2022

UNITED STATES GLOBE

PARTNER YEARBOOK

The GLOBE Program

www.globe.gov/web/united-states-of-america

GLOBE History

Announced in 1994 and launched in 1995, the Global Learning and Observations to Benefit the Environment (GLOBE) Program has been a leader as an international science and education program that creates a network of youth, educators and scientists to better understand, sustain and improve Earth's environment at local, regional and global scales.

More than 238 million measurements have been contributed to the GLOBE science database, creating useful, standardized, research-quality data that support informal and professional scientific exploration.

Generations of youth and educators in more than 125 countries have moved through and beyond The GLOBE Program. Widely available information technology and tools have enabled citizen scientists to participate in GLOBE anywhere and anytime. By motivating and supporting citizen science with authentic learning of Earth Systems Science, GLOBE serves learners of all ages who are enthusiastic about scientific discovery locally and globally.

The GLOBE Vision

A worldwide community of students, teachers, scientists and citizens working together to better understand, sustain and improve Earth's environment at local, regional and global scales.

The GLOBE Mission

To increase awareness of individuals throughout the world about the global environment, contribute to increased scientific understanding of the Earth and support improved student achievement in science and mathematics.

For more information, we invite you to visit www.globe.gov.

GLOBE Partnerships

GLOBE Partners make GLOBE happen throughout the United States. Partners recruit, train and mentor new GLOBE educators and facilitators to promote the teaching and learning of science, enhance environmental literacy and stewardship and promote scientific discovery.

Each U.S. GLOBE Partner must have a formal affiliation with an institution of higher education, a school district, a state department of education or a recognized informal education organization (501c3) such as STEM learning centers, museums and foundations that can sustain the implementation of GLOBE in their communities.

New and prospective GLOBE Partners must demonstrate the capacity to recruit, train and mentor educators in their service area. Their efforts must focus on capacity-building, program sustainability and youth inquiry and research.

View a list of current U.S. GLOBE Partners. If you would like information about becoming a GLOBE Partner, please contact the Community Support Team at globehelp@ucar.edu.

GLOBE is sponsored by the U.S. National Aeronautics and Space Administration (NASA) and supported by the National Science Foundation (NSF), National Oceanic and Atmospheric Administration (NOAA) and the United States Department of State. The GLOBE Implementation Office is supported under the NASA Grant and Cooperative Agreement NNX17AD75A awarded to the University Corporation for Atmospheric Research.

Sponsored by: Supported by: Implemented by: UCAR

The GLOBE U.S. Coordination Office

The GLOBE U.S. Coordination Office ("U.S. GLOBE" or "The Office") is supported through a sub-award from the GLOBE Implementation Office. Headquartered at the Leitzel Center at the University of New Hampshire, U.S. GLOBE is managed by Jennifer Bourgeault, U.S. Country Coordinator; Haley Wicklein, U.S. Assistant Country Coordinator; and Alicia Carlson, Outreach Lead.

U.S. GLOBE supports a diverse group of 110 experienced and committed GLOBE Partners to create a strong, self-sustainable framework for training and responsive support for every GLOBE learner in the country. The Office works with the U.S. Partner Forum to contact and provide support for every Partner in the country on a personal basis and through a regional model.

U.S. GLOBE Program Highlights

- U.S. GLOBE hosts regular webinars—called Watercoolers—on topics such as GLOBE website troubleshooting, funding and educational opportunities, and other topics as suggested by Partners. These webinars model the idea that informal gatherings around watercoolers at work can lead to valuable exchanges of information and new collaborations.
- The Office publishes stories about U.S. GLOBE students, teachers, Partners, and organizational accomplishments. Stories are featured on the GLOBE website and U.S. GLOBE social media accounts (Twitter and Facebook).
- U.S. GLOBE coordinates six annual in-person Student Research Symposia (SRS) for teacher/student teams, supported with funding from NASA (grant 80NSSC18K0135) and Youth Learning as Citizen Environmental Scientists (YLACES).
- The Office helps strengthen the local scientist network and GLOBE alumni on a regional level and engages these groups in GLOBE events.

GLOBE

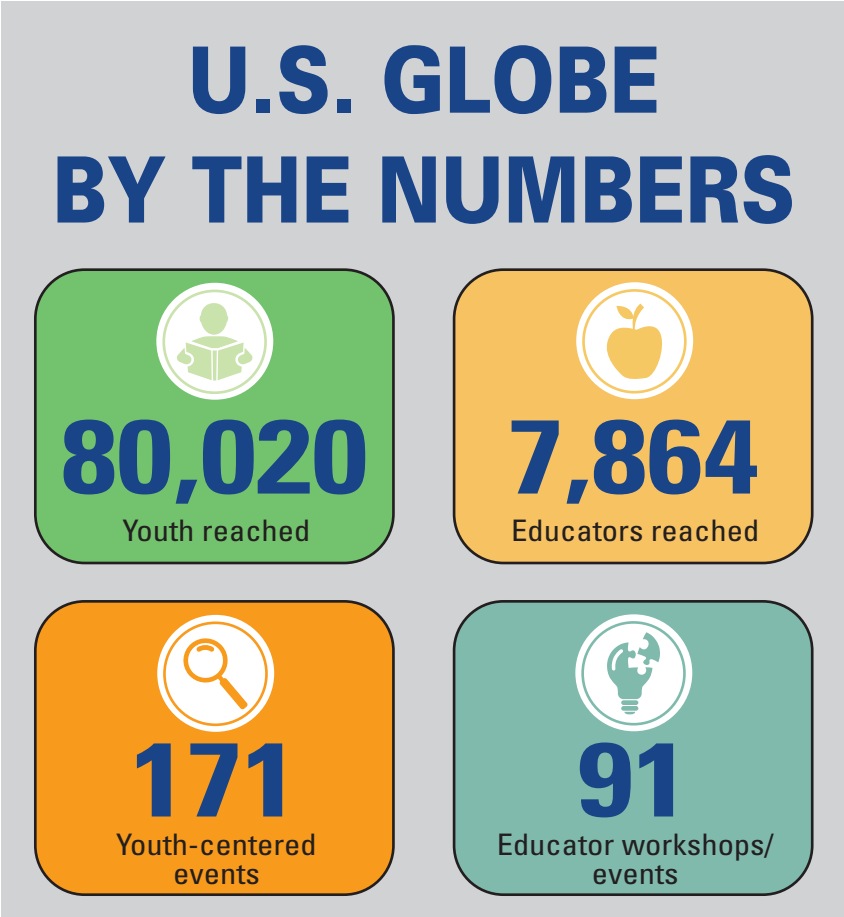
Impact

This year U.S. GLOBE Partners reached a wide audience through their events and activities. We asked them to report the numbers, including:

- Youth
- Youth-centered events
- Educators
- Educator-centered events

The graphic shows the cumulative reports of the 18 Partnerships that reported on at least one of the categories. There were a few superstar reporters! Most notably:

- The Science Action Club (Calif.) reported reaching 68,750 youth and 6,540 educators.
- Berks Nature (Pa.) reported reaching 6,638 youth and 173 educators.
- The University of Alaska, Fairbanks reported reaching 1,443 youth and 330 educators.



Partnerships that contributed to these numbers have an icon on their page for each category they reported on.

United States GLOBE Partnerships

STATE/TERRITORY	PARTNERSHIP	CONTACT	PARTNER WEBPAGE
ALABAMA	AMSTI	Jackie DeJarnett jackie.dejarnett@alsde.edu	www.globe.gov/web/amsti-globe
ALASKA	University of Alaska Fairbanks *(pg. 20)*	Dr. Elena Sparrow ebsparrow@alaska.edu (907) 474-7966	www.globe.gov/web/university-of-alaska-fairbanks
ARIZONA	Arizona State University	Molina Walters Molina.walters@asu.edu (480) 727-1510	www.globe.gov/web/arizona-state-university-globe-partner
	Biosphere 2	Dr. Kevin Bonine kebonine@email.arizona.edu (520) 626-4999	www.globe.gov/web/biosphere-2
	Northern Arizona University	Mansel A. Nelson mansel.nelson@nau.edu (928) 523-1275	www.globe.gov/web/northern-arizona-university
ARKANSAS	Arkansas Partnership for STEM Education	Keith Harris krharris@ualr.edu (501) 569-8149	www.globe.gov/web/arkansas-partnership-for-stem-education
	University of Arkansas *(pg. 21)*	Lynne H. Hehr lhehr@uark.edu (479) 575-3875	www.globe.gov/web/university-of-arkansas
CALIFORNIA	California Academy of Sciences/ Science Action Club *(pg. 22)*	Rachael Van Schoik rvanschoik@calacademy.org	www.globe.gov/web/26109314
	Central San Joaquin Valley *(pg. 23)*	Leigh-Ann Olsen lolsen@kingsburghigh.com (559) 897-5156	www.globe.gov/web/central-san-joaquin-valley-partnership
	Elkhorn Slough National Estuarine Research Reserve	Peggy Foletta peggy.foletta@wildlife.ca.gov (559) 970-9467	www.globe.gov/web/elkhorn-slough-national-estuarine-research-reserve
	Los Angeles Public Library	Vivienne Bird vbyrd@lapl.org (213) 228-7552	www.globe.gov/web/los-angeles-public-library
	Los Angeles Unified School District	Henry Ortiz henry.ortiz@lausd.net (818) 416-9506	www.globe.gov/web/los-angeles-unified-school-district

United States GLOBE Partnerships continued

STATE/TERRITORY	PARTNERSHIP	CONTACT	PARTNER WEBPAGE
CALIFORNIA continued	NASA Jet Propulsion Laboratory *(pg. 24)*	Peter Falcon pcfalcon@jpl.nasa.gov (818) 393-0729	www.globe.gov/web/jet-propulsion-laboratory
	New Education Options	Bo Lebo bo_lebo@hotmail.com	www.globe.gov/web/new-education-options
	WestED and CCASN at UC Berkeley *(pg. 25)*	Tracy Ostrom tostrom@berkeley.edu (510) 219-0538	www.globe.gov/web/wested-and-casn-at-uc-berkeley
COLORADO	CIRES Education Outreach *(pg. 26)*	Jonathan Griffith Jonathan.Griffith@colorado.edu	www.globe.gov/web/cires-education-outreach
	Metropolitan State University of Denver *(pg. 27)*	Janelle Johnson jjohn428@msudenver.edu (303) 556-3166	www.globe.gov/web/metropolitan-state-university-of-denver
	UCAR Center for Science Education *(pg. 28)*	John Ristvey jristvey@ucar.edu (303) 497-2591	www.globe.gov/web/ucar-center-for-science-education
CONNECTICUT	Talcott Mountain Science Center	Jonathan Craig jcraig@tmsc.org (860) 677-8571	www.globe.gov/web/talcott-mountain-science-center
FLORIDA	Florida Agricultural and Mechanical University	Dr. Katherine Milla Katherine.milla@famu.edu (850) 412-7004	www.globe.gov/web/florida-agricultural-and-mechanical-university
	University of South Florida *(pg. 29)*	Teresa Greely greely.usf.edu (727) 553-3921	www.globe.gov/web/university-of-south-florida
	WeatherSTEM by Ucompass.com, Inc.	Edward Mansouri emansouri@weatherstem.com (850) 297-1800	www.globe.gov/web/weatherstem-by-ucompass.com-inc.

United States GLOBE Partnerships continued

STATE/TERRITORY	PARTNERSHIP	CONTACT	PARTNER WEBPAGE
GEORGIA	Center for Sustainable Communities	Garry Harris gharris@htsenterprise.com	www.globe.gov/web/center-for-sustainable-communities
	Museum of Arts and Sciences *(pg. 30)*	Kimberly Novak knovak@masmacon.com	www.globe.gov/web/museum-of-arts-and-sciences/home
	SOSSI – Saving Our Sons & Sisters International LLC	Chuck Barlow Jr info@iamsossi.org	www.globe.gov/web/sossi-saving-our-sons-sisters-international-llc
	University of West Georgia	Randa Harris rharris@westga.edu (678) 839-4056	www.globe.gov/web/state-university-of-west-georgia
ILLINOIS	Illinois State University	Do-Yong Park dpark@ilstu.edu (309) 438-5050	www.globe.gov/web/illinois-state-university
	Northern Illinois University	Nathan Stansell nstansell@niu.edu	www.globe.gov/web/northern-illinois-university
	Western Illinois University	Dr. Redina Herman RI-herman@wiu.edu (309) 298-1764	www.globe.gov/web/western-illinois-university
INDIANA	Purdue University	Steven Smith mrsmith@purdue.edu	www.globe.gov/web/purdue-university
IOWA	Iowa Academy of Science	Craig Johnson craig.johnson@uni.edu (319) 273-2021	www.globe.gov/web/the-iowa-academy-of-science
KANSAS	Fort Hays State University	Paul Adams padams@fhsu.edu (785) 628-5344	www.globe.gov/web/fort-hays-state-university
	Kansas State University	Kimberly Staples Kstaples@ksu.edu (785) 532-5556	www.globe.gov/web/kansas-state-university

United States GLOBE Partnerships continued

STATE/TERRITORY	PARTNERSHIP	CONTACT	PARTNER WEBPAGE
LOUISIANA	College of Education, University of New Orleans	Ivan Gill igill@uno.edu (504) 280-1278	www.globe.gov/web/college-of-education-university-of-new-orleans
	Sci-Port: LOUISIANA'S Science Center	Catherine Williamson cwilliamson@sciport.org (318) 424-8706	www.globe.gov/web/18553
	Southeastern Louisiana University	Deborah Dardis deborah.dardis@selu.edu	www.globe.gov/web/southeastern-louisiana-university-partnership
	Xavier College of Louisiana	Rosalind Pijeaux Hale rhale@xula.edu	www.globe.gov/web/xavier-university-of-louisiana
MAINE	Gulf of Maine Research Institute Partner	Leigh Peake lpeake@gmri.org (207) 772-2321	www.globe.gov/web/gulf-of-maine-research-institute-partner
MARYLAND	Arlington Echo Outdoor Education Center	Eoin O'Neill eoneill@aacps.org (410) 222-3822	www.globe.gov/web/arlington-echo-outdoor-education-center-partner
	Earth Networks	Anuj Agrawal aagrawal@earthnetworks.com (301) 250-4000	www.globe.gov/web/earth-networks
	NASA Goddard Space Flight Center *(pg. 32)*	Todd Toth Todd.e.toth@nasa.gov (301) 286-2774	www.globe.gov/web/nasa-goddard-space-flight-center
MASSACHUSETTS	Boston University School of Education *(pg. 33)*	Peter Garik garik@bu.edu (617) 353-4735	www.globe.gov/web/boston-university-school-of-education1
	Global STEM Education Center, Inc. *(pg. 34)*	Larisa Schelkin larisa.schelkin@globalstemcenter.org (508) 395-0676	www.globe.gov/web/global_stem_education_center

United States GLOBE Partnerships continued

STATE/TERRITORY	PARTNERSHIP	CONTACT	PARTNER WEBPAGE
MICHIGAN	Grand Valley State University *(pg. 35)*	Janet Vail vailj@gvsu.edu (616) 331-3048	www.globe.gov/web/grand-valley-state-university
	Northern Michigan University *(pg. 36)*	Mitchell Klett mklett@nmu.edu (906) 227-1641	www.globe.gov/web/northern-michigan-university
	Wayne RESA *(pg. 37)*	David Bydlowski davidbydlowski@me.com (734) 306-9508	www.globe.gov/web/wayne-county-math-science-center-resa
MINNESOTA	Concordia Language Villages	Denise Phillippe phillipp@cord.edu (218) 586-8727	www.globe.gov/web/concordia-language-villages
	Gidakiimanaaniwigamig (Our Earth Lodge) - Nat'l Cntr for Earth-surface Dynamics	Holly Pellerin pell0078@umn.edu (218) 879-0757	www.globe.gov/web/gidakiimanaaniwigamig-our-earth-lodge-nat-l-cntr-for-earth-surface-dynamics
	Hamline University	Dr. Brian Haskell haskell@umn.edu (612) 378-3242	www.globe.gov/web/hamline-university-prtmn112-
	Wilderness Inquiry	Mary Mallinger mary@wildernessinquiry.org	www.globe.gov/web/wilderness-inquiry
MISSISSIPPI	Alcorn State University	Dr. Sam Aceil saceil@bellsouth.net (601) 877-2343	www.globe.gov/web/alcorn-state-university
	INFINITY Science Center	Donna Torres dtorres@visitinfinity.com	www.globe.gov/web/infinity-science-center-partner
	University of Mississippi	Dr. Debby Chessin dchessin@olemiss.edu (662) 915-5878	https://www.globe.gov/web/university-of-mississippi
	University of Southern Mississippi *(pg. 38)*	Dr. Sherry Herron Sherry.herron@usm.edu (601) 266-4739	www.globe.gov/web/university-of-southern-mississippi

United States GLOBE Partnerships continued

STATE/TERRITORY	PARTNERSHIP	CONTACT	PARTNER WEBPAGE
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	Stone Child College	Douglas Crebs douglas_crebs@hotmail.com (406) 385-4313	www.globe.gov/web/stone-child-college
NEBRASKA	STEM Education at Glacier Creek Preserve	Ashlee Dere adere@unomaha.edu	www.globe.gov/web/stem-education-at-glacier-creek-preserve
NEVADA	Nova77 STEM Workshop Partner	Ping Wang pingwang@nova77.org (702) 529-1567	www.globe.gov/web/nova77-stem-workshop-partner
	University of Nevada- Reno *(pg. 39)*	Megan Beckam mbeckam@unr.edu	www.globe.gov/web/university-of-nevada-reno
NEW HAMPSHIRE	Leitzel Center at the University of New Hampshire *(pg. 40)*	Jennifer Bourgeault usglobecc@gmail.com (603) 862-2449	https://www.globe.gov/web/leitzel-center
NEW JERSEY	Institute for Earth Observations *(pg. 41)*	John D. Moore mr.moore.john@gmail.com (856) 829-1900 x262	www.globe.gov/web/palmyra-cove-nature-park
NEW MEXICO	New Mexico Public Education Department	Shafiq Chaudhary shafiq.chaudhary@state.nm.us (505) 827-6511	www.globe.gov/web/new-mexico-public-education-department
	New Mexico Wildlife Center	Dr. Christy Wall christy@newmexicowildlifecenter.org	www.globe.gov/web/new-mexico-wildlife-center
NEW YORK	Institute for Research in Science Teaching *(pg. 42)*	Dr. Michael Jabot jabot@fredonia.edu (716) 673-3639	www.globe.gov/web/institute-for-research-in-science-teaching
	Queens College	Dr. Allan Ludman Allan.ludman@qc.cuny.edu (718) 997-3324	www.globe.gov/web/queens-college

United States GLOBE Partnerships continued

STATE/TERRITORY	PARTNERSHIP	CONTACT	PARTNER WEBPAGE
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	Southwestern Community College	Matthew Cass mcass@southwesterncc.edu	www.globe.gov/web/southwestern-community-college-partner
	University of North Carolina at Charlotte	Alisa Wickliff abwickli@uncc.edu (704) 687-8818	www.globe.gov/web/university-of-north-carolina-at-charlotte
NORTH DAKOTA	University of North Dakota	Dr. Matt Gilmore gilmore@atmos.und.edu (701) 777-2184	www.globe.gov/web/university-of-north-dakota
OHIO	NASA AESP Glenn Research Center	Susan Kohler Susan.m.kohler@nasa.gov (216) 433-5104	www.globe.gov/web/nasa-aesp-glenn-research-center-ms-7-4
	University of Toledo *(pg. 43)*	Dr. Kevin Czajkowski kevin.czajkowski@utoledo.edu (419) 530-4274	www.globe.gov/web/university-of-toledo
	Xcite Learning/BGSU-NWO/Toledo Zoo & Aquarium *(pg. 44)*	Dr. Jodi J. Haney jhaney@bgsu.edu (419) 350-8469	www.globe.gov/web/bowling-green-state-university
OKLAHOMA	Southeastern Oklahoma State University	Katheryn Shannon kshannon@se.edu	www.globe.gov/web/southeastern-oklahoma-state-university
	Southeastern Oklahoma State University-McCurtain County Campus	Dr. Cathy Stewart Lightsey clightsey@se.edu (580) 376-5209	www.globe.gov/web/southeastern-oklahoma-state-university-mccurtain-county-campus
	University of Tulsa	Dr. David Brown David-brown@utulsa.edu (918) 631-2719	www.globe.gov/web/the-university-of-tulsa

United States GLOBE Partnerships continued

STATE/TERRITORY	PARTNERSHIP	CONTACT	PARTNER WEBPAGE
OREGON	Alder Creek Community Forest	Devin Hunt Devin.Hunt@susd.k12.or.us	www.globe.gov/web/alder-creek-community-forest-partnership
	College of Earth, Ocean, Atmospheric Sciences (CEOAS)	Peder Nelson peder.nelson@oregonstato.edu (541) 737-8052	www.globe.gov/web/college-of-earth-ocean-atmospheric-sciences-ceoas-
PENNSYLVANIA	Advancing Science, Gettysburg College	Valerie Stone advancingscience@gettysburg.edu (717) 337-6150	www.globe.gov/web/advancing-science-gettysburg-college
	Berks Nature - The Nature Place *(pg. 45)*	Michael Griffith michael.griffith@berksnature.org (610) 372-4992 Ext. 108	www.globe.gov/web/berks-conservancy-environmental-exploration-center
	Legacy Bridges STEM Academy, Inc.	Joi Spraggins drjoi@legacybridges.academy (215) 552-8950	www.globe.gov/web/legacy-bridges-stem-academy-inc.
	SciStarter Science for Citizens, LLC	Hined Rafeh hined@scistarter.com (856) 366-9644	www.globe.gov/web/scistarter-science-for-citizens-llc
PUERTO RICO	University of Puerto Rico, Mayaguez Campus *(pg. 46)*	Dr. Juan Lopez Garriga lopezj@uprm.edu (787) 265-5453	www.globe.gov/web/university-of-puerto-rico-mayaguez-campus
SOUTH CAROLINA	Clemson University	Dr. Cynthia Minchew Deaton cdeaton@clemson.edu (864) 656-5115	www.globe.gov/web/clemson-university
	Hilton Pond Center for Piedmont Natural History	Bill Hilton Jr. hilton@rubythroat.org (803) 684-5852	www.globe.gov/web/hilton-pond-center-for-piedmont-natural-history
SOUTH DAKOTA	South Dakota Discovery Center *(pg. 47)*	Anne Lewis annelewis@sd-discovery.org	www.globe.gov/web/south-dakota-discovery-center1

United States GLOBE Partnerships continued

STATE/TERRITORY	PARTNERSHIP	CONTACT	PARTNER WEBPAGE
TENNESSEE	Tennessee Environmental Education Association	Ramona Nelson Ramona.nelson@mytcalions.com (731) 695-8888	www.globe.gov/web/tennessee-environmental-education-association-partner
	Tennessee State University	Dr. David Padgett dpadgett@tnstate.edu (615) 963-5508	www.globe.gov/web/tennessee-state-university
	University of Tennessee at Chattanooga *(pg. 48)*	Dr. Deborah McAllister deborah-mcallister@utc.edu (423) 425-5376	www.globe.gov/web/university-of-tennessee-at-chattanooga-partner
TEXAS	Ellison Miles Geotechnology Institute at Brookhaven College - TRC	Melanie Gamble mcamble@dcccd.edu (972) 860-4269	www.globe.gov/web/ellison-miles-geotechnology-institute-at-brookhaven-college-trc
	El Paso Community College *(pg. 49)*	John Gilbert Olgin jolgin@epcc.edu	www.globe.gov/web/el-paso-community-college1
	ESC Region 05 - Silsbee Conference Center - TRC	Roxanne Minix-Wilkins rminix-wilkins@esc5.net (409) 923-5445	www.globe.gov/web/esc-region-05-silsbee-conference-center-trc
	ESC Region 18 - TRC	Martha Alexander malexander@esc18.net (432) 567-3274	www.globe.gov/web/esc-region-18-trc
	Our Lady of the Lake University - TRC	Isaac Esquivel isaac.esquivel@nisd.net	www.globe.gov/web/our-lady-of-the-lake-university-trc
	Texas Southern University	Dr. Obot Ekwere obot.ekwere@tsu.edu	www.globe.gov/web/texas-southern-university
	Texas STEM Coalition *(pg. 50)*	Michael Odell modell@uttyler.edu (903) 566-7149	www.globe.gov/web/texas-stem-coalition
	Texas Tech University-CISER – TRC	Susan Talkmitt susan.talkmitt@ttu.edu (806)742-1997	www.globe.gov/web/texas-tech-university-ciser-trc
	The University of Texas at Tyler *(pg. 51)*	Teresa Kennedy tkennedy@uttyler.edu (903) 566-7448	www.globe.gov/web/the-university-of-texas-at-tyler

United States GLOBE Partnerships continued

STATE/TERRITORY	PARTNERSHIP	CONTACT	PARTNER WEBPAGE
TEXAS continued	University of Texas at Brownsville & Texas Southmost College- TRC	Dr. Reynaldo Ramirez Jr. reynaldo.ramirez@utb.edu (956) 882-7255	www.globe.gov/web/18196
	University of Texas Medical Branch - Educational Outreach - TRC	Marguerite Sognier masognie@utmb.edu (832) 216-0001	www.globe.gov/web/university-of-texas-medical-branch-educational-outreach-trc
VERMONT	Shelburne Farms	Joan Haley jhaley@shelburnefarms.org	www.globe.gov/web/shelburne-farms-partner
VIRGINIA	Institute for Global Environmental Strategies (IGES) *(pg. 52)*	Cassie Soeffing cassie_soeffing@strategies.org (605) 331-2987	www.globe.gov/web/institute-for-global-environmental-strategies-iges-
	NASA Langley Research Center *(pg. 53)*	Jessica Taylor jessica.e.taylor@nasa.gov (757) 864-6358	www.globe.gov/web/nasa-langley-research-center
	Virginia State University	Shobha Sriharan sriharan@vsu.edu (804) 712-7181	www.globe.gov/web/virginia-state-university
VIRGIN ISLANDS	St. Croix Foundation/ Virgin Islands Department of Labor	Dr. Michelle D. Peterson mpeters@uvi.edu (340) 692-4254	www.globe.gov/web/15893
WASHINGTON	University of Washington Bothell	Blakely Tsurusaki btsuru@uw.edu	www.globe.gov/web/university-of-washington-bothell-partner
WEST VIRGINIA	NASA IV&V ERC *(pg. 54)*	Josh Revels jrevels@fairmontstate.edu	www.globe.gov/web/nasa-iv-and-v-facility-educator-resource-center
WISCONSIN	University of Wisconsin-Madison *(pg. 55)*	Michael Notaro mnotaro@wisc.edu	www.globe.gov/web/space-science-and-engineering-center
AT LARGE	National Wildlife Federation - Eco-Schools USA *(pg. 56)*	Jennifer Hammonds HammondsJ@nwf.org (703) 438-6240	www.globe.gov/web/nwf

GLOBE 2022 NEWS SUMMARY

These U.S. articles were posted on the GLOBE website in 2022. The full stories are available from the linked titles.

EDUCATION: STUDENT RESEARCH

Elkhorn Slough Reserve 2022 Student Research Symposium Highlights. Twenty-one students from seven schools participated in the local Student Research Symposium at Elkhorn Slough National Estuarine Research Reserve in Watsonville, Calif. Five projects were reviewed in two poster sessions.

St. Peter's School 2022 Student Research Symposium Highlights. GLOBE Teacher Janene Smith hosted a Student Research Symposium for seven junior high students in an elective class. Partners from the University of Toledo participated as reviewers.

Mescalero Apache School 2022 Student Research Symposium Highlights. Ten students attended the Student Research Symposium at the Mescalero Apache School hosted by GLOBE Teacher Nate Raynor.

The Toledo Zoo and Aquarium 2022 Student Research Symposium Highlights. Forty-seven students from two schools gathered at The Toledo Zoo and Aquarium. Project topics included surface temperature, soil moisture, plant diversity, air temperature, and animal diversity.

Kenner Discovery Health Sciences Academy 2022 Student Research Symposium Highlights. Twenty-seven students from three schools attended a Student Research Symposium on 11 May 2022. The event started with poster sessions of the twelve projects.

Chabot Space and Science Center 2022 Student Research Symposium Highlights. Thirty-three students from four high schools attended a Student Research Symposium on 5 May 2022. It began with peer reviews of six projects.

2022 U.S. GLOBE Student Research Symposia Summary. With support from NASA and Youth Learning As Citizen Scientists, the GLOBE U.S. Coordination Office supported seven in-person local Student Research Symposia. Our Partners reported that 212 students presented a total of 68 projects to their peers and STEM professional reviewers.

Congratulations to U.S. GLOBE Student Researchers! The International Virtual Science Symposium had 212 students from the United States submit a total of 63 projects. At seven in-person local Student Research Symopsia, 211 students presented 68 research projects.

COMMUNITY PARTNERSHIPS

49+ GLOBE-related Projects Presented at the 2021 AGU Fall Meeting. More than a hundred authors representing at least 49 GLOBE-related projects presented at the 2021 AGU Fall meeting, held virtually and in New Orleans, La., in December. Authors included partners, community members, NASA and GIO, as well as GLOBE students (as part of the Bright Stars program).

Collaborations Across the United States with the AREN Project and GLOBE Mission EARTH. The University of Toledo GLOBE Mission EARTH team worked with the AEROKATS & ROVER Education Network (AREN) to train teachers to use AquaROVERs to collect water quality data from local waters.

Midwest U.S. GLOBE Partnership Spring Roundup. Brief stories from Midwest GLOBE Partners around student research, regional collaborations, and Partnership updates.

ESS Collaboratives Converge in Colorado. Six teams of GLOBE Earth System Science Collaboratives from across the United States convened to provide focused planning time and to share ideas between groups.

Meet Berks Nature – The Nature Place. Berks Nature is a 501(c)(3) nonprofit conservation organization in Reading, Pa. Michael Griffith trains citizen scientists, Berks Nature Ambassadors, and watershed member volunteers in GLOBE protocols for water quality testing.

Meet a New Southeast Region Partnership—The Museum of Arts and Sciences. One of the newest Partnerships in the U.S. GLOBE community is the Museum of Arts and Sciences in Macon, Ga. Kimberly Novak is the Curator of Education; she organizes partnerships and volunteers for STEAM programming.

2022 North American Regional Meeting Overview. The 2022 GLOBE North American Regional Meeting took place both virtually (02–04 November) and at three in-person professional development workshops (07–08 November).

2022 NARM at the Toledo Zoo in Ohio. Midwest partners from GLOBE Mission EARTH, AREN, and Prairie Project joined forces to host a workshop at The Toledo Zoo as part of the GLOBE North American Regional Meeting. Area teachers who participated were provided GLOBE equipment and materials.

California Partners Host In-Person NARM Workshop. GLOBE Partners WestEd/UC Berkeley and the California Academy of Sciences co-hosted an in-person North American Regional Meeting workshop at the Lake Merritt Boathouse in Oakland, Calif.

GLOBE 2022 News Summary continued

COMMUNITY PARTNERSHIPS continued

2022 GLOBE NARM at Berks Nature – The Nature Place. The 2022 GLOBE North American Regional Meeting hosted at Berks Nature at The Nature Place hosted GLOBE Partners, community-based colleagues, public school teachers and administrators, NASA employees, and GLOBE employees.

GLOBE at AGU. Over 30 GLOBE-related projects were presented at the 2022 American Geophysical Union Fall meeting. Authors included Partners, community members, NASA and GIO, as well as NASA SEES student interns.

NASA Langley and Camp Discovery Partner with Longleaf Middle School in a Yearlong Surface Temperature Investigation. Students at Longleaf Middle School in Blythewood, S.C., are conducting a yearlong surface temperature investigation in their school parking lot. NASA Langley and Camp Discovery provide ongoing support to the teachers and students through training, communication, collaboration, and subject matter experts connections.

SCIENCE

University of Toledo GLOBE Mission EARTH to Study Algal Blooms in Lake Erie with Ohio Students and Teachers. The University of Toledo GLOBE Mission EARTH team received funding from the Ohio Environmental Education Fund to study the relationship of farm runoff and algal blooms with local teachers and their students.

GLOBE Mission EARTH Receives a B-WET Grant. Through a NOAA grant, students will collect GLOBE data at Earth Heart Farms to understand how land use can reduce harmful algal blooms and improve water quality in Lake Erie.

GLOBE 2022 News Summary continued

EDUCATION

GLOBE Teacher Vicky Gorman Uses GLOBE to Foster Authentic Science Learning with Students. Vicky Gorman, teacher at Medford Township Public School District, details how she has incorporated GLOBE into her teaching practices to enhance authentic science learning in her classroom.

NASA Langley Partners with Camp Discovery and Longleaf Middle School: ZooBot Magnet in a GLOBE Surface Temperature Investigation. Students in grades 6–8 at Longleaf Middle School in Columbia, S.C., went to Camp Discovery for a surface temperature field experience.

A Successful Second Year for University of Toledo's "GLOBE Kids Club." Kids Club ran as weekly half-hour virtual interactive sessions for students in Grades 3–5. The University of Toledo led the afterschool enrichment program with support from Partners at Boston University, NASA Langley and Wallops NASA Center.

NASA SEES Internship Students to be Hosted by GLOBE Mission EARTH This Summer. GLOBE Mission EARTH hosted two groups of students participating in the NASA STEM Enhancement in Earth Science (SEES), including 12 students in an Urban Heat Island Effect group and six students in a group examining air quality.

GLOBE and the Natural Inquirer Crosswalk Project. Educators and pre-service teachers can earn a stipend for contributing to a project to show connections between GLOBE protocols, activities and story books and Natural Inquirer readers for students.

Summer Opportunities for Students and Teachers in Ohio. The Xcite Learning/Bowling Green State University/Toledo Zoo Partnership led a STEM-based Elementary GLOBE program at a summer camp for 125 students. At a teacher professional development project, they trained 15 teachers in GLOBE protocols to investigate prairies.

GLOBE Youth Geoscientist Summer Internship Completes Year 2. The GLOBE Youth Geoscientist program provides a blend of earth system science field research with college readiness and career exploration. It is supported by the WestEd/UC Berkeley GLOBE Partnership.

Students Collected GLOBE Data at Earth Heart Farms in October. Over 170 students and 12 teachers from four local school districts visited Earth Heart Farms to take measurements and explore science foundational concepts. They learned about what contributes to the formation of significant harmful algal blooms in the western basin of Lake Erie.

NASA Takes GLOBE to Camp 2022. NASA Takes GLOBE to Camp provided more than 10,000 campers across the United States with opportunities to explore GLOBE protocols at more than 30 camps.

United States GLOBE Audiences served

We asked Partnerships to report on the audiences they served. Partnerships that contributed have an icon on their page for each category they reported on.

- **PreK** — Pre-school age youth
- **Elem** — Elementary school age youth
- **MS** — Middle school age youth
- **HS** — High school age youth
- **UG** — Undergraduate students
- **Grad** — Graduate students
- **PreEd** — Pre-service educators
- **Educ** — PreK-12 educators
- **LLL** — Life-long learners

UNIVERSITY OF ALASKA FAIRBANKS

University of Alaska Fairbanks Partnership Page (GLOBE)

About the Partnership: The University of Alaska Partnership engages in culturally sustaining climate change education focusing on issues important to and selected by local communities. It financially supports diverse Alaska schools, teams, and projects, providing GLOBE supplies or equipment and travel support for symposia and conferences as well as teacher PD. We connect students with scientists and Indigenous knowledge holders, matching expertise with the subject matter focus of student projects and helping students make sense of the data.

2022 Highlights: Find more information on University of Alaska Fairbanks highlights.

- Engaged 330 informal and formal educators and community members in professional development workshops.
- Approximately 1,443 youth engaged in climate change learning using Arctic and Earth STEM Integrating GLOBE and NASA (SIGNs) activities and GLOBE methodologies and NASA assets.
- Fresh Eyes on Ice greatly expanded the use of GLOBE Observer Land Cover to track ice conditions of freshwater rivers for safety and flood prediction.
- GLOBE Grandma continued to develop eLearning programming for elementary youth.
- Hosted the first Alaska GLOBE Student Research Symposium (SRS) in Fairbanks on Earth Day, April 22.
- Revised the SRS review criteria to honor and elevate Indigenous values and knowledges.

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, pre-service teachers, GLOBE in undergraduate classrooms, education research, science research, citizen science, informal science, Indigenous knowledges

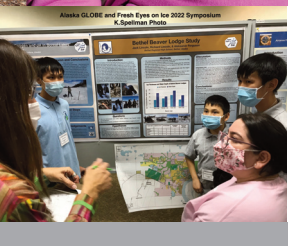
Cooperating Organizations: University of Alaska Fairbanks (UAF); Association of Interior Native Educators; NASA Science Activation Science Mission Directorate; NASA Citizen Science; NASA Minority University Research and Education Project (MUREP) for American Indian and Alaska Native Science, Technology, Engineering and Mathematics (STEM) Engagement; National Weather Service; University of Montana School of Public and Community Health Sciences. Key Organizations at UAF: International Arctic Research Center; Bonanza Creek Long Term Ecological Research Project; Water and Environmental Research Center; 4-H - Alaska and Florida; Alaska Satellite Facility; Alaska Climate Research Center.

Funding: NASA Cooperative Agreement Award NNX16AC52A; Bonanza Creek Long Term Ecological Research Project NSF DEB -1636476; Winterberry Project NSF Award 1713156; Fresh Eyes on Ice National Science Foundation Award 1836523 and NASA Cooperative Agreement Award 180NSSC21K0858

Publications **News Stories**

Student Research Support: Two projects support students in entering their research in the IVSS and SRS: Arctic and Earth SIGNs and Fresh Eyes on Ice. These projects have a yearly workshop with educators plus a monthly professional development opportunity.

Audiences served: Elem MS HS UG Grad PreEd Educ LLL



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UNIVERSITY OF ARKANSAS, FAYETTEVILLE

Center for Math and Science Education

About the Partnership: The Arkansas GLOBE Partnership at the University of Arkansas, Fayetteville through the STEM Center for Math and Science Education has been continuously active since its creation in 1996.

2022 Highlights:

- Citizen science and lifelong learners have been a key focus this past year and the GLOBE Observer has been a very useful tool for enhancing interest in data collection.
- GLOBE Mentor Trainer Lynne Hehr has been active in the Education Working Group as 2023 Chair.
- GLOBE Trainer John Hehr has continued to be active with atmosphere presentations to the Northwest Arkansas Master Naturalists chapter, a group of over 400 members.

The Arkansas GLOBE Partnership plans to continue its community outreach efforts through citizen science with lifelong learners and the K–5 education community (school team support, educator workshops, equipment and material loans, and teacher mentoring) as it works with GLOBE U.S. and international partners.

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, pre-service teachers, engineering, education research, science research, citizen science, informal science

Presentations:

- Presenter: 2022 GLOBE International Annual Meeting
- Professional development provider: K-4 GLOBE materials and resources
- Chair: Education Working Group 2022 involved with Trainer/Mentor Trainer and Learning Activities committees
- Team Member: 2022 GLOBE AMSTI Science Specialist Training
- Presentations: Northwest Arkansas Master Naturalists in Trainings—Soils, Clouds, Climate, Weather Station and Arkansas Environmental Education Association, Citizen Science
- Project: Northwest Arkansas Master Naturalist Davis Weather Station

Step Up To What We Have To Offer CMASE
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University of Arkansas

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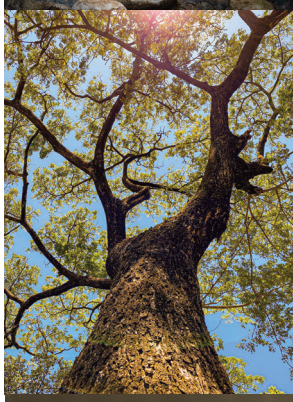

CALIFORNIA ACADEMY OF SCIENCES/ SCIENCE ACTION CLUB

Science Action Club

About the Partnership: Designed for students in grades 5–8, Science Action Club (SAC) is a global out-of-school-time program that inspires youth to explore and connect with nature while achieving essential science, technology, engineering, and math (STEM) learning goals. Through dynamic curricula that integrate high-energy games and hands-on activities with citizen science investigations, the program ignites curiosity, fosters workforce development skills, and builds STEM identity among the next generation of environmental stewards, in-person or virtually.

SAC's Cloud Quest unit explores the impact of clouds on weather and climate. Through games and projects, youth investigate local sky conditions, document their discoveries with GLOBE Observer, explore environmental issues, and design strategies to protect our planet. More than 75,000 youth and educators have participated since 2011.

Areas of Expertise: In-service professional development, programming for students, citizen science, informal science

Cooperating Organization: California School-Age Consortium

Funding: Pisces Foundation, Simons Foundation, Overdeck Foundation

News Stories: California partners host in-person NARM workshop

Student Research Support: SAC features staff training and science kits that make it easy for out-of-school educators to lead science experiences with confidence and skill. Each kit includes twelve activities and bonus resources; science tools and supplies; interactive, self-paced online training for program staff members; and options for customized training.

Audiences served: MS

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CENTRAL SAN JOAQUIN VALLEY

Central San Joaquin Valley Partnership Page (GLOBE)

About the Partnership: This partnership serves schools and informal education centers around the Central Valley of California. We can offer GLOBE information on training and other events going on around the state, country and the world.

2022 Highlights: The COVID-19 pandemic saw a lull in student participation in the partnership, but Leigh-Ann Olsen and Peggy Foletta continued to collaborate during the off years. They presented "Hydrology: Learning About Protocols" at the 2022 GLOBE Annual Meeting.

The 2022-2023 school year has three students from Kingsburg High working on data collection for a Student Research Symposium project. AP Environmental Science students will be collecting weather data to post to GLOBE this winter and spring, as well.

Areas of Expertise: Incorporating citizen science into the classroom

Student Research Support: Currently only one school is involved in the SRS this year. Funding comes from GLOBE, and instruments and other items are purchased through that school's funding for the science department.

Audiences served: HS Educ

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NASA JET PROPULSION LABORATORY

NASA JPL Partnership Page (GLOBE) **Jet Propulsion Laboratory (NASA)**

About the Partnership: Our Partnership strives to work with U.S. and international students of The GLOBE Program, provide NASA scientists to help with student research, and educational specialists to work with teachers via webinars, professional development workshops, and virtual presentations. We partner with local libraries, science institutes, Los Angeles and Pasadena school districts, and outdoor environmental programs to provide students, teachers, and the general public with NASA resources, imagery, and Earth Science data visualizations that can be used for student research projects and in classroom settings.

2022 Highlights:

- Co-hosted year 4–5 of the Trees Around the GLOBE Student Research Campaign. We have recorded 136,000 observations from 47,000 global sites. Held 52 webinars and eight special webinars focusing on student research.
- Member of the California Strong ESS Collaborative, a partnership that strives to share Earth system science initiatives throughout California and work on international student collaborations.
- Invited by the U.S. Embassy to support the GLOBE Regional Learning Expedition in Käsmu, Estonia. Took part in climate change presentations, conducted workshops and assisted students with data collection and analysis, which will lead to International Virtual Science Symposium projects.
- Attended the European and Eurasia Regional meeting, leading workshops using the GLOBE observer data collecting app and gathering data (trees, clouds, landcover, and mosquito habitat mapper).
- Peter Falcon was interviewed by the AGU Narratives Storycorps team. He discussed his experience working at NASA's JPL and being a part of the GLOBE program. The interview will be archived in the American Folklife Center at the Library of Congress in Washington D.C.

Areas of Expertise: In-service professional development, Elementary GLOBE, pre-service teachers, citizen science, informal science

Cooperating Organizations: WestEd/UC Berkeley Partnership; Elkhorn Slough National Estuarine Research Reserve; Los Angeles Unified School District, Office of Outdoor and Environmental Education; San Francisco State University, National Estuarine Research Reserve

Funding: NASA

News Stories

- Trees Around the GLOBE Intensive Observation Period
- NASA Trains Students at the 2022 GLOBE Regional Learning Expedition in Estonia
- STATE Magazine: GLOBE aims to make science education cool in Estonia
- U.S. Chargé d'Affaires and Estonia President Open GLOBE Environmental Research Expedition in Käsmu

Student Research Support: We support student-led projects via webinars, workshops and subject matter expert presentations. We support the U.S. GLOBE Pacific Region Student Research Symposium, the International Virtual Science Symposium, the European and Eurasia Virtual Student conference and the GLOBE Regional Learning Expedition in Käsmu, Estonia.

Audiences served: Elem MS HS UG PreEd Educ

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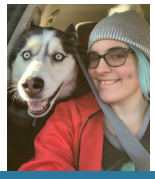

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WESTED/UNIV OF CALIFORNIA BERKELEY

WestEd/UC Berkeley

WestEd/UC Berkeley Partnership Page (GLOBE)
GLOBE Mission Earth Page (GLOBE)

About the Partnership: The WestEd/UC Berkeley GLOBE Partnership focuses on providing support to K-12 formal and informal science education. This support is offered through professional learning opportunities and place-based assistance to educators. Our program goal is to engage K-12 educators and their students in field-based data collection in order to gain a better understanding of the Earth around them.

2022 Highlights:

- **SRS— Chabot Space & Science Center:** The Partnership hosted the first in-person student research symposium since the pandemic. More than 30 students attended the event presenting poster research projects to 13 STEM professionals. This event was hosted by Chabot Space and Science Center in Oakland, California.
- **Microplastics Pilot Program:** This year the Partnership piloted a four-day pacing guide on microplastics for 5th, 7th, 10th graders at three public schools. The pilot program engaged students in understanding the extent and challenges of plastics in the environment. The microplastics lab protocols are modeled after the extensive work completed by GLOBE Italy and GLOBE Australia.
- **NARM 2022 In-Person:** The Partnership welcomed participants from Colorado, Alaska, New Mexico, and California in a two-day, in-person workshop in GLOBE hydrosphere and atmosphere protocols in collaboration with the California Academy of Sciences. Participants conducted water quality analysis, investigated microplastics in urban water runoff and experienced leadership training for Science Action Club's clouds program.

Areas of Expertise: In-service professional development, programming for students, education research, citizen science, informal science, summer/after school GLOBE internship

Cooperating Organizations: CA Strong Earth System Science Collaborators: Solar System Ambassadors, NASA JPL, Elkhorn Slough NERR, San Francisco Bay NERR, LA Unified Office Of Outdoor Environmental Education; Partnership Collaborators: American River Conservancy; Earth Team; Chabot Space and Science Center; Lawrence Hall of Science

Funding: National Science Foundation Advancing Informal STEM Learning; National Science Foundation IUSE: Geopaths, NASA Science Activation Grant

News Stories:

- GLOBE Mission EARTH participates in North American Regional Meetings (NARM)
- Student Symposia Hosted or Supported by GLOBE Mission EARTH!
- Science From the Rooftops

Student Research Support : Our partnership provides both school and teacher stipends for GLOBE implementation. We also provide ongoing support to teachers and students for daily GLOBE integration and student research project development for regional SRS. SRS projects are uploaded to the GLOBE Mission Earth webpage

Audiences served: Elem MS HS

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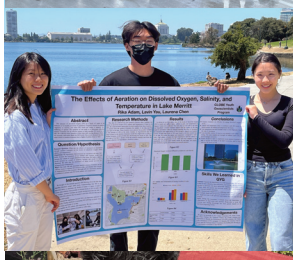
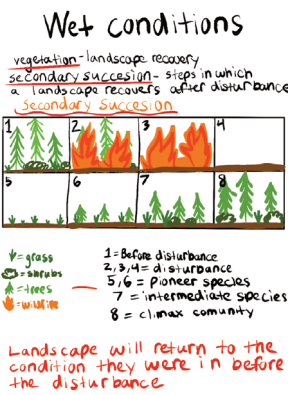
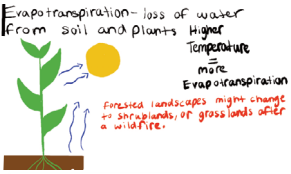
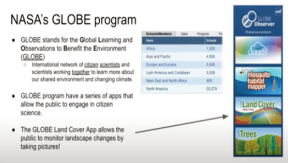


COOPERATIVE INSTITUTE FOR RESEARCH IN ENVIRONMENTAL SCIENCES







The Future of Forests

About the Partnership: The Cooperative Institute for Research in Environmental Sciences (CIRES) is a NOAA Cooperative Institute at the University of Colorado Boulder. CIRES scientists conduct a wide range of Earth System Science (ESS) research. CIRES Education & Outreach develops relationships between our scientists and the communities we serve. As a GLOBE partner, we provide outreach and engagement opportunities for formal and informal educators. GLOBE protocols are built into many of our projects, curricula, and professional development workshops. We are a member of the Colorado-based GLOBE ESS Collaborative, a team of regional GLOBE partners to promote and support the use of GLOBE in and out of the classroom.

2022 Highlights: In 2022, we partnered with Rocky Mountain National Park (RMNP) to co-lead a teacher workshop in which participants engaged with our latest NASA-supported resource, "The Future of Forests," a free middle/high school storyline unit connected to NGSS life science standards. Workshop participants interacted with the curriculum just as their students would, exploring NASA resources and the GLOBE Observer Land Cover tool as they gathered evidence to construct explanatory models for the unit driving question, "How do landscapes recover after a wildfire?" After engaging with the curriculum, RMNP rangers took participants out into the field to measure post-fire recovery at a number of different burn sites.

This curriculum is freely available at bit.ly/theFutureofForests

Areas of Expertise: In-service professional development, citizen science, informal science

Cooperating Organizations: The University of Colorado Boulder

Funding: Community Outreach and Engagement Programs

News Stories: Investigating Shifts in Post-Fire Landscape Recovery

Student Research Support : We support schools by facilitating professional development opportunities centered around "The Future of Forests" curriculum. In 2023, we will partner with high-needs schools in the Denver-metro area to bring classrooms that engage with the curriculum to RMNP to participate in the fire ecology program. Students will have the opportunity to measure post-fire recovery and test ideas they developed in the classroom.

Audiences served: MS HS

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METROPOLITAN STATE UNIVERSITY OF DENVER

Center for Advanced STEM Education (MSU)

About the Partnership: During 2017–2020, an NSF ITEST Grant (#1615193) funded numerous teacher training workshops, an annual multi-day teacher training institute and support for individual GLOBE teachers. Since 2020, our unfunded efforts have been more limited, with efforts mostly in support of GLOBE teachers supported through the NSF grant. Our focus is Earth systems science through equity and career lenses.

2022 Highlights:

- The highlight for 2022 was continued collaboration with the GLOBE-aligned Colorado Earth System Science Collaborative. The group of educators from UCAR, Colorado State University, CoCoRaHS and others met in Estes Park, Colo., to plan for future field-based teacher training events.
- We used GLOBE resources for summer and weekend programming with middle school students and for undergraduate classes.
- Janelle Johnson also is leading statewide Colorado STEM Ecosystem.

Areas of Expertise: In-service professional development, Elementary GLOBE, pre-service teachers, GLOBE in undergraduate classrooms, education research, STEM equity

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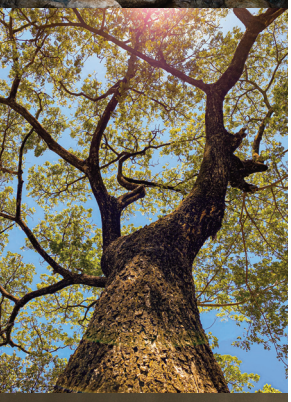

UCAR CENTER FOR SCIENCE EDUCATION

Center for Science Education (UCAR)
GLOBE Weather Curriculum (UCAR)
GLOBE Weather Pathways (UCAR)
Earth System Science Collaboratives (GLOBE)

About the Partnership: The UCAR Center for Science Education (UCAR SciEd) serves the geoscience community by amplifying and complementing the work of the National Science Foundation's National Center for Atmospheric Research (NCAR) and University Corporation for Atmospheric Research (UCAR) member universities by reaching our audiences: K-12 educators, university faculty, students, and the public through excellence in educational programs and experiences.

UCAR Center for Science Education facilitated development of seven Earth System Science (ESS) Collaborative Teams beginning in March 2020 with remote learning opportunities over two years, culminating in a workshop in July 2022. The purpose was to study how the ESS collaborative model (a group of organizations with the common interest in promoting ESS in Colorado using GLOBE) could be replicated and adapted across GLOBE regions in the United States.

2022 Highlights: In 2022, UCAR SciEd was awarded a grant from NSF GeoPaths. The goal of "GLOBE Weather Pathways for Students with Disabilities" is to develop and test an approach to provide middle school educators with the experiences, tools and abilities to adapt geoscience curricular resources to meet the needs of students with disabilities and articulate career pathways and opportunities in STEM for them. GLOBE Weather Pathways will consist of three interrelated components: 1) establishment and support of a geoscience learning ecosystem consisting of local STEM educators, content specialists (atmospheric sciences), special educators and person(s) with a disability working in STEM fields to support student career pathways; 2) professional learning on the GLOBE Weather curriculum, an NGSS based unit in which students engage with weather concepts through a phenomena-based approach, and; 3) Exceptional Needs Workshops where participants will work to adapt materials for middle school students with physical disabilities.

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, engineering, education research, citizen science, informal science, educational resource development, GLOBE weather professional development

Cooperating Organizations: Colorado ESS/GLOBE Collaborative: University of Colorado, Boulder CIRES, University of Colorado Fiske Planetarium, Colorado State University Natural Sciences Education & Outreach Center, College of Natural Sciences, Metropolitan State University, CoCoRaHS, St. Vrain Valley Schools, Colorado STEM Ecosystem

Funding: NSF

Publications and Presentations:

- globe.gov/web/ucar-center-for-science-education/home/publications
- Elementary GLOBE, GLOBE Weather, GLOBE Data Explorations
- ESS Climate Panel Recording (July 8, 2022)
- ESS Groups Report out Presentations and Feedback Recording (July 9, 2022)

Audiences served: Elem MS HS Educ LLL

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UNIVERSITY OF SOUTH FLORIDA

USF Partnership Page (GLOBE)
College of Marine Science (USF)

About the Partnership: We focus on training teachers, graduate students, and young scholars how to use science tools to take atmospheric and hydrology data.

Each summer we use GLOBE protocols to take atmospheric and hydrology data during our 3-week program called the Oceanography Camp for Girls.

2022 Highlights: We had a fun, educational week-long workshop for elementary school teachers in 2022. They learned how to use Elementary GLOBE resources to take environmental data in the field and in their classrooms. We explored our local watershed through kayaking, boating, and walking. The teachers took hydrology readings— nitrate, phosphorus, temperature, salinity, and more—in a river. They took atmospheric data— temperature, clouds, humidity, and more—at the beach, in an estuary, and in a manmade area. All of these skills have now been applied to be used in their classrooms.

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, citizen science, informal science

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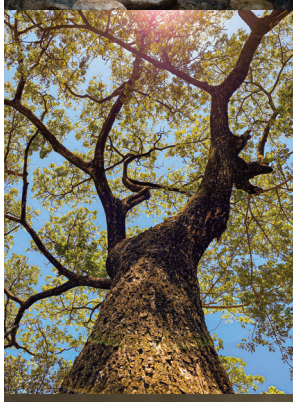

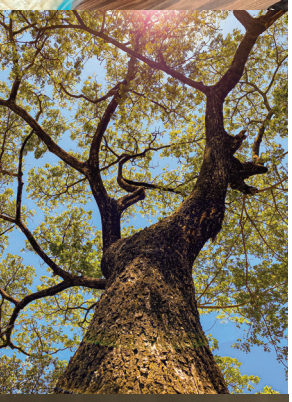

MUSEUM OF ARTS AND SCIENCES

Museum of Arts and Sciences Partnership Page (GLOBE)

About the Partnership: Our nascent program is starting GLOBE training for local schools and introducing GLOBE Observer as a citizen science project to local groups (eg. Garden Clubs).

2022 Highlights: In 2022, we became a GLOBE partner, attended the Virtual GLOBE conference, and trained one Trainer in the Atmosphere Protocols. We have completed one Atmosphere Protocol training with the Georgia Academy for the Blind.

Areas of Expertise: In-service professional development, citizen science

Cooperating Organizations: Georgia Academy for the Blind, Mercer University

Audiences served: Educ LLL

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Museum of Arts and Sciences

U.S. GLOBE YEARBOOK STORIES 2022

U.S. GLOBE WATERCOOLERS

The U.S. GLOBE Watercoolers – virtual learning and networking opportunities for GLOBE teachers and Partners – continued with presentations by U.S. GLOBE community members. The U.S. GLOBE Office hosted 17 Watercoolers with 89 unique attendees representing GLOBE Partners, teachers, students, and community members. Topics covered a wide range of topics including GLOBE Eclipse, Mission SnowGLOBE, the Student Research Symposia, GLOBE in the middle school classroom, and Telling our Tree Stories.

STUDENT RESEARCH SYMPOSIA

In 2022, the decision was made to cancel the in-person Regional SRS. However, with support from NASA and Youth Learning As Citizen Environmental Scientists (YLACES), the GLOBE U.S. Coordination Office supported seven in-person local Student Research Symposia (SRS). At these local SRS, 211 students presented sixty-eight GLOBE research projects. Students presented their investigations to peers and STEM professionals.

FALL NORTH AMERICAN REGIONAL MEETING

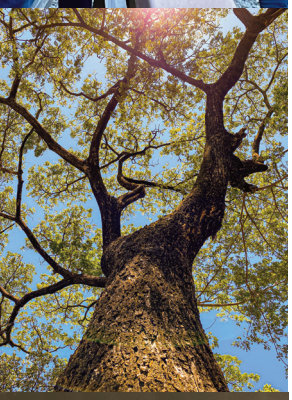
The 2022 GLOBE North American Regional Meeting (NARM) took place both virtually 02–04 November and at three in-person professional development workshops 07–08 November. This new hybrid model of virtual and in-person options was chosen to reach the widest North American GLOBE community audience, while still in the midst of the COVID pandemic.

Seventy-eight GLOBE Partners and educators registered for the virtual portion of the meeting. Each day's schedule was two and half hours of themed lightning talks and discussions, program updates, videos highlighting GLOBE Partnership activities, and more.

The three in-person NARM Professional Development workshops were well-attended (from 16 to 30 participants) and focused on different aspects of GLOBE and related programs. In Oakland, Calif., the theme was "Hydrosphere Protocols and Microplastics Training" organized by WestEd/UC Berkeley and Science Action Club. In Toledo, Ohio, the theme was "From Midwestern Prairies to City Centers: GLOBE Student Research to Better Our Region's Environment" organized by University of Toledo, GLOBE Mission Earth, Wayne RESA, and Xcite Learning/Bowling Green State University/Toledo Zoo. In Reading, Pa., the theme was "Citizen Scientists: Engaging the Community" organized by Berks Nature.

NORTH AMERICAN GLOBE INTERNATIONAL STEM NETWORK MENTORSHIP

During the COVID-19 pandemic, the GLOBE U.S. Coordination Office shifted its programmatic focus to mentoring activities provided by U.S. members of the GLOBE International STEM Network (GISN) North America region. Forty-six North American GISN members volunteered for this mentorship program by filling out a survey with details to match them with students. A pilot mentor-matching program continued into Spring 2022; seven educators completed registration surveys that collected information about learner populations and expectations. All educators who responded to the registration survey were matched with one or more GISN mentors. Mentors and educators who engaged in mentoring activities had a positive experience.



NASA GODDARD SPACE FLIGHT CENTER

NASA Goddard Space Flight Center Partnership Page (GLOBE)

About the Partnership: The Goddard GLOBE Partnership provides resources to schools and teachers in our 11-state region. We offer program support to integrate GLOBE into school curricula, webinars to provide additional training, answers to specific problems via telecons and telephone calls, and, if possible, face-to-face in-school support. We offer an equipment loan program for new GLOBE schools and students preparing for the Student Research Symposia (SRS). NASA's Goddard Space Flight Center in Greenbelt, Md., is home to the nation's largest organization of scientists, engineers, and technologists who build spacecraft, instruments, and new technology to study the Earth, the sun, our solar system, and the universe.

2022 Highlights: 2022 was a busy year for our partnership with a wide variety of GLOBE events locally, regionally, and internationally. Locally our GLOBE partnership provided support, training, and resources to area school districts in Pennsylvania and Maryland. Regionally, our partnership worked with schools and citizen science groups throughout the mid-Atlantic states. Internationally, we worked with a new GLOBE partnership in the country of Bhutan supported by the GLOBE partnerships in India, Thailand, and the Philippines.

We are also involved in a pilot program to develop student built and programed CO2 sensors that may potentially be used to support the current GLOBE Carbon Cycle activities. Our partner in this pilot project is Fizzee Labs in New Jersey.

With the help of Lyn Wigbels (GLOBE International Coordinator) our partnership continued to provide GLOBE Program support for the U.S. Department of State and their Global Education Resource Fair as part of the Fulbright Teachers for Global Classrooms Program.

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, pre-service teachers, GLOBE in undergraduate classrooms, education research, science research, citizen science, informal science, individualized GLOBE training and implementation

Cooperating Organizations: NASA, NOAA, U.S. Department of State, National Wildlife Federation

Funding: NASA

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BOSTON UNIVERSITY SCHOOL OF EDUCATION

Boston University Partnership Page (GLOBE)

About the Partnership: The GLOBE Partnership at Boston University's Wheelock College of Education and Human Development promotes GLOBE activities to support science education in Massachusetts and Rhode Island.

BU GLOBE Mission Earth is a member of the GLOBE Mission Earth consortium supported by NASA Science Activation 2.0. We work with teachers in grades K–12 to engage their students in GLOBE outdoor investigations of their environment and in the use of GLOBE and NASA online data resources.

The BU GLOBE Partnership invites individual teachers, youth serving organizations, or school districts to contact us. We can offer GLOBE training and support year-round, as well as integration into our current network of GLOBE schools and teachers.

2022 Highlights

- Each summer we offer a one-week GLOBE workshop for teachers to introduce teachers to GLOBE and for veterans to share their GLOBE practices, including which NGSS standards are supported by which activity. In 2022 the workshop was hybrid with a focus on figuring out new ways for GLOBE and Mission Earth activities to fit into classrooms with shifts in district science curriculum.
- During the school year we provide quarterly professional development sessions focused on students' research projects and support of teachers' implementation of GLOBE activities.
- For the fourth year in a row, we staged a Providence District Science Research Symposium.

Areas of Expertise: In-service professional development, pre-service teachers, Elementary GLOBE, co-teaching in science classes, independent student research

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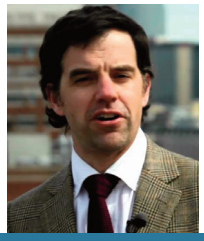

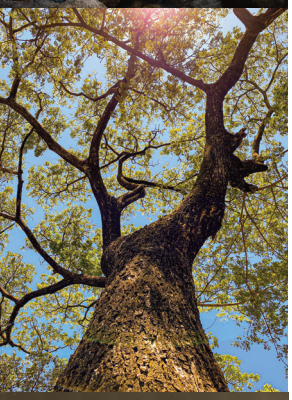

GLOBAL STEM EDUCATION CENTER, INC

Global STEM Education Center Partnership Page (GLOBE)
Global STEM Education Center
@GlobalSTEMClass on Twitter

About the Partnership: As a small 501(c)(3) nonprofit, we are committed to equity, STEM careers, global citizenship, diversity and inclusion, and assisting schools beyond the greater Boston area from underserved and underrepresented groups.

2022 Highlights

- The Center devoted its efforts to supporting and maintaining relationships with our partnership schools and to developing professional development for teachers. We continued recruiting new GLOBE members, outreaching to schools and nonprofit organizations, making new connections, and presenting virtually to school committees, superintendents, school principals, and university faculty.
- We are working with great student-led associations: BPA Massachusetts (students from vocational career technical high schools majoring in business and academic high schools) and Youth Climate Action Now.
- We participate in the NASA GLOBE Lifelong Learning program led by Dorian W. Janney; we are working on piloting it at the Shrewsbury Senior Center and Hopkinton Senior Center in Massachusetts.
- In partnership with Professor Mike Jabot and SUNY Fredonia, we have continued developing an online teacher professional development resource on teamwork skills based on 4D Systems and "How NASA Builds Teams," intercultural communication and global competency, environmental science diplomacy, and online teaching and learning.
- We participated in the GLOBE presentation at the UN General Assembly Science Summit and presented at the at 25th Annual Colloquium on International Engineering Education in November 2022 at University of Rhode Island.
- GLOBE protocols used included atmosphere (air temperature, precipitation, clouds and contrails, relative humidity, surface temperature) and biosphere (biometry, trees).

Areas of Expertise: In-service teacher professional development, programming for students, citizen science, informal science, after school programs

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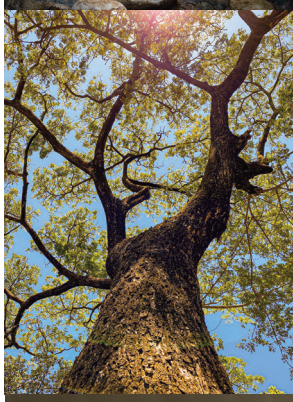

GRAND VALLEY STATE UNIVERSITY

Grand Valley State University Partnership Page (GLOBE)
Grand Valley State University

About the Partnership: The GVSU GLOBE Partnership has focused on educator training (pre- and in-service) and delivering programs for K–12 students at a GVSU facility.

2022 Highlights

There were two main areas of focus in 2022.

- We integrated GLOBE protocols into our outdoor programs for students in grades 4 through middle school. This complements the use of GLOBE water quality measurements that the students make on our onboard aquatic education program.
- Another area was teacher education for the third year of a NASA Michigan Space Grant project. Using the theme of climate change, educators were introduced to a variety of GLOBE protocols. Surface temperature was highlighted.

Additionally, GVSU participated in the GLOBE Midwest ESS Collaborative.

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, pre-service teachers, citizen science

Cooperating Organizations: GVSU Geology Department, GVSU Annis Water Resources Institute (AWRI)

Funding: GVSU Annis Water Resources Institute

Audiences served: Elem MS PreEd Educ

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NORTHERN MICHIGAN UNIVERSITY

Northern Michigan University Partnership Page (GLOBE)

About the Partnership: Northern Michigan University has several opportunities for pre-service and in-service teachers. All training has focused on students in the teacher preparation program in science education. Students are taught to integrate elementary processes into field observations.

2022 Highlights: Our greatest accomplishment for 2022 was the continuation of the BWET program and collaboration with our community school partners. Northern is also integrating approaches in science using GLOBE protocols in life and earth science courses.

Areas of Expertise: In-service professional development, Elementary GLOBE, pre-service teachers, GLOBE in undergraduate classrooms

Audiences served: Elem MS UG PreEd

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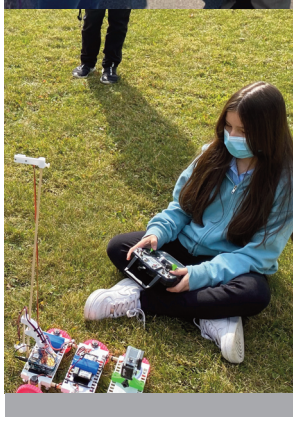
WAYNE RESA



Wayne RESA Partnership Page (GLOBE)
David Bydlowski (GLOBE)

About the Partnership: The Wayne RESA GLOBE Partnership has the primary focus of supporting and implementing The GLOBE Program within the NASA AREN Project (AEROKATS and ROVER Education Network). Although the primary audience is the AREN community, locally the Partnership supports educators in Wayne County, Mich., and Southeast Michigan. The Partnership also works closely with the Friends of the Rouge - Rouge Education Project and the Metropolitan Detroit Science Teachers Association.

2022 Highlights

- April 25–May 25: AREN Project 2022 Remote Sensing Summer Institute Workshop (online). This workshop was designed to train educators, who were selected for the AREN Project TerraROVER workshop, to become GLOBE teachers. Components included: introduction to GLOBE, introduction to atmosphere, and surface temperature.
- July 4–23: AREN Project 2022 Remote Sensing Summer Institute Workshop (online). This workshop was designed to train educators, who were selected for the AREN Project 2022 Remote Sensing Summer Institute workshop, to become GLOBE teachers. Components included: introduction to GLOBE, introduction to atmosphere, and clouds.
- October 6: GLOBE Support for Water Quality Testing/Surface Temperature/Atmosphere Protocols (Clippert Academy, Detroit). Middle school students from Clippert Academy in Detroit spent the morning collecting water quality monitoring data for the Rouge Education Project, surface temperature using IRTs and TerraROVERs, and atmospheric data using AEROKAT kite systems.
- November 7–8: NARM PD Learning Workshop "From Midwestern Prairies to City Centers: GLOBE Student Research to Better Our Region's Environment" (Toledo Zoo). This workshop was one of three face-to-face NARM PD Learning Workshops, held after the annual NARM meeting. GLOBE components included: surface temperature, atmosphere, and Earth systems. Presentation with University of Toledo, Xcite Learning/NWO @BGSU, and the Toledo Zoo.

Areas of Expertise: In-service professional development, programming for students, citizen science

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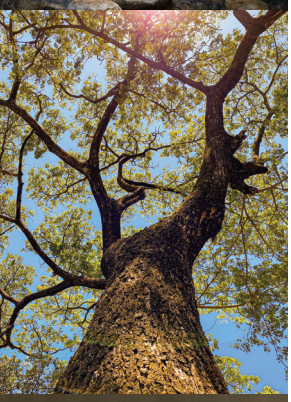

UNIVERSITY OF SOUTHERN MISSISSIPPI

Dr. Sherry Herron (GLOBE)

About the Partnership: Dr. Herron provides outreach to students and conducts workshops for in-service teachers. Dr. Buford teaches GLOBE protocols to biology undergraduate students at USM each fall semester and provides research support for teachers and students through the Region I Science and Engineering Fair.

2022 Highlights: In June 2022, Dr. Herron conducted a one-week in-service elementary teacher workshop followed by a one-week STEM student camp (based on Elementary GLOBE) at the Brenda Cowan Elementary School in Lexington, Ky. Scheduling conflicts prevented the fall STEM experience to take place that had been planned for 100+ K–2 students from a different school.

Throughout this year, Dr. Ali based her online biology research course on the GLOBE Mosquito Habitat Campaign. The undergraduate online biology course, offered each trimester at William Carey University, reached 100+ students across the U.S.

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, pre-service teachers, GLOBE in undergraduate classrooms, citizen science, informal science

Cooperating Organizations: USM, William Carey University, Kentucky State University

Funding: Funding for the summer program was provided by the William R. Kenan Jr. Charitable Trust through Kentucky State University.

News Stories

- Kentucky State University partners with NASA's GLOBE Program for hands-on STEM education
- Kentucky State University partners with Fayette County Public Schools for STEM learning

Audiences served: Elem, MS, HS, UG, Grad, PreEd, Educ

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UNIVERSITY OF NEVADA, RENO

University of Nevada Reno Partnership Page (GLOBE)

About the Partnership: The University of Nevada, Reno GLOBE Partnership works with in-service and pre-service educators to facilitate training sessions and build competency in utilizing GLOBE protocols within formal and informal science spaces.

2022 Highlights: In 2022 we partnered with the Nevada State Science Teachers Association and will be planning outreach events to include students across our state in GLOBE events. We continued to work with pre-service teachers, giving them access to 5E lessons which incorporate GLOBE activities.

We invite individual teachers and youth serving organizations to contact us if interested in learning more about how to be involved.

Areas of Expertise: Elementary GLOBE, pre-service teachers, GLOBE in undergraduate classrooms, citizen science

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LEITZEL CENTER AT THE UNIVERSITY OF NEW HAMPSHIRE

Leitzel Center Partnership Page (GLOBE)

About the Partnership: The Leitzel Center New Hampshire GLOBE Partnership works to build a training team of GLOBE teachers and university scientists and graduate students. We work primarily with schools and teachers in New Hampshire, but training and support are available to schools in Vermont and Maine as well.

2022 Highlights

- The Soil Tent program (a traveling educational exhibit combining hands-on soils science activities and a 10x10 tent with striking murals depicting students' observations of their local soils) reached 943 K–12 students, 24 educators during professional development, and 810 members of the general public.
- NH GLOBE Team, the USDA Forest Service, and UNH Cooperative Extension held a workshop on the Soil Tent for educators and STEM Docents (June) and Haley Wicklein presented the Soil Tent to educators as a part of a workshop held by the NH Timberland Owners Association (July).
- The NH GLOBE Team, a USDA Forest Service representative, and a STEM professional led water quality activities at Maple St. School, Rochester, N.H., to start on the development of Water Tent panels with educators and students in grades 4 and 5 (October).
- The NH GLOBE Partnership is a part of a group of UNH researchers that received a $3.5 million award from the U.S. Department of Education to develop a multi-tiered program that will support New Hampshire middle and high schoolers in learning topics related to STEM. In 2022, Jen Bourgeault co-facilitated an Extended Learning Opportunity for high school students in Manchester, N.H., using the GLOBE Carbon Cycle materials (October - December).
- Haley Wicklein and Alicia Carlson presented as part of the GLOBE Exchange at the GLOBE North American Regional Meeting (November).

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, education research, citizen science

Cooperating Organizations: USDA Forest Service; University of New Hampshire Cooperative Extension; NH Education and Environment Team

News Stories: Hampstead Central School (NH) Pre-K through 4th Grade Students Explore Soils with the Soil Tent Program

Audiences served: Elem MS HS Grad Educ

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INSTITUTE FOR EARTH OBSERVATIONS

Palmyra Cove Nature Park

About the Partnership: Our focus at the Institute for Earth Observations is the correlation of data and imagery between ground observations and those from Space. We developed the Space to Earth : Earth to Space Model (SEES) and have instituted that approach in our research and Environmental STEM Center and 250-acre nature park.

Areas of Expertise: In-service PD, programming for students, GLOBE in undergraduate classrooms, engineering, education research, science research, citizen science, informal science

Funding: Burlington County Bridge Commission; Palmyra Cove Environmental Education Foundation (PCEEF); GLOBE Mission Earth

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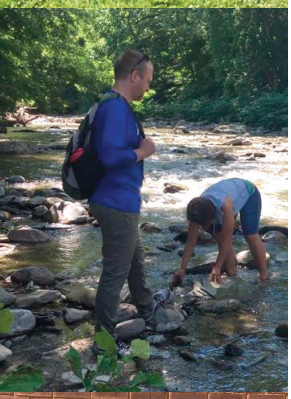
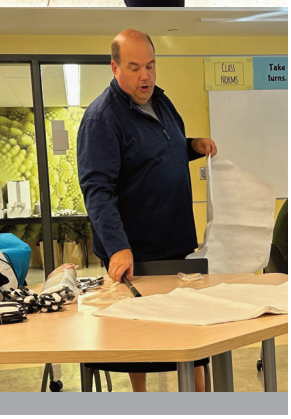
INSTITUTE FOR RESEARCH IN SCIENCE TEACHING





About the Partnership: The Institute's focus has been the infusion of GLOBE into classrooms across our region through our ongoing partnerships, which grows from the use of GLOBE in our pre-service teacher education program and having the trained pre-service teachers serve as ambassadors of GLOBE in classrooms.

2022 Highlights

- We worked on building pre-service teachers' understanding of the role of GLOBE in developing content knowledge and their knowledge of how to engage young scientists in their classrooms as they seek to help meet the NGSS in their classrooms. We have continued to expand the role that the content course developed here, The Earth as a System, plays in helping these future teachers address both GLOBE and the UN Sustainable Development Goals.
- With Larisa Schelkin of the Global STEM Education Center, we have expanded our offering of sessions for the UNITAR Science Diplomacy Program as well as taking part in the UN General Assembly Science Forum.
- We have expanded our work on connecting GLOBE to Career and Technical Education with training in the Capital Region at the QUESTAR III BOCES. This work is an outgrowth of the model of instruction funded through the Earth Systems Teams grant funded through UCAR and our work here with E2CC BOCES and the New York State Department of Environmental Conservation.
- We continue to expand our Regional Climate Network, providing GLOBE schools with snow and frost-tube protocols as well as expanding data collection to other meteorologic data.
- Our work with the NOAA B-WET grant program has further expanded to include curricular interventions as well as adding yet another NOAA B-WET to our work, now making our work integral to seven B-WET initiatives.
- We continue to partner with GLOBE Mission Earth on the integration of GLOBE to both preservice education and engineering. Several schools are planning to use the Student Research Symposium model with an SRS on our campus as well as in the Buffalo, N.Y., area with hopes of students submitting to the IVSS and Regional SRS in Spring 2023.

Collaborators: GLOBE Mission Earth, AREN Project, GLOBE Teams Project, GLOBE Satellites and Education Team, NOAA B-WET, National Science Foundation.

Areas of Expertise: In-service professional development, Elementary GLOBE, pre-service teachers, GLOBE in undergraduate classrooms, engineering, education research, science research, citizen science

Cooperating Organizations: State University of New York at Fredonia

Publications

Audiences served: Elem MS HS UG Grad PreEd Educ LLL

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UNIVERSITY OF TOLEDO

GLOBE (UToledo); GLOBE (Mission Earth); Follow us on Facebook

About the Partnership: The University of Toledo (UT) has engaged more than 500 schools and organizations throughout its history of work with GLOBE. UT leads the efforts of GLOBE Mission EARTH (GME), a collaborative of institutions whose mission is to increase involvement in GLOBE. Dr. Kevin Czajkowski is the lead scientist on the Urban Heat Island Effect-Surface Temperature Intensive Observation Period.

2022 Highlights: Find more information on UT Highlights

Teacher Professional Development

- Partnered with Earth Heart Farms to educate local teachers and students on environmental issues.
- GME/BWET Professional Development expanded with the addition of the AquaROVER (Remotely Operated Vehicles for Education and Research) materials from the AREN project.
- Co-hosted the 2022 GLOBE North American Regional Meeting at the Toledo Zoo.

Outreach to Students

- Kids Club, engaged over 20 students from grades 3–5 in learning about clouds, budburst and trees.
- UT reached 19 high school students in the STEM Enhancement in Earth Science (SEES) program. Janene Smith, high school teacher, facilitated.
- Worked with Upward Bound students to collect water quality data on the Ottawa River and study urban heat islands on UT's campus.

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, pre-service teachers, GLOBE in undergraduate classrooms, engineering, education research, science research, citizen science, informal science

Cooperating Organizations: The University of Toledo; WestEd/University of California Berkeley; Boston University; Tennessee State University; NASA Langley Research Center; Institute for Earth Observations at Palmyra Cove; The Nuhop Center for Experiential Learning; State of New Mexico; Defiance College; Northern Michigan University; State University of New York (SUNY)-Fredonia, Earth Heart Farms.

Funding: NASA Cooperative Agreement Notice; NOAA Bay Watershed Education and Training (B-WET); Ohio Environmental Education Fund (OEEF) Grant

News Stories: GLOBE Mission EARTH news

Student Research Support: UT assisted 23 students in submitting 10 projects to IVSS 2022 and co-hosted the Midwest Earth System Science Virtual Student Research Symposium (video).

Audiences served: Elem, MS, HS, UG, Grad, PreEd, Educ, LLL

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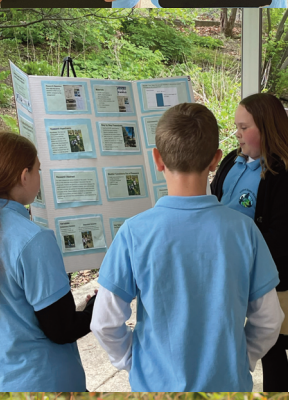

XCITE LEARNING/BGSU-NWO/ TOLEDO ZOO & AQUARIUM

Xcite Learning/ NWO @ BGSU/ Toledo Zoo Partnership Page (GLOBE)

Our collaborative Xcite Learning/Bowling Green State University (BGSU) Northwest Ohio Center for STEM Education (NWO), and The Toledo Zoo and Aquarium GLOBE Partnership engaged in teacher professional development, K–12 student programming, pre-service teacher training, and collaborative federal grant activities to promote GLOBE in the region.

2022 Highlights:

Two Ohio STEM-designated schools participated in GLOBE student research projects made possible through funding from National Geographic and Youth Learning as Citizen Environmental Scientists (YLACES). Fifth and 6th-grade students from Hull Prairie Intermediate school in Perrysburg (led by teacher Amy Boros) and 4th grade students from Dorr Elementary School in Holland (led by teacher Kristy DiSalle) researched projects focused on comparing their school prairies to other habitats and measured surface, soil, and air temperature, soil moisture, and/or plant and animal diversity. Dr. Jodi Haney met with students both face-to-face and via Zoom to mentor students throughout the process. The student teams submitted 13 research presentations to the GLOBE International Virtual Science Symposium (IVSS). In May, roughly 55 students, 20 parents, six Toledo Zoo staff, and two representatives from BGSU-NWO came together for the GLOBE Student Research Symposium (SRS) held at the Toledo Zoo. Students presented to parents, school administrators, and other student groups. Toledo Zoo and NWO faculty and staff served as expert reviewers.

During the fall semester, BGSU Early Childhood and Inclusive Education pre-service teachers received GLOBE programming for their engaged participation in course activities that integrated Elementary GLOBE and GLOBE atmosphere (clouds) and trees protocols. These 137 undergraduate BGSU students then led GLOBE protocols at the second annual Bioblitz BG program on September 21. Over 150 students from Crimm Elementary school in Bowling Green and Washington Junior High in Toledo participated in GLOBE data collection (air, surface, and soil temperatures, and GLOBE Observer cloud observations), an iNaturalist biodiversity Bioblitz, and a take-home monarch butterfly-attracting Seed Drops activity. The event took place at the prairie in Wintergarden Park, Bowling Green, Ohio. Pre-service teachers from BGSU worked one-on-one with young learners from the local elementary school to better understand and protect our local prairie environments.

Funding: National Geographic; Youth Learning as Citizen Environmental Scientists (YLACES) sponsored the Project Prairie Pandemic program; Northwest Ohio Center for Excellence in STEM Education (NWO) sponsored Bioblitz BG

Cooperating Organizations: Xcite Learning, The Toledo Zoo, Wintergarden Park, NWO STEM Center of Excellence at BGSU

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, pre-service teachers

Audiences served: Elem MS HS UG Grad PreEd Educ LLL

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BERKS NATURE - THE NATURE PLACE

Berks Nature

About the Partnership: Our audience consists of preschool and school-aged children, teachers, administrators, and community members. Through field trips, educator professional development, and community science, we train our audience to gather and upload data. Berks Nature's volunteers are also trained to upload data to GLOBE.

2022 Highlights: Berks Nature had three main GLOBE accomplishments in 2022.

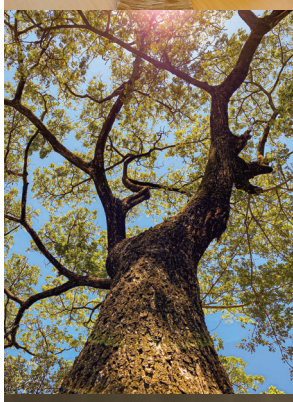
- Michael Griffith, who has been a trainer for about six years, earned certification for his new role as Mentor Trainer.
- Berks Nature was one site of the North American Regional Meeting (NARM), during which we hosted a 2-day event for educators, administrators, community partners, and NASA employees. The event included both elementary and secondary training focused on GLOBE protocols, as well as a climate change debate and deep exploration of the NASA GLOBE online tools and app.
- Berks Nature accomplished the great feat of training all our new water quality volunteers, as well as refreshing the training of current volunteers.

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, pre-service teachers, education research, science research, citizen science, informal science

Cooperating Organizations: Local school districts; William Penn Foundation in Philadelphia; Academy of Natural Science in Philadelphia

Funding: Berks Nature; William Penn Foundation; GLOBE (for NARM

Audiences served: PreK Elem MS HS UG Grad PreEd Educ LLL



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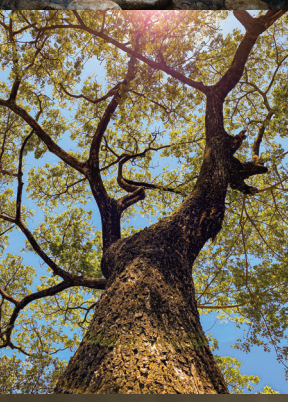
UNIVERSITY OF PUERTO RICO, MAYAGÜEZ CAMPUS



University of Puerto Rico, Mayagüez Campus Partnership Page (GLOBE)

About the Partnership: The University of Puerto Rico, Mayagüez Campus's (UPRM) GLOBE initiative aims to encourage highly qualified STEM majors to become teachers and enhance their STEM education experiences. Bilingual pre-service STEM teachers participating in the UPRM Noyce Scholar program learn to use the GLOBE website, resources, and protocols. In addition, they aim to integrate GLOBE, through the supervising teacher, into schools. Thus, the process facilitates STEM pre-service teachers implementing GLOBE learning activities in the classrooms. Continuous UPRM Noyce Scholar evaluations show that the participants strongly agreed to practice GLOBE in their schools.

2022 Highlights: The GLOBE webpage was introduced to the UPRM Robert Noyce participants and affiliates in both English and Spanish through three programs during 2022. Two sets of evaluations were carried out during the process. First, pre-service teachers answered questions related to whether the GLOBE web page use and its presentation were presented and accomplished, if the process and presentation were well organized, if time was distributed effectively, If previous knowledge and participant's needs were taken into account in the workshop, and if they were persuaded to put in practice the things they learned.

Also, students included evaluation comments such as: (i) I can introduce the GLOBE Program to my students and increase their motivation for understanding environmental science and its study; (ii) I will use this GLOBE program to integrate activities that involve each student in my classes. For example, I will use them to motivate the students to participate actively in developing field trips; (iii) Without a doubt, I would use this platform to bring valid information to my class. Furthermore, the experimentation will motivate the student to investigate beyond their knowledge; (iv) I will use the new GLOBE knowledge to create lesson plans in my teaching practice course.

Areas of Expertise: Pre-service teachers, informal science

Cooperating Organizations: Teacher preparation program, University of Puerto Rico, Mayaguez Campus

Funding: NSF-DUE Robert Noyce Scholarship Program, Division of Undergraduate Education

News Stories: NOYCE – NoTeS – University Research and Educational Services Resource Center (uprm.edu)

Student Research Support: The UPRM STEM Noyce Teacher Scholars Program supports pre-college teachers and two undergraduate students. The two undergraduate students help the pre-service teachers to implement GLOBE in the pre-service teachers' practice schools.

Audiences served: MS HS PreEd

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SOUTH DAKOTA DISCOVERY CENTER

South Dakota Discovery Center Partnership Page (GLOBE)

About the Partnership: The South Dakota Discovery Center GLOBE partnership supports educators in studying water, soil, climate, and air. We provide professional development in a variety of formats as well as small mini-grants for South Dakota GLOBE trained teachers.

2022 Highlights:

- Field based professional development in Badlands National Park, including an educator from Nepal.
- Integrated GLOBE protocols into Soil Health Bucket lessons.

Areas of Expertise: In-service professional development, Elementary GLOBE, citizen science

Funding: South Dakota Department of Agriculture and Natural Resources; USDA Natural Resource Conservation Service

Student Research Support: The South Dakota Discovery Center can support up to 3 teams participating in the SRS by covering registration fees through funding from the South Dakota Space Grant Consortium. Teachers can contact the Partnership Coordinator directly.

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UNIVERSITY OF TENNESSEE AT CHATTANOOGA

University of Tennessee at Chattanooga Partnership Page (GLOBE)

Areas of Expertise: In-service professional development, Elementary GLOBE, pre-service teachers, education research, informal science, mathematics education, science education

Funding: Tennessee Space Grant Consortium

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EL PASO COMMUNITY COLLEGE

El Paso Community College Partnership Page (GLOBE)

About the Partnership: Focusing on K–12, early college, and college freshman and sophomores with GLOBE Observer protocols. Working with El Paso Community College (EPCC) Service Learning Program.

2022 Highlights:

- Continued enrolling more students in collecting cloud data using the GLOBE Observer app.
- Worked with high school students in the CURE program in collecting environmental data for summer projects using the cloud and land cover GLOBE Observer app.
- Conducted data quality research on cloud data.

Areas of Expertise: In-service professional development, programming for students, pre-service teachers, GLOBE in undergraduate classrooms, education research, citizen science

Cooperating Organizations: El Paso Community College Service Learning Program

Audiences served: HS UG

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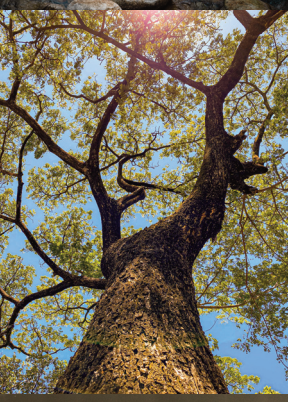

TEXAS STEM COALITION

Texas STEM Coalition

About the Partnership: The Texas STEM Coalition GLOBE Partnership provides a venue for recruiting, training, follow-up, and dissemination of the GLOBE Program Across Texas. Specifically, the annual Texas STEM conference includes a GLOBE focused strand to promote GLOBE and student environmental research. The coalition also provides GLOBE teachers with a venue to present their GLOBE activities during the conference.

2022 Highlights: The 15th Annual Texas STEM Conference was held in San Antonio, Texas, and there were opportunities for teachers to learn about GLOBE. The two sessions are cited below. Teachers were introduced to GLOBE, Elementary GLOBE, and the GLOBE Observer app. Teachers received sample materials they could use in their classrooms and were introduced to the 2023 Southwest Student Research Symposium opportunity.

Areas of Expertise: In-service professional development, Elementary GLOBE

Cooperating Organizations: University of Texas at Tyler GLOBE Partnership

Publications and Presentations:

Odell, M.R.L. and Kennedy, T.J. (2022). The GLOBE Program: A Free ESS NASA Supported Program. Texas STEM Conference, San Antonio, Texas.

Odell, M.R.L. and Kennedy, T.J. (2022). Using GLOBE to Prepare Preservice Teachers to Facilitate Scientific Communication. GLOBE Virtual International Conference.

Audiences served: Elem MS HS Educ

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THE UNIVERSITY OF TEXAS AT TYLER

University of Texas at Tyler

About the Partnership: The University of Texas at Tyler is responsible for recruiting, training, and mentoring teachers in GLOBE activities and facilitating student research in schools across East Texas. Students take GLOBE measurements at their schools on the UT Tyler campus. The partnership focuses on training pre-service and in-service teachers and facilitating student research at the UT Tyler University Academy Lab Schools in Tyler, Palestine, and Longview.

2022 Highlights:

- Trained pre-service teachers enrolled in elementary and secondary science methods classes.
- Agreed to host the 2023 Southwest Student Research Symposium.
- Incorporated GLOBE in an undergraduate STEM Research Methods course that supports future STEM teachers.

Areas of Expertise: Programming for students, Elementary GLOBE, pre-service teachers, GLOBE in undergraduate classrooms, science research

Cooperating Organizations: The Texas STEM Coalition Partnership

Publications and Presentations:

Kennedy, T. J., & Tunnicliffe, S. D. (2022). Introduction: The role of Play and STEM in the Early Years. In S. D. Tunnicliffe & T. J. Kennedy (Eds.), Play and STEM Education in the Early Years: International Policies and Practices (Chapter 1, pp. 3-37). Switzerland: Springer Nature.

Prieto, A. B., & Kennedy, T. J. (2022). GLOBE, STEM and Citizen Science in the Early Years in Argentina. In S. D. Tunnicliffe & T. J. Kennedy (Eds.), Play and STEM Education in the Early Years: International Policies and Practices (Chapter 19, pp. 383-423). Switzerland: Springer Nature.

Tunnicliffe, S. D. & Kennedy, T. J. (Eds.) (2022). Play and STEM Education in the Early Years: International Policies and Practices. Switzerland: Springer Nature. Print ISBN 978-3-030-99829-5; eBook ISBN 978-3-030-99830-1.

Worch, R., Odell, M.R.L., and Magdich, M. (2022.) Engaging Children in Science Learning Through Outdoor Play. In Tunnicliffe, S.D. & Kennedy, T.J. (Eds.). Play and STEM Education in the Early Years Worldwide. Ch. 5, pp. 105-122. Switzerland: Springer International Publishing.

Audiences served: PreK Elem MS HS UG PreEd

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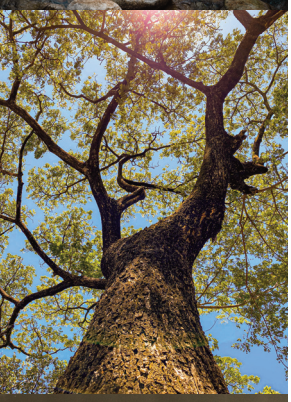

INSTITUTE FOR GLOBAL ENVIRONMENTAL STRATEGIES

Institute for Global Environmental Strategies
Institute for Global Environmental Strategies Partnership Page (GLOBE)

About the Partnership: Our partnership centers on supporting GLOBE Observer outreach and participation within the GLOBE Community, with a focus on GLOBE Observer Mosquito Habitat Mapper and GLOBE Observer Land Cover. We do this through supporting monthly community webinars, creating educational resources for use by GLOBE teachers, and maintaining a campaign website, and providing two-way conversation through our Mighty Network Space (GLOBE Mission Mosquito and Student Research).

2022 Highlights:

- 3 peer-reviewed publications
- 12+ webinar presentations to the community
- Supported NASA SEES high school internship
- Engaged 93 high school students resulting in 28 International Virtual Science Symposium (IVSS) projects

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, GLOBE in undergraduate classrooms, science research, citizen science

Cooperating Organizations: University of South Florida, GLOBE Africa, GLOBE Kenya, GLOBE Ghana, GLOBE Madagascar, GLOBE Brazil

Funding: NESEC; Fulbright Fellowship to Russanne Low for scientific work in partnership work with GLOBE Brazil

Student Research Support: In 2022 we had 93 students submit 28 projects to IVSS (14 earned 4 badges) and 23 abstracts/posters to AGU Bright STaRS.

Audiences served: Elem MS HS UG Grad Educ LLL

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NASA LANGLEY RESEARCH CENTER

NASA Langley Partnership Page (GLOBE)

About the Partnership: We help engage the GLOBE community in NASA science.

2022 Highlights:

- Started our second cohort of the GLOBE ENGAGE Virtual Teacher Cohort with 20 teachers from across the country and provided bilingual training support in English and Spanish.
- Continued GLOBE Goes to Camp pilot project expanding to 21 states and served over 17,000 summer campers.
- Celebrated a huge milestone of reaching one million satellite matches to GLOBE Clouds citizen science data. #GLOBE1M
- Engaged 39 U.S. schools in Air Quality student investigations.

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, pre-service teachers

Cooperating Organizations: GLOBE Mission Earth and the NASA Earth Science Education Collaborative

Funding: NASA

Student Research Support: Sponsored travel and organized the GLOBE Clouds Match to a Million Poster Session.

Audiences served: PreK, Elem, MS, HS, UG, Grad, PreEd, Educ, LLL

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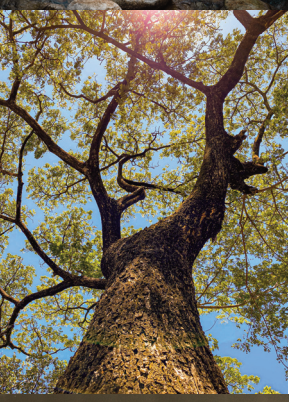

KATHERINE JOHNSON NASA IV&V EDUCATION RESOURCE CENTER

NASA IV&V Partnership Page (GLOBE)
Katherine Johnson NASA IV&V Education Resource Center

About the Partnership:

- Strengthen public understanding of NASA's missions.
- Build a diverse future STEM workforce by helping educators provide high quality engaging STEM activities.
- Create unique opportunities for students.

2022 Highlights:

- Now have a GLOBE: Atmosphere loanable kit that includes sling psychrometers, aneroid barometers, and infrared thermometers, and learning activities along with the one-week Clouds pacing guides for trained educators to use for two-week periods in classrooms across the state. The kit training is divided into four modules: Wind and Pressure, Temperature and Air Masses, Clouds, Precipitation & Humidity, and Climate. The ERC looks to begin training on this kit in 2023.
- Engaged in the Carbon Cycle Journey Game with the members of West Virginia's Climate Change Professional Development Community and challenged them to have their clubs and classes participate in a Day of Action. Participants earned a digital badge for the Climate Day of Action.
- Presented additional climate lessons designed specifically for West Virginia classrooms at the West Virginia Science Teachers Association Annual Conference. Teachers engaged in West Virginia Mass Concentration studies using data from the NASA GRACE missions, which was then contrasted with precipitation data from My NASA Data to evaluate the effects as well as evidence of climate change in West Virginia.

Areas of Expertise: In-service professional development, pre-service teachers, citizen science

Cooperating Organizations: Fairmont State University

Audiences served: PreEd Educ

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UNIVERSITY OF WISCONSIN – MADISON

University of Wisconsin Partnership Page (GLOBE)
Midwest GLOBE/ESS Collaborative
The Sky's The Limit STEM Camp

About the Partnership: The Wisconsin GLOBE partnership works with K-12 schools and environmental centers, providing teacher professional development workshops, classroom presentations, STEM camps, internships, and additional opportunities.

2022 Highlights:

- GLOBE workshops: School District of Beloit, Southern Door County School District, Prairie School
- The Sky's The Limit Summer STEM Camp
- GLOBE Midwest ESS Virtual Science Symposium
- Sustainable Action Through a Beloit Lens—event focused on National Center for Atmospheric Research (NCAR) Real People, Real Climate, Real Changes traveling climate exhibit
- High school student internships at the Welty Environmental Center
- Beloit College pre-service teacher lesson plan development

Areas of Expertise: In-service professional development, programming for students, Elementary GLOBE, pre-service teachers, science research, citizen science, informal science

Cooperating Organizations: Welty Environmental Center; School District of Beloit; Beloit College; Achieving Collaborative Treatment; Butternut School; Prairie School; Southern Door County School District

Funding: National Science Foundation GEOPAths Program; Wisconsin Sea Grant; Baldwin Wisconsin Idea Grant

News Stories:

- Director's cut: Michael Notaro. Meet the new director for the Center for Climatic Research
- CCR's interim director's work to develop STEM summer camp featured in Beloit Daily News
- Welty Environmental Center in Beloit to hold STEM summer camp for autistic youth
- NSF grant supports internships at the Welty Environmental Center

Student Research Support: The Wisconsin GLOBE partnership provides GLOBE training, project guidance, equipment, and additional supports to schools.

Audiences served: Elem MS HS PreEd Educ

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NATIONAL WILDLIFE FEDERATION - ECO-SCHOOLS USA

Eco-Schools USA Partnership Page (GLOBE)
Eco-Schools USA (National Wildlife Federation)

About the Partnership: Eco-Schools USA offers a certification program for elementary through secondary schools that nurture environmental learning and climate action. Our framework and resources support school communities as they assess, track, benchmark and celebrate environmental excellence. We are the exclusive national operator of the Eco-Schools program in the United States and a member of the international network of Eco-Schools programs coordinated by the Foundation for Environmental Education.

Areas of Expertise : In-service professional development, programming for students, Elementary GLOBE, citizen science

Audiences served: Elem MS HS Educ

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GLOBE and Earth System Science (ESS) Collaboratives

ESS Collaboratives Website

Purpose: In early 2020, teams of Earth System Science (ESS) Providers and GLOBE partners were recruited to develop and implement a plan for sustaining collaboratives in each of the six GLOBE regions with the potential for one or more teams to cross these regions. This work is based on a model from Colorado which has an Earth System Science Collaborative Network that brings together a variety of stakeholders from different sectors that work together to benefit ESS in Colorado. Six additional collaboratives were formed in the following regions: California, the Midwest, New York, New England, and two cross-regional teams in the Southeast.

Who Makes up the Collaborative Teams?

- Formal and informal providers in Earth System Science (ESS) from:
  - K-12 schools
  - Community colleges
  - Universities
  - Minority serving institutions
  - Informal science learning centers
  - Nonprofit education organizations
- Regional GLOBE representative
- Active GLOBE Partners in a region

The GLOBE ESS Collaborative project is supported by the National Science Foundation, Division of Atmospheric and Geospace Sciences (AGS), # 2011518.

CA STRONG EARTH SYSTEM SCIENCE COLLABORATIVE

About the Collaborative: The California Strong Earth System Science Collaborative (CA Strong) is a group of scientists, researchers, outreach specialists and educators who work together to spread Earth system science initiatives throughout California using the tools and resources of the GLOBE Program.

2022 Highlights:

Microplastics: The collaborative successfully piloted a five-day microplastics pacing guide at three schools. Working with students in grades 5, 7 and 11 in general education, life science and chemistry classrooms, respectively, Dr. Matt Ferner from the San Francisco Bay National Estuarian Research Reserve and Tracy Ostrom, GLOBE partner at UC Berkeley, provided both teachers and students with the training and equipment necessary to filter and analyze water samples for GLOBE hydrosphere protocols and for the presence of microplastics. Procedures were revised based on the feedback from teachers and students, and microplastics (pacing guide) training was provided at the North America Regional Meeting (NARM) in November in Oakland, Calif. The microplastics pilot testing was performed under the guidance support of GLOBE Italia and GLOBE Australia, who originated the microplastics protocol and field guides.

Collaboration Guide: CA Strong partners created a collaboration guide that will be piloted in 2023 with Slovakia, Malta, and perhaps Bhutan. These countries have expressed interest in working with high school students in the U.S. It is expected that once the guide is used by participating teachers, it will be shared with the GLOBE community and serve as an example of international collaboration.

NOAA/NERR: CA Strong partners presented to all the U.S. National Estuarine Research Reserves (NERR) at the annual NERR conference on how to connect with GLOBE and create partnerships like CA Strong. The San Francisco Bay NERR develops and leads educational programs that connect people to science and the estuary. Their program is part of the national NERR system of 30 coastal reserves. The education program engages community members, students, and teachers with the SF Bay NERR field sites and partner organizations.

LAUSD Office of Outdoor Environmental Education: CA Strong partners provided hydrosphere training webinars for naturalist staff at two Los Angeles Unified School District outdoor camps: Point Fermin and Clear Creek. In 2023, the CA Strong will expand its participation by providing in-person naturalist training on microplastics at these camps and will include a new camp, Canyon Creek. These camps help students create an emotional connection to learning and the outdoors by providing hands-on, outdoor experiences.

Solar System Ambassadors: CA Strong partners lent a hand with the review of new SSA applications. In 2023, CA Strong will offer a series of GLOBE webinars for CA SSA to inform them on GLOBE and how they can participate as Subject Matter Experts in classrooms.

CO2 Sensor: CA Strong partners worked with NASA Goddard in piloting a CO2 sensor over Elkhorn Slough. Additional pilot testing is anticipated for 2023.

MIDWEST EARTH SYSTEM SCIENCE COLLABORATIVE

About the Collaborative: The vision of the Midwest Earth System Science Collaborative is to expand and strengthen GLOBE interactions among citizens and schools/districts in the Midwest United States.

Actions:

1. Provide opportunities for team-based, student-led GLOBE based scientific research projects and collaborative events.
2. Provide a regional focus that fosters multi-school/locale interactions.
3. Increase the Number/Participation of GLOBE Schools, Teachers, Citizens, and Partnerships.
4. Increase the input of quality GLOBE data entered on the website.

2022 Highlights:

Dr. Michael Notaro, University of Wisconsin-Madison (Baldwin Wisconsin Idea Endowment Grant), led the effort to host the Second Midwest Earth System Science Collaborative Virtual Science Symposium (SRS) with GLOBE Partners David Bydlowski, Wayne RESA (AREN Project), and Dr. Kevin Czajkowski and Janet Struble, University of Toledo (GLOBE Mission Earth). The symposium, held on May 11 with 60 students (Grades 3–12) participating, featured GLOBE work done from 11 Midwest area schools. Twenty-five projects, involving over 80 students, were shared live or virtually. Each participating teacher received an award of $250 for equipment from YLACES. The Midwest Earth System Science Collaborative Virtual Science Symposium is on YouTube.

Scientists and parents attended the live virtual event. After each presentation, the moderator provided two comments to the students. Certificates of Participation were emailed to the teachers along with "Thank You" messages. Teachers thanked the Collaborative for the opportunities to showcase their students' research and connect to other teachers who are involved in GLOBE.

The group was amazed to see third graders from Defiance Elementary studying clouds and looking at the quality of their water. One third grader stated,

"I like observing the cloud and going outside and learning the names of the clouds."

The most innovative project was done by students in grades 4 and 5 from North Star Montessori Academy. They studied how to keep the ice on their natural luge track on Lucy Hill in Negaunee, Mich., longer. The students found the ice will stay longer if the boards of the track were painted white. One student commented,

"We appreciated doing this research for GLOBE and NASA because it was really fun and we were able to help the luge club."

Students from Crestwood High School used a terraROVER (Remotely Operated Vehicles for Education and Research) to collect fine particle matter using Arduino technology. A student commented,

"It was a great learning experience just building on our experiences with Arduino programming and using that and it's really cool how we have a real-life example of how you can actually use the power of programming to help a community."

Find the list of student projects.

NEW ENGLAND REGIONAL EARTH SYSTEM SCIENCE COLLABORATIVE

About the Collaborative: The members of the New England Regional Earth System Science (NERESS) Collaborative are dedicated to supporting environmental stewardship through science education in schools and universities, and through promotion of science citizenship in urban and rural communities. This group places extra focus on the vitally important area of climate change. As a working group, NERESS will draw upon science education materials and subject matter experts from GLOBE, NASA, NOAA, and other federal and state agencies, such as the U.S. Forestry and Parks Service. We provide science resources for students, teachers, and citizens of all ages. Specifically, we support science education and science citizenship in communities of low economic standing to support their efforts in correcting systemic environmental inequities.

Our objectives are:

- Share resources between the founding members of NERESS.
- Incorporate and adapt GLOBE, NASA, NOAA, and other science and science education resources in an increased number of school districts and informal science education venues.
- Support community action by students and citizens in communities that are of low socioeconomic status to advocate for positive changes in the quality of their environment.

As a collaborative, we will recruit and welcome all regional organizations to assist us in our planning and outreach.

GLOBE
N.E.R.E.S.S. Collaborative

NEW YORK STATE EARTH SYSTEM SCIENCE COLLABORATIVE

About the Collaborative: The New York State ESS Collaborative is focusing on ways that GLOBE and Earth System Science can be infused as a regional approach to science education. Our ESS Collaborative is built around strategic partnerships between higher education (SUNY Fredonia and Buffalo State University), career and technical education (E2CC BOCES); statewide STEM professional development (the New York State Master Teacher Program and the Science Teachers Association of New York State); and government agencies (the New York State Department of Environmental Conservation). In our work, these groups are coordinating teacher and student activities to take advantage of the unique strengths that these organizations have to offer.

As an example, our current focus is on the development of student understanding of the carbon cycle. In this, teachers across the region are being trained in the GLOBE Carbon Cycle protocols as the scaffold for future work. This work is built upon the NOAA B-WET funded work with the NYSDEC, the sustained professional development of teachers offered by the NYS Master Teacher Program, the development of STEM technologies with E2CC BOCES classrooms across the region, and the development of classroom-based pedagogies by pre-service teachers at SUNY Fredonia and Buffalo State University. We are starting to see the impacts of this work and have adopted a "watershed lens" for expanding this work using the GLOBE Earth as a System Bundle to allow teachers/schools to have locally relevant connections to their work.

Our original hope was that since each of the organizations also exist outside the Western New York region, our model could scale across New York State and eventually serve as a model that other states could use. This hope has come to fruition with the expansion of the New York State ESS Collaborative to the Questar 3 BOCES in the Capital Region of New York.

Partnership Areas of Expertise

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