A Publication
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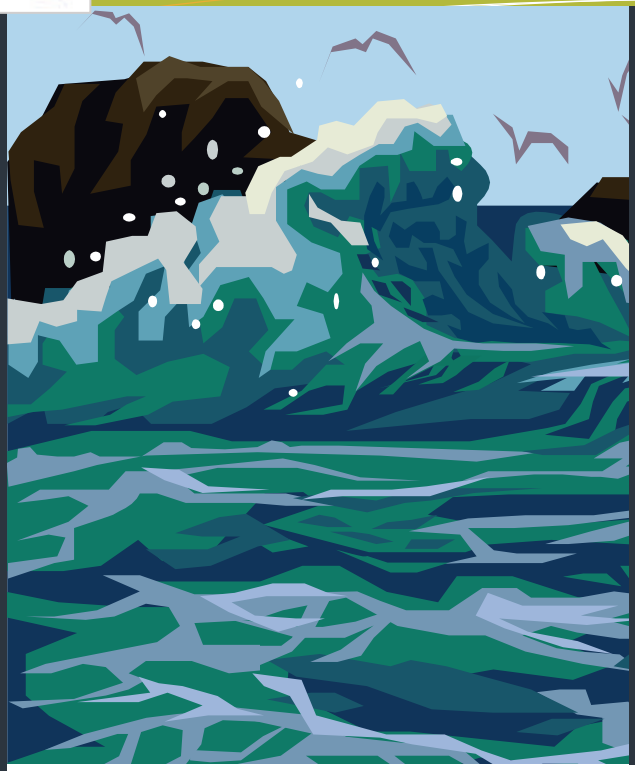
Women in Science



this issue: **Oceans**

Seattle AWIS President's Letter

Greetings AWIS Members!

We have had a fantastic start to our year of programs. A new location and some new member activities, such has a post-program Happy Hour, have brought out new and old members alike. We have also had continued success with our GEMS program, the mentoring program and our Biotech outreach events, the most recent being hosted by Dendreon.

The newsletter has also added a new feature, a member news section in which we are able to highlight news from our local AWIS membership related to their career changes and accomplishments. This will be a great way to document and share the amazing contribution our AWIS membership makes to the biotech community.

This issue builds upon a fantastic October program featuring LuAnne Thompson from the University of Washington Oceanography department. Her talk highlighted not only the amazing research she has undertaken but also her involvement with MPOWIR (Mentoring Physical Oceanography Women to Increase Retention). Read about LuAnne's research and her role mentoring women.

Building on the ocean theme, AWIS board member Melissa Lerch educates AWIS about the pivotal oceanographic research taking place off the Pacific Northwest coast. Our state's leadership in understanding the oceans is something that I think few Washingtonians know about.

The accumulation of toxins in Puget Sound is another topic that does not get enough recognition. In her explanatory article, AWIS board member Fran Solomon describes the research to date about endocrine disruptors found in the waters of Puget Sound. The data may surprise you, but Fran offers ways we can become more engaged in ways to control toxin build-up in our environment.

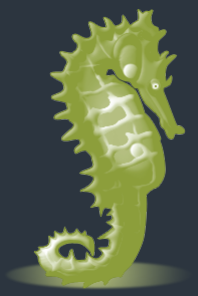
As the calendar year draws to a close, I wanted to express thanks to our many members for their continued support. Our programs are a success because of our member involvement, and we look forward to each event and program as an opportunity to strengthen our networks and friendships.

Best wishes for the coming year!

Jennifer S. McCullar, PhD

Overview of Endocrine Disruptor Chemicals and their Impacts on Puget Sound Aquatic Organisms

By Fran Solomon



Whenever I have out-of-town visitors, I take them on a Puget Sound ferry ride. Everyone always marvels at the beauty and cleanliness of our inland marine waters. Unfortunately, their observations are not entirely accurate. Lurking beneath the seemingly pristine surface is a soup of toxic chemicals in the water column and sediments – chemicals that we manufactured to make our lives better and that are now known to harm the survival, activity, growth, metabolism, and reproduction of fish and wildlife. Many species have declining populations; some such as Puget Sound Chinook salmon and Southern resident orca whales are threatened or endangered.

The topography of Puget Sound increases the vulnerability of its fish and wildlife to toxic chemicals. The Sound is long and deep like a fjord. Additionally, several sea-floor sills limit the entrance of relatively clean Pacific Ocean waters. Therefore, toxic chemicals that enter the Sound are more likely to stay there than in other industrialized water bodies that are flushed more effectively with less polluted water.

Endocrine disruptor chemicals (EDCs) are toxic chemicals "with the potential to alter hormonally mediated signals in plants or animals" (National Research Council, 1999). Normally a hormone binds with a receptor on the surface or interior of a cell and induces a physiological or behavioral response. When an EDC is present, it binds with the receptor and blocks or mimics hormones. When a hormone is mimicked, cells respond to the EDC as they would respond to the hormone . The consequences are fascinating, alarming, and far-reaching.

EDCs are found in everyday products, and are discharged to the waters of Puget Sound via sewage, stormwater, industrial waste, soil percolation, and atmospheric deposition.

The Washington Toxics Coalition (www.watoxics.org) and People for Puget Sound (www.pugetsound.org) confirmed that a group of industrial chemicals called phthalates, which are a component of soft plastic and of fragrance in many personal care products, enter Puget Sound via laundry water. In their study "Puget Sound Down the Drain," they collected and analyzed household dust and laundry water samples from six homes in the region and found phthalates in every sample. There was a positive correlation between levels of diethylhexyl phthalate (DEHP) in dust and laundry water in each home. Phthalates off-gas to air, attach to dust, settle on clothes, and then end up in laundry water which goes to sewage treatment plants. However, phthalates and other EDCs are not removed from sewage. Each year, 9,363 pounds of DEHP alone are legally discharged from sewage treatment plants in the Puget Sound region.

This article will explain why EDCs are toxic, how aquatic organisms are exposed, which specific

groups of EDCs and mixtures of EDCs are damaging our aquatic resources, and what we can do to prevent and reduce discharge of EDCs to Puget Sound.

Properties and Exposure Pathways of EDCs

Several properties of EDCs contribute to their toxicity. They dissolve in fats, are rapidly absorbed through cell membranes, and persist in fatty tissues. EDCs undergo bioconcentration and biomagnification. Bioconcentration means that the concentration of an EDC in an organism is higher than in the surrounding water or sediments. Biomagnification refers to increased concentrations of an EDC at each higher level of a food chain. Puget Sound orca whales, other large marine mammals, birds of prey such as osprey and eagles, and humans will have the highest concentrations (levels) of EDCs in their bodies.

Fish are exposed to EDCs via diffusion across gill membranes, skin absorption, ingestion of contaminated water and sediments, and via the food chain. Early life stages are especially vulnerable to the effects of EDCs. A given amount of an EDC will be a higher percentage of a young fish's body weight or body volume than that of an adult. The higher breathing, metabolic, and growth rates of fish larvae and juvenile fish will also lead to faster and greater uptake of EDCs. Furthermore, young fish do not have fully developed detoxification systems as do adults.

Examples of EDCs Impacts

Polychlorinated biphenyls (PCBs) were formerly used in the electrical industry because of their heat resistance, inflammability, and insulating properties. Although they were banned in the U.S. in the 1970s, they continue to persist in soil, sediments, and fatty tissues of organisms such as Puget Sound fish and wildlife.

For more than 20 years, the Washington Department of Fish and Wildlife (WDFW) has been sampling Puget Sound fish for the presence of PCBs and other toxic chemicals. Every two years, WDFW biologists sample 120 English sole at each of 10 locations in Puget Sound. Because English sole feed in the sediments at the bottom of the Sound, PCBs levels in these fish reflect sediment levels of PCBs. The accumulation of PCBs in sediments and aquatic organisms means that these both can be considered reservoirs of PCBs in Puget Sound. Scientists are not finding declines in PCBs levels in our local fish.

Puget Sound Southern resident orca whales have the highest PCBs levels of any whales on Earth. This is because they are at the top of the food chain and eat Chinook salmon that have accumulated PCBs from their prey. Puget Sound Chinook salmon are more contaminated with PCBs than other salmon populations on the Pacific Coast of North America. Some ospreys and orca whales have high enough levels of PCBs in their bodies to weaken their immune systems.

Polybrominated diphenyl ethers (PBDEs), which are used as flame retardants, are structurally similar to PCBs, and have similar endocrine-disrupting effects on the immune system. Scientists from Seattle's Northwest Fisheries Science Center found that juvenile salmon exposed to environmentally realistic levels of PBDEs are more susceptible to infections than are non-exposed salmon. Captive harbor seals from the inland marine waters of British Columbia (an extension of Puget Sound) were fed from an area contaminated with PCBs and PBDEs; the seals also had depressed immune systems.

The Southern resident orca population declined by 20% between 1996 and 2001. Their body burden of PCBs and PBDEs is a likely contributor. When Chinook salmon populations declined in the 1990s, the orcas may have used up some of their fat stores, thereby releasing PCBs and PBDEs into their blood and making them more vulnerable to disease.

Another EDC is bisphenol-A (BPA), a component of hard plastic in baby bottles and sports water bottles and of the resins that line food cans. Unfortunately, BPA can leach out of the products in which it is found. A recent King County survey of EDCs in freshwater detected BPA in 25% of river and stream samples and in all stormwater samples. Recent monitoring by the Northwest Fisheries Science Center detected BPA in the bile of 10% to 100% of tested English sole, depending on their location. BPA is an estrogen mimic. Laboratory tests of fish exposed to environmen-

Overview of Endocrine Disruptor Chemicals and their Impacts on Puget Sound Aquatic Organisms

continued from page 3

tally realistic levels of BPA have demonstrated an altered hormonal balance and disrupted sperm production. The reproductive health of Puget Sound fish could be compromised by this EDC.

By blocking testosterone, the group of EDCs called phthalates can also harm the reproductive health of fish and other aquatic organisms in Puget Sound. Phthalates have been found throughout the Sound, including 13 of 18 sediment cleanup sites as well as in salmon, fin fish such as English sole, shellfish such as crabs, and sediment-dwelling invertebrates. Some phthalates interact synergistically so that the total toxicity of a mixture in Puget Sound will be greater than the sums of the individual toxicities.

Sediments in urban areas of Puget Sound frequently contain phthalates above the Washington Department of Ecology cleanup levels, which are set to protect aquatic organisms. Impaired reproduction has been observed in mussels and sand fleas that live in the sediments of Thea Foss Waterway in Commencement Bay. When larval development is disrupted, fewer animals hatch from eggs and/or emergence from eggs is delayed. The result is fewer live offspring and smaller populations. Mussels and sand fleas make up the bottom of the food chain. When populations of these insects and shellfish are impacted, there will be less food for fish and other organisms at higher trophic levels and consequently, repercussions throughout the ecosystem. Research also indicates that phthalates affect fish directly. Exposure of rainbow trout to an environmentally realistic level of dibutyl phthalate affected their ability to grow normally.

Another group of EDCs are the perfluorinated compounds (PFCs). Often referred to as teflon chemicals because of their use in the manufacture of non-stick cookware, they are also a component of stain-resistant materials. They are detected in the waters and wildlife of Puget Sound and many rivers in Washington State. Their ability to cause tumors in trout exposed in the lab to environmentally realistic concentrations and their presence at elevated levels in California river otters that died of infectious diseases suggests that PFCs may harm the immune systems of fish and aquatic mammals. Although research about PFCs in Puget Sound biota is in the early stages, impacts observed elsewhere could be found here as well.

Puget Sound Southern resident orca whales have the highest PCBs levels of any whales on Earth.

Aquatic organisms are usually exposed to mixtures of EDCs rather than to one chemical or one group of chemicals at a time. In the springs of 1997-2001, male English sole were surveyed at 16 sites in Puget Sound for the presence of vitellogenin (vtg). This is an egg yolk protein normally produced by female fish, and is therefore a straightforward biomarker of exposure to EDCs that mimic estrogen. Vtg was detected in male English sole at 12 of the 16 sites. Not surprisingly, the highest levels were in fish from the most industrialized and urbanized bays, e.g., Elliott Bay in Seattle and Commencement Bay in Tacoma. Between 12% to 47% of male fish were affected at sites in these bays. Delayed spawning was also observed in male and female English sole at three Elliott Bay sites with the highest percentages of males producing vtg. The female fish at these sites released their eggs later in the season after other Puget Sound fish had completed spawning. This delayed spawning could ultimately result in less successful reproduction.

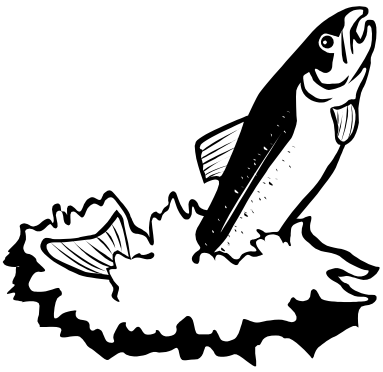
Production of vtg has also been observed in juvenile salmon living near stormwater and wastewater treatment plant out-

falls in the Puget Sound region. In a recent study, Battelle Sequim scientists observed decreased fertility and increased vtg production in male trout near the White River sewage treatment plant outfall. Synthetic estrogens and fluoxetine (Prozac) were detected at this site. Prozac impacts pituitary gland function in fish.

Regulatory Reform and Other Actions

To decrease the exposure of Puget Sound fish and wildlife as well as human exposure to EDCs, it is necessary to ban or restrict the manufacture and use of these chemicals. Washington State has led the way by banning PBDEs (2007), restricting phthalate concentrations in children's products (2008), and banning BPA in baby bottles and sports water bottles (2010).

Unfortunately, federal policy has lagged behind, but there are signs of possible change. Senator Frank Lautenberg (D-NJ) introduced the Safe Chemicals Act (S. 847) into the U.S. Senate on April 14, 2011. This bill would update the 1976 Toxic Substances Control Act by making manufacturers prove that the chemicals they use in their products are safe for the environment and human health before they are allowed on the market. Hearings were held by the Senate Committee on Environment and Public Works on November 17, 2011.



Puget Sound Chinook salmon are more contaminated with PCBs than other salmon populations on the Pacific Coast of North America.

The Safe Chemicals Act is an important piece of legislation that will help protect Puget Sound from further toxic contamination. I encourage the readers of this article to phone the U.S. Capitol switchboard (202-224-3121) to urge Senator Maria Cantwell and Senator Patty Murray to co-sponsor and vote for this bill. Additionally, I am working with the Washington Toxics Coalition to write a letter from environmental scientists to our senators to urge them to co-sponsor S. 847. The letter will be sent during the first quarter of 2012. If you would like to see and potentially sign the letter, please contact me (fran@enviroteach.com).

Fran Solomon, Ph.D., is an AWIS board member, head of the Scholarship Committee; Visiting Faculty, The Evergreen State College; Adjunct Faculty, Western Washington University; and Owner, Environmental Teaching International.

What You Can Do

As well as supporting regulatory reform, there are several actions that we can take as individuals to help prevent and reduce the discharge of EDCs to Puget Sound. Here are some suggestions.

- Avoid or decrease the use of pesticides in your home or garden. Many pesticides are EDCs.
- Use fragrance-free (hence phthalates-free) personal care and cleaning products, e.g., Seventh Generation laundry detergent.
- Avoid the use of polyvinyl chloride (PVC) products such as shower curtains and vinyl floors because the phthalates used in the manufacture of PVC can get washed down the drain to Puget Sound.
- Do not flush unused pharmaceuticals down the sink or toilet; some of these products are EDCs. Bring these products to a pharmacy for disposal (www.disposemymeds.org).
- Get involved in an environmental nonprofit organization that addresses EDCs issues. Two outstanding examples are the Washington Toxics Coalition and People for Puget Sound.

Local View: Oceanography off the coast of Washington and Oregon

By Melissa Lerch

Living in the Pacific Northwest, we are surrounded by water. Puget Sound, lakes, and rivers divide the landscape. Even the rain encompasses us. But what do we really know about the science of the ocean? In many ways we know more about the surface of Mars than our own planet because Earth is covered in water. Some areas of the ocean have been well studied, like the tropical equator. California has a long history of constant monitoring of the ocean at its coast through CalCOFI (California Cooperative Oceanic Fisheries Investigation), established 62 years ago to monitor the collapse of the sardine population off the coast of California. The program has been adapted to track changes in the biodiversity and composition of the ocean. But the Pacific Northwest has not been sampled nearly as often or regularly. And many of us are unaware of the research that is being done in our local waters.

The University of Washington (UW) has one of the top Oceanographic Institutes in the world, complete with its own fleet of research vessels. The presence of such a prominent school of oceanography might lead you to believe that the coast of Washington would be a natural place to study; however, the local waters are cold, rough with high winds, and difficult to access. This situation is in stark contrast to California, Oregon, or the East Coast that all have a thriving economy along their coastlines. Washington has only a handful of sleepy coastal towns.

In recent years, ocean acidification, large scale fish die-offs due to hypoxia in the Hood Canal, and general decreases in fisheries have led to more interest in studying Puget Sound and the Washington coastline. The Northwest Association of Networked Ocean Observing Systems (NANOOS) was formed to provide a monitoring system to collect, analyze, and model data. These results are used to create an integrated picture of the ocean for developing forecasting and decision-making tools to improve safety, enhance the economy, and protect our environment. NANOOS is a partnership of over 40 independent academic, tribal, government, and non-governmental organizations. The products of NANOOS include real-time weather quality analysis, a Google-based interactive map for tsunami evacuation routes, and a one-stop shopping site for tides, currents, and weather conditions for mariners.

> UW has one of the top oceanographic institutes in the world, complete with its own fleet of research vessels.

Jan Newton, Executive Director of NANOOS, is a biological oceanographer at the Applied Physics Lab (APL) who uses a system-based approach to marine ecosystems, assessing the impact of humans, watershed, oceans and climate. She has played a fundamental role in the Hood Canal Low Dissolved Oxygen Program as well as heading up the ocean-monitoring program. She has determined that low dissolved oxygen could contribute to oyster reproductive failures, but ocean acidification may also play a role.

Ocean acidification is primarily due to the absorption of carbon dioxide from the atmosphere by the ocean. This absorption leads to a reduction in the carbonate ion concentration, in turn lowering ocean pH. More specifically, when carbon dioxide dissolves in seawater, carbonic acid is formed, which releases hydrogen ions and bicarbonate ions. The increase in hydrogen ions can result in a reduction of carbonate ion required for shell formation (see equations on next page). Consumption of carbonate ions impedes calcification processes because the surrounding seawater must be saturated with

carbonate for shell formation. As the ocean becomes more acidic, shellfish do not develop properly, including effects on both larval metamorphosis and the formation of calcium carbonate shells. The effects can be widespread and linked to declines in shellfish populations and changes in plankton— the base of the food chain in the ocean. In addition to the carbon dioxide inputs from the atmosphere, local anthropogenic conditions like agricultural and residential runoffs, soil erosion, or logging can also lead to localized hotspots. These hotspots drive the need for an effective monitoring program, including a good understanding of the physical oceanography underlying water and energy transport and mixing events.

Jan Newton recruited Matthew Alford, a physical oceanographer at APL, to the Washington monitoring program to design an instrument to help them monitor the hotspots. His research team, affectionately called the Wave Chasers, primarily studies internal waves that transfer energy through the ocean. Unlike surface waves that we can see and appreciate, these waves are deep under the surface of the ocean and can range from 100m to 1000m; literally, the skyscrapers of waves. The Wave Chasers travel around the globe to track and understand the impact of these waves.

Alford and his team are also invested in understanding the situation in local waters, as part of the Northwest Enhanced Moored Observatory (NEMO), which consists of a heavily-instrumented real-time networked profiling buoy, a real-time subsurface profiling mooring, and a Seaglider to collect spatial information. Seagliders are remotely operated instruments that collect data from the surface to the deep ocean. They are typically deployed for three to six weeks, returning to the surface every six hours to transmit data and receive instructions. The project improves the understanding of complex physical, chemical and biological processes on the largely unsampled Washington shelf. It may lead to a greater understanding of anthropogenic inputs following storms or other crucial checks of the health of the Pacific Ocean and Puget Sound. With that information in hand, recommendations can be made to help save the Sound, including economically vital food species. The Quileute Tribe had a contest to name the buoy because of the importance of salmon and shellfish to the local Indian tribes; they chose Cha-ba (pronounced chay buh), meaning whale tail. Murdock Charitable Trust funded a large part of this project, upholding its mission to enrich the quality of life for people in the Pacific Northwest. Cha-Ba is located just 14 miles off the coast of Washington near La Push.

Cha-ba was conceived, designed, and built by the Wave Chaser group. It features a wind-powered generator to produce its own power and NOAA sensors mounted on board. “The mooring measures variables like nitrogen, oxygen, and chlorophyll, indicating the phytoplankton for understanding the biology of the system. Water velocity,

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Carbon dioxide dissolved in water forms carbonic acid:

$$CO_2 + H_2O \leftrightarrow H_2CO_3$$

Carbonic acid disassociates in seawater, releasing bicarbonate and the hydrogen ion that increases the pH:

$$H_2CO_3 \leftrightarrow H^+ + HCO_3^-$$

The released hydrogen ions can then combine with the carbonate ion, reducing its availability for calcification:

$$H^+ + CO_3^{2-} \leftrightarrow HCO_3^-$$

Ocean Variability, Climate Change, and Global Health

By Melissa Lerch

Professor LuAnne Thompson from the Oceanography Department at the University of Washington presented an overview of the role of the ocean in climate variability. Many climate scientists focus on the atmosphere contribution to climate change. But the ocean may well hold the key to long-term climate change because it acts as a buffer to store heat and release energy into the atmosphere. See the sidebar for an overview of her model system.

One of Dr. Thompson's former graduate students focused on the interplay of the ocean and the atmosphere with respect to storm strength. For storms near the Gulf Stream, an increase in sea surface temperature correlated with increased storm intensity. This helps to explain why the storm intensity during hurricane season varies from year-to-year and may show an overall trend of increasing in strength as the surface of the ocean warms.

Thompson's current research focuses on the Gulf Stream and the effect of the heat loss from the ocean with respect to seasonality. There are two main times of the year when the north Atlantic ocean radiates heat into the atmosphere, in May-June and December. The

Modeling the Oceans' Effect on Climate Change

Attendees learned from Dr. Thompson how the top five meters of the world's oceans hold as much heat as the entire atmosphere. In fact, roughly 90 percent of the excess heat of climate is held in the ocean. This may come as a surprise to those who associate climate with atmospheric weather. We may spend most of our time discussing ways to limit greenhouse gas emissions, but the vast heat stored in the ocean means we are already committed to a certain level of climate change. The oceans are a powerful player in weather systems as a result of their storage and buffering of heat and carbon dioxide (CO_2). Dr. Thompson has described a model outlining basic controls for heat storage in the upper ocean (see figure) that have enabled her to test many hypotheses related to the role of oceans and climate change. The ocean role begins with its movement of heat energy.

Earth's energy balance consists of solar radiation brought in from the sun and longwave radiation moving out. The outgoing longwave radiation is primarily low energy infrared emitted by the atmosphere. The oceans and atmosphere move heat from Earth's equator to the poles, but the heat transfer by each ocean varies widely. This ocean heat transfer, or thermohaline circulation, is known as the Great Ocean Conveyor Belt. Heat moves, generally speaking, in shallow currents from the Pacific to the Indian to the Atlantic oceans where it joins the Gulf Stream. In the north Atlantic, the ocean releases heat to the atmosphere. As the water cools, it sinks and propels the flow of cold water in deep currents from the Atlantic to the Indian and back to the Pacific oceans. This thermohaline circulation is critical to the warmer temperatures enjoyed by nations at high latitude such as those in Western Europe and even states along the eastern coast of the United States.

Dr. Thompson and her students study a critical piece of the ocean conveyor belt, the Gulf Stream, using sea level data measured by satellite. Sea level is a proxy for

December heat loss is relatively well understood, but they are uncertain what drives the heat loss during the May-June period. Her group is testing if the June heat loss could correlate with a calm atmosphere. Check back for her latest results.

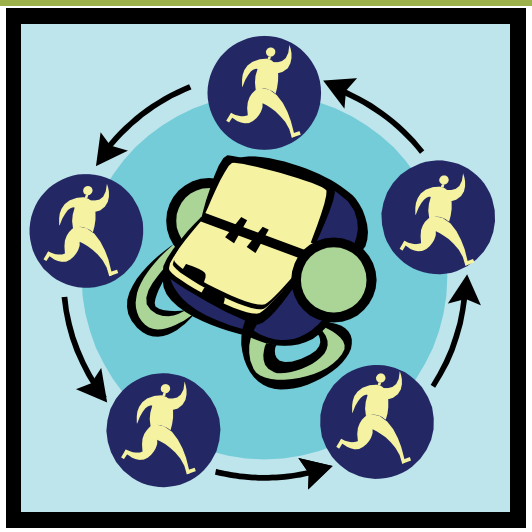
Thompson has been a great advocate for women in science. She has been fundamental in organizing MPOWIR, a group that provides mentoring to women in physical oceanography (details in the right sidebar). Her recent article in Nature Geoscience highlights the stark drop of women obtaining tenure-track jobs in physical oceanography in the last 10 years. Twenty-four percent of male graduate students obtain tenure-track jobs; women who graduated between 1980 and 1990 were able to attain a similar percentage of success. However, data for graduates from 1995 to 2005 reveal that only 8 percent of women obtained tenure track jobs. There is not a readily identifiable reason for the decline in recruiting female faculty. Thompson hypothesized that it may be related to early recruitment of women to satisfy a diversity quotient that many departments strove to achieve, ultimately limiting their desire to continue to recruit more women.

Analysis of the faculty recruitment and gender data in her field of oceanography required some conjecture in the realm of social behavior and sparked Thompson to consider other complex questions at the interface of science and humanity. She became a global health fellow along with 15 other UW colleagues to investigate the interaction of climate, environment, and human health. The group has diverse goals ranging from establishing community gardens in Peru to evaluating the interplay of climate change and infectious disease. Her specific project is evaluating the interaction of climate and HIV/AIDS. One of the primary concerns in this area is the presence of opportunistic infections in HIV+ patients resulting from climate variability. There are a number of other important factors to consider like social unrest, and even the interaction of agriculture/ecosystems and climate. The questions are very complex, with each field using widely different metrics for inputs and to measure outcomes. The interdisciplinary nature of this research should bring new insight into the complex problems with inventive solutions.

surface pressure and upper ocean heat content. There is a one meter difference in sea level above and below the Gulf Stream. Sea level is higher *below* the Gulf Stream because the water is warmer. By combining the sea level data with storm tracking information, one of Dr. Thompson's students was able to determine that warmer sea surface temperatures and a smaller heat gradient lead to stronger storms in the north Atlantic. Analyses of these relationships will prove critical to our understanding of the ramifications of a global climate change.

MPOWIR ("Mentoring Physical Oceanography Women to Increase Retention"), is an organization dedicated to helping women studying oceanography to build their careers.
http://mpowir.org/
From the web site: "The overall goal of MPOWIR is to make mentoring opportunities for junior physical oceanographers universally available and of higher quality by expanding the reach of mentoring opportunities beyond individual home institutions. The aim is to reduce the barriers to career development for all junior scientists in the field, with a particular focus on improving the retention of junior women."

Dr. Thompson analyzed the career trajectories of men and women earning oceanography degrees, determining that women's representation in tenure-track faculty positions was near parity in x to x, but is now severely lagging. Bringing attention to this discrepancy has started important conversations about career support for women. To see the article, see Nature Geosciences **4**:211–212 (2011) doi:10.1038/ngeo1113 (http://www.nature.com/ngeo/journal/v4/n4/full/ngeo1113.html).



Networking Your Way to Success

By Nadia Kulshina

Sherri Edwards, founder of Resource Maximizer, a business she started in order to "empower people to find rewarding work and build dynamic workplaces," spoke to AWIS program attendees this November about the role of networking in career development and advancement. She is a consultant, motivational speaker and trainer, with more than 25 years of experience working with small to medium size businesses, non-profit organizations and public agencies.

In a lively and informative presentation, Ms. Edwards made some key points to ensure networking success. 1) It is important to network not only at the time when you are actively looking for a new job, but also when you are steadily employed. This will ensure preparedness in the case of a lay-off or may be helpful for career advancement if an interesting opportunity comes up. 2) To maintain an effective network it is crucial to stay in touch with your contacts. 3) Come prepared to networking events; for example, have business cards, know who you want to talk to, and don't be shy!

After a 30-minute formal presentation, attendess proceeded to Happy Hour at Joey's on Eastlake. Ms. Edwards could not join, but this event turned out to be a very popular with the audience— about 20-30 women came to Happy Hour. We plan to use this format again in the future.

Sherri Edwards' Advice:

1. Never stop networking
2. Stay in touch with your contacts
3. Come prepared to networking events

Biotechnology and Pharmaceutical Industry News

By Cathy Manner

Bristol-Myers Squibb Company and **Johnson & Johnson** have announced a partnership to study a potential combination therapy for chronic hepatitis C. The companies will initiate clinical testing in the first half of 2012 of a drug cocktail that combines Johnson & Johnson's TMC435 with Bristol-Myers Squibb's daclatasvir. The cocktail will be tested with and without the standard therapies ribavirin and pegylated interferon. As oral drugs, TMC435 and daclatasvir potentially offer significant advantages over interferon, which is administered intravenously and can cause serious side effects. (Bloomberg Businessweek, December 2, 2011)

Civitas Therapeutics has received a grant from the Michael J. Fox Foundation for Parkinson's Research (MJFF) to support development of an inhaled form of levodopa (L-dopa) for Parkinson's disease. L-dopa is currently taken in pill form several times daily, but it can be difficult to maintain optimal levels of the drug in the blood to effectively control symptoms while minimizing side effects. Civitas will use the MJFF grant and $20 million in Series A funding received earlier in 2011 to support two clinical trials of CVT-301 over the next year. (Xconomy, November 29, 2011)

Eli Lilly gives Seattle's IDRI $4.2 million to continue its TB drug development effort.

The US Food and Drug Administration (FDA) has revoked approval of **Genentech**'s drug Avastin® (bevacizumab) for the treatment of metastatic breast cancer. The drug received accelerated approval for this indication in 2008, contingent upon completion of two confirmatory clinical trials. Those trials showed that Avastin—which can cause severe side effects, including heart attacks and heart failure— delayed tumor growth slightly but did not improve survival or quality of life. Avastin, which inhibits the development of the new blood vessels necessary for tumor growth (angiogenesis), is still approved for the treatment of metastatic colorectal cancer and kidney cancer, advanced non-small cell lung cancer, and glioblastoma. (National Cancer Institute Cancer Bulletin, November 29, 2011)

Eli Lilly and Company, which previously pledged $6 million in cash and $9 million in in-kind donations to establish the non-profit Lilly Tuberculosis (TB) Drug Discovery Initiative, has agreed to provide an additional $4.2 million to Seattle's Infectious Disease Research Institute, which houses the Initiative, to continue its drug development efforts. The Initiative is a public-private partnership that aims to accelerate early-stage drug discovery by bringing together specialists from around the world to screen large, privately owned molecular libraries for new TB treatments. TB, a contagious lung disease, killed an estimated 1.7 million people in 2009, primarily in Southeast Asia and Africa. (Xconomy, November 17, 2011, and http://www.tbdrugdiscovery.org/)

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Local View: Oceanography in Washington and Oregon

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temperature, and salinity are used for understanding the physical conditions of the water column that can vary dramatically from the deep water to the surface," says Alford. In order to get a really solid dataset to detect and define the threats to Puget Sound, about a dozen more high-tech buoys are needed. The datasets are available to the public with no embargo, allowing immediate analysis by anyone in the world.

Wave Chaser John Mickett has taken the lead on ensuring that Cha-ba gets top-notch engineering to provide a complete and accurate data record. Alford's graduate student Shuang Zhang has analyzed the dataset to determine where the internal waves are generated and where the energy generated off the coast of Washington may be going. Her project is complicated by the use of a single mooring rather than a series that would allow her to triangulate the origins of the waves. Cha-ba is located near the Juan de Fuca submarine canyon, making it an interesting study site for internal waves. Topography on the ocean floor can contribute to the energy propagation and dissipation of internal waves. This project is the first in-depth analysis of its kind off the Washington coast and Alford's group and the Wave chasers are excited to analyze the data.

NEMO and NANOOS are collaborative projects aimed at understanding the oceans of the Pacific Northwest from a biological, chemical, and physical perspective. The results of these studies will lead to improved recommendations for accessing and protecting our ocean.

See page 13 for Wave Chaser links

Melissa Lerch is an AWIS board member, co-chair of the Programs Committee.

Biotechnology and Pharmaceutical Industry News

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Geron, which initiated the world's first clinical trial of a human embryonic stem cell therapy in 2010, has announced that it will end that trial and terminate its stem cell program. The company stated that these decisions were made to conserve resources in the current economic climate and do not reflect doubts about the promise of stem cell therapy. By reducing its workforce by 38% (66 people) and focusing efforts on its cancer drugs, which are further along in development, Geron should be able to survive on its current capital resources until it receives the results of the oncology clinical trials within the next 18 months. Geron hopes to sell or license its stem cell program to another company that would continue it. (New York Times, November 14, 2011)

Cathy Manner is an AWIS member and former Newsletter Committee Chair

Just for fun check out the Wave Chaser's CrushCam from a recent cruise to Samoa. The Wave Chasers used a camera to film gummy bears being crushed at high pressure under water. The videos were featured on UW News and their blog.

UW News link:
http://www.washington.edu/news/articles/wavechasers-condemn-gummy-bears-to-crushing-ocean-depths

Blog link:
http://mokuleia.apl.washington.edu/~malford/wavechasersblog/Wavechasers_Blog/Samoan_Passage/Entries/2011/10/29_Crush_Cam.html

Related links:
http://wavechasers.apl.washington.edu
http://hoodcanal.washington.edu
http://nanoos.org/nvs/nvs.php

Seattle AWIS Member Updates

This space is intended to showcase the career changes of our membership, be it promotion, job change or career milestone. Please send your news to newsletter@seattleawis.org

Annika Fain joined Confluence Environmental Company as a Senior Hydrologist. Annika's main focus will be hydrologic, hydraulic, and hydrodynamic studies supporting diverse projects including river geomorphologic analysis, wetland restoration, and coastal and estuarine habitat projects. Since joining Confluence Environmental Company, Annika has quickly engaged in complex analyses of hydrodynamics and sediment fate and transport for clients at two Northwest Superfund Sites.
http://www.confenv.com

CONFLUENCE
ENVIRONMENTAL COMPANY

An article by Wendy Lawrence at ParentMap.com about how scholastic performance can be hindered by stereotypes draws on the personal experience of AWIS board member **Reitha Weeks**, Resident Scientist at Northwest Association for Biomedical Research. Reitha gives tips for encouraging girls to approach math and science and lets parents realize how to be role models.
http://www.parentmap.com/article/encouraging-girls-in-math-and-science

Outgoing AWIS board member **Denise Inman** joined the faculty of the Northwest Ohio Medical University in Rootstown, Ohio. She will be an assistant professor in the department of pharmaceutical sciences.
http://www.neomed.edu

Northeast Ohio
MEDICAL UNIVERSITY

AWIS Programs 2012

Date	Speaker	Topic
Jan 18	Pacific Science Center and Northwest Association for Biomedical Research	Science Communication Forum
Feb 15	Tanya Parish, PhD. Director of Drug Discovery, IDRI	
March 21	Panel Discussion	Work-life Balance
April 18	Kathyrn Hinsch Founder and President of Women's Bioethics Project	
May 16	TBA	
June 20	TBA	End of Year Social

Meetings are at FHCRC, Pelton Auditorium at 6 pm.
Meetings are free and Open to all.

www.seattleawis.org

Become part of the Seattle AWIS online community!

AWIS
ASSOCIATION FOR WOMEN IN SCIENCE
Seattle

Our goal is to create a broad interdisciplinary environment dedicated to advancing the careers of women in science and technology and to promoting the participation of girls in the sciences. We offer:

- Monthly meetings
- A newsletter
- Networking opportunities with local professionals in your field
- The opportunity to mentor and be mentored through chapter-based and Internet resources

Please contact the Programs Committee for info and input: Programs@seattleawis.org

Contact info@seattleawis.org to be added to our mailing list

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