

National Center for Atmospheric Research Education & Outreach Strategic Plan 2018 - 2024







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Introduction to NCAR's Responsibility in Education and Outreach

The National Science Foundation's National Center for Atmospheric Research is a Federally-Funded Research and Development Center serving a broad research community, including atmospheric and geospace scientists and researchers in complementary areas of the environmental sciences and geosciences. The National Center for Atmospheric Research (NCAR) is managed under a cooperative agreement between the National Science Foundation (NSF) and the University Corporation for Atmospheric Research (UCAR), a university-governed and university-serving organization comprising more than 110 degree-granting academic institutions.

The NCAR mission is to understand the behavior of the atmosphere and related Earth and geospace systems; to support, enhance, and extend the capabilities of the university community and the broader scientific community, nationally and internationally; to foster the transfer of knowledge and technology for the betterment of life on Earth. The education and outreach activities at NCAR directly support NCAR's mission and the National Science Foundation's vision of "a nation that is the global leader in research and innovation".

Working in close collaboration with NSF, the university and broader scientific community, NCAR enables the education and development of a diverse workforce for the atmospheric and related sciences, in particular, of those groups which are underrepresented in the US science and engineering workforce; and integrates research and education in an increasingly multi- and interdisciplinary arena.

NCAR has a responsibility to engage and inspire the public about its work, and to demonstrate the benefits of the nation's investment in its mission. NCAR has a long history of contributing to the scientific literacy of society and inviting citizens into its facilities and engaging them through exhibits, lectures, and outreach events during national and international field campaigns. NCAR aims to capture the imagination of a broader public and K-12 students and teachers by creating engaging programs that will allow the public to experience the excitement and adventure of atmospheric sciences and related sciences.

NCAR also serves as a national hub for career and professional development, serving both U.S. and international universities. NCAR provides a wide range of training in and exposure to a breadth of content, skills, and careers that is unparalleled by any other organization in the wider atmospheric science community. NCAR scientists and engineers mentor undergraduate and graduate students on projects, complementing training provided by university partners. Postdoctoral fellows are embedded in NCAR's laboratories and participate in cutting-edge research and development. Acting as a nexus between academia, government, and the private industry, NCAR is in a unique position to contribute to the national conversation on preparing tomorrow's geoscience workforce through identifying national trends and workforce needs.

A fundamental goal of the National Center is to support universities in preparing future generations of scientists and engineers. NCAR supports faculty in bringing research to the classroom and conducting research using facilities beyond the resources of an individual university. The cutting-edge science and engineering research, modeling, and instrumentation developed at NCAR are built into the foundation of future educational resources and trainings. Faculty come to NCAR to participate in modeling workshops, do research with scientists, or use technical facilities such as airborne platforms or high-performance computing. Faculty then return to their campuses inspired and better supported to engage students in research.

It is through this dynamic, multi-pronged effort to engage and support a broader audience of learners and burgeoning professionals in the atmospheric and related sciences that NCAR strives to serve our nation.



NCAR's Committment to Education and Outreach

NCAR's commitment to Education and Outreach is to provide transformative science, technology, engineering, and math (STEM) educational and training experiences for all learners. NCAR's programs support the advancement of individuals' careers in the atmospheric and related sciences. NCAR entrains future generations of diverse scientists and engineers into its research, inspires and engages the public, and demonstrates the importance of NCAR's mission to the media and policymakers. NCAR makes all opportunities, resources, and programs accessible and welcoming to individuals from a wide range of backgrounds and institutions.

Guiding Principles

NCAR is committed to developing and supporting education programs and products with the highest quality standards. NCAR strives to provide education activities that integrate the following values and principles:

Service:	Supporting and engaging students, faculty, and the public in NCAR's mission
Excellence:	Providing high quality educational training, partnerships, and resources
Integrity:	Setting the highest standards in science, engineering, education, ethical conduct, evaluation, and assessment
Inspiration:	Igniting the imagination and creativity of students, teachers, scientists, and the public
Diversity:	Broadening participation of students, faculty, and the public in NCAR's education and outreach activities
Inclusion:	Creating accessible and welcoming experiences for all learners
Impact:	Developing opportunities and activities that equip the nation with enhanced knowledge, understanding, and awareness of STEM

Plan Development

One of the six strategic imperatives articulated in the NCAR 2014 - 2019 Strategic Plan is to educate and entrain a talented and diverse group of students and early career professionals (NCAR 2014). NCAR recognizes that its vivacity is closely linked with the vitality of the atmospheric and related sciences community as a whole.

To affirm its commitment to this imperative, NCAR embarked on a strategic planning process with wide stakeholder input to formalize its existing education efforts and develop new initiatives based on center and community needs. NCAR developed this plan with input from the university community, informal education institutions, and NCAR leadership and staff. In 2016, a Needs Assessment Survey

was distributed to members of the University Corporation for Atmospheric Research (UCAR), the managing entity of NCAR, to identify priorities of the university community with respect to educational efforts and initiatives (NCAR 2016). In addition, feedback on the strategic plan was obtained from the atmospheric sciences community in different professional settings, including the annual meeting of the American Meteorological Society. The NCAR Education & Outreach Advisory Board was formed to accompany the development of this strategic plan and its implementation. The plan has been reviewed by an external evaluator. The 2018-2024 Education & Outreach Strategic Plan is closely aligned with the goals articulated in the University Corporation for Atmospheric Research Strategic Plan 2015-2018 (UCAR 2015) and the National Science Foundation Strategic Plan 2018-2022 (NSF 2018).

This plan is also shaped by the following documents, which discuss the need for science education, the development of a strong STEM workforce, and the advancement of lifelong learning opportunities in STEM:

- American Innovation and Competitiveness Act, 2017. 114th Congress (2015-2016)
- National Academies of Science Board on Higher Education, 2016. Revitalizing Graduate STEM Education for the 21st Century
- National Research Council, 2015. Identifying and Supporting Productive STEM Programs in Out-of-School Settings. Washington, DC: The National Academies Press
- National Science and Technology Council's Committee on STEM Education, 2013. Federal Science, Technology, Engineering, and Math (STEM) Education 5-Year Strategic Plan
- National Research Council, 2011. A Framework for K-12 Science Education—Practices, Crosscutting Concepts, and Core Ideas
- National Academies of Sciences Report, 2010, Rising Above the Gathering Storm, Revisited
- National Research Council, 2009. Learning Science in Informal Environments: People, Places, and Pursuits. Washington, DC: The National Academies Press



Plan Overview

The 2018-2024 Strategic Plan will provide guidance for NCAR Education and Outreach and a framework for tracking and reporting impact. The plan's three main strategic goals are:

Goal 1: To inspire, engage and inform the public about the atmospheric and related sciences conducted by NCAR and the university community.

Goal 2: To entrain and prepare a highly skilled and diverse workforce for careers in the atmospheric and related sciences.

Goal 3: To support the university community in educating students in the atmospheric and related sciences.

In this strategic plan, NCAR outlines its approach for achieving these goals. Each goal is described by an introduction, objectives, strategies, and evidence of progress, as follows:

- **Goals** are the long-term, broader aim or intention for NCAR's education efforts.
- **Objectives** describe specific aims that support the goals.
- Strategies indicate how NCAR will accomplish these objectives.
- Evidence of progress outlines how NCAR will measure the outcomes.

The goals appear in order of scale from reaching broad audiences to very specific audiences, including: engaging the general public, strengthening the STEM workforce, and partnering with the university community. All three goals are equally important and strive to fulfill NCAR's commitment to education and outreach. The order of each objective, its strategies, and evidence of progress is designed to demonstrate alignment among these components as well as to the related goal.





Implementation

Implementation Plan

NCAR Education and Outreach (E&O) will develop an implementation plan to operationalize and accompany the E&O Strategic Plan. The Implementation Plan 2018-2024 will show timelines and milestones for the strategies outlined in the E&O Strategic Plan and identify resources needed to achieve the milestones. A comprehensive survey of all education and outreach activities across NCAR will be undertaken. This will allow leadership to match current education and outreach programs and activities with strategies, identify gaps and needs for creating new programs, and sunset activities that do not align with the E&O Strategic Plan. Additional components of the implementation plan include establishing baselines for evaluation of progress and developing a plan for disseminating results through publications and presentations at national conferences.

The implementation plan will be developed with input from educators at NCAR and NCAR leadership, in partnership with the UCAR Center for Science Education, and guided by the NCAR Education and Outreach Advisory Board.

Advisory Board

NCAR has created an external Education and Outreach Advisory Board to provide advice, feedback and accountability on education programs and practices. The Advisory Board has experienced representatives from the university community, K-12 education, informal science education institutions, and industry. The makeup of the Advisory Board is designed to represent broad perspectives, including those from universities, smaller colleges, and Minority Serving Institutions. The Advisory Board will hold "in-person" meetings a minimum of every other year, and telecon meetings during the in-between years, or as necessary, to provide input, guidance, and feedback on the priorities and implementation of the E&O Strategic Plan.

Reassessment of the E&O Strategic Plan

This E&O Strategic Plan will be reassessed in 2019 to ensure alignment with the strategic goals identified in NCAR's new Strategic Plan 2019-2024. This will be done in conjunction with the writing of the NCAR Strategic Plan and with input from NCAR leadership. In 2024, the E&O Strategic Plan will be reassessed and inform the development of the E&O Strategic Plan 2025- 2030. The reassessment and writing of the follow-on E&O Strategic Plan will be done with the involvement of the NCAR Education and Outreach Advisory Board, the community, and external evaluators.

Evaluation and assessment

NCAR is committed to evaluating its education and outreach programs such as internships, workshops, and tutorials, and has rich data sets on programs such as the NCAR Advanced Study Program.

Using assessment and evaluation of NCAR's Education and Outreach efforts, NCAR documents outputs such as the number and types of programs, the number and demographics of participants, the number, type, and quality of activities, and the duration of the programs. Established and standardized data collection methods will be used to assess and improve individual programs, including formative and summative surveys, focus groups, and interviews of the participants. With the expertise of an external evaluator, this assessment will be used to guide continuous program development and contribute to future funding prioritization.

For existing education and outreach activities that align with the strategies of this strategic plan, NCAR E&O will assess their current reach and impact. This will provide a baseline against which milestones for future activities and goals can be set, and against which evidence of progress can be measured.

Evaluation methods include:

- <u>Annual collection of metrics</u>. Engagement of NCAR staff will be measured through NCAR annual reports.
- <u>Standardized organizational assessments.</u> NCAR Education and Outreach will assess common measures across programs for educational activities, such as visitor satisfaction and student and mentor surveys.
- <u>Web-analytics</u>. User numbers and behavior will be tracked on NCAR's main educational websites.
- <u>Annual accomplishments</u>. Narratives of program impacts and individual success stories will complement qualitative data collected in annual reports and surveys.
- <u>Advisory Board feedback</u>. The Education and Outreach Advisory Board will provide annual reviews and measure the NCAR education team against progress towards milestones identified in the Implementation Plan of the NCAR E&O Strategic Plan.
- <u>National metrics</u>. NCAR's progress in education and outreach goals will be evaluated against national statistics.
- <u>Historical overview</u>. NCAR will document the program's history, staffing and operations and ensure alignment of operations with the NCAR mission.
- <u>Embedded data.</u> NCAR will analyze embedded, or existing, data to better understand program operations and impacts and to identify potential opportunities for data collection from new sources that might enhance alignment of goals, objectives, and activities.



NCAR's Strategic Goals for Education and Outreach

Strategic Goal 1

Inspire, Engage, and Inform the Nation Inspire, engage and inform the public about the

atmospheric and related sciences conducted by NCAR and the university community.



Develop a Highly Skilled and Diverse Workforce

Entrain and prepare a highly skilled and diverse workforce for careers in the atmospheric and related sciences.





Strategic Goal 3

Partner with the University Community in Higher Education and Research Support the university community in educating

students in the atmospheric and related sciences.



Strategic Goal 1: Inspire, Engage, and Inform the Nation Inspire, engage, and inform the public about the atmospheric and related sciences conducted by

NCAR and the university community.

















Strategic Goal 1: Inspire and Inform the Nation

Inspire, engage, and inform the public about the atmospheric and related sciences conducted by NCAR and the university community.

As a national scientific center and as a research facility, it is NCAR's fundamental responsibility to share its research, to inspire future generations of scientists, and to enhance the public understanding of and support for atmospheric and related sciences. NCAR wants to excite and spark public interest in the atmospheric and related sciences and create understanding that this research provides benefits and solutions to society, for example, in dealing with the hazards of long-term atmospheric and climate changes, extreme weather, space storms, and impacts such as drought, storm surges and wildfires. NCAR aims to increase scientific literacy in the nation's youth and the general public. Together, these elements will create a citizenry that appreciates the importance of atmospheric science as both a necessary element of our society and a viable pathway for careers. NCAR E&O has a responsibility to reach and engage all segments of the general public and aims to broaden the impact of and expand participation in its educational and outreach programs.

The National Center for Atmospheric Research is a hub for science education in the atmospheric and related sciences. Many of the education resources developed at NCAR and its UCAR partners are leveraged through collaboration with K-12 educators and their schools. The aim is to ensure that NCAR's resources, materials, and messages are integrated into formal and informal education venues with wide audiences. This linkage between learning about science in the classroom and the application to real life is instrumental for engaging students in learning about fundamental science concepts. An informed society will make better decisions when using weather, space weather, and climate information. Early investment in getting young students excited about the atmospheric sciences, related computational sciences, and engineering will result in more students seeing the atmospheric and related sciences as a viable career option. Youth engagement may also lead to an expanded pool of future employees for NCAR, as well as for the academic, government, and private sectors.

Formal and informal education play key roles in this endeavor. NCAR will partner with UCAR Community Programs and with national and state organizations to provide programs and materials that are relevant, instructive, and engaging for informal and formal K-12 educators to use, as well as for the individual citizen. Materials need to be aligned with the Next Generation Science Standards (NGSS) for K-12 content. NCAR will sustain and increase the involvement of its scientists, engineers, and educators in UCAR Community Programs, such as the UCAR Center for Science Education, the web-based training program COMET, and the GLOBE Implementation Office, which runs an international citizen science program. While NCAR E&O develops programs locally, many of its strategies are aimed at a national education community.

Objectives

- 1. Engage the public with the excitement of atmospheric research and the observational platforms that NCAR uses to understand our planet.
- 2. Capture the imagination of K-12 learners by providing engaging and accessible programs showcasing atmospheric research and career pathways.
- 3. Ensure that NCAR's scientific and engineering knowledge is integrated into formal and informal K-12 education, such as curricular programs, exhibits, media, materials, and programs that support NCAR's mission.
- 4. Reach a broader national audience through new and strengthened partnerships with professional societies and science museums.
- 5. Raise the profile of NCAR as a trustworthy national resource on weather and climate information for teachers and the public.

Strategies

- 1. Engage the public and K-12 audiences nationally through newly developed augmented and virtual reality experiences that display Earth system datasets dynamically.
- 2. Reach broad national audiences by broadcasting live events such as the successful "Explorer Series" public lecture via UCAR Live, and through social media.
- 3. Communicate NCAR science and engineering and the expertise, careers, and projects of NCAR scientists and engineers to the public in partnership with TV and media outlets, both locally and nationally.
- 4. Involve pre-service and experienced teachers from across the nation in research experiences in the atmospheric and related sciences, for integration into K-12 education.
- 5. Provide scientific expertise to the UCAR Center for Science Education in their efforts to increase STEM literacy through NGSS-based teacher training, instructional materials development, and public engagement.
- 6. Develop and implement in-the-field experiences for educators by leveraging field campaigns in the U.S. and around the world.
- 7. Support the development of traveling exhibits, citizen science opportunities for the K-12 education community, informal education networks, and community-based learning environments.
- 8. Develop and disseminate information on weather or other related events including data, graphs, videos, news stories, and images from NCAR to existing state and national networks of educators.

Evidence of progress

As evidence of progress toward advancing this goal and the supporting objectives, NCAR's Education and Outreach programs will demonstrate:

- 1. Increased interest in the atmospheric and related sciences amongst the public and students via engaging programs, as measured by changes observed in assessing the popularity of the programs and interest in the sciences.
- 2. Improved accessibility to high quality content and education activities at NCAR, especially for those students from populations traditionally underrepresented in STEM. Evidence will include positive feedback on NCAR educational content through focus groups and surveys, and tracking of user numbers and demographic characteristics.
- 3. Increased contribution of NCAR science and engineering materials in K-12 education, as evidenced by the number of materials developed and disseminated to teachers.
- 4. Increased partnerships with professional societies and science museums, and increased numbers of visitors at exhibits. Evidence will include descriptions and reports of partnerships in which NCAR and UCAR content has been integrated into local programming across the nation.

Strategic Goal 2: Workforce Development Entrain and prepare a highly skilled and diverse workforce for careers in the atmospheric and related sciences.













Strategic Goal 2: Develop a Highly Skilled and Diverse Workforce

Entrain and prepare a highly skilled and diverse workforce for careers in the atmospheric and related sciences.

Investment in a scientific and engineering workforce offer multiple benefits for NCAR, the university community, and the nation, which relies on a scientifically trained workforce. NCAR has a leadership role at the nexus of government, academia, and industry, and helps to shape the conversation about academic training and defining the atmospheric science workforce. NCAR provides hands-on scientific training and apprenticeships in the atmospheric and related sciences, trains students in supplementary skills, and complements its partners' curricular and research efforts. NCAR offers training for high school, community college, undergraduate, and graduate students from colleges and universities around the nation and world. NCAR is recognized for its well-established Advanced Study Program that provides postdoctoral fellows with a premier opportunity to continue to pursue their research interests in atmospheric and related sciences.

Atmospheric science plays a key role in meeting societal challenges, from addressing extreme weather events to air pollution, adapting to a changing climate, and informing decision-making related to human activities, including travel, food security, and other matters of national interest. According to a recent occupational outlook (Bureau of Labor Statistics 2018), employment of atmospheric scientists is projected to grow faster than other occupations, as businesses increasingly rely on weather and climate information. Partnerships with the private sector and other employers allow NCAR to prepare students for these careers and inform the college and university community of which skills are needed in today's job market.

The benefits of these partnership and training efforts are myriad. Students and postdoctoral researchers from around the world are provided with an opportunity to gain real-world experience that cannot be acquired in a classroom setting. NCAR researchers benefit from the exposure to new energy and ideas, as well as possible new partnerships. Employers in government, industry, and academia benefit from the knowledge and skills offered by a more diverse, highly trained workforce. Direct exposure of many students to NCAR research means that the next generation of public and private sector scientists have connections with NCAR and are more likely to build pipelines between NCAR and industry. Thus, partnership efforts reach a variety of stakeholders and, in doing so, positively contribute to the national scientific workforce.

NCAR regards attracting, motivating, and training future generations of diverse scientists and engineers into the atmospheric and related sciences as one of its fundamental responsibilities. In an increasingly diverse nation, the geosciences need to draw and support students from all backgrounds; yet, several demographic groups remain significantly underrepresented. These include people from certain ethnic and racial minority groups, women, people with disabilities, and veterans, amongst others. Students can bring new ideas and approaches, connect NCAR to diverse communities, and meet the workforce needs of the nation, making training and preparation a key goal for NCAR.

Objectives

- 1. Engage students and postdoctoral fellows in research as well as training on NCAR's state of the art instrumentation, modeling, computing, and cutting-edge scientific and engineering practices.
- 2. Develop a professional and inclusive community for students and postdoctoral fellows who participate in an NCAR educational experience.
- 3. Raise awareness of and provide skills training for different career paths in the atmospheric and related sciences and engineering for students and postdoctoral fellows.

- 4. Uphold and disseminate best practices for conducting inclusive research internships, workshops, and professional development opportunities for the atmospheric sciences community.
- 5. Broaden participation in NCAR programs to include more students and postdoctoral fellows from groups that are traditionally underrepresented in the atmospheric and related sciences.
- 6. Contribute to the national conversation on atmospheric science workforce development in alignment with policy makers' initiatives, employers' needs, and current literature.

Strategies

- 1. Provide transformative research opportunities for undergraduate and graduate students that prepare them for careers in atmospheric research and related sciences, such as internships, short-term immersion programs, and externships.
- 2. Sustain a strong Advanced Study Program with opportunities for graduate students, postdoctoral fellows, and faculty fellowships, and partner with the SOARS program to broaden participation.
- 3. Develop and lead an NCAR-wide community of students and postdoctoral fellows that provides guidance, resources, and support to pursuing careers in the atmospheric and related sciences.
- 4. Disseminate career information and training through webinars, social media and at student and early-career conferences of scientific societies and societies focused on the promotion of minority participation in STEM.
- 5. Support the national community of internship leaders in the geosciences and help shape best practices in facilitating student training programs.
- 6. Partner with Minority Serving Institutions, community colleges, and the UCAR SOARS Program to increase recruitment and support of students and postdoctoral fellows from groups that traditionally have been underrepresented in the atmospheric and related sciences.
- 7. Provide training for NCAR staff on mentoring students and postdoctoral fellows from all backgrounds.
- 8. Engage in conversations with national scientific societies as well as faculty on preparing the future workforce for careers in the atmospheric and related sciences.

Evidence of progress

As evidence of progress toward advancing this goal and the supporting objectives, NCAR's Education and Outreach programs will demonstrate:

- 1. Increased and improved assessment of NCAR internships and research opportunities related to the quality of students' and postdoctoral fellows' experiences, as reflected by formative and summative surveys, focus groups, interviews, and informal discussions.
- 2. Improved sense of community and professional development for students and postdoctoral fellows at NCAR, as assessed by exit interviews.
- 3. Increased number of students and postdoctoral fellows having received information and training on careers in the atmospheric and related sciences, as measured by the number of workshops, number of workshop participants, and documented learning outcomes assessed by NCAR surveys.
- 4. Increased training and guidance on student and postdoctoral fellow mentoring that is standardized across all programs, as measured by the number of NCAR staff trained and as evidenced in participant surveys.
- 5. Increased proportion of students and postdoctoral fellows from underrepresented backgrounds trained at NCAR for careers in the atmospheric and related sciences.
- 6. Contributions to national conversations on best practices for research internships and workforce development through publications, workshops, and webinars.

Strategic Goal 3: Partner with the University Community in Higher Education and Research Support the university community in educating students in the atmospheric and related sciences.

















Strategic Goal 3: Partner with the University Community in Higher Education and Research

Support the university community in educating students in the atmospheric and related sciences

NCAR has a key role in supporting colleges and universities in preparing the future generation of scientists. Through its long-standing relationships with universities, government agencies, and the private sector, NCAR keeps a finger on the pulse of the changing demands of the workforce and the training being offered in academia. In addition, it provides tools and training for faculty to bring research to the classroom and conduct research using facilities beyond the resources of an individual program. NCAR will ensure that the cutting-edge science and engineering research, modeling, and instrumentation developed at NCAR and in collaboration with the community college and university community are built into the foundation of future educational resources and trainings. Partnerships and bilateral communication with industry will inform the development of educational programs, reflecting actual demand.

The National Center for Atmospheric Research participates in national conversations on identifying frontiers in education and ensures that the needs of the field are met and students are prepared accordingly. This includes providing resources and support to faculty in conducting research, opportunities for faculty training, and helping the university community align academic education with workforce needs. NCAR will continue to partner with UCAR Community Programs to provide resources, curricula, workshops, and supporting materials that can be adapted by university faculty for use in their classrooms.

Engaging a greater number of faculty in NCAR research and development increases collaborative opportunities and creates the potential for more innovation, which will strengthen NCAR, its partners, and society. One way of bringing new perspectives and approaches into this process will be to increase the number of faculty from Minority Serving Institutions (MSIs) and primarily-teaching colleges and connect them with NCAR resources through expanded faculty fellowships. Specifically, NCAR will develop closer relationships and share opportunities with MSIs and community colleges, which provide vital education pathways for underrepresented students.

Objectives

- 1. Provide a venue for faculty to share their expertise and access new resources for teaching and research in the atmospheric and related sciences.
- 2. Support academic partners by addressing educational needs in the atmospheric and related sciences as identified by the colleges and university community.
- 3. Enhance teaching and learning by sharing NCAR resources and materials with faculty at a wide range of academic institutions.
- 4. Strengthen connections between NCAR and a broader academic community.

Strategies

- 1. Broaden research collaborations between NCAR and institutions of higher education through faculty sabbaticals and fellowships, especially for schools that traditionally have not participated in NCAR activities, including MSIs and smaller schools.
- 2. Provide training opportunities for faculty in NCAR's science, data, modeling, and instrumentation through workshop and tutorials.
- 3. Co-develop and teach courses related to NCAR's mission in partnership with faculty and offer NCAR scientists opportunities to teach at partnering universities and colleges.
- 4. Support university teaching with deployments of instruments and observational platforms from NCAR's Lower Atmosphere Observing Facilities.

- 5. Share engaging learning materials such as videos, lectures, new stories, and cutting-edge visualizations on NCAR science and engineering topics with faculty.
- 6. Provide training in diversity, inclusion, and cultural awareness to NCAR staff who engage in partnerships with MSIs.

Evidence of progress

As evidence of progress toward advancing this goal and the supporting objectives, NCAR's Education and Outreach programs will demonstrate:

- 1. Broadened participation in NCAR workshops, tutorials, and research collaborations in terms of institutional type and faculty demographics.
- 2. Increased use of courses co-developed and taught by NCAR scientists and faculty, as assessed by in-classroom course evaluations and online course user statistics.
- 3. Broadened access of NCAR resources for faculty, as measured by the number of instrument deployments and web analytics for online resources.
- 4. Expanded and strengthened collaborations with MSIs that enable them to leverage NCAR's research infrastructure, as measured by numbers of new university partnerships and faculty sabbaticals.

NCAR is excited to continue inspiring, engaging, and informing the nation about the atmospheric and related sciences, developing a highly skilled and diverse workforce, and partnering with the university community in higher education and research. This NCAR Education and Outreach Strategic Plan outlines these goals, objectives, and strategies, and will guide the implementation of programs that aim to fulfil these goals. NCAR will achieve these goals in close partnership with the larger research and education community and invites the public, students, and educators to join us in this important endeavor.





Appendix

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