



# FY 2025 BUDGET REQUEST TO CONGRESS






U.S. National Science Foundation

Credit: The University of Texas at El Paso

## FISCAL YEAR 2025 BUDGET HIGHLIGHTS

The Biden-Harris Administration released the President's Budget for Fiscal Year 2025. The \$10.183 billion request for the U.S. National Science Foundation will carry out the NSF vision, which rests on three pillars that support transformational science and technology investments made in recent years, including those enabled by the CHIPS and Science Act of 2022 and by the FY 2023 Omnibus and the Disaster Relief Supplemental appropriations. These pillars are:

 <p><b>STRENGTHENING ESTABLISHED NSF</b></p> <p>Driving discovery and enhancing state-of-the-art research capabilities are and will continue to be NSF's central focus.</p>	 <p><b>INSPIRING MISSING MILLIONS</b></p> <p>NSF will continue to scale up existing pathways into STEM fields for every demographic and socioeconomic group in every geographic region of the country.</p>	 <p><b>ACCELERATING TECHNOLOGY AND INNOVATION</b></p> <p>NSF will continue to support advancing breakthrough technologies, translating research results to the market and society, fostering partnerships, and nurturing diverse STEM talent.</p>
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### THESE THREE PILLARS ARE INTERTWINED IN FOUR MAJOR THEMES:

**Advance Emerging Industries for National and Economic Security:** As the U.S. faces intensifying global competition for science and technology leadership, NSF will strengthen and scale investments in breakthrough technologies, innovation and translation by expanding support for basic research, nurturing technology transfer and empowering new approaches to potential application of research breakthroughs. Investments in FY 2025 include the NSF Convergence Accelerator (\$100 million) and the National Artificial Intelligence Research Resource (\$30 million).

**Create Opportunities Everywhere:** A whole-of-NSF approach infuses the actions of all directorates and offices by striving to ensure equity in program delivery, while building on the concept of the "Missing Millions." It focuses on expanding access and inclusion in STEM along individual, institutional and geographic lines. NSF's commitment to finding talent provides opportunities that build strong STEM pathways that lead to a well-paid workforce and support the U.S. economy. Investments in FY 2025 include the Growing Research Access for Nationally Transformative Equity and Diversity (GRANTED) program (\$40 million) and the National STEM Teacher Corps (\$30 million).

**Build a Resilient Planet:** Accelerating the development of solutions to the interconnected challenges of resilience requires bold thinking, convergent approaches, and an overarching commitment to environmental equity, justice, and workforce development and education. NSF will invest strategically in emerging research areas on resilience to ensure U.S. leadership for an economically strong, nationally secure, sustainable, and equitable future. Investments in FY 2025 include the U.S. Global Change Research Program (\$898 million), Clean Energy Technology (\$500 million), and greenhouse gas research (\$69 million).

**Strengthen Research Infrastructure:** NSF investments in science and engineering have stimulated the design and development of novel infrastructure, giving rise to new and different forms of research infrastructure. Investments in FY 2025 will support modernization of existing research infrastructure and the development of new infrastructure. FY 2025 investments include operations and maintenance support for over 15 Major Facilities (\$1.1 billion), the Mid-scale Research Infrastructure program (\$192 million), and the National Center for Science and Engineering Statistics (\$83 million).

FY 2025 Budget Request: NSF Budget by Appropriation (Dollars in Millions)								
NSF by Account	FY 2023 Base <sup>1</sup>	FY 2023 Disaster Relief Supplemental (DRS)			FY 2023 Total	FY 2025 Request	Change over FY 2023 Total	
		DRS Base	DRS CHIPS & Science Implementation	DRS Damaged Research Infrastructure			Amount	Percent
Research and Related Activities <sup>2</sup>	\$7,023	\$608	\$210	\$3	\$7,884	\$8,045	\$202	3%
STEM Education <sup>2</sup>	\$1,137	\$92	\$125	-	\$1,354	\$1,300	-\$54	-4%
Major Research Equipment and Facilities Construction	\$187	-	-	-	\$187	\$300	\$113	60%
Agency Operations and Award Management	\$463	-	-	-	\$463	\$504	\$41	9%
Office of Inspector General	\$23	-	-	-	\$23	\$28	\$5	22%
Office of the National Science Board	\$5	-	-	-	\$5	\$5	\$0	3%
<b>Total, NSF Discretionary Funding</b>	<b>\$8,839</b>	<b>\$700</b>	<b>\$335</b>	<b>\$3</b>	<b>\$9,877</b>	<b>\$10,183</b>	<b>\$306</b>	<b>3%</b>

Totals exclude reimbursable amounts.

<sup>1</sup> Reflects the anticipated transfer of \$15.0 million of carryover within the R&RA account to the AOAM account to be completed in FY 2024.

<sup>2</sup> FY 2023 R&RA and STEM Education accounts are restated to show consolidation of NSF mission support activities within R&RA comparably with FY 2025.



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## WHO WE ARE, OUR MISSION AND VISION

**Who We Are:** The [U.S. National Science Foundation](#) is an independent federal agency created by Congress in 1950. NSF is the only federal agency that supports research across all fields of science and engineering and STEM education at all levels. NSF invests in curiosity-driven, discovery-based explorations and use-inspired, solutions-focused innovations that spur new technologies, are critical to our economic and national security, and cultivate the diverse STEM workforce of tomorrow.

**Mission:** To promote the progress of science; to advance the national health, prosperity and welfare; to secure the national defense; and for other purposes.\* NSF promotes the progress of science by investing in research to expand knowledge in science, engineering and education. NSF also invests in actions that increase the capacity of the U.S. to conduct and exploit such research.

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

\* From the "National Science Foundation (NSF) Act of 1950" (P.L. 81-507).

## DRIVING RESULTS AND INNOVATION, BENEFITING SOCIETY

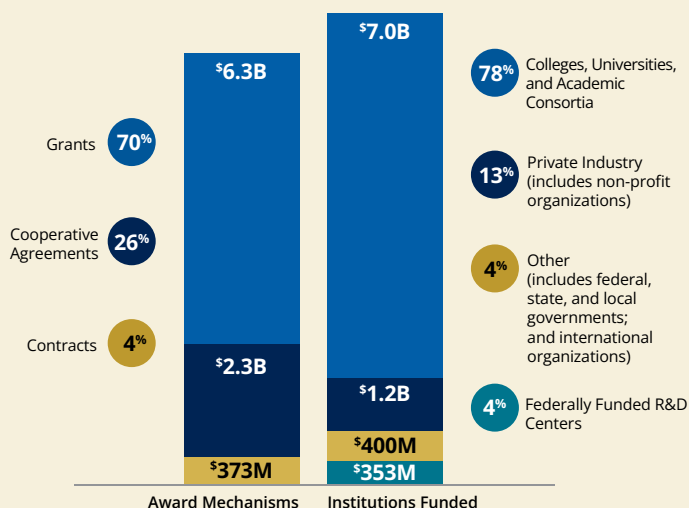
For nearly 75 years, NSF has advanced the frontiers of the full spectrum of science and engineering research and innovation. Tasked with keeping the U.S. at the leading edge of discovery in science and engineering, to the benefit of all, NSF funded researchers generate new knowledge and discoveries that provide a greater understanding of the world around us. NSF's long-term support for solutions-oriented research has fueled industries of the future, produced advancements for the American people, and created world-leading technologies.

In FY 2025, NSF will build on prior investments that grow the U.S. STEM enterprise. The agency will continue to invest in regional innovation across the Nation, strengthen investments in emerging technologies, advance climate research and development, bolster research infrastructure, and promote access in STEM education and workforce training, striving to keep America at the forefront of science and engineering through:

- Investing in high-risk, potentially transformative research projects that lead to ground-breaking discoveries and innovative technologies. This includes support for research in advanced wireless technology, including communications technology; biotechnology, including genomics; advanced manufacturing, including robotics; microelectronics and semiconductors, including advanced computer hardware; and quantum information science, including quantum computing.
- Bolstering emerging industries across all geographic regions of the country. This includes investments in key technology areas specified in the CHIPS and Science Act of 2022 and is carried out through programs such as the Experiential Learning for Emerging and Novel Technologies (ExLENT) program.
- Funding advanced instrumentation, infrastructure, and facilities. This includes construction of major research facilities such as large telescope complexes and research vessels funded through the Major Research Equipment and Facilities Construction (MREFC) account, as well as support for smaller scale projects funded through the Mid-Scale Research Infrastructure program and the Major Research Instrumentation program funded through the R&RA Account.
- Fostering a diverse STEM workforce capable of addressing society's most pressing challenges that draws on the talents of all Americans, wherever they are found. This includes investments in programs to broaden participation in STEM at all levels, such as through the Established Program to Stimulate Competitive Research (EPSCoR).
- Increasing innovation at speed and scale through public-private partnerships to build stronger bridges between discovery, innovation and commercialization. Funding supports NSF's Strategic Partnerships Office, which serves as an agency-wide resource to catalyze and scale public and private partnerships to amplify NSF's investments, as well as dedicated programs such as the Industry-University Cooperative Research Centers program.

### WHERE IT GOES AND HOW IT GETS THERE:

FY 2023 Obligations for Research and Education Programs:  
\$9.0 Billion



Notes: NSF Research and Education Programs include Research and Related Activities, STEM Education, and Major Research Equipment and Facilities Construction appropriations. Totals may not add due to rounding. R&D - Research and Development.



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## CHIPS AND SCIENCE ACT

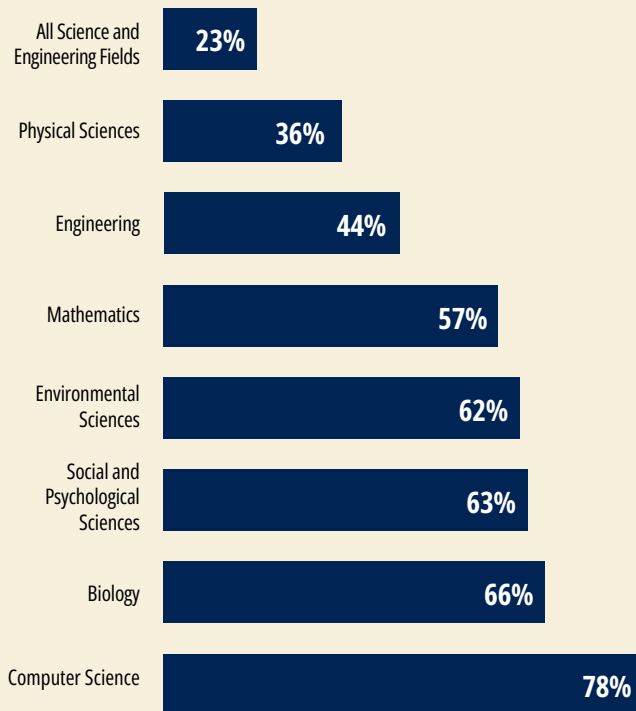
NSF will continue to advance the priorities articulated in the CHIPS and Science Act of 2022, bolstering our nation's science and engineering enterprise to even greater heights to ensure the U.S. remains the global leader in discovery, innovation and manufacturing. Funding for NSF will be key to ensuring that the agency expands regional innovation; invests in domestic STEM talent; strengthens the lab-to-market pipeline; and increases funding for the basic science and engineering research that lays the foundation for the future. Continued investment in NSF will be critical to achieving these goals and unlocking science and technology breakthroughs to drive our economy and national security for decades to come.

More information about the impacts of the "CHIPS and Science Act" on NSF can be found at <https://new.nsf.gov/chips>.

## EXTREMELY LARGE TELESCOPES

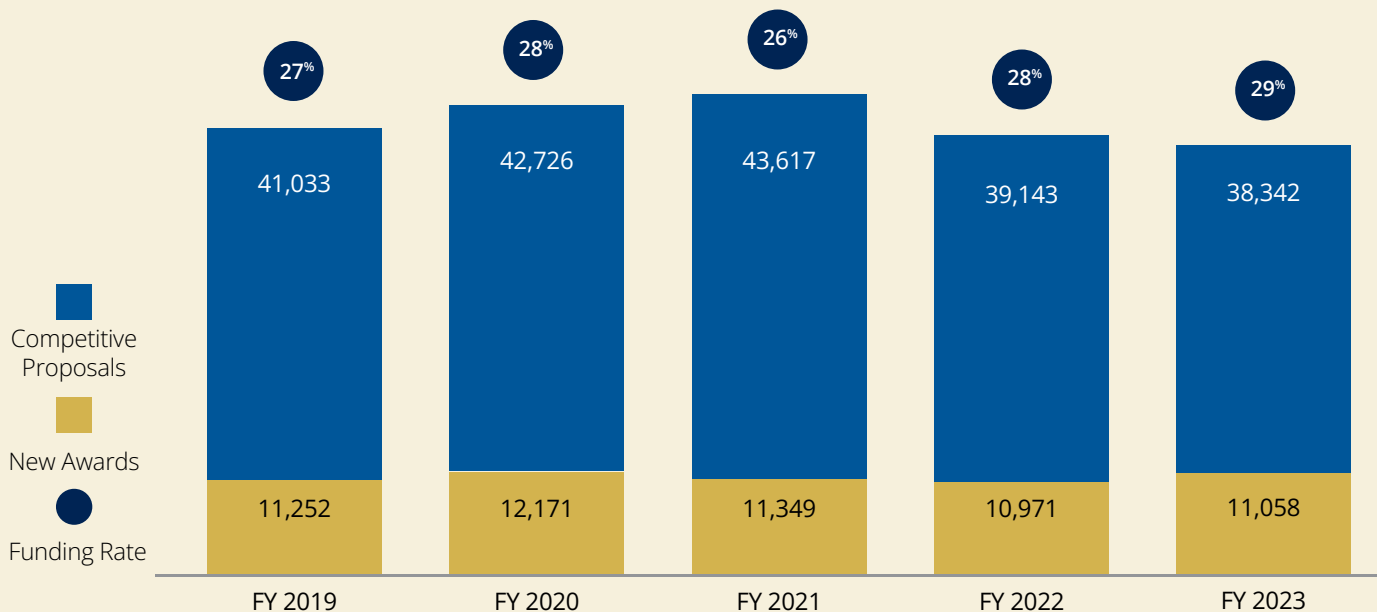
The FY 2025 Budget supports the continued design of a single telescope within the U.S. Extremely Large Telescope (US ELT) program. Consistent with a recent statement by the National Science Board to fund one telescope in the ELT program, NSF will initiate an external expert panel to conduct a review of the two existing US ELT projects that will inform NSF's decision of which project will remain in the Major Facility Design Stage. A future decision remains about whether to advance that project to Construction, pending completion of the Final Design Phase.

## NSF SUPPORT OF ACADEMIC BASIC RESEARCH IN SELECTED FIELDS (as a percentage of total federal support)



Notes: Biology includes Biological Sciences and Environmental Biology. Biology and Psychological Sciences exclude National Institutes of Health. Source: NSF/National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development, FY 2020.

## NUMBER OF NSF COMPETITIVE PROPOSALS, NEW AWARDS, AND FUNDING RATES



Note: The number of new awards is a subset of the total number of competitive proposals.



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## ● NSF By The Numbers

The National Science Foundation (NSF) is an [\\$9.9 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.



**\$9.9B**  
FY 2023 Total Enacted

**93%**  
Funds research, education and related activities



**11K**  
Awards



**1.9K**  
Institutions



**353K**  
People

*"Data represents FY 2023 Actuals unless otherwise indicated"*

## RESEARCH AND EDUCATION HIGHLIGHTS



### NSF Regional Innovation Engines Awards

NSF Regional Innovation Engines (NSF Engines) capture a potential \$1.6 billion investment over the next decade, forming one of the largest broad investments in place-based research and development in the nation's history. NSF Engines serve as regional science and technology development centers that enrich local communities and economies in targeted areas across the nation, with the first-ever NSF Engines awarded to 10 teams spanning 18 states in January 2024. NSF's initial \$150 million investment in these 10 regions is being matched almost two to one in commitments from local and state governments, alongside other federal agencies, private industry, and philanthropy. Together, this first cohort of NSF Engines is comprising almost 500 partners that span nearly the entire United States and includes participants from academia, industry, small business, nonprofits, investors, federal agencies, and state, local and tribal governments. They will join 44 existing NSF Engines Development awardees announced in May 2023.



### National AI Research Institutes Program

As AI shakes up the global tech industry, NSF has made targeted, strategic investments into this changemaking technology with seven new National Artificial Intelligence Research Institutes, established by NSF and partners with a brand new \$140 million investment in 2023. The AI Institutes are part of a broader government-wide effort to advance a cohesive approach to AI-related opportunities and risks, constituting a major Federal investment in AI research. Since 2020, there has been approximately half a billion dollars in commitments for AI Institutes, and momentum is only building as the technology improves. These specific Institutes (2023) will promote ethical and trustworthy AI systems and technologies, a theme that is of critical importance with the popular conversation surrounding AI and its risks.

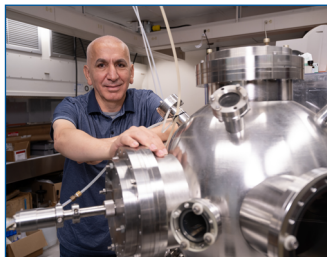
*Credit: U.S. National Science Foundation*

NSF hosted an AI Hill Day on Tuesday, September 19, 2023, at the Russell Senate Office Building in Washington, D.C. This event was an opportunity for the 25 AI Institutes to showcase their research, accomplishments, and programs to members of Congress. *Credit: NSF/Giovanni Rodriguez*

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## RESEARCH AND EDUCATION HIGHLIGHTS



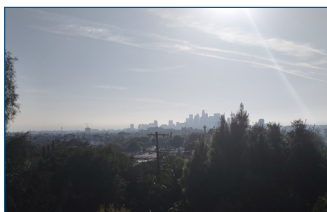
### **CREST Phase I Center for Advanced Magnets and Semiconductors**

A new research and educational hub is being established at Morgan State University in Baltimore with funding from NSF's Center of Research Excellence in Science and Technology (CREST) program. The \$5 million award, partly funded through the CHIPS and Science Act of 2022, will support CREST over the next five years and play a major role in producing a highly talented and diverse technology workforce. The center will partner with neighboring institutions to perform bold, innovative studies in advanced magnets and semiconductors and oversee STEM education and outreach initiatives for underrepresented minorities. This includes developing two new graduate programs, joint educational initiatives such as symposia and internships, and summer programs for high school students and science teachers.



### **A protein mines and sorts rare earths, paving way for green tech**

Rare earth elements are vital to modern technology, inherent in everything from smartphones to hard drives, but they are infamously difficult to separate from the Earth's crust. Rare earth elements like neodymium and dysprosium make up critical components of everyday life, and now, Penn State researchers have discovered a groundbreaking new mechanism by which bacteria can select between differing rare earth elements, utilizing the ability of a bacterial protein to bind to another unit of itself, also known as to "dimerize" – when it is bound to certain rare earth elements, or prefer to remain a single unit - "monomer" - when bound to others.



### **Drought, Heat Waves Worsen West Coast Air Pollution Inequality**

A new study supported by NSF's Dynamics of Integrated Socio-Environmental Systems (DISES) Program found drought and heat waves could make air pollution worse for communities that already have a high pollution burden in California and deepen pollution inequalities along racial and ethnic lines. The study also found financial penalties for power plants can significantly reduce people's pollution exposure, except during severe heat waves, when penalties failed to reduce emissions.



### **Improving Manufacturing Environments and Workforce Education Using Virtual and Augmented Reality**

Morehead State University engineering labs are working to test, train, and enrich the American manufacturing workforce, scaling it up to global leadership levels via software algorithms and machine learning – alongside a healthy dose of powerful augmented and virtual reality scenarios. "In Kentucky there is a lack of knowledge in manufacturing skills especially in the areas of automation and robotics design...so we created different scenarios using virtual reality and augmented reality to create this kind of environment in order to train our students but also to train people that are working in industry," says Dr. Jorge Ortega-Moody. Dr. Ortega-Moody's lab students – from undergrad to post-doc, hailing from diverse backgrounds, learn mechanical design, electrical design and programming in their courses. From virtual welding to excavation, these students are laying the groundwork for future collaborations with local industry, preparing Dr. Ortega-Moody's students to be manufacturing experts in the near future.

Adbellah Lisfi, Ph.D., professor of Physics at Morgan State University, serves as the principal investigator on NSF's Center of Research Excellence in Science and Technology (CREST) grant. *Credit: Morgan State University.*

A sample of clay containing rare earths. *Credit: Patrick Mansell / Penn State. Creative Commons*

Downtown Los Angeles through pollution haze. *Credit: Elizabeth Holloway*

Graduate Assistant Ritesh Chakradhar using VR & AR to enhance manufacturing. *Credit: Kynsfepscor.edu / Morehead State University*

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## RESEARCH AND EDUCATION HIGHLIGHTS



### **NSF Funding Drives Semiconductor Industry in Arkansas**

For over 20 years, NSF has funded semiconductor research in Arkansas and spawned an entire manufacturing industry in the state. Most notably, a Materials S&E Center award (0520550) worth \$8.0 million and an EPSCoR award (1457888) worth \$20.0 million have enabled basic research to move to technology transfer in Arkansas. As a result of research facilitated by NSF for over 20 years, there are now more than 20 companies in Arkansas that manufacture semiconductors and related components. One prime example, Ozark Integrated Circuits, was founded by Matt Francis in 2011, who received his Ph.D. from the University of Arkansas. Francis' company was initially funded through an NSF SBIR grant (1248693); resulting federal investments have helped it transform into an industry leader in semiconductor and circuit fabrication for extreme environments.



### **US-Australia Collaboration in Responsible and Equitable AI**

NSF and Australia's national science agency, CSIRO, awarded \$1.8 million on the U.S. side and \$2.3 million on the Australian side to accelerate groundbreaking research in responsible and ethical artificial intelligence solutions. Responsible and ethical AI concerns have risen sharply with the increasing availability of AI-powered technologies. Awards under the NSF-CSIRO partnership are expected to contribute to establishing ethical frameworks — and ultimately guidelines — in order to ensure AI algorithms and their deployments are safe, fair and beneficial to all citizens.



### **Studying Fire and Ice in Alaska Yields Sizzling Impacts**

Through an Alaska EPSCoR RII Track-1 award, Alaskan researchers are using remote sensing, field work, laboratory experiments and modeling methods to track and understand boreal forest fires and coastal marine ecosystems. The project – now in its 5th year – has yielded several fascinating findings, including predictive modeling for regional wildfires and how glacial melt impacts streams and estuaries, which contains enormous implications for keystone fish species and the fishing industry overall in Alaska.



### **Insurers Need Climate Change Data: The Industry-University Cooperate Research Center is Here to Help**

As the rate of climate-driven extreme weather events increases, insurance companies are struggling to adapt. Across the nation, insurers have been raising prices or canceling policies leaving homeowners trying to keep up. A new partnership between the National Science Foundation and the National Oceanic and Atmospheric Administration plans to address this issue by helping insurers consider climate change predictions. The goal of the new Industry-University Cooperative Research Center (IUCRC) is to assist companies in combining their traditional catastrophe models with modern climate change data and projections. This will help insurers adjust their business to cope with the risk of climate-driven disasters in the future, which will better inform the products and services they are able to offer consumers.

*Credit: U.S. National Science Foundation*

NSF Director Sethuraman Panchanathan met with Australian Chief Scientist Cathy Foley to discuss the recent successes of and ways to further advance NSF-CSIRO partnerships. *Credit: Brian Stone/NSF*

Fire & Ice Boreal Fires student lays down a transect in the Shovel Creek burn outside Fairbanks, July 30, 2020. *Credit: Tom Moran/Alaska NSF EPSCoR*

Supercell thunderstorm near Moscow, Kansas, on May 21, 2020. NSF-supported scientists are honing long-range forecasts of U.S. tornadoes and hail. *Credit: Victor Gensini, Northern Illinois University*