

DIVISION OF GRADUATE EDUCATION

2023 – 2028 STRATEGIC PLAN



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About the Cover Image:

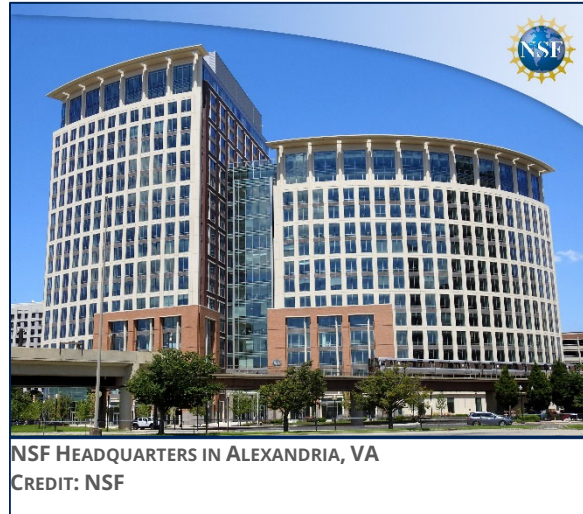
Image from [NSF Research Traineeship Award 2151820](#) to Arkansas State University on Understanding Invasion and Disease Ecology and Evolution through Computational Data Education

Credit: Travis Marisco, Arkansas State University



ABOUT THE DIVISION OF GRADUATE EDUCATION

The Division of Graduate Education (DGE) is one of four divisions of the U.S. National Science Foundation (NSF) Directorate for STEM Education (EDU). DGE advocates for innovative, inclusive, equitable, high-quality graduate education in Science, Technology, Engineering, and Mathematics (STEM) fields. DGE manages innovative programs that serve all the STEM disciplines eligible to receive funding from NSF. DGE programs directly or indirectly support U.S. citizens and permanent residents as they prepare to become leading scientists and engineers. To contribute to the knowledge base regarding best practices in graduate education, DGE supports research, education, and other activities.



Summary of Programs Managed Primarily by DGE

CyberCorps® Scholarship for Service Program (SFS)

Increase the number and diversity of qualified cybersecurity professionals prepared to serve the cybersecurity mission of the government.

Graduate Research Fellowship Program (GRFP)

Support outstanding graduate students as they prepare to serve as the nation's future STEM scholars and leaders.

Innovations in Graduate Education Program (IGE)

Encourage development and implementation of bold and potentially transformative approaches to STEM graduate education and training.

NSF Research Traineeship Program (NRT)

Prepare diverse cohorts of STEM graduate students for a range of careers in high-priority interdisciplinary or convergent research areas.

Secure & Trustworthy Cyberspace, Education (SaTC EDU)

Advance research that will contribute novel understanding and impact on cybersecurity learning, pedagogy, and equity and inclusion in educational settings.

STEM Education Postdoctoral Research Fellowships (STEM Ed PRF) Program

Build the national capacity to conduct STEM education research by funding early-career scholars.



STRATEGIC PLANNING PROCESS

DGE initiated an effort to develop a division-wide strategic plan in 2022, shortly after the arrival of a new Division Director and Deputy Division Director. Although the leadership team was relatively new, they recognized their arrival as an opportunity to critically reflect on the division, its current identity, and its desired future state. The division was firmly committed to becoming recognized for leadership in STEM graduate education, and to dedicating the time needed to chart a path forward. The outcomes of DGE retreats and strategic planning efforts in prior years were incorporated in the division's current effort to take the following steps as part of the strategic-planning process:

- Articulate a mission, vision, and set of values aligned with NSF's current strategic plan.
- Succinctly describe DGE programs.
- Define strategic goals necessary to enact DGE's mission.
- Create action plans to achieve each goal.



A CYBERSECURITY LAB AT OLD DOMINION UNIVERSITY
FROM SFS AWARD 2042882
CREDIT: COREY NOLEN PHOTO, OLD DOMINION
UNIVERSITY.

The final plan represents a collaborative effort that incorporated input from all division staff through a process consistent with DGE's previously defined values of **Excellence**, **Respect**, and **Opportunity**. The planning process began in 2023 with a team-building activity designed to promote effective communication and shared responsibility for development of the plan. This was followed by a full-day in-person facilitated retreat. Subsequently, DGE leadership organized the results of the retreat, and an early draft of the strategic plan was presented to interested staff for review and comment during a half-day facilitated virtual retreat. Later, each component of the strategic plan was presented to all staff during regularly scheduled division-wide meetings. Feedback and suggestions were incorporated into the draft document on an ongoing basis. The final version, presented here, was reviewed and approved by the entire division. Articulation of a set of action plans, associated with each of DGE's strategic goals, was developed and refined by small working groups who presented their results to others during division-wide meetings.



DGE STRATEGIC PLAN

DGE's mission, vision, values, and goals as articulated in this plan are aligned with NSF's [2022-2026 Strategic Plan](#). Priorities for actions to be taken to address the goals and enact the division's mission were developed based on staff input and the current availability of resources; these are articulated in a separate document that is only accessible by DGE staff. The priorities will be used to guide DGE's short- intermediate- and long-term actions and will be reviewed and revised by staff as necessary on an ongoing basis.

DGE VISION

NSF envisions a nation that leads the world in science and engineering research and innovation, to the benefit of all, without barriers to participation. DGE envisions an inclusive, equitable, and globally competitive U.S. graduate education enterprise that advances STEM innovation, research, scholarship, diversity, and education.



STUDENTS EXAMINE NANOPARTICLES FROM NANOSCIENCE FOR LIFE NRT AWARD 2151945
CREDIT: SHANTE BOOKER, CUNY

DGE MISSION

The mission of NSF is to promote the progress of science, and DGE's mission is to enable and inspire an inclusive, equitable, and globally competitive U.S. STEM workforce by support students, research, scholarship, and innovations in graduate education.

NSF Vision

A nation that leads the world in science and engineering research and innovation, to the benefit of all, without barriers to participation.

DGE Vision

An inclusive, equitable, and globally competitive U.S. graduate education enterprise that advances STEM innovation, research, scholarship, diversity, and education.

NSF Mission

To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes.

DGE Mission

To enable and inspire an inclusive, equitable, and globally competitive U.S. STEM workforce by supporting students, research, scholarship, and innovations in graduate education.





DGE VALUES

DGE is guided by NSF's core values as published in the [NSF 2022-2026 Strategic Plan](#). These core values inform all aspects of decision making, priority setting, and other work in DGE. In accordance with NSF's core values, each member of DGE's staff is committed to enhancing scientific leadership, valuing diversity and inclusion, and demonstrating integrity and excellence through public service. DGE staff recognize that innovation and collaboration are necessary for enactment of the division's mission and realization of DGE's vision.

Values articulated by DGE as part of this Strategic Plan guide each staff member's day-to-day activities. DGE staff are committed to the values of *Excellence*, *Respect*, and *Opportunity*. DGE's values require that staff are respectful, demonstrate personal integrity, support others' growth, promote equality, and contribute to the physical, emotional, and mental well-being of colleagues and the STEM community served by DGE.

DGE Values	NSF Core Values				
<p>We Value Excellence</p> <ul style="list-style-type: none"> ✓ We are innovative and interdisciplinary collaborators enabling new discoveries. ✓ We are forward-looking professionals shaping STEM graduate education nationally. ✓ We are passionate leaders advancing education to impact people's lives and the world. 	Scientific Leadership	Diversity and Inclusion	Integrity and Excellence	Public Service	Innovation and Collaboration
<p>We Value Respect</p> <ul style="list-style-type: none"> ✓ We value and respect the talents, experience, and perspectives of others. ✓ We are open, honest, fair, and kind with one another and our stakeholders. ✓ We care for and treat one another in the manner they want to be treated. 					
<p>We Value Opportunity</p> <ul style="list-style-type: none"> ✓ We provide an environment where all can grow, while feeling recognized, welcomed, and included. ✓ We ensure equitable and fair consideration of people and ideas. ✓ We support programs that provide opportunities for ALL potential STEM learners. 					



DGE GOALS

As described above, DGE's vision, mission, and values are aligned with the vision, mission, and values of NSF. This Strategic Plan also identifies a set of six goals that will guide DGE's activities. These six goals are aligned with the four NSF-wide strategic themes articulated in the [NSF 2022-2026 Strategic Plan](#): Empower, Discover, Impact, and Excel.

DGE Goals	NSF Strategic Goals
<p>Goal 1: Promote and empower STEM talent to participate in post-baccalaureate education and training throughout career stages to advance U.S. global leadership in STEM.</p>	<div style="display: flex; flex-direction: column; align-items: center; justify-content: center;"> <div style="margin-bottom: 20px;">Empower</div> <div style="margin-bottom: 20px;">Discover</div> <div style="margin-bottom: 20px;">Impact</div> <div>Excel</div> </div>
<p>Goal 2: Contribute to STEM graduate student success by supporting the discovery and promotion of equitable practices and effective strategies to overcome barriers.</p>	
<p>Goal 3: Serve as a source of support for discovery and dissemination of information about best practices in STEM graduate education.</p>	
<p>Goal 4: Evaluate the impact of NSF's investments in graduate education and identify gaps in the agency's portfolio.</p>	
<p>Goal 5: Cultivate sustainable partnerships that enable inclusive and equitable practices to inspire, support, and prepare current and future graduate students for diverse and globally competitive careers in STEM.</p>	
<p>Goal 6: Excel in program operations and management aligned with the DGE Mission by leveraging data & tools, increasing skill training, and fostering teamwork.</p>	

A companion internal DGE document addressing additional details regarding the DGE Strategic Plan development and implementation will be maintained by the division. This document details the actions planned to achieve the division's goals over the next five years. The document, which will be reviewed and revised at regular intervals, will be used to track progress towards achieving the division's vision, mission, values, and specific goals.



INFORMATION ABOUT DGE PROGRAMS

PROGRAMS HOSTED BY THE DIVISION OF GRADUATE EDUCATION

NSF CYBERCORPS® SCHOLARSHIP FOR SERVICE (SFS) PROGRAM

The [NSF CyberCorps® Scholarship for Service \(SFS\) Program](#) was established as a result of Presidential Directive 63, dated May 22, 1998. The subsequent National Plan for Information Systems Protection, issued January 8, 2000, was the first attempt by any national government to design a way to protect its cyberspace. The Cybersecurity Enhancement Act of 2014, as amended by the National Defense Authorization Acts for 2018 and 2021, authorized NSF, in coordination with the U.S. Office of Personnel Management (OPM) and the U.S. Department of Homeland Security (DHS), to continue to offer the SFS program. The SFS program is designed to recruit and train the next generation of information technology professionals, industrial control system security professionals, and security managers to meet the needs of the cybersecurity mission for Federal, State, local, and tribal governments.

The NSF CyberCorps® Scholarship for Service (SFS) is designed to increase the number and diversity of qualified cybersecurity professionals prepared to serve the cybersecurity mission of the government.

Until 2017, the SFS program included two tracks. The first was a Scholarship Track that provided funding to universities to award scholarships for up to three years to students in undergraduate or graduate degree programs in the area of cybersecurity. All scholarship recipients were required to work after graduation in an approved organization in a position



UCF STUDENTS COMPETE IN CYBERSEED COMPETITION FROM SFS AWARD 2042996
CREDIT: UNIVERSITY OF CENTRAL FLORIDA

related to cybersecurity for a period of time equal to the duration of the scholarship. The second track was a Capacity Building Track that provided funding to increase the ability of the U.S. higher education enterprise to produce cybersecurity professionals. In 2018, the Capacity Building track removed from the SFS program solicitation and merged with the Education Designation (EDU) of the cross-agency Secure and Trustworthy Cyberspace (SaTC) program.



NSF GRADUATE RESEARCH FELLOWSHIP PROGRAM (GRFP)

The [NSF Graduate Research Fellowship Program \(GRFP\)](#) is the oldest federal fellowship program directly supporting graduate students in STEM fields. The purpose of the NSF

The NSF Graduate Research Fellowship Program (GRFP) is designed to support outstanding graduate students as they prepare to serve as the nation's future STEM scholars and leaders.

Graduate Research Fellowship Program (GRFP) is to help ensure the quality, vitality, and diversity of the scientific and engineering workforce of the United States. The program recognizes and supports outstanding undergraduate and graduate students who are pursuing full-time research-based master's and doctoral degrees in STEM or STEM education. The GRFP provides three years of support over a five-year fellowship period for individuals who have demonstrated their potential for

significant research achievements. NSF actively encourages the submission of applications from the full spectrum of diverse talent in STEM.

The GRFP has a long history of selecting recipients who achieve high levels of success in their future academic and professional careers. Over 40 former Graduate Research Fellows have won Nobel Prizes.

INNOVATIONS IN GRADUATE EDUCATION (IGE) PROGRAM

The [Innovations in Graduate Education \(IGE\) Program](#) began as a track within the NRT program intended to extend the impact of the NRT approach by generating potential models

The Innovations in Graduate Education (IGE) is designed to encourage development and implementation of bold and potentially transformative approaches to STEM graduate education and training.

for improvements in graduate education. Like the NRT program, projects supported by IGE are designed to prepare STEM graduate students for the full range of possible STEM career paths to advance the nation's STEM enterprise. In 2017, the IGE track was presented to the STEM community as a distinct program with its own solicitation. The IGE program is designed to encourage the development and implementation of bold, new, and

potentially transformative approaches to STEM graduate education training. The program seeks proposals that explore ways for graduate students in research-based master's and doctoral degree programs to develop the skills, knowledge, and competencies needed to pursue a range of STEM careers.

In 2021, the NSF awarded a cooperative agreement to the [Council of Graduate Schools \(CGS\)](#) to develop and implement an [IGE Innovation Acceleration Hub](#). The IGE Hub facilitates awardee communications about research activities and outcomes and provides a platform for external stakeholder engagement.



NSF RESEARCH TRAINEESHIP (NRT) PROGRAM

The [NSF Research Traineeship \(NRT\) program](#) was launched in 2014, and the tenth cohort of NRT awards were made in 2023. NRT's predecessor was the Integrative Graduate Education and Research Traineeship (IGERT) program, NSF's flagship interdisciplinary training program, which was active between 1998 and 2013. The NRT program supports diverse

The NSF Research Traineeship Program (NRT) provides funding for projects that prepare diverse cohorts of STEM graduate students for a range of careers in high-priority interdisciplinary or convergent research areas.

graduate students in research-based master's and doctoral degree programs to develop the skills, knowledge, and competencies needed to pursue a range of STEM careers. The program is dedicated to effectively training STEM graduate students in high-priority interdisciplinary or convergence research areas through a comprehensive traineeship model that is innovative, evidence-based, and aligned with changing workforce and research needs.

The NRT program addresses workforce development, emphasizing broad participation and institutional capacity-building needs in graduate education. The program encourages proposals that involve strategic collaborations with the private sector, non-governmental organizations, government agencies, national laboratories, field stations, teaching and learning centers, informal science centers, and academic partners.

Convergence research is driven by a specific and compelling problem that requires deep and intentional integration across disciplines. Convergence research discovers and develops new frameworks, paradigms, or disciplines that address critical questions or challenges.

SECURE AND TRUSTWORTHY CYBERSPACE - EDUCATION DESIGNATION (SATC-EDU) PROGRAM

Funding opportunities designed to strengthen the capacity of the United States' higher education enterprise to produce cybersecurity professionals include the [Secure and Trustworthy Cyberspace - Education Designation \(SaTC-EDU\)](#).

The Secure and Trustworthy Cyberspace - Education Designation (SaTC-EDU) is designed to advance research that will contribute novel understanding and impact on cybersecurity learning, pedagogy, and equity and inclusion in educational settings.

The goals of the SaTC program are aligned with the National Science and Technology Council's (NSTC) [Federal Cybersecurity Research and Development Strategic Plan \(RDSP\)](#) and [National Privacy Research Strategy \(NPRS\)](#), which articulate goals to protect and preserve the growing social and economic benefits of cyber systems while ensuring security and privacy. The Education (EDU) designation is used to label proposals focusing on cybersecurity and privacy education and training. The



SaTC program involves collaboration among the Computer and Information Science and Engineering (CISE); Engineering (ENG); Mathematical and Physical Sciences (MPS); Social, Behavioral and Economic Sciences (SBE); and EDU Directorates at the National Science Foundation.

STEM EDUCATION POSTDOCTORAL RESEARCH FELLOWSHIP (STEM ED PRF) PROGRAM

The Directorate for STEM Education (EDU) STEM Education Postdoctoral Research Fellowships (STEM Ed PRF) program launched in 2022. The STEM ED PRF program funds postdoctoral fellowship projects designed to enhance the research knowledge, skills, and practices of recent doctoral graduates in STEM, STEM education, education, and related disciplines. Two solicitations exist and they support [individual postdoctoral fellowship awards](#) and [organizational postdoctoral fellowship programs](#).

The STEM Education Postdoctoral Research Fellowships (STEM Ed PRF) is designed to build the national capacity to conduct STEM education research by funding early-career scholars.

The STEM Ed PRF program seeks to increase the number of STEM education researchers who can advance knowledge regarding STEM learning and learning environments, broaden participation in STEM fields, and enhance the development of the STEM workforce. The program is designed to support postdoctoral fellows engaged in experiences that will advance their career goals by developing their expertise, skills, and competencies in fundamental STEM education research.

STEM Ed Individual (STEM Ed IPRF) awards provide direct support to Fellows to enable them to engage in ongoing research, develop independent research, and implement an independent professional development plan under the guidance of a sponsoring researcher. STEM Ed Organizational (STEM Ed OPRF) awards provide support to organizations as they develop a STEM education postdoctoral research fellowship project and support a cohort of fellows.

DIRECTORATE-WIDE PROGRAMS INVOLVING THE DIVISION OF GRADUATE EDUCATION

In addition to the programs listed in the previous section that are housed within the DGE, the division also contributes resources in support of three additional programs that involve collaborations among all four divisions in EDU. These programs are described in this section. DGE also collaborates with other directorates within NSF to contribute to the management and operation of many other programs, such as the NSF-wide [Faculty Early Career Development Program \(CAREER\)](#); the entirety of the cross-directorate programs is not listed here.



EDU-Wide Programs Involving DGE

EDU Core Research (ECR:Core)

Support fundamental research generating knowledge and understanding in STEM learning and learning environments, broadening participation in STEM fields, and STEM workforce development.

EDU Core Research: Building Capacity in STEM Education Research (ECR:BCSER)

Support projects that collectively build investigators' capacity and broaden the pool of researchers prepared to carry out high-quality STEM education research that will enhance the Nation's STEM education enterprise.

Racial Equity in STEM Education (EDU Racial Equity)

Support projects focused on advancing racial equity in STEM education and workforce development that are led or co-developed by individuals and communities most impacted by inequities.

EDU CORE RESEARCH (ECR:CORE) PROGRAM

The [EDU Core Research \(ECR\) program](#) invites proposals for fundamental research (curiosity-driven basic research and use-inspired basic research) that contributes to the general, explanatory knowledge that underlies STEM education in one or more of three broadly conceived research areas: research on STEM learning and learning environments, research on broadening participation in STEM fields, and research on STEM workforce Development. Within this framework, the ECR program supports a wide range of fundamental STEM education research activities, aimed at learners of all groups and ages in formal and informal settings.

EDU CORE RESEARCH: BUILDING CAPACITY IN STEM EDUCATION RESEARCH (ECR:BCSER) PROGRAM

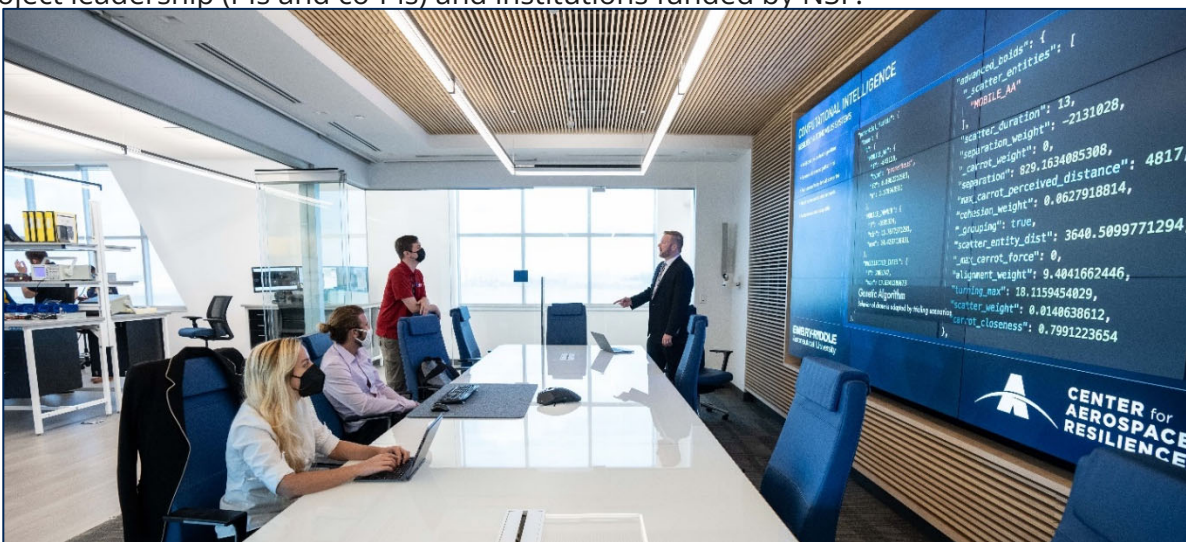
[ECR's Building Capacity in STEM Education Research \(ECR:BCSER\) program](#) supports projects that build investigators' capacity to carry out high-quality STEM education research that will enhance the nation's STEM education enterprise. In addition, the ECR:BCSER program seeks to broaden the pool of researchers who can advance knowledge regarding STEM learning and learning environments, broadening participation in STEM fields, and STEM workforce development. Researchers of races and ethnicities, genders, sexual orientations, and abilities who are currently underrepresented in STEM education research and the STEM workforce, as well as faculty at minority-serving and two-year institutions, are particularly encouraged to submit proposals.



ECR:BCSER supports activities that enable researchers to enhance their expertise and acquire the requisite knowledge and skills to conduct rigorous research in STEM education. Career development may be accomplished through investigator-initiated professional development and research projects or through institutes that enable researchers to integrate methodological strategies with theoretical and practical issues in STEM education.

RACIAL EQUITY IN STEM EDUCATION (EDU RACIAL EQUITY)

The [EDU Racial Equity program](#) is aligned with NSF's long-standing investments in the development of a diverse and well-prepared public and workforce. The [NSF 2022-2026 Strategic Plan](#) focuses on ensuring that U.S. research is an inclusive enterprise that benefits from the talent of all sectors of American society – a research enterprise that incorporates the rich demographic and geographic diversity of the nation. Racial inequities often create barriers to STEM knowledge generation and participation in the STEM workforce. Similarly, inequities limit access to and participation in STEM education and research. In ongoing efforts to address disparities, NSF EDU seeks to support bold, groundbreaking, and potentially transformative projects that advance racial equity in STEM education and workforce development through practice and/or fundamental or applied research. Collectively, proposals funded by the Racial Equity program: (1) substantively contribute to institutionalizing effective research-based practices, policies, and outcomes in STEM environments for those who experience inequities; (2) advance scholarship and promote racial equity in STEM in ways that expand the array of epistemologies, perspectives, ideas, theoretical and methodological approaches that NSF funds; and (3) further diversify project leadership (PIs and co-PIs) and institutions funded by NSF.



THE CENTER FOR AEROSPACE RESILIENCE AT EMBRY RIDDLE UNIVERSITY ADDRESSES CYBER THREATS IN AERO SYSTEMS FROM SFS AWARD 2146462

CREDIT: EMBRY-RIDDLE AERONAUTICAL UNIVERSITY/DAVID MASSEY



GRAPHICAL SUMMARY OF DGE'S STRATEGIC PLAN

Alignment of NSF & DGE Vision, Mission, and Strategic Goals

NSF Vision: A nation that leads the world in science and engineering research and innovation, to the benefit of all, without barriers to participation.

NSF Mission: To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes.

DGE Vision: An inclusive, equitable, and globally competitive U.S. graduate education enterprise that advances STEM innovation, research, scholarship, diversity, and education.

DGE Mission: To enable and inspire an inclusive, equitable, and globally competitive U.S. STEM workforce by supporting students, research, scholarship, and innovations in graduate education.

EMPOWER Empower STEM talent to fully participate in science & engineering Ensure accessibility and inclusivity Increase the involvement of communities underrepresented in STEM and enhance capacity throughout the nation Unleash STEM talent for America Grow a diverse STEM workforce to advance the progress of science and technology	DISCOVER Create new knowledge about our universe, the world and ourselves Advance the frontiers of research Accelerate discovery through strategic investments in ideas, people and infrastructure Enhance research capability Advance the state of the art in research practice	IMPACT Benefit society by translating knowledge into solutions Deliver benefits from research Advance research and accelerate innovation that addresses societal challenges Lead globally Cultivate a global S&E community based on shared values and strategic cooperation	EXCEL Excel at NSF operations & management Strengthen at speed and scale Pursue innovative strategies to strengthen and expand the agency's capacity and capabilities Invest in people Attract, empower and retain a talented and diverse NSF workforce
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DGE Strategic Plan Advances All NSF Strategic Goals

 EMPOWER	Goal 1: Promote and empower STEM talent to participate in post-baccalaureate education and training throughout career stages to advance U.S. global leadership in STEM.
 EMPOWER DISCOVER	Goal 2: Contribute to STEM graduate student success by supporting the discovery and promotion of equitable practices and effective strategies to overcome barriers.
 DISCOVER IMPACT	Goal 3: Serve as a source of support for discovery and dissemination of information about best practices in STEM graduate education. Goal 4: Evaluate the impact of NSF's investments in graduate education and identify gaps in the agency's portfolio.
 IMPACT	Goal 5: Cultivate sustainable partnerships that enable inclusive and equitable practices to inspire, support and prepare current and future graduate students for diverse and globally competitive careers in STEM.
 EXCEL	Goal 6: Excel in program operations and management aligned with the DGE Mission by leveraging data & tools, increasing skill training, and fostering teamwork.

Foundations: People, Ideas, Partnerships