Stories of Science: Website Content & Design

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ABSTRACT

One key method for scientists to share their research is through an extensive presence on the web. This summer as a science communication intern, I updated the web pages of the Environmental Sample Processor (ESP) led by Jim Birch, the Acoustical Ocean Ecology Group led by Kelly Benoit-Bird, and two technology project pages led by Tom O'Reilly. A major component of updating these websites was identifying effective scaffolding of information and designing intuitive navigation schemes. In addition, I ran the summer intern blog which included intern profiles, activities, and a weekly mystery photo contest. Over the course of 10 weeks at the Monterey Bay Aquarium Research Institute (MBARI), I created, updated, or edited more than 60 web pages or posts.

INTRODUCTION

Communicating science to audiences ranging from scientists to the general public requires a multipronged approach. Interested researchers seek more technical information, while curious members of the public might want broad, clearly explained overviews of research. To achieve this over the internet, multiple styles of writing must be employed over a variety of web pages.

For my 10-week internship with Nancy Barr, the print and web project manager at the Monterey Bay Aquarium Research Institute (MBARI), I was tasked with updating the web pages of several different projects. The first of these, two technology projects led by Mechanical Engineer Tom

O'Reilly, served as an excellent introduction to the style of MBARI writing and to MBARI website's platform, WordPress. I updated the pages about the mobile autonomous cytometer and the Wave Glider Hot Spot with more specific information and redesigned the organization of the content. The goal of the first of these projects is to mount an autonomous flow cytometer to an autonomous underwater vehicle, thereby allowing flow cytometry to be run in situ. The project involves the deployment of Wave Gliders with a variety of modems that turn it into a communication hub that connects autonomous underwater vehicles (AUVs) to the shore.

My second project was to update the lab page of the Acoustical Ocean Ecology Group, led by Scientist Kelly Benoit-Bird. The lab uses active acoustics to explore pelagic ocean ecology, looking specifically at community interactions, such as schooling or predator-prey dynamics. I also wrote two "behind-the-scenes" short news stories about Benoit-Bird's work. One article focused on a small, but unexpected discovery about the acoustic signature of diving common and thick-billed murres, while the other focused on the collaborative effort to create a more streamlined deployment system for the group's echosounder, a tool used to send and receive soundwaves.

My third, and largest project was redesigning the pages for the Environmental Sample Processor (ESP), an instrument designed by the SURF Center (Sensors: Underwater Research for the Future). The ESP takes water samples and runs biochemical assays to determine the presence and populations of microbial communities. The original ESP website lacked a coherent navigation due to the instruments straddling between science and technology. It originally had both a vague page under the science section and a more descriptive section about the actual instrument under the technology page. However, the technology page required more clicks to navigate to, so a major focus was redesigning the website so that readers could navigate easier within the science-technology spectrum.

My final project was to run the intern blog, which was intended to serve as promotional material for future interns. A large part of this was putting together intern profiles and activities, but a "mystery" image contest was also used to ensure regular content and provide an element of interactivity.

MATERIALS AND METHODS

SOURCES

For each project, I began by scanning the original MBARI web pages of the scientists and/or technology, and then further exploring related information through the annual reports (http://www.mbari.org/about/annual-reports/) and any relevant publications. For the two larger lab group projects, I then prepared questions for the leading scientists/engineers involved in each project. These questions were designed to prompt information for specific sections, with a tentative layout in mind. In addition to these major sources, I also attended lab meetings and watched presentations (both in-person and archival recordings). This process was also useful for writing the two behind-the-scenes articles.

In the case of the autonomous cytometer and the Wave Glider Hot Spot, I relied on project reports written by Tom O'Reilly to produce the bulk of the content, then met with O'Reilly for review and further questions.

For the intern blog, I first looked over the initial intern blog from 2010 (https://mbari2010interns.wordpress.com/) to determine style and content ideas.

Most photos used came from either the MBARI archives or were taken by current MBARI staff or myself. In the case of the ESP, some photos came from non-MBARI collaborators.

To learn more about different tools and software available to me, I used the tutorials offered on Lynda.com.

LAB GROUP WEB PAGE DESIGN AND CONTENT ORGANIZATION

All content was designed using WordPress. For group and technology pages, I used the page style template. For the intern blog, I used the post template.

For the two larger web page projects (the ESP and Acoustical Ecology groups), I first needed a basic template. To come up with a very general layout, I explored the pages of different MBARI lab groups, paying close attention to both design and content. As my base model, I used the Submarine Volcanoes lab group (www.mbari.org/science/seafloor-processes/volcanoes) which featured an introductory homepage and a grid-style menu to allow the user to navigate to pages about specific areas of research.

After briefly brainstorming a general idea of topics to include in a web page and conducting interviews (see Sources), I spoke with the lead scientist of the project to outline possible pages. This typically involved visual explanations in which we drew out different possible solutions on paper.

From there, I created a skeleton of web pages in WordPress, publishing them on the MBARI website with a protective password in order to test navigation ideas. To navigate through the pages, I used post tags to pull intended pages into grids at the bottom of each page. This process was repeated several times for the ESP web page as the intended content and navigation evolved over time.

On each page I included specific subsections with a basic outline of intended content and potential photos before beginning to write. To write content, I relied heavily on primary MBARI sources and interviews. I focused on writing small snippets of different types of research to represent the entirety of the lab group.

For the autonomous cytometer and Wave Glider Hot Spot, I first read through the project descriptions, highlighting and color-coding text into three categories of what, why, and how. I then reorganized the text by the overarching subject, divided by subheaders.

WRITING BEHIND-THE-SCENES ARTICLES

To write two Behind-the-Scenes (BTS) articles featuring the Acoustical Ocean Ecology Group, I attended Kelly Benoit-Bird and Larry Bird's joint presentation on the Day of Engineering, Science, and Technology (DOEST). I learned about Kelly Benoit-Bird's research, which is facilitated by the echosounder deployment system built by Larry Bird and identified potential stories. After further interviewing Kelly Benoit-Bird and Larry Bird, I wrote two BTS items, one about the acoustic signature of diving murres birds and another about the R/V *Paragon*'s echosounder. After writing these, they were edited by Nancy Barr and then sent to Kelly Benoit-Bird and Larry Bird for further editing. Photos from the DOEST presentation were used for the echosounder BTS, and photos provided by Kelly Benoit-Bird were used for the murres birds BTS.

MANAGING INTERN BLOG

To organize the blog, I used the MBARI "Expeditions" template (http://www.mbari.org/at-sea/expeditions/) to create a feed of latest posts. I added an additional column on the right to include an overarching navigation that allowed visitors to move quickly from the different types of posts or back to the main feed.

For intern profiles, I wrote a base template for each intern to fill-out. As they were returned to me, I did the primary editing for grammar. The profiles were then copyedited a second time by Alia Thompson or Nancy Barr before publishing them to the website.

To produce posts about intern activities, I attended events, took photos, and wrote up content in a friendly and semi-informal style. I additionally used the Unite Gallery WordPress plugin to produce several slideshows or galleries. Other interns, Rachel Kahn and Beverly Abadines, also assisted by contributing guest-written articles about intern activities. These were then edited by Nancy Barr and me before being published.

Finally, for the blog's mystery photo, Alia Thompson and I regularly combed the beach near MBARI. After photographing and publishing the mystery photo, we used both our own educated guesses and the submitted guesses to properly identify the item. In one case, we confirmed the identity of the object with George Matsumoto to ensure accuracy. Guesses were submitted using a submission form. The first, most specific answer was selected as the winner with runner ups as additional specific answers of the same caliber. The winner received a small prize of MBARI cards to encourage participation. Also to improve participation, the mystery photos were occasionally promoted on both the official MBARI and my personal social media accounts.

PHOTO EDITING

To edit photos, I relied primarily on Photoshop from the Adobe Web Premium CS5 suite. Image editing was minimal, and included adjusting brightness, exposure, and white balance. White and black levels were also frequently adjusted.

I took photos primarily on a Canon EOS Rebel T5i with an 18-55mm lens. For many of the blog mystery reveal photos, I used an additional 58mm macro lens. The zoomed mystery photos were captured through a collaborative effort with Alia Thompson, using her portable dissecting microscope (made by Learning Resources). Additionally, the idea for the mystery photo contest came from Alia Thompson.

RESULTS

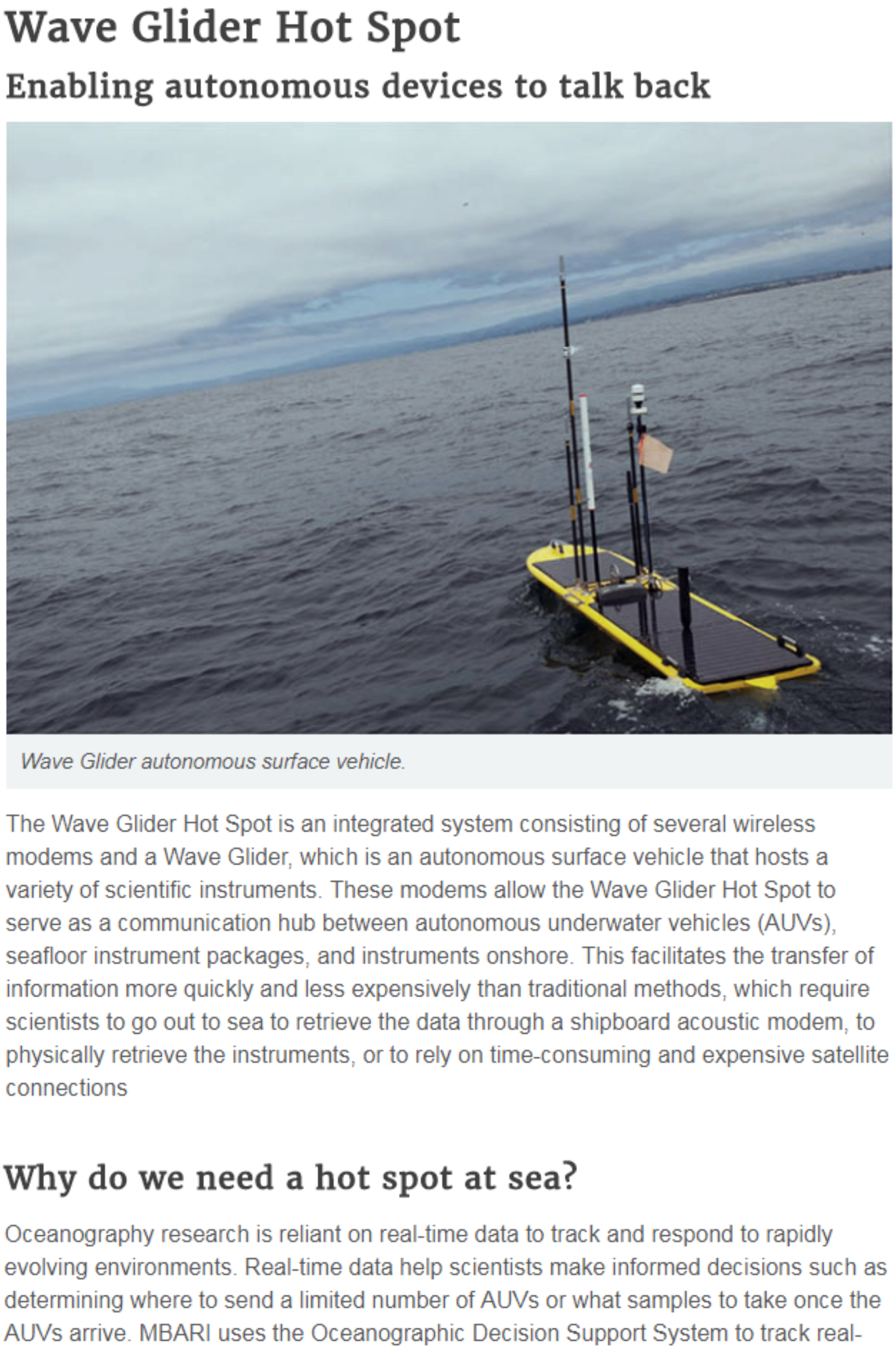
OVERVIEW OF WEB PAGES

I updated or created more than 60 pages, ranging from lab group pages, technology descriptions, brief news articles, and blog posts.

AUTONOMOUS CYTOMETER AND WAVE GLIDER HOT SPOT WEB PAGES

To update the technology pages for the autonomous cytometer and the Wave Glider Hot Spot, I provided additional subheads to improve readability. Major subheads were written as questions the reader might have (ex: "How does it work?"), while inner sections, which explained more technical aspects, were more direct (ex: "Wi-Fi modems").

These cytometer and Wave Glider Hot Spot pages can be viewed online at http://www.mbari.org/technology/emerging-current-tools/instruments/mobile-flow-cytometer/ and http://www.mbari.org/technology/emerging-current-tools/communications/wave-glider-based-communications-hotspot/ respectively.



Wave Glider Hot Spot

Enabling autonomous devices to talk back

Wave Glider autonomous surface vehicle.

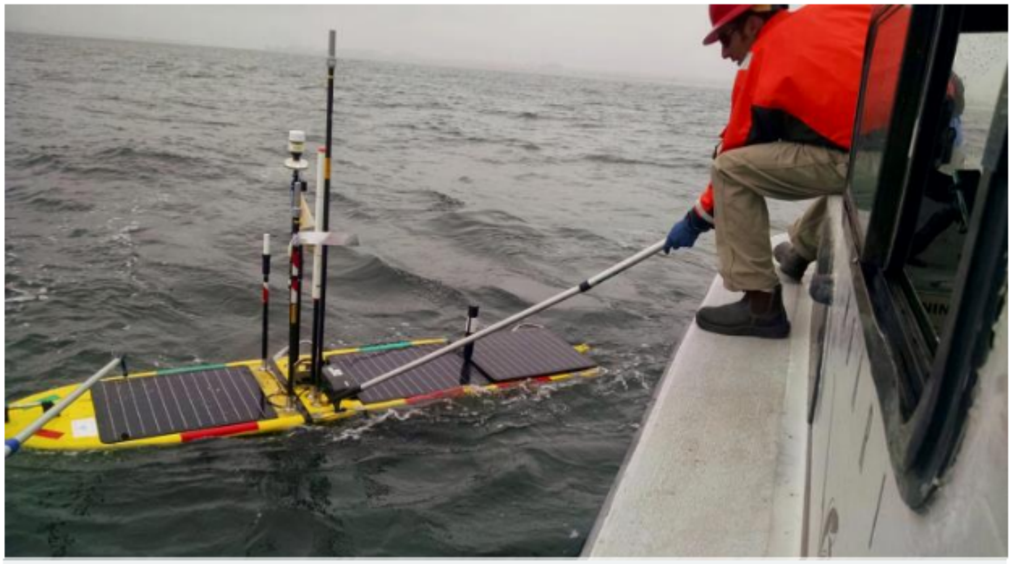
The Wave Glider Hot Spot is an integrated system consisting of several wireless modems and a Wave Glider, which is an autonomous surface vehicle that hosts a variety of scientific instruments. These modems allow the Wave Glider Hot Spot to serve as a communication hub between autonomous underwater vehicles (AUVs), seafloor instrument packages, and instruments onshore. This facilitates the transfer of information more quickly and less expensively than traditional methods, which require scientists to go out to sea to retrieve the data through a shipboard acoustic modem, to physically retrieve the instruments, or to rely on time-consuming and expensive satellite connections

Why do we need a hot spot at sea?

Oceanography research is reliant on real-time data to track and respond to rapidly evolving environments. Real-time data help scientists make informed decisions such as determining where to send a limited number of AUVs or what samples to take once the AUVs arrive. MBARI uses the Oceanographic Decision Support System to track real-

Figure 1. The updated page of the Wave Glider Hot Spot illustrates the use of section headings to provide helpful guidance to the reader.

How does it work?



A Wave Glider Hot Spot is deployed off the R/V Paragon.

The Wave Glider Hot Spot is able to navigate autonomously and carries several types of modems, ranging from acoustic to satellite. The Hot Spot acts as a communication relay by retransmitting information received on one modem link to another link, e.g. by transferring AUV data received on an acoustic link to shore via satellite.

Acoustic modems:

Unlike radio waves, sound can propagate through the ocean and allow information to be sent to nearby underwater and surface vehicles. An AUV or seafloor instrument package with a compatible modem can send collected data to a nearby Wave Glider, which can transfer the data to shore. The range between the Wave Glider and underwater target can be calculated by measuring the travel time of the acoustic signal; several ranges can be taken from various locations to “triangulate” the target’s position. In addition the Wave Glider can carry a special modem called an ultra-short base line (USBL) system; this device can determine the range, azimuth, and elevation to the target.

Wi-Fi modems:

Exchanging data acoustically is a slow process however, so the Wave Glider Hot Spot also carries a Wi-Fi modem. If an AUV is within a few hundred meters of the Wave Glider Hot Spot, the AUV can surface to transfer larger loads of data much more quickly

Figure 2. In addition to including larger section headings written as questions, the updated Wave Glider and Mobile Cytometer pages also include smaller, technical subheads.

ACOUSTICAL OCEAN ECOLOGY WEB PAGES

In all, for the Acoustical Ocean Ecology page I updated or created five pages.

The primary homepage of the Acoustical Ocean Ecology Group was left very similar to its original form, with some editing to remove jargon. I also created four additional pages to feature information about the Acoustical Ocean Ecology Group's technology (primarily echosounders), two aspects of their research (acoustic signal identification and community ecology), and chronological media coverage. Each of these pages relied on additional subheads to improve organization and readability.

Although I went out to sea with the Acoustical Ocean Ecology Group to gather photos, the majority of photographs were courtesy of Kelly Benoit-Bird, the principal investigator of the Acoustical Ocean Ecology Group, and Todd Walsh, MBARI's photographer, as their photos were higher quality.

The homepage of the Acoustical Ocean Ecology page can be accessed with this link: http://www.mbari.org/acoustical-ocean-ecology/

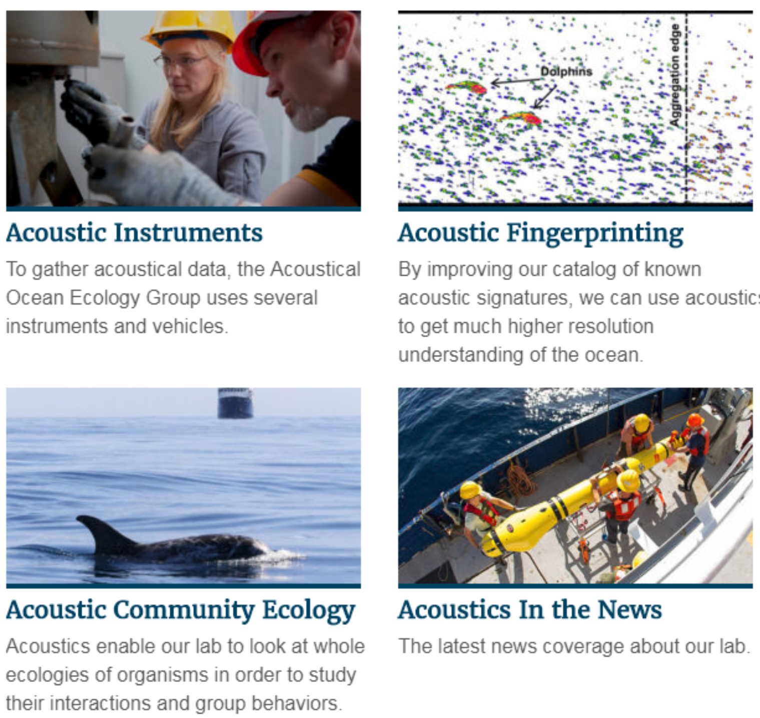


Figure 3. The updated version of the Acoustical Ocean Ecology Group site features four new pages which can be accessed through the grid-menu on the group's homepage.

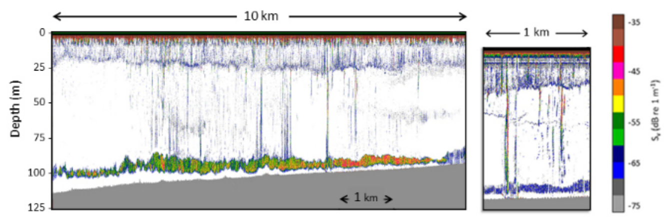
ACOUSTICAL OCEAN ECOLOGY BEHIND-THE-SCENES

The two articles I wrote for the Acoustical Ocean Ecology Lab Group were approximately 350 words each. The article featuring Larry Bird and the echosounder has already been published (http://www.mbari.org/speeding-sound-sampling/), while the diving murres article will be published in the near-future. Both were written as small news stories, with “soft-lede” style beginnings to introduce the key problem, and concluded on an optimistic and positive note about the work of MBARI research.

BEHIND THE SCENES

Murres dive into acoustic ecology

August 4, 2017



A chart of acoustic readings from the Bering Sea with strange barcode-like lines that turned out to be diving murres. Image courtesy Kelly Benoit-Bird

At first, Scientist Kelly Benoit-Bird wondered if the strange lines appearing on her acoustic readouts were a technical error. Unlike the more typical blobs and bands that were picked up by her echosounder, a machine which uses sonar technology to “see” into the ocean, these lines looked almost like barcode stripes.

Nothing seemed to explain how or why the lines were appearing, until Benoit-Bird realized that every time the lines occurred, a seabird biologist aboard the fishing vessel *Frosti* would point out the common and thick-billed murres (*Uria aalge and U. lomvia)* nearby. These birds, with their black and white plumage, look a bit like penguins but are actually a type of auk. Although capable of flying, the birds are much more graceful in water and are capable of diving down to depths of over 150 meters (almost 500 feet).

A common murre. Image courtesy Kelly Benoit-Bird

As it turns out, the black and white plumage of the common murre isn’t just striking. It also helps keep the birds warm by retaining air. As the birds dive, the water pushes the air out of their feathers, releasing a stream of bubbles—the cause of the mysterious lines in Benoit-Bird’s data.

Although the birds are as common as their name implies, capturing their dives with an echosounder is not. Normally when acoustically sampling the ocean, scientists have a large amount of sea to cover. Ships sail quickly to cover as much ground as possible and take snapshots of the ocean. However, for this mission, Benoit-Bird was interested in the small scale patterns around the seabird colonies in the Bering Sea. The slower pace of the boat allowed her to capture the column of bubbles released when the birds dive, something never before used by scientists to study the ecology of these animals.

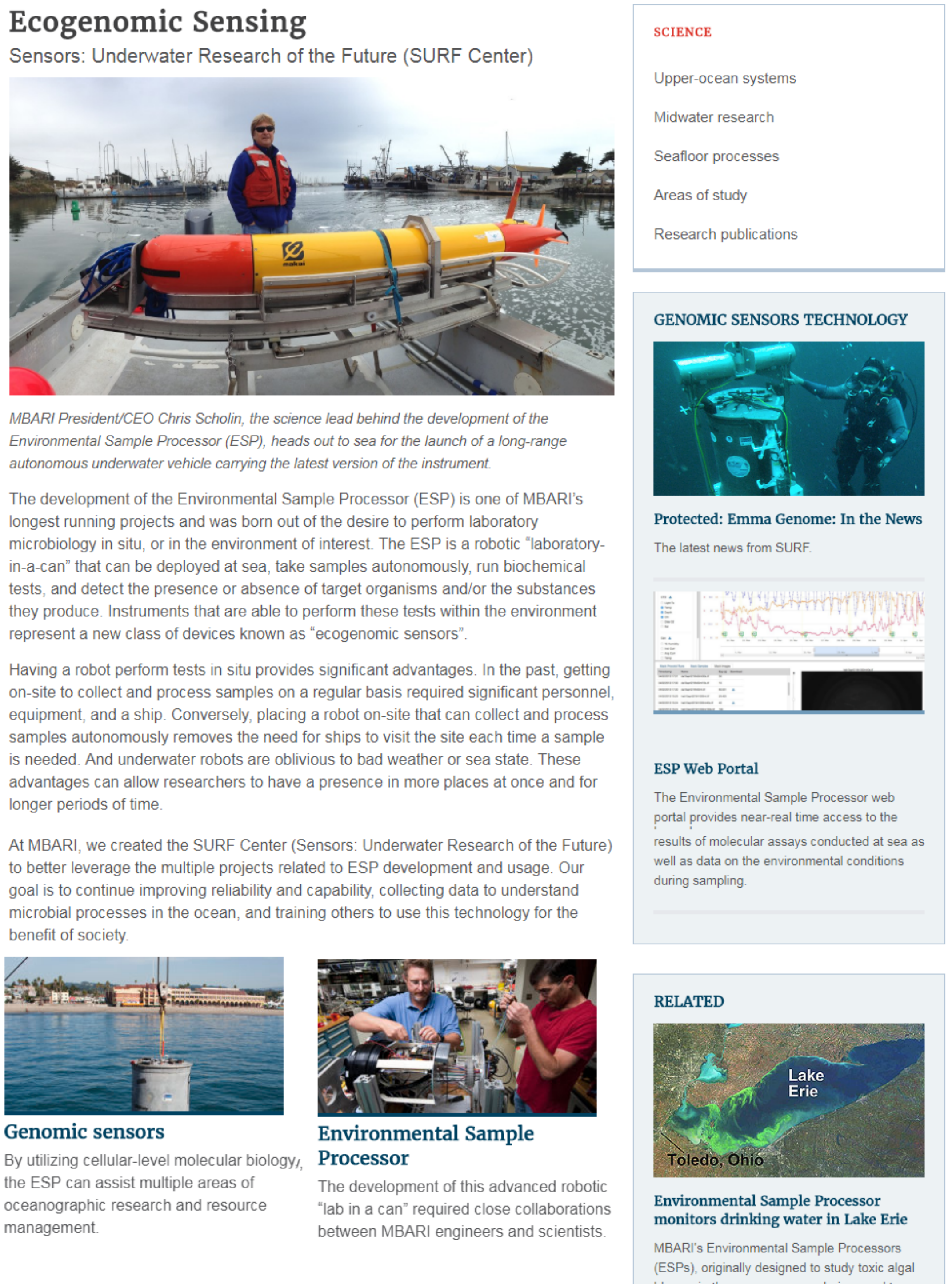
Figure 4**.** The finished version of the Behind-the-Scenes news article featuring the acoustic signal created by the common murre.

ENVIRONMENTAL SAMPLE PROCESSOR (ESP) WEB PAGES

Updating the ESP Group page was the largest of my projects. In all, I created, updated, and wrote 22 main pages.

A major focus of the project was identifying a logical and cohesive navigation that blended seamlessly with the website's overarching structure. The result was creating one main home page which offered readers two pathways: science or technology. On each of the pages, additional pathways were offered leading to engineering, ecological applications, and other relevant areas. Users are able to navigate from the "science" page to the "technology" page easily, and there is additional navigation on the sidebar to help orient the user.

The homepage of the ESP project, named "Ecogenomic sensing" can be accessed at this link: http://www.mbari.org/science/upper-ocean-systems/ecogenomic-sensing/



Ecogenomic Sensing

Sensors: Underwater Research of the Future (SURF Center)

MBARI President/CEO Chris Scholin, the science lead behind the development of the Environmental Sample Processor (ESP), heads out to sea for the launch of a long-range autonomous underwater vehicle carrying the latest version of the instrument.

The development of the Environmental Sample Processor (ESP) is one of MBARI's longest running projects and was born out of the desire to perform laboratory microbiology in situ, or in the environment of interest. The ESP is a robotic "laboratory-in-a-can" that can be deployed at sea, take samples autonomously, run biochemical tests, and detect the presence or absence of target organisms and/or the substances they produce. Instruments that are able to perform these tests within the environment represent a new class of devices known as "ecogenomic sensors".

Having a robot perform tests in situ provides significant advantages. In the past, getting on-site to collect and process samples on a regular basis required significant personnel, equipment, and a ship. Conversely, placing a robot on-site that can collect and process samples autonomously removes the need for ships to visit the site each time a sample is needed. And underwater robots are oblivious to bad weather or sea state. These advantages can allow researchers to have a presence in more places at once and for longer periods of time.

At MBARI, we created the SURF Center (Sensors: Underwater Research of the Future) to better leverage the multiple projects related to ESP development and usage. Our goal is to continue improving reliability and capability, collecting data to understand microbial processes in the ocean, and training others to use this technology for the benefit of society.

Genomic sensors

By utilizing cellular-level molecular biology, the ESP can assist multiple areas of oceanographic research and resource management.

Environmental Sample Processor

The development of this advanced robotic "lab in a can" required close collaborations between MBARI engineers and scientists.

SCIENCE

Upper-ocean systems

Midwater research

Seafloor processes

Areas of study

Research publications

GENOMIC SENSORS TECHNOLOGY

Protected: Emma Genome: In the News

The latest news from SURF.

ESP Web Portal

The Environmental Sample Processor web portal provides near-real time access to the results of molecular assays conducted at sea as well as data on the environmental conditions during sampling.

RELATED

Environmental Sample Processor monitors drinking water in Lake Erie

MBARI's Environmental Sample Processors (ESPs), originally designed to study toxic algal

Figure 5. The homepage of the ESP site features two pathways which lead the reader towards more science or technology/engineering information.

On the MBARI website main heading, the "science" menu includes the option "Ecogenomic sensors," which takes users to the main, overarching page. However, in the "technology" section of the main website navigation, the user is taken directly to the main ESP technology page. From there, users can go deeper into the engineering behind the ESP or move to the science side. Although two points of access can increase confusion, linking the two separate MBARI menu sections to different pages is a logical response to the user's desires, which are made clear by their initial choice between "science" or "technology" on the MBARI main menu. The reason the main menu "science" links to the ESP homepage, rather than directly into the science, is because "science" is slightly more vague than "technology." Users selecting "science" may be interested in both the applications of the ESP and in the ESP itself. Arriving at the overarching homepage gives the reader necessary context to make further pathway decisions.

Although I wrote the initial content for all the pages, this ended up serving as a detailed outline for Jim Birch to modify in order to produce the final content. Birch included more technical descriptions of both engineering and science, fleshing out my descriptions, due to time constraints hindering the editing process.

INTERN BLOG

For the intern blog, I wrote more than 40 pages, edited 15 profiles, and edited an additional 3 guest contributions. The homepage to the blog can be found here: http://www.mbari.org/2017-summer-interns-blog/

July 6, 2017

2017 Summer Intern Profile: Rachel Kahn

Name: Rachel Kahn

Project/Mentor: Spatial Temporal Oceanograhpic Query System (STOQS) with Mike McCann

School: Recent grad of Scripps College

Hometown: Laguna Woods, California

Tell us about your project: STOQS is an open source, web-based software package developed to allow for visualization of oceanographic data (for more info, see the STOQS website here). This summer, I have the opportunity to contribute to the software, which is in continuous development, by implementing machine learning techniques to label data. This will enable the computer to generate models, and will hopefully help scientists learn more from the data.

Why did you want to intern for MBARI: I have been interested in the ocean since I was old enough to have interests. As an undergraduate, I found myself gravitating toward physics and engineering, and their intersection with other fields like ecology, physiology, and geology. I'm trying to figure out which direction I'd like to take my career, so I wanted an opportunity to explore the field of engineering and expose myself to as many different aspects of marine science/engineering as I could.

What's been your favorite part of MBARI so far / What are you looking forward to: My favorite part of this experience so far was a week-long research cruise with Steve Haddock's bioluminescence lab (Thanks, Steve!). It was so cool to see the ROV *Doc Ricketts* in action, and to see the deep sea in real time. I've already learned so much and tried many new things here at MBARI, and I am so excited to see what the rest of the program has in store.

And, if you had a boat, what would you name it? R/V *Schrödinger's Fish*

Figure 6. Each Summer 2017 intern was asked to fill out a brief profile explaining a bit about themselves and their research projects.

The profiles section and mystery photo, named "Animal, Plant, Mineral, or Man-Made (APMM)", proved to be the most popular based on personal interactions. MBARI staff enjoyed learning more about the interns, while both staff and friends/family enjoyed the mystery photos. With no promotion, the average range of guesses was between three and 10. Promoting directly to family/friends typically garnered approximately 20 submissions, while social media yielded what seemed to be an additional one or two submissions per post. Posts that revealed the mystery picture garnered a fair amount of “likes” (290 and 317) on the official MBARI Instagram, although this was on the lower-end of average likes for other content on the MBARI Instagram. However, it did seem to engage more directly with audience members as the number of comments (three and seven) were higher than average. These comments also seemed more introspective, expressing interest and delight in the photos, rather than tagging friends to share the post.

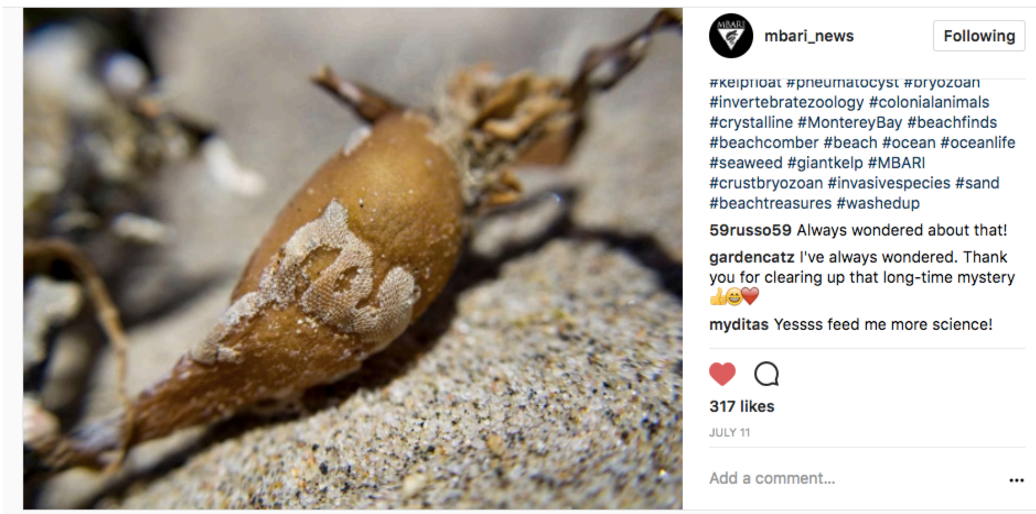


Figure 7**.** The reveal of one APMM that was featured on the official MBARI Instagram resulted in more introspective comments which focused on education.

The intern activities section of the blog was the most challenging to manage and suffered from regular backlogging of posts, which were often shelved until there was more time to edit them. To reduce strain, several blog posts were written to be much shorter than the initial few, and relied more heavily on WordPress Unite galleries.

DISCUSSION

A key component of all of these projects was identifying successful navigation and scaffolding for each web page. For larger projects like updating the web pages of the ESP and Acoustical Ocean Ecology Groups, much energy was spent on determining how a user would navigate through the different pages. While designing page navigation, I focused on asking questions like “What questions will the user have after reading this page?” and “What will they click next?” to further develop a cohesive and intuitive navigation pathway. This required a large amount of design iteration and back-and-forth between me and the lead scientists, emphasizing the importance and complexity of successful navigation.

The same type of navigation design was also applied to individual pages in regards to their content organization. By breaking the text into sections, headed by basic questions like "How does it work?" or "Why do we need it?" I hoped to streamline the process of exploring a page by helping readers easily identify the content of each section. The structure of the page, including the size of the paragraphs and the shape (portrait or landscape) of photos, all contribute to whether a site visitor will even read the content.

Another major aspect of my project was finding a balance between layman's descriptions of projects for the public and more technical details that are relevant to interested researchers visiting the MBARI website. I struggled especially with the latter, and found I was prone to over-simplification. In particular, this became an issue with the ESP lab page. I spent too much time identifying and designing a navigation pattern, leaving myself little time to write the content for the pages and then make necessary edits. The edits for these pages turned out to be quite extensive due to my oversimplification. As the internship was nearing its end, the solution to this problem was to allow Jim Birch to write a large portion of the content to bring it up to technical rigor. In retrospect, I should have anticipated and budgeted for more time to make extensive edits—a valuable lesson I can apply to future projects.

Interestingly, while the mystery picture contest on the blog seemed to be quite popular based on word-of-mouth, with several people offering unofficial guesses or remarking that they enjoyed checking it weekly, the number of submitted guesses was quite low. Adding a submission form directly to the page by the second round helped bump the number of guesses slightly, as contestants no longer had to send a separate email, but this appeared to be temporary. By the end of the internship, only a handful of guesses were being submitted each week by regular, dedicated participants. It is possible that people were not looking at the mystery picture as much as they implied they were, but I think a major component of low guess submission was that people only submitted guesses when they felt confident in their answer. One way to improve the number of weekly guesses might be to begin offering a random, participatory prize or even a "judge's choice" prize for the most interesting, but incorrect, guess.

The mystery pictures also yielded a lower amount of likes on Instagram, but a higher number of introspective comments. Further analysis would be required to identify specifically why, but I have theorized it may be due to the subject of the photos. Most mystery pictures featured normal, day-to-day objects or organisms rather than novel and exciting deep-sea creatures, which are typically of more interest. The higher number of comments, however, may indicate some level of surprise among readers— those that took the time to read the blurb learned something new, or perhaps found the information more exciting than they had first anticipated. The purpose of the mystery picture was to instill wonder in readers for the smaller and more typical day-to-day aspects of world, so the comments seem to indicate that was achieved at least somewhat— although at lower numbers than hoped.

Another aspect of instilling wonder with brief amounts of content was writing the Behind-the-Scenes items. These short news stories allow readers to "look behind the curtain" so to speak, as well as giving MBARI the chance to showcase interesting discoveries not large enough to warrant an entire press release, such as in the case of the acoustic signature of murres. This seems to be an important direction for future science communication work and may serve to help bridge a relationship between the scientific community and the general public.

CONCLUSIONS/RECOMMENDATIONS

Managing multiple projects for MBARI this summer gave me clear insight into the different content needs of both individual researchers and the institution as a whole. These multi-faceted needs, ranging from semi-technical descriptions of research to promotional and interactive materials, are difficult to juggle successfully. However, this necessary juggling is a reality of science communication— different audience members have different needs, but they will all visit the homepage of your website.

Key to managing these needs is not just well-written and relevant content, but also a clear and comprehensive navigation structure, both in linking different web pages together and clear content organization on a single page.

Toward these needs, I have updated or created web pages for the ESP, the Acoustical Ocean Ecology Group, and two technology pages, as well as creating and managing an intern blog. For all of the the pages, excluding the blog, an update at least once a year but preferably once a quarter would be ideal. Even small updates, such as brief team updates in the case of the ESP or including recent publications as they arrive, would prevent the page from losing relevance.

While it may not be necessary to run an intern blog next year, it may also serve a new purpose of building a history of each year's internship, as well as perhaps expanding more on the day to day life of interns. Many content ideas, such as blog posts about the intern housing and more focused looks at the average life of an intern, did not have a chance to make it on the blog. This could be an excellent side project for an interested intern, especially since the format of the blog is already designed. Next year's interns could also improve upon the weekly contest, and perhaps make it more successful via better promotion or prizes.

Ultimately, to manage a successful website to communicate a specific institution's research, the communicator must rely heavily on website design both throughout the entire site and within individual pages. The communicator must also balance these projects carefully, as it can be easy to allow one to distract from others. However, this mixture of promotion, research, and fun is a crucial component of a successful research website.

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