2019 United States GLOBE PARTNER YEARBOOK

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

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 connects a network of students, teachers, and scientists in order to better understand, sustain, and improve Earth’s environment at local, regional, and global scales.

More than 186 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 students and teachers in more than 120 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 engaging teachers, students, and the public in authentic learning of Earth Systems Science (ESS), 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 promote the teaching and learning of science, enhance environmental literacy and stewardship, and promote scientific discovery.

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

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.
About GLOBE Partnerships

GLOBE Partners facilitate the implementation of GLOBE within a service area. Partners recruit, train, and mentor new GLOBE teachers and facilitators to promote the teaching and learning of science, enhance environmental literacy and stewardship, and promote scientific discovery.

These organizations are invited to become U.S. GLOBE Partners:

- **Nonprofit or governmental organizations** who support student inquiry and research about the environment
- **Businesses and organizations** whose corporate mission is to invest in successful educational outcomes of students and the community at large

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 teachers in the identified service area(s). Their efforts must focus on capacity-building, program sustainability, and student inquiry and research.

View a list of current GLOBE U.S. Partners at [https://www.globe.gov/web/united-states-of-america/home/resources](https://www.globe.gov/web/united-states-of-america/home/resources). If you would like information about becoming a GLOBE Partner, please contact the Community Support Team at [globehelp@ucar.edu](mailto:globehelp@ucar.edu).
United States GLOBE Program Office

The United States GLOBE Program Office ("The Office") is supported through a sub-award from the GLOBE Implementation Office. Headquartered at the Leitzel Center at the University of New Hampshire, The Office is managed by Jennifer Bourgeault, United States Country Coordinator, and assistant Haley Wicklein.

The Office supports a diverse group of 126 fully-engaged GLOBE Partners to create a strong, self-sustainable framework for training and responsive personal support for every GLOBE member 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.

Activity/program Highlights

- The Office hosts regular webinars on topics such as GLOBE website troubleshooting, funding and educational opportunities, and other topics as suggested by the Partners. These webinars, called Partner Watercoolers, model the idea that informal gatherings around watercoolers at work can lead to valuable exchanges of information and new collaborations.

- The Office publishes, and encourages Partners to publish stories on U.S. GLOBE students, teachers, Partners, and organizational accomplishments, featured on the GLOBE website and U.S. GLOBE social media accounts (@US_GLOBE and https://www.facebook.com/groups/US.GLOBE.Educators/).

- The Office 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), along with strengthening the local scientist network and GLOBE alumni on a regional level and engaging these groups in GLOBE events.

United States GLOBE Highlights

- SPRING North American Regional Meeting (NARM) 2019 ............................... Pg 27
- FALL North American Regional Meeting (NARM) 2019 ............................... Pg 27
- Watercooler Meet-ups ................................................................. Pg 27
- 2019 GLOBE Student Research Symposia ........................................ Pg 28
# United States GLOBE Partnerships

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<td>NASA Marshall Space Flight Center</td>
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<td>WestED and CCASN at UC Berkeley <em>(pg. 18)</em></td>
<td>Tracy Ostrom</td>
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<td>Metropolitan State University of Denver <em>(pg. 19)</em></td>
<td>Janelle Johnson (<a href="mailto:jjohn428@msudenver.edu">jjohn428@msudenver.edu</a>)</td>
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<td>UCAR Center for Science Education <em>(pg. 20)</em></td>
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<td>HAWAII</td>
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<td>MAINE</td>
<td>Gulf of Maine Research Institute Partner</td>
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<td>University of Missouri, Kansas City</td>
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# United States GLOBE Partnerships cont.

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<td>Carol Engelmann</td>
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<td>Leitzel Center at the University of New Hampshire (pg. 35)</td>
<td>Jennifer Bourgeault</td>
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<td>New Mexico Public Education Department</td>
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<td>Dr. Michael Jabot <a href="mailto:jabot@fredonia.edu">jabot@fredonia.edu</a> (716) 673-3639</td>
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<td>Devin Hunt <a href="mailto:Devin.Hunt@susd.k12.or.us">Devin.Hunt@susd.k12.or.us</a></td>
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<td>SciStarter Science for Citizens, LLC</td>
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<td>University of Tennessee at Chattanooga <em>(pg. 41)</em></td>
<td>Deborah McAllister <a href="mailto:deborah-mcallister@utc.edu">deborah-mcallister@utc.edu</a></td>
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<td>Our Lady of the Lake University - TRC</td>
<td>Peggy Carnahan <a href="mailto:pscarnahan@ollusa.edu">pscarnahan@ollusa.edu</a></td>
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<td>Texas Southern University</td>
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<td>Texas STEM Coalition (pg. 42)</td>
<td>Michael Odell <a href="mailto:modell@uttyler.edu">modell@uttyler.edu</a> (903) 566-7149</td>
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<td>The University of Texas at Tyler (pg. 43)</td>
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<td>VERMONT</td>
<td>Shelburne Farms (pg. 44)</td>
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### United States GLOBE Partnerships cont.

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<th>STATE/TERRITORY</th>
<th>PARTNERSHIP</th>
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<th>PARTNER WEBSITE</th>
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</table>
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|                 | Institute for Global Environmental Strategies (IGES) *(pg. 45)* | Cassie Soeffing  
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| **WISCONSIN** | University of Wisconsin-Madison *(pg. 47)* | Rosalyn A. Pertzborn  
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| **AT LARGE** | National Wildlife Federation - Eco-Schools USA *(pg. 33)* | Jennifer Hammonds  
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Cooperating organizations: Arctic and Earth STEM Integration of GLOBE and NASA (SIGNs), NESEC, GLOBE Mission Earth, AREN, Smoky Mountain Collaborative, International Arctic Research Center, Bonanza Creek Long Term Ecological Research Program, Alaska Arctic Observatory Knowledge Hub, Association of Interior Native Educators, Alaska EPSCoR Program, NSF AISL Arctic Berry Harvest- Public Participation in Scientific Research, Alaska Climate Science and Adaptation Center, Boys and Girls Club of Alaska, 4-H Club of Alaska, Center for Alaskan Coastal Studies, Environmental Literacy for Alaskan Climate Stewards project (NOAA), Fresh Eyes on Ice project (NSF), Santa Ana College MESA Program.

Funding: NASA and leveraged funding from other projects.

Program Description and Activities: The University of Alaska Partnership supports GLOBE schools in Alaska (and in other states if our funding sources allow) through professional development workshops with travel support, GLOBE equipment and supplies, follow-up activities like connecting classrooms to NASA SMEs, audio calls, emails, one-on-one phone calls, and data discovery sessions through Zoom sessions or school/classroom visits. We mentor students K-16 in their GLOBE projects—for the 2018 GLOBE GLE, Ket’ackik & Aapalluk Memorial School and Palmer High School; for the GLOBE Northwest SRS, Boys and Girls Club of Metlakatla (2019) and Bethel Regional High School (2018); for the 2019 GLOBE IVSS and research reports on the GLOBE program, undergraduate students from 2019 UAF Fall Water Management course.

In 2019 our Partnership held 12 GLOBE trainings, training over 200 teachers and community members in GLOBE protocols within the Hydrosphere, Pedosphere (soils, surface temperature, frost tube), Atmosphere (clouds, temperature), as well as GLOBE Observer. Partnership team members also presented GLOBE to students at UAF Water Day, used GLOBE protocols in undergraduate learning, and held pre-service workshops on the inquiry process and how to design an investigation that braids indigenous knowledge, NASA data and GLOBE monitoring protocols.

Areas of Expertise: Informal education, Formal education, Citizen science/community science, Pre-service teachers, Undergraduate science class, SME connections.


News Stories:

Alaska students from Metlakatla Boys and Girls Club present at the GLOBE Northwest SRS – May 21, 2019
Climate Change in My Community Takes Top Honors at the GLOBE Regional Symposium – Arctic Earth, May 15, 2019
Juneau students work with ACRC scientist to measure water quality – Alaska Coastal Rainforest Center, December 19, 2019
Researcher offers ways to get public involved in science – UAF news and information, December 11, 2019
Program helps students see SIGNs of a career path in the sciences – International Arctic Research Center, December 13, 2019
Scientist-educator collaborations reveal world to students – UAF news and information, December 10, 2019

NASA Explorers: Cryo-Kids-Frost Tube – NASA Explorers, June 05, 2019

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Cooperating organization: NASA

Funding: NASA/California Institute of Technology

Program Description and Recent Activities: The JPL partnership continues to support local schools and science centers by conducting professional development workshops, taking part in educational webinars, and mentoring science interns at NASA's Jet Propulsion Laboratory. We also help to grow the GLOBE Program both domestically and internationally through teacher workshops, focusing on the Atmosphere and Pedosphere protocols.

In the summer of 2019, Dr. Erika Podest co-mentored two interns (Kenan Arica and Jaqueline Castellanos) tasked with analyzing GLOBE Mosquito Habitat Mapper data and quality assessment of mosquito imagery and exploring corroborations of mosquito app data and social media trends. Castellanos explored correlations between remote sensing variables (air temp, soil moisture, precipitation) and mosquito abundance data collected through the MHM app.

Dr. Narendra Das has created, and is currently piloting, a low-cost soil moisture sensor which can be used by the GLOBE community in measuring soil moisture in the pedosphere protocol and interfaced into the existing GLOBE database. The data will also be used as in-situ soil moisture measurements to correlate with the NASA SMAP satellite.

The partnership’s efforts to conduct pre/in-service teacher workshops, GLOBE refresher-trainings, informal discussions, outreach/communications, webinars and student/teacher Q&A is led by Peter Falcon, Kalina Velev, and Rachel Zimmerman-Brachman. The team also supports the GLOBE Observer Citizen Scientist app, GLOBE Student Research Symposium (SRS), and International Virtual Science Symposium (IVSS). We also provide feedback to Spanish speaking students from Central and Latin American countries via webinars. The team also highlights the GLOBE Program and GLOBE Observer app by supporting outreach and communications events such as: National Ocean Bowl, National Science Bowl, Explore JPL Open House, Night at the Aquarium of the Pacific, EAA, Air Venture Air show, and AMS and AGU conferences.

Both Peter and Rachel are members of the NESEC GLOBE Observer working group and communications team. Dr. Erika Podest and Dr. Narendra Das are members of the GLOBE International STEM Network (GISN), and Peter Falcon is a member of the Trees Campaign.

For a complete list of Presentations, please see https://www.globe.gov/web/jet-propulsion-laboratory/home/publications

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 Organization: The WestEd/UC Berkeley GLOBE Partnership works with a several organizations. In 2019, the Partnership collaborated with the University of Toledo, Boston University, and Tennessee State University, all GLOBE partners that work together through the GLOBE Mission EARTH (GME) program. WestEd/UCB collaborates with Earth Team in an afterschool internship program. This project is called Exploring Careers and Learning Informally to Prepare for STEM Employment (ECLIPSE). The Partnership works with a variety of other organizations including government agencies, private industry, and non-profit organizations that provide engagement and career development experiences to GLOBE students.

Funding: GLOBE Mission EARTH is funded through NASA Cooperative Agreement Notice (CAN) NNX16AC54A. The EXCIPSE Project is funded through National Science Foundation grant 1713456.

Program Description and Recent Activities: The WestEd/UC Berkeley GLOBE Partnership supports teachers, after school program facilitators, and students throughout the year. In August 2019, the Partnership trained UC Berkeley atmospheric science graduate students. This training focused on the atmospheric protocols for clouds, surface temperature, air temperature, barometric pressure, and relative humidity. Annual PD/training is given to GME teachers in the fall at the beginning of school. In September 2019, the partnership trained new GME teachers in atmosphere protocols (clouds, surface temperature, air temperature, barometric pressure, and relative humidity) and a biosphere protocol (tree height). In November 2019, the Partnership trained new Earth Team facilitators in atmosphere protocols (clouds, surface temperature, air temperature, barometric pressure, and relative humidity), and hydrosphere protocols (water temperature, alkalinity, pH, E.C., transparency, nitrates, and dissolved oxygen).

Through the GME project, the Partnership supported 13 California schools in 2019 (including one school in HI). Through the ECLIPSE project, the Partnership supported three after school internship programs. We incorporate Subject Matter Experts (SMEs) to support teachers in completing curricular goals when teaching GLOBE in the classroom. SMEs visited classrooms and spoke with students in the field. Teachers also incorporated SMEs into the curriculum by “studying famous ones covered in books.”

Of the GME-West schools, students from eight schools participated in the Pacific Student Research Symposium in April 2019. Students developed more than 50 projects with more than 300 students participating. Fifty students attended the SRS, presenting 19 projects.

During 2019 Partnership presented on Diversity, Equity and Inclusion in STEM at the spring and fall North America Regional Meetings (NARM) as well as AGU. For a complete list of Presentations, please see https://www.globe.gov/web/wested-and-casn-at-uc-berkeley/home/publications

Area of Expertise: Professional development

News Stories:
- 2019 Fall Data Challenge – February 07, 2020
- 2019 Fall NARM Meeting – October 17, 2019
- GLOBE Mission Earth- West – Professional Development 2019 – September 10, 2019
- Skyridge Students Prepare for SRS 2019 – April 18, 2019

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Cooperating Organizations: Metropolitan State University of Denver, Community College of Denver.

Funding: National Science Foundation ITEST Grant 1615193

Recent Activities: The highlight of 2019 was our three-day Multi STEM Summer Institute where our teachers interacted with GLOBE stalwarts including Jennifer Bourgeault, Mike Jabot, Marile Robles, David Padgett, John Ristvey, Jennifer Hammonds, Kristin Wegner, and Christi Buffington, and Colleen McDaniel of Vernier. The focus was Dissolved Oxygen. Among the ways we support GLOBE schools: travel support for teams presenting at 2019 Southwest Region SRS, partner and undergraduate school visits to support K-12 GLOBE research, and assistance with student projects in preparation for the February 2020 Denver Student Research Showcase and the 2020 GLOBE International Virtual Science Symposium.

Teacher Workshops Sponsored (most with stipends for participating in- & pre-service teachers):
- Student Research Watercooler, November 2019
- Preparing for Student Research Projects, October 2019
- MULTI STEM Institute, June 2019
- MULTI STEM Train the Trainer, June 2019
- English Learners in STEM Subjects (NSTA Virtual Session), May 2019
- A Community Approach to Engaging Students on Water in the Southwest Teacher P.D. at Southwest Regional SRS (Mescalero, New Mexico), May 2019
- Hands-on Math with Climate Data, March 2019
- Mosquito Madness (with GIO, UCAR, and Bug Chicks), March 2019
- GLOBE Weather Station and Data Visualization Workshop (with GIO), January 2019

Areas of Expertise: In-service and pre-service professional development, Elementary GLOBE, Education research, STEM equity; innovative models of professional development

News Stories:
- 2019 Southwest Student Research Symposium Highlights - September 03, 2019
- Metropolitan State University Uses GLOBE to Connect with Community - July 26, 2019
**UCAR Center for Science Education**

https://scied.ucar.edu/about

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**Cooperating Organization:** Colorado Earth System Science/GLOBE Collaborative

**Funding:** NASA and NSF

**Recent Activities:**
- GLOBE Weather Train-the-Trainer Workshop in Boulder, Colorado, September 25-26, 2019
- GLOBE Weather Workshop at SUNY Fredonia, August 19-21, 2019
- GLOBE Weather Workshop at NASA Langley August 19-21, 2019
- GLOBE Weather Workshop at Jackson State University, June 11-13, 2019

**Highlighted Presentations:** For a complete list of Presentations, please see [https://www.globe.gov/web/ucar-center-for-science-education/home/publications](https://www.globe.gov/web/ucar-center-for-science-education/home/publications)
- AGU 2019, GIFT Workshop: Helping Middle School Students Build Understanding of Hazardous Weather and Its Impacts with the GLOBE Weather Curriculum, Gardiner, Hatheway, Ristvey
- AMS 2019, Hands-on Learning About the Atmosphere in the New NGSS-Aligned GLOBE Weather Curriculum, Hatheway
- NSTA, 2019, Short Course GLOBE Weather: A New NGSS-Based Middle School Unit, Hatheway, Rummel, Snode-Brenneman

**Areas of Expertise:** Informal science, Programming for Students, Citizen science, Elementary GLOBE, GLOBE Weather, GLOBE Data Explorations
University of South Florida College of Marine Science
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Cooperating Organizations: NOAA Gulf B-WET Program, C-IMAGE Program

Funding: Grants, school districts, and individual programs

Program Description and Recent Activities: The USF College of Marine Science is home to Clam Bayou Marine Education Center. In addition to providing outdoor environmental programming to teachers, students, community programs, and college students, the center provides GLOBE training on-site and at other locations throughout Florida. The college has been a GLOBE partner for 10 years. To date, 168 schools and 151 teachers have participated, providing 6,434 observations.

In 2018-19 we completed our first Elementary GLOBE in-service professional development activities for teachers and young scholars in area Title I schools as part of a NOAA Gulf Bay Watershed Education and Training program. The highlights for teachers and young scholars were monitoring their school environments and applying GLOBE during a coastal watershed field trip near their schools.

Areas of Expertise: In-service professional development, Elementary GLOBE, Pre-service teachers, GLOBE in undergraduate classrooms, Citizen science
**Center for Sustainable Communities**

www.csc-atl.org

**Coordinator**
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**Funding:** Georgia Space Grant Consortium, Jones Foundation Small Grant

**Program Description and Recent Activities:**

- The STEM Academy at the SMART Academy Center of Excellence was launched last year to provide unique experiences to youth in a broad range of applications. Students used GLOBE protocols including Tree Heights Measurement, Carbon Cycle, Heat Island Effect, as well as educational curriculum provided by NOAA, NASA, and others.

- SMART Academy Center for Excellence successfully deployed GLOBE as the Project Success Environmental Science Program where students from multiple schools from around Atlanta participated in GLOBE exercises including Carbon Cycle, Clouds, and Mosquito protocols.

- SMART Academy Center for Excellence is participating in a GLOBE supported collaborative consisting of HBCU partners, a major NASA research institution and a research institute to help advance the GLOBE mission for K-12, Women in Science, Energy and the Environment.

- SMART Academy Center for Excellence hosted the 2019 Southeast Regional Student Research Symposium at Atlanta Metropolitan State College. The event featured students from across the Southeast presenting their research-based projects. Students were treated to speakers, special science venues, and tours including the Johnson Research Laboratory.

- SMART Academy Center of Excellence helped launch GLOBE at the Elizabeth City State University in Elizabeth City, North Carolina. Elizabeth City State University partnered with the SMART Academy Center of Excellence to host a workshop for Pacific Islander teachers through IEEE.

- GLOBE protocols were used in training materials designed to be used globally through the United Nations Training University in conjunction with Institute for Environmental Strategies, United Nations CIFAL Organizations, and Georgia Institute of Technology Regional Center for Expertise in Education for Sustainable Development.

**Areas of Expertise:** Elementary GLOBE, GLOBE in undergraduate classrooms, Citizen science, Informal science, Programming for students
Cooperating Organizations: Imagination Station, West Lafayette Parks Department Tippecanoe Emergency Management, Indiana Department of Natural Resources, Purdue University Departments: Earth, Atmospheric, and Planetary Sciences, Chemistry, Biology, Agronomy, Forestry and Natural Resources, and Libraries.

Funding: Competitive grants including the Indiana Department of Education, the National Science Foundation, Haliburton Foundation, and alumni donations.

Program Description and Recent Activities: The Purdue University GLOBE partnership offers teacher professional development every summer, open to anyone. Workshop content varies but many GLOBE protocols are covered. One of our goals is to include field-related professionals in the workshop experience. We also offer one-day single sphere workshops throughout the school year. We facilitated the Indiana Virtual Science Symposium for Indiana students to submit projects and get feedback from graduate students, faculty, and staff members on their research projects. Additionally, we work with education faculty to incorporate GLOBE Observer in preservice classes.

We supported student teams at the 2019 Midwest Student Research Symposium (topics included Effect of Road Salt on Local Water Quality and Determining the Ideal Location for a Campus Garden). For the November 2019 Indiana Virtual Science Symposium, student groups submitted links to participate in the event; the top two projects were recognized with the Purdue College of Science Staff and Faculty Choice Awards.

Presentations: We presented GLOBE at student events, pre-service teacher classes, state conferences, and GLOBE meetings. Highlighted the GLOBE Program in several Purdue University Superheroes of Science podcast episodes. For a full list of presentations, please see https://www.globe.gov/web/purdue-university/home/publications.

Areas of Expertise: In-service professional development, Programming for students, Elementary GLOBE, Pre-service teachers, Engineering, Science research, Citizen science, Informal science

News Stories:
Teacher Professional Development Leads to Student Participation in SRS — April 12, 2019
Local High School Students Mentored by Science K-12 Outreach Recognized for Research — August 14, 2019
Iowa Academy of Science

www.scienceiniowa.org

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Cooperating Organizations: University of Northern Iowa, Universidad de Piura, The GLOBE Program Midwest Region

Funding: Environmental Protection Agency (EPA), Iowa-Q, to University of Northern Iowa; Partners of the Americas Foundation, English Immersion through Environmental Education, to University of Northern Iowa; YLACES, 2019 Midwest SRS, to The GLOBE Program.

Program Description and Recent Activities: GLOBE Iowa engaged in professional development activities for local and international educators in 2019. Fourteen Iowa secondary teachers are participating in a year-long professional development workshop through the Iowa-Q Program. These educators spent nearly two weeks on the University of Northern Iowa campus learning about air and water quality monitoring and careers, then returned to the classroom to engage their own students in community based air and water quality investigations. Students from two of the Iowa-Q schools were selected to present at the 2020 Midwest GLOBE SRS Conference.

The University of Northern Iowa hosted nine preservice educators from Universidad de Piura for the workshop English Immersion through Environmental Education. These students participated in six weeks of distance training and two weeks of face-to-face classes, including braving the Iowa winter to collect surface temperature and cloud data. The final projects of this course were designing a GLOBE-themed unit to meet standards connected to a class they hope to teach in the future.

Iowa hosted the 2019 Midwest GLOBE Student Research Symposium, welcoming middle and high school student researchers to present their research on campus. EPA sub-awards to Iowa-Q educators and on-going professional development throughout the school year support and insure GLOBE implementation.

Areas of Expertise: In-service professional development, Programming for students, Elementary GLOBE, Pre-service teachers

News Stories:
UNI CIEP won two grant funds through Partners of the Americas – International Panther, Spring 2018 (page 4)
UNI receives $40 million in grants for research and special projects - Inside UNI, January 2020
Mr. Nall’s Science Class - Albernette Community Schools Newsletter (page 4), October 2019
Cooperating Organizations: NASA, NOAA, U.S. Department of State, National Wildlife Federation

Funding: NASA

Program Description and Recent Activities: The Goddard GLOBE Partnership provides resources to schools and teachers involved in GLOBE within our 11-state region. We offer program support to implement GLOBE into school curricula, webinars to provide additional training, answers to specific problems via telecons, telephone calls or, if possible, face to face in-school support. We offer a GLOBE equipment loan program for schools just starting in the program or students involved in continuing research and preparation for the Student Research Symposia (SRS).

NASA’s Goddard Space Flight Center in Greenbelt, Maryland, 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. 2019 was a busy year for our partnership with a wide variety of GLOBE events. Workshops and trainings were held as follows:

- GLOBE trainings at Pennsylvania, Maryland, New York and Virginia public schools
- GLOBE trainings for staff at the U.S. Department of State, Renfrew Institute (PA), Peace Corps volunteers in Madagascar, and students at the Notre Dame University of Maryland
- Earth Day at Union Station in downtown Washington D.C.
- Working with minority/historically Black colleges and universities in the Washington/Baltimore area
- Development of new introductory remote sensing activities with the cooperation of the NASA Goddard Office of STEM engagement
- Monthly webinars for teachers interested in the GLOBE Program
Massachusetts

Global STEM Education Center, Inc 501 (c)(3)

www.globalstemcenter.org and on Twitter@GlobalSTEMClass

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Funding: 501(c)(3) non-profit

Program Description and Recent Activities: In 2019, we welcomed new schools from Massachusetts joining our U.S. GLOBE Partnership and continued working with other schools:

- Maynard Public High School, (https://www.maynard.k12.ma.us) the lead-teacher Ms. Valerie Cairns
- Nipmuc High School (https://www.mursd.org/) the lead teacher Mr. James Gorman
- Northbridge Middle School (https://www.nps.org/middle-school) and the lead-teacher Ms. Elizabeth Wermuth
- Northbridge High School (https://www.nps.org/high-school) and the lead-teacher, Ms. Christine Cote
- RF Ryan Finn Road Elementary School in Northampton (http://www.northamptonschools.org/project/rk-finn-ryan-road-school/), Massachusetts and the lead-teacher, Ms. Sarah Simmons

GLOBE protocols used in these schools included Hydrosphere (Water Temperature, pH, salinity, transparency, alkalinity, nitrates), Atmosphere (Air Temperature, Precipitation, Clouds and Contrails, Relative Humidity, surface temperature), and Biosphere (Biometry (Trees), Carbon Cycle).

The highlight of our 2019 U.S. GLOBE Partnership was the participation of all new GLOBE schools from Massachusetts in the Student Research Symposium (Northeast/Mid-Atlantic region) at Boston University, where the students and teachers Northbridge Middle School received recognition for their efforts. Northbridge High School presented their GLOBE and GSTEM projects at the Hall of Flags at Massachusetts State House.

As a small 501(c)(3) non-profit, we are devoted to equity, STEM Careers and global citizenship. We are committed to diversity and inclusion and to providing services to underserved, underrepresented groups and the schools in outside of Greater Boston area.

Areas of Expertise: In-service professional development, Informal science, Programming for students (after school program), Elementary GLOBE, IVSS, GLOBE SRS
Selected U.S. GLOBE News Stories from 2019

**SPRING North American Regional Meeting (NARM) 2019**

The NASA Langley Research Center Partnership hosted the North America Regional Meeting and an Atmosphere Professional Learning Workshop March 5-7, 2019 in Hampton, Virginia. The workshop provided introductory and in-depth information on atmosphere concepts including clouds and aerosols and the relation to NASA’s active atmospheric science missions. Lightning talk sessions, tours of NASA Langley, GLOBE observation data collection, and time for networking and relationship-building filled out the meeting. About 60 people, including representatives from 23 partnerships, Canada Country Coordinator Kevin O’Connor, and affiliated organizations attended.


![SPRING NARM 2019 group photo](image)

**FALL North American Regional Meeting (NARM) 2019**

The WestEd/UC Berkeley GLOBE Partnership recently hosted the annual North American Regional Meeting at the University of California Berkeley’s Lawrence Hall of Science. Forty-two participants from more than 30 U.S. GLOBE Partnerships and the GLOBE Country Coordinators of Canada and the United States attended this three-day event. The first day started with a professional development workshop, including sessions on the GLOBE website, MyNASAData, STEM, and Urban Protocols. This was followed by a two-day meeting of presentations, lightning talks, keynote speakers, and networking.


![FALL NARM 2019 group photo](image)

**Watercooler Meet-ups**

The United States GLOBE Professional Learning Community regularly presents to one another virtually. Both GLOBE Partners and GLOBE Teachers participate in these monthly Zoom meetings, called Watercoolers. A GLOBE teacher may give a brief presentation on how they use GLOBE with their students or their experience with the Student Research Symposia, a GLOBE Partner may discuss a particular professional development technique or a resource which aligns with GLOBE content or protocols. The Watercoolers are recorded for future viewing. Among this year’s topics:

- GLOBE and Mobile Earth and Space Observatory (MESO): Connecting Students to STEM
- MULTI STEM at the Metropolitan State University of Denver Partnership
- GLOBE strategic plan
- US GLOBE overview
- #GettingScienceDone
- Helping Students Create SRS and IVSS Projects
- GLOBE in the Classroom
- Medford Memorial Middle School & the Citizen Science Education Program

See all teacher Watercoolers: [https://www.youtube.com/watch?v=PnL6fbOj2rs&list=PLfpnkA52I_NbopB8w1iGPrtWkh_K3UDp](https://www.youtube.com/watch?v=PnL6fbOj2rs&list=PLfpnkA52I_NbopB8w1iGPrtWkh_K3UDp)
In 2019, with support from a grant from NASA (Grant No. 80NSSC18K0135) and Youth Learning As Citizen Environmental Scientists (YLACES), the GLOBE Student Research Symposia (SRS) brought together 261 students and 66 teachers from 26 states across the country, as well as scientists, GLOBE partners, and other attendees. During these six regional face-to-face events, students shared the results of their field investigations using GLOBE protocols to their peers and local scientists.

The results of surveys conducted at the SRS show that most students and teachers are satisfied with the events and bring useful ideas for science learning home with them afterwards. Students also show significantly increased science interest and self-efficacy. Practicing science skills at the event raises their confidence and their belief that they can do science and be part of the scientific community.

At the end of the SRS, students agreed significantly more than at the beginning that they are able to …

... learn new things in science.
... ask good questions to do science research.
... interpret data in science research.
... conduct peer review of other students’ science research.

Most students say participating in the SRS impacted their understanding of the scientific process and what it’s like to do science research.

Most teachers say participating in the SRS improved their ability to integrate science research into their classroom or program.

“Participating in this year’s SRS has given me more inspiration and ideas on the scientific process. Doing science research for my project was fun and interesting.”
— 10th grade student, Southwest

[The SRS] impacted my understanding of the scientific process and what it’s like to do science research. It gave me a better perspective on science.
— 8th grade student, Southeast

“It has made me feel more confident in asking the questions and giving the students more time to discuss and/or explain themselves. Stop rushing them and let them be more creative.”
— Teacher, Midwest

Talking to other teachers and students about their projects helped me find new things/activities to do in class with my students.
— Teacher, Northeast

Cooperating Organizations: GVSU Annis Water Resources Institute (GVSU-AWRI), GVSU Regional Math & Science Center

Funding: Grand Valley State University (GVSU)

Program Description and Recent Activities: GVSU GLOBE has been active for more than 20 years. Some of the original GLOBE scientists who developed protocols have assisted us with our trainings over the years. GLOBE hydrology protocols continue to be the staple of our onboard outreach program that serves over 5,000 participants per year. This includes students in grades 4 and up as well as adults who participate in our educator workshops.

On the GVSU-AWRI research and education vessels, students use a Secchi disk and a turbidity tube to measure water clarity in two bodies of water (Lake Michigan and Muskegon or Spring Lake). In the onboard laboratory, they measure pH, alkalinity, conductivity, and dissolved oxygen using simple meters or kits. Students make weather observations as well. GLOBE protocols such as surface temperature are used in activities in GVSU-AWRI’s K-12 outreach classroom.

We have trained many teachers in the past but recently most of our activity has focused on reaching pre-service teachers and being available as a GLOBE resource for in-service teachers. Training in GLOBE protocols is integrated in a science course at GVSU for pre-service teachers. We have reached out to the GVSU student chapter of the National Science Teaching Association and a program about GLOBE was presented to them during fall semester. GVSU-AWRI hosted teachers in three workshops in summer 2019 where the educators experienced hands-on experience with GLOBE hydrology protocols on our two research and education vessels.

Areas of Expertise: In-service professional development, Elementary GLOBE, Pre-service teachers, Informal science
Northern Michigan University
https://www.globe.gov/web/northern-michigan-university

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Program Description and Recent Activities: Northern Michigan University is a four-year (or more) public school located in Marquette, Michigan. It is classified as Master’s College and University (medium programs) by Carnegie Classification and its highest level of offering is Doctor’s degree. Representatives attended the summer 2019 Detroit GLOBE Annual Meeting.

Areas of Expertise: In-service professional development (limited), Elementary GLOBE, Pre-service teachers, GLOBE in undergraduate classrooms, Education research, Science research, Educational technology
Wayne RESA

https://www.globe.gov/web/wayne-county-math-science-center-resa
http://globe.gov/web/aren-project

Cooperating Organizations: Wayne RESA and NASA
Funding: Wayne RESA and NASA

Program Description and Recent Activities: The GLOBE Partnership at Wayne RESA supports students and educators in Wayne County, Michigan through professional development and classroom interaction. The Center also supports the work of the Metropolitan Detroit Science Teachers Association and the Rouge Education Project. The partnership focuses on in the atmosphere and hydrosphere GLOBE protocols. The Wayne County Math and Science Center community comprise more than 200 schools and 300 teachers who have submitted more than a half million total observations to the GLOBE database.

Our partnership is directly linked to the AREN Project, a NASA-funded CAN Award. The AEROKATS and ROVER Education Network (AREN) introduces NASA technologies and practices in authentic, experiential learning environments. Low-cost instrumented systems for in-situ and remotely sensed Earth observations include kite-based AEROKATS, and remotely controlled aquatic and land-based ROVERS.

AREN technologies and lesson development are middle school and high school NGSS aligned and provide necessary science literacy skills. Data capture and visualization tools, designed to integrate with the GLOBE Program, enable the expansion of GLOBE study sites with transects and vertical profiles. Engineering design concepts are embedded in student development of platform and instrument systems. Training, safety practices, and STEM challenges are a focus of the AREN Team, concurrently advancing student research projects investigating Earth science-related phenomena.

The Center co-hosted the GLOBE Annual Meeting in 2019 and supported student participation in both the SRS and IVSS. https://www.globe.gov/news-events/meetings_symposia/annual-meetings/23rd-annual-meeting

**INFINITY Science Center**

https://www.visitinfinity.com/

**Cooperating Organizations:** NOAA, NASA, USM, MSU

**Funding:** INFINITY is a 501c3 non-profit. Our programming is mainly funded through grants, donations, and sponsorships.

**Program Description and Recent Activities:** In 2019, INFINITY finished a pilot program in preparation its NOAA B-Wet grant. The pilot program began in the 2018/2019 school year. It involved 28 high school biology and chemistry students assigned to seven teams. In 2019, students were finalizing their research and beginning their symposium posters. Two of the seven teams were chosen to attend the 2019 Southeast Region Student Research Symposium in Atlanta. INFINITY’s staff scientist and science mentor for the program, Melissa Wedel, went to Atlanta with the students. These students were excited to attend the symposium and, for some of the girls, it was an incredible opportunity that they would not have had without the program. INFINITY’s team won an award for community impact. This structure will be used for the 2020/2021 school year with 15 teachers and more than 400 students. The GLOBE Southeast Student Research Symposium for 2021 will be held at INFINITY.

**Areas of Expertise:** In-service professional development, Programming for students, Engineering, Science research, Citizen science, Informal science, GLOBE in undergraduate classrooms

**News Stories:**  
Spring and Summer Highlights from INFINITY Science Center GLOBE Partnership – July 26, 2019

All photos are already covered under photo release for the 2019 Southeast GLOBE student research symposium that were turned in prior to leaving for Atlanta in 2019.
Eco-Schools is a global program run by the Foundation for Environmental Education (FEE) and is found in 67 countries around the world, and reaches over 12 million students annually. National Wildlife Federation has offices in Washington, Oregon, California, Montana, Colorado, Texas, Michigan, Georgia, Florida, Virginia, D.C., Maryland, and Vermont.

Eco-Schools USA participated in the North American Partner Meetings in February 2019 and October 2019 with presentations on how Eco-Schools integrates GLOBE through the Seven Step Framework (Spring), and on connecting GLOBE partners to our regional offices around the nation (Fall).

Eco-Schools USA presented a session on equity and justice, titled Combating Social Injustice to a full room at the Annual Meeting in Detroit, Michigan-July 2019. This short course focused on Indigenous and marginalized populations who are systemically affected most by environmental degradation and pollution, and who are most left out of the environmental movement. The workshop demonstrated how to combine science, environment and representative voices to combat injustice.

Eco-Schools USA also conducted the following trainings/courses:

- Monarch Recovery Gardens-Summer 2019 – Using GLOBE protocols to become a #MonarchHero by increasing content knowledge about the monarch butterfly life cycle, its conservation plight and its habitat requirements.

- Earth Systems Science in your Schoolyard Habitat®-Fall 2019 - provide experiential learning opportunities for their students through the implementation of GLOBE investigations and the Eco-Schools USA Seven Step Framework.

- Eco-Schools USA brought Indigenous and non-Indigenous students together around the theme Watersheds, Oceans and Wetlands, Water Connects Us All at the International Student Conservation Leadership Summit in San Diego, California - August 2019, where they worked with several on-the-ground partners and used GLOBE protocols while in the field.

- Arlington Public Schools, GLOBE and Eco-Schools USA Joint Training-Arlington, Virginia-August 2019. APS has a NOAA B-WET grant and together they are helping the district address the need for its students to take positive actions to support a healthier watershed. Alongside GLOBE partner Todd Toth at NASA Goddard Space Flight Center, they trained teachers at APS to conduct GLOBE protocols applicable to studying the watershed, focusing on continuous monitoring, community building and student advocacy.
Science Action Club

https://www.calacademy.org/sac

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Cooperating Organization: California School-Age Consortium (CaSAC)

Funding: Pisces Foundation, Simons Foundation

Program Description and Recent Activities: Designed for youth in grades 5–8, Science Action Club (SAC) is a nationwide 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.

SAC features high quality staff training and science kits that make it easy for out-of-school time educators to lead citizen science experiences with confidence and skill. Each kit includes:

- 12 activities and bonus resources for 60-90 minute club sessions
- Science tools and supplies for 20 youth in grades 5-8
- Interactive, self-paced, online training for program staff member
- Options for customized, in-person trainings

SAC’s Cloud Quest unit explores the impact of clouds on weather and climate. Through games, projects, and hands-on activities, youth investigate local sky conditions, document their discoveries with GLOBE Observer, explore environmental issues, and design strategies to protect our planet. In 2019, 221 out-of-school time programs participated in Cloud Quest nationwide.

Areas of Expertise: In-service professional development, Programming for students, Citizen science, Informal science
Cooperating Organizations: NH Project Learning Tree, Project WILD (NH Fish and Game), Project WET (NH Department of Environmental Services), the USDA Forest Service, and University of New Hampshire Cooperative Extension, https://www.facebook.com/BringingNHEETtoEducators

Funding: National Science Foundation ITEST grant #1615193, PI Dr. Janelle Johnson, Metropolitan State University

Program Description and Recent Activities: The Leitzel Center NH 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 trainings and support are available to schools in Vermont and Maine as well.

- Participating in the UNH STEM Educators Summit (January), leading workshops on Elementary GLOBE and the Question Formulation Technique from the Right Question Institute
- Mentoring two GLOBE teachers (one from Old Town High School, Maine and one from Newport Middle School, New Hampshire) and their students in attending the 2019 Student Research Symposium in Boston, Massachusetts where reviewers recognized an Old Town High student’s project as exemplary in Research Process and Use of GLOBE Protocols
- Supporting UNH graduate student Eliza Balch in representing the Leitzel Center at a STEAM day at a local elementary school with macro-invertebrates and the GLOBE Water Wonders activity (May)
- Hosting Science Camp 2.0 professional development week (June) with funding from an NSF ITEST grant. Participants included 10 teachers from all over New Hampshire. Bourgeault and the other leaders provided content on pollinators, invasive species, soils, and carbon using materials from GLOBE, Project WET, Project Learning Tree, and Project WILD, along with resources from Cooperative Extension and the USDA Forest Service
- Showcasing the GLOBE Clouds and Biometry protocols at the family-friendly UNH STEM Day at a UNH football game in November


Areas of Expertise: In-service professional development, Elementary GLOBE, Education research, Citizen science
Institute for Research in Science Teaching

https://www.globe.gov/web/institute-for-research-in-science-teaching

Cooperating Organization: State University of New York at Fredonia

Program Description and Recent Activities: Our main focus has been the infusion of GLOBE into classrooms across our region through our ongoing partnerships. The introduction of GLOBE into classrooms has been an outgrowth of the use of GLOBE in our pre-service teacher education program and having the trained pre-service teachers serve as ambassadors of GLOBE as they work in classrooms across our region.

The focus during 2019 was on the use of GLOBE to meet the New York State Science Learning Standards (NYSSLS) with the focus on 3D learning. This has been accomplished in several ways, including our hosting of the GLOBE weather workshop in summer 2019 and using GLOBE protocols as part of our NOAA B-WET grant that studies water quality in the tributaries of Lake Erie. We have more than 300 teachers contributing to GLOBE and anticipate this number will grow as links between GLOBE and NYSSLS are better established and expanded.

We have supported a number of GLOBE teachers and classrooms as they integrated science research into their classroom practice. Two schools have continued to expand this work and attended the Student Research Symposium held at Boston University in 2019.

Areas of Expertise: In-service professional development, Elementary GLOBE, Pre-service teachers, GLOBE in undergraduate classrooms, Engineering, Education research, Citizen science

For a complete list of Presentations, please see https://www.globe.gov/web/institute-for-research-in-science-teaching/home/publications

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Cooperating Organizations: Center of Excellence for Remote Sensing Education and Research
Funding: IEEE-Geoscience and Remote Sensing Society (GRSS)

Program Description and Recent Activities: The ECSU site focuses on enhanced learning of hydrology and atmospheric protocols while assisting pre-service and in-service teachers in understanding these protocols. The collaborative partners include IEEE-Geoscience and Remote Sensing Society (GRSS) and Langley Research Center’s GLOBE Office and ECSU’s GRSS Chapter. Chapter representatives are actively involved in the organization of GLOBE protocol teacher training events locally and during the GRSS annual conferences.

Site representatives participated in the GLOBE North American Regional Meeting (NARM) in 2019 and the Atmosphere Professional Learning Workshop (March 5-7 2019) at NASA Langley, Hampton, Virginia. Following that workshop, Dr. Tony Murphy, Director of the GLOBE Implementation Office, Mr. Garry Harris, GLOBE Southeast Partner Forum member, and our GRSS chapter representatives visited various classrooms in the area.

Funding from Langley Research Center and the NSF Science Gateways Community Institute were used to support participation of one student’s summer involvement in the GLOBE program at NASA Langley. That student was the illustrator during the design of the new GLOBE Science Process poster.

On April 5-6 2019, GLOBE at Elizabeth City State University sponsored a workshop for teachers that included the hydrology, clouds, and atmosphere protocols. Twenty pre-service and in-service teachers participated. Speakers included Lin Chambers, Physical Scientist and Science Education Integration Manager, NASA. Also presenting were Marilé Colón Robles, NASA GLOBE Clouds Project Scientist, and Jessica Taylor, GLOBE Master Trainer in Atmosphere.

Publications: Hayden, Linda Bailey, GLOBE data entry app version 1.3 now available to GLOBE community. Create and edit sites without active Internet connection. GRSM-2017=00032


Areas of Expertise: In-service professional development, Elementary GLOBE, Pre-service teachers
Bowling Green State University

www.globe.gov/web/bowling-green-state-university

Cooperating Organization: Xcite Learning

Funding: Choose Ohio First (Science and Math in ACTION Program)

Program Description and Recent Activities: The GLOBE Midwest Region Bowling Green State University (BGSU) Partnership engaged in teacher professional development, undergraduate student research, and collaborative federal grant development activities to promote GLOBE in the region and beyond.

Our GLOBE partnership continues to work with the Toledo Public School’s ANSAT program (AEROSPACE & NATURAL SCIENCE ACADEMY OF TOLEDO). Teachers in the program mentor high school student research projects which are presented locally and at the BGSU sponsored Ohio Junior Science and Humanities Symposium (OJSHS). Our partnership provides professional development and GLOBE mentoring to these teachers and students. Next year, we are hoping to include GLOBE-related projects in the Midwestern GLOBE Student Research Symposium.

BGSU’s Science and Math in ACTION Program is a Choose Ohio First-funded endeavor that prepares middle and high school math and science teachers to excel in best practice instruction. Incoming freshman students participate in a three-week summer bridge program and the GLOBE Program is spotlighted as the inquiry-in-learning mini-course. Each ACTION team of four students conducts and presents a student research project focusing on urban heat islands and GLOBE surface and air temperatures (our research confirms that the BGSU campus is indeed a heat island). This summer, the ACTION GLOBE course and undergraduate student research projects were completed virtually, with students collecting GLOBE clouds, surface, and air temperature data remotely. The projects were excellent, showing that GLOBE can be done in the COVID remote learning environment in which we currently live. During this upcoming freshman academic year, eight students will be working on a follow-up study to last year’s undergraduate research project. Last year, our team identified BGSU’s hottest (and coolest) places on campus and will write and submit a campus sustainability grant application in 2020 requesting funds to mitigate our urban heat by placing roofing granules on dormitory rooftops to cool the roof and surrounding air. The students also studied the utility of FLIR cameras in monitoring surface temperature. This year, the new student research team will test the roofing granules to examine their impact on both surface and surrounding air temperatures.

BGSU faculty engaged in collaborative grant-writing activities, submitting a Department of Education SEED grant entitled Project Prairie Plus (submitted June 2020). The BGSU GLOBE team partnered with the Toledo Zoo and Aquarium and several local school districts. Project Prairie Plus will advance science learning by engaging citizen scientists (grades K-8) in monitoring critical environmental conditions contributing to the health of local school prairies. GLOBE atmosphere, land cover, soil, and hydrology protocols will be employed in the project’s science learning programs.

Areas of Expertise: In-service professional development, Pre-service teacher development, Elementary GLOBE, Citizen Science, Project-based learning, student research mentoring.
Cooperating Organizations: The University of Toledo, Ohio; WestEd/University of California (UC) Berkeley, California; Boston University, Massachusetts; Tennessee State University, Tennessee; NASA Langley Research Center (LaRC), Virginia; Institute for Earth Observations at Palmyra Cove, New Jersey; The Nuhop Center for Experiential Learning, Ohio; State of New Mexico

Funding: GLOBE Mission EARTH is funded by NASA Cooperative Agreement Notice (CAN): NNX16AC54A and NOAA Bay Watershed Education and Training (B-Wet) Program.

Program Description and Recent Activities: Dr. Kevin Czajkowski at the University of Toledo serves as the Principal Investigator for GLOBE Mission EARTH, a collaborative of multiple institutions across the United States whose mission is to increase involvement in the GLOBE Program. In addition to the members from our partner institutions, our group includes hundreds of other individuals including scientists, teachers, students, and citizen scientists, located throughout the United States and the world. UT presents at local, state, national and international scientific and educator conferences.

In the summer of 2019, UT partnered with Susan James in Mansfield, OH (GLOBE Partner) and Dr. Amanda Gilbert from Defiance College, Defiance, OH (new to GLOBE) to facilitate GLOBE teacher professional development in their areas. Mansfield teachers were trained in the Urban Protocol Bundle and Defiance teachers in the Water Quality Bundle. UT received additional funding from NOAA B-Wet grant for the Defiance professional development.

GME-UT teachers are encouraged to have their students conduct research with their GLOBE data and present at IVSS, Midwest Regional Student Research Symposia (SRS), and SATELLITES (our yearly student research symposium). UT supports teachers and students to attend the GLEs and GLOBE annual meetings.

Dr. Czajkowski leads the Urban Heat Island-Surface Temperature Campaign (https://globe.gov/web/surface-temperature-field-campaign). UT produces webinars to showcase what is being done by scientists, teachers, and students. This year, GME-UT has added webinars related to water quality issues in the Maumee River watershed and Lake Erie. Our webinars are located on our YouTube channel: https://tinyurl.com/globemissionearth2.

The University of Toledo has engaged more than 450 schools and organizations throughout its history with GLOBE. GLOBE protocols used include Atmosphere (Aerosols, Air Temperatures, Barometric Pressures, Clouds, Precipitation, Relative Humidity, Surface Temperatures), Hydrosphere (Alkalinity, Conductivity, Dissolved Oxygens, Freshwater Macroinvertebrates, Nitrates, Transparency, Water pH, Water Temperature), Biosphere (Budbursts, Green Up/Green Down, Land Cover), and Pedosphere (Soil Temperature, Soil Moisture).

Presentations: See our webpage: http://www.globe.gov/web/mission-earth

Areas of Expertise: Pre-service, In-service, Elementary GLOBE, STEM in GLOBE, Undergraduate students doing GLOBE
South Dakota Discovery Center
www.sd-discovery.org

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Funding: South Dakota Department of Environment and Natural Resources via EPA Region 8 319 Information and Education project funding

Program Description and Recent Activities: The Next Generation Science Standards have changed the way we offer professional development at the South Dakota Discovery Center. We now frame our teaching in terms of three dimensional instructional. In 2019, we piloted this concept by offering a workshop on using phenomena as the topic of our monthly, two-hour class that meets via online conferencing platform. Water transparency and surface temperature were the two protocols featured. They both provided good phenomena that could be included in a storyline to address the NGSS performance expectations.

- **4-ESS2-1 Earth’s Systems**
  Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

- **MS-ESS3-5 Earth and Human Activity**
  Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

The South Dakota Discovery Center continues to offer extended field-based workshops in Badlands National Park. In 2019, we facilitated two workshops. Participants complete GLOBE training on the website and then practice the protocols in the field.

The South Dakota Discovery Center provides mini-grants to GLOBE trained teachers to purchase classroom supplies. In 2019, we supported a third grade classroom at Jefferson school in Pierre to study weather by purchasing a weather station and a set of elementary GLOBE story books. We also supported a middle school classroom in Edmunds School district with water quality monitoring supplies. They applied to attend the 2019-2020 SRS.

Areas of Expertise: In-service professional development, Programming for students, Elementary GLOBE, Citizen science, Informal science
The University of Tennessee at Chattanooga

https://www.globe.gov/web/university-of-tennessee-at-chattanooga-partner

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Funding:
Previous: Tennessee Higher Education Commission grant
Anticipated: Tennessee Space Grant Consortium

Areas of Expertise: In-service professional development, Elementary GLOBE, Pre-service teachers, Education research, Mathematics education
Texas STEM Coalition

www.txstem.org

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Cooperating Organizations:
University of Texas Medical Branch, Galveston, Texas
Ingenuity Center, University of Texas at Tyler
University of Texas at Austin UTeach Institute
Educational Service Center Region 13
Educational Service Center Region 20
Educational Service Center Region 1

Funding: Self-supported

Program Description and Recent Activities: The Texas STEM Coalition became a GLOBE Partner in the fall of 2019. The primary activity is working with schools statewide to expand student research and project-based learning. Each year, the Texas STEM Coalition hosts the annual Texas STEM Conference and GLOBE-related sessions were highlighted and well-attended. The coalition is the lead partner for the upcoming Southwest Student Research Symposium to be held in Austin. T-STEM is supporting schools in Region 13 of Texas for the upcoming Student Research Symposium.


Areas of Expertise: In-service professional development, Elementary GLOBE
University of Texas at Tyler
GLOBE Partnership
https://www.uttyler.edu/globe/

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Cooperating Organizations:
University of Texas at Tyler
Ingenuity Center at UT Tyler
UT Tyler University Academy – Tyler
UT Tyler University Academy – Palestine
UT Tyler University Academy - Longview

Funding: Roosth Endowment, University of Texas at Tyler

Program Description and Recent Activities:
The University of Texas at Tyler Partnership supports the GLOBE Program in East Texas. The partnership focuses on the following activities:

- GLOBE training for preservice teachers
- Student Research Symposium (SRS) support for schools
- Technical assistance for GLOBE schools across Texas
- GLOBE training for in-service teachers
- Professional development programs at conferences
- Planning for the Southwest Student Research Symposium

The partnership provides two preservice workshops annually. In-service workshops are offered at the request of school districts. The partnership also works to support GLOBE activities at the UT Tyler University Academy lab schools located in East Texas. The partnership has supported teachers and students at the UT Tyler University Academies in Longview, Tyler, and Palestine to attend the Southwest SRS and provided technical assistance and mentoring support. The partnership has brokered international collaborations between East Texas Schools and Schools in Argentina and Ecuador.

Highlighted Publications and Presentations:
For a complete list of publications and presentations, please see https://www.globe.gov/web/the-university-of-texas-at-tyler/home/publications


Areas of Expertise: In-service professional development, Elementary GLOBE, Pre-service teachers, GLOBE in undergraduate classrooms, Education research, GLOBE in language classrooms – content-based language learning through STEM

News Stories:
2019 Southwest Student Research Symposium Highlights – September 03, 2019
The influence of aerosols on the color of the sky and visibility in Junín de los Andes - 2020 Collaborative research project currently underway with Argentina.
Shelburne Farms spent the fall of 2019 planning for its first GLOBE gathering in January 2020, a fun and productive two-day Collective Science and Student Stewardship Workshop on the carbon cycle and weather. Read the event agenda.

Shelburne Farms’ purpose is to build a collaborative learning community; the workshop is designed to encourage educators to share their expertise. Educators will be invited to bring their favorite activities or resources about the carbon cycle, weather, or climate change.

Event goals include:

- How to navigate the GLOBE website
- How to plan lessons using citizen science
- Communication with Upper Valley educators for collaboration
- How to conduct protocols
- The merits of authentic scientific work, and its role in place-based learning
- How to visualize and manipulate data

The organizers secured funding from the New Hampshire Charitable Foundation’s Wellborn Ecology Fund to support the workshop, and expressed appreciation for the expertise that will be offered by Jen Bourgeault (U.S. GLOBE Country Coordinator, NH GLOBE Coordinator) and Alicia Carlson (University of New Hampshire Extension).
Cooperating Organizations: GLOBE Mission Mosquito, NESEC, The Outdoor Campus, All City Elementary, STEM Enhancement in Earth Science (SEES)

Funding: NASA, IGES

Program Description and Recent Activities:

• Our team hosts monthly GLOBE Mission Mosquito professional learning webinars related to the GLOBE Observer Mosquito Habitat Mapper tool (15 were held in 2019). We also provide content for the Mission Mosquito campaign page (https://www.globe.gov/web/mission-mosquito).

• We offer a NASA Virtual Internship, ‘VIRTUAL MOSQUITO MAPPER’. Participants meet regularly with mentor scientists online and complete a guided 8-week research experience that engages participants in all aspects of the scientific process, while building familiarity with the GLOBE Observer app, NASA Worldview satellite data portal, Google Earth and ArcGIS. Sixty-nine students completed research work. Low and Soeffing lead this work.

• Through NESEC we support Odyssey of the Mind World Finals with GLOBE Observer sessions on clouds, land cover and mosquitoes.

• GO Oklahoma is a regional campaign supporting the research of scientists Dr. Caio França and Dr. Mike Wimberly. The goal is to recruit at least 100 Oklahoma citizen scientists of all ages, who will use NASA’s GLOBE Observer app, volunteer scientists to contribute their observations. Low and Soeffing lead this work.

Information on how we support schools can be found at the following links: Team OMER: https://www.globe.gov/web/team-omer, Team SEES: https://www.globe.gov/web/sees2019, Team GO OK: https://www.globe.gov/web/go-ok

For a complete list of BLOG Posts, please see https://www.globe.gov/web/institute-for-global-environmental-strategies-iges-/home/blog

For a complete list of Publications and Presentations, please see https://www.globe.gov/web/institute-for-global-environmental-strategies-iges-/home/publications

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
NASA Langley Research Center

https://www.globe.gov/web/nasa-langley-research-center/

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Cooperating Organizations: GLOBE Mission Earth, NESEC

Funding: NASA

Recent Activities:

• Hosted the GLOBE Spring NARM sharing the GLOBE Cloud Protocol with North American GLOBE Partners, demonstrating our training method of using station rotations to teach the various components of the cloud observation within the GLOBE Observer app.

• Earth Day 2019: The team shared GLOBE Clouds with students at Langley Elementary in Hampton, Virginia. Students rotated through stations as they learned the basic skills associated with making cloud observations aligned with the components of the GLOBE Observer app.

• Summer GLOBE Camp Pilot Program, “GLOBE Goes to Camp” during the summer of 2019, provided camps with training and resources supporting GLOBE cloud and surface temperature citizen science data collection. Through their participation, campers had the opportunity to learn about environmental issues within their own communities and how GLOBE could be used to help them address those issues.

• The team participated in a variety of outreach events sharing GLOBE resources, GLOBE Observer, and information related to the various GLOBE challenges at Homeschool Day and YMCA STEM Fair at Virginia Air and Space Center, and Dare Elementary STEM Day.

• Team attended and presented during the 2019 GLOBE Annual Meeting conducting Cloud Protocol Training (NESEC), Urban Heat Island Training (GME) and a variety of other GLOBE presentations featuring both formal and informal aspects of GLOBE.

• Our team mentored two GLOBE Interns Kevin Ivy and Olivia Ferrer during the summer of 2019. Kevin participated as the Keynote Speaker for the MidAtlantic/Northeastern Student Research Symposium (SRS) in Boston and shared a poster based on his research.

• Our team held a Fall GLOBE Cloud Challenge with a variety of outreach components in support of the GLOBE Cloud protocol.

• International Astronomical Conference: Cloud Protocol training, collaborated with Todd Toth and Trena Ferrell (30, K-12 teachers)

• Tina Harte attended the Mid-Atlantic/Northeastern SRS in Boston and served as a reviewer for the projects and also served as part of the SRS Leadership Committee.

• Supported the Northern Shores Elementary After-school program implementing GLOBE investigations, one group participated in the Mid-Atlantic/Northeastern SRS. Title of project, “Cloud Cover around the GLOBE.”

For a list of Publications and Presentations please see https://www.globe.gov/web/nasa-langley-research-center/home/publications

Areas of Expertise: Informal science, Citizen science, Elementary GLOBE, SME connections

News Stories:

NASA Langley Lead a GLOBE Camp Pilot Summer 2019 – November 20, 2019
NASA Langley’s GLOBE Team Celebrated Earth Day – April 30, 2019
2019 North America Regional Meeting Highlights – April 09, 2019
Jessica Taylor, Woman of Color Awardee – February 13, 2019
Cooperating Organizations: Nelson Institute for Environmental Studies, Center for Climatic Research, University of Wisconsin-Madison

Funding: All Wisconsin GLOBE activities are sponsored by competitive grants. Current efforts are funded by the Ira and Ineva Baldwin Foundation (Wisconsin Ideas Program) and the National Science Foundation (NSF) CHEESEHEAD (Chequamegon Heterogeneous Ecosystem Energy-balance Study Enabled by a High-density Extensive Array of Detectors) Project, under the direction of Professor Ankur Desai (UW-Madison Department of Atmospheric and Oceanic Sciences).

The Baldwin Foundation provides support for purchase of basic GLOBE equipment as well as a stipend for teachers who complete training. Currently those schools include the Butternut, WI School District and the Blessed Trinity Catholic School District (Dane, WI). Funding is available for up to 5 additional schools in the third year of the grant (ending June 2022).

Program Description and Recent Activities: The Wisconsin GLOBE partners recently wrapped up the second year of the three-year project supported by the Baldwin Foundation. The August 2018 GLOBE training workshop in Butternut, Wisconsin encompassed all basic GLOBE protocols and enabled the school’s participation in the NSF-sponsored CHEESEHEAD research project in Summer 2019. The GLOBE trained Butternut K-12 students and their teachers collected land cover classification data, soil properties, and atmospheric data at seven of the tower sites at multiple times throughout the summer. The 2019 GLOBE training occurred at the Wisconsin Ice Age Trail Headquarters in Cross Plains, Wisconsin for the Blessed Trinity Catholic School District.

In the third year of the Baldwin Project, the Wisconsin GLOBE partners will train teachers in Door County Wisconsin. The Door County Climate Forum hosted a GLOBE presentation in May 2019 and facilitated planning for the August 2019 GLOBE workshop.

Other activities include a proposal (February 2020) to NSF to support GLOBE training for educators and community members in Beloit, Wisconsin in partnership with Beloit College, the Beloit Unified School District, and the Welty Environmental Center. The GLOBE partners met with the Madison-WI Unitarian Society to discuss the development of an interdenominational program focused on climate.

The Wisconsin GLOBE team received media attention in 2019 from Door County Pulse (“Taking GLOBE to Wisconsin classrooms”) and the Nelson Institute In Common Newsletter (“Baldwin grant: UW-Madison Baldwin Wisconsin Idea Endowment brings climate change research to communities and classrooms across the state”)

The team planned the Midwest GLOBE Student Research Symposium for May 2020 but unfortunately had to cancel the event due to the coronavirus pandemic.

For a complete list of Presentations and News Stories, please see https://www.globe.gov/web/space-science-and-engineering-center/home/publications

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