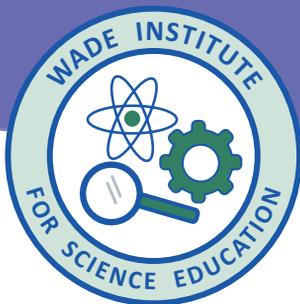


# Wade Institute for Science Education



## 2021 Annual Report



1354 Hancock St., Ste. 302  
Quincy, MA 02169  
[www.wadeinstitutema.org](http://www.wadeinstitutema.org)

Tel. 617-328-1515  
Fax. 617-328-1516  
[wadeinstitute@wadeinstitutema.org](mailto:wadeinstitute@wadeinstitutema.org)

# Message from the Wade Institute's Executive Director

In 2021 we began to transition from the virtual programming that we'd employed during January - August, and shifted back towards in-person programs for the fall. During the Pandemic our staff developed a wide variety of skills for delivering remote/virtual programs, enabling us to broaden both our reach and our resources. We have continued to use these skills as we develop new hybrid programs and continue with virtual programs. This is enabling us to continue and expand our relationships with collaborating partners across the US and provide quality Professional Learning to educators outside of Massachusetts.

This year we became Certified Professional Learning Providers for the OpenSciEd curriculum currently being implemented in many of the Commonwealth's middle schools. We were invited to submit an application to be included in Rivet Education's National Professional Learning Partner Guide, a list of organizations that provide the best curriculum-aligned professional learning services in the country. We are currently the only Massachusetts-based Professional Learning Provider in the directory. Both certifications have led to expansion of our Customized Professional Learning Services.

We welcomed Kathryn L. Atkins as our new Education Director in September. Kathryn comes to us with a wealth of experiences in developing and delivering Professional Development Learning programs, having experience both as a classroom teacher and professional development provider. She has many wonderful ideas for improving and expanding our programs. If you have not already met Kathryn, I hope you have the opportunity to meet and work with her in the coming year.

Thank you for your support as we continue to move forward with our mission to support inquiry-based STEM education.



-Sandra Ryack-Bell  
Executive Director

# 2021 Summer Professional Development Institutes

The 2021 Summer Professional Development Institutes consisted of four hybrid, remote programs. The Institutes took place between June and July and, due to their remote nature, the Wade Institute was able to involve partners and participants from beyond specific regions in Massachusetts as well as outside the state.

Across Institutes, teachers participated in an active learning community as they worked with professional scientists and engineers, virtually explored sites around New England, examined thematic content, and participated in at-home investigations and design challenges.



At the close of each course, teachers used the experiences, content, and resources they gathered throughout the Institute to design inquiry-based investigations that supported their students in investigating real-world phenomena through hands-on, minds-on learning.

## ***Seasons and Cycles: How Weather Affects Us and How We Affect the Weather***

Elementary and middle school educators explored the dynamics of weather systems and seasonal cycles through inquiry-based investigations, citizen science monitoring, virtual live presentations, and more. They investigated phenomena and forces affecting the earth, observed their local weather, and learned how to make meteorological predictions.

Teachers virtually toured Blue Hill Observatory & Science Center to find out about the weather data collection process and how scientists use data sets to publicly share weather updates or develop models to study changes in climate over time. They also conducted their own balloon releases and designed kites for weather observation. During hands-on, minds-on investigations with the EcoTarium, educators explored heat capacity, air pressure, and other physical science topics that explain how weather occurs. They contributed to real world research through The GLOBE Program (Mission Earth) citizen science monitoring tools and refined their understanding of the complexities of Earth's weather systems as well as its carbon and water cycles.

### ***Landscapes on the Move: Investigating Geologic Formations and Processes***

During this Institute, elementary and middle school educators dug deep into the science of land formations by investigating the forces and processes that shape Massachusetts landscapes. With Cape Cod Learning Tours Science Educator, teachers searched for evidence revealing Cape Cod's glacial past as they investigated the impacts of glaciers on forming and shaping the land. They observed how weathering and erosion contribute to continual changes of the Massachusetts landscape by participating in hands-on, minds-on activities presented by the Lloyd Center for the Environment.

Educators connected to scientists studying sea level rise and learned more about the effects of storms on coastal communities. With collaborators from the Cape Cod Museum of Natural History, teachers explored natural resources monitoring tools and citizen science applications while gaining insight into the challenges coastal cities face when planning for resiliency to sea level rise. The Center for Coastal Studies Provincetown led them through a roleplay activity where teachers took on the roles of community stakeholders to discuss the real-world issue of beach erosion impacting a parking lot on Cape Cod.

This course got educators looking back in time and thinking about the future while discovering ways to make earth science exciting and accessible for their students.

### ***How Does Your Dinner Grow? Exploring Connections Between Food Production and Sustainability***

Middle and high school educators explored models for making our food systems more sustainable as they dug into the science, engineering, and technology as well as the complex relationships, systems, and processes involved in food production. Teachers whet their appetites for science learning during an inquiry-based cheese making investigation led by Shelburne Farms. They went behind-the-scenes of a small, family owned dairy farm (Barstow's Longview Farm) and discovered how organic waste is used to produce natural gas, heat, and fertilizer in a Vanguard Renewables anaerobic digester. The group discussed differences in terrestrial and aquatic food sources after hearing from One Fish Foundation about the environmental impacts of the fishing industry and techniques used to promote sustainability.

On a virtual visit to an urban community farm, educators gained ideas to promote community food equity. They evaluated how food systems are related to environmental and human health, and they discussed ways to encourage healthy food habits.

Teachers talked with Massachusetts Farm to School about the role of schools in addressing student food security and what more they could do to empower students to seek sustainable food sources. By the end of this Institute, educators were planning school gardens and sharing ideas for supporting healthy, equitable food access in their communities.



### ***My Soda Bottle Ended Up Where? Exploring Plastic Problems and Solutions***

Middle and high school educators investigated environmental impacts of humans' plastic consumption and identified ways in which they can support solutions to our plastic problem. They followed the journey of plastics from cradle to grave by assessing their own usage, surveying debris in their communities, observing global impacts of pollution, and connecting to innovators developing sustainable waste management practices and bio-based alternatives.

Educators began their investigation into plastics by inventorying their day-to-day consumption, identifying types used in their households, and collecting citizen science data about trash strewn through their neighborhoods. After observing the phenomena of the Great Atlantic Garbage Patch, educators modeled ocean currents and discussed ocean plastics with Salem Sound Coastwatch. Joined by Sea Education Association, the group conducted a hands-on, minds-on investigation of plastic densities that helped to clarify why oceanic garbage patches do not look like floating islands of trash.



Focusing on solutions, educators heard from the founder of wTe Corporation about the state of the global recycling industry. They learned that innovation is the key to developing new methods of recycling, but the challenge of using less plastic starts with daily choices since certain types of plastics simply cannot be recycled. In search of more plausible solutions, educators worked with Beyond Benign to design their own bio-based plastic using green chemistry. Teachers compared how reducing, reusing, recycling, and refusing plastics can all be worthwhile methods of tackling the unsustainable issue of global plastic waste. By the end of this course, educators were developing business models for upcycling plastics into everyday products.

# Academic Year Professional Development Institutes

In 2021 the Wade Institute held two hybrid professional development institutes during the school year. Both programs incorporated virtual weekend sessions as well as online coursework.

## ***Inquiry and Literacy in the Elementary Science Classroom***

From January to March, elementary school teachers explored the connections between scientific inquiry and literacy. Through the expertise of collaborators Karen Worth, Jeff and Martha Winokur, and Wade Institute educators, teachers were introduced to inquiry through an investigation of water drops and practiced academically productive talk through making predictions about what happens when you wring out a washcloth on the International Space Station. Teachers shared and discussed plant observations and unpacked how notebooks could be used as both a science and literacy tool. Participants also explored virtual learning tools, including using Google slides as a virtual gallery. The final session highlighted the use of text in interactive read alouds as a means to support inquiry in science. Teachers wrapped up the Institute by developing investigations to implement in their classrooms that wove together inquiry and literacy.



## ***Making Place Based Learning Phenomenal***

From February to May, middle and high school teachers explored how to use local phenomena to engage students in science. Instructors highlighted phenology and animal migration as phenomena. Partners from Manomet, Inc. led a discussion of phenology as participants analyzed data of plant buds and bird migration in the spring. They also contributed data to a citizen science project, used eBird to identify bird species, and brainstormed ways to utilize their local community for science education. With partners from the Atlantic White Shark Conservancy, teachers developed a timeline for shark and human interactions in Massachusetts, traced patterns of shark movement, and developed a way for shark tracking tags to be used in saltwater. Teachers left the Institute with resources for identifying local phenomena, a stronger understanding of place-based learning, and a set of classroom investigations they developed.

# Focus Workshops

## ***Science Inquiry During Remote Learning***

To support K-8 teachers in bringing inquiry to their remote science instruction during the pandemic, the Wade institute offered a four-session workshop, Science Inquiry During Remote Learning: Engaging Students in the Science and Engineering Practices, during the spring semester. Each week, the twelve participants completed grade-level, inquiry-based investigations using strategies and tools for teaching remotely. The investigations, such as *Inquiry on Ice* and *Simulating a Watershed*, aligned with Disciplinary Core Ideas and modeled effective use of the Science and Engineering Practices. The workshop's success is best reflected in the participants' expressed intentions to apply their learning in their own classrooms.

## ***Learning and the Brain in the "New Normal" Classroom***

During the spring, Robert Payo, Director of K-12 Education for Denver Urban Gardens, brought his expertise on the latest research in mind and brain science and how it applies to science teaching. He has helped hundreds of teachers apply these approaches in their teaching at local and national levels. Starting with a brief overview of brain function, they discussed how the Pandemic affected our students and ourselves from both cognitive and social, emotional perspectives and what that means as we enter a "new normal" in the classroom.

# 2021 Massachusetts STEM Week Challenge



## ***Hurricane Heroes! Storm City, Massachusetts***

The statewide 2021 MA STEM Challenge, sponsored by the MA STEM Advisory Council and the MA Department of Higher Education centered on the theme of See Yourself In STEM. The Wade Institute received funding to run one of the challenges. In partnership with the Lloyd Center for the Environment and Salem Sound Coastwatch, we developed *Hurricane Heroes! Storm City, Massachusetts*. The design challenge scenario was a fictional city that had just been hit by a hurricane and subsequently flooded with 14 inches of rain. The challenges included: design a strong shelter, evacuate citizens to safety, remove water using alternative energy sources, and redesign the city to prevent future flooding. Over 60 teachers participated in the Challenge. Teachers received a curriculum packet and a materials kit for running the challenge with their students. They also participated in a pre-challenge workshop in which they experimented with the challenge investigations. During STEM Week in October, teachers conducted the challenge with their students and shared their experiences in a Virtual Showcase.

# Customized Professional Learning Services

In 2021, phenomena-based learning was a focal point for the Wade Institutes' Customized Professional Learning Services (CPLS) which reached six districts and more than 200 teachers. The Wade Institute brought professional learning experiences responsive to the expressed needs and interests of schools and districts across the state and in Canada. To address the varied needs of K–12 educators, some programs served as an introduction to phenomena-based learning, while other programs took a deeper dive into using phenomena and introduced the practice of using storylines for instruction. In addition to providing the expertise of the Wade Institute's staff with inquiry-based instruction, some programs shared professional learning about science and literacy as well as equitable science instruction. In the districts of Nantucket, Holyoke, and Wakefield, the programs were multi-day offerings. In Quincy and Fitchburg, grade level programs were offered on different days, and in Ottawa, a virtual, half-day program introduced enthusiastic early childhood/day care providers to inquiry-based learning and science and literacy instruction.



# Wade Institute Participates in ACESSE Project Unconference

From July 19th–22nd, Executive Director Sandra Ryack-Bell and Education Specialist Kathy Renfrew joined the Massachusetts Department of Elementary and Secondary Education as part of the state's team of representatives at the Advancing Coherent and Equitable Systems of Science Education (ACESSE) Project's 2021 STEM Teaching Tools Unconference. ACESSE is a collaboration between the Council of State Science Supervisors (CSSS or CS3), the University of Washington, and the University of Colorado Boulder that connects partners in education with the goal of providing resources for STEM educators. This year's Unconference focused on equity and coherence in science education. Sandi contributed to a professional learning module that promotes cultural literacy in science. Once it is completed, this module will become a tool for professional development across the country. Kathy helped to outline an advocacy plan for promoting equity in elementary science education. The resulting resource will broaden the scope of existing STEM Teaching Tools by incorporating ideas of informing school administrators and other authorities of the importance of engaging early elementary grades students in science learning.



## Networking

The Wade Institute staff and partners presented sessions during the National Science Teachers Association Annual Conference, the Massachusetts Science Education Leadership Conference, the National Marine Educators' Conference, the MA Southeast STEM Network's DEIA Conference and the Association for Science and Technology Centers. All of these conferences were held virtually.

Wade staff continued to sit on the advisory committees for the regional STEM Networks across the state and on the Boards of the Massachusetts Association of Science Teachers, the Massachusetts Science Education Leadership Association, and the National Marine Educators Association. The staff continues to promote STEM Education through networking with professional organizations across the state and region.

# OpenSciEd Certification

In the fall of 2021, Wade Institute staff members participated in the National OpenSciEd Launch for Facilitators training. The Wade Institute



became the first certified provider of OpenSciEd professional learning in Massachusetts. OpenSciEd is a nationally recognized NGSS and MA STE Framework aligned high quality science curriculum - all available for free - that is centered on phenomena-based storyline units that are student driven. The facilitator training was followed by work through the Bloomboard Microcredentialing system, with each Wade staff member demonstrating our command of the Anchoring Phenomenon Routine within the OSE Storyline model. In January of 2022 all staff completed their microcredentialing process, solidifying our Certification as OpenSciEd PL providers.

## Wade Institute Included in Rivet Education's Professional Learning Partner Guide

In September of 2021 MA DESE invited the Wade Institute to apply for inclusion in Rivet Education's Professional Learning Partner Guide (<https://riveteducation.org/>). The Professional Learning Partner Guide (PLPG) is a list of organizations that provide the best curriculum-aligned professional learning services in the country. In order to be listed in the PLPG an organization must submit a rigorous application that among other things demonstrates organizational expertise in high-quality instructional materials (HQIM). Our certification in OpenSciEd allowed us to apply.

Several Wade staff members were instrumental in completing our application to be listed in the PLPG to deliver OpenSciEd Launch Professional learning, including Sandi Ryack-Bell, Kathryn Atkins, Rosemary Rak and Allison Pagliaro. In February we receive notification that our application was successful and that we would be listed in the PLPG! The Wade Institute for Science Education is one of only 45 professional learning partners in the country to be recognized with inclusion in the PLPG. To see our listing please visit: <https://plpartnerguide.org/partner/wade-institute-for-science-education/>

# 2021 Collaborating Partners

- Atlantic White Shark Conservatory
- Beyond Benign
- Blue Hill Observatory and Science Center
- Cape Cod Museum of Natural History
- Cape Cod Learning Tours
- Center for Coastal Studies Provincetown
- Dana Marcus, J.D. (Philanthropy and Non-Profit Consultant)
- Denver Museum of Nature and Science
- Denver Urban Gardens
- EcoTarium
- Flying Cloud Institute
- GLOBE Mission Earth (Boston University)
- Lloyd Center for the Environment
- Manomet Inc.
- Massachusetts Farm to School
- Salem Sound CoastWatch
- Shelburne Farms
- wTe Corporation
- UMass Boston



# Staff and Board

## Wade Institute Staff

- Sandra Ryack-Bell, *Executive Director*
- Janine Whealan, *Office Manager*
- Nan Waksman Schanbacher, *Director of Development*
- Angela Damery, *Director of Education (January - August)*
- Kathryn L. Atkins, *Director of Education (September - December)*
- Allison Paglaro, *Education Coordinator*
- Amanda Noble, *Marketing & Education Resource Coordinator*
- Rosemary Rak, *Education Specialist*
- Margaret Brumsted, *Education Specialist*
- Kathy Renfrew, *Education Specialist*
- Jane Heinze-Fry, *Special Programs Director*

## Wade Institute Board of Directors

- Emily V. Wade, *President*
- Nan Waksman Schanbacher, *Co-Chair and Clerk*
- Karen Worth, *Co-Chair*
- Neil Gordon, *Treasurer*
- Deborah Cary
- Robert Chen
- Cedith Copenhaver
- Donald DeRosa
- Jacob Foster
- Paul Fucile
- Terry Kwan
- David Spencer
- David Wong



# Supporters

We are grateful to the many individuals, companies, and foundations who contribute their talent, time, and funds to support our work.

## Foundations and Corporations

- Alchemy Foundation (Kyra Montagu)
- Arthur Gelb and Linda Gelb Charitable Foundation
- Beveridge Family Foundation
- Boston Foundation
- Cell Signaling Technology
- Cleveland Foundation (Robin & Ellery Sedgwick)
- Cleveland Foundation (Irene Briedis)
- George Garretson Wade Charitable Trust
- Hermann Foundation
- Hirsh Family Foundation (Mark & Jane Hirsh)
- Maine Community Foundation (Warren & Brammie Cook)
- Massachusetts Executive Office of Education
- Michigan Science Teachers Association
- National Grid Foundation
- Nordson Corporation Foundation
- Sanofi Genzyme
- Sensata Technologies Foundation
- Vanderbilt Family Foundation
- Verizon Foundation

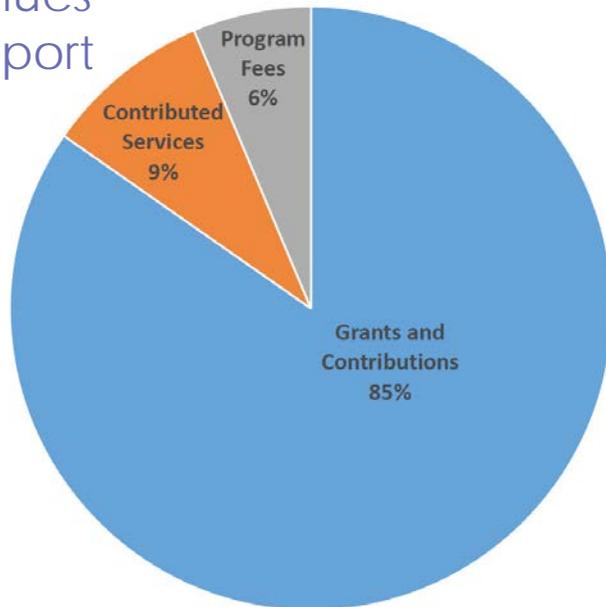


## Individuals

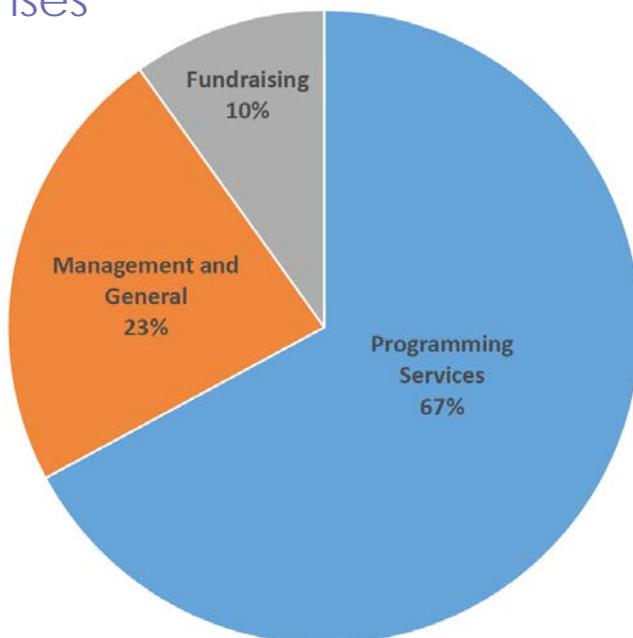
- |                         |                         |                              |
|-------------------------|-------------------------|------------------------------|
| Elsie Aidinoff          | Marie Daumy             | Barry Nelson                 |
| Anonymous               | Don & Rosemarie DeRosa  | David & Virginia Packer      |
| Sheldon Apsell          | Patricia Deveaux        | Harold I. & Frances G. Pratt |
| Gregory & Karen Arenson | Suzanne Werber Dworsky  | Rosemary Rak                 |
| Allan & Rhea Bufferd    | Carolyn Fine Friedman   | Nan Waksman Schanbacher      |
| Karen Byers             | Jacob Foster            | Ross Sherbrooke              |
| Charles & Deb Cary      | John C. Fuller          | David & Virginia Spencer     |
| John K. Castle          | Norman & Madeleine Gaut | Herman & Joan Suit           |
| Susan Chamberlain       | Neil Gordon             | Mary Supple-Dailey           |
| Carole Charnow          | Priscilla Gray          | Emily V. Wade                |
| & Clive Grainger        | Raymond Griffin Jr.     | Peter G. Wade                |
| Susan Chamberlain       | Samuel A. Hartwell Jr.  | Estelle Weedon               |
| Robert Chen             | James Hughes            | Constance V. R. White        |
| Thomas & Rachel Clafin  | Heidi Hughey            | Karen Worth                  |
| Jeff & Brooke Cook      | Susan Hunnewell         |                              |
| Rebecca Cook            | Kim Kastens             |                              |
| Edith Copenhaver        | Terry Kwan              |                              |
| Brit d'Arbeloff         | William & Angela Lowell |                              |
| Davis Dassori           | Michael Monroe          |                              |

# Financial Statement

## Revenues & Support



## Expenses



# Financial Statement

## Revenues & Support

Grants & Contributions	\$629,168
Contributed Services	\$66,550
Program Fees	\$47,230
<b>Total Revenues</b>	<b>\$742,948</b>

## Expenses

Programming Services	\$507,163
Management and General	\$173,542
Fundraising	\$74,853
<b>Total Expenses</b>	<b>\$755,558</b>

Net Assets Beginning	\$306,960
Net Assets Ending	\$294,350

# Reflections on Programs

*There were many “best parts” today. On our Jamboard of ideas, someone wrote something about creating a school garden and developing a self-guided tour for visitors. I think that is great and is something I’d like to do. We have a garden and also various plants and trees that I think would be good to include as well. I would really like to connect students with the nature that is right outside the school. - Arlington Public Schools Teacher*



*I really enjoyed working in the break-out rooms & the hands-on convection current activity. I am inspired to contact the water department in the town that I work in order to learn more and possibly bring an expert into the classroom. - Berkley Public Schools Teacher*

*The role playing activity was definitely the best part. It was fun and interactive and it gave us the opportunity to react in real time to others perspectives while using the science content we learned to argue our own roles. - Nashoba Regional School District Teacher*

*You will come away with a wealth of additional resources to use in the development of your curriculum. - 2021 Making Place-Based Learning Phenomenal Professional Development Institute Participant*

*Probably the most important insight about today’s program was that I don’t need to be a ‘science-y’ person. Someone said ‘you don’t have to be an expert’ and to just think of the big idea; what are we trying to pass on to the students. It’s not just knowledge and facts but also the process and engaging their thinking and rationale. - Westborough Public Schools Teacher*

*“I loved both the interactive science experiment and observation/sound inquiry that we all got to participate in. It was fun, engaging, and had a low ‘barrier to entry’. Simple materials that everyone has, and fun and engaging ways to share their findings live.” - Ottawa-Carleton District (Ottawa, Canada) Teacher*