

Partnership

Fall 2013 Issue: Volume 23, No. 2

Letter from the Co-Chairs

Suzanne Avtges, Mashpee High School, and JC Weber, Marine Biological Laboratory

This school year will mark 24 years of WHSTEP working to promote, expand and facilitate science and technology education within the area school districts. We are truly fortunate to live in a unique area that is home to such a rich and vibrant scientific community. Over the years, WHSTEP has played a role facilitating communication and serving as a bridge between our region's scientific educators and the innovative researchers at the forefront of science working at the world renowned institutions clustered in and around Woods Hole. The research conducted in our relatively small geographic area is a tremendous resource for science education, demonstrating real world application of scientific knowledge and principles. The member research institutions conduct a wide variety of truly interdisciplinary scientific endeavors in a variety of ecosystems from aquatic systems of the deep sea and coastal/estuarine systems to terrestrial ecological research in pristine grasslands, forests, and urban settings.

As WHSTEP moves forward into 2014, we continue to evolve and grow. Our area hosts a great variety of innovative science and technology companies. In fact, the products and technical expertise from these private companies fuel and support the applied research conducted at the institutions. Also, many of these companies' founders and employees have worked at the local research institutions. An exceptional, strong partnership and synergy has evolved between the two groups. Within the last few months, we have been exploring ways to facilitate and enhance partnerships between these companies and the area schools, bringing some of the amazing scientific and technology resources of the area into the classroom. A student can truly be inspired by the wide breadth and diversity of applications within science and how many ways science can be directly applied in settings beyond basic research.

In mid-October, WHSTEP invited representatives from several local science and technology business to our annual Liaison Dinner at The Landfall Restaurant, a longtime community business partner, in Woods Hole. The event is attended by school and institutional liaisons, who serve as points of contact from all of the member institutions, as well as science teachers and administrators from the local school districts. It is a wonderful opportunity for the educators to connect with our member research partners. Representatives from McLane Research Laboratories, Teledyne/Benthos, Onset Computer Corporation, Falmouth Scientific, and Hydroid all brought informative displays about their scientific products, research instruments, and technology. All were eager and enthusiastic to talk with the educators. The educators present also truly appreciated this exposure to applied scientific principles that they teach in the classroom. Many of the institution liaisons at the dinner also had discussions with educators on how they utilize applied science and technology in their basic research. There were smiles and lively discussions all around the room that evening. It definitely had the feeling of something new and exciting beginning to emerge as the seeds of future partnership were sown.

We at WHSTEP are truly looking forward to fostering and expanding upon our partnerships with the science and technology business in our area, building a strong bidirectional bridge between them and area schools. Just as we have with the research institutions over the last couple of decades, that bridge can serve as an opportunity to bring real world science to the classroom, adding an interactive dimension beyond the textbook and inspiring students to become excited about science. It can also directly benefit the member institutions and business partners by inspiring and training the next generation of scientists and engineers who will keep their research and technology endeavors propelling forward. It is our vision that those new partnerships and excitement about novel outreach efforts will also invigorate the liaisons from the member research institutions, adding a fresh vitality to WHSTEP which will further energize and diversify science education in our schools.

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WHSTEP 2013 Highlights

WHSTEP's General Meeting was held on January 24 at the **Woods Hole Science Aquarium** of the **National Marine Fisheries Service**. Teachers and community members enjoyed learning about the research and outreach work of NOAA and NMFS groups based in Woods Hole. Laboratory Director Russ Brown welcomed the group and George Liles, aquarium director, shared details about school visits and internships at the aquarium.



For the past 16 years, WHSTEP has recruited many local science and engineering professionals to serve as mentors for the **science fair project mentoring program** at the Lawrence School in Falmouth. Members of the WHSTEP scientific community meet with 7th and 8th grade students and help them design their science projects. In 2013, mentoring took place February 4 - 8. Twenty-eight volunteers participated from MBL, WHOI, USGS, SEA, and WBNERR.

WHSTEP coordinated **science institution exhibits** at the Falmouth District Science Fair in early March. Students and families enjoyed the informative and interactive displays from all of the WHSTEP member institutions. The Bourne Science Fair was held in mid-March at Bourne Middle School. WHOI, USGS, MBL, C-MORE and the Encyclopedia of Life exhibited at the Fair.

On April 25, teachers attended a **WHSTEP Science Safari** at the **Falmouth Wastewater Treatment Plant**. Amy Lowell, Falmouth's Assistant Wastewater Manager, guided participants through the town's main wastewater treatment facility, outlining the treatment processes and discussing the history and future of wastewater management in Falmouth.

On May 8, the **WHSTEP Annual Meeting** was held at **Sea Education Association** in Woods Hole. Dr. Amy Siuda of SEA and former Falmouth teacher Pat Keoghan presented a program on the Plastics at Sea project <http://www.sea.edu/plastics/>. This topic is receiving increasing interest as results show the volume and extent of plastic pollution in the ocean. The presenters described SEA's project, which included a daily ship-to-classroom email exchange.



On October 23, the annual **WHSTEP Liaison Welcome Dinner** was held at the Landfall Restaurant in Woods Hole with over 40 attendees. This year representatives from five local technology-based businesses brought displays and talked with attendees about how their companies use applied science and technology. School and institutional liaisons, elementary, middle and high school teachers, school administrators, and scientists enjoyed an evening of networking, sharing ideas, and planning for WHSTEP annual events.

In November, WHSTEP sponsored at **Science and Technology Safari at Coonamessett Farm** in Hatchville, Falmouth. Farm manager Stan Ingram guided participants around the farm, describing the hydroponic systems which allow them to produce salad greens year-round; the use of koi ponds to recycle water and produce nutrient-rich water for hydroponic systems, the wind turbine that provides power for the farm's pumps, and many other ways science and technology are used on a working farm.



On-going projects:

- Through our liaison network, WHSTEP links teachers with researchers and materials from the member scientific institutions, and links researchers with schools to fulfill their outreach goals.
- WHSTEP awards mini-grants to support and enhance science, math and technology education in member schools.
- "Partnership," the WHSTEP newsletter, is published biannually and distributed to a mailing list of over 400 people.
- WHSTEP administers an email listserv to publicize our programming and meetings, as well as relevant local workshops and lectures on topics of science, math and technology.

Visit the WHSTEP website at:
<http://www.whoi.edu/whstep/>

For announcements about events related to science and math, subscribe to the WHSTEP listserver at:
<http://lists.mbl.edu/mailman/listinfo/whstep>

WHSTEP Liaison Welcome Dinner

- Pat Harcourt

On Wednesday evening, October 21, the busy summer tourist season on Cape Cod had slowed down to a quiet pace, but the Landfall Restaurant in Woods Hole was bursting with energy as Woods Hole Science and Technology Education Partnership kicked off its 24th year with the annual Liaison Welcome Dinner. This year, representatives from five local businesses that use science, technology, and engineering for their products and services set up display tables and talked with the more than 40 liaisons and administrators who attended the event.



WHSTEP Executive Committee member Patti Parker (left) enjoys learning about ocean instrumentation from Joe Borden and Debbie King of Teledyne Benthos. Photo by Don Parkinson, Falmouth Enterprise

Conversations were animated as teachers and administrators discussed with presenters ways to respond to the perpetual student question “why do we have to learn this stuff?” Observing the interactions, WHSTEP Co-Chair JC Weber commented, “Seeing how engaged the teachers were as they talked to the business representatives, I know that the discussions made quite an impact, and that enthusiasm is sure to be transferred to the classroom to really inspire the kids.”

WHSTEP extends warm thanks to Don Estes, owner of the Landfall Restaurant and member of the WHSTEP Executive Committee, who donated use of the restaurant and refreshments for the event, to the business representatives who made the evening so informative, and to institutions that provided

educational materials for the teachers as well as raffle prizes.



Jim Towey of Onset Computer (right) describes unique data loggers to Craig Connolly of Woods Hole Research Center. Photo by Don Parkinson, Falmouth Enterprise

Liaison Dinner presenters and web links:

Onset Computer

<http://www.onsetcomp.com/>

Dataloggers and allied products
Representative: Jim Towey



McLane Labs

<http://www.mclanelabs.com/>

Oceanographic profilers,
samplers, flotation
Representative: Yuki Honjo



Teledyne Benthos

<http://www.benthos.com/>

Acoustic communication, positioning,
remotely operated vehicles, autonomous
underwater vehicles, profiling floats
Representatives: Debbie King, Joe Borden



Hydroid

<http://www.km.kongsberg.com/hydroid>

Autonomous Underwater Vehicles
for deep sea survey and mapping
Representative: Eli Perrone



KONGSBERG

Falmouth Scientific

<http://www.falmouth.com/>

Precision instrumentation for
oceanographic applications
Representatives: John Baker, Carl Mancuso



WHSTEP Fall Science Safari: Coonamessett Farm

Pat Harcourt

Teachers from Bourne, Falmouth, and Mashpee were treated to a behind-the-scenes tour of [Coonamessett Farm](#) at the November WHSTEP Science Safari, "Science and Technology Down on the Farm" Thursday November 21. Coonamessett Farm is a twenty-acre farming and research organization in Hatchville village, Falmouth. In addition to growing produce and raising alpacas, goats, sheep, donkeys, chickens, and ducks, there is ongoing research on agriculture, and the farm is also a testing site for research on commercial fishing technology.

Farm manager and chair of Falmouth's Agricultural commission Stan Ingram led the WHSTEP teachers through the fields, describing the annual cycle of planting, cultivation, and harvest, and how technology is used to conserve water and energy and protect the plants from insect pests. Because of the relatively small scale of the farm, much of the daily work is done by hand during the growing season.



Coonamessett Farm manager Stan Ingram introduces the hydroponic aquaculture facility in one of the greenhouses at the farm. Photo by Pat Harcourt

The teachers visited three of the five greenhouses, where Mr. Ingram explained the workings of the hydroponic and aquaculture systems, which allow the farm to produce salad greens, vegetables, herbs, and even water hyacinths through the winter.

Mr. Ingram introduced the teachers to the farm's wind turbine, a 120 foot 10 KW tower, which was installed along with a set of solar panels to supply some of the electricity needed for the hydroponic systems and other farm equipment. Mr. Ingram demonstrated how to read graphs and data on the turbine's monitoring system.



Stan Ingram discusses a graph of the electricity generated by Coonamessett Farm's 10 KW wind turbine. Photo by Pat Harcourt

Coonamessett Farm offers farm tours and programs for school groups. For more information, contact Lori Lieberman at 508-564-5624
events@coonamessett.net

Resources for teaching about farms and farming

Massachusetts Dept of Agriculture Resources
<http://www.mass.gov/eea/agencies/agr/>

Agriculture in the Classroom: Wide selection of lesson plans including science, math, and social studies for levels K through 12 from
<http://www.agclassroom.org/index.cfm>

"Exploring Cranberries" curriculum for grades 3-6
<http://www.cranberries.org/cranberries/teachers.html>

4H virtual farm – interactive activities including science and technology
<http://www.sites.ext.vt.edu/virtualfarm/>

WHSTEP Annual Meeting 2013 at Sea Education Association

Deb Scanlon

About 30 teachers, community members and scientists attended the WHSTEP annual meeting on May 8, hosted by Sea Education Association on Woods Hole Road. The presentations focused on their Plastics at SEA course, a scientific research expedition dedicated to the study of the effects of plastic marine debris in the ocean ecosystem that took place in fall 2012.

SEA has catalogued and archived more than 100,000 individual plastic pieces since 1986, and SEA authors have published analyses of these data in a number of scientific articles. SEA scientists are currently studying the plastic material to understand the ultimate fate of plastics in the ocean, as well as the organisms that make floating debris their home.

The WHSTEP General Meeting featured two speakers. Dr. Amy Siuda of the SEA faculty provided the first presentation. Dr. Siuda spoke on the current state of the science including how plastic debris is distributed in the ocean and its impacts. Noting that the scientific study of plastic marine debris is relatively young, she said many deceptively simple questions drive the field: How is plastic marine debris distributed? How much plastic marine debris exists? Is the concentration of plastic marine debris changing through time? What are the biological or economic impacts of plastic marine debris?



Tiny pieces of plastic from a net tow far offshore. Photo by Jon Waterman



A student on the Plastics at SEA cruise counts microplastic pieces. Photo by Matt Ecklund

The second talk was presented by Pat Keoughan, a retired Falmouth teacher, who sailed on the Plastics at SEA expedition in the North Pacific in fall of 2012 as a classroom outreach coordinator. She told about sharing results from the cruise in real time with 11 schools and the successes and challenges of this endeavor.



Pat Keoughan on board the *Robert C. Seamans* during the Plastics at SEA cruise, consulting with research assistant Greg Boyd. Photo by Jon Waterman

Visit SEA's Plastics at SEA website for more information <http://www.sea.edu/plastics/>

WHSTEP Mini-Grant Program

The mini-grant program provides small (up to \$500) grants to teachers in the member schools and their partners to develop projects that will improve or enhance science, technology, engineering and math education for their students. They are intended to create opportunities not ordinarily funded by the schools. The next deadline to submit a proposal for review is **Friday March 21, 2014**.

Visit the [WHSTEP website](#) for more information, and a copy of the grant application.

WHSTEP Mini-Grant Frequently Asked Questions

Q: Can all teachers apply for WHSTEP Mini-Grant funds?

A: No. Funds are available only to teachers in our member districts of Bourne, Falmouth, and Mashpee, Massachusetts. Scientists, parents, and community members partnering with these teachers may also apply.

Q: I am a teacher who would like to partner or consult with a scientist on my project. How can I find a match?

A: WHSTEP can help! We maintain a registry of science outreach volunteers, and have liaisons at each of the local research institutions and agencies.

Q: How many Mini-Grants are funded each year?

A: The number varies, but *most proposals are funded partially or in full* if they meet the grant criteria spelled out in the cover letter and explained more clearly in the FAQs.

Q: Do proposals have to be for science projects only?

A: No. In fact, projects in mathematics and engineering are encouraged!

Q: What about interdisciplinary projects, for example Language & Arts Science?

A: Fine, provided that math, science and/or engineering is a *strong component* of the proposal.

Q: Can I use WHSTEP Mini-Grant funds to take my students on a whale watch?

A: No. Proposals should demonstrate the capacity to become self-sustaining. One-time, special events may be considered with a description of pre- and post-event curriculum and products.

Q: Can I use WHSTEP funds to replenish my science kits?

A: No. Funds are intended to create opportunities *not ordinarily* funded by the schools.

Q: Can I apply for equipment or materials for my classroom?

A: Yes, provided that the materials are an integral part of an instructional plan that uses a new or innovative approach to teaching.

Q: Can WHSTEP funds be used for conference fees?

A: Yes. Conference fees and travel for professional purposes are listed as legitimate expenses.

Q: By "technology" do you mean computers?

A: No. The word "technology," as used in *Woods Hole Science & Technology Education Partnership*, is interpreted by the Partnership to mean engineering and design (i.e. application of the principles of math and science).

Q: When and how can I submit a mini-grant proposal?

A: Proposals can be submitted any time during the year! Proposals are reviewed twice a year, in November and March. Mail or fax proposal to address listed on the form.

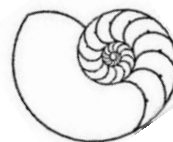
Q: How much funding can I expect to receive? How soon are funds available?

A: Up to \$500 per proposal is available. Consideration is given to one-year renewals. Funds are available to reimburse your expenses right away, following grant approval.

Q: What if I'm not sure if my idea is okay for a WHSTEP Mini-Grant?

A: By all means, contact us at pharcourt@gmail.com or whstep-info@whoi.edu.

To view examples of projects funded in recent years, and to download additional applications, visit the WHSTEP website: <http://www.whoi.edu/whstep>



WHSTEP Spring Science Safari: Wastewater Management: Past, Present and Future

Kama Thieler

On April 25, 2013, 10 teachers and liaisons from Falmouth, Mashpee and Bourne visited the Town of Falmouth's main wastewater treatment plant. Amy Lowell, Falmouth's Assistant Wastewater Manager, led a tour of the facility, outlining the treatment processes and discussing the history and future of wastewater management.



Participants climb the stairs to see the sequencing batch reactor in action. Photo by Kama Thieler.



Amy Lowell, center, describes the phases of water treatment in the reactor. Photo by Kama Thieler.



In the lab, teachers view water samples through microscopes. Photo by Kama Thieler.

The plant was upgraded in 2005 to include a sequencing batch reactor which uses bacteria to remove the nitrogen from wastewater. In the lab, participants viewed some of the microscopic life that lives in the treatment tanks and the state-of-the-art computer system that monitors the facilities.

Resources for teaching about groundwater and wastewater on Cape Cod

Groundwater Guardians: publications and background with many illustrations

<http://www.capecodgroundwater.org/pubs.html>

Wastewater education materials from EPA including posters, diagrams and readings

<http://cfpub.epa.gov/npdes/wastewatermonth.cfm>

MA Water Resources Authority wastewater and water conservation curriculum guides for various grade levels

<http://www.mwra.state.ma.us/02org/html/sticurriculum.htm>

WHSTEP Liaison Quick Reference 2013 - 2014

WHSTEP Executive Committee

| | | | |
|---------------------------------|--------------------------|----------------|---|
| Suzanne Avtges, WHSTEP Co-Chair | Mashpee HS | 539-3600 x2291 | savtges@gmail.com |
| Sara Bysshe | Community representative | | sebysshe@gmail.com |
| Don Estes | Business representative | 548-1758 | landfall46@aol.com |
| Janet Fields | WHOI | 289-2950 | jfields@whoi.edu |
| Patti Parker | Bourne PS | 759-0670 | patti.parker@verizon.net pparker@bourneps.org |
| Lynn Parks | Community Representative | 274-4497 | tchscience@msn.com |
| Kathleen Savage | WHRC | 540-9900 x142 | savage@whrc.org |
| Debbie Scanlon | Community/business rep | 289-7496 | debbie.scanlon@gmail.com |
| Amy Siuda | SEA | 540-3954 x51 | asiuda@sea.edu |
| Ann Vachon | Upper Cape Tech HS | 759-7711 x185 | avachon@uppercapetech.org |
| J.C. Weber, WHSTEP Co-Chair | MBL | 289-7696 | jweber@mbi.edu |
| Pat Harcourt | WHSTEP Administrator | 508 215-9641 | pharcourt@gmail.com whstep-info@whoi.edu |

Institution/Business Liaisons

| | | | |
|--|----------------|---------------|-------------------------|
| Marine Biological Laboratory | Joe Vineis | 289-7179 | jvineis@mbi.edu |
| MBL Ecosystems Center | Kate Morkeski | 289-7772 | kmorkeski@mbi.edu |
| National Marine Fisheries Service | George Liles | 495-2001 | george.liles@noaa.gov |
| Sea Education Association | Juliana Miller | 540-3954 x565 | jmillier@sea.edu |
| US Department of Agriculture | Ron Mack | 563-9303 x247 | ron.mack@aphis.usda.gov |
| US Geological Survey | Claudia Flores | 457-2391 | cflores@usgs.gov |
| | Kate Ackerman | 457-2331 | kackerman@usgs.gov |
| Waquoit Bay Natl Estuarine Res Reserve | Joan Muller | 457-0495x107 | joan.muller@state.ma.us |
| Woods Hole Oceanographic Institution | Judy McDowell | 289-2557 | jmcowell@whoi.edu |
| | Kama Thieler | 289-3478 | kthieler@whoi.edu |
| | Joanne Tromp | 289-3338 | jtromp@whoi.edu |
| Woods Hole Research Center | Craig Connolly | 540-9900 | cconnolly@whrc.org |

WHSTEP School Liaisons

Falmouth

| | | | |
|--------------------------------------|---------------------------------|---------------|--|
| Falmouth Academy (7-12) | Ginny Edgcomb | 457-9696 | vedgcomb@whoi.edu |
| Falmouth High School (9-12, Science) | Chris Brothers | 540-2200 x160 | cbrothers@falmouth.k12.ma.us |
| Lawrence School (7-8, Science) | Bob Porto | 548-0606 | bporto@falmouth.k12.ma.us |
| Lawrence School (7-8, Math) | Carrie Fitzpatrick | 548-0606 | cfitzpatrick@falmouth.k12.ma.us |
| Morse Pond School (5-6) | Linda Werner Stephen Kapulka | 548-7300 | lwerner4@verizon.net skapulka@falmouth.k12.ma.us |
| East Falmouth Elementary (K-4) | Wendy Scholes Kate Skehill | 548-1052 | scholes.wendy@gmail.com kskehill@falmouth.k12.ma.us |
| Mullen-Hall School (K-4) | Trish Mara | 548-0568 | tmara@falmouth.k12.ma.us |
| North Falmouth Elementary (K-4) | Kathy Bowker Debra McCurdy | 563-2334 | kbowker@falmouth.k12.ma.us dmccurdy@falmouth.k12ma.us |
| Teaticket Elementary (K-4) | Gordon Starr | 548-1550 | gstarr@falmouth.k12.ma.us |

Mashpee

| | | | |
|--------------------------------------|-------------------------------|--------------|--|
| Mashpee High School (9-12, Science) | Tom Hoppensteadt | 539-3600 | thoppensteadt@mashpee.k12.ma.us |
| Mashpee Middle School (7-8, Science) | Mark Rosbach Robin Geggatt | 539-3601 | mrosbach@mashpee.k12.ma.us rgeggatt@mashpee.k12.ma.us |
| Quashnet School (3-6) | Sheila Carotenuto | 508-539-1550 | scarotenuto@mashpee.k12.ma.us |
| K.C. Coombs School (K-2) | Lee Horner | 539-1520 | lee.lmh2006@gmail.com |

Bourne

| | | | |
|------------------------------------|---------------------------------|----------------|--|
| Bourne High School (9-12, Science) | Marcia Flavel | 759-0670 | mflavell@bourneps.org |
| Bourne Middle School (5-8) | Robert Ruggiero Sarah Lavoie | 759-0690 | rruggiero@bourneps.org slavoie@bourneps.org |
| Bournedale Elementary (K-4) | Jillian Norton | (508) 743-3800 | jnorton2@bourneps.org |
| Peebles Elementary (K-4) | VACANT | 759-0680 | |
| Upper Cape Tech (9-12) | Kathleen Gausman | 759-7711 x234 | kgausman@uppercapetech.org |

WHSTEP community education and business representatives

| | | | |
|--|---------------|----------|--------------------------|
| | Deb Coulombe | 540-1036 | deb@whmsi.com |
| | Molly Cornell | 540-7652 | mollycornell@comcast.net |
| | Judy Fenwick | 289-3487 | jfenwick@whoi.edu |
| | Pat Perry | 420-0665 | pperrya@msn.com |



WHSTEP Events Winter and Spring 2014

JANUARY

6 Mon 4:00 Executive Committee Meeting
15 **Wed 4:00** **WHSTEP General Meeting** at WHRC

FEBRUARY

3 Mon 4:00 Executive Committee Meeting
13 Thurs Falmouth Academy Science Fair
28 Fri Falmouth District Science Fair

MARCH

1 Sat Falmouth District Science Fair
3 Mon 4:00 Executive Committee Meeting
21 Fri Mini-Grant Proposal Deadline

APRIL

7 Mon 4:00 Executive Committee Meeting
9 **Wed 3:30** **Science/Math Safari**
Date TBA **WHSTEP Family Science Outing**

MAY

5 Mon 4:00 Executive Committee Meeting
8 **Wed 4:00** **WHSTEP Annual Meeting** at WHOI

JUNE

2 Mon 4:00 Executive Committee Meeting

The WOODS HOLE SCIENCE AND TECHNOLOGY EDUCATION PARTNERSHIP (WHSTEP), established in 1989, is a partnership of schools, scientific institutions, businesses, and community resources. Its purpose is to support, promote, and expand science, math, and technology education and science literacy in the participating communities.

How to get involved:

- ✓ Attend a Partnership meeting in January or May, or a Science and Math Safari
- ✓ Contact an Executive Committee member or a liaison with program ideas or feedback
- ✓ Host a teacher tour or class field trip in your lab
- ✓ Volunteer to present your research at a WHSTEP event
- ✓ Serve as a mentor for a student science fair project
- ✓ Make a financial contribution to support WHSTEP programs and grants for teachers

Contact:

General information whstep-info@whoi.edu
Website <http://www.whoi.edu/whstep/>