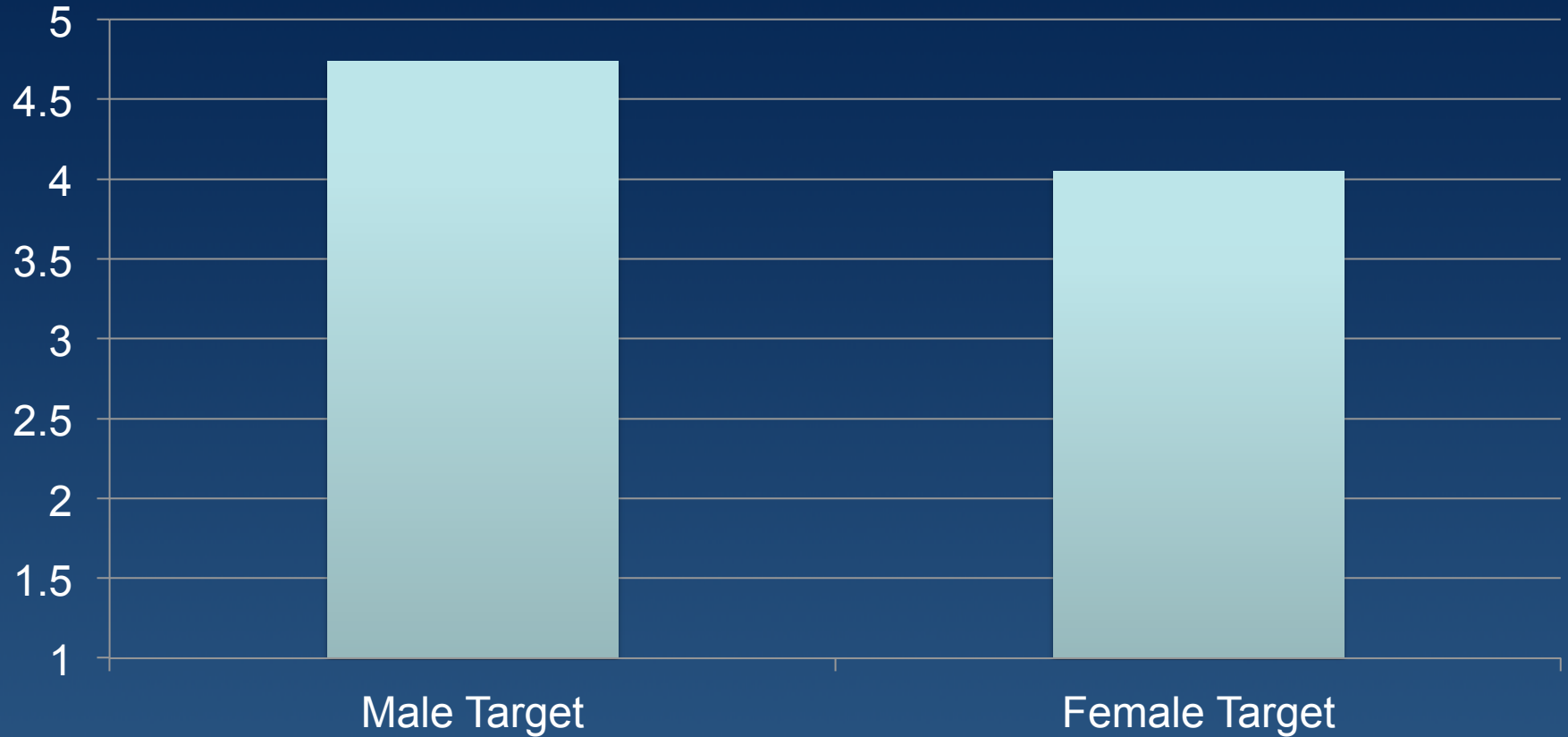


$t(125) = 4.22, p = .001, d = .70$



# Would Jennifer or John receive mentoring?

## Mentoring

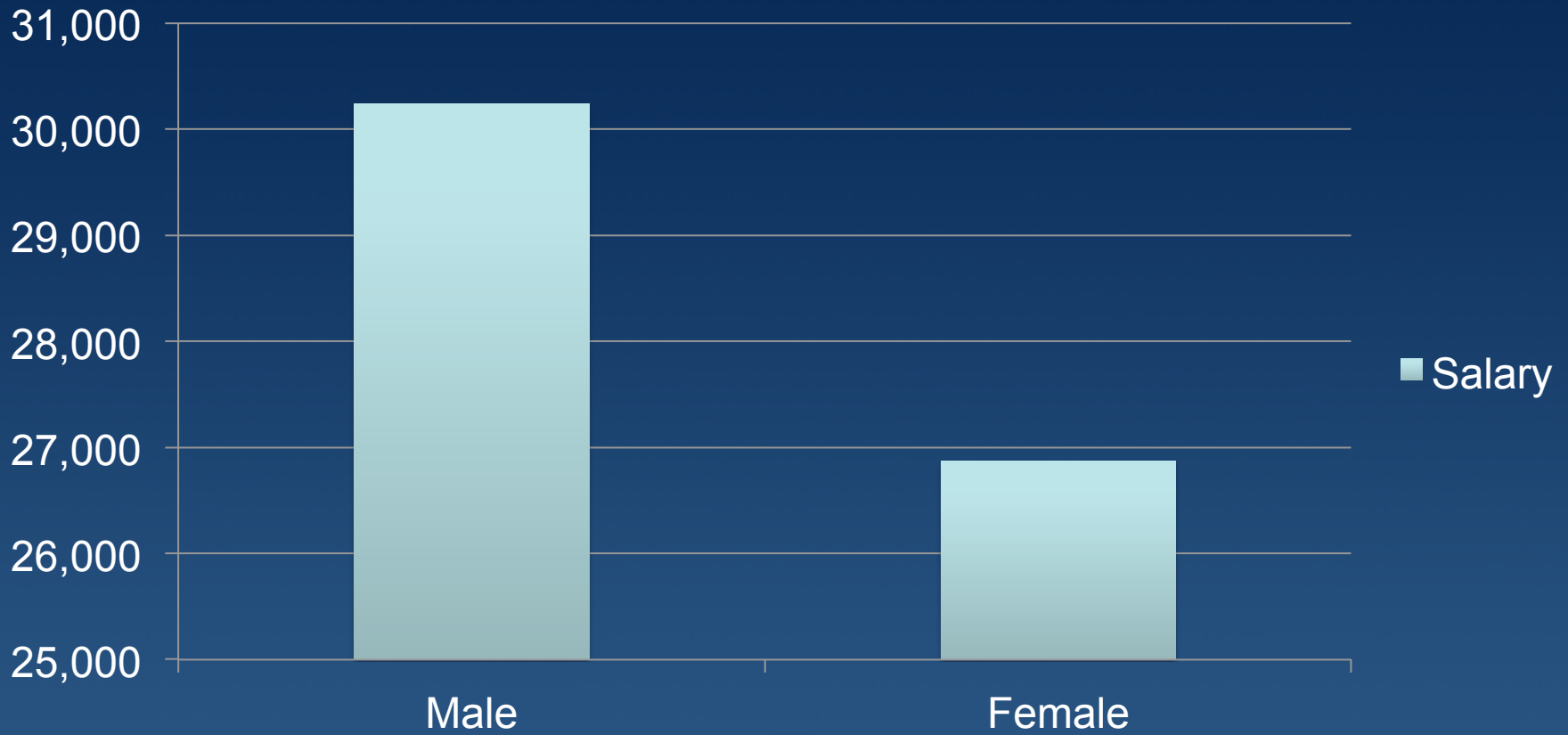


$t(125) = 3.43, p < .01, d = .60$



# How much would Jennifer or John be paid?

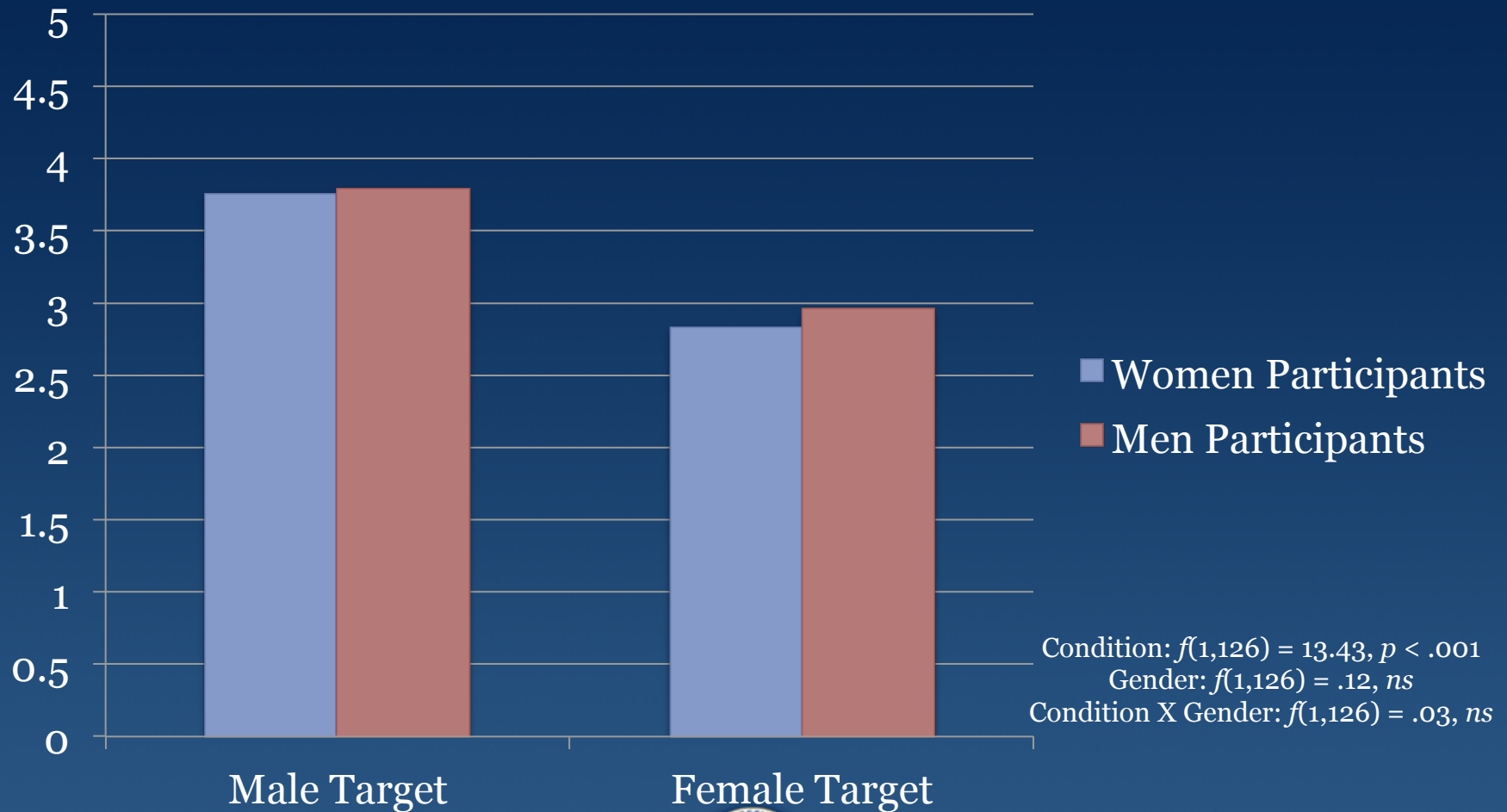
## Salary



$t(125) = 2.94, p < .01, d = .51$



# Did the faculty gender matter in their evaluation of Jennifer or John?



# Other recent studies show...

- Faculty less likely to respond to emails about research opportunities from women and ethnic minorities (6500 faculty members)

Mailman et al., 2014

- “Elite” faculty in biomedical sciences—male PI’s have fewer women in their labs than female PI’s

Sheltzer and Smith 2014



# Faculty as Gatekeepers

- Faculty provide students
  - Formal and informal advising
  - Access to opportunities
  - Feedback on their abilities
  - A vision of a professional path



# Other Manifestations of Bias

## Structural –

- barriers to work-life balance that affect women more than men
- practices that favor male performance such as lecturing vs active learning
- Images in institutions of higher learning





# White House Policy

## Addressing bias

<https://www.whitehouse.gov/blog/2015/07/16/stem-strength-through-diversity>

- Report on “Mitigating the Effects of Implicit Bias”
- Assisting mass media writers with depictions of science and scientists



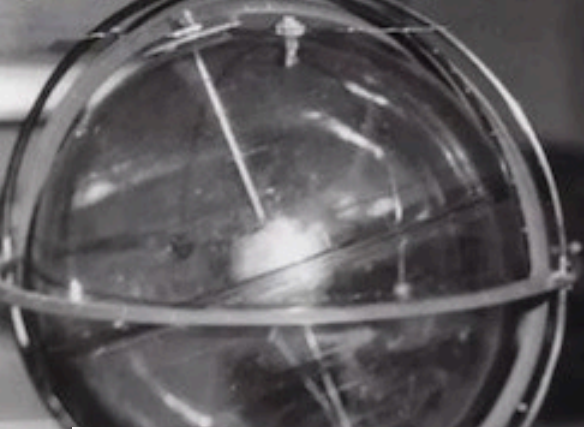
# Image of STEM in the Media



# Katherine Johnson

From forgotten figure to celebrity





... as Katherine Johnson  
in forthcoming "Hidden Figures"

# Image of STEM in the Media

- **Work with entertainment industry**
- **Collaborate with writers, producers, and actors**
- **Promote positive and diverse representations of STEM people and professions in popular media**
- **Engage advertising media community to raise awareness, and seek commitments**



# Mass Media and STEM

- NFE, ANA pledge about depiction of women and women in STEM in TV ads and women
- Noted changes — Blackish character—“Chemistry nerd”
- Dashboard to rate commercial and show content



# Entertainment Media and Social Change

- Image of smoking (US)
- Concept of designated driver (US)
- Teen pregnancy (US)
- Inter-racial families (Rwanda)
- Gay/lesbian acceptance (US)



# Vision of Future Workforce

- Resembles demographic profile of the US
- Abundant workers with STEM training to fill jobs in STEM and in other fields
- Populated with critical thinkers about STEM
- Populated with non-STEM workers who understand the nature of science







<http://www.ostp.gov>

@jo44





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Send your questions for this session to:  
[civilrightsinfo@nasa.gov](mailto:civilrightsinfo@nasa.gov)



Student Corner

# NSF Big Ideas for Future

## RESEARCH CHALLENGES

- Navigating the New Arctic
- Harnessing Data for 21<sup>st</sup> Century Science and Engineering
- Shaping the New Human – Technology Frontier
- Understanding the Rules of Life: Predicting Phenotype
- Windows on the Universe: The Era of Multi-messenger Astrophysics

## PROCESSES

Growing Convergent  
Research at NSF

NSF INCLUDES

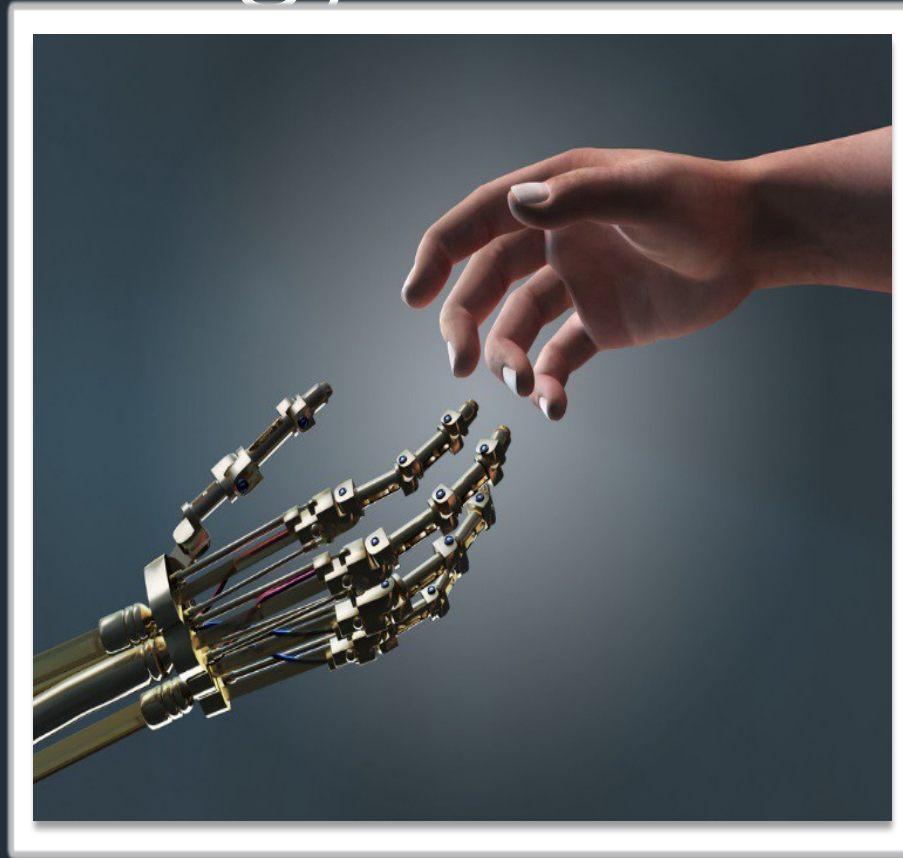
Mid-scale Research  
Infrastructure

NSF 2050



DR. FRANCE A. CORDOVA  
DIRECTOR, NATIONAL SCIENCE FOUNDATION  
AUGUST 8, 2016

# The New Human Technology-Frontier



DR. FRANCE A. CÓRDOVA  
DIRECTOR, NATIONAL SCIENCE FOUNDATION  
AUGUST 8, 2016

# NSF INCLUDES



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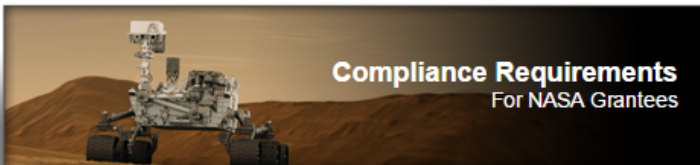
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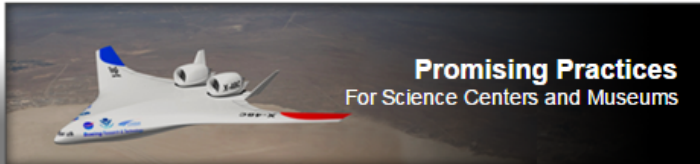
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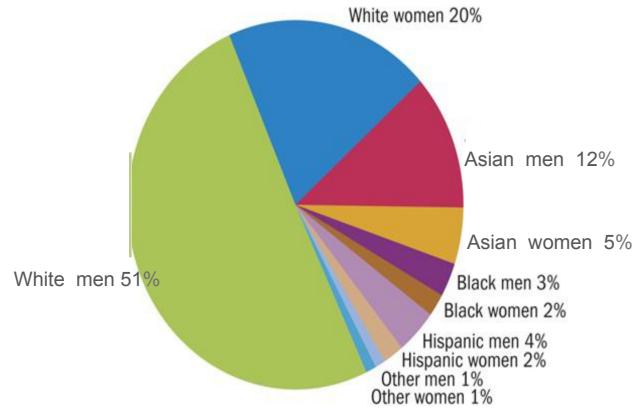


Featured Promising Practices



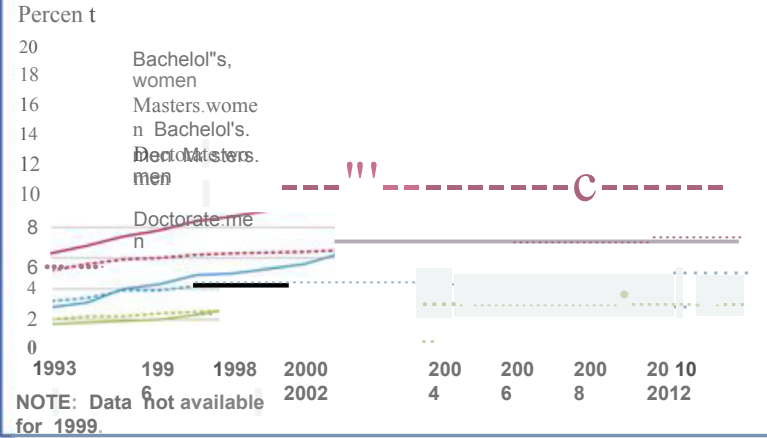
Comments or Questions?

## Scientists and engineers working in science and engineering occupations: 2013



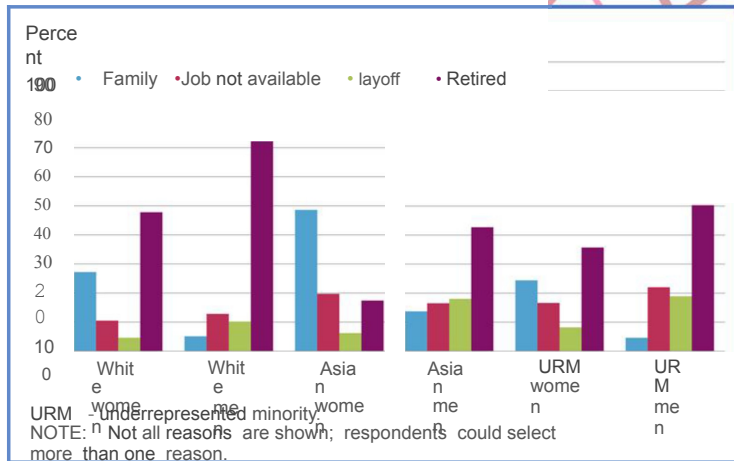
NOTE: Hispanic may be any race. Other includes American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and multiple race.

## Science and engineering degrees earned by underrepresented minority women and men: 1993-2012



Women, Minorities, and Persons with Disabilities in Science and Engineering: 2015  
[www.nsf.gov/statistics/wmpd/](http://www.nsf.gov/statistics/wmpd/)

## Reasons for not working among scientists and engineers : 2013



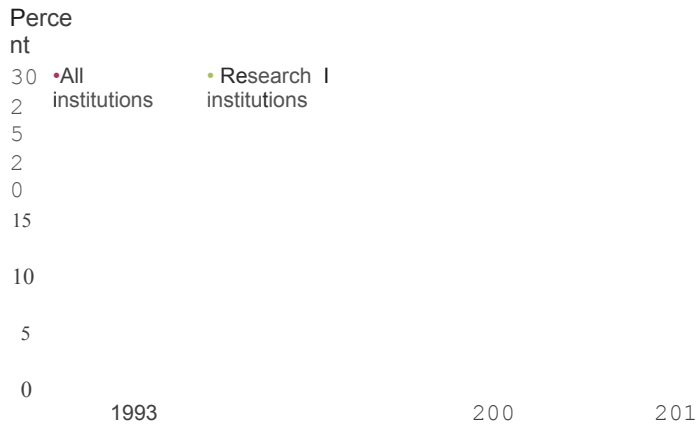
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**Women as a percentage of full-time, full profess  
science, engineering, and health  
with**

**institution: 1993-2013**



NOTE: Criteria for research I institutions based on 1994 Carnegie classification.

[www.nsf.gov/statistics/wmpdf/](http://www.nsf.gov/statistics/wmpdf/)



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Student Corner



**Alice Bowman**  
**New Horizons Mission Operations Manager**



**JOHNS HOPKINS**  
APPLIED PHYSICS LABORATORY









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Student Corner

University of Texas at El Paso

# Department of Mechanical Engineering

*Where Opportunity Meets Excellence*

Panel: Accessing NASA Grants/Contracts  
MissionSTEM Summit 2016  
National Aeronautics and Space Administration  
NASA Headquarters August 8-9, 2016

**Ahsan Choudhuri, PhD**  
**Professor and Chair, Department of Mechanical Engineering**  
**Mr. and Mrs. MacIntosh Murchison Chair II in Engineering**  
**Director, NASA MIRO Center for Space Exploration and Technology Research**  
**University of Texas at El Paso, USA**

The First National Research University Serving a 21<sup>st</sup> Century Student Demographic

[me.utep.edu](http://me.utep.edu)



# UTEP at a Glance

Almost 100 years ago, 27 students rode streetcars and walked nearly a mile through the dusty desert to the Texas State School of Mines and Metallurgy. It was **Sept. 23, 1914**, the first day of school at what would become The University of Texas at El Paso.

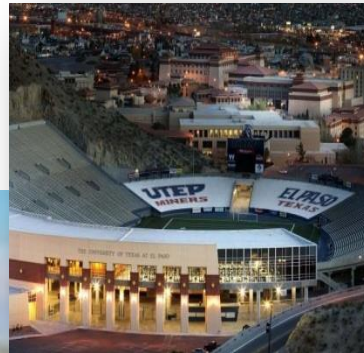
- ❑ Enrollment: 24,000+
- ❑ Faculty: 1,200+
- ❑ Academics: 7 Colleges: Business Administrations, Education, Engineering, Health Sciences, Liberal Arts, Nursing, and Science
- ❑ Annual Operating Budget: \$404.6 million
- ❑ Annual Research Expenditures: \$90 million

The University of Texas at El Paso's extraordinary progress in developing its research capacity and expanding its doctoral programs has earned UTEP the designation as one of the state's "**Emerging Tier One**" universities by the Texas Higher Education Coordinating Board.



- **We Believe in Tier I Higher Education for Common People**

- We reject the traditional choice between **Access and Excellence** that characterized U.S. higher education in the twentieth century and insist upon the joint attainment and continuing enhancement of both **Access and Excellence**.
- We are poised to bring our region the pinnacle of excellence in public higher education – that is, the full capacity, breadth, innovation and regional impact of a national research university.

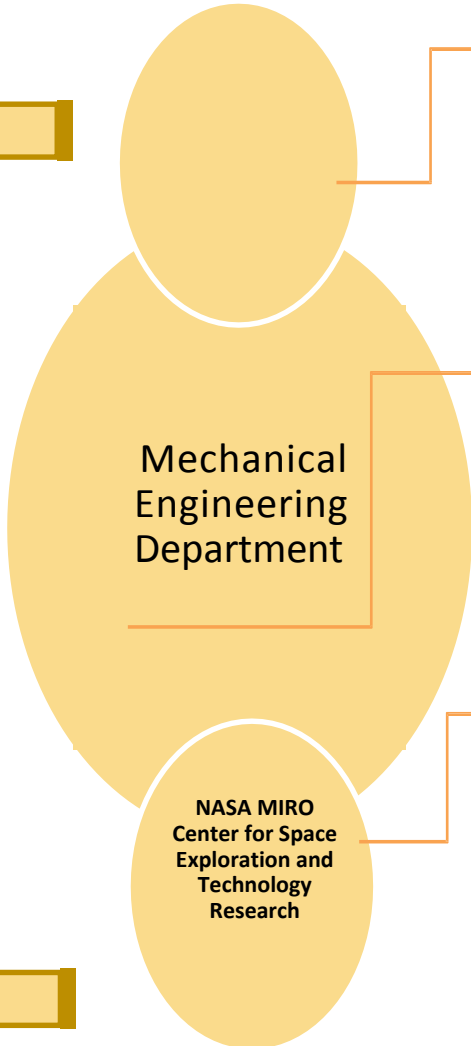




# Integrated Capacity Building



Collaborations across the Department's Boundary



- **Research Management (Advanced Manufacturing)**
  - Research Strategies and Development
  - Research Infrastructure Development and Management
  - Contracts and Grants
  - Charge Center/Cost Center
  - Professional Staff and Research Faculty
  - Professional Graduate Programs

- **Academic Management**
  - Students and Faculty
  - Curriculum
  - Course Scheduling
  - Advising and Progress Tracking and Monitoring
  - Teaching Innovation and Excellence
  - Tenure and Promotion

- **Research Management (Aerospace and Energy)**
  - Research Strategies and Development
  - Research Infrastructure Development and Management
  - Contracts and Grants
  - Professional Staff and Research Faculty
  - Student Professional Development Programs
  - K-12 Outreach Programs

# Vision

The cSETR *vision* is to establish a *minority university Center of Excellence in Advanced Propulsion* research through strategic partnerships and to educate a diverse future aerospace workforce.

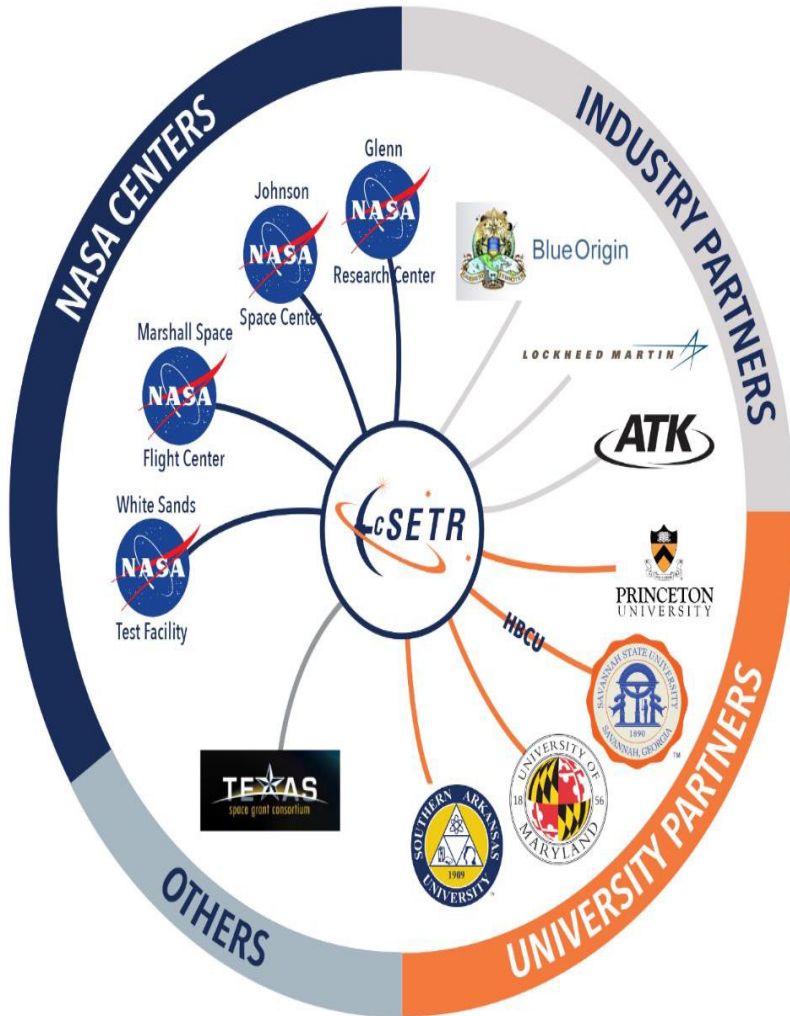
- ❑ Aerospace and Defense Systems
- ❑ Energy Engineering
- ❑ Crosscutting Technologies



# Our Story: Building an Aerospace Education and Research Program from Scratch

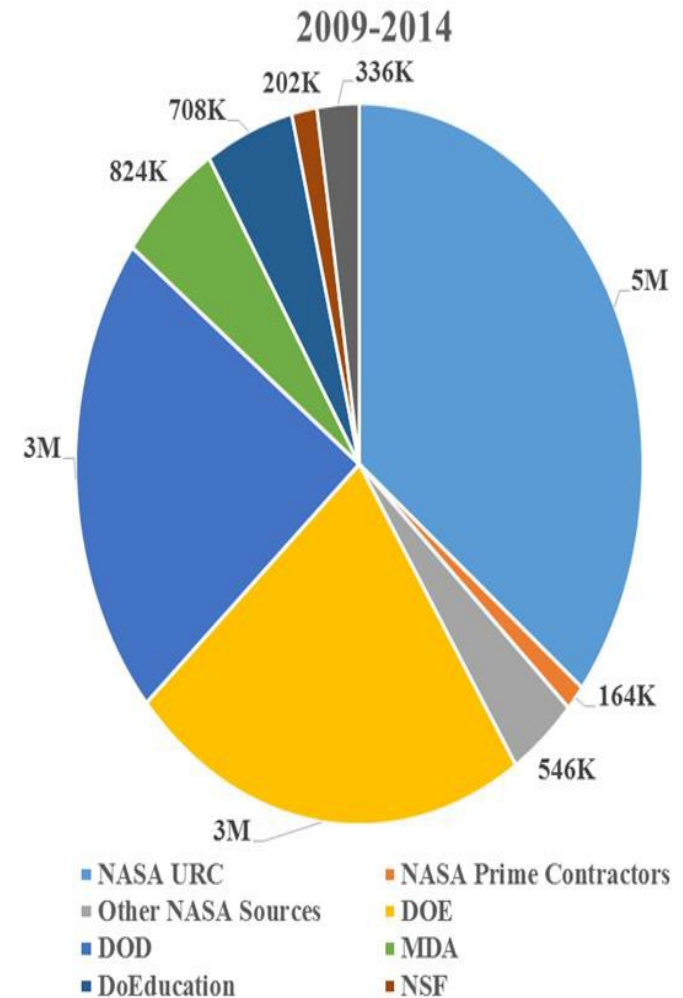


# Partnerships



# Accomplishments (2009–2014)

- ❑ 267 students supported within the Center since 2009
- ❑ 60 student interns and co-ops in aerospace industry since 2009
- ❑ 10 NASA new hires and many aerospace and defense contractor hires
- ❑ 78% of all NASA sponsored students from underrepresented groups in STEM, 65% from all funding sources
- ❑ 35% of sponsored students are undergraduates, 65% graduate students (PhD and MS)
- ❑ Average of 80 students, 8 faculty per semester sponsored in research in the Center
  
- ❑ 166 different professional & technical publications (journal articles, conference proceedings, etc)
- ❑ 40+ articles in AIAA Conferences
  
- ❑ \$14M in total support since 2009
  
- ❑ Significant infrastructure and capacity building: \$ 5M Institutional Investment
  - ❑ 14,000 sq-feet of advanced aerospace and energy research laboratories
  - ❑ 3,000 sq-fit instructional laboratory capacity building
  - ❑ Multiple vacuum chambers, altitude simulation system, LOX-Methane injectors and igniters, multiple low thrust measurement stands, multiple liquid methane production units, numerous advanced diagnostic and imaging systems
  
- ❑ > 5,500 students in K-12 with 20 or more hours of direct contact
- ❑ > 18,000 K-12 in outreach effort (8 hours or less)
- ❑ > 170 professional development and outreach events
  
- ❑ Strategic Partnership with NASA JSC, NASA GRC, and NASA MSFC
- ❑ Strategic Partnership with Lockheed Martin Corporation

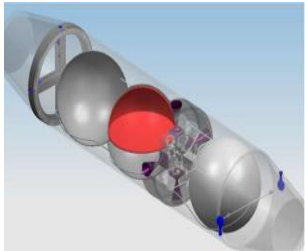


# A sustainable Pathway to Access and Excellence

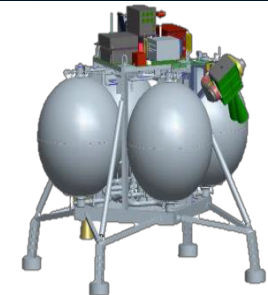




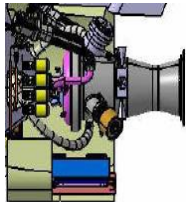
# Technical Goal (LO<sub>2</sub>/CH<sub>4</sub> Propulsion Technologies)



**DAEDALUS**  
Suborbital Payload Scale Methane  
Propulsion Technology Testbed



**JANUS**  
Robotic Lander Scale Methane  
Propulsion Technology Testbed



**CROME**  
500 lb<sub>f</sub> LO<sub>2</sub>/CH<sub>4</sub> Engine



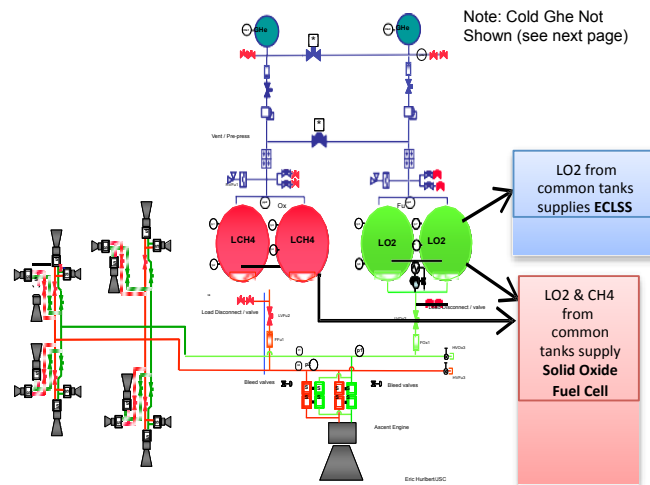
**PENCIL THRUSTER**  
5 lb<sub>f</sub> Reaction Control System



**CROME X**  
2000 lb<sub>f</sub> Regenerative LO<sub>2</sub>/CH<sub>4</sub> Engine



**PENCIL-X THRUSTER**  
5-10 lb<sub>f</sub> Reaction Control  
System

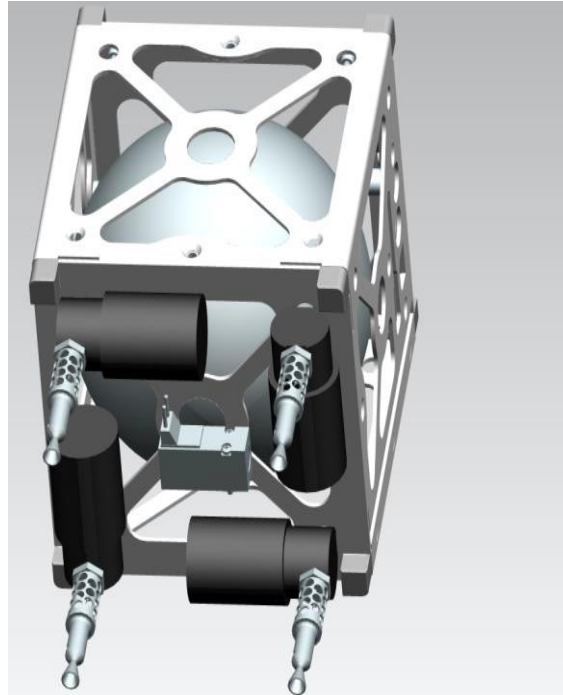


- LO<sub>2</sub>/Methane Propulsion Risk Reduction
- Integration of Propulsion, Power and Thermal Systems at the Spacecraft Level
- Additive Manufacturing (AM) Capability Demonstrations and Maturation

# Technical Goal

## [Green Propulsion Technologies/Missile Defense Agency DACS]

- HTP
- LMP-103S
- AF-M315 E



CubeSat Modular Green Propulsion Testbed  
5 lbf, 1 lbf, and 0.1 lbf

- Monolithic Catbed
- Additive Manufacturing

# Building and Sustaining a C21 Aerospace R&D Workforce

## Agency-Academia-Industry Partnerships

### Research Capacity Development at HBCU and MIs

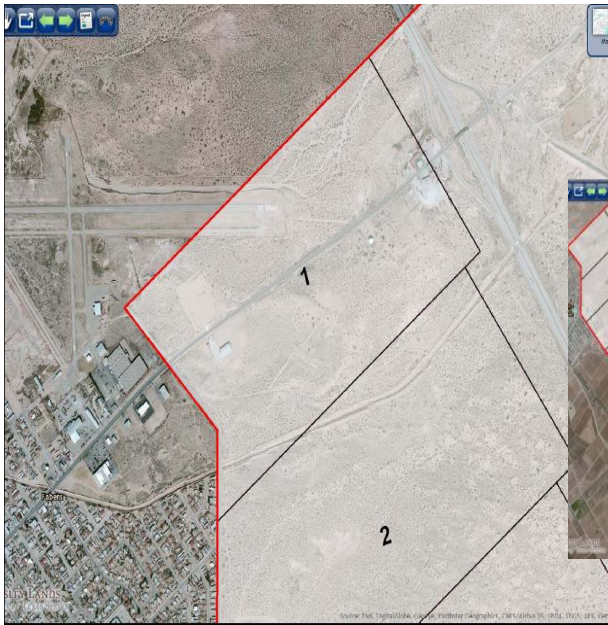
- Faculty and Staff Development
- Major Research Equipment and Acquisition Programs
- Research Equipment Loan and Donation Programs
- Contract Management Personnel Development
- HBCU and MI Set-aside funding for Aerospace Research Programs
- University-Industry-NASA Center Collaborative Research Programs
- Regional Capacity Development

➤ Universities, Industries and Multi-agency Partnerships

# Regional Impact

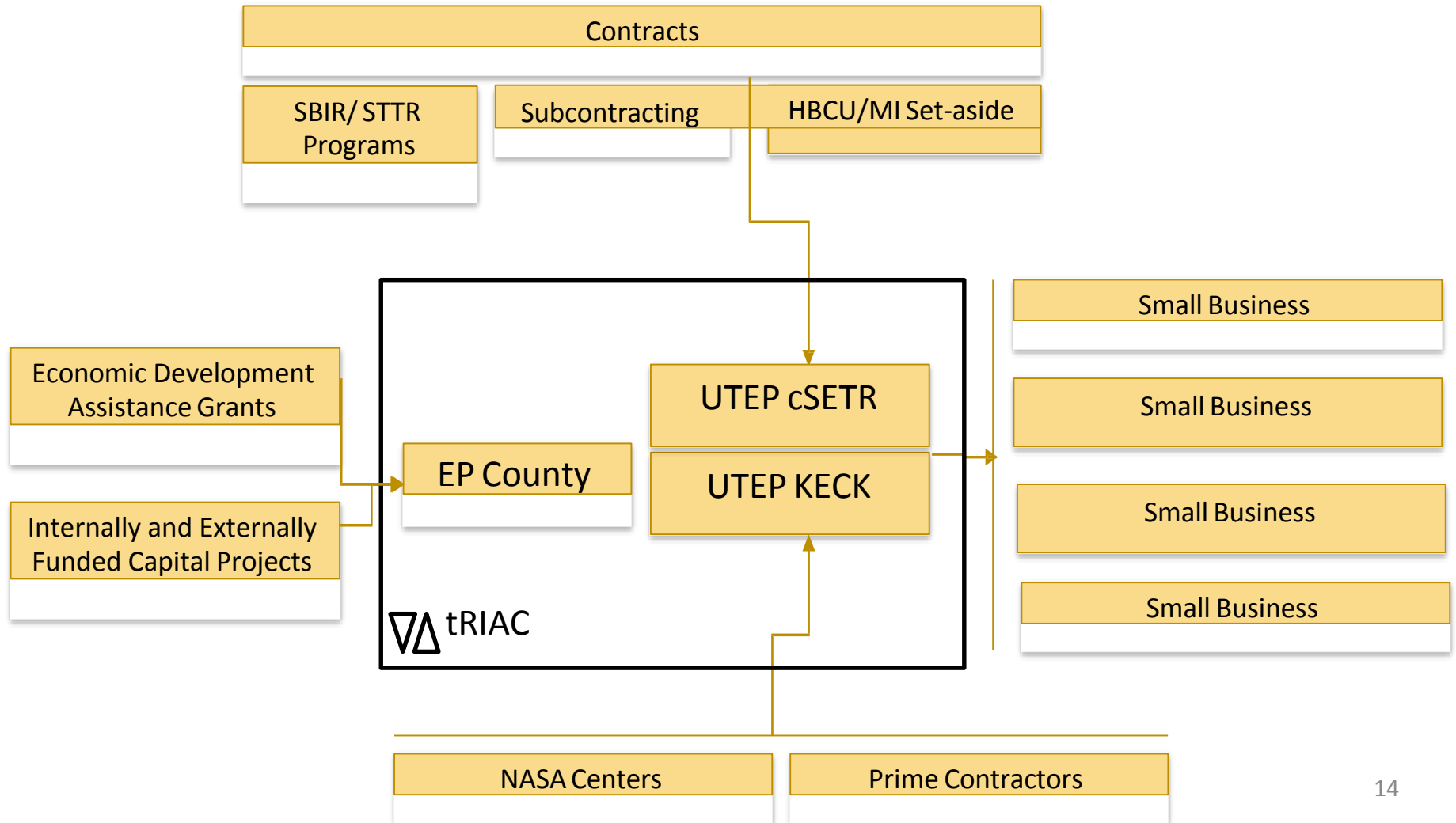
## MIRO cSETR-El Paso Community Partnership

- Technology Research and Innovation Acceleration (tRIAc) Park [2015-2020]: 30 miles from the main campus
  - Fabens Airport, 400 acres El Paso County Land, and 9,600 acres University of Texas Systems Land
  - UTEP cSETR and El Paso County Economic Development Partnership



# Block A Development Strategies

## Small Hi-Tech Business Ecosystems



# Operation BoldStroke

Lockheed Martin Aeronautics and UTEP Partnership

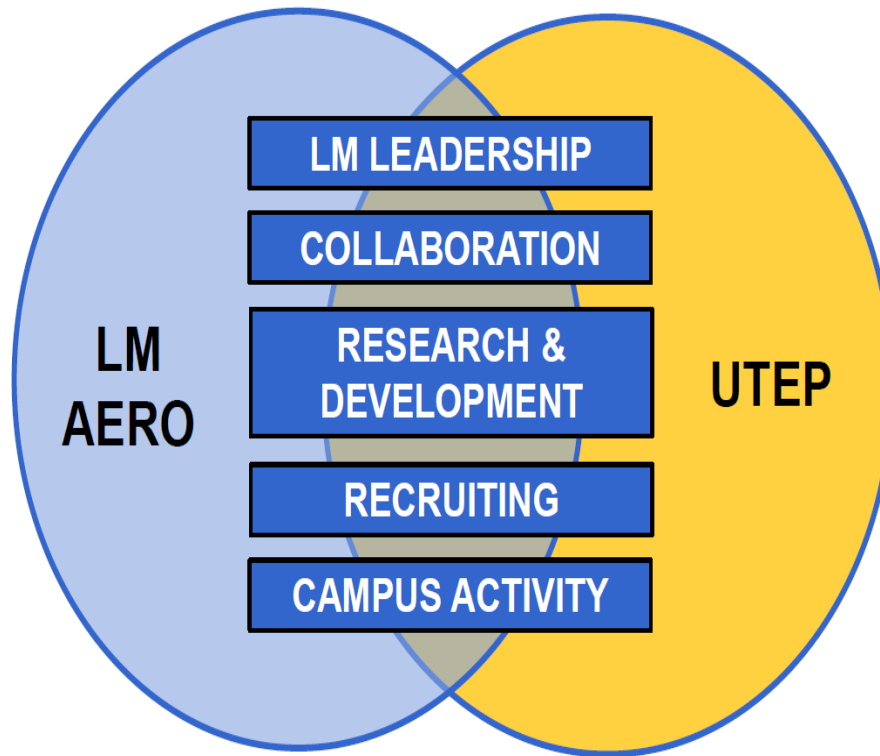
## STRATEGIC CAMPAIGN TO ADDRESS LOCKHEED MARTIN'S WORKFORCE CHALLENGE



*Courtesy: David Rapisand  
Lockheed Martin Aeronautics*

# Operation BoldStroke

Lockheed Martin Aeronautics and UTEP Partnership



# Operation BoldStroke

## Lockheed Martin Aeronautics and UTEP Partnership

Tech Ops		Prod Ops	
Advisory Board	Research Projects	Research Projects	Recruiting / Internships
Curriculum Development	Recruiting / Internships		
Q&MS		F&BO	
Adjunct Teaching	Research Projects	Advisory Board	Recruiting / Internships
Curriculum Development	Recruiting / Internships	Ethics Class	Student Visits to Aero
SCM		M&FC	
Advisory Board	Recruiting / Internships	Joined Journey in 2011	Curriculum Development
Mentor Protégé Program	Small Business Conference	Research Projects	Recruiting



# Operation BoldStroke

## Lockheed Martin Aeronautics and UTEP Partnership

Curriculum Development	
Development Of Master Of Science Program "Systems Engineering"  LM Aero (2007 - 2010)	Development Of Master Of Science Program "Software Engineering"  LM M&FC (2011 - 2013)
Advisory Boards	
College of Engineering	College of Business
<ul style="list-style-type: none"><li>• Dean's Advisory Board</li><li>• Systems Engineering</li><li>• Software Engineering</li><li>• Industrial Engineering</li></ul>	<ul style="list-style-type: none"><li>• Dean's Advisory Board</li><li>• Accounting Advisory Board</li><li>• ERP Advisory Board</li></ul>

UTEP Considering Offering Engineering Aeronautics Curriculum  
New Opportunity For LM To Influence Curriculum Development

# Operation BoldStroke

## Lockheed Martin Aeronautics and UTEP Partnership

- **40+ projects over 8 years totaling nearly \$4M**

- (Does not include Palmdale ADP)

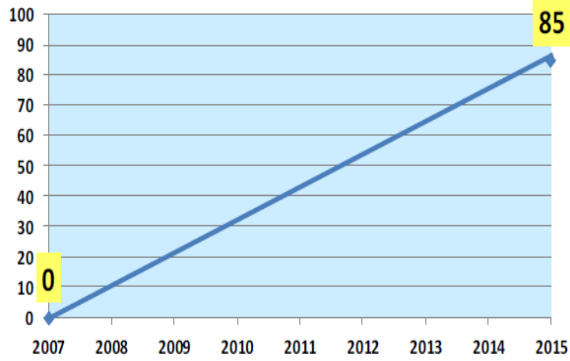
Year	Task Value	# Of Tasks	Organizations					Projects
			Tech Ops	Prod Ops	Q&MS	ADP	Other	
2008	\$505,000	5	1			3	1	White Papers, Texas Emerging Tech Fund, Small Business Enhancement, System Verification
2009	\$525,000	8	7			1		Modeling & Architecture, Reference Frames, Image Sensor Modeling, RF Communications Link
2010	\$490,000	6	5				1	Systems Control Guide, Avionic Interfaces, Electromagnetic Effects, Finite Element Analysis
2011	\$265,000	4	4					Thermal Analysis Principles, System Design, Reference Manuals, System Engineering Services
2012	\$665,000	6	5		1			Predictive Algorithm, TRAM, DynViewer, Rhapsody, Thermo Analysis, Data Storage & Transfer
2013	\$425,000	5	2		2	1		IR Imaging, Automated Data Reporting, FOD Elimination Research, EEE, ISHM
2014	\$490,000	4	2	2				ISHM, ITM, Direct Labor Incentives, Additive Mfg
2015	\$500,000	6	1	3	1		1	FOD Elimination Research, Composites, ITM, Mentor-Protégé, Additive Mfg

# Operation BoldStroke

## Lockheed Martin Aeronautics and UTEP Partnership

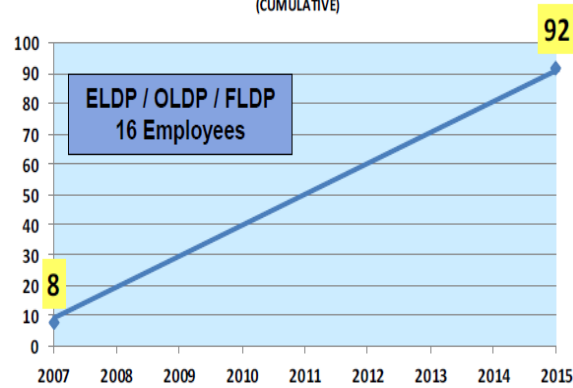
### AERO INTERNSHIPS - UTEP STUDENTS

(CUMULATIVE)

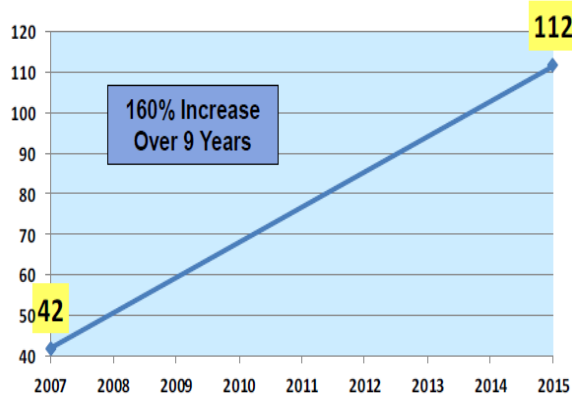


### GRADUATE - NEW HIRES

(CUMULATIVE)



### AERO EMPLOYEES - UTEP ALUMNI



### 2007-2015 HIRING MIX

DEGREE	NEW HIRES
Engineering	49
Business	43

# Operation BoldStroke

## Lockheed Martin Aeronautics and UTEP Partnership

Objective	Descriptive	Achieved
LM Leadership	Build Relationships With Administration, Professors & Students Provide Proactive Development Of Engineering Curriculum	✓
Collaboration	Influence Research And Education Direction / Orientation Of Faculty & Students	✓
R&D	Opportunity To Sponsor Directed Research Programs	✓
Recruiting	Preferential Access to Top Diversity Graduates (Engineering & Business)	✓
Campus Activity	Recruiting, R&D, Executive Visits, E-Week, Teaching & UTEP Student Visits At Aero	✓

# Operation BoldStroke

Lockheed Martin Aeronautics and UTEP Partnership



# The Texas State School of Mines and Metallurgy

Offers unlimited advantages to the young man who desires a technical knowledge of mining.



## THE LOCATION IS IDEAL

El Paso is the center of one of the greatest mining districts in the world—West Texas, New Mexico, Arizona and undeveloped Mexico are at her door. Within one to ten miles of the School of Mines are found in great variety those geological formations that are usually associated with the mining industry.

## SPLENDID OPPORTUNITY FOR PRACTICAL EXPERIENCE

Arrangements have been made at a number of mines easily accessible to the school where students may engage in practice work. The second largest smelter in the world is situated in El Paso. It is in reality the main metallurgical laboratory for the students where they study in minute detail the treatment of ores by smelting. The large variety of ores which come to this smelter forms a collection that can hardly be duplicated elsewhere.

The School is located four and one-half miles northeast of the city and can be reached by the Fort Bliss car.

PROF. S. H. WORRELL, Dean

Telephone 5854-W

Thank You

NASA MIRO Center for Space Exploration & Technology  
Research

Mechanical Engineering Department  
University of Texas at El Paso  
Engineering Building Bldg. Room M 305  
500 W. University Ave.  
El Paso, TX 79968-0521

Tel: (915) 747-8252; Fax: (915) 747-5549

[csetr@utep.edu](mailto:csetr@utep.edu)  
[research.utep.edu/csetr](http://research.utep.edu/csetr)



# MissionSTEM

21st Century Civil Rights Technical Assistance for Science, Technology, Engineering, and Mathematics

### What's New?

- + [MissionSTEM Summit 2016](#)
- + [Deputy Administrator's Blog on Harassment Policies](#)
- + [Chief Scientist's Blog on Data Collection](#)

Message from the Administrator  
[+ Watch video](#)



- + Home
- + About Mission STEM
- + MissionSTEM Summit 2016
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- + Compliance Requirements
- + Civil Rights Compliance Reports
- + Promising Practices (NASA)
- + Promising Practices (Colleges)
- + Promising Practices (Museums)
- + Diversity and Inclusion Leadership
- + NASA Innovations Impact the World
- + Unconscious Bias in STEM: Addressing the Challenges
- + Related Links
- + Media Gallery
- + Reading Room
- + FAQs



+ Age



+ Disability



+ Gender



+ Race/Ethnicity

## Office of Diversity and Equal Opportunity

The MissionSTEM Web site is designed to assist NASA grant recipients with their civil rights compliance efforts. The Agency strives to provide a broad scope to its technical assistance in this arena. [+ Read More](#)

Send your questions for this session to:  
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Student Corner



# **NASA MissionSTEM Summit: FAMU Experience**

**Okenwa Okoli**

**US DoE – Samuel P. Massie Chair of  
Excellence**

**Industrial & Manufacturing  
Engineering**

**Florida Agricultural & Mechanical  
University**





# PROTÉGÉ BENEFITS



- **Six years working with a Large Prime – Orbital ATK**
- **3 teams, each made of 3 students (9 students) were mentored by Orbital ATK engineers and managers each year**
- **Students put six-sigma into practice**
  - Define, Measure, then mid review
  - Analyze, Improve, Control, then final review



# PROTÉGÉ BENEFITS



- **Training**
  - Performance Enterprise System (PES)
  - 5-S
    - Sort, Set in order, Shine, Standardize, Sustain
- **Students were mentored throughout the academic year via conference calls and face-to-face where possible**
- **Review sessions were attended by ATK mentors with feedback provided**
- **Resume building workshop by Orbital ATK**



# Outcomes – Manpower Development



- **The students who had their resumes boosted by their Orbital ATK experience easily found employment in STEM fields**
- **A good number were motivated to attend our graduate program at FAMU (funded), and elsewhere**
  - One of these minority students defended his doctoral research in April, and is well employed at Intel, another is on track to graduate next year
  - This relationship with Orbital ATK also allowed us fund a number of minority undergraduate research assistants to keep them interested in graduated study



# Resulting Relationships



- **Orbital ATK currently on our IME Industry Advisory Board**
- **Working with Aileen Yates Aerojet Rocketdyne**
- **Working with Michelle Butzke and LM team on a proposal for IDIQ Task Order Support**
- **Hosting a NASA HBCU/MSI Technology Infusion Road Tour at Florida A&M University (FAMU) on September 27-29, 2016**



# \$10M State-of-the-Art Equipment and Unique Scale- up Manufacturing Capability



High-Performance Materials Institute **HPMI**

Leading, Learning, Building a  
Legacy...  
Manufacturing Upwards!



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Student Corner



# NASA MissionSTEM Summit

## **Orbital ATK contract/MPA with Florida A&M University**

August 8, 2016



# Contract Opportunity

- Space Launch System – Marshall Space Flight Center
- Accomplishment = Team Approach.
  - **NASA MSFC**
    - Goal Requirement
    - Mentor Protégé Program and Contractual Changes
  - **Orbital ATK**
    - Leadership Assurance
    - Technical Champion
  - **Florida A & M University**
    - Understanding and Opportunity
    - Working outside the box



# Building Relationships – Contractors View

- Orbital ATK worked internally with Contracts and Program Management to identify a possible solution in meeting the goal requirements.
- SBLO takes the lead in identifying HBCU/MI Strengths and Capabilities.
- Identify a course of action that yields a return on investment. Make a good faith effort toward your goal that adds value to your contract.
- Management assigns a champion from his staff.
- Selection of the University.

# Important Details and Understanding Process

- Meetings with FAMU to discuss possible ways to contract. Decision on what to break out from the Orbital ATK contract for consideration.
  - *Study to optimize fabrication process flow for refurbishment, assembly and verification testing of the SLS Core Stage Attach Rings and implementation analysis .*
- Technical Team wrote the statement of work and reviewed with the FAMU staff to ensure they were capable of the work. Two months to negotiate T&C's.
- Contract specifics – Study needed to be completed by the end of the school year. Multiple year contract with senior class project.
- Availability of Orbital ATK engineering and project lead was critical in completing the study as outlined in the statement of work. Continuous Q&A

# Coordinate Expectation of Contract

- Contract is a legal binding agreement between two parties. A Mentor Protégé Agreement is an agreement for actions from both the Mentor and the Protégé.
  - MPA - Orbital ATK provided training and tools to assist with the success of the study.
    - Propulsion Enterprise System Training – Improvement, Cost Save, Competitive.
    - Hardware Processing Services – Program Process Constraints.
    - Value Stream Mapping – Current Condition and Target Condition
    - Marketing Individual Development – Resume Development
  - Benefits to the Mentor or Prime Contractor.
    - Benefit from the intel and knowledge of a University and associated staff.
  - Protégé Benefits.
    - Real life experience working on the space program.

# Benefits to the Space Program

- Industry and Educational communities working together to go forward.
  - Industries technology today is not going to be applicable as time goes on, we are in never ending race to improve and move forward.
  - Universities create an environment of expanding all possibilities to think beyond past experience or situation.
  - Working together as a team for each the same objective would be an ideal situation. Respecting both parties processes to be able to complete a contract is the goal.
  - Future and continual accomplishments for the space industry will start from the real experiences offered to the next generation.

 + GO

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Student Corner



**Accessing NASA Grants/Contracts  
“The MUREP Perspective”  
MissionSTEM Summit  
August 8, 2016**

Tania B. Davis, Acting MUREP Manager,  
NASA Headquarters

- Guiding Framework
- Define MUREP and its role in NASA Education
- MUREP Activities (EONS 2014 solicitation)
- Q&A

## **NATIONAL PRIORITIES**

- ❑ **America COMPETES Reauthorization Act of 2010**

<https://www.gpo.gov/fdsys/pkg/PLAW-111publ358/pdf/PLAW-111publ358.pdf>

<http://democrats.science.house.gov/sites/democrats.science.house.gov/files/documents/Competes%202014%20Fact%20Sheet.pdf>

- ❑ **National Science and Technology Council (NTCS) Committee on Science, Technology, Engineering and Mathematics Education (CoSTEM)**

<https://www.whitehouse.gov/administration/eop/ostp/nstc/committees/costem>

[https://www.whitehouse.gov/sites/default/files/microsites/ostp/stem\\_stratplan\\_2013.pdf](https://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf)



## **AGENCY PRIORITIES**

- ❑ **NASA Strategic Plan** [https://www.nasa.gov/sites/default/files/files/FY2014\\_NASA\\_SP\\_508c.pdf](https://www.nasa.gov/sites/default/files/files/FY2014_NASA_SP_508c.pdf)

**Goal 2:** Advance understanding of earth and develop technologies to improve the quality of life on our home planet.

**Objective 2.4:** Advance the Nation's STEM education and workforce pipeline by working collaboratively with other agencies to engage students, teachers and faculty in NASA's missions and unique assets.

- ❑ **NASA Education Implementation Plan 2015-2017**  
[http://www.nasa.gov/sites/default/files/atoms/files/nasa\\_education\\_implementation\\_plan\\_2015-2017.pdf](http://www.nasa.gov/sites/default/files/atoms/files/nasa_education_implementation_plan_2015-2017.pdf)

- ❑ **Multi-year Performance Goals and Annual Performance Indicators**

## **Agency's Response to Presidential Executive Orders for Minority Serving Institutions**

MUREP is established to **increase NASA's responsiveness to federal mandates** related to Minority Serving Institutions (MSIs) and underrepresented and underserved communities, including women, girls, persons with disabilities and veterans.

- EO 13532:** Historically Black Colleges and Universities (HBCUs)
- EO 13592:** Tribal Colleges and Universities (TCUs)
- EO 13555:** Hispanic Serving Institutions (HSIs)
- EO 13515:** Asian American and Native American Pacific Islander – Serving Institutions (AANAPISIs)
- EO 13621:** Predominantly Black Institutions (PBIs)

**Administered by NASA's Office of Education and Implemented at  
NASA's 9 Field Centers and at JPL**

- ❖ Ames Research Center, CA
- ❖ Armstrong Flight Research Center, CA
- ❖ Glenn Research Center, OH
- ❖ Goddard Space Flight Center, MD
- ❖ Jet Propulsion Laboratory (Cal Tech), CA
- ❖ Johnson Space Center, TX
- ❖ Kennedy Space Center, FL
- ❖ Langley Research Center, VA
- ❖ Marshall Space Flight Center, AL
- ❖ Stennis Space Center, MS



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## FOUR LINES OF BUSINESS

### LEARNERS

**STEM Engagement (SE)** provides opportunities for participatory and experiential learning activities to connect learners to NASA-unique resources.

**NASA Internships, Fellowships, and Scholarships (NIFS)** utilizes NASA's facilities and assets to provide work experiences and research and educational opportunities to improve retention in STEM and prepare students for employment in STEM jobs.

### EDUCATORS

**Educator Professional Development (EPD)** prepares STEM educators and leaders to deliver quality STEM instruction utilizing unique NASA assets and content.

### INSTITUTIONS

**Institutional Engagement (IE)** focuses on improving the capacity of U.S. institutions to deliver effective STEM education.

---

# MUREP Activities (EONS 2014)

**MUREP Educator Institute  
(MEI)  
Stennis Space Center**

- ✧ Support or financial assistance to eligible MSIs
- \*\*Proposals are not being solicited at this time.**

## Purpose & Goals

Established to bring pre-service and alternative route STEM educators from MSIs across the country to NASA centers annually for a one week professional development session. Awarded MSIs facilitate in-depth learning institute(s) for participants at each NASA field Center.

- **ENGAGE WITH MSIs** to bring high performing undergraduate students, who plan to teach STEM, to NASA Centers for one week to interact with NASA missions and SMEs;
- **ENGAGE PARTICIPATING FUTURE EDUCATORS WITH NASA EXPERTS** to collaborate and provide the most advanced and innovative pre-service/alternate route experiences possible;
- **INSPIRE FUTURE EDUCATORS TO HELP NASA COMMUNICATE WITH STUDENTS** for years to come; and
- **REACH UNDERSERVED AND UNDERREPRESENTED POPULATIONS AND INSTITUTIONS.**

## Objectives

- Engage pre-service and alternative route educators enrolled in MSIs in NASA-unique, authentic STEM experiences affiliated with NASA missions and facilitated by NASA SMEs; and
- Train these future educators in the use of evidence-based instructional practices that provide students with rich, NASA-unique STEM learning opportunities.

## Eligibility

### **Eligible applicants are:**

Minority Serving Institutions as designated and listed by the U.S. Department of Education.

## Funding

*Awards are funded as three-year cooperative agreements, not to exceed \$1,000,000 per year.*

FY2015: One award (Approx. \$1M)

- Texas State University – San Marcos



**MUREP Institutional  
Research Opportunity  
(MIRO)  
Armstrong Flight  
Research Center**

**MUREP Community College  
Curriculum Improvement  
(MC<sup>3</sup>I)  
Jet Propulsion Center**

- ✧ Direct support or financial assistance to eligible MSIs
- ✧ Typically funded as **competitive cooperative agreements**

**\*\*Proposals are not being solicited at this time.**

## Purpose & Goals

Established to strengthen and develop the research capacity and infrastructure of Minority Serving Institutions (MSIs) in areas of strategic importance and value to NASA's mission and national priorities.

- **EXPAND THE NATION'S BASE** for aerospace research and development;
- **DEVELOP MECHANISMS FOR INCREASED PARTICIPATION** by faculty and students at MSIs in the programs of NASA's mission directorates; and
- **INCREASE THE NUMBER OF UNDERGRADUATE AND GRADUATE DEGREES** to students from MSIs in NASA-related fields.

## Objectives

- Establish multi-disciplinary STEM research centers at the host university;
- Improve rates that underserved and underrepresented students receive degrees in NASA-related fields; and
- Gain support from sources outside of MIRO by pursuing additional funding opportunities.

## Eligibility

Eligible applicants are:

- (1) Minority Serving Institutions
- (2) Institutions in partnership with (i) at least one four-year Institution of higher education and (ii) one or more NASA Centers.

## Funding

*Awards are funded as five-year cooperative agreements, not to exceed \$1,000,000 per year.*

FY2015: 10 awards (Approx. \$10M/year)

- California State Univ. – Los Angeles
- Delaware State University
- Hampton University
- Langston University
- San Jose State University
- University of California – Merced
- University of California, Riverside
- University of Texas - El Paso
- University of the Virgin Islands
- Xavier University of Louisiana

## Purpose & Goals

Established to strengthen curriculum and curricular pathways in STEM, and attract, retain, and support the success of underrepresented students in STEM degree programs.

- **INCREASE THE NUMBER OF STEM COURSES AND CURRICULAR PATHWAYS** that are available at Minority Serving Community Colleges (MSCCs);
- **ATTRACT, RETAIN, AND SUPPORT THE SUCCESS OF STUDENTS** in STEM degree programs, and subsequently in NASA-related careers;
- **INCREASE THE NUMBER OF STUDENTS WHO COMPLETE STEM CERTIFICATES/DEGREES** from backgrounds that are historically underrepresented in STEM.

## Objectives

- Develop curriculum improvements in STEM vocational certificate programs, AA/AS degree programs, and/or transfer programs;
- Expand the STEM pipeline through the development of new or existing high school partnerships; and
- Develop and expand curricular options in engineering.

## Eligibility

Eligible applicants are:

Minority Serving Community Colleges

## Funding

*Awards are funded as three-year cooperative agreements.*

FY2015: 4 awards (Approx. \$1M/year)

- Baltimore City Community College
- Napa Valley Community College
- Queensborough Community College – CUNY
- Santa Monica Community College

**MUREP STEM Engagement  
(MSE)  
Kennedy Space Center**

**MUREP Aerospace Academy  
(MAA)  
Glenn Research Center**

**MUREP American Indians  
& Alaskan Native STEM  
Partnership  
(MAIANSP)  
Goddard Space Flight Center**

- ✧ Direct support or financial assistance to eligible MSIs
- ✧ Typically funded as **competitive cooperative agreements**

**\*\*Proposals are not being solicited at this time.**

## Purpose & Goals

Established to create and implement a NASA-related STEM challenge.

- **INCREASE THE RETENTION AND COMPLETION RATES OF UNDERGRADUATE DEGREES** awarded from MSIs in NASA-related STEM disciplines;
- **INCREASE THE NUMBER OF NASA-FOCUSED STEM EXPERIENCES** that engage underrepresented groups in active learning to improve retention of information and critical thinking skills; and
- **DISSEMINATE PROVEN, INNOVATIVE PRACTICES AND PROGRAMS IN STEM TEACHING, STEM LEARNING, AND RECRUITMENT AND RETENTION** of underrepresented/ underserved students in STEM fields.

## Objectives

- Design, develop, and implement a NASA-related STEM challenge targeted for MSI and community college STEM-enrolled student participation;
- Align the challenge design with the NASA mission and with a specific NASA program or project; and
- Develop and implement processes to capture the impact of activities and strategies implemented through this challenge.

## Eligibility

Eligible applicants are:

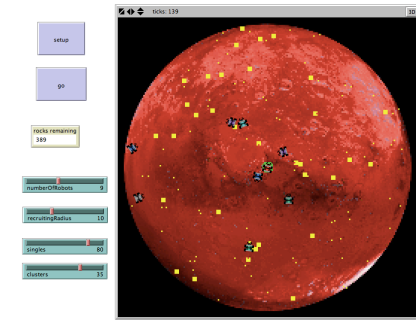
Four-Year Colleges/Universities and Two-Year Minority Serving Community Colleges.

## Funding

*Awards are funded as three-year cooperative agreements, not to exceed \$600,000 per year.*

FY2015: One award to University New Mexico





# Next Swarmathon Competition

## APRIL 2017

at NASA Kennedy Space Center Visitors Complex

[nasaswarmathon.com](http://nasaswarmathon.com)

email [info@nasaswarmathon.com](mailto:info@nasaswarmathon.com)

NASA Contact: Theresa Martinez

[Theresa.c.martinez@nasa.gov](mailto:Theresa.c.martinez@nasa.gov) (w) 321-867-0590 (c) 321-289-2741

## Purpose & Goals

**Established to increase participation and retention of historically underserved and underrepresented K-12 youth in STEM.**

- **IMPROVE STEM LITERACY** by engaging students, family members and teachers through the integration of emerging technologies; and
- **EDUCATE STUDENTS UTILIZING A STEM CURRICULUM** that meets national STEM standards aligned to NASA's mission directorates.

## Objectives

- Increase the number of historically underserved and underrepresented students interested in NASA specific STEM careers;
- Provide skills to parents/caregivers to work with and encourage their children in STEM activities and programs;
- Involve community groups, business, industry, museums and educational and professional organizations through mentoring, field trips, guest speakers and other MAA activities; and
- Engage students in participatory activities such as hands-on learning, research use of advanced technology, peer support groups, and mentoring relationships with professionals working in the STEM fields.

## Eligibility

### **Eligible applicants are:**

Minority Serving Institutions as designated and listed by the U.S. Department of Education.

## Funding

*Awards are funded as three year cooperative agreements.*

Individual award values range from \$100,000 - \$160,000 for year one and year two. Year three sites receive between \$80,000-\$100,000 to ensure sustainable operations.

FY2015: 9 awards (Approx. \$1.3M/year)

- Tennessee State University
- Hartnell Community College
- University of Texas – El Paso
- Cuyahoga Community College
- Texas State University – San Marcos
- California State University - Fresno
- York College (CUNY)
- Elizabeth City State University
- Morgan State University

## Purpose & Goals

**Established to improve the quality of STEM education, specifically in computer sciences at American Indian and Alaskan Native MSIs and high schools.**

- **INCREASE THE LEVEL OF STEM LITERACY AND ENGAGEMENT** of the American Indian and Alaska Native secondary and postsecondary levels through the utilization of culturally relevant and responsive subject matter;
- **CREATE A DIVERSE, HIGHLY SKILLED, and MOTIVATED FUTURE WORKFORCE** in computer-related sciences;
- **ADVANCE THE UNDERSTANDING OF HOW TO EFFECTIVELY TEACH COMPUTER PROGRAMMING CONCEPTS** to historically underrepresented and underserved populations.

## Objectives

- Increase the number of historically underrepresented and underserved students who engage/graduate in computer science studies;
- Improve the rates at which students, who historically have been underrepresented in NASA-related fields, are awarded undergraduate and graduate degrees at their respective universities in NASA-related fields;
- Increase the diversity of the NASA STEM workforce; and strengthen two-year and four-year MSIs in their curricula in order to attract more students into STEM-based academic programs, retain them, and prepare them for success when they take the next steps in their education or in their careers.

## Eligibility

### **Eligible applicants are:**

American Indian and Alaskan Native Serving Institutions (AIANSIs)

## Funding

*Awards are funded as three-year cooperative agreements.*

FY2015: 3 awards (Approx. \$800K/year)

- Haskell Nations University
- Southwestern Indian Polytechnic Institute
- Chief Dull Knife College

**MUREP Other Opportunities  
(MOO)  
Johnson Space Center**

- ✧ Support or financial assistance to eligible MSIs
- \*\*Proposals are not being solicited at this time.**

## Purpose & Goals

**Established to strengthen curriculum and curricular pathways in STEM, and attract, retain, and support the success of underrepresented students in STEM degree programs.**

## Objectives

**Strategic Goal 2:** Advance understanding of earth and develop technologies to improve the quality of life on our home planet.

**Strategic Objective 2.4:** Advance the Nation's STEM education and workforce pipeline by working collaboratively with other agencies to engage students, teachers, and faculty in NASA's missions and unique assets.

## Eligibility

### **Eligible applicants are:**

All US Organizations and Minority Serving Institutions  
(including NASA centers)

## Funding

Awards are funded as three-year cooperative agreements, not to exceed \$500,000 per year.

FY2015: 4 awards (Approx. \$2M)

FY2016: 2 awards (Approx. \$1M)

- University of Hawaii
- University of Texas – El Paso
- Howard University
- Elizabeth City State University
- Lawson State Community College
- City College of New York



# Questions

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# MissionSTEM

21st Century Civil Rights Technical Assistance for Science, Technology, Engineering, and Mathematics

### What's New?

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- + [Deputy Administrator's Blog on Harassment Policies](#)
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- + Media Gallery
- + Reading Room
- + FAQs



+ Age



+ Disability



+ Gender



+ Race/Ethnicity

## Office of Diversity and Equal Opportunity

The MissionSTEM Web site is designed to assist NASA grant recipients with their civil rights compliance efforts. The Agency strives to provide a broad scope to its technical assistance in this arena. [+ Read More](#)

Send your questions for this session to:  
[civilrightsinfo@nasa.gov](mailto:civilrightsinfo@nasa.gov)



Student Corner



## **Diversifying Grants Through Partnerships Example Programs**

**NASA Mission STEM  
August 8, 2016**

Andres Quintanilla  
Program Manager  
AQuintanilla@EdExcelencia

Consuelo Grier  
Director of Constituency Engagement  
CGrier@EdExcelencia

---

# Examples of Effective Partnerships

- **Louis Stokes Alliance for Minority Participation at UT El Paso**
  - Encourages students to participate in a "university exchange" by selecting summer research sites away from their home campuses.
- **Pathway to the Baccalaureate at Northern Virginia**
- **Community College**
  - Creates a pipeline between partner institutions and provides seamless transfer
- **INfluence Student Potential and Increase Representation in Education (INSPIRE) at Rosalind Franklin University**
  - Provides hands-on research opportunities and faculty mentoring to promising high school and college students.

# What Works for Latino Students



***[EdExcelencia.org/Growing-What-Works](http://EdExcelencia.org/Growing-What-Works)***



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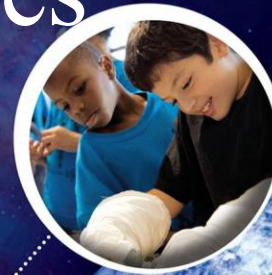


Student Corner



# NASA Internships, Fellowships, and Scholarships (NIFS)

Carolyn Knowles  
Director





# NASA MISSION

Drive advances in science, technology, aeronautics, and space exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of Earth.

# NASA Education Mission

*Advance high-quality STEM education using  
NASA's unique capabilities*

## **NASA Strategic Objective 2.4**

Advance the Nation's STEM education and workforce pipeline by working collaboratively with other agencies to engage students, teachers, and faculty in NASA's missions and unique assets.

# Alignment with National Education Priorities

**Enhance STEM Experience of Undergraduate Students:** Graduate one million additional students with degrees in STEM fields over the next ten years;

**Better Serve Groups Historically Underrepresented in STEM Fields:** Increase the number of students from groups that have been underrepresented in STEM fields that graduate with STEM degrees in the next ten years and improve women's participation in areas of STEM where they are significantly underrepresented; and,

**Design Graduate Education for Tomorrow's STEM Workforce:** Provide graduate-trained STEM professionals with basic and applied research expertise, options to acquire specialized skills in areas of national importance, mission-critical workforce needs for the agency, and ancillary skills needed for success in a broad range of careers.

# NIFS Mission

The NIFS Line of Business (LOB) leverages NASA's unique mission activities to enhance and increase the capabilities, diversity, and size of the Nation's next generation workforce needed to enable future NASA discoveries.

# Internships Definition

**Internships** are competitive awards to support educational work or enhanced research opportunities that provide NASA related experiences for high school, undergraduate, and graduate students, as well as educators

# Internships Criteria

- Minimum contact hours are 400 for college students and 320 for high school students or educators;
- Experience must be mentor-centric;
- Assignments and task-deliverables must be defined/approved by the mentor;
- Experience must be task-centric;
- Assignments and task-deliverables must be degree-relevant and immediately beneficial to the mentor in furthering NASA's ongoing missions;
- Tasks serve to integrate the intern into a team or group of career professionals.
- Stipend are paid to interns for the benefit of their participation in the educational experience, not for services rendered or hours worked.

# Internship Opportunities

NASA Internships occur within 4 sessions per year:

- Fall Session opportunities (16 wks) begin in late August or early September and conclude in Mid-December.
- Spring Session opportunities (16 wks) begin in mid-January and conclude in early May.
- Summer Session opportunities (8-10 wks) begin in late May or early June and conclude in early August.
- Year-Long Session opportunities (greater than 16 wks) do not correspond to the 3 standard sessions above.

**Application Period for the 2017 Spring Session:**

**6/2/2016 - 10/17/2016**

# Fellowships Definition

**Fellowships** are competitive awards to support independently conceived or designed research proposals, or senior design projects for graduate students in disciplines needed to help advance NASA's missions.



# Fellowships Criteria

Students should be:

- early in their graduate studies,
- pursuing or planning to pursue graduate studies leading to the Master's or Doctoral degrees,
- pursuing relevant NASA-related disciplines at accredited U.S. universities.

# Fellowship Opportunities

## **NASA Aeronautics Scholarship and Advanced STEM Training and Research Fellowship (AS&ASTAR)**

- Improve the nation's future STEM workforce by developing the skills and competencies of graduates pursuing degrees in STEM disciplines;
- Provide opportunities for a diverse population to participate and contribute to NASA's missions and projects;
- Use NASA's unique mission content, workforce, and facilities in order to enhance and increase the capabilities, diversity, and size of the nation's next generation workforce needed to enable future NASA discoveries;
- Improve the rates at which students, who have historically been underrepresented in NASA-related fields, are awarded graduate degrees at their respective universities in the STEM fields.
- Build an intellectual network between NASA and higher education institutions by allowing faculty greater access and knowledge of NASA's research opportunities.

**The solicitation is usually released in NSPIRES in Fall of each year.**

# Fellowship Opportunities

## NASA Aeronautics Scholarship and Advanced STEM Training and Research Fellowship (AS&ASTAR)

- 2016 NASA Education Research Announcement (NRA): Aeronautics Scholarship and Advanced STEM Training and Research (AS&ASTAR) Fellowship has closed for this 2016. The solicitation was found at this link: <https://nspires.nasaprs.com/external/solicitations/summary.do?method=init&solId={87B17E76-1FDD-A38A-6A69-050E4EB3C8A4}&path=open>. The selections will be posted in September, 2016 on NSPIRES.
- Questions concerning NASA Education Fellowship activities, may be directed to Elizabeth Cartier, NASA Fellowships and Scholarships Deputy Program Manager, Ames Research Center, Office of Education, Moffett Field, CA 94035; E-mail: [elizabeth.a.cartier@nasa.gov](mailto:elizabeth.a.cartier@nasa.gov).

# Scholarships Definition

**Scholarships** are competitive awards to support undergraduates in their STEM academic endeavors, by providing tuition funding and access to NASA STEM discipline employees..

# Scholarships Criteria

Students should be:

- early in their undergraduate studies,
- pursuing Bachelor's degrees in relevant NASA-related disciplines at accredited U.S. universities.

# Scholarship Opportunities

## NASA Education Scholarship

- The NASA Education Scholarship Program, formally known as the NASA Undergraduate Aeronautics Scholarship and the NASA MUREP Scholarship Program, is not making new awards for the academic year 2016-2017 due to funding and programmatic restructuring.
- Questions concerning NASA Education Scholarship activities, may be directed to **Elizabeth Cartier, NASA Fellowships and Scholarships Deputy Program Manager, Ames Research Center, Office of Education, Moffett Field, CA 94035; E-mail: [elizabeth.a.cartier@nasa.gov](mailto:elizabeth.a.cartier@nasa.gov)**.
- The 2017 session dates are available in the 'Internships for Students' page on <https://intern.nasa.gov>



# NASA Internships, Fellowships, and Scholarships (NIFS)



# Additional Slides



# NASA Graduate Student Opportunities

- NASA Earth and Space Science Fellowship (NESSF)
- NASA Space Technology Research Fellowships (NSTRF)
- Graduate Internships

# NASA's Science Mission Directorate (SMD)

## NASA Earth and Space Science Fellowship (NESSF)

This opportunity solicits graduate students seeking degrees in Earth and space sciences, or related disciplines, at respective institutions. The purpose of NESSF is to ensure continued training of a highly qualified workforce in disciplines needed to achieve NASA's scientific goals:

- *Understand the Sun and its interactions with Earth and the solar system, including space weather;*
- *Advance knowledge of Earth as a system to meet the challenges of environmental change and to improve life on our planet;*
- *Ascertain the content, origin, and evolution of the solar system and the potential for life elsewhere; and*
- *Discover how the universe works, explore how it began and evolved, and search for life on planets around other stars.*

The solicitation is usually released in NSPIRES in the Fall of each year.

## NASA Space Technology Research Fellowships(NSTRF)

This opportunity solicits applications from graduate student researchers, who show significant potential to contribute to NASA's goal of creating innovative new space technologies for our Nation's science, exploration, and economic future.

Students perform innovative space technology research and seek to improve America's technological competitiveness by providing the Nation with a pipeline of innovative space technologies.

NASA's Space Technology efforts can be defined as the orderly pursuit of the following objective:

- *Transform NASAmissions and advance the Nation's capabilities by maturing crosscutting and innovative space technologies.*

**The solicitation is usually released in NSPIRES in the Fall of each year.**

# NASA Graduate Internships

NASA internships are available to high school through graduate level students attending full-time programs appropriate to the NASA opportunity for which they receive an offer.

Graduate internships are educational hands-on opportunities that provide unique NASA-related research and operational experiences for graduate students.

Internships integrate participants with career professionals emphasizing mentor-directed, degree-related, work-place task completion. NASA internships consist of at least 400 contact hours. They may be full-time, or part-time and can take place at a NASA facility, or anywhere NASA-related activities are ongoing.

# NASA Graduate Internships

## NASA Graduate Internship Eligibility

- Must be attending full-time accredited program
- U.S. citizenship required for most internship opportunities
- Must be enrolled full-time in a degree-granting course of study appropriate to NASA's long-term professional workforce needs
- Must have minimum GPA of 3.0 on a 4.0 scale or equivalent.

# NASA Postdoctoral Program

The NASA Postdoctoral Program (NPP) provides early-career and more senior scientists the opportunity to share in NASA's mission, to reach for new heights and reveal the unknown so that what we do and learn will benefit all humankind.

NASA Postdoctoral Fellows work on 1 to 3 year assignments with NASA scientists and engineers at NASA centers and institutes to advance NASA's missions in earth science, heliophysics, planetary science, astrophysics, space bioscience, aeronautics, engineering, human exploration and space operations, astrobiology, and science management.

NASA Postdoctoral Program Fellows contribute to our national scientific exploration, confirm NASA's leadership in fundamental research, and complement the efforts of NASA's partners in the national science community.

# NASA Postdoctoral Program

## Eligibility

- Completed the requirements for a Ph.D. or an equivalent doctorate degree before beginning the fellowship.
- U.S. citizenship, Lawful Permanent Resident (LPR) status, or the Exchange Visitor J-1 Visa (research scholar only) before beginning the fellowship. An H-1B status is not acceptable because the NPP is not an employment program. You are eligible to apply for the NPP while holding the F-1 status. However, if you are selected for an appointment, you must change your status to one listed above.
- Since each NPP Fellowship is tied to a specific research opportunity located at a NASA Center or program institute, you must relocate to the Center or program institute that supports the opportunity to which you were accepted. In the case of virtual Centers such as the NASA Astrobiology Institute, you must relocate to the university location of your advisor as listed on the research opportunity. Establishing and maintaining residency at the Center or at the location of the advisor is required to begin the appointment and to remain in the program.



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+ Disability



+ Gender



+ Race/Ethnicity

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Student Corner



# Increasing STEM-Workforce Diversity

- Forbes | Insights Study: Fostering Innovation Through a Diverse Workforce - Over 300 executives surveyed\*
  - ★ Diversity/Inclusion efforts should start with senior management
  - ★ Organizations must be convinced that diversity is the key to innovation and industry disruption
- National Center for Women & Information Technology\*\*
  - ★ Focus on the company culture - not just the pipeline
  - ★ “Majority-Group” members must get involved in shaping the culture
- The STEM workforce includes US military careers too - I am living proof!

\* [http://www.forbes.com/forbesinsights/innovation\\_diversity/index.html](http://www.forbes.com/forbesinsights/innovation_diversity/index.html)

\*\* <http://www.fastcompany.com/3041339/strong-female-lead/10-commitments-that-will-make-a-difference-in-increasing-diversity-in-tec>

# Silicon Valley Tech Companies have started to incorporate diversity as an integral component of their corporate strategy ...



June 22, 2016

The White House  
1600 Pennsylvania Ave. NW  
Washington, DC 20500

Dear Mr. President:

As the eyes of the world are on Silicon Valley for the Global Entrepreneurship Summit, senior leadership at over 30 companies are today making a bold commitment to fuel American innovation and economic growth by increasing the diversity of our technology workforce.

We resolve to take action to make the technology workforce at each of our companies fully representative of the American people, as soon as possible. We will treat this goal as a top management priority and business imperative, because tapping the full measure of talent from across the country is critical for the long-term success of both our individual companies and the nation as a whole.

The undersigned companies are committed to taking each of these three essential actions:

- **implement and publish company-specific goals to recruit, retain, and advance diverse technology talent**, and operationalize concrete measures to create and sustain an inclusive culture;
- **annually publish data and progress metrics on the diversity of our technology workforce** across functional areas and seniority levels;
- **invest in partnerships to build a diverse pipeline of technology talent** to increase our ability to recognize, develop and support talent from all backgrounds.

We encourage more companies to sign this Tech Inclusion Pledge at [tech-inclusion.org](http://tech-inclusion.org).

Signed,

500px	Drillinginfo	Medium	Turnitin
Airbnb	ezCater	Moz	UnifyID
Arimo	Gainsight	Nootrobox	Unitrends
Box	GitHub	Pinterest	VMWare
BrightBytes	GoDaddy	Return Path	ZestFinance
Clarifai	Illuminate Education	SAP	Zynga
Color Genomics	Intel	SkyTap	
DataSift	Intrinsic	Spotify	
Distil Networks	Lyft	TeamSnap	

# STEM-related Occupation Statistics\*

Occupation	2012 Jobs	2022 Jobs	% Increase	Median Salary in 2012
<b>Computers &amp; Math</b>	2.8 million	3.4 million	18%	\$76,270
<b>Architecture &amp; Engineering</b>	1.8 million	1.9 million	9.3%	\$109,797
<b>Life, Physical, &amp; Social Sciences</b>	.55 million	.6 million	8.1%	\$106,840 (physicists)
<b>Farming, Fishing, &amp; Forestry</b>	.017 million	.016 million	-1.0%	N/A

\*Compiled from Bureau of Labor and Statistics: <http://www.bls.gov/opub/mlr/2013/article/occupational-employment-projections-to-2022.htm>



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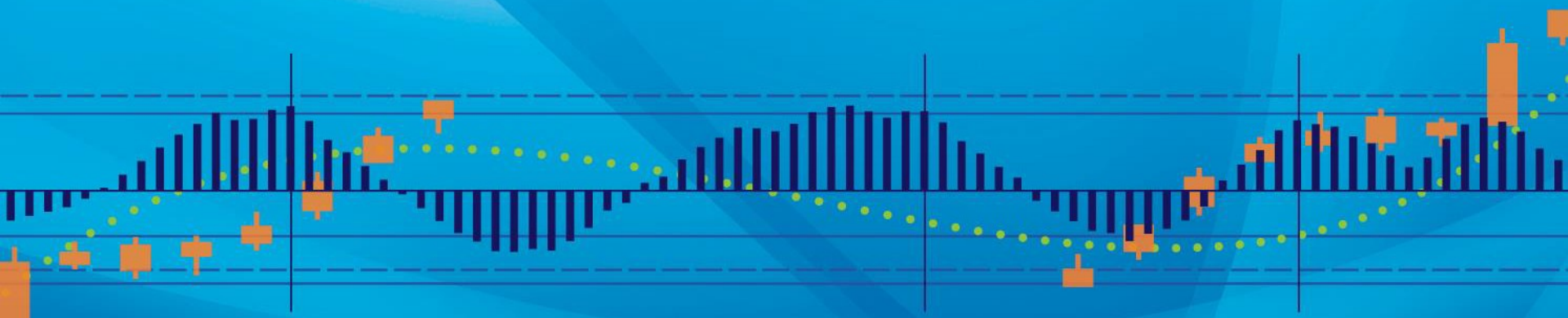
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Student Corner



# NASA's Pathways Program

Mission STEM – Increasing Diversity in STEM –  
The STEM Pipeline

August 9, 2016



Office of Human Capital Management  
*Live. Thrive. Connect.*

Workforce Planning and Analysis

# Pathways Programs at NASA



- Pathways Programs were established government-wide in 2012
- Components:
  - Pathways Intern Program
  - Pathways Recent Graduate Program
  - Presidential Management Fellows Program



# Pathways Intern Program



- The NASA Pathways Intern Program is for current students and individuals accepted for enrollment in a qualifying educational program
- The NASA Pathways interns are enrolled in a variety of educational institutions and have paid opportunities to work here and explore Federal careers while still in school
- This program exposes students to jobs in the Federal civil service by providing meaningful development work at the beginning of their career, before their career paths are fully established
- Most interns are eligible for conversion to career-conditional appointments in the Federal service upon graduation and completion of program requirements. Others, who are given temporary (a.k.a. "NTE") appointments, are not eligible to convert (these positions are typically clerical)
- *Eligibility Requirements:*
  - NASA Pathways interns meet applicable qualification requirements, either (1) OPM qualification standards; or, (2) NASA's Aeronautics, Scientific, and Technical (AST) qualification standards for engineering and science positions; or Agency developed qualification standards
  - Interns must maintain at least an overall 2.9 GPA
  - Interns are United States citizens



# Key Differences: Pathways vs SCEP (“Co-op”)



- Public Notice and competitive announcement process
- Veterans Preference
- Increased competition for positions (approximately 100 applicants for each Pathways Intern selection)
- Transition from “recruiting” to “outreach” (hiatus in on-the-spot hiring at campus recruiting events)
- Changed Relationships with Universities
  - Formal Agreements between NASA and universities are no longer required
  - Weakened of partnerships between NASA and key academic partners
  - Limited ability to target hiring at HBCUs, HACUs, etc.
- Direct hiring from NASA Intern, Fellowship, Scholarship (NIFS) no longer possible





# Demographic Overview of the Intern Program



- NASA Pathways Intern Program
  - Hires about 150-200 interns per year at the NASA Centers
  - Roughly 2/3 of interns are S&E, 1/3 business/mission support
  - 40% graduate interns, 60% undergraduate interns
  - Receives about 15,000-20,000 applications per year
  - Converts about 60% of interns within four years of hire
  - Currently has nearly 500 interns, enrolled at 200 universities, in 46 states + DC



# Pathways Recent Graduates Program



- The NASA Pathways Recent Graduates Program is for individuals who have recently graduated from qualifying educational institutions or programs
- This developmental program lasts one year. After one continuous year of service and having demonstrated successful job performance, participants may non-competitively convert to term or permanent competitive service jobs
- The Program provides opportunity to individuals who lack experience to participate in jobs in the Federal civil service at the beginning of their careers, before their career path is fully established
- *Eligibility Requirements:*
  - Applicants must have completed, within the previous 2 years, a qualifying associates, bachelors, masters, professional, doctorate, vocational or technical degree or certificate from a qualifying educational institution. A veteran, who, due to military service obligations was unable to apply within 2 years of receiving their degree, has as much as 6 years after degree completion to apply
  - NASA Recent Graduates meet applicable qualification requirements, either (1) OPM qualification standards; or, (2) NASA's Aeronautics, Scientific, and Technical (AST) qualification standards for engineering and science positions
  - Recent Graduates are United States citizens



# Presidential Management Fellows Program



- The Pathways Presidential Management Fellows Program is for individuals who have completed a qualifying advanced degree (e.g., graduate or professional degree) within two years of the opening date of the PMF announcement
- OPM makes eligibility determinations and identifies finalists eligible for consideration
- PMFs may be appointed at the GS-9, GS-11 or GS-12 level. PMF appointments are limited to two years
- PMFs may be converted to career/career-conditional appointments upon completion of a rigorous two-year paid program that includes:
  - At least 80 hours of formal, interactive training per year (for a total of 160 hours) that advances the PMF's competencies in the occupation or functional discipline where they would most likely be placed.
  - At least one rotational or developmental assignment of 4 to 6 months, with management and/or technical responsibilities.
  - Work with a senior-level Mentor
- NASA collaborated with OPM to develop the "PMF-STEM" track in 2014
- *Eligibility Requirements:*
  - NASA PMFs meet applicable qualification requirements, either (1) OPM qualification standards; or, (2) NASA's Aeronautics, Scientific, and Technical (AST) qualification standards for engineering and science positions
  - PMFs are United States citizens





# Questions





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Student Corner


# U.S. Department of Education Office for Civil Rights



## Highlighting How the Federal Civil Rights Laws Relate to STEM Programs at Institutions of Higher Education

This presentation provides general information and does not represent a complete recitation of the applicable law and OCR policy in this area. It does not address specific issues of compliance because determinations of compliance depend on specific facts and are made on a case-by-case basis. The language used in these slides is approved for purposes of this presentation only and should not be used for other purposes.

# Overview of Presentation

- ▶ Overview of the applicable Federal civil rights laws enforced by OCR
  - ▶ Highlights of how these laws relate to STEM
    - Admissions
    - Recruitment/Outreach
    - Retention
    - Additional considerations for students with disabilities
  - ▶ Resources
  - ▶ Contacting OCR
- 

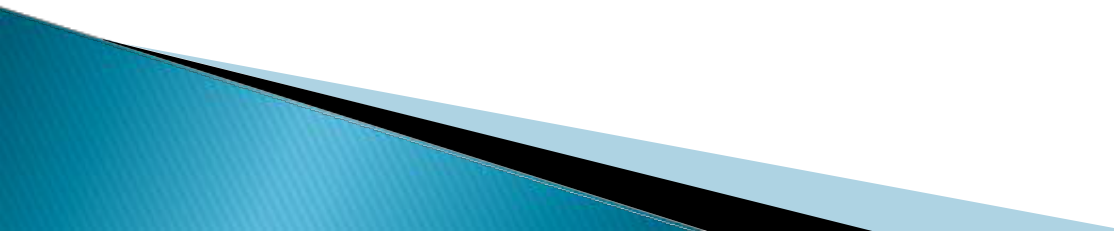
# Applicable Federal Civil Rights Laws Enforced by OCR

- ▶ OCR enforces federal civil rights laws that prohibit discrimination on the basis of:

<b>Race, color, national origin</b>	Title VI of the Civil Rights Act of 1964
<b>Sex</b>	Title IX of the Education Amendments of 1972
<b>Disability</b>	Section 504 of the Rehabilitation Act of 1973 Title II of the Americans with Disabilities Act of 1990



# Admissions and Eligibility Criteria

- ▶ Must not deny admission to students on the basis of race, sex, or disability.
  - ▶ Must not condition admission of students with disabilities on foregoing aids/services.
  - ▶ Must not use eligibility criteria that have an unjustified disparate impact based on race, sex, or disability.
- 

# Admissions and Eligibility Criteria

- ▶ What can schools do to increase the enrollment of underrepresented students in STEM programs?
  - Eliminate prerequisites for admission
    - To meet the needs of students entering with varying backgrounds, the school could create multiple first year courses that students can select based on their level of prior experience.
  - Ensure there is diversity on the admissions committee
  - Review admissions criteria to ensure they are neutral in application or effect and are valid predictors of success
  - Consider using a multi-factorial admissions process so that no one criterion is given undue weight

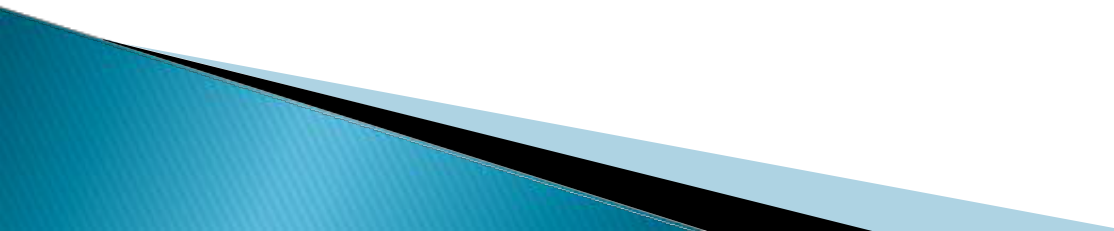
# Admissions and Eligibility Criteria

- ▶ Special Considerations for Race – Voluntary Use of Race
  - May consider an applicant's socioeconomic status, first-generation college status, geographic residence, or other race-neutral factors
  - May give special consideration to applicants who went to a low-performing school or have overcome other hardships
  - May guarantee admission to a top percentile of students graduating from all in-state high schools
  - May preference students of all races who graduated from high schools with certain socioeconomic or racial composition
  - May consider the race of individual students among other factors in admissions if narrowly tailored to a compelling interest

# Recruitment and Outreach

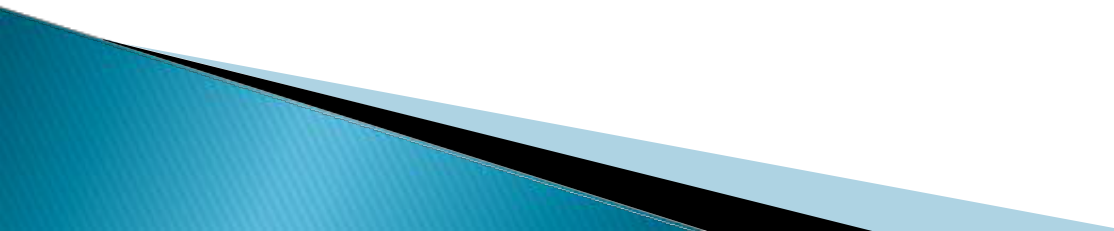
- ▶ Must ensure that STEM recruitment materials are free of bias and stereotypes

# Recruitment and Outreach

- ▶ What can schools do to improve recruitment of underrepresented students?
    - Target schools or districts that are low performing, have high dropout rates, or are geographically underrepresented
    - Target schools, districts, or areas with many potential applicants of groups underrepresented in the school's applicant pool
    - Advertise in media, at community events, or conferences targeted at underrepresented groups
- 

# Recruitment and Outreach

What can schools do to improve recruitment of underrepresented students?

- Partner with ESE schools in your community to support the preparation of all students for higher education in STEM fields
  - STEM departments may engage in outreach during events for prospective students explaining the benefits of specific STEM careers and counteract any stereotypes about the fields
  - Design STEM introductory courses to appeal to a diverse group of students, including presentations from diverse STEM academics
  - Ensure recruitment materials and websites for STEM programs highlight diversity
- 

# Retention

- ▶ Schools seeking the benefits of diversity not only must enroll a diverse group of students, but must also retain those students.
- ▶ Schools may operate mentoring, tutoring, retention, and support programs for enrolled students who may need additional assistance to succeed.

# Retention

- ▶ What can schools do to improve retention of underrepresented students?
  - ▶ Provide mentoring, tutoring, and academic support to all enrolled students at risk of not completing their program
  - ▶ Provide support programs that are open to all students with content of particular interest to a group targeted for retention (e.g., highlighting accomplishments of groups that are underrepresented in STEM)
  - ▶ Provide training to faculty, staff, and students on the effects of implicit bias



# Retention

- ▶ What can schools do to improve retention of underrepresented students?
  - ▶ Examine the process for assigning and changing advisors
    - ▶ Is the process for assigning advisors to students non-discriminatory?
    - ▶ Can students request to change advisors?
  - ▶ Provide “life counselors” in addition to formal faculty advisors to all students.
    - ▶ These counselors provide advisement related to social networking and career choices.
    - ▶ They benefit the entire student body, and particularly underrepresented groups who may feel isolated.

# Additional Considerations for Students with Disabilities

## ▶ Academic Adjustments

- Schools must make modifications to academic requirements to ensure that such requirements do not discriminate or have the effect of discriminating on the basis of disability
- Modifications may include:
  - Length of time permitted to complete degree requirements
  - Adaption of the manner in which specific courses are conducted

# Additional Considerations for Students with Disabilities

## ▶ Academic Adjustments

- Schools may not impose other rules on students with disabilities that have the effect of limiting the participation of students with disabilities:
  - Prohibiting tape recorders or guide dogs in classrooms

# Additional Considerations for Students with Disabilities

## ▶ Academic Adjustments

- Provide auxiliary aids to students with disabilities as necessary
  - Taped texts
  - Interpreters for hearing impaired students
  - Readers for students with visual impairments
  - Classroom equipment adapted for use by students with manual impairments

# Additional Considerations for Students with Disabilities

## ▶ Accessible Technology

- May not require the use of technology in a classroom environment when the technology is inaccessible to SWDs unless accommodations or modifications that permit them to receive all the educational benefits provided by the technology in an equally effective manner are provided
  - Acquire the same information,
  - Engage in the same interactions, and
  - Enjoy the same services

# OCR Resources

- ▶ Title IX STEM powerpoint

[www.ed.gov/ocr/presentations/stem-t9-powerpoint.pdf](http://www.ed.gov/ocr/presentations/stem-t9-powerpoint.pdf)

- ▶ Title IX Resource Guide

[www.ed.gov/ocr/docs/dcl-title-ix-coordinators-guide-201504.pdf](http://www.ed.gov/ocr/docs/dcl-title-ix-coordinators-guide-201504.pdf)

- ▶ Resources on Supporting Racial Diversity

[www.ed.gov/ocr/frontpage/pro-students/issues/roi-issue07.html](http://www.ed.gov/ocr/frontpage/pro-students/issues/roi-issue07.html)

- ▶ Guidance on Use of Electronic Book Readers and Other Emerging Technologies

[www.ed.gov/ocr/docs/dcl-ebook-faq-201105.html](http://www.ed.gov/ocr/docs/dcl-ebook-faq-201105.html)

[www.ed.gov/offices/list/ocr/docs/504-qa-20100629.pdf](http://www.ed.gov/offices/list/ocr/docs/504-qa-20100629.pdf)

[www.ed.gov/ocr/letters/colleague-20100629.pdf](http://www.ed.gov/ocr/letters/colleague-20100629.pdf)

# Contacting OCR

- ▶ OCR website

[www.ed.gov/ocr](http://www.ed.gov/ocr)

- ▶ Contact Information for OCR Headquarters

(800) 421-3481

[OCR@ed.gov](mailto:OCR@ed.gov)

- ▶ Contact Information for OCR Regional Offices

<https://wdcrobcolp01.ed.gov/CFAPPS/OCR/contactus.cfm>

 + GO

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+ Age



+ Disability



+ Gender



+ Race/Ethnicity

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Student Corner



# The Critical Role of Diversity and Inclusion in STEM Disciplines

NASA MissionSTEM Summit  
August 9, 2016

Lorelle L. Espinosa, Ph.D.  
Assistant Vice President for Policy  
Research and Strategy  
American Council on Education

# Overview of Remarks

- Diversity in a 21<sup>st</sup> century context and the research underpinnings
- Race-conscious and race-neutral approaches
- The role of campus climate, including for women of color in STEM
- Models for institutional practice



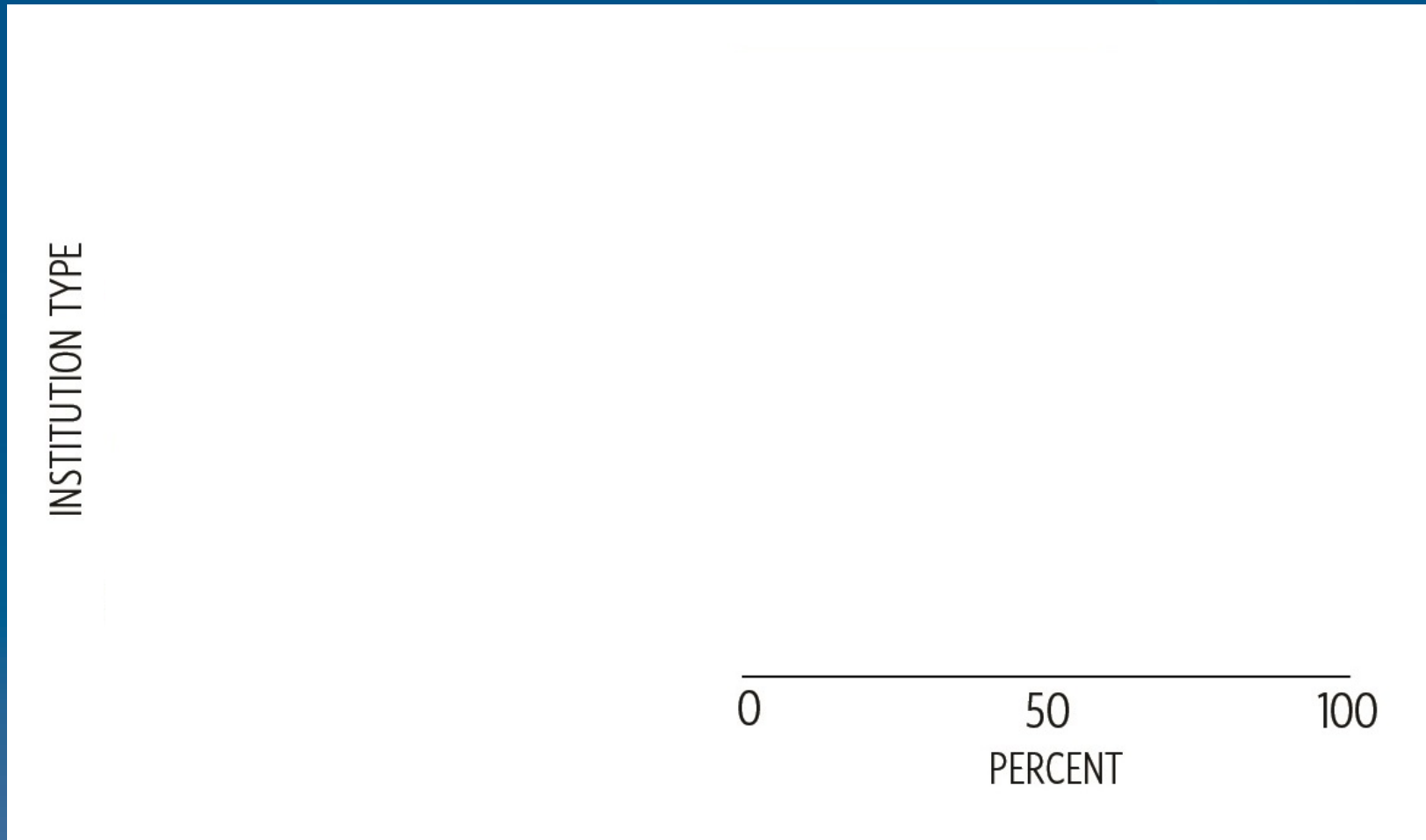
# Race, Class, & College Access

Achieving Diversity  
in a Shifting Legal Landscape

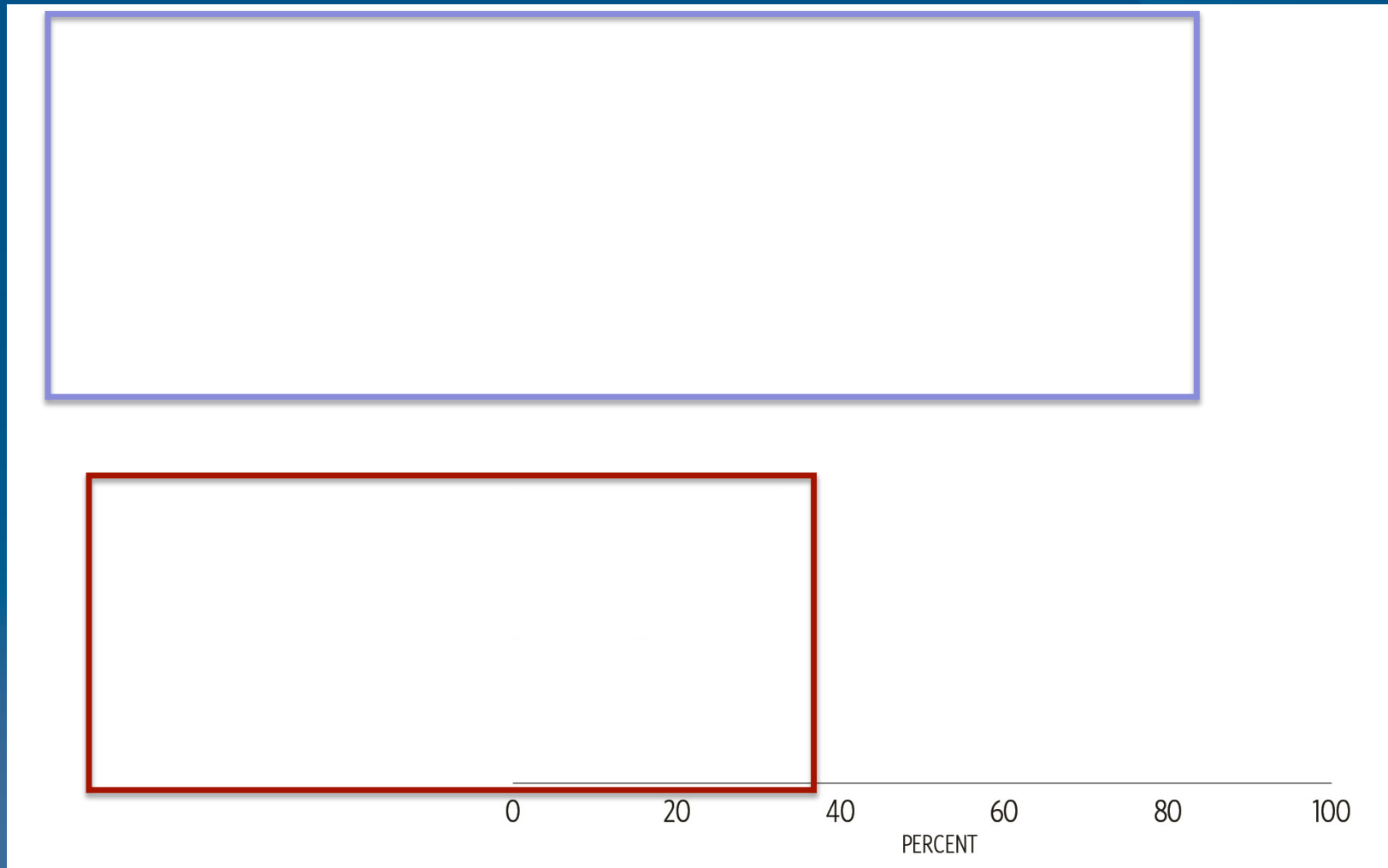
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Lorelle L. Espinosa, Matthew N. Gaertner, and Gary Orfield

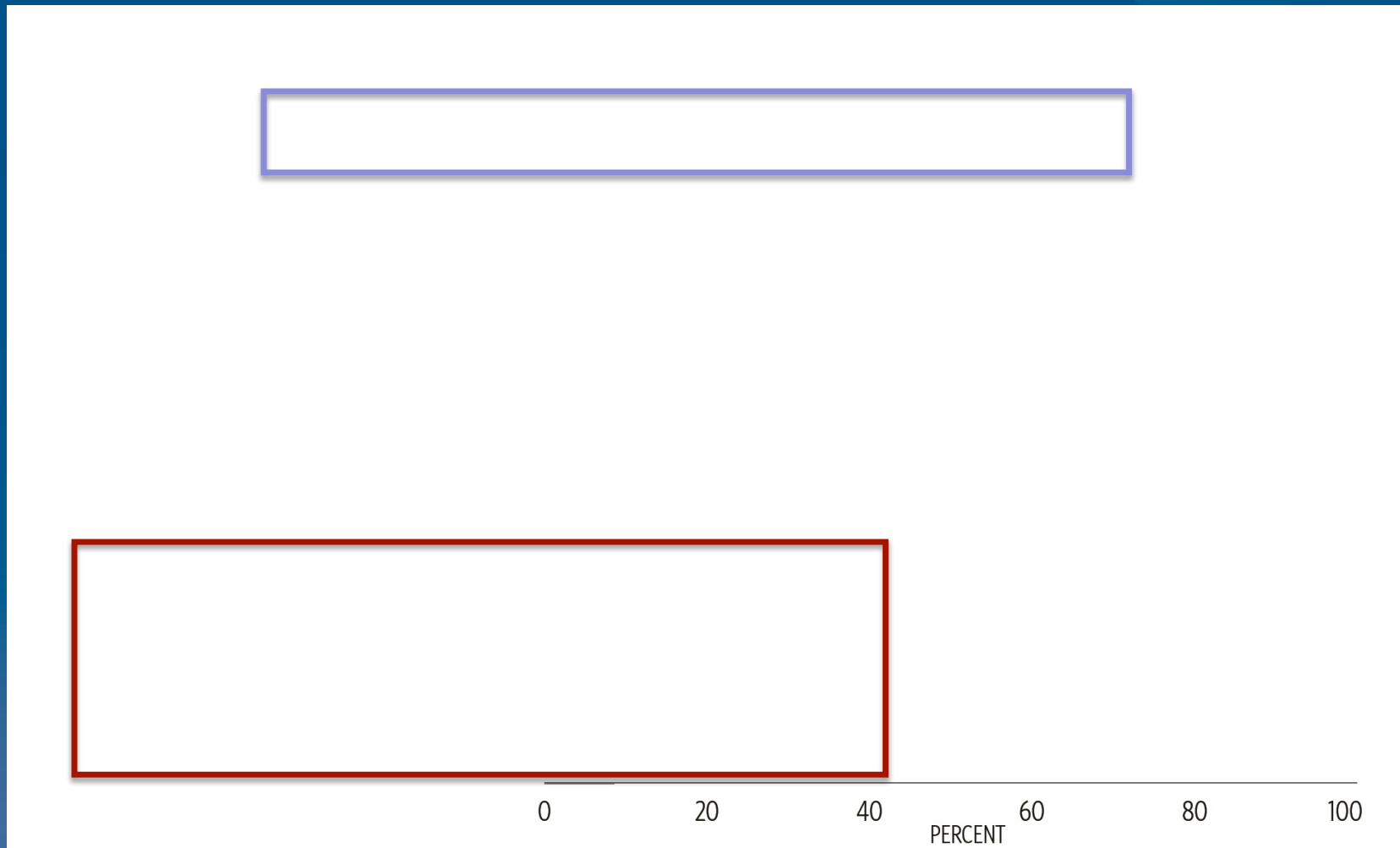
# Race is an Admissions Consideration Across the Selectivity Spectrum



# What Are the Most and Least Widely Used Diversity Strategies? (racial/ethnic, socioeconomic diversity)



# Which Diversity Strategies Are Perceived as Most and Least Effective? (racial/ethnic diversity)



“While numbers are necessary for realizing the benefits of diversity, they are not alone sufficient. What we need moving forward is a shift in our understanding of diversity as solely a ‘numbers game.’ ”

– Liliana Garces and Uma Jayakumar

## Early Work on Climate

Race relations and racial attitudes on college campuses have been studied since late 1960s

- Sedlacek & Glenwood (1967) assessed racial attitudes by college students
- Burbach & Thompson (1973) explored alienation as a contributor to a campus' climate
- Pfeifer & Schneider (1974) put forth seminal work on “university climate”



## Defining *Campus Climate*

*“...the current attitudes, behaviors,  
and standards and practices of employees  
and students of an institution”*

Rankin, S. & Reason, R. (2008). Transformational Tapestry Model: A comprehensive approach to transforming campus climate. *Journal of Diversity in Higher Education*, 1(4), 262.

# Campus Climate & Sense of Belonging for Women of Color

Dawn R. Johnson (2012)

- Transformative practice requires that institutions take responsibility for the transformation of STEM environments
- Faculty from dominant groups are especially critical
- Supportive academic and social climates within the residence hall are the strongest contributors to overall sense of belonging
- Perceptions of a positive campus racial climate are also significant

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Summer 2011 Issue »

**Inside the Double Bind**

A Synthesis of Empirical Research on Undergraduate and Graduate Women of Color in Science, Technology, Engineering, and Mathematics

MARIA ONG, CAROL WRIGHT, LORELLE L. ESPINOSA, AND GARY ORFIELD

In this article, Maria Ong, Carol Wright, Lorelle Espinosa, and Gary Orfield review forty years of scholarship on the postsecondary educational experiences of women of color in science, technology, engineering, and mathematics (STEM). Their synthesis of 116 works of scholarship provides insight into the factors that influence the retention, persistence, and achievement of women of color in STEM fields. They argue that the current underrepresentation of women of color in STEM fields represents an unconscionable underutilization of our nation's human capital and raises concerns of equity in the U.S. educational and employment systems. They refute the pervasive notion that underrepresented minority women are less interested in pursuing STEM fields and then present a complex portrait of the myriad factors that influence the undergraduate and graduate experiences of women of color in STEM fields. Finally, the authors discuss the policy implications of their findings and highlight gaps in the literature where further research is needed, providing a knowledge base for educators, policy makers, and researchers to continue the mission of advancing the status of women of color in STEM.

Share

Summer 2011 Issue Abstracts

Symposium: Unraveling the Double

*Symposium*

**Unraveling the Double Bind:**  
 Women of Color  
 in STEM

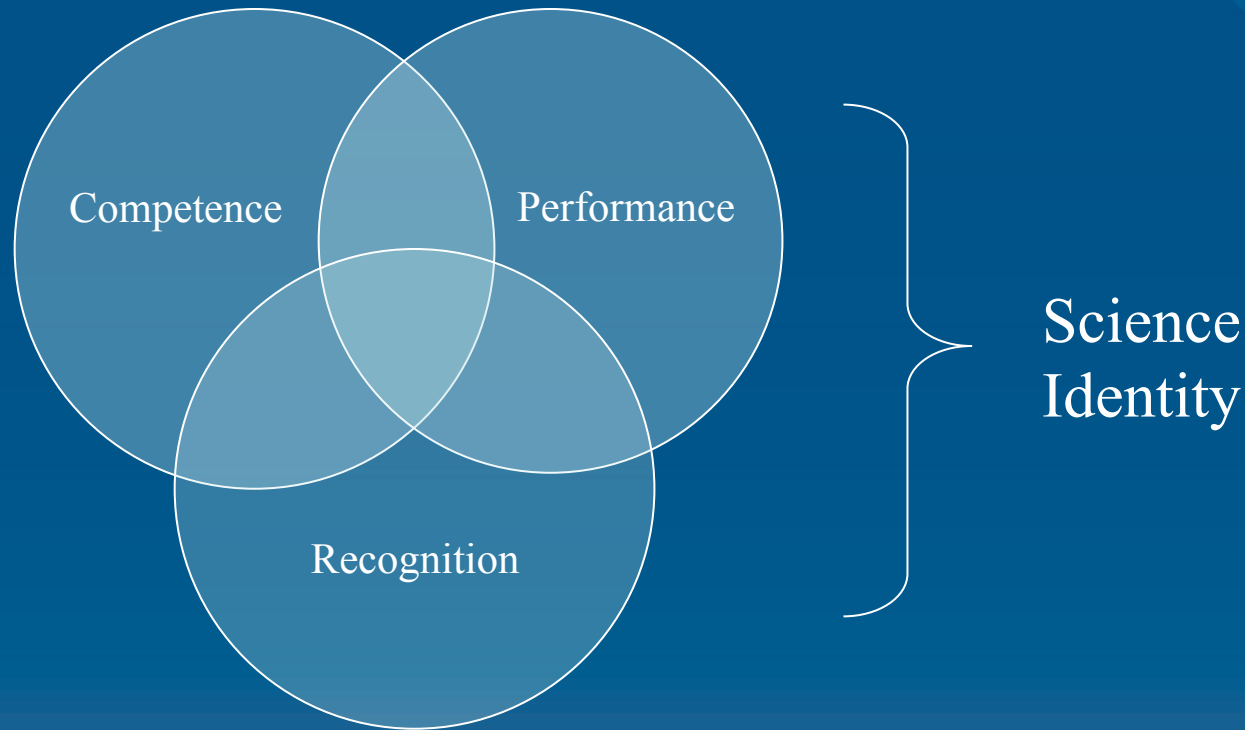


## **Inside the Double Bind**

Ong, Wright, Espinosa, & Orfield (2011)

- Campus climate plays a critical role in retention & satisfaction of women in STEM
- Family & community support one of most salient factors for degree completion
- Student-faculty relationships and peer support networks are also critical
- Women of color often use their status to harness personal empowerment

# Carlone & Johnson (2007) Science Identity for Women of Color in STEM



Carlone, H. B. & Johnson, A. (2007). Understanding the science experiences of successful women of color: Science identity as an analytic lens. *Journal of Research in Science Teaching*, 44(8), 1187-1218.

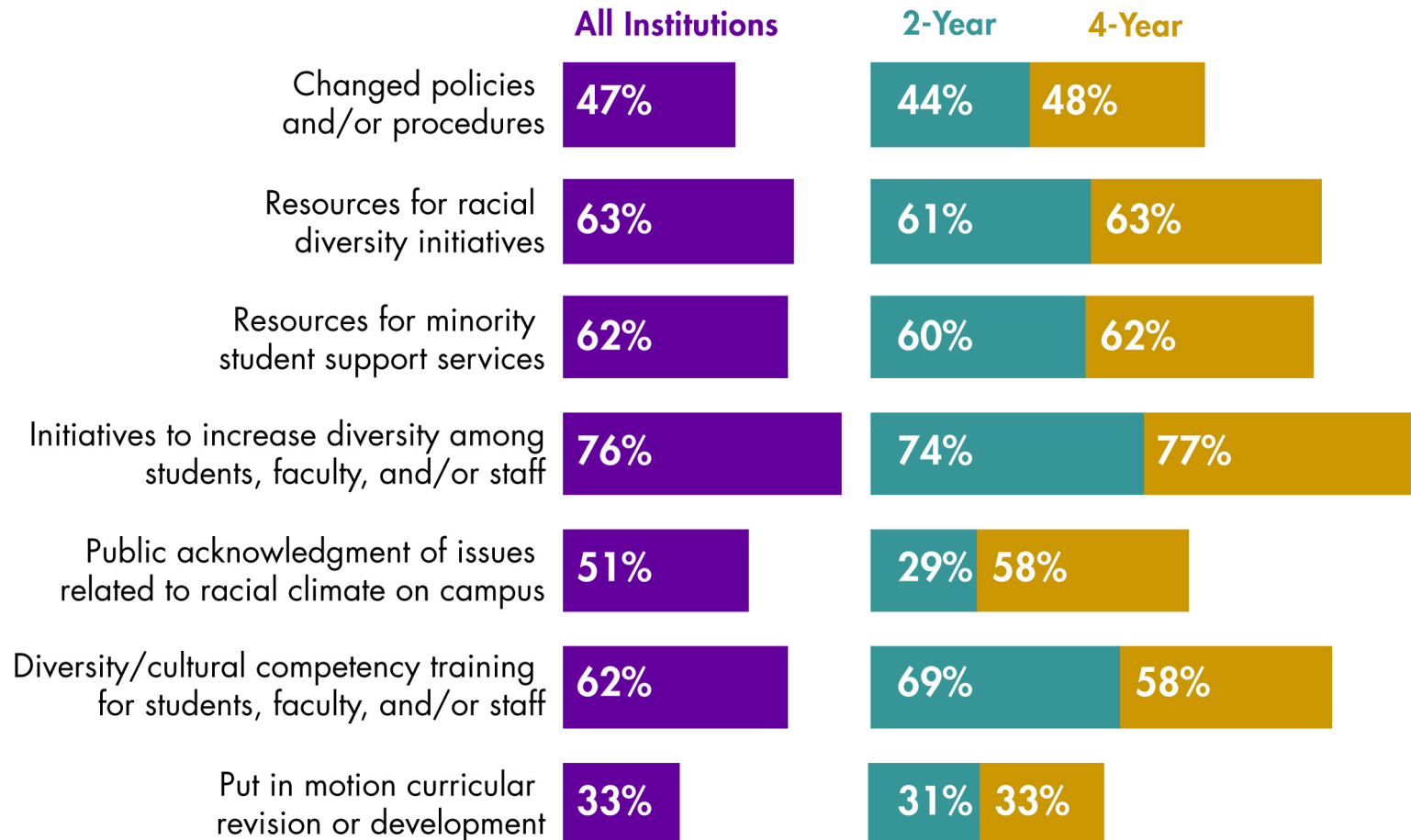
# ACE Analysis of Student Demands

**What are students demanding?**

**All Institutions**

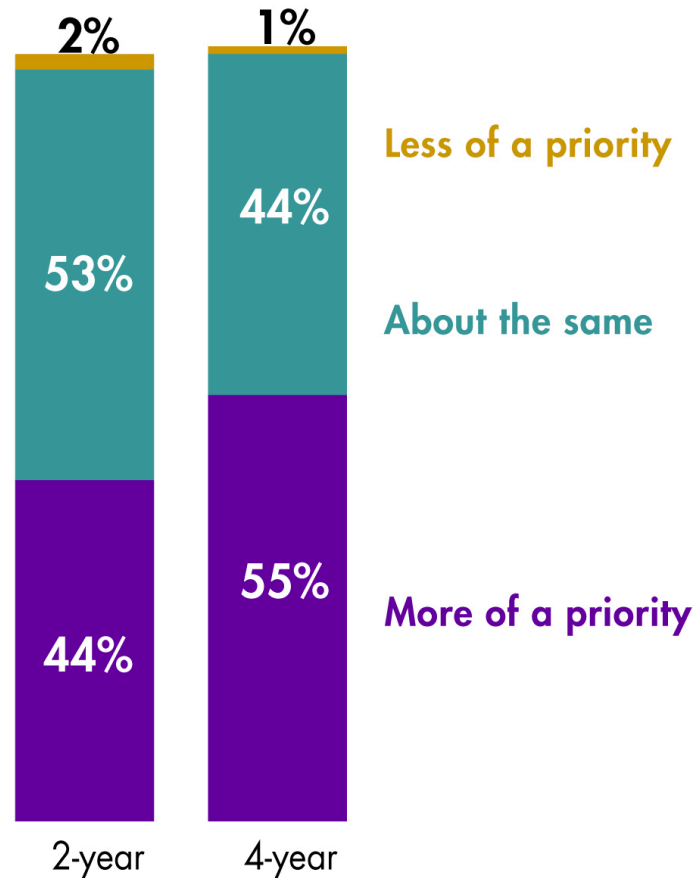
# ACE Pulse Point Analysis

## Actions taken in the last five years (2-year and 4-year institutions)



# ACE Pulse Point Analysis

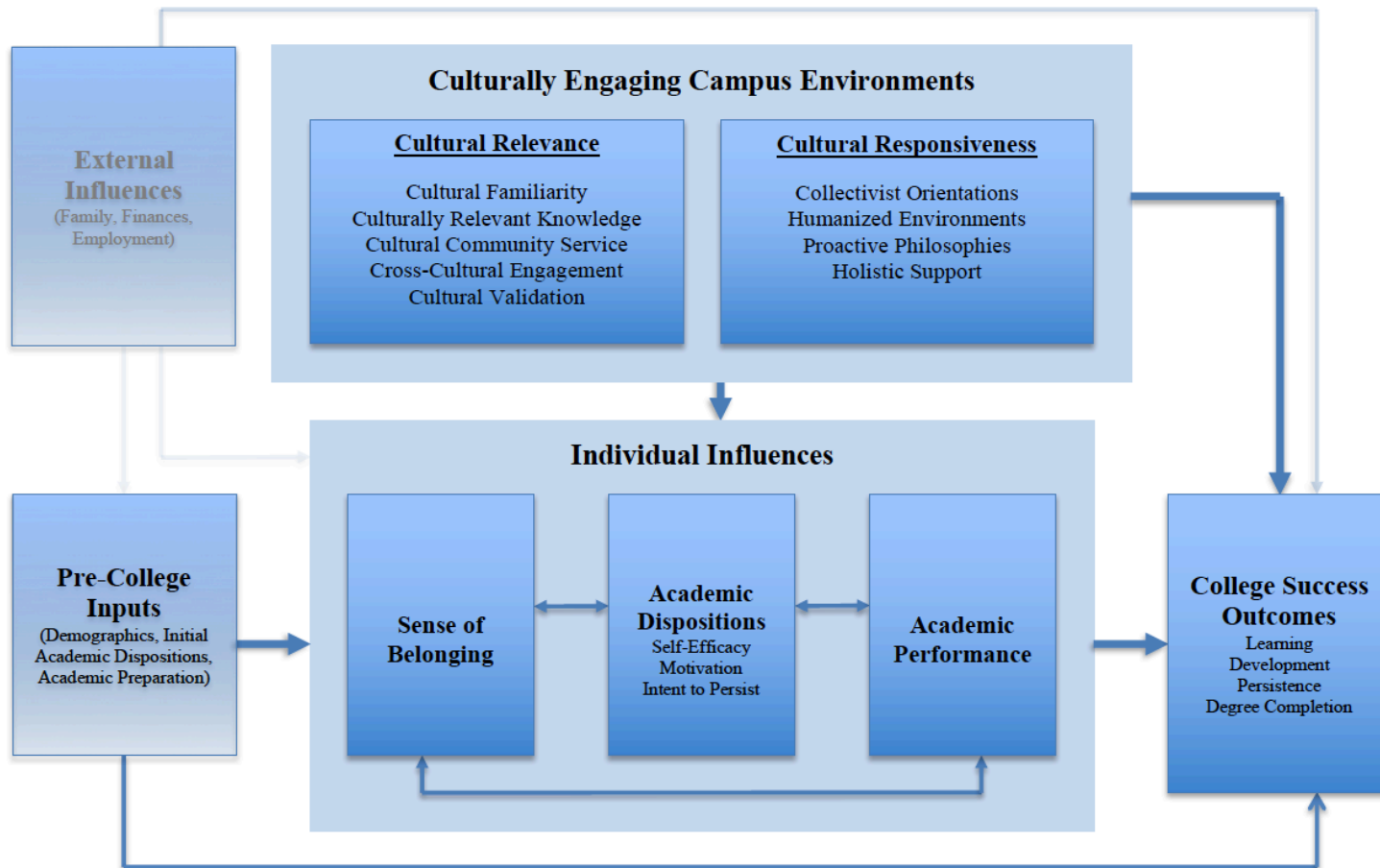
Compared to three years ago, has the racial climate on your campus become more of a priority, about the same, or less of a priority? (2-year and 4-year institutions)





# Museus' Culturally Engaging Campus Environments (CECE) Model

Figure 1. The Culturally Engaging Campus Environments (CECE) Model of College Success



# Museus' Culturally Engaging Campus Environments (CECE) Model

## Cultural Relevance

- Cultural Familiarity
- Culturally Relevant Knowledge
- Cultural Community Service
- Meaningful Cross-Cultural Engagement
- Cultural Validation

# Museus' Culturally Engaging Campus Environments (CECE) Model

## Cultural Responsiveness

- Collectivist Cultural Orientations
- Humanized Educational Environments
- Proactive Philosophies
- Holistic Support

## Garces and Jayakumar (2014) Dynamic Diversity

Four key areas to develop inclusive environments:

1. Assess racial climate
2. Attend to institutional history and context
3. Break down barriers to cross-racial engagement
4. Nurture quality cross-racial interactions

Thank you!  
lespinosa@acenet.edu



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+ Age



+ Disability



+ Gender



+ Race/Ethnicity

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Student Corner

# Museum of Science, Boston

Inclusion through organizational learning



# Inspiration

“One of the most pervasive messages of my childhood was, ‘Not for you.’ That’s something that’s incredibly destructive for the life of a child. Places like science museums can dispel those messages more than almost any place else. I remember my few visits to museums as just wonderful. I believe everybody should have that experience.

And I do mean everybody.”

– Betty Davidson, Ph.D.



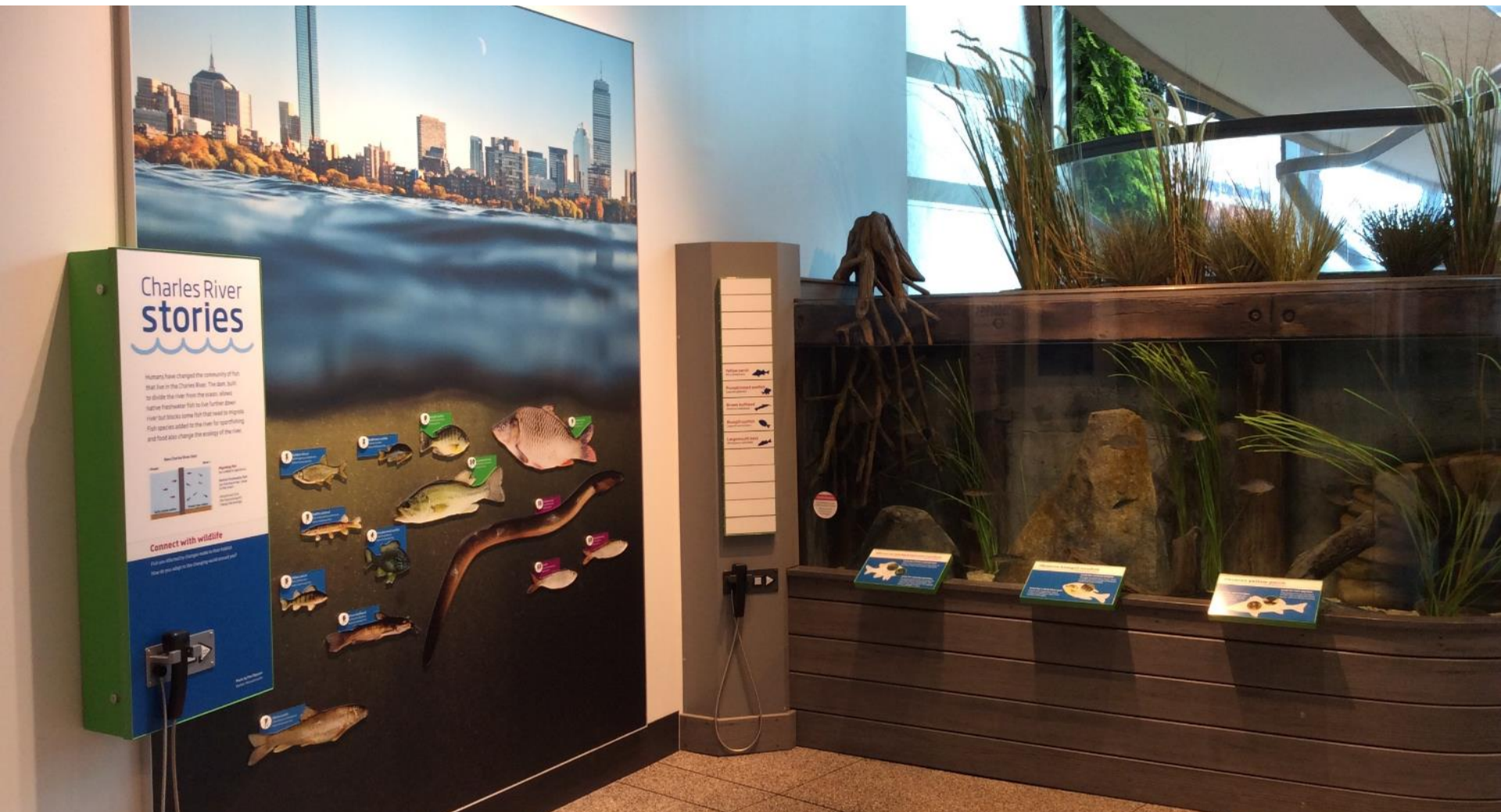
# **Our vision for access**

The Museum of Science, Boston is committed to the inclusion of people with disabilities and will create an environment that is inviting, engaging, and accessible for everyone.

**What does this means in practice?**

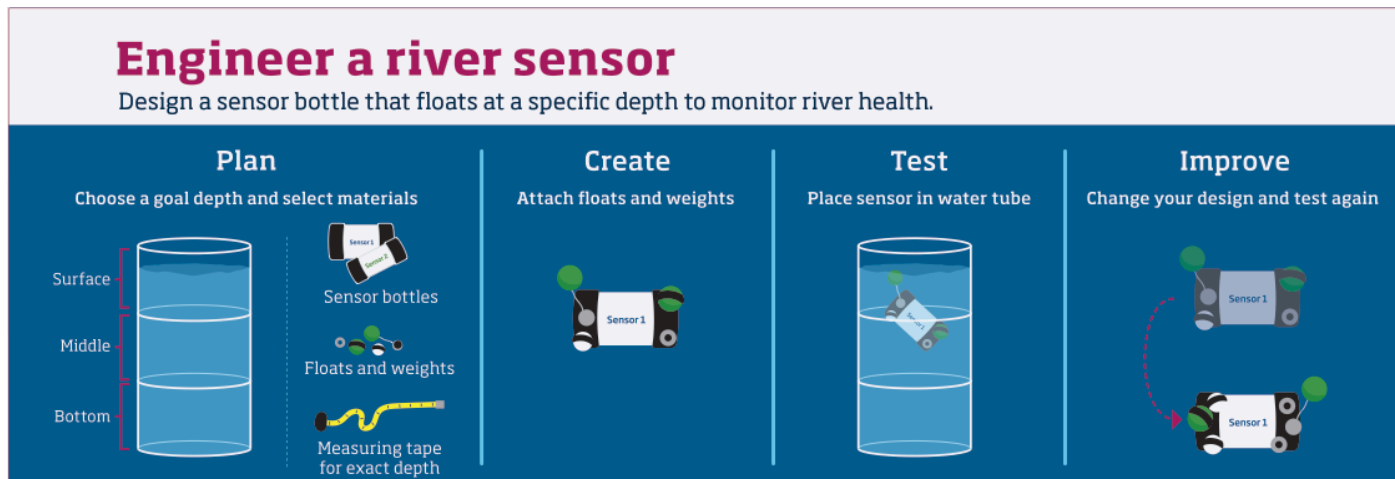
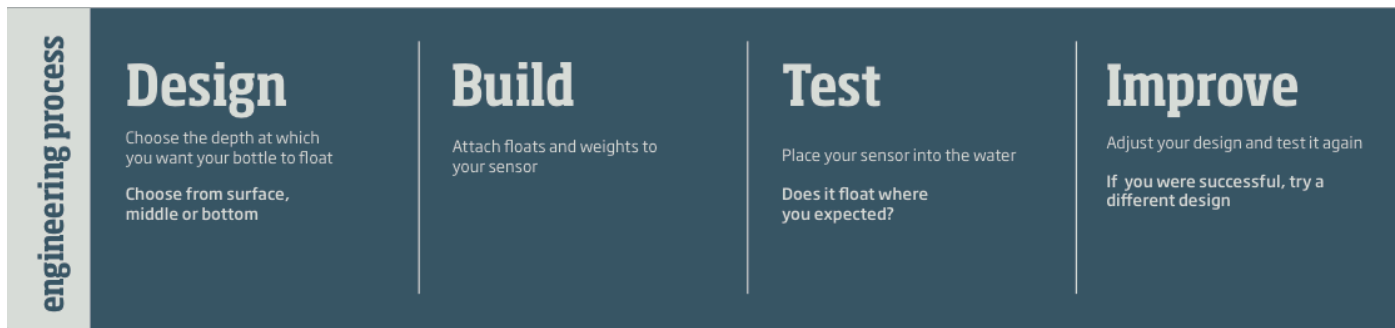
# Focusing on inclusion

to ensure all programming is accessible to a broad audience



# Employing universal design

when designing environments for staff and visitors



# Identifying audiences

who need additional support through programming



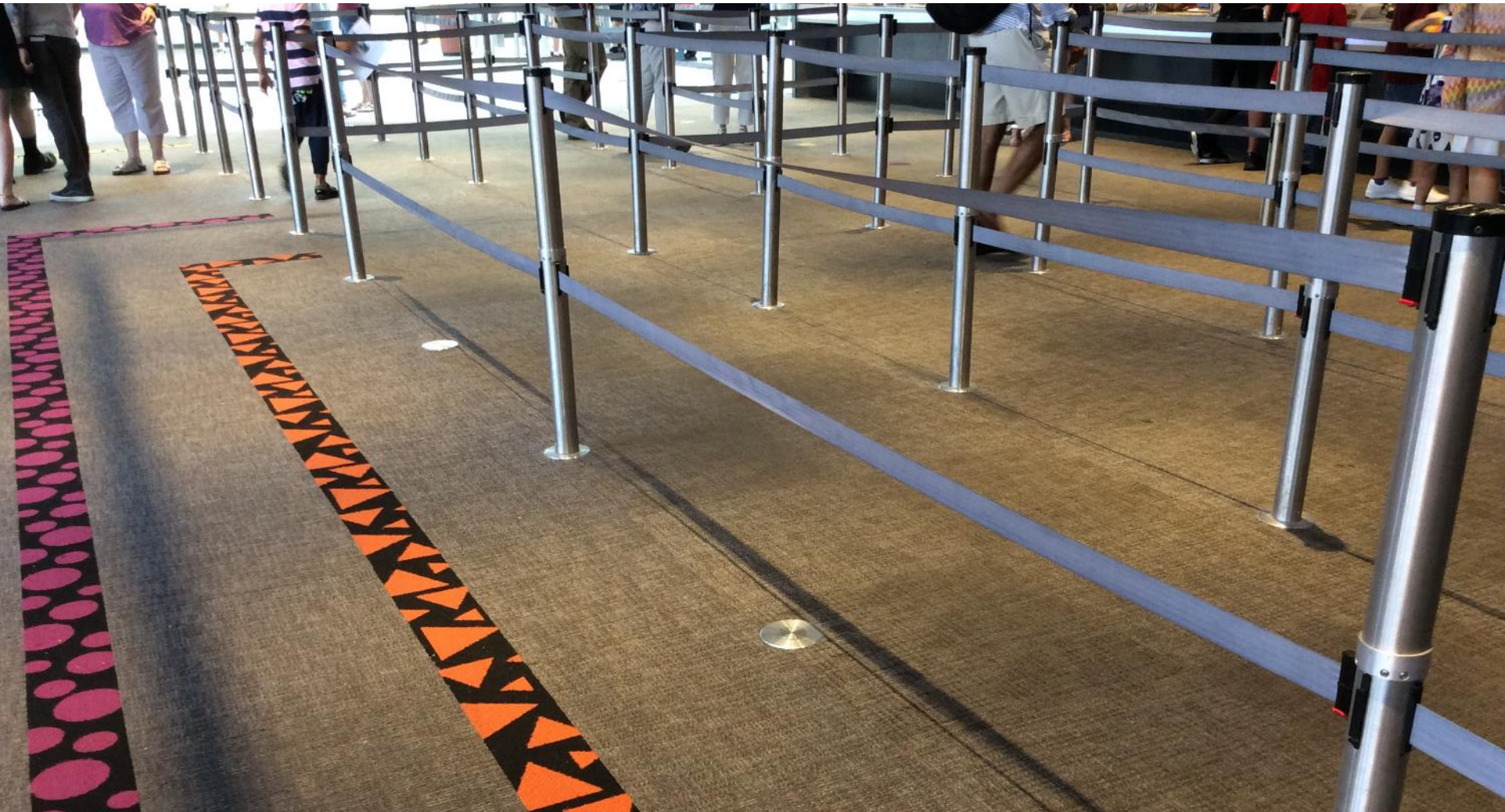
# Embedding accessibility

into all major initiatives



# Targeting key resources and amenities

for enhanced accessibility



# Involving people with disabilities

in our work as staff members, volunteers, and consultants





# Offering professional development

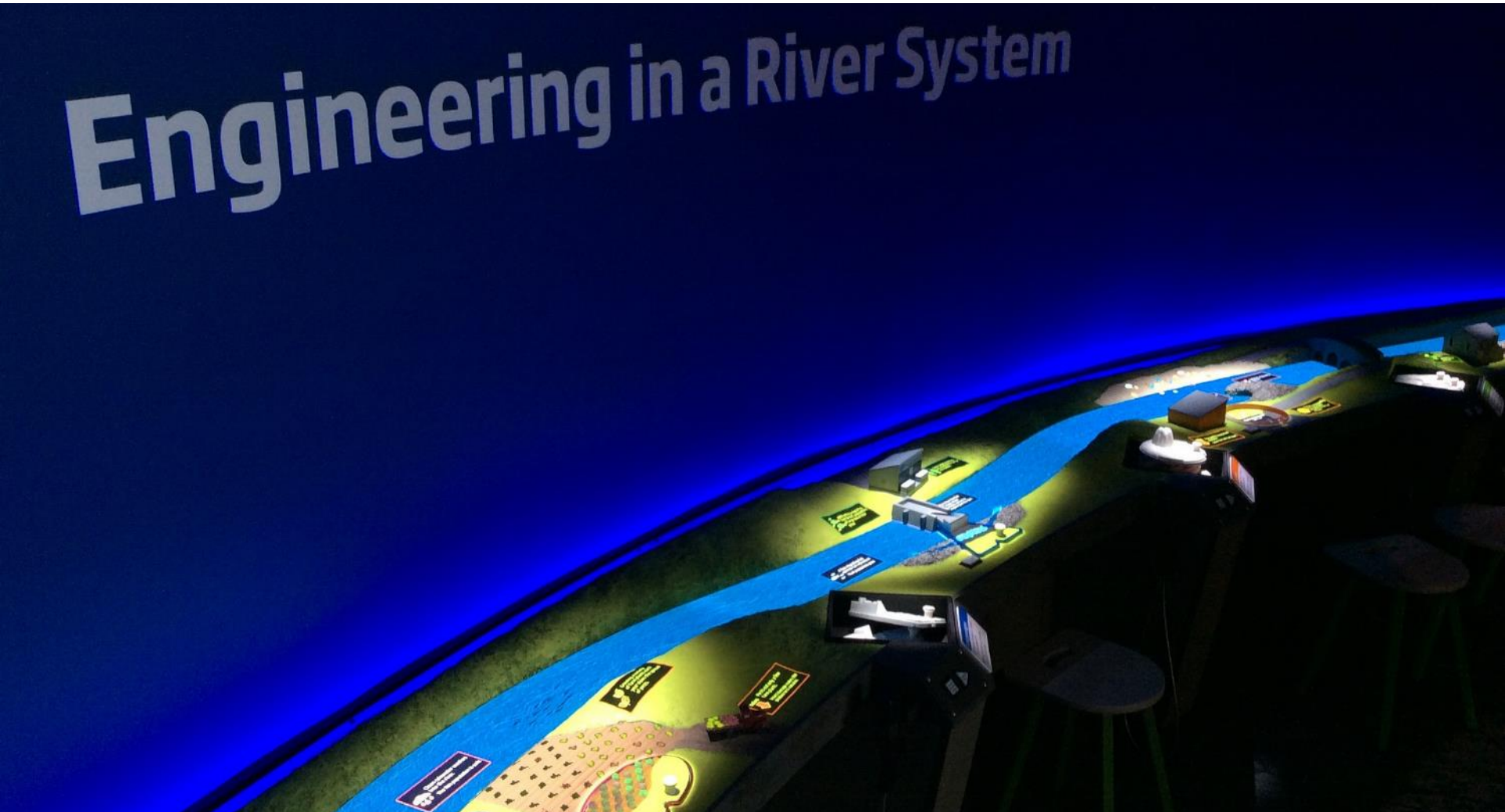
for all Museum staff members



# Experimenting with new approaches

that offer innovative solutions to field-wide problems

## Engineering in a River System



# “Our story”



Betty Davidson,  
Fearless Leader



Created an accessible exhibition,  
better for everyone

Voila! There was change!

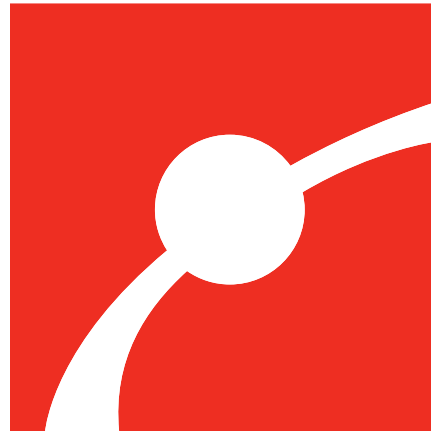
**Is that the whole story?**



# What facilitates change?

Continuous improvement and change through organizational learning

- Involve people with disabilities in their work
- Embed inclusive practices in the work and regular communication
- Engage in on-going experimentation and reflection about inclusive practices
- Promote inclusive practices as something that benefits people with and without disabilities



# **Museum of Science, Boston**

Christine Reich, [creich@mos.org](mailto:creich@mos.org)



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