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In The Trenches

THE NEWS MAGAZINE OF THE NATIONAL ASSOCIATION OF GEOSCIENCE TEACHERS

SHARING MORE
THAN SCIENCE



Plus... Our Annual Salute to Outstanding Earth Educators

In The Trenches

Editor in Chief: Redina Finch
Managing Editor: Nancy Ashmore

On the Cover: Laura Guertin in Cape Town, South Africa, about to board *JOIDES Resolution* and serve as onboard outreach officer for Expedition 390. [Photo by L. Tamborrino]

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is a quarterly magazine of the National Association of Geoscience Teachers, a professional association that works to foster improvement in the teaching of the Earth sciences at all levels of instruction, to emphasize the cultural significance of the Earth sciences, and to disseminate knowledge in this field to the general public.

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FROM THE EDITOR

The October issue of *In The Trenches*, our most exciting one every year, highlights shining stars in geoscience education. As we celebrate these winners of NAGT and other awards, it's also important to keep in mind the many, many other geoscience educators out there making a difference every day. October is a good time to celebrate the accomplishments of all of us. Well done, everyone!

We are exhausted, but strong. We survived the challenges of the COVID pandemic and came out better on the other side. We embraced the use of technology to reach ALL students, even when it was difficult (fieldwork!) Students have also adapted. Using the technology that now permeates education is preparing them better for today and the future. They come to us at times behind, emotionally and educationally, but they now expect to use this kind of technology throughout their education. Five years ago that was not the case. Our new reality is still evolving. I can't wait to see what happens next.

In addition to recognizing this year's award winners, who will be celebrated in person at the GSA meeting in Denver on October 9-12, 2022, this issue offers a look at an innovative avenue for exposing students to oceanography, geography, and teamwork. As an Onboard Outreach Officer aboard the *JOIDES Resolution*, Laura Guertin interacted with students and faculty around the world. She shares what she learned in the process, beginning on page 1. Read, enjoy, and learn. You can be part of the adventure too. — Redina

SHARING MORE THAN SCIENCE

Ship-to-Shore Broadcasts from *JOIDES Resolution*



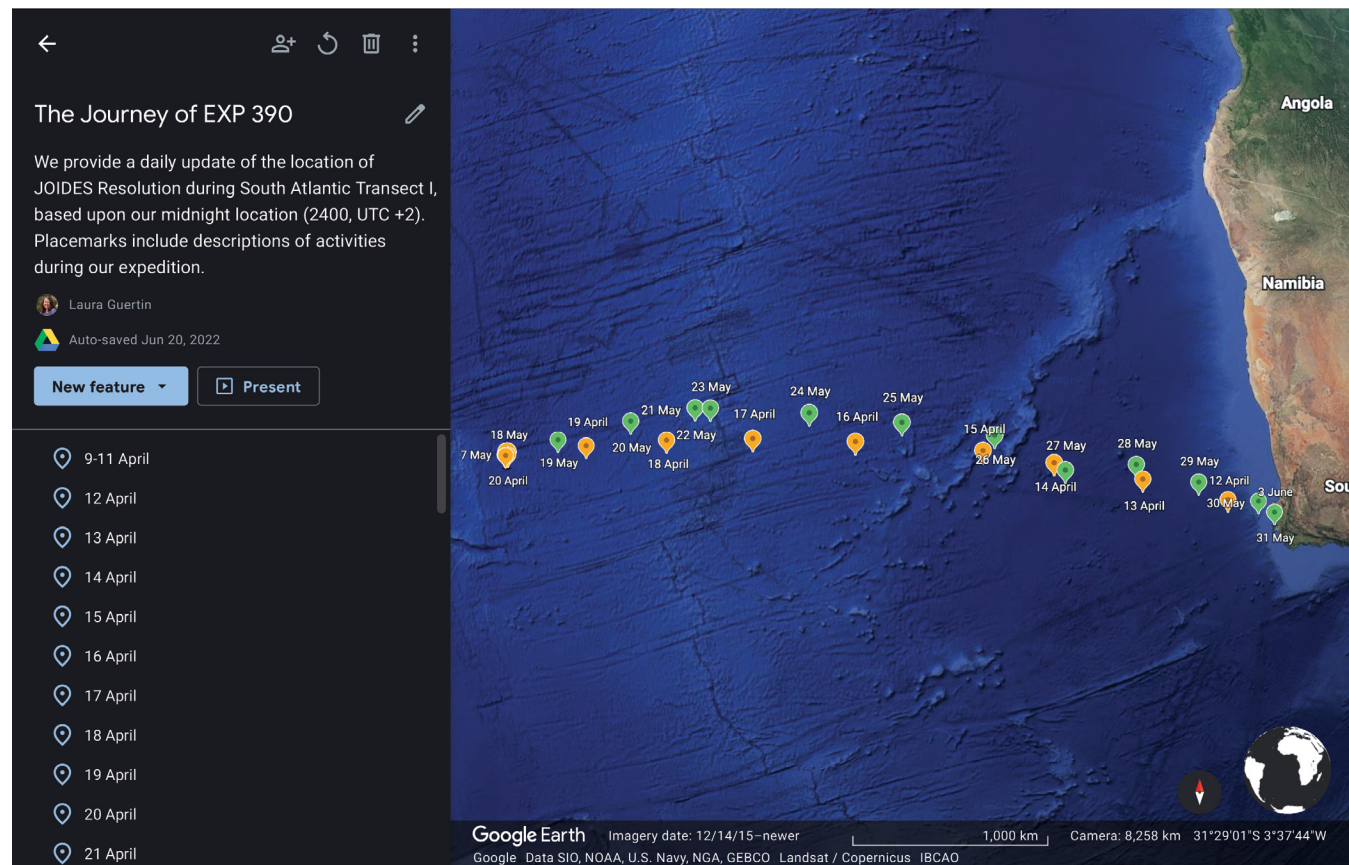
Members from the science party for Expedition 390, waiting for the first sediment core to arrive on deck during the expedition. Each individual was born in a different nation. [Photo by S. Herrmann]

The Integrated Ocean Drilling Program (IODP) started sailing Education Officers during Expedition 323 in the Bering Sea (5 July – 4 September 2009). Since then, on each expedition of the scientific ocean drilling vessel *JOIDES Resolution* (Deep Earth Academy, 2012) at least one person has filled this role, renamed Onboard Outreach Officer. Typically, though not exclusively, this position is filled by formal and informal educators teaching elementary school through university-level classes, dedicated to coordinating all education and outreach activities for their assigned expedition. The duties for the International Ocean Discovery Program (IODP) include writing for the expedition blog (<https://joidesresolution.org/expeditions/>), posting to the *JOIDES Resolution* (JR) social media channels, conducting live video broadcasts from the

ship-to-shore-based audiences, and additional education/outreach projects of the outreach officer's own design.

I had the opportunity to sail as one of the JR Onboard Outreach Officers for Expedition 390, South Atlantic Transect I (7 April – 7 June 2022). During my two months at sea, I led 50 live sessions from the ship with classrooms, community and nonprofit groups, museums, businesses, and more. To establish this telepresence, I would take an iPad connected to the ship's wireless Internet, and while in Zoom walk around the ship to show audiences the laboratories, the drilling activities, the core material be-

LAURA GUERTIN (guertin@psu.edu), professor of Earth sciences at Penn State Brandywine, Media, PA, and the scientists of South Atlantic Transect IODP Expedition 390 & 393



A Google Earth project provided a daily update of the ship's location during South Atlantic Transect I. Placemarks offered descriptions of the activities taking place during the expedition. [Image from <https://bit.ly/EXP390location>]

ing described and sampled, and converse with the scientists. The tours focused on the science and mission of the expedition, which was also posted as daily/weekly summaries on the IODP Expedition 390 reports website (http://iodp.tamu.edu/scienceops/sitesumm/390_393/index.html#X390). However, there were many additional benefits that a ship-to-shore broadcast provided for students as well as instructors. I share a summary here of some of these learning opportunities beyond the science to encourage instructors to provide this live engagement opportunity to benefit their students' broader learning of science processes and the global scientific community.

Fostering Geographic Literacy

The context of "space and place" is important; geographic knowledge is required to understand systems and scales and is applied across disciplines. In 1997, the publication *Rediscovering Geography: New Relevance for Science and Society* addressed the "recent calls to 'do something' about geographic illiteracy" in the United States (National Research Council, 1997). Concerned that geography was narrowly being viewed as the ability to correctly identify a location of a place name on a map, the report presented ways geographic instruction should include broader perspectives, subject matter, techniques, and human connections. Almost a decade later, though, the National Geographic-Roper Public Affairs Survey showed that only 50% of Americans ages 18-24 could accurately locate New York on a

map, and only 25% of those surveyed just months after the 2004 Indian Ocean earthquake and tsunami could find Indonesia on a map (GfK NOP, 2006).

The two existing scientific ocean drilling vessels *JOIDES Resolution* and *Chikyu*, as well as JR's predecessor *Glomar Challenger*, have sailed in all the world's ocean basins to collect sediment and oceanic crust from the deep sea. A live ship-to-shore session provides an opportunity for an instructor to show the location of the ship, as well as where it has been and where it is going on the current expedition. The expedition home page will show where the cores are being collected (see Expedition 390 — http://iodp.tamu.edu/scienceops/expeditions/south_atlantic_transect.html), with the Daily Science Reports posting the latitude and longitude location of each drill site. Drill Site Maps, going back to the first expedition of *Glomar Challenger* in 1968, are available for download at <http://iodp.tamu.edu/scienceops/maps.html>. This page also links to instructions for putting the site locations in Google Earth.

To further enhance the geographic connection between the JR and audiences for my own expedition, I created a Google Earth project that I updated daily with the location of the ship and a photo and description of a ship activity (see <https://bit.ly/EXP390location>). I learned that not only instructors and students were accessing this file before and after their Zoom sessions, but the family and friends of those sailing on Expedition 390

were also accessing the file to learn more about their time at sea.

Observing the Process of Science at Sea

In classrooms and laboratories on campus, students learn how to carry out scientific research and engage in data collection and analyses. Being on a ship that is transiting or kept in one location by dynamic thrusters during scientific ocean drilling requires the scientists aboard *JOIDES Resolution* to take different steps in order to carry out even the simplest tasks. Ship movements such as heave (vertical motion on the water) can rule out the use of basic methods used in land-based laboratories. For example, the micropaleontologists are always working to keep their microscopes in focus, and it is necessary to use two scales at the same time to weigh one sample (for further details on these required modifications, see Guertin (2022b)). In Zoom, the surprised reactions of instructors as well as students indicated that learning about these adaptations at sea had captured their fascination.

Expedition 390 was also impacted by the COVID pandemic. Originally scheduled to sail in 2020, the expedition was rescheduled to 2022 with new health protocols in place. All 113 people scheduled to sail (scientists and crew) were required to fly to the departure port of Cape Town, South Africa, and quarantine in a hotel for a week before boarding the ship. There were multiple COVID tests required before travel, while at the hotel, and on the ship. Mask wearing was required, and during the first two weeks I conducted the ship-to-shore broadcasts while wearing a mask and keeping my distance as best as possible from those on the JR. The pandemic, although incredibly challenging for logistics of going to and being at sea, provided an opportunity to share with students how scientific research has been impacted by COVID.

Working in Groups

Towards the end of one of my Zoom tours with a university class, the instructor asked me to share with their students the importance of working as a team on *JOIDES Resolution*. There was urgency in their voice as they made this request, and I was able to discuss the many circumstances when scientists needed to be in constant communication with each other, how the science team needed to speak with the drillers about the drilling activity to collect our cores, how the co-chief scientists needed to speak with the captain of the ship and bridge crew about our site locations, and more.

For example, everyone on the ship works twelve-hour shifts. At the end/beginning of every shift, each day, the science discipline teams working on opposite shifts come together to discuss topics such as the work completed in the past twelve hours, work in progress, and unique core features and discoveries. Scientists across the teams would also use this crossover time to meet around recently acquired core sections to determine where samples would be collected for

thin sections, paleomagnetic and physical property analyses, and micropaleontological determination. It did not matter the number of academic degrees the scientist had, their academic rank, or the nation they were from — everyone had a role and responsibility on the ship for listening, discussing, and carrying out the assigned tasks to reach our expedition objectives.

At the end of this specific tour, the instructor reminded students of their own group projects that they were to be working on and submitting very soon. I then realized that the urgency in the instructor's voice related to what many of us see in our own classes — the struggles with communication and productivity during group projects. But the JR's teamwork happens without hesitation, as working in groups is required for the success of the expedition and is a valuable model for students to witness.

Introducing an International Community of Collaborators

JOIDES Resolution sails scientists, technicians, and crew from nations across the globe. During the ship-to-shore broadcasts, I emphasized how our research on the ocean was being carried about by a global community of individuals collaborating and working together. For myself, this was one of the highlights of being on the JR, living and working with others that shared my passion for learning more about our ocean.

One common question asked by K-12 students was how everyone on the ship communicated with one another, as we came from nations and spoke different languages. Myself and the other scientists were quick to explain that even though everyone spoke English on the ship, we also communicated with hand gestures and even drawing objects and concepts. Many instructors shared with me after their Zoom sessions how surprised they were at just how international the ship was and the many cultures and communities represented working on our research questions.



Microbiologist Mako Takada, a graduate student of the University of Tokyo, Japan, poses with her winning logo design for Expedition 390 right before adding it to the other expedition logos in the JR stairwell. [Photo by L. Guertin]

An Opportunity to Discover Careers Beyond Ocean Science

Although the ship-to-shore broadcasts will typically feature scientists discussing their work and showing the equipment and samples they are analyzing, there is an entire supporting group of technicians, drillers, and more that are necessary for the ship to function. During each of my ship-to-shore broadcasts, I made sure to mention how the JR has computer specialists and application developers, electricians, mechanics, a publications specialist, a medical doctor, cooks, and stewards. The bridge crew was available to speak with some of my Zoom sessions to describe their roles on the ship, from navigation to recording meteorological data. Although live interactions with the scientists allow students to break science stereotypes and work towards developing their own science identity (Schinske et al., 2016; Shin et al., 2016), showcasing the additional career fields related to and that support the scientific work allows students to possibly see themselves in these roles.

Showing the Human Side of Scientists

When students are taught science, they may only see the scientist/educator side of the individual presenting them discipline information. Yet scientists who teach and do research have full lives beyond these roles, which is especially true for scientists at sea.

For example, each expedition hosts a ship-wide contest to draw a logo for the expedition, separate from the expedition patch used by IODP. The entries are voted upon, and the winning logo is printed on T-shirts as well as placed on the wall in one of the ship stairwells. This particular stairwell has the contest-winning logos from most of the expeditions, including the expeditions going back to *Glomar Challenger*. I would always pause for a moment in this stairwell during tours and show the different logos drawn by scientists and others on the ship.

During one tour, one university student spoke up and said that they didn't believe that any of the logos were drawn by scientists, because all of their friends majoring in STEM fields had no artistic talent. This provided an excellent opportunity to not only discuss the artistic talent of those on board, but the fact that we also brought some of our hobbies on board with us, from knitting to playing musical instruments to mastering the yo-yo. We did not focus on science 100% of our time at sea, instead spending time with each other off our shift playing card games, watching movies, exercising in the gym, and even organizing a paper airplane flying contest for National Paper Airplane Day.

By learning of the interests, hobbies, and talents of those on board the JR, students may not only expand their perception and definition of a scientist, but these live conversations have the potential to create a more equitable and inclusive science community for those studying STEM fields (Jarvis, 2020; Vincent-Ruz & Schunn, 2018).

Earth Systems Science and Ocean Literacy

Certainly, a live ship-to-shore broadcast offers students a unique opportunity to learn science content about the ocean, from the ocean. Each expedition has a different set of primary and secondary objectives, and these objectives allow the Onboard Outreach Officer, as well as the onshore classroom instructor, to assist students in seeing the connections across and beyond the hydrosphere and lithosphere. For example, for Expedition 390, one of our primary objectives is to investigate the microbes living in the sediment and basement and how they have varied in abundance and diversity over time and location from the Mid-Atlantic Ridge (Coggon et al., 2020). The expedition patch was an excellent visual for me to begin each tour and share with students the interactions across and spatial/temporal relationships with multiple Earth systems. Although knowledge from all ocean expeditions advances Ocean Literacy Principles #1 (Earth has one big ocean with many features) and #7 (The ocean is largely unexplored), Expedition 390 also provided the foundation for classrooms to discuss #5 (The ocean supports a great diversity of life and ecosystems) (see Guertin, 2022a; NOAA, 2020).

Benefits for the Scientists Onboard

This paper highlights the benefits for students and instructors participating in a live ship-to-shore session, yet there are benefits to the scientists on board *JOIDES Resolution* as well. Scientists that participated in these live events had the opportunity to improve their science communication skills, especially as they needed to adjust their content and presentation style, depending upon the education level of the audience. Krebs et al. (2020) found that live classroom/scientist interactions are effective in helping scientists realize the importance of their roles as science communicators. At the same time, the live interaction with a scientist can provide an experience that a learner can draw on for some time following the expedition, leading to student achievement and a deeper understanding of science as a process of inquiry (Niemitz et al., 2008).

Conclusions

Although computer simulations and direct experiences at sea each have their advantages to teaching students oceanographic concepts (see Winn et al., 2005), conducting ship-to-shore sessions through telepresence expands the sharing of the process of science as well as the science during expeditions at sea. This access democratizes the science and removes barriers for students that may never be able to see a live view of ocean while learning about oceanography or have an opportunity to speak with an oceanographer (Marlow et al., 2017). Students, as well as instructors, expand their learning beyond the expedition science objectives by being introduced to the how science is conducted at sea, career opportunities, and the lives and identities of scientists.

An excellent overview on the history and impacts of scientific

ocean drilling is presented in Becker et al. (2019). To schedule a free, live ship-to-shore broadcast for your classroom or community group, visit: <https://joidesresolution.org/about-the-jr/live-video-events-with-the-joides-resolution/>. The current Onboard Outreach Officer will be more than happy to discuss with you the content you are interested in highlighting during your live session.

REFERENCES

- Becker, K., Austin, J.A., Exon, N., Humphris, S., Kastner, M., McKenzie, J.A., Miller, K.G., Suyehiro, H., and Taira, A., 2019, Fifty years of scientific ocean drilling: *Oceanography*, v. 32, p. 17-21, doi:10.5670/oceanog.2019.110.
- Coggon, R.M., Christeson, G.L., Sylvan, J.B., Teagle, D.A.H., Estes, E., Williams, T., and Alvarez Zarikian, C.A., 2020, Expedition 390/393 Scientific Prospectus: The South Atlantic Transect. International Ocean Discovery Program, doi:10.14379/iodp.sp.390393.2020.
- Deep Earth Academy, 2012, *JOIDES Resolution* Education Officers Three Year Review, <https://joidesresolution.org/wp-content/uploads/2018/07/JR-Education-Officers-Three-Year-Review-summary-report.pdf> (accessed August 2022).
- GfK NOP, 2006, Final Report – National Geographic-Roper Public Affairs 2006 Geographic Literacy Study. Prepared by GfK NOP, <https://media.nationalgeographic.org/assets/file/NGS-Roper-2006-Report.pdf> (accessed August 2022).
- Guertin, L., 2022a, How Expedition 390 Advances Ocean Literacy. *JOIDES Resolution* Expedition 390 blog, <https://joidesresolution.org/exp-390-ocean-literacy/> (accessed August 2022).
- Guertin, L., 2022b, Science at Sea – Adjustments Necessary. *JOIDES Resolution* Expedition 390 blog, <https://joidesresolution.org/science-adjustments/> (accessed August 2022).
- Jarvis, C.L., 2020, Helping students (re)think of themselves as scientists. *C&EN*, 98(28), <https://cen.acs.org/education/undergraduate-education/Helping-students-rethink-themselves-scientists/98/i28> (accessed August 2022).
- Krebs, C.L., Loizzo, J.L., Stone, W.A., and Telg, R.W., 2020, Scientist Online: Entomologists' Experiences Engaging With School Audiences Through Skype in the Classroom. *Frontiers in Communication*, 5, Article 576593, doi:10.3389/fcomm.2020.576593.
- Marlow, J., Borrelli, C., Jungbluth, S.P., Hoffman, C., Marlow, J., Girguis, P.R., and the AT-36 Team, 2017, Proceedings of the

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Laura Guertin thanks the members of the Expedition 390 science party and technical staff, as well as the ship's crew from the bridge, that assisted with the ship tours by sharing their expertise, at-sea experiences, and personal journeys into ocean science. Expedition 393 was the second two-month leg of the South Atlantic Transect and followed immediately after 390, from June-August 2022.

National Academy of Sciences (PNAS), v. 114, p. 4841-4844, doi:10.1073/pnas.1703514114.

NOAA (National Oceanic and Atmospheric Administration), 2020, Ocean Literacy: The Essential Principles and Fundamental Concepts of Ocean Sciences for Learners of All Ages, Version 3. Washington DC, http://oceanservice.noaa.gov/education/literacy/ocean_literacy.pdf (accessed August 2022).

National Research Council, 1997, *Rediscovering Geography: New Relevance for Science and Society*. Washington DC: The National Academies Press, doi:10.17226/4913 (accessed August 2022).

Niemitz, M., Slough, S., Peart, L., Klaus, A.D., Leckie, R.M., and St. John, K., 2008, Interactive Virtual Expeditions as a Learning Tool: The School of Rock Expedition Case Study. *Journal of Educational Multimedia and Hypermedia*, v. 17, p. 561-580.

Schinske J., Perkins, H., Snyder, A., and Wyer, M., 2016, Scientist Spotlight Homework Assignments Shift Students' Stereotypes of Scientists and Enhance Science Identity in a Diverse Introductory Science Class. *CBE - Life Sciences Education*, v. 15, doi:10.1187/cbe.16-01-0002.

Shin, J.E.L., Levy, S.R., and London, B., 2016, Effects of role model exposure on STEM and non-STEM student engagement. *Journal of Applied Social Psychology*, v. 46, p. 410-427, doi:10.1111/jasp.12371.

Vincent-Ruz, P., and Schunn, C.D., 2018, The nature of science identity and its role as the driver of student choices. *International Journal of STEM Education*, 5, Article number 48, doi:10.1186/s40594-018-0140-5.

Winn, W., Stahr, F., Sarason, C., Fruland, R., Oppenheimer, P., and Lee, Y-L., 2005, Learning oceanography from a computer simulation compared with direct experience at sea. *Journal of Research in Science Teaching*, v. 43, p. 25-42, doi:10.1002/tea.20097.

THE NAGT, GSA, GEO-CUR, GER, GEOZYC, STOUT, & JGE AWARDS FOR 2022

For detailed biographies, visit <https://nagt.org/nagt/awards/index.html>.



Aida Awad

ROBERT CHRISTMAN AWARD

Recognizing individuals who have provided long, distinguished service to NAGT at the national and/or section level

AIDA AWAD

American InterContinental University, Schaumburg, Illinois

Aida Awad was the science department chair at Maine East High School in Park Ridge, Illinois, when she was elected an NAGT Councilor in 2008 and also began serving as an associate editor for NAGT's *Journal of Geoscience Education*. Following her term as councilor, she was elected to serve in the presidential line—the first K-12 instructor to do so in NAGT's history—and she followed that with a term as secretary/treasurer. During her twelve years on the Executive Committee, she co-lead the NAGT review team for the Next Generation Science Standards (NGSS) and, following their publication, worked to



Erik Klemetti

develop strong, collaborative relationships between NAGT, AGI, and NESTA to lead efforts to bring the Earth and space science community together around successful implementation of the new standards. It is no overstatement to say that, without Aida, our community would not be where we are in NGSS implementation.

Awad serves on the NAGT Webinar Committee as the co-lead of the NGSS-ESS Implementation program and has reviewed countless activities in Teach the Earth and helped indicate their alignment with the NGSS. She has been invaluable as a source of feedback in our efforts to grow and support our K-12 educator membership.

Awad has followed a unique path from teaching high school science into higher education and consulting, always learning new strategies and ideas. Throughout her journey, she has kept NAGT in the forefront, contributing in



Vashan Wright

profound ways to the organization and our efforts.

JAMES SHEA AWARD

Honoring individuals for exceptional writing or editing of Earth science materials of interest to the general public and/or teachers of Earth science

ERIK KLEMETTI

Denison University, Granville, Ohio

By day, Erik Klemetti is an assistant professor of geosciences at Denison, where he teaches hard rock fundamentals to students and researches magmatic processes and the source of crystals found in the magma of volcanoes in California and New Zealand. But when class ends and the research day is done, he wears another hat, the hat of an expert communicator.

Since 2008, Klemetti has shared his knowledge online, leveraging the power of the Internet to make information available to a broad audience and making great contributions to the online geoscience



Douglas Faulkner

community. His writing style is conversational and humorous while still retaining the scientific rigor of a journal publication, while keeping the content accessible for a variety of audiences. His long-standing blog (in its various incarnations as Rocky Planet at *Discover Magazine* and *Eruptions at Wired*, *ScienceBlogs* and *Big-Think*) has addressed everything from difficult theories in "What Might have Triggered the 2018 Eruption at Kilauea" to advocating for indigenous geographical names in "Let's Return the Cascade Volcanoes to Their Original Names" to offering advice on "The Right and Wrong Way to Die When You Fall Into Lava."

In addition, he advocates for early-career and minority geoscientists, sharing his struggles and triumphs in geoscience teaching. His openness, accessible language, and intriguing topics help to bridge the gap between academics and the general public, dispelling pseudoscientific ideas

and spreading scientific understanding beyond the classroom, a service that is greatly needed in the world.

THE NAGT EXCELLENCE IN JEDI AWARD

Honoring significant contributions to the promotion of justice, equity, diversity, and/or inclusion (JEDI)

VASHAN WRIGHT

University of California San Diego, San Diego, California

Vashan Wright is an assistant professor at Scripps Institution of Oceanography, University of California San Diego. He is Jamaican and enjoys playing tennis, watching television shows, going for walks, and joking around with friends over meals or get-togethers. He studies tectonics, earthquake physics, and geoscience education. He is an outspoken voice for improving belonging, accessibility, justice, equity, diversity, and inclusion in geoscience. He believes that cultivating deep, meaningful, and healthy relationships is the key to happiness and productivity. Wright thanks everyone he has worked with in geoscience education and JEDI programs, FYRES (First-Year Research in Earth Science), GeoFORCE Texas, URGE (Unlearning Racism in Geoscience), and R2GEO (Representation and Retention in Geoscience).

GEO-CUR AWARD

Recognizing outstanding undergraduate research mentoring

DOUGLAS FAULKNER

University of Wisconsin Eau Claire, Eau Claire, Wisconsin

Douglas Faulkner, a professor of geography and anthropology, is recognized for his long

record of mentoring undergraduate research students, both outside of the classroom and via course-based research. His approach with research students is to engage with them throughout all stages of the research process, from initial research design focused on student interests through supporting students as first authors on abstracts to national conferences; for many mentees, Faulkner's engagement continues beyond graduation and throughout their careers.

BIGGS AWARD

Awarded by the Geological Society of America (GSA) for excellence in Earth science teaching by undergraduate faculty who have been teaching full-time for 10 years or fewer

CHRISTY VISSAGI

Georgia State University, Atlanta, Georgia

Christy Visaggi is a senior lecturer and undergraduate director in geosciences and also serves as the senior faculty associate for Signature Experiences at Georgia State University. Her courses include introductory geosciences, paleontology, integrated science for teachers, careers in geosciences, as well as an array of field courses, study abroad programs, and honors seminars focused on natural disasters, conservation, and more. Her approaches rely heavily on place-based learning, culturally responsive pedagogy, experiential learning, and in particular engaging students in undergraduate research.

Much of Visaggi's service is dedicated to education and outreach initiatives for the Paleontological Society, National Park Service and National Association for Geoscience Teachers. As one of

her students shared, "Dr. V has devoted herself to helping students find their passion within geosciences" and that the student had "never before considered education as something suitable" for herself, but upon entering Visaggi's class she was "able to see the ripple effects of a truly invested teacher," having experienced that herself.

GER TRANSFORMATION AWARD

Recognizing outstanding undergraduate research mentoring

KAREN MCNEAL

Auburn University, Auburn, Alabama

Karen McNeal is Auburn's College of Science and Mathematics Molette Endowed Professor and director of the Geocognition and Geoscience Education Research Lab. She conducts research in the field of geoscience education/geocognition to investigate geoscience teaching and learning challenges in formal and informal settings. Her work employs psychomotor tools (e.g., eye-tracking, pupillometry, and skin biosensors), psychometric tools (e.g., concept inventories and pre-post surveys), and open-ended approaches (e.g., interviews, concept-maps, etc.) to measure people's engagement,



Christy Visaggi

conceptual understanding, and perceptions about the Earth. Her work has included a focus on climate change education where she has worked to understand how stakeholders use actionable science products, understand how people engage with climate related visualizations and information, and create assessments and evaluate educational climate change curriculum at the 7-20 grade levels.

GER EARLY CAREER AWARDS

Honoring colleagues in their first 10 years post-dissertation who have made significant contributions to the development of geoscience education research

KATHERINE RYKER

University of South Carolina, Columbia, South Carolina

Katherine Ryker is an assistant professor of geoscience education at the University of South Carolina and has served the NAGT Geoscience Education Research division as secretary (2014-2017), vice president, president, and past president (2017-2020). Her primary research interests revolve around interventions in introductory geoscience classes (especially labs) to improve cognitive and affective learning goals, and teaching professional development (faculty,



Karen McNeal



Kathrine Ryker

graduate teaching assistants and pre- and in-service teachers). This includes exploring connections between reformed teaching practices, student learning, teaching beliefs, and the implementation of inquiry-based geoscience labs. Other specific topics she is interested in include the use of augmented and virtual reality in geoscience programs and how teachers develop their beliefs and identities over time.



Alison Jolley

**GEOZYC
OUTSTANDING ADJUNCT
FACULTY AWARD**

KUSALI GAMAGE
Austin Community College,
Austin, Texas

Soon after Kusali Gamage started adjunct teaching at Austin Community College in 2011, she explored ways to expose her students to the work of scientists, as well as possible career fields. In 2014, she developed classroom materials based on an ongoing International Ocean Drilling Program expedition (studying the Izu Bonin Mariana Forearc). Her students read an overview of the drilling cruise, followed the expedition's blog for two weeks, and then composed questions which they asked to project scientists during a live video conference.

Inspired by positive student feedback and a desire to expose her students to more geoscience research, Gamage applied for an NSF IUSE:GEOPath grant with two collaborators at UT Austin. The team was awarded the grant in 2016, and thus developed their Summer Undergraduate Research Experience Course (SUREC). In addition to summer research opportunities, the grant funds field trips to the Gulf Coast repository at Texas A&M University to expose



Kusali Gamage

ACC students to sediment and rock core analysis. These field trips happen each semester. According to Gamage, "During the 3-year program a total of 158 students have participated in the field activity and 24 students have participated in the summer research program. Twenty students from the summer program have successfully transferred to a four-year institution (UT or Texas A&M) to study geosciences or related STEM field."

**DOROTHY
LALONDE STOUT
PROFESSIONAL
DEVELOPMENT GRANTS**

**Supporting the professional
ventures of Earth science
faculty, teachers, and
students**

MELANIE RODRIGUEZ
Louis Armstrong Middle School,
Los Angeles, California

Melanie Rodriguez is a 7th grade science teacher in Los Angeles, California. She believes in getting students involved in the community and using practices that will help them make an impact in the area around them. This award will be used to help the gardening club at Armstrong Middle School plant a pollinator garden. It will include a variety of plants for bees, hummingbirds, and specifically cater



Melanie Rodriguez

to monarch butterflies, which are facing a threat due to climate change. Her goal is that her students become lifelong learners and develop a scientifically based awareness of their relationships with the environment. She also hopes her students apply that knowledge toward building and nurturing sustainable, harmonious, and cooperative relationships within the physical environment and the community.

**JOURNAL OF GEOSCIENCE
EDUCATION AWARDS**

OUTSTANDING PAPER

KAREN VISKUPIC
Boise State University, Boise, Idaho

ANNE E. EGGER
Central Washington University,
Ellensburg, Washington

RORY R. MCFADDEN
Gustavus Adolphus College,
St. Peter, Minnesota

MARK D. SCHMITZ
Boise State University, Boise, Idaho

"Comparing Desired Workforce Skills and Reported Teaching Practices to Model Students' Experiences in Undergraduate Geoscience Programs," *Journal of Geoscience Education*, 69:1, 27-42, DOI: 10.1080/10899995.2020.1779568

OUTSTANDING REVIEWER

**SAMUEL CORNELIUS
NYARKO**
Indiana University-Purdue
University, Indianapolis, Indiana

OUTSTANDING EARTH SCIENCE TEACHER AWARDS FOR 2022

For more detailed biographies, visit https://nagt.org/nagt/awards/oest/2022_oest.html.



Yvonne Garrison

SECTION WINNERS

CENTRAL SECTION

YVONNE GARRISON
Mason County High School,
Maysville, Kentucky

Before beginning her teaching career in 2012 at Mason County High School, Yvonne Garrison worked as a field biologist for the Ohio EPA and the Ohio River Sanitation Commission, conducting water tests and sampling fish populations in the Ohio River and basin tributaries. She now teaches biology, AP Environmental Science, and general college biology and coaches the Mason County Envirothon Team, which regularly competes at the state level.

Garrison takes a project-based learning approach in her biology classes, having her students tackle small, phenomena-based questions and large real-world problems and design and implement real solutions to them. A recent project required studies of hydrology and storm-water management on school



Wendy Grimshaw

grounds, water testing, and biotic index stream studies, identifying water quality problems within the stream flowing at the edge of the campus, and proposing solutions. She took students on field trips to study businesses with green roofs, permeable surface parking lots, rain gardens, and rain barrels. Later, selected student teams implemented their projects to improve water quality (and quantity) in the stream, planting more than 100 trees on school grounds to improve the riparian zone around the stream and installing a large rain garden below a parking lot to manage water before it enters into the storm-water drain system and flows from there into the stream.

**EASTERN SECTION AND
VIRGINIA STATE**

WENDY GRIMSHAW
Andrew Lewis Middle School,
Salem, Virginia

Throughout over 25 years of teaching, middle school science



Lorraine Cathey

teacher Wendy Grimshaw has engaged students in inquiry-based learning that fosters interpretation of the world through a geoscience lens. She promotes content literacy through experiential learning, interdisciplinary problem solving, and engineering design activities and employs a CER-modeled IT Field Book routine that develops her students' ability to reflect on scientific observations, express ideas, generate drawings, and demonstrate learning. Her students apply geoscience learning when connecting with community partners like Trout Unlimited, the Appalachian Trail Conservancy, the U.S. Forest Service, and the Roanoke Valley Astronomical Society during service learning, citizen science, and grant-funded outdoor education experiences.

Grimshaw has served on advisory boards, as a mentor teacher, on curriculum writing teams, and as the proprietor of The Learning Barn LLC, a sustainability-focused STEM school she opened on her farm



Joanna Latham

in 2015. Since 2012, she has served as a KidWind coach and judge for hundreds of middle and high school students as they've researched, designed, built, and tested small-scale wind turbines. Teams of her students have twice advanced to the national level, winning the national challenge in 2017. She has regularly participated in professional development opportunities including NASA Space Camp for Educators, the TSGC/NASA Lift Off! Program, and other state, national, and international STEM conferences. Since 2009, she has attended Eastern Section meetings, bringing many innovative ideas and resources back to her classroom.

FAR WESTERN

LORRAINE CATHEY
St. Thomas the Apostle School,
San Francisco, California

Lorraine Cathey has been an educator for twenty-eight years in the San Francisco Bay Area, teaching in public, charter, and Catholic schools. She began her

career as the director of the San Francisco Title V American Indian Education Project, which focused on local California Native Tribes and their cultures. Since then, she has built a science curriculum around sustainability, stewardship, and inquiry. Collaborations with the Marine Mammal Project, GLOBE, and now NAGT, as well as the Exploratorium Teacher Institute have broadened the scope and depth of learning for her students.

While project director of Title V, Cathey was also school secretary and head volunteer at New Traditions Creative Arts Elementary in San Francisco. There she was able to work with teachers on cross-curriculum development, integrating social studies with art and literature, music with mathematics, and science with Poets in the Schools.

Since earning her Multiple Subject CLAD Credential in 2000, Cathey continues to expand her teaching practices. She has brought math and science together with art through San Francisco Youth Arts Festival entries, started up a string orchestra at KIPP Bayview Academy, helped to pilot the Marine Mammals Ocean Ambassadors program at Visitation Valley Middle School, and is currently developing thematic units on the San Francisco Bay

Area at St. Thomas the Apostle School. Hands-on learning (augmented reality sandbox, Lab-Aids, Nature Journals) and modeling stewardship and a sense of place are foremost in her teaching practices.

MIDCONTINENT SECTION

NO AWARD IN 2022

NEW ENGLAND SECTION

JOANNA LATHAM
Milton Academy,
Milton, Massachusetts

An Upper School science teacher at Milton Academy, Joanna Latham teaches geology and foundational science courses. She is also Second Vice President of NAGT's New England section. Her experience as a professional geologist in the mining, environmental, and geotechnical industries cut the path to her career as an educator. While working as a consultant, she began teaching "The Geology of the Boston Area" with Northeastern University's College of Professional Studies in 2007. This ultimately guided her to the high school classroom, where she works with a range of learners from diverse backgrounds, giving rise to her "mission": through a combination of passion and compassion, she strives to create an environment that inspires students to be confident in their authentic

selves and their abilities and aspires to help them find their joy in learning as they discover themselves as individuals and an essential part of a whole and as lifelong learners.

As Latham works with high school students and with all grade levels, she seeks to productively challenge and engage students through hands-on, inquiry-based explorations that both incorporate "real world" connections and foster a love for the natural world. These explorations take advantage of the rich variety of educational resources in the Boston area, including, of course, the great outdoors.

NORTH CENTRAL SECTION

NO AWARD IN 2022

PACIFIC NORTHWEST

KERRY LOCKWOOD
Pinetree Secondary School,
Coquitlam, British Columbia

Kerry Lockwood is an Earth science and rock enthusiast with 32 years of experience educating students ranging from kindergarten to grade 12. She currently teaches chemistry, Earth science, and general science.

A major influence on her teaching came 13 years into her career with a decision to switch

from being a high school teacher to being an elementary teacher-librarian. Her passion for science became quickly known there, and her treats became rocks and sand collected and shared by students and families.

Lockwood is active in multiple projects that support teachers to further science education in their own classrooms. Since 1996, she has been Fisheries and Oceans Canada Salmonids in the Classroom program coordinator for the Coquitlam School district. She delivers salmon eggs to classrooms and supports teachers as they create educated stewards. She has received the Canada 150 Community Leader award for her work in preventing the program from being defunded. She is the lead writer and creative developer of MineralsEd's Grade 7/8 Earth Sciences Resource Unit and has presented the in-service workshop for this outstanding unit to teachers around British Columbia since 2011 as well as facilitating MineralsEd's teacher Pro-D programs at AME's Roundup conference.

Education requires being able to identify and support the needs of specific learners. Through her active science teaching, Lockwood continues to find ways to develop a connection to and curiosity about science in our everyday world.

SOUTHEASTERN SECTION AND ALABAMA STATE WINNER

AMANDA SAVRDA
Auburn High School,
Auburn, Alabama

Amanda Savrda strives to "make the world the classroom" for her Earth and environmental science students at Auburn High School. Her own studies have included being a team member of the United States Antarctic Program Special Project G-432-E, where her research focused on the thermotactic history of rocks of Palmer Land, Antarctic Peninsula. After five years working in the oil and gas industry as a senior geoscientist in ExxonMobil's Exploration Company in Houston, Texas, and receiving a master's degree in education, she has taught 10th, 11th, and 12th graders and earned both National Geographic Educator Certification and an NISE National Certificate for STEM Teaching.

Savrda leverages her experiences in research and industry to help students connect their everyday lives to science content in the classroom. Her students use NOAA publications to explore relationships between global phenomena such as the Southern Oscillation and tornado frequency in Alabama and use ArcGIS to understand how epidemiologists map pandemics—lessons rife with real-world applications and connections that involve active research, interpretation of real-world and real-time data, and exploration of the relationships between local, regional, and global phenomena.

Savrda has participated in K-12 science outreach as a science camp counselor, Boy Scout

geology merit badge instructor, geology guest speaker, STEM outreach instructor, and geosciences career representative for middle school and high school students. A member of Auburn University's Department of Geosciences Advisory Board since 2015 and a charter member of Auburn University's Chapter of the Association for Women in Science, she works to support women and underrepresented minorities in the geosciences.

SOUTHWEST SECTION

NO AWARD IN 2022

TEXAS SECTION

NO AWARD IN 2022

STATE WINNERS

LOUISIANA

SANDRA SAYE-FOUCQUETEAU
Copper Mill Elementary,
Zachary, Louisiana

Fifth-grade science teacher Sandra Saye-Foucqueteau is passionate about Louisiana coastal protection and restoration efforts. She engages students with both state and national environmental projects.

Her students strive to create new solutions for both natural and man-made issues of localized flooding from the Mississippi River, Louisiana's disappearing coastline, as well as global environmental issues. She has developed a culminating field trip for over 400 students to visit the newly opened LSU River Center Studies Facility.

Saye-Foucqueteau lives on sustainable Sunflower Farm and has received Certification

from LSU's Garden Leadership program. She shares her farm and her travels as classroom phenomenon. She was selected to attend Lamar University's "Teaching Environmental Science Institute," Texas A&M's Geology Camp, the Keystone Science's Environmental Institute, and numerous Louisiana workshops. She was named the Louisiana Science Teachers Association's Essie Beck "Rising Star." In August 2021, she was selected to be a Fellow in the Louisiana Department of Education's Louisiana Coastal Fellowship. The fellowship held bimonthly trainings with Washington State University's project, Learning in Places, which promotes equitable, cultural, evidence-based science education in outdoor learning. These professional studies help Sandra instill a love of Earth Science in her students.

MARYLAND

SARA SNOOK
North Carroll Middle School,
Hampstead, Maryland

Sara Snook is an 8th-grade Earth and space science teacher in Hampstead, Maryland. After graduating from the University of Delaware in 2013 with degrees in Earth science education and English education, she began her science teaching career. She is currently completing her master's degree in curriculum and instruction from McDaniel College.

Snook tries to implement as much hands-on, inquiry-based learning as possible. She believes that she is a facilitator of learning, challenging students to explain or solve real-world phenomena and problems. In doing so, she promotes collaboration and communication among students. She aims

to make science accessible and engaging for all students.

Snook has been a county curriculum writer since 2016 as well as a Maryland State Assessment item writer and scorer. She has been nominated for her county's outstanding teacher award and was part of a team of teachers that won the 2021 McLean Yoder Award for Professional Excellence.

In her free time, Sara spends time with her husband, Nate, new baby girl, Emerson, and animals. She likes to travel, especially to national parks, with her family.

MISSISSIPPI

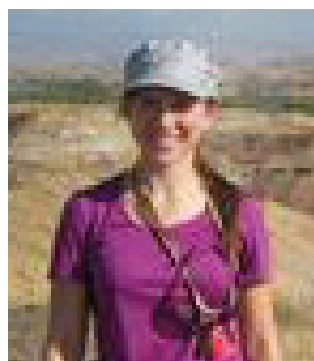
VERONICA WYLIE
Hazlehurst High School,
Hazlehurst, Mississippi

Originally from Denver, Colorado, Veronica Wylie is now a high school teacher in Hazlehurst, Mississippi. After graduating from Denver East High School, she went on to receive a B.S. in chemistry from Loyola Marymount University, an M.A. in curriculum and instruction from the University of Colorado at Denver, and an M.Div. from Denver Seminary. She will complete an M.S. in chemistry education from Illinois State University and a Ph.D. at Jackson State University in the fall of 2022.

Wylie recently completed an internship with NASA's Office of STEM Engagement. She worked with the Moon to Mars Team and helped to design and pilot the NASA SPARX competition, develop the Totally Artemis Camp Guide, and act as a Point of Contact for the PAGE activity. While interning at NASA, she completed an anti-racism in science research fellowship through Lab-X-Change and



Kerry Lockwood



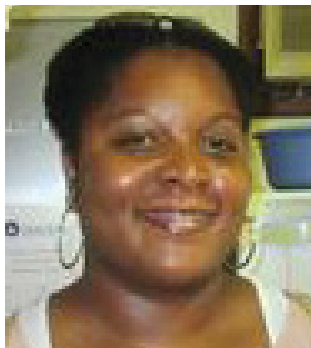
Amanda Savrda



Sandra Saye-Foucqueteau



Sara Snook



Veronica Wylie

Harvard University. Wylie served as a 2021 FFT fellow and was able to learn to scuba dive. She is in the process of introducing community youth to the world of SCUBA. During her spare time, Veronica runs STEMSouth, a small non-profit that aims to develop “success, tenacity, excellence, and merit through science, technology, engineering, and math.” She is a lifelong learner.

NEVADA

MICHELE LAVERTY

Edward C. Reed High School, Sparks, Nevada

Michele Laverty has been teaching Earth science and leadership for more than six years. She is a graduate of San Jose State University where she studied public relations and chemistry. After working more than 20 years in the agricultural field she returned to school, attending Grand Canyon University, and receiving a MA in secondary education.

Prior to becoming a teacher, Laverty created and operated a mobile science lab providing hands-on agricultural science education to thousands of middle school students each year. This experience helped hone her belief that hands-on exploration and connecting to the local environment are key to helping students understand and want to learn



Michele Laverty

about the Earth and their local environment.

Her educational philosophy is to connect lessons to what the students see around them, providing scientific terms to things they have already experienced. She has found the key to student engagement is through projects where the students work in groups and explore topics on their own.

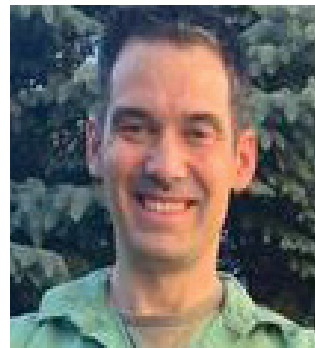
Laverty has been a facilitator for the development of the pacing guide for Earth science for her district and has presented workshops for fellow educators. A professional development opportunity she enjoys is participating in the Nevada Mining Association’s annual teacher training.

NEW YORK

ZACHARY MILLER

John Jay Middle School, Cross River, New York

Zach Miller, an Earth science teacher, has been teaching for more than 16 years at both the middle school and high school levels. He earned both geology and hydrology undergraduate degrees from SUNY Oneonta and a teaching graduate degree from SUNY Purchase. Miller credit this strong foundation in geosciences for his passion for the subject, along with having taken an undergrad-level geology course while in high school from Steve Kluge (a past OEST award recipient).



Zachary Miller

Miller strives to demonstrate the relevance of geosciences to students in 8th-grade accelerated Regents Earth science by requiring students to think critically and express their understanding. To this end, he enjoys incorporating technology in his lesson. For example, Google Earth® has become an integral part of his Earth science course as both a teacher visualization tool and a tool for student-centered lab activities.

Miller enjoys being the science fair coordinator, as well as bringing professional scientists and researchers into his classroom for “virtual field trips.” He enjoys being a part of the SUNY Oneonta ESPRIT Listserv community to support teachers new to the geosciences.

NORTH CAROLINA

STEFAN KLAKOVICH

Carrboro High School, Carrboro, North Carolina

Stefan Klakovich has been an environmental science teacher since 1999, first in California and for the last nine years in North Carolina, where Earth and environmental science is a high school graduation requirement for all students.

Klakovich shares his passion for the environment everyday with his students and wants them to fall in love with our beautiful planet and its systems. He tells students on the first day



Stefan Klakovich

of class that he wants them to see their world differently when the year is finished. He feels that an understanding of how our world works helps build confidence and just makes life more interesting. He challenges students to ask questions. He gets them outside of the classroom as much as possible. Because he feels that students learn the most when they are engaged in real work and if given the chance to become involved in constructive projects in the community will be less inclined to be involved in destructive activities, his students help manage several ongoing projects at their school including an oak reforestation project, apple orchard, community garden, native plant garden, and school composting program.

Klakovich also thinks that many students don’t reach their potential out of a fear of failing. “We need to give students opportunities to fail that don’t hurt them academically.” This philosophy requires him to give feedback that the students can act on to improve their work and their grades.

Klakovich is happy that all of his Earth science classes are now heterogeneously mixed. Differentiating the curriculum is one of the more difficult things he does but he says he knows that all students benefit from this arrangement.



Nichole Erwin

SOUTH CAROLINA

CHRISTOPHER WILLIS

Lady’s Island Middle School, Beaufort, South Carolina

OREGON

NICHOLE ERWIN

Sunridge Middle School, Pendleton, Oregon

Nichole Erwin has been teaching 6th-grade science and math for 12 years, for the last four years strictly science. Erwin has been awarded the Crystal Apple Award for excellence in education, as well as, Sunridge Middle School Teacher of the Year.



Beth Allcox

WISCONSIN

BETH ALLCOX

New Holstein High School, New Holstein, Wisconsin

Erwin has been interested her whole life in natural phenomena, and she brings that excitement and curiosity to the classroom. As sixth graders her students are just getting their first experiences in science as an everyday academic class, so creating an environment where they feel comfortable sharing ideas and asking questions is important. Erwin’s classroom is a very student-led environment with an emphasis on historical and real-life connections.

Erwin is also very involved outside of school hours in science activities. For the last five

years, she has written grants and coordinated Girls in Science events for middle school girls. She also does after-school science clubs and is an education coordinator for the Pendleton Outdoor School Program.

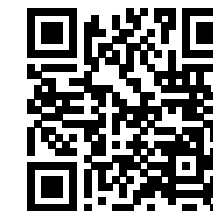
Beth Allcox is in her 18th year of teaching science at New Holstein High School. She earned her bachelor of science in biology from University of Wisconsin Whitewater and her masters in secondary education with an emphasis in physics from University of Wisconsin River Falls.

She was chosen as a Science Teacher as Researchers (STAR) recipient and had the honor of spending two weeks at the Pacific Northwest National Lab, working in the glass lab. There she learned about the vitrification process being used to tackle the

nuclear waste problem. Allcox served six years as the District Three director for the Wisconsin Society of Science Teachers (WESTA) and is currently the chairperson for the Wisconsin Earth Science Teachers Association (WESTA), a sub-group of WSST.

Allcox has brought 3D printing into her classroom, giving students the opportunity to create models of the concepts discussed in class. This allows them to work with the concepts in greater detail.

FOR DETAILS ON NAGT AWARDS and instructions and deadlines for nominating someone, visit <https://nagt.org/nagt/awards/index.html>.



OUTSTANDING TEACHING ASSISTANTS AWARDS FOR 2022

NAGT recognizes outstanding undergraduate and graduate teaching assistants in geoscience. Winners receive a one-year NAGT membership, which includes an online subscription to the Journal of Geoscience Education and In The Trenches. The undergraduate awards are the gift of Thomas Hendrix, Grand Valley State University. The graduate student awards are funded by NAGT.

- STEVE ADAMS**
University of Oklahoma
- BETH BARTEL**
Michigan Technological University
- EMILY ELEY**
University of South Carolina
- TRAVIS ESQUIVEL**
Cabrillo College
- KRISTEN FOLEY**
Western Michigan University
- ALEKSANDRA GAWRONSKA**
Miami University
- MAYA GILCHRIST**
University of Minnesota Twin Cities

- CLEMENTINE HAMELIN**
University of Minnesota Twin Cities
- KATHARINE IZZO**
Northeastern Illinois University
- ANNIE KLYCE**
University of South Carolina
- ANNA LESKO**
Baylor University
- MD LAL MAMUD**
University of Mississippi
- KEVIN MENDOZA**
University of Utah
- LAUREN MILLER**
Colorado School of Mines

- STAFFORD MULLIN**
University of South Carolina
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Cabrillo College
- M. JOSEPH PASTERSKI**
University of Illinois Chicago
- MADDIE PETERSON**
University of South Carolina
- JESSICA PRINCE**
Tennessee Tech University
- LIANNIE CORAL VELÁZQUEZ SANTANA**
Miami University

- CHEYANNE SCHENKEL**
Northern Illinois University
- GREG SHAFER**
Boise State University
- JOYCE SMITH**
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