A network of schools, science institutions and agencies, businesses and community members "to support, promote and enhance science education, and science literacy in the participating communities."

The Partnership
WHSTEP Fall 2018 Newsletter: Volume 28, Number 1

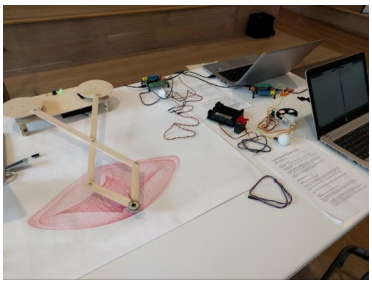
WHSTEP Spring 2018 Meeting - Scottie Mobley

WHSTEP's Spring 2018 meeting, "Robotics: In the Classroom & In the Region" was held on May 17 at Falmouth Academy.

The event opened with a social mixer & poster session featuring local student Science Fair projects. Speakers were Martha Borden, the Director of Technology at Falmouth Academy & Clayton Jones, a Senior Director at Teledyne.

Clayton Jones gave a talk "Autonomous Platforms - Roaming the Oceans for Science". He gave attendees an in depth look into the use of robotic platforms that are helping scientists better understand the world's oceans.

Mrs. Borden was a recipient of a WHSTEP Mini-Grant that provided funds to take her programming elective from 2D to 3D with Hummingbird Robotics.



Science Stroll – Bob Heller

The 2018 Summer Science Stroll was a family favorite for all. On a beautiful Saturday in August families from all over came to Woods Hole to see the various institution's displays and enjoy the bounty of the Cape. We showed up with 300 sea clam and scallop shells for children to decorate as ornaments and by the end we had none left! It was a great opportunity to chat with adults about WHSTEP's mission and the contributions of all the institutions and community members! Would like to thank Kathy Patterson and Joanne Tromp from WHOI and the rest of the team that did such a great job organizing this monumental task! Looking forward to 2019!

Chairman Report - Bob Heller

30 years ago I was a new teacher in the beautiful seaside community of Falmouth, Massachusetts. I knew of the wealth of research happening right down the road. I just lacked a way to open this door to my inquisitive students. Enter the Woods Hole Science and Technology Education Partnership, WHSTEP. For almost three decades WHSTEP has provided the students and public of Falmouth with an open door to much of the research and technology that takes place right here in our own backyard. From Family Science Nights to Teacher Science Safaris we provide current and relevant programs for your classroom and your family's general knowledge. WHSTEP Mini Grants help teachers to enhance their curriculum. Mentors from the community and many different institutions sign up every year to assist students with science projects; some students return to work as summer interns. The connection is real.

Change happens, and JC Weber, who has been at the helm at WHSTEP for nearly 9 years is stepping down from his position as Co-Chairman but is remaining on the board. Through his leadership we have grown, encompassing more school districts and providing more outreach. We have become a non-profit organization and the website is up and running. If it isn't said enough, thank you JC for your dedication and leadership! We now welcome Sarah Fuller from WHOI to the Co-Chairman position. She comes to us with an energy and vision at least equal to her predecessor. Thank you so much for stepping up to the position! We also want to welcome Pat Harcourt back as a community member! Having been a member before, her knowledge and insight are a welcome asset to the board.

And now a general thanks to the WHSTEP executive board. For several years now I have had the honor to sit at meetings and watch in amazement as programs and activities take shape. This is truly one of the most efficient and effective boards that I've ever seen. Thank you all for your continued passion and dedication to our community. I remember fondly the original founders; Dick Jones, Mary Wright, Beth Schwarzman, Larry Pearson, and others who have passed. I worked with these people. I learned many hands-on activities from these people. I still have many labs and activities with their names written all over them. I'm sure they would be impressed at how their vision has grown and continues to offer opportunities and information to the community. Their energy and spirit continues. "If I have seen further than others, it is by standing upon the shoulders of giants." is a familiar quote from Sir Isaac Newton. I would like to tell Mr. Newton that I'm sitting at a table with giants.

For more information about past WHSTEP Events and Programs, visit our website at www.whoi.edu/whstep and look under our EVENTS section

WHSTEP Family Science Night: "The Unselfish Shellfish: How Aquaculture Helps Humans" September 27, 2018 – Marie Alvernaz

"Unselfish Shellfish" was the theme for this year's Family Science Night. The NOAA Aquarium in Woods Hole, "the oldest Aquarium in America", hosted the event. Special thanks to Sarah Trudel of NOAA for keeping the Aquarium open for us! A blend of young and old from the community came out to hear Rick York and Ashley Fisher review data related to how these tasty treats can help to improve our local water quality. Rick York is the Mashpee Shellfish Constable and has been working to use oyster propagation as a means to mitigate eutrophication in Cape Cod waters. The town of Mashpee has been working on a Comprehensive Watershed Nitrogen Management Plan (CWNMP). The Environmental Protection Agency (EPA) and Massachusetts Department of Environmental Protection (DEP) allow removal of nitrogen by shellfish to be included in CWMPs plan.

Oysters filter algae for food. Oysters are able to survive where other shellfish species cannot. They can live in waters with only ~15PPT salinity. This prevents most oyster diseases and blocks most predators due to the lower salinity. Some of the benefits of using oysters for water quality restoration versus water treatment systems include: estuary based, storm resistant, no seasonal load issue, and inexpensive. It has been calculated that oysters have removed ~30 tons of nitrogen/year in Popponesset and Waquoit Bays. Since the large oyster beds have been established, no fish kills have occurred. Before the water quality restoration project, eutrophication caused by algae causes the body of water to become overly enriched with minerals. This process may result in oxygen depletion of the water body. The oysters are filtering the algae that blooms on excess nitrogen.

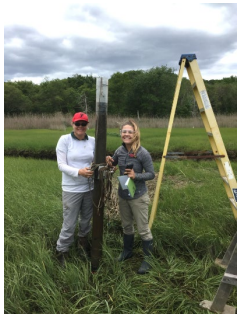
Another benefit to commercial shellfish aquaculture (farming oysters) is it is increasing the commercial shellfish production. "First Light Oysters" provides premium quality oysters, which are the pride of the Mashpee Wampanoag Tribe. Oysters grown commercially on the Mashpee Wampanoag Tribe's Oyster Farm at the mouth of the Mashpee River also filter algae and remove nitrogen.

Maureen Thomas, Water Resource Specialist from the Buzzards Bay Coalition, was also present with her display and a huge scallop that was soft and plushy for the kids to explore. Several shells were also available for children to decorate and make ornaments from.

https://www.mashpeema.gov/town-clerk/pages/shellfish

Science Safari Highlights Blue Carbon Research – Pat Harcourt

The star of a recent WHSTEP Science Safari was….dirt! Actually, it was salt marsh soil, which is turning out to be an important tool to address climate change. On a rainy October afternoon WHSTEP liaison Joan Muller of Waquoit Bay National Estuarine Research Reserve welcomed the group to the Reserve's visitor center and introduced the term "blue carbon," which has been the focus of extensive research at the Reserve since 2013. Blue carbon refers to carbon dioxide taken out of the atmosphere by plants in coastal systems and stored in soil.

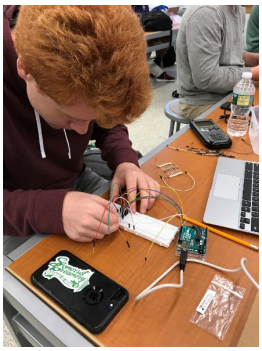


The guest speaker for the Safari was Dr. Megan Gonneea of US Geological Survey, who described to the group the efficiency of salt marsh ecosystems in taking up and sequestering, or storing, carbon. Salt marshes, along with more southern coastal mangrove systems, store more carbon per unit of area than any other type of ecosystem, and can potentially hold the carbon out of circulation for up to thousands of years. Dr. Gonneea is currently studying how sea level rise may affect the flows of greenhouse gases such as carbon dioxide and methane in a salt marsh and the process of sequestration. She stressed that salt marshes only sequester carbon effectively if they are functioning well and not impaired by eutrophication (over-enrichment), impacts from constant foot or vehicle traffic, or other pressures.

Teachers on the Safari learned about the research project, "Bringing Wetlands to Market," which resulted in a model that can be used by coastal managers to predict the amount of carbon taken up and stored by a salt marsh. This carbon sequestration represents potential value to a community if carbon credits are sold in carbon markets. The marketable value of carbon credits can be used to highlight the value of coastal salt marshes, and provides a compelling argument for preserving coastal wetlands. A curriculum on blue carbon was produced as part of the BWTM project, and is posted on the Waquoit Bay Reserve web site.

Microcontrollers Mini Grant – Amy Fish

The Innovation Studio at Bourne Public Schools received a grant that provided Arduino microcontrollers, sensors, and other peripherals. This October, students in our Introduction to Engineering class spent several weeks learning how to write code that is then sent to the controller to execute the program. Learning activities included, controlling LEDs, using ultrasonic and pressure sensors to trigger alarms, and flashing LEDs to match the beat of songs. Beginning in November, any



student who is entering the Bourne Science & Engineering Fair can utilize these materials as part of their independent research. We are very appreciative of the opportunities that these materials have provided to our students and look forward to seeing how students will use them in the future.

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WHSTEP 2017-2018 HIGHLIGHTS

March 30th, 2017 Spring Teacher Safari – McLane Research Laboratories

The spring teacher safari highlighted McLane Research Laboratories. After a brief overview of their mission and story, attendees were lead on an exciting tour of their facilities featuring a 50ft test well, pressure testing tank, and a range of sampling and profiling instruments.

May 15th, 2017 Spring Meeting – Lawrence School

Mass Audubon's Spadefoot Toad Coordinator, Jay Cordeiro, gave a presentation all about the importance of vernal pools. He gave an overview of the vernal pools in our region, followed by short teacher presentations from Mashpee, Falmouth Academy, UCT, and Lawrence Middle presenting how they incorporate vernal pool field sites into their curriculum. It ended with a tour of Lawrence's vernal pool site!

Aug. 12th, 2017 Woods Hole Science Stroll

At this fun, family friendly event, participants got to explore science on the streets of Woods Hole and got an up-close view of a working research vessel. There were plenty of hands-on activities, science demos, and kids crafts, including WHSTEP's logo contest! Jonah Etler, a senior from Falmouth High School, won our logo design contest.

Oct. 18th, 2017 WHSTEP Liaison Dinner

This event brings together representatives from each member school and the Woods Hole area science institutions. 2017's theme centered around the benefits of aquaculture and showcased research and efforts by member research institutions, schools and the community. Featured exhibits included, an algae biofuels project from the Marine Biological Laboratory and WHOI and current student aquaculture projects from the environmental and technology department at Upper Cape Cod Regional Technology School. The keynote speaker for the night was Rick York, the Director of Natural Resources for the Town of Mashpee. He gave a talk titled "Shellfish and Water Quality Restoration".

Check out WHSTEP's New Website!

https://web.whoi.edu/whstep/

February 7th, 2018 WHSTEP Winter Meeting – SEA Education Association

This winter meeting featured a film screening of the documentary film: "Transatlantic: A Voyage of Discovery". The film was about SEA Semester's voyage from Woods Hole to Ireland showcasing students of class C-267 as they challenged themselves in an epic adventure, and forged lasting bonds as shipmates on a lengthy and inspiring ocean passage. The film was a winner of the Grand Prize for Feature Film at the International Maritime Film Festival. Dr. Deb Goodwin, the film's featured chief scientist and oceanographer, gave a follow up Q & A session.

May 17th, 2018 WHSTEP Spring Meeting – Falmouth Academy

At the spring meeting attendees got to experience Robotics: In the Classroom & In the Region. Martha Borden, the Director of Technology at Falmouth Academy, gave a presentation featuring her awarded WHSTEP Mini-Grant (2017) "Transitioning Programming from 2D to 3D". Following that, Clayton Jones, a Senior Director at Teledyne Webb Research, presented "Autonomous Platforms - Roaming the Oceans for Science". His talk gave viewers a look into the use of robotic platforms to help enable a better understanding of the world's oceans.

Aug. 11th, 2018 Woods Hole Science Stroll

At this fun, family friendly event, participants got to explore science on the streets of Woods Hole and got an up-close view of a working research vessel. There were plenty of hands-on activities, science demos, and kids crafts, including WHSTEP's decorate a shell ornament.

NEW Co-Chair

Sarah Fuller (WHOI) replaced J.C. Weber (MBL) as a WHSTEP Co-Chair. J.C. remains as a WHSTEP board member.

Sept. 27th, 2018 Family Science Night – NOAA Aquarium

Families got to check out the NOAA aquarium and learn about how oysters, a tasty snack, are benefitting our communities! There were also some exhibits from local scientific institutions and shell ornaments to decorate and take home.
Rick York, of the Town of Mashpee, gave a talk titled, "Shellfish and Water Quality Restoration".

Oct. 11th, 2018 Teacher Safari – Waquoit Bay National Estuarine Research Reserve

This 2018 WHSTEP Teacher Safari highlighted student salt marsh studies in the face of sea level rise at the Waquoit Bay Reserve and South Cape Beach Research Site. Meagan Gonneea, Research Scientist at USGS and Joan Muller, the Education Coordinator at Waquoit Bay Reserve taught about local research focusing on sea level rise, values of estuaries, and "blue carbon." There was also an introduction to the "Bringing Wetlands to Market STEM Curriculum Linking Wetlands and Climate Change" and demos of a few activities from the on-line curriculum. Unfortunately, the weather did not allow for a visit to the study site.

Nov. 7th, 2018 WHSTEP Liaison Dinner

This event brings together representatives from each member school and the Woods Hole area science institutions. 2018's theme centered around women in science and showcased research and efforts by member research institutions, schools and the community. The keynote speaker for the night was Dr. Sue Natali, an Associate Scientist at the Woods Hole Research Center. She gave a talk titled "Gender, leadership and science: A global initiative to heighten the impact of women in science".

Mini-Grants Awarded

Amy Fish (2018): "Arduino Microprocessors Across the Curriculum"
Jeff Farrington (2018): "Garden Project for Bourne High School"
Amanda Hough (2018): "SeaPerch Rover Collaborative Project"

WHSTEP Coming Events

March 6, 2019…WHSTEP WINTER MEETING
Hosted by the Marine Biological Laboratory, come learn about Climate Change in the Arctic! Featured speakers include, MBL scientists: Dr. Edward Rastetter & Dr. Anne Giblin, along with Falmouth teachers: Celeste Cruse & Maureen Tichenor.

May 21, 2019…WHSTEP SPRING MEETING
Hosted by the Quashnet School in Mashpee, come learn about Penikese Island: the history and connections with scientific research and exploration! Featured speakers include, David Kooharian, the Program Director of Penikese Island Retreats. More TBA!

Sign up on WHSTEP's email list for more details about this event and other future events.

http://mailman.whoi.edu/mailman/listinfo/whstep-news