

Wade Institute for Science Education

2018 Annual Report



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MITS, Inc = Wade Institute for Science Education

As 2018 drew to a close an exciting change took place in the MITS office. The Museum Institute for Teaching Science became the Wade Institute for Science Education.

In 1983 Massachusetts Institute of Technology (MIT) President Dr. Paul Gray expressed his concerns about the future of science education to MIT Corporation Board member and longtime supporter of Boston-area museums, Emily V. Wade. Mrs. Wade, endearingly known as “Paddy,” had received her Bachelor of Science degree in Chemistry from MIT in 1945. Paddy and her husband, Jep, were active on the Boards of several Boston-area museums and had witnessed that museum staff held the resources and expertise to engage young learners in exciting ways.

Together, Paddy and Dr. Gray challenged directors from the Museum of Science, Boston Children’s Museum, Harvard’s Museum of Comparative Zoology, Mass Audubon, Arnold Arboretum, Franklin Park Zoo, and the New England Aquarium to design a program that would spark students’ interest in science. The goal was simple: “get kids to like science.”

The museum directors formed a collaborative organization, the Museum Institute for Teaching Science (MITS), and designed a program that would provide teachers with hands-on, minds-on pedagogy and practical experiences that they could use in their classrooms to more effectively engage their students in science. At the time the name MITS was very appropriate since the focus of the organization was to provide professional learning experiences for educators through collaborations of museums and science centers.

Over the past 35 years MITS has continued to build on this model of collaborations and to foster and promote inquiry, minds-on hands STEM education on both a state and national level.



Our collaborative professional learning programs for educators have expanded to include a diversity of organizations as collaborating partners, enabling us to work with technology centers, research facilities, STEM businesses and industries, cultural institutions and other organizations supporting STEM education.

Our new name, the Wade Institute for Science Education, reflects this evolution in the organization's services and honors our founder, Emily V. Wade. Paddy is still actively involved with the Wade Institute for Science Education, serving as its Board President and volunteering her time to contribute to the success of STEM education in Massachusetts.

In preparation for our name change from the Museum Institute for Teaching Science to the Wade Institute for Science Education, we updated several key components of our brand, including our logo, our website and our email address.

Our new logo was designed in-house by two staff members, who researched best practices and optimal logo styles before deciding on a circular badge for the new logo. It incorporates different areas of science, including our focus on inquiry.

We worked with 2 local website consultants to update our home page, along with the navigation of the website. The result is a website that customizes our offerings based on our audience – whether it's K-12 classroom educators, informal educators, or school administrators, and provides them with a look into the programs that are most relevant to their professional background.

2018 Summer Professional Development Institutes

Using Science and Engineering Practices to Engage Your Students in Inquiry-Based Learning

Five Summer Professional Development Institutes were held from July 9th - 20th. These one-week institutes provided teachers with the tools to implement the revised MA Science and Technology/Engineering Standards and bring the Science and Engineering Practices into their classrooms through inquiry investigations. In all regions, teachers focused on standards-based science content, engaged in investigations that bridge the traditional science disciplines, linked their science investigations to the engineering design process or the Common Core and experienced a continuum of inquiry models, which they could then apply to their classroom situations.

Regional Highlights

From Land to Sea: Practicing Sustainability, Modeling Solutions was held on **Cape Cod**. Participants in this institute learned about many topics that fit under the umbrella of “sustainability”. Educators increased their content knowledge through direct observations at field sites, and used hands-on inquiry investigations to learn about threats to the coastal environment and animals in Cape Cod and Southeastern Massachusetts. During the day at the



National Marine Life Center, teachers learned about shellfish aquaculture, which improves water quality and sustainable farming techniques that preserve soil and water. At WHOI, participants visited a seaweed aquaculture lab and the necropsy lab, and then visited Kingman Yacht Center to learn about sustainable marina practices.

The **Berkshire** Region Institute, *Going Green with Your Students: The Science and Engineering Behind Clean Energy*, explored several of the ongoing renewable, clean energy projects in Western Massachusetts. Teachers learned about solar, hydroelectric, wind and biomass technologies that can be used to help reduce our carbon footprint. They traveled to Brodie Mountain to get a behind-the-scenes look at the wind turbine/farm, and to Harvard Forest to learn more about carbon-sequestering. They built wind



turbines and solar fountains as they explored investigations to bring this knowledge to their students. With Flying Cloud Institute they looked at phenomena-centered learning as an educational strategy, explored the value of the *Suchman Method of Inquiry*, engaged in engineering design challenges focused around renewable energy projects, and evaluated inquiry resources available for implementation in their classrooms.

Landscapes for Learning: A Natural Confluence of Science, Literacy, Mathematics and Place-Based Pedagogy was held in the **MetroWest** Region. Communities and their landscapes - whether forest, farms or streetscapes - provided context for the study of ecology, history, culture and society. With the Concord River, the battlegrounds of Concord, and the woods of Thoreau as a backdrop, teachers collected data from local rivers and ponds, investigated how geography and climate have shaped not only the lives but the history of the region, and explored the landscapes, habitats and artifacts that have inspired a confluence of science and ideas for three centuries. Teachers learned effective strategies for using nature journals, science notebooks and other literacy tools in their classrooms. They designed investigations based on inquiry-based learning that would connect students in meaningful ways to their local environments.

The **North Shore's** *Investigating Ecosystems and Assessing Human Impact* connected teachers to current field-science and climate-change researchers. Field studies took teachers to many sites around the region, allowing them to

experience multiple habitats from marshes to mud flats, to explore a scientific perspective on issues facing endangered habitats, and to participate in research activities. They collected and analyzed data, and focused on ways to effectively communicate field data through citizen-science projects that would later become part of their classroom activities. They learned how their own schoolyards could become a Monarch Watch certified way-station where students could be engaged in a meaningful citizen-science data collection activity.

This year's **Central** Region, *Parts and Purpose: Using Inquiry to Explore Structure and Function in Nature's Laboratory*, helped teachers explore animal and plant biology, nutrient flow and pollinator systems that are at work all around us. Over the week participants analyzed soil nutrients from different locations, investigated how birds, seeds and insects move through their environment, and explored the co-evolution of the pollen-collecting adaptations of bumblebees, and the bee-attracting adaptation of flowers. At Wachusett Meadow Wildlife Sanctuary teachers collected and examined water samples from a spring-fed pond to assess the health of that micro-ecosystem and identify adaptations that helped with the organism's survival in that habitat.

The Summer Professional Development Institutes were funded by:

The Hermann Foundation

MathWorks

National Grid Foundation

New England BioLabs Foundation

Sanofi Genzyme

Professional Development Seminar Series

The 2018 Professional Development Seminar Series provided educators with in-depth STEM content and inquiry-based activities that could be used to enhance their institution's educational programs and exhibits. Each seminar connected participants to real-world science and broadened their repertoire of hands-on, minds-on teaching resources to use with learners of all ages. Through these four seminars, educators gained ideas for engaging learners in the science of weather, climate change, biology, and sustainability.

The series began on January 24th with a two-part presentation focusing on climate change. With presenter, Dr. Ellen Douglas, Associate Professor of Hydrology at the UMass Boston School for the Environment, participants used historical weather data to predict possible causes of extreme weather events and identify reasons why they might increase as global temperatures rise. Educators delved deeper into the evidence supporting climate change by assessing long-term data of year-to-year weather patterns with afternoon presenter, Dr. Jeremy Shakun, Assistant Professor in the Department of Earth & Environmental Science at Boston College.

The February 14th seminar spotlighted ways to communicate science and engineering content to the general public. Participants examined the molecular biology of human's sense of taste during an activity developed by Dr. Lindsay Mehrmanesh, Biology Teaching Lab Supervisor at Brandeis University and former Science & Engineering Communication Fellow at The Discovery Museum. Participants then learned from presenters Denise LeBlanc, Director of Learning Experiences and Elizabeth Leahey, Assistant Director of Learning Experiences at The Discovery Museum, how they can work with scientists and engineers to facilitate effective communication strategies and develop hands-on activities to share current research with the public.



During a special full-day seminar on March 28th with presenters Ryan Morra, Professional Learning Coordinator at Shelburne Farms & Vermont FEED, Simca Horwitz, Co-Director at Massachusetts Farm to School, and Rachel Harb, Training & Events Coordinator at Massachusetts Farm to School, educators explored how sustainability can be used to engage learners in interdisciplinary topics such as health, economics, resource management, and conservation. Participants gained insights into the community benefits of using organic, local produce in classrooms and school cafeterias, and investigated the resources used to bring a single locally or non-locally produced meal to the table.

On April 24th, educators learned more about forecasting technologies, like biodegradable weather balloons and automated sensors, as well as the severity of weather that leads to local warnings from presenter Glenn Field, Warning Coordination Meteorologist at National Oceanic and Atmospheric Administration (NOAA) / US National Weather Service, Boston. Participants also discovered ways to integrate weather and climate modules into their current curriculum through investigations of PBS LearningMedia resources with Jake Foster, MITs Board Member and then Director of Curriculum and Instruction at WGBH.



Sustainable Energy Workshops for Teachers

In the Spring and Fall of 2018, the Wade Institute offered two Focus workshops for educators in collaboration with Mass Audubon. The two-day workshops, *Lighting the Way with Wind and Solar: Pathways to a Sustainable Energy Future*, engaged more than 30 middle, high school, and upper elementary teachers in inquiry-based investigations that explored energy and climate change relating to global warming, carbon reduction and the adoption of clean, renewable energy technologies. Teachers modeled the effect of greenhouse gases, experimented with solar panels and electric circuitry, and tackled problem-solving as they designed and built model solar houses and wind turbines. They played interactive simulation games to develop deeper understanding of energy systems and infrastructure.



As they explored the challenges of climate change and building sustainable communities for the future, teachers made connections to the science and engineering standards and their grade level curriculum and instruction. Teachers took home a toolkit of hands-on materials and resources to get started with wind and solar investigations in the classroom. This very successful collaboration with Mass Audubon brought together the expertise of scientists and educators around climate change, energy literacy, standards-based curriculum, and inquiry-based instruction in the classroom.

These workshops were partially funded by the Dorr Foundation.



Customized Professional Learning Services

The Customized Professional Learning Services program played a key role in the Wade Institute fulfilling its mission of fostering inquiry-based science and engineering education in 2018. Through its work with five schools/districts, the Customized Professional Learning Services program reached more than 200 K-12 educators. Education Specialists delivered professional learning experiences that support the efforts of school administrators and classroom teachers to implement best practices for K-12 science and engineering instruction. Using the 2016 MA Science and Technology/Engineering Framework as its guide, the Wade Institute's learning experiences spanned the life, earth, and physical sciences, as well as tech/engineering. The offerings are helping districts to develop standards-based, grade level curricula. The feedback from participating teachers and school administrators confirmed the value of the Customized Professional Learning Services program as an integral part of the Wade Institute's offerings.

The 2018 participating schools and districts were Acton-Boxborough, Dighton-Rehoboth, Norwood Public Schools, Walpole Public Schools, and Whittier Regional Vocational Technical High School. In particular, the Wade Institute has fostered long-term professional relationships with Norwood and Walpole Public Schools that are generating effective and sustainable curricula. The work with these districts will serve as models for future Wade Institute Customized Professional Learning Services programs.



Board and Staff Development

In January, the Wade Institute was awarded a consulting project with the Community Consulting Teams Boston. The project focused on assisting the Wade Institute with defining and refining value propositions that aligned the Wade Institute's unique resources and programs with the needs and expectations of the audiences we serve. The project resulted in changing the organization's name and logo to better reflect our mission and goals, changing the focus of our message and marketing materials, and adjusting the names of our programs to provide clarity in the services we provide.



Wade Institute Executive Director Sandi Ryack-Bell, Board co-chair Karen Worth and Wade Institute Development Director Karen Chretien were selected to participate in the Associated Grant Makers Nonprofit Learning Institute. As a result of all these initiatives, the Wade Board and staff completed a new Strategic Plan for the organization at the end of the year.

Promoting STEM Education

MITs staff and partners presented sessions at the National Science Teachers Association Conference in Atlanta, GA the National Marine Educators' Conference in Long Beach, CA, the North American Association for Environmental Education Conference in Spokane, WA and the Massachusetts Science Teachers Association Conference. The Wade Institute also provided an interactive display at the annual Massachusetts STEM Summit.

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

Staff and Board

Wade Institute Staff

Sandra Ryack-Bell, *Executive Director*

Janine Whealan, *Office Manager*

Karen Chretien, *Director of Development*

Linda McIntosh, *Director of Education*

Brianna Wilkinson, *Assistant Director of Education (until August 2018)*

Anita Lavakumar, *Assistant Director of Education (September 2018 on)*

Amanda Noble, *Marketing & Education Resource Coordinator*

Rosemary Rak, *Education Specialist*

Margaret Brumsted, *Education Specialist*

Christine Harris, *Education Specialist (until April 2018)*

Kathy Renfrew, *Education Specialist (November 2018 on)*

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*

Donald DeRosa

Jacob Foster

Paul Fucile

Terry Kwan

Joseph Levine

David Spencer



2018 Partners

2018 Summer Professional Development Institutes Lead Institutions

Berkshire Region: Flying Cloud Institute

Cape Cod Region: National Marine Life Center

Central Region: Mass Audubon's Broad Meadow Brook Wildlife Sanctuary

MetroWest Region: Mass Audubon's Drumlin Farm Wildlife Sanctuary

North Shore Region: Mass Audubon's Endicott Wildlife Sanctuary

2018 Collaborating Partners

Center for EcoTechnology

Community Consulting Teams Boston

Concord Museum

Dana Marcus, J.D. (Philanthropy and Non-Profit Consultant)

Glen Urqhart School

Gould Farm

Harvard Forest

Ipswich River Watershed Association

Lloyd Center for the Environment

Mass Audubon's Arcadia Wildlife Sanctuary

Mass Audubon's Long Pasture Wildlife Sanctuary

Mass Audubon's Oak Knoll Wildlife Sanctuary

Mass Audubon's Wachusett Meadow Wildlife Sanctuary

Massachusetts Farm to School

Massachusetts Maritime Academy

Plum Island Ecosystems LTER

Shelburne Farms

South Shore Natural Science Center

Tower Hill Botanic Garden

Trustees of Reservations

Vermont FEED

Walden Woods Project

Woods Hole Oceanographic Institution

Worcester Polytechnic Institute

YMCA Camp Burgess Farm



Supporters

We are grateful to the many individuals, companies, and foundations who contribute their talent, time, and funds to support our work. Their support helps us keep our program fees affordable for teachers and schools.

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Alchemy Foundation (Jean & Kyra Montagu)
Cleveland Foundation (Robin & Ellery Sedgwick)
Community Foundation of Southeastern Massachusetts (Jim and Bess Hughes Fund)
Dave and Ginny Packer Fund
Fish Family Fund (Lawrence & Atsuko Fish)
George Garretson Wade Charitable Trust
Henry Luce Foundation (at the request of David V. Ragone)
Hermann Foundation
Kurtz Family Foundation (Ronald & Carol Kurtz)
Maine Community Foundation (Brammie & Warren Cook)
MathWorks
National Grid Foundation
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Sanofi Genzyme
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Vanderbilt Family Foundation



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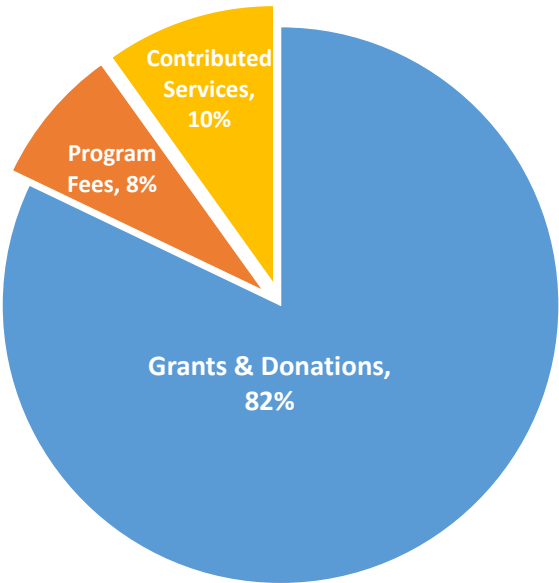
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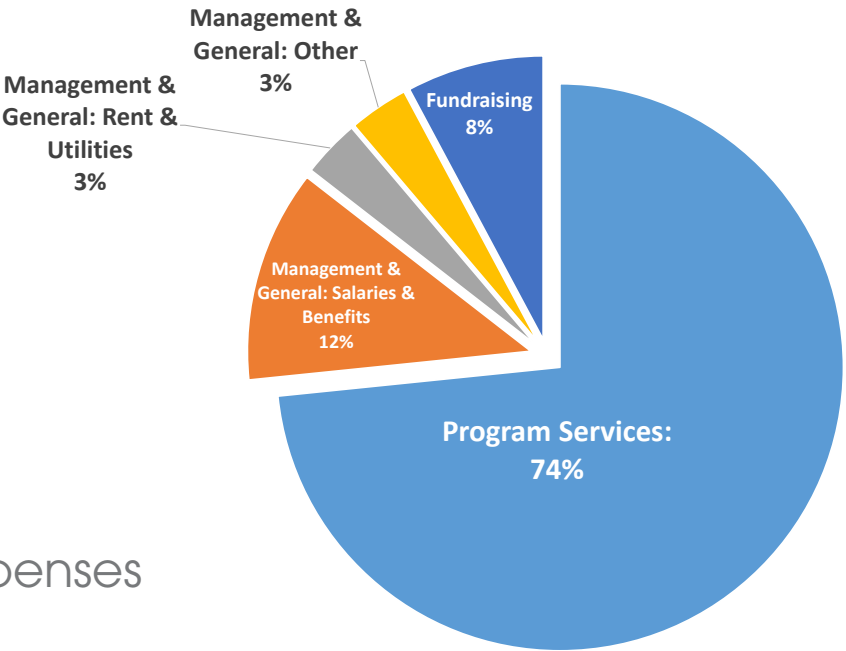
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Marian & Richard D. Thornton
Emily V. Wade
Peter Wade
C.V.R. White
Karen Worth
Nicholas Yoder

Financial Statement

Income



Expenses



Financial Statement

Income

Grants & Donations	\$586,955
Program Fees	\$57,260
Interest	\$70
Contributed Services	\$70,655
Total Revenues	\$714,940

Expenses

Program Services	
Salaries and Benefits	\$257,020
Workshops and Other Programs	\$263,044
Management and General	
Salaries and Benefits	\$85,964
Rent and Utilities	\$23,381
Other	\$23,945
Fundraising	\$55,383
Total Expenses	\$708,737

Net Assets Beginning	\$194,274
Net Assets Ending	\$200,477

A full copy of the audit is available at the Wade Institute office.

Reflections on Focus Workshops

"Thank you for an excellent workshop! Presentation and information was wonderful and extremely relevant. Staff did a great job creating a positive and constructive learning environment!" - 2018 Sustainable Energy Workshop Participant

"I really enjoyed this workshop. Not only was it interesting and engaging, but very relevant to my teaching curriculum. Thank You!" - 2018 Sustainable Energy Workshop Participant



Reflections on Summer Professional Development Institutes

"The best part of the day was touring the windfarm. Wow! What an experience to be able to stand next to the marvels of engineering and seeing them start to kick on. Our guides were excellent and answered questions genuinely and with great detail...I would love to give my students the same experience." - 2018 Berkshire Region participant

"Today, I really enjoyed all of the field learning that we did. From the experts at WHOI, to the folks at Kingman [Yacht Center], I thought the professional contacts made plus the local learning was really worth it." - 2018 Cape Cod Region participant

"The best part of today's PD was the chance to work collaboratively with other teachers that love science. The conversations were informative and collegial." - 2018 Central Region participant

"I grew so much in this PD! My background knowledge and comfort with not knowing everything have increased dramatically. I love how this course developed throughout the week and built on itself. The inquiry experience and practice was beneficial. I would not change anything." - 2018 North Shore Region participant

Reflections on Customized Professional Learning Services

"The exposure to many types of models was excellent. This was professional development time in our discipline well spent!" - Norwood Public School Teacher, Middle School

"I love how the activities and information is actually useful and the materials are affordable and attainable." - Whittier Tech High School Teacher

"It was very helpful to participate in an investigation that I can use in the classroom. It was valuable to see the progression of the standards both across the grade levels and the content areas." - Walpole Public School Teacher, Kindergarten