

Partnership

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Co-Chairmen's Report: Bringing Science to Life

- Pat Harcourt and Patti Parker

“Discovery consists in seeing what everyone else has seen and thinking what no one else has thought.” Albert Szent-Gyorgyi

Children are natural observers and questioners, which means they have the most important prerequisites for pursuing science. They are also wellsprings of creativity, using their active imaginations not only for play but also to solve the problems they encounter in their daily activities. The same creative thinking and problem solving is a most important ingredient for engineers and technology specialists. How can teachers support children's explorations in the natural world and provide experiences that will enrich their interest in science, technology, engineering, and math?

WHSTEP is here to help. We have a program designed to make it easy for teachers to make connections with scientists, technicians, and engineers. The Registry of Science Outreach Volunteers (ROV) has assembled a group of professionals from local research and engineering institutions who are eager to work with students, teachers, and classes. We even have a team of people to help teachers plan the best type of event or presentation for their students and find the right person for the partnership. Whether you are interested in providing girls with role models in science, having an engineer bring some cool equipment in to a class, or hearing about the adventures of scientists studying Arctic ice, ocean currents, sand movement, or transparent marine plankton, we can help identify a volunteer who will bring science, engineering, and technology to life for students of any age or grade.

Teachers can take advantage of our wealth of local talent in another way – by attending a Safari or meeting sponsored by WHSTEP. At each event we highlight the research topics and projects of one or two people who work in the fields of science, engineering, or technology, and provide an opportunity for teachers to meet and converse with them. Teachers may arrange to borrow samples, slides, or use data, or to set up email or Skype correspondence between the scientist and students. Many of the scientists are willing and eager to speak with students about their careers and the training they needed to work in their field. All of the presenters can attest to the importance and utility of math for anyone who wants to go into science, engineering, or technology. Check out the calendar of events in this newsletter and save the dates of our spring programs now!

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Debbie Scanlon

Matthew Erickson, MBL Ecosystems Center, explains research he and his colleagues conduct in Antarctica to Mashpee High School teacher Suzanne Avtges at the WHSTEP Liaison Welcome Dinner.

If you are a teacher looking for ways to bring science, engineering and technology to life, keep WHSTEP in mind. We'll get you into labs, introduce you to scientists, and keep you connected with the exciting research that happens here every day.

WHSTEP Liaison Welcome Dinner

- Debbie Scanlon

Fifty scientists, teachers and liaisons representing member schools and scientific institutions gathered October 22 for dinner and networking at the Landfall Restaurant. "Meet the Scientist," this year's theme, gave teachers the opportunity to learn about new and interesting research at Woods Hole's scientific institutions.

Using laptop computers, posters, microscopes, maps, and samples, 10 scientists gave an overview of their research activities, along with basic science concepts that teachers can use in their classrooms from kindergarten through high school. After the display session, teachers and scientists had drinks, hors d'oeuvres and pizza together and made connections for future classroom presentations.

Attending were 25 teachers from the three districts, representing elementary, middle and high schools. Also present were Marc Dupuis, interim superintendent of Falmouth Public schools, and Liz McGonagle, interim assistant superintendent in Falmouth and director of curriculum and instruction.

We would like to thank Don Estes, owner of the Landfall Restaurant and member of the WHSTEP executive committee, who donated use of the restaurant for the event, and the scientific institutions for providing literature, maps and other education material for the teachers as well as raffle prizes. We are grateful to the scientists for providing displays of their research and for their in-depth discussions with teachers.



Debbie Scanlon

Mindy Richlen of WHOI describes her research on harmful algal blooms to Pat Harcourt, WHSTEP, and Liz McGonagle, Falmouth Public Schools, at the Liaison Welcome Dinner.

"Meet the Scientist" topics and presenters

Take a look at these websites to learn more:

Antarctic Ecology

Matthew Erickson, Ecosystems Center, MBL
<http://pal.lternet.edu/>

Encyclopedia of Life

Kristen Lans, MBL
<http://www.eol.org/>

Fisheries

Russ Brown, Northeast Fisheries Science Center
<http://www.nefsc.noaa.gov/>

Forest Soils and Carbon Cycling

Kathleen Savage, Woods Hole Research Center
http://www.whrc.org/new_england/forest_ecol.htm

Greenland Glaciers

Sarah Das and Maya Bhatia, Geology and Geophysics, WHOI
<http://polardiscovery.who.edu/>

Teaching Oceanography through the Research Experience

Kara Lavender Law, Sea Education Association
<http://www.sea.edu>

Harmful Algal Blooms

Mindy Richlen, Biology, WHOI
<http://www.who.edu/redtide/>

Mapping the Seafloor

Brian Buczkowski, USGS Woods Hole Science Center
http://woodshole.er.usgs.gov/project-pages/coastal_mass/

Undersea Robotics and Imaging

Hanu Singh, Deep Submergence Lab, WHOI
<http://www.who.edu/page.do?pid=21138>

WHSTEP Welcomes New Liaisons

- Kama Thieler

One of the most important components of the WHSTEP partnership is the liaison network, which is comprised of at least one representative from each member school and organization. WHSTEP liaisons play a critical role in communicating the needs, interests, available programs and resources of their respective institutions and schools.

For the 2008-09 school year, WHSTEP welcomes the following new liaisons: Joanne Tromp, WHOI; Tom Hoppensteadt (science) and Cheryl Bellanger (math), Mashpee High School; Mark Rosbach (science) and Judy Mooney (math), Mashpee Middle School; Marcia Flavell (science) and Bill Thomas (math), Bourne High School.

WHSTEP Safari to Massachusetts Maritime Academy

- Pat Harcourt

Technology is the middle name of the Woods Hole Science and Technology Education Partnership, so for the fall 2008 Safari we decided to investigate the green technology at Massachusetts Maritime Academy in Buzzards Bay. On the blustery and cold afternoon of Thursday November 13 a group of teachers, liaisons, and students gathered at MMA's historic Blinn Hall and were greeted by Lieutenant Commander Elizabeth Stevenson for a tour of its energy facilities.

The first stop on the tour was at the Academy's 660 kilowatt wind turbine, which soars above the campus at Taylor's Point. At 242 feet high and with blades extending 154 feet, the turbine is grand in scale, but elegant in design. The motion of the blades is surprisingly swift, and was only audible when the group approached to within about 150 feet. At that distance, the sound was similar to the sound of wind in the trees on a breezy fall day. Facilities Director Paul O'Keefe, who led the tour, gave the group an opportunity to step inside the base structure of the turbine to see the control panel and ladders used to access the nacelle, which houses the generator. The turbine produces 50,000 to 100,000 kilowatt hours of energy per month, which reduces MMA's electricity costs by almost 30% and generates about a quarter of the electricity used on campus.



Kama Thielor
Falmouth High School teacher Miguel Zamora tours the MMA wind turbine.

Our next stop was the dormitory complex, where Mr. O'Keefe pointed out the installation of 81 kilowatts of solar panels on the roof. The new solar photovoltaic panels are only part of the energy supply and energy efficiency plan for the dormitories. Mr. O'Keefe brought the group deep inside the building to the power plant where heat and hot water are supplied.

The hot water heaters use natural gas satellite boilers and micro turbine cogeneration installations to make use of waste heat to warm the water. The setup saves hundreds of thousands of kilowatt hours annually as well as thermal and energy cost savings.

Even the campus walkways we followed in the late November dusk were lit with renewable energy, with the largest installation of solar-powered outdoor lighting in New England. The lights' solar panels are positioned to shed snow, and they incorporate technology which adapts to ensure that facilities are not left in the dark, even in the darkest days of winter and during extended cloudy periods.



Kama Thielor
Quashnet School teacher Sheila Carotenuto exits the base of the turbine tower.

The group wound up its tour at the Bay State Conference Center and Memorial Dining Hall, where we were treated to a very informative presentation by Kathy Driscoll, director of Health, Safety, and Sustainability programs at MMA. Ms. Driscoll's explanations gave tour participants a great appreciation for the many projects MMA is undertaking to increase energy efficiency and incorporate renewable energy in all aspects of the institution's facilities and protocols. The group members were also pleased to meet with MMA student Michael McDonough, president of the active student Green Club.

The fall 2008 WHSTEP Safari was packed with information and impressive technology. Participants agreed MMA's projects and efforts were an inspiration, and we all extend a big round of applause and a warm thank you to the MMA staff for sharing their time and expertise with us.



Renewable Energy resources

Massachusetts Maritime Academy

Information on the wind turbine and real time data on the turbine's electricity output:
<http://www.maritime.edu/12.cfm?page=169>

Information on the solar panels with data on incoming sunlight and electricity output:
<http://view2.fatspaniel.net/PV2Web/merge?view=PV/detail/HostedAdmin&eid=67668>

Kid Wind Project

Wind turbine kits, lesson plans, science fair project ideas, and turbine blade design:
<http://www.kidwind.org/>

WHSTEP Annual Meeting 2008

Git Along, Lil' Black Sea Bass...

- Arlene Hanlon

"Give a man a fish and you feed him for a day." Teach a fish to catch itself...and you have the research project of Simon Miner, a research assistant at the Marine Biological Laboratory in Woods Hole (not to mention a completely new twist on the old Chinese proverb.) The details of Mr. Miner's project, "acoustic ranching" of black sea bass (BSB), were presented to the audience at WHSTEP's Annual Meeting held in May at Falmouth Public Library.

With a \$270,000 from the National Oceanic and Atmospheric Administration, Mr. Miner, along with Scott Lindell, the project manager, trained black sea bass (BSB) to "catch themselves." The project began in the summer of 2007 with 6500 black sea bass. The project's first objective was to determine if BSB could be trained using classic Pavlovian acoustic conditioning techniques. The fish were held in a circular tank. Using a 280Hz tone, the sound was played for 20 seconds, 3 times a day, for about 2 weeks. When the tone was sounded, food was dropped, and the fish entered a "feeding zone" through a very small opening. The next step was to feed the fish outside of the "feeding zone" without a tone and then test to see if they would go to feeding area when the tone sounded again. Some fish remembered the sound for only 5 days, while others remembered for as long as 10 days, with the hope of extending the recall period to 2 weeks. Miner said that the strength of the memory seemed to be linked with how long the fish are trained. Miner has a great term for his trained bass--"remote-controlled fish."

Field trials were to begin during the summer of 2008, with the placement of an "AquaDome" in Buzzards Bay near the Weepecket Islands. The dome is a mesh-covered, geodesic half-dome, 32 feet in diameter, 16 feet tall, secured by anchor lines and five 1,200-pound weights, at a depth of 35 feet. A total of 5,000 black sea bass would be placed in the dome, and would hear the tone, signaling to them an underwater feeding. Gradually the fish would be released into the open ocean to forage, with the hope that they would return to the dome at the sound of the tone for

occasional feedings. The range of the tone is up to 100 meters. The project will culminate with the "dinner bell" being rung one last time. The dome will be pulled from the water in late summer or early fall, before the black sea bass migrate to warmer waters, with a final count being made to see how many BSB returned to the dome. Miner says that BSB are territorial and thinks they will not stray too far from the dome once they are released.

The project has many objectives. One hope is to maintain the fishing areas of Cape Cod and other coastal communities. This approach to aquaculture could also provide support for fish stocks and fishermen. If the project succeeds, trained fish could someday be used to reinforce the depleted numbers of black sea bass. Another goal, just as important as increasing fish stock, is to defray the costs of fish farming. Ideally, after "grazing" in the open ocean, trained fish would return to the feeding area. In addition, fish raised by acoustic conditioning would have less stress than true farmed-fish, "much in the way that free-range chickens are healthier than their confined counterparts." The combination of foraging and controlled feedings makes the approach more economical. An important consideration is how many fish will return and how many will be eaten by predators or just swim away?

Teachers and community members enjoyed the informative and thought-provoking presentation.



Visit the WHSTEP website at:

<http://www.who.edu/whstep/>

For announcements about events related to science and math, subscribe to the WHSTEP listserver at:

<http://lists.mbl.edu/mailman/listinfo/whstep>

For all WHSTEP questions, send an e-mail to

whstep-info@who.edu

WHSTEP R.O.V. Update

- Kama Thieler

The web-based Registry of Science Outreach Volunteers (ROV) was created by WHSTEP in 2004 to facilitate connections between teachers and people in the community who have scientific knowledge they would like to share. The ROV welcomes scientists, technicians, graduate students and local community members to register for a variety of outreach activities, including mentoring teachers and students, making an in-class presentation, assisting with teacher training, hosting a group visit to their lab, and providing materials or data to supplement lessons.

WHSTEP is currently revising and updating the registry to make it more useful to teachers. Some of the new features will make searching easier, such as offering keywords that match with MA Department of Education science and technology curriculum standards. We will also create a new category for scientists who are willing to email, blog or Skype with a class about their research or to communicate from the field. We recognize that sometimes a "real person" is needed to facilitate the process of linking teachers and scientists, and we will make it easier to ask the ROV administrator for assistance.

The registry is online at <http://www.whoi.edu/ccod/rov.html>. We will issue a call for new volunteers, and for current registrants to review their entry, in the near future. In the meantime, please send comments or questions about the WHSTEP ROV to whstep-info@whoi.edu.

Volunteers Needed

for the Lawrence School science
project mentoring program
January 26-30, 2009



Scientists interested in volunteering
please contact WHSTEP at

whstep-info@whoi.edu
for more information

Join us for the

WHSTEP General Meeting

At the U.S. Geological Survey
Woods Hole Science Center
Quissett Campus

Wednesday, January 28th, 4:15pm

Come enjoy featured speaker Beth Schwarzman,
local author and earth science educator

Learn more about USGS research and
educational resources

Mini-Grant Recipients

-Kama Thieler

WHSTEP offers mini-grants for teachers to provide support for new and innovative science, math, and technology programs in our member schools. Mini-grants provide an extra resource to bring science equipment, projects, activities, experiences, and information to students. The mini-grant forms are easy to complete and applications are reviewed several times a year. We encourage partnerships between teachers and the science community, and will be happy to help make a match. The mini-grant application can be found at <http://www.whoi.edu/whstep/minigrants.html>.

During our recent funding rounds, these local teachers received grants to incorporate new activities into their schools:

Miguel Zamora and Tom Messer, chemistry and physics teachers at Falmouth High School, received funding for "Hydrogen Rockets". Their students built and launched the mini rockets, enjoying the iterative design process, the excitement of the launches, and some friendly competition between student groups.

Ann Marie Strode, a sixth grade social studies teacher at Bourne Middle School, attended a WHSTEP Safari on teaching with maps and wanted to bring GPS technology to her students. The mini-grant funded hand-held GPS units for a project entitled "Geography Treasure Hunt".

Linda Werner and sixth grade students from Morse Pond School in Falmouth received funds for a mural of ocean life surrounding Cape Cod. The mural, which was designed and painted by the students, now fills a wall of the cafeteria at the school.

Erica Amaral, a first grade teacher at Peebles Elementary School in Bourne, will be using mini-grant funds to purchase an egg incubator for a "Hatchling Project", part of an embryology and life cycle unit.

WHSTEP Meetings and Events

| | |
|---------------------------------|--|
| Friday, January 16 1:30 pm | Teacher In-Service Day Tour of Woods Hole labs |
| Wednesday, January 28 4:15pm | General Meeting USGS, Quissett Campus |
| Wednesday, March 25 4:15pm | Science/Math Safari (details TBA) |
| Thursday, May 14 4:15pm | Annual Meeting Falmouth Public Library |

Executive Committee meetings are held on the first Monday of each month, 4pm-5:30pm, usually at the Falmouth Public Library. The meetings are open to anyone who would like to attend. If there is something you would like to bring to the attention of the Executive Committee, please contact whstep-info@whoi.edu ahead of time to be added to the agenda.

WHSTEP Liaison Reference 2008-09

WHSTEP Executive Committee

Suzanne Avtges
Mashpee High School

Sheila Carotenuto
Quashnet School

Don Estes
Landfall Restaurant

Arlene Hanlon
Community

Pat Harcourt, Co-Chair
WBNERR

Kara Lavender Law
Sea Education Association

Kate Madin
WHOI

Cheryl Milliken
Falmouth High School

Patti Parker, Co-Chair
Bourne High School

Patricia Perry
East Falmouth ES

Debbie Scanlon
Marine Biological Laboratory

WHSTEP General

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whstep-info@whoi.edu

WHSTEP School Contacts

Bourne High School (Bourne, 9-12)
Marcia Flavell
Bill Thomas

Bourne Middle School (Bourne, 5-8)
Bob Ruggiero
Sarah Lavoie

East Falmouth Elem. (Falmouth, K-4)
Wendy Scholes
Sam Slarskey

Falmouth Academy (Falmouth, 7-12)
Ginny Edgcomb

Falmouth High School (Falmouth, 9-12)
Chris Brothers

Hoxie School (Bourne, K-4)
Barbara Sabulis

KC Coombs School (Mashpee, K-2)
Lee Horner

Lawrence School (Falmouth, 7-8)
Carrie Fitzpatrick
Bob Laquidara

Mashpee High School (Mashpee, 9-12)
Tom Hoppensteadt
Cheryl Bellanger

Mashpee Middle School (Mashpee, 7-8)
Mark Rosbach
Judy Mooney

Morse Pond School (Falmouth, 5-6)
Linda Werner

Mullen-Hall Elementary (Falmouth, K-4)
Trish Mara

North Falmouth Elem. (Falmouth, K-4)
Janet Wessling

Otis Memorial School (Bourne, K-2)
Jane Gould

Peebles Elementary (Bourne, K-4)
Laura Gray-Shultz

Quashnet School (Mashpee, 3-6)
Bob Bailey

Teaticket Elementary (Falmouth, K-4)
Gordon Starr

Upper Cape Tech (Bourne, 9-12)
Ann Vachon
Nolan Leroy

WHSTEP Institution Contacts

Marine Biological Laboratory (MBL)
Michelle Bahr

MBL Ecosystems Center
Debbie Scanlon

National Marine Fisheries Service
Ambrose Jearld

Sea Education Association (SEA)
Paul Joyce

U.S. Department of Agriculture (USDA)
Ron Mack

U.S. Geological Survey (USGS)
Nancy Soderberg

Waquoit Bay National Estuarine Research Reserve (WBNERR)
Pat Harcourt

Woods Hole Oceanographic Institution (WHOI)
Judy McDowell
Janet Fields
Joanne Tromp

Woods Hole Research Center (WHRC)
Kathleen Savage

Useful Internet Addresses

MBL: www.mbl.edu

NMFS: www.nefsc.nmfs.gov

SEA: www.sea.edu

Sea Grant: www.whoi.edu/seagrant

USGS: <http://woodshole.er.usgs.gov>

WBNERR: www.waquoitbayreserve.org

WHOI: www.whoi.edu

WHRC: www.whrc.org