EDU | DIRECTORATE FOR STEM EDUCATION

Strategies that Promote Inclusive Environments in Higher Education

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PROGRAM DIRECTOR

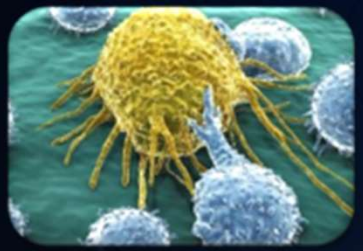
28 OCTOBER 2024

U.S. National Science Foundation
Directorate for STEM Education

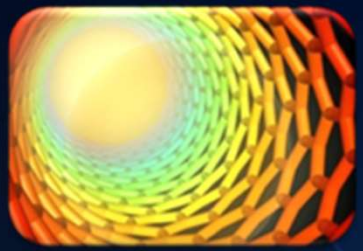
Preparing a diverse STEM workforce and a well-informed citizenry

NSF's Mission

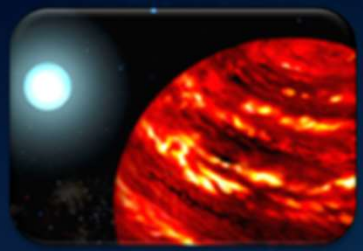
NSF Funds Research and Education Across All Fields of Science and Engineering



Biological Sciences



Engineering



Mathematical and Physical Sciences

Computer & Information Science & Engineering

Geosciences & Polar Programs

STEM Education

Social, Behavioral, and Economic Sciences

Technology, Innovation and Partnerships

Office of International Science and Engineering

Office of Integrative Activities

NSF By The Numbers

The U.S. National Science Foundation (NSF) is an $9.06 billion independent federal agency created by Congress in 1950 to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense. NSF's vital role is to support basic research and researchers who create knowledge that transforms the future.

DID YOU KNOW?

NSF has funded the work of **261** Nobel Prize winners over 75 years.

$9.06B
FY 2024
Total Enacted

93%
Funds research, education and related activities

11K
Awards

1.9K
Institutions

353K
People

NSF-Powered Innovations

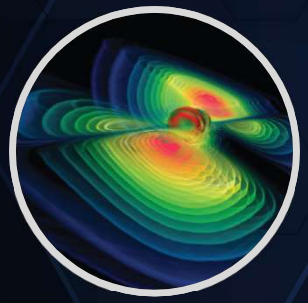
FOUNDATION FOR THE INTERNET

3-D PRINTING BREAKTHROUGH

FIRST IMAGE OF A BLACK HOLE

RAPID COVID-19 TESTING

CLIMATE FORECASTING



LIGO GRAVITATIONAL WAVES

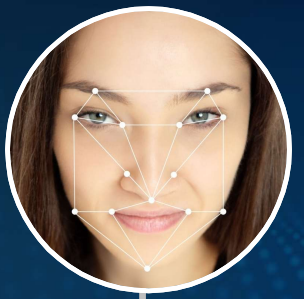
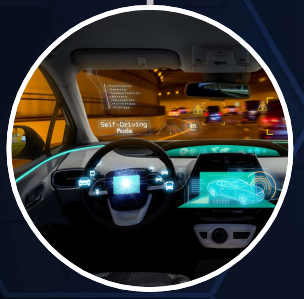
COMPUTER CHIP FABRICATION

ARTIFICIAL INTELLIGENCE

EARLY WEB SEARCH

MAGIC SCHOOL BUS

Investment to Impact: Artificial Intelligence (AI)

	1970s: MACHINE LEARNING	1970s: NATURAL LANGUAGE PROCESSING	1980s: BAYESIAN NETWORKS	1980s: INTELLIGENT TUTORING SYSTEMS	1990s: MEASURING FACIAL EXPRESSIONS IN SBE
NSF INVESTMENTS					
CURRENT IMPACTS					
	DEEPSCALE: VISION SYSTEMS FOR SELF-DRIVING CARS	SPEECH RECOGNITION SOFTWARE	TRAFFIC PREDICTION AND ROUTING	AI INSTITUTE FOR STUDENT-AI TEAMING	EMOTIENT STARTUP

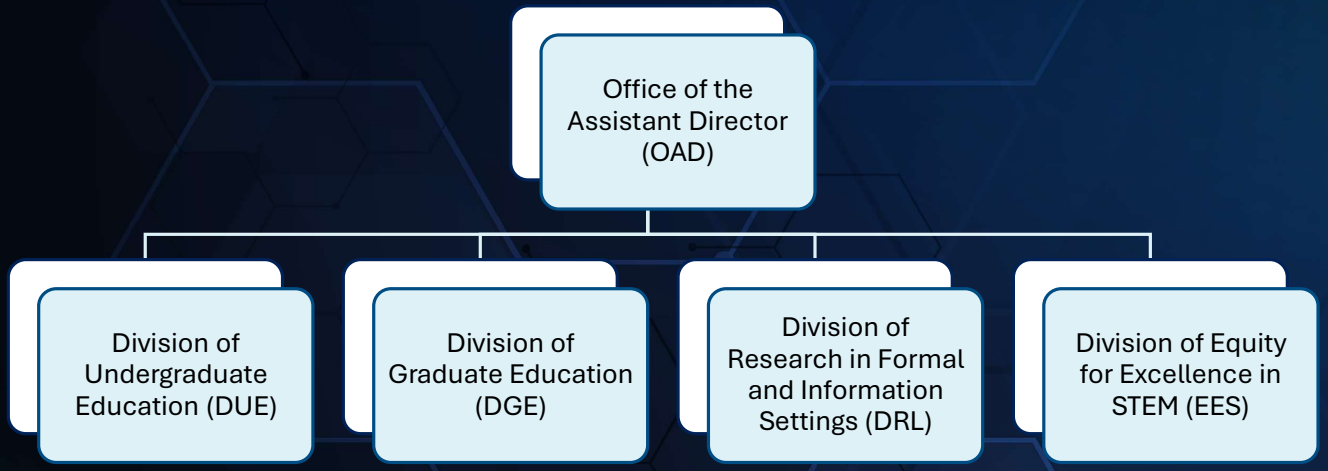
Addressing Two Urgent Challenges to Our Nation

1. Lack of opportunity for every talent that is present in our nation
   (all ethnicities and geographic areas)

2. Stimulate science & engineering jobs and innovation in this country

Directorate for STEM Education (EDU)

The U.S. National Science Foundation's Directorate for STEM Education works to develop a well-informed citizenry and a diverse and capable workforce of scientists, technicians, engineers, mathematicians and educators.



STEM Learning and Learning Environments

Broadening Participation & Institutional Capacity

STEM Professional Workforce Development

Division of Undergraduate Education (DUE)

STRENGTHEN STEM education at two- and four-year colleges and universities by improving curricula, instruction, laboratories, infrastructure, assessment, diversity of students and faculty, and collaborations.

Promote Student Learning and Success

- Stimulate and support research on learning
- Develop exemplary materials and strategies for education
- Effect broad dissemination of effective pedagogy and materials
- Invest in the nation's future K-12 teacher workforce
- Foster connections between all education levels and between academia, industry and professional societies
- Encourage faculty to combine teaching and discipline-based research

DUE Programs

- NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) NSF 24-511
- Advanced Technological Education (ATE) NSF 21-598
- Improving Undergraduate STEM Education: Directorate for STEM Education (IUSE: EDU) NSF 23-510
- IUSE: Innovation in Two-Year College STEM Education (ITYC) NSF 23-584
- IUSE: Hispanic-Serving Institutions (HSI Program) NSF 22-611 *(DUE/EES)*
- Robert Noyce Teacher Scholarship Program NSF 23-586

NSF Scholarships in Science, Technology, Engineering and Mathematics (S-STEM)

Preparing Future Leaders and Movers in Engineering and Computer Science.

2023 S-STEM FLAME Cohorts

Project aims to smooth STEM students' path from 2-year to 4-year institutions

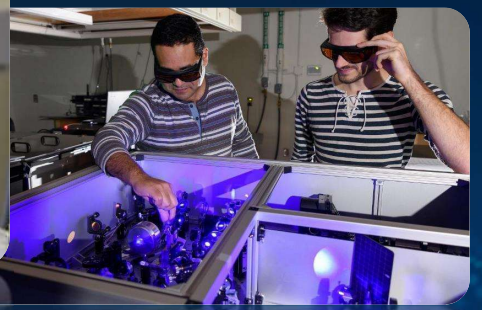
Researchers spearheading a five-year, $3 million S-STEM project reaching students around the country at community colleges.

Robert Noyce Teacher Scholarship Program

2022 Robert Noyce Scholars and Fellows

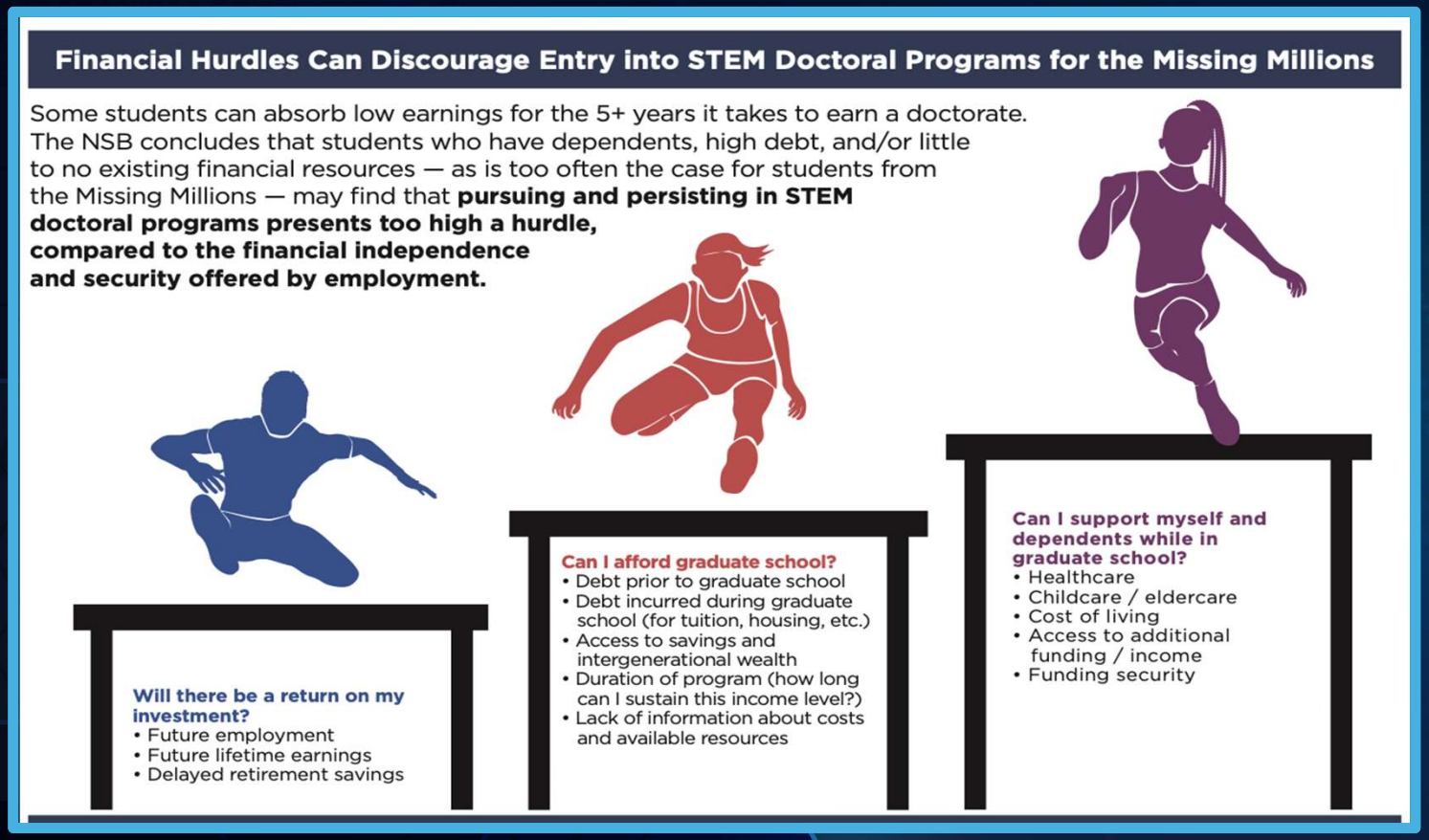
2023 Robert Noyce Scholars and Fellows

Division of Graduate Education (DGE)



PROVIDE funding to support graduate students and the development of novel, innovative programs to prepare tomorrow's leaders in STEM fields.

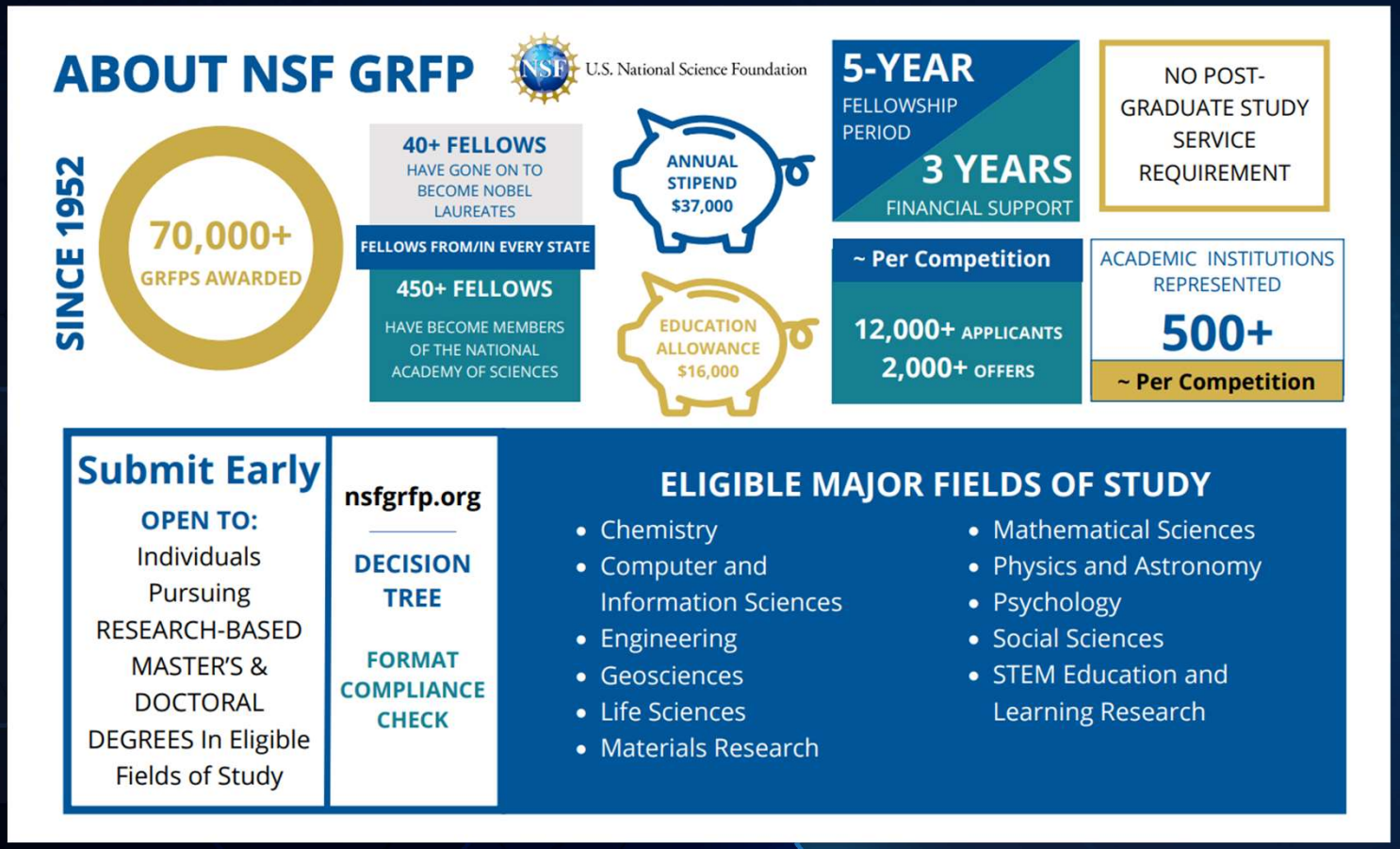
Remove Student Barriers to Graduate Education



DGE Programs

- National Science Foundation Research Traineeship (NRT) Program NSF 24-597
- Innovations in Graduate Education (IGE) NSF 24-529
- Graduate Research Fellowship Program (GRFP) NSF 23-605
- CyberCorps® Scholarship for Service (SFS) NSF 23-574
- Secure and Trustworthy Cyberspace (SaTC) NSF 24-504
- EPSCoR Graduate Fellowship Program (EGFP) NSF 24-588

Graduate Research Fellowship Program (GRFP)



NEW

NSF EPSCoR Graduate Fellowship Program (EGFP)

View guidelines

NSF 24-588

U.S. National Science Foundation
Directorate for STEM Education

Preparing a diverse STEM workforce and a well-informed citizenry

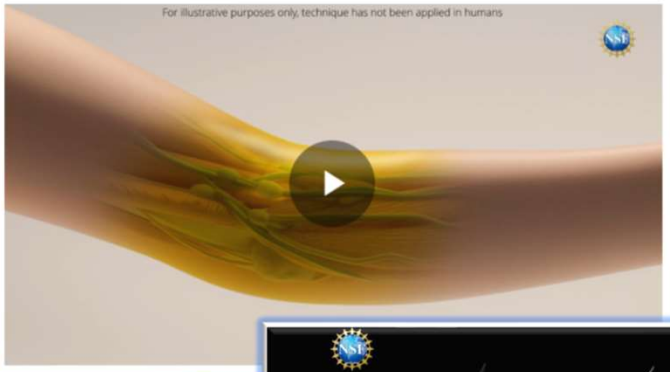
GRFP Fellow Helps Develop Method for Transparent Skin

NSF News

A window into the body: Groundbreaking technique makes skin transparent

Using common food dye, researchers make skin, muscle safely and reversibly transparent

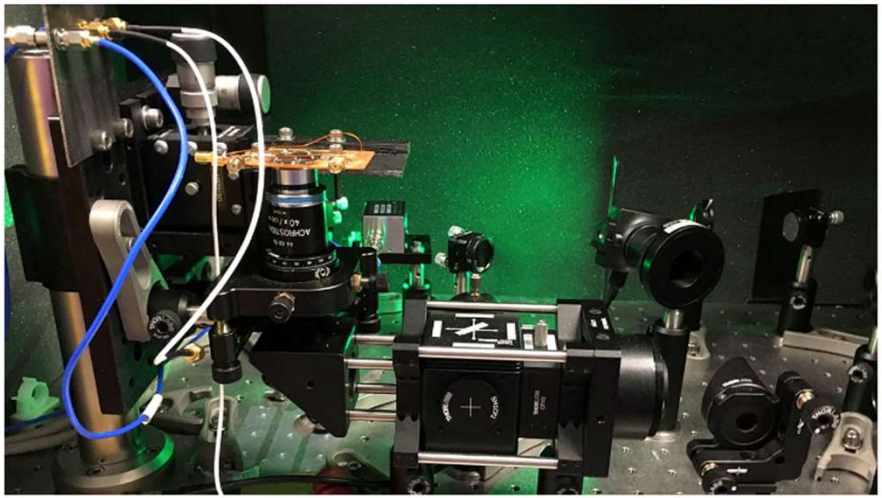
September 5, 2024



NSF Research Traineeship (NRT) Program

LOCAL NEWS

National Science Foundation awards Morgan State University $3 million research traineeship grant



UNM launches innovative quantum photonics graduate program with $3 million NSF grant

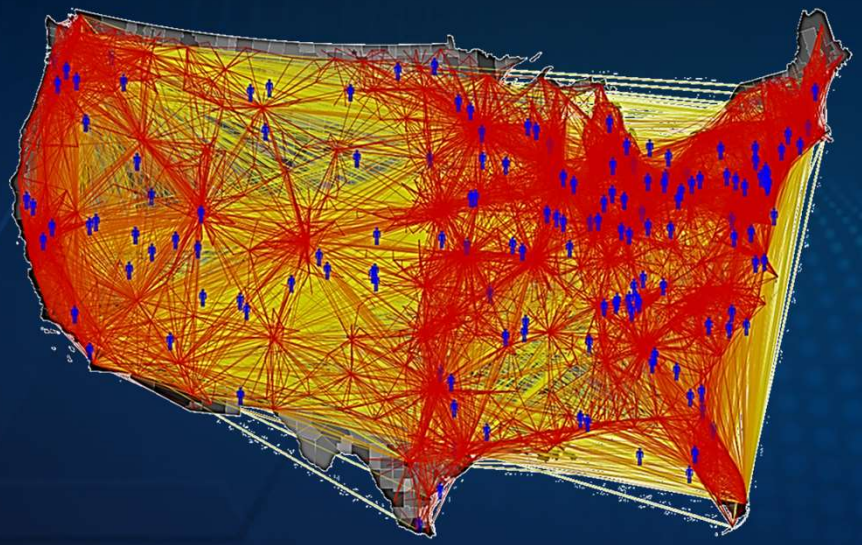
Division of Research on Learning in Formal and Informal Settings (DRL)

INVEST in the improvement of STEM learning for people of all ages by promoting innovative research, development, and evaluation of learning and teaching across all STEM disciplines in formal and informal learning settings.

Improve the Effectiveness of STEM Learning for People of All Ages

Catalyst for Change – advancing theory, method, measurement, development and application in STEM education

- Innovative research, development, and assessment/evaluation of learning and teaching in both formal and informal learning settings
- Broadening and deepening of capacity and impact in the educational sciences



DRL Programs

- Advancing Informal STEM Learning (AISL) NSF 22-626
- Computer Science for All (CSforAll) NSF 24-555
- Innovative Technology Experiences for Students and Teachers (ITEST) NSF 22-585
- Discovery Research PreK-12 (DRK-12) NSF 23-596

EDU Core Research (ECR) Program

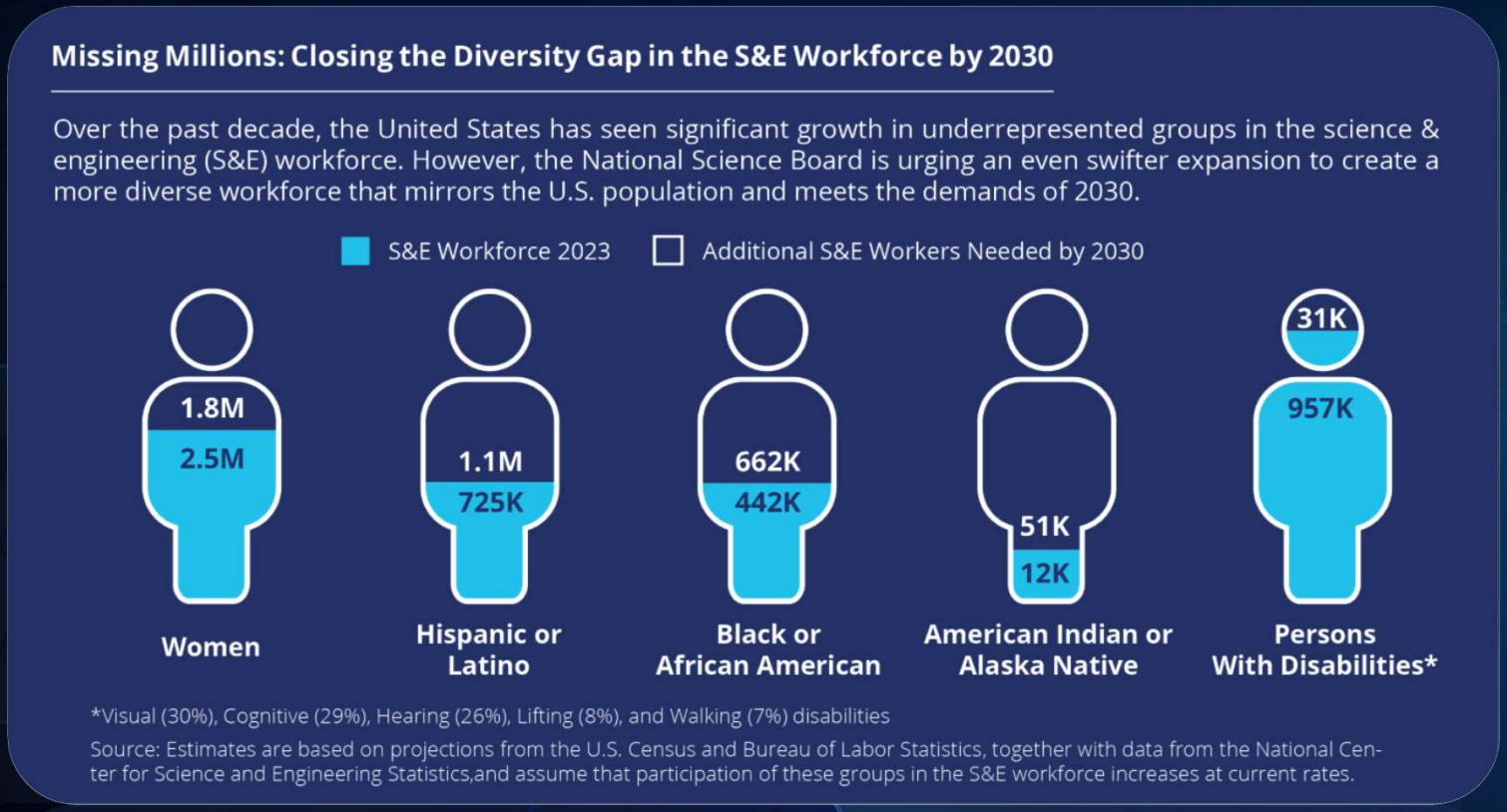
Racial Equity in STEM Education Program

- **Examines racial inequities in STEM** to develop effective research-based practices, policies, and outcomes
- All proposals must **address just two goals:**
  - Systemic barriers to opportunities
  - How these barriers impact access, retention, and success

Division of Equity for Excellence in STEM (EES)

SUPPORT and **PROMOTE** activities that seek to strengthen STEM education for underserved communities, broaden their participation in the workforce, and add to our knowledge base about programs of inclusion.

Reaching the Missing Millions



EES Programs

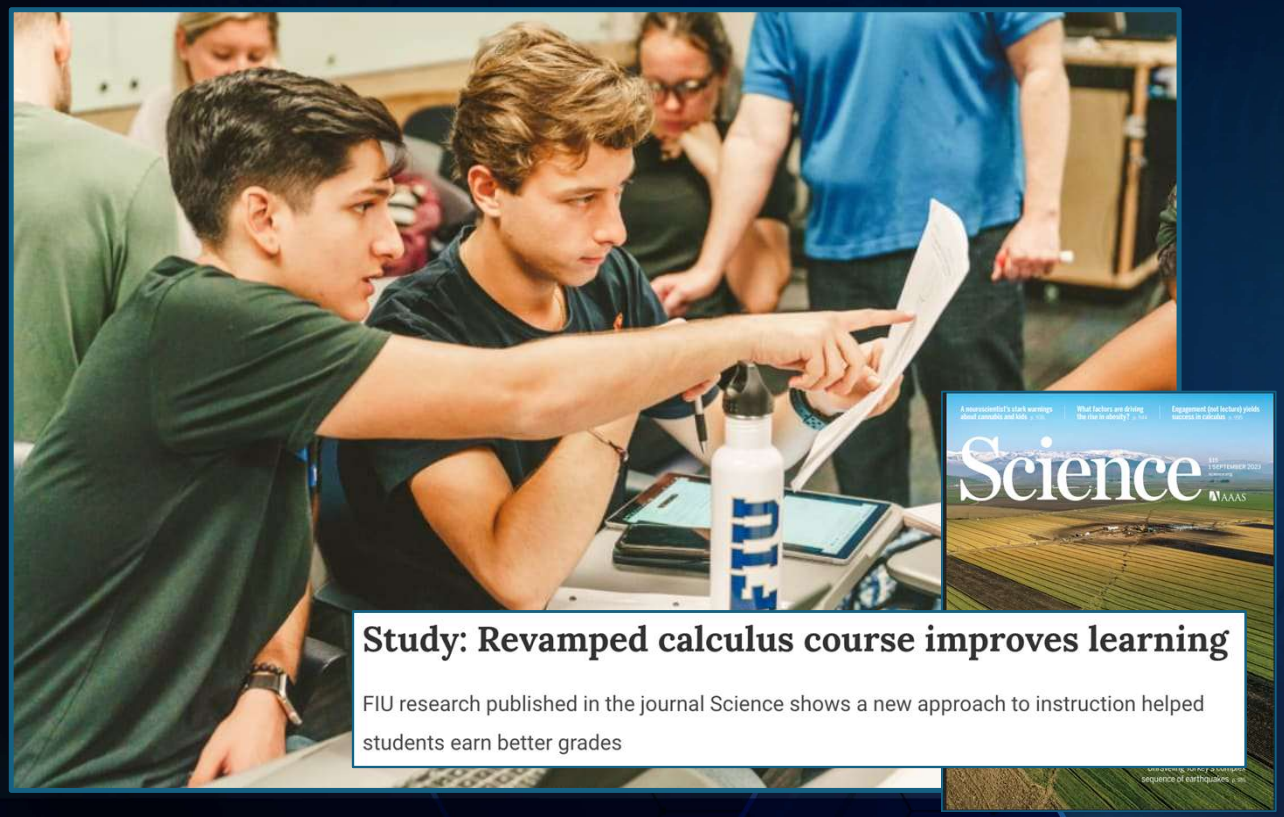
- Louis Stokes Alliances For Minority Participation (LSAMP) **NSF 24-563**
- Tribal Colleges and Universities Program (TCUP) **NSF 21-595**
- Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) **NSF 23-563**
- Centers of Research Excellence in Science and Technology (CREST Centers) **NSF 23-595**
- Alliances for Graduate Education and the Professoriate (AGEP) **NSF 21-576**
- ADVANCE: Organizational Change for Gender Equity in STEM Academic Professions (ADVANCE) **NSF 20-554**
- NSF's Eddie Bernice Johnson Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES) Initiative **NSF 22-622**
- IUSE: Hispanic-Serving Institutions (HSI Program) **NSF 22-611** *(DUE/EES)*

Tribal Colleges and Universities Program (TCUP)

Minnesota tribal colleges to boost science offerings with $5 million in grants

Red Lake Nation College will invest more in health and behavioral sciences, while White Earth Tribal and Community College will create a new associate degree in natural science.

IUSE: Hispanic-Serving Institutions (HSI) Program

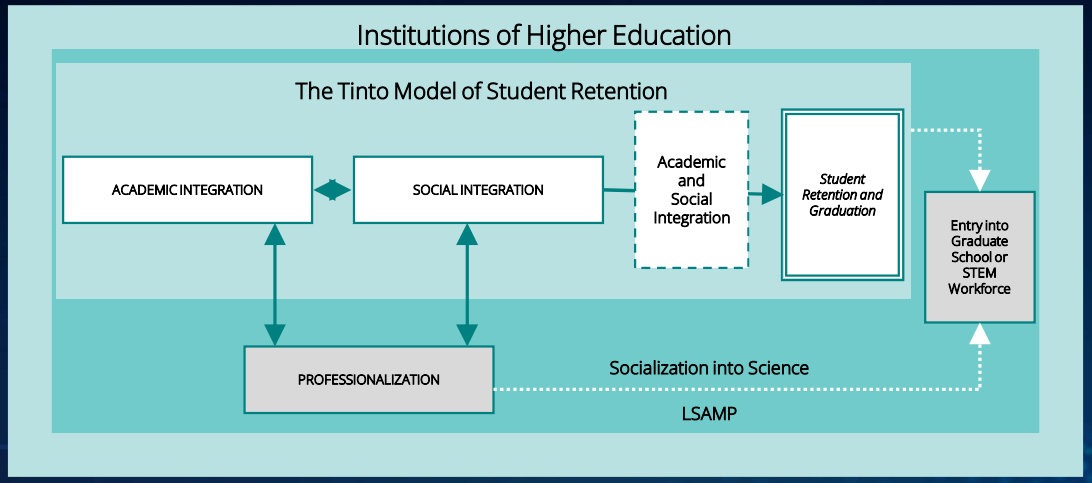


- Researchers found that active learning leads to better grades and understanding of calculus compared to lecture-based classes
- Improved teaching methods help graduate more STEM professionals

Louis Stokes Alliances for Minority Participation (LSAMP)

- Authorized by Congress in 1991
- Significantly increase the quality and quantity of underserved students successfully completing STEM BS degree programs to diversify workforce
- Implement strategies that focus on critical transition points
- Alliances are composed of universities and colleges, government labs, industry and not for profit partners

LSAMP Model and Elements

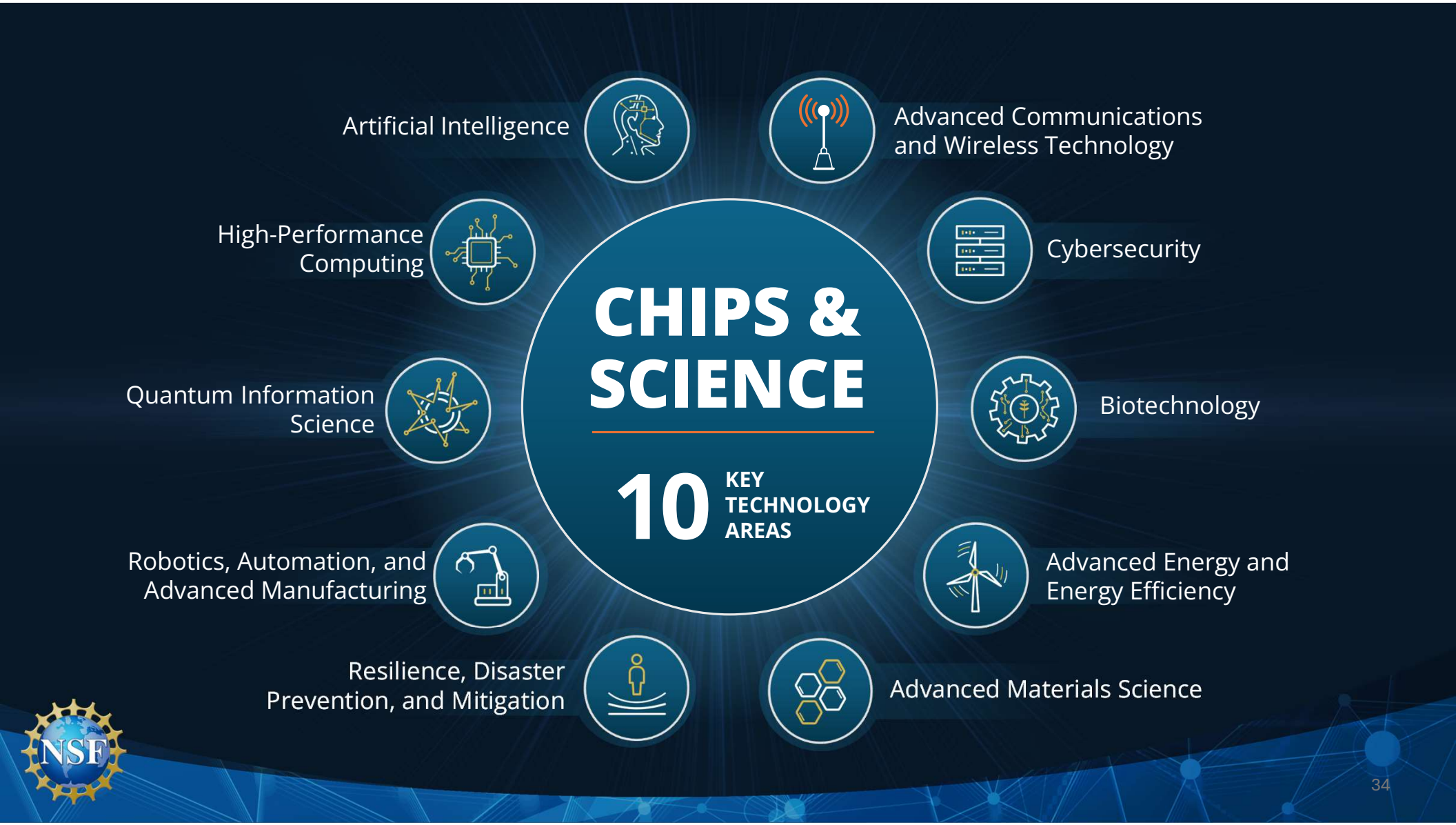


Activity	Academic Integration	Social Integration	Professionalization
Summer Bridge	✓	✓	
Peer Study Group	✓	✓	
Learning Centers	✓	✓	
Academic Advising	✓		
Summer Academic Enrichment	✓		
Tutoring	✓		
Research Experience	✓	✓	✓
Mentorships	✓	✓	✓
Conferences	✓		✓
Internships	✓	✓	✓
Career Awareness			✓
GRE Test Preparation	✓		✓
Graduate School Admissions Support			✓

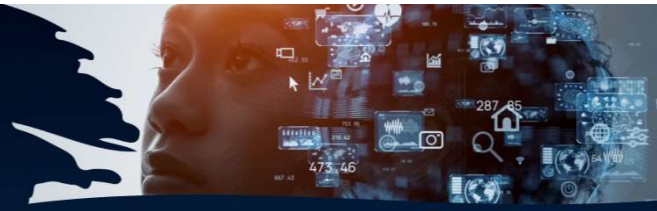
Workplace Equity for Persons with Disabilities in STEM and STEM Education

- Study barriers and solutions to diversity, equity, inclusion, and accessibility in STEM and STEM education workplaces and training settings
- Apply intersectional social identity perspectives to investigate characteristics and conditions of STEM and STEM education workplaces and training environments that limit and/or improve diversity, equity, inclusion, and accessibility
- Conduct use-inspired and solution-oriented translational research about diverse, equitable, inclusive, and accessible STEM and STEM education workplaces and training settings


CHIPS & SCIENCE ACT OF 2022


Artificial Intelligence
Advanced Communications and Wireless Technology
High-Performance Computing
Cybersecurity
CHIPS & SCIENCE
10 KEY TECHNOLOGY AREAS
Quantum Information Science
Biotechnology
Robotics, Automation, and Advanced Manufacturing
Advanced Energy and Energy Efficiency
Resilience, Disaster Prevention, and Mitigation
Advanced Materials Science

Creating Opportunities Everywhere



- Increasing investments in STEM education research
- Disseminating evidence-based practices in STEM for underresourced schools
- Addressing preparation and access barriers to STEM courses
- Increasing investments in recruitment, preparation, and retention in STEM
- Addressing financial barriers to STEM education
- Developing new and different pathway programs in STEM
- Investing in AI and technological innovations that advance STEM teaching and learning
- Ramping up STEM broadening participation investments
- Engaging in partnerships and collaborations that advance STEM education research, teaching and learning, etc.

NSF Partnerships

NSF News

NSF announces $10 million partnership with Intel Corporation to train and build a skilled semiconductor manufac… workforce

Gates Foundation, Schmidt Futures, Walton Family Foundation partner with NSF

…ading foundations that will support …inalized groups. Read more

Advancing Elementary Science Education: A New Joint Investment between IES and NSF

September 25, 2024 Blog Editor NCER

NSF launches new partnership for gender … with The Kaleta A. Doolin Foundati…

The new partnership will invest in NSF programs that su… activities for women in science. Read more.

NSF News

NSF investing nearly $8M in EducateAI awards to develop next generation of well-trained AI workforce

September 4, 2024

View image credit & co…

Discovery Files

NSF and Micron invest in STEM teacher training to support future microelectronics workforce

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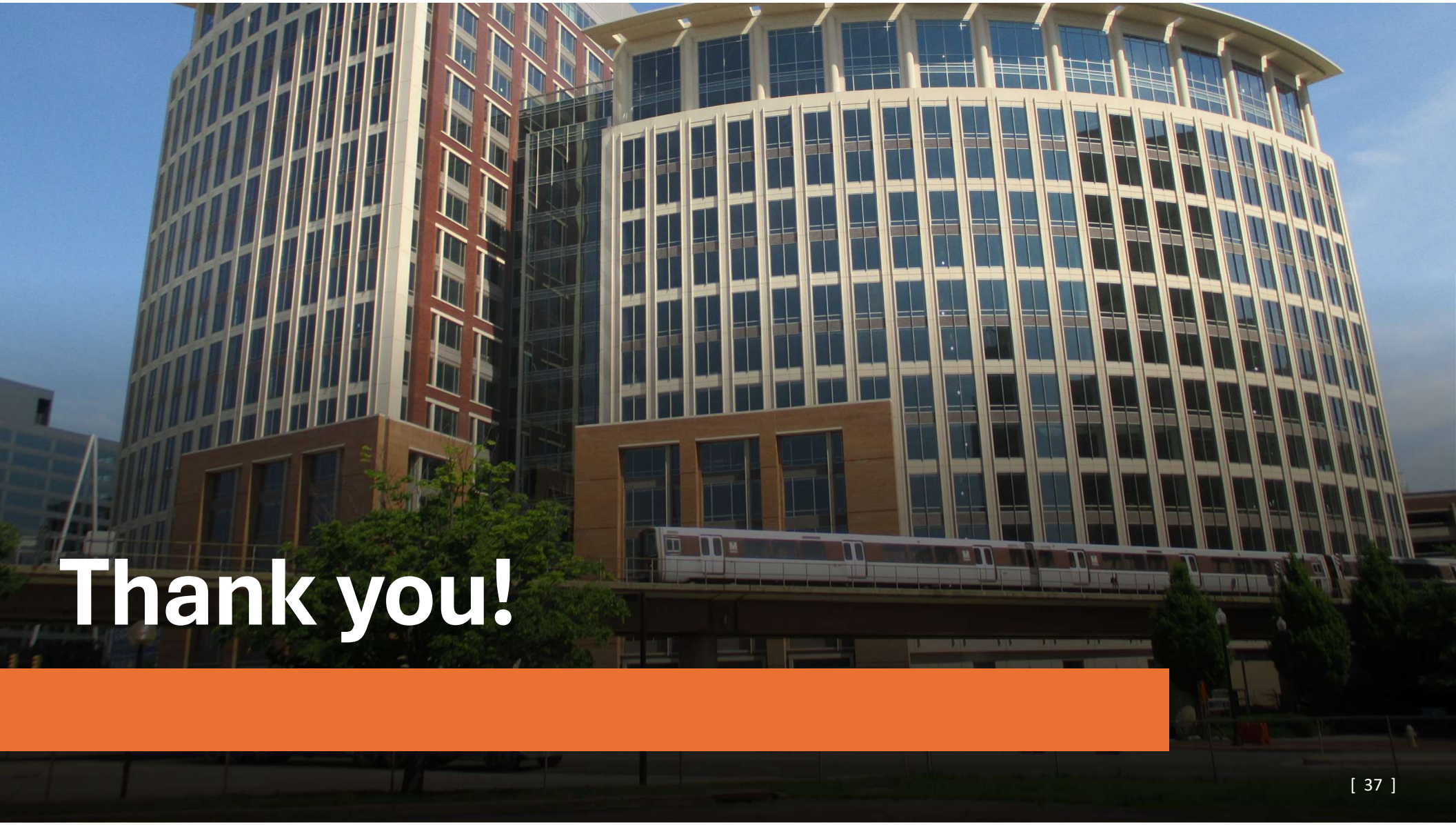

Thank you!