

Blurring the Edges: The Osmosis of Ideas

Proceedings of the 43rd Annual IAMSLIC Conference

October 22-26, 2017

Honolulu, Hawaii



Editor: Dorothy Barr

Conference Convener: David Baca

Published by:
IAMSLIC
Cambridge, MA, USA
2018

IAMSLIC CONFERENCE SERIES

(ISSN:2380-0399)

Order information: Contact Dorothy Barr, Proceedings editor, at dbarr@oeb.harvard.edu.
The Proceedings will be available online to members in spring 2018, and freely available to all in October 2018.

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Library of Congress Cataloging-in-Publication Data

IAMSLIC Annual Conference (43rd : 2017 : Honolulu, Hawaii)

Blurring the Edges: proceedings of the 43rd IAMSLIC Conference,

Mérida, Mexico / editor: Dorothy Barr ; conference convener: Kristen Anderson.

pages cm. -- (IAMSLIC conference series, ISSN 2380-0399)

Proceedings of the 42nd IAMSLIC Annual Conference held 22-26 October in Honolulu, Hawaii.

Includes bibliographical references.

1. Marine science libraries--Congresses. 2. Aquatic science libraries--Congresses. 3. Aquatic sciences-- Information resources--Congresses. 4. Marine sciences--Information resources Congresses. 5. Aquatic sciences--Information services--Congresses. 6. Marine sciences--Information services--Congresses. I.

Barr, Dorothy, editor of compilation. II. International Association of Aquatic and Marine Science Libraries

and Information Centers. III. Title.

Z675.M35I2 2018

026.55146--dc23

2017009290

43rd **IAMS LIC** Blurring the Edges
2017 • Honolulu

Group Photo



Blurring the Edges: The Osmosis of Ideas

Proceedings of the 43rd IAMS LIC Conference, October 22-26, 2017 in Honolulu Hawaii

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INTRODUCTION

David R. Baca

IAMSLIC President 2017-18
43rd Annual IAMSLIC Conference Convener

Honolulu, Hawaii could not have been more perfect for the 43rd annual IAMSLIC Conference. Over 40 attendees from all over the globe enjoyed great weather, great food and great fellowship. The theme of the conference was Blurring the Edges: The Osmosis of Ideas, and blur the edges we did. Our guest speakers were a diverse group of social researchers, scientists, storytellers, magicians and actors. We kicked off the conference with a welcome by Ku'uleilani Reyes, a well-respected Kumu Hula within the Native Hawaiian community. Ku'uleilani set the stage for exploring not only the "What" of libraries and information centers, but the "How." How do information resources get created? Who created them? Where do ideas for innovation originate? How can we bring new perspectives to our work and community?

We had wonderful speakers, including Danika and Eleanor Kleiber, Ruth Gates and Helen Wong Smith. To blur our edges even further we also invited Kelvin Chun, a local magician, to help us understand how we can build magic into using our talents and resources to surprise our customers. The next day we invited Alton Chung for an afternoon workshop on using storytelling to communicate our passions through story. We went even farther afield with Mark Branner and his acting company from the University of Hawaii showing us how to incorporate puppetry into educational programming. All of the sessions were delightful, informative and brought us closer together as a community. Olivia Diehr, IAMSLIC member from the Leibniz Institute for Baltic Sea Research, encouraged members to think in new ways with her short workshop entitled Meeting the Fairy: Think in New Ways to Create New Resources. Attendees found out something about each other and themselves.

We also explored what the future holds for our organization and profession through a panel discussion involving brand new, early career and established librarians. Our panel consisted of a library school student, librarians that were in the first years of their careers and two old-timers with over 50 years of experience between them. The discussion on the current and evolving roles of aquatic and marine science librarians informed us that our future is bright and that we should keep forging ahead with what we already know best.

Jennifer Walton, one of the members of the new transitional IODE-GEMIM, gave us some valuable insight into new opportunities established by IODE for Associated Information Units, a program analogous to the existing Associated Data Units.

It wasn't all work. Honolulu is rich in cultural and entertainment opportunities. Our banquet, organized by our Honolulu hosts, was a private affair held at the Waikiki Aquarium. Many of the group took advantage of guided tours to sites around town, as well as an enjoyable day snorkeling at Hanauma Bay. I want to thank all of the members that put in hard work on the conference including our Executive Board and especially our local hosts, Kris Anderson and Jean Thoulag. Thanks also to Inter-Research for their support and sponsorship. And finally, thanks to Steve Watkins for his friendship and leadership this past year.

PRESIDENT'S WELCOME

Steven Watkins

IAMSLIC President 2016-17

California State University, Monterey Bay

Welcome to the Proceedings of the 43rd Annual Conference of the International Association of Aquatic and Marine Science Libraries and Information Centers.

This year's conference was held in the beautiful city of Honolulu, Hawaii, and afforded opportunities to learn about and experience local Hawaiian culture in addition to the content of the conference program itself. In addressing the theme of "Blurring the Edges: The Osmosis of Ideas," Conference Convener David Baca incorporated several creative elements into the program that had attendees thinking outside the box and engaging in activities that helped us to draw upon elements of magic, puppetry, and storytelling as avenues to thinking about how we conceive of and integrate innovative approaches into our professional work.

We were also pleased to welcome a significant number of first-time attendees to the conference, including several library school students and recent graduates. They made substantive contributions to the program in the form of presentations, posters and panel discussions. Knowing that such talented new professionals are emerging and showing interest in IAMSLIC lends hope to us older members for the continued renewal and success of the Association.

A successful conference such as this relies on the hard work of many individuals and I would like to sincerely thank David Baca and the entire Program Committee for their excellent work, and Kris Anderson and Jean Thoulag for the wonderful local arrangements and speakers. Hearty thanks are due also to Dorothy Barr for editing these Proceedings.

User Acceptance of IAMSLIC Digital Fisheries Library

Stephen B. Alayon

*Aquaculture Department, Southeast Asian Fisheries Development Center, Iloilo, 5021
Philippines
College of Liberal Arts, Sciences, and Education, University of San Agustin, Iloilo, 5000
Philippines
College of Education, Central Philippine University, Iloilo, 5000, Philippines
E-mail: sbalayon@seafdec.org.ph*

Steve G. Watkins

*Monterey Bay Library, California State University, CA, 93955, U.S.A
E-mail: swatkins@csUMB.edu*

Abstract

The International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC) through the Aquatic Commons Board approved the deployment of IAMSLIC Digital Fisheries Library in the Philippines during the 2015 Conference. The digital library utilized the LibraryBox, a portable, open source distribution tool. This standalone wireless access is ideal for fisheries schools in the area due to limited or no Internet access and intermittent electrical power conditions. With the aim of providing access to SEAFDEC Aquaculture Department (AQD) publications in these schools, more than a thousand publications that were already made available in SEAFDEC/AQD institutional repository were also added in the box. The box contained over 26,000 publications, reports, articles and documents on all aspects of fisheries that are freely available. SEAFDEC/AQD is the first institution in the country to launch the project in July 2016 using LibraryBox. Five boxes were distributed in Philippine fisheries libraries devastated by Typhoon Yolanda or hazed by fire. This study examined the factors that influence student's acceptance and attitude towards the IAMSLIC Digital Fisheries Library. A survey was distributed to selected fisheries and marine biology undergraduate students in the Philippines. Relevance, perceived usefulness, perceived ease of use, screen design and behavioral intention to use the digital library were determined.

Keywords: IAMSLIC, digital fisheries library, LibraryBox, fisheries students, technology acceptance model.

Meeting Information Needs through Innovation:
A Case Study of the Use of the IAMS LIC and Fisheries Abstracts Database

Diana Castillo
Dalhousie University

Abstract

A significant hallmark of today's society is the large quantity of scientific information about oceans available to researchers and decision-makers in a wide diversity of formats. Although much information is easily accessible, sizeable volumes may be unknown or limited in access despite benefiting stakeholder communities. The ASFA database is an access point for a large amount of grey literature. Due to the rapidly changing information landscape, the future of ASFA in its present form is being reconsidered. This paper reported on research, pursued in collaboration with FAO, to determine how ASFA is currently accessed and used. The initial results from the research were presented, along with preliminary discussion of how the service might evolve in the changing information landscape.

Keywords: ASFA, FAO, grey literature.

Testing the Waters - Publishing Literacy - a New Role for Marine Science Librarians?

Olivia Karin Diehr

Christian Heene

Leibniz Institute for Baltic Sea Research (IOW)
Seestrasse 15, 18119 Rostock, Germany

Abstract

Libraries have a strong service culture. For decades information literacy has been well established in our libraries and information centers. The training on skills to search, evaluate and consume information is a substantial part of libraries' information literacy programs. At the same time, library services for authors still seem to be in their infancy, at least in specialized libraries beyond universities. There are plenty of varied possibilities to discover. Let us test the waters and explore how librarians may contribute to the publishing process of authors at their institutions. Where are the potential docking points for libraries during the writing and publishing process? Where are exciting opportunities to see? Which limitations have to be considered?

Keywords: Publishing process, information literacy, author support, library future, digital transformation, library services, open access.

Do you know what a liblisher is? Or a publarian?

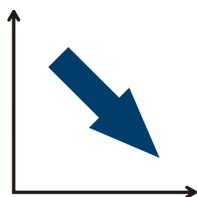
A liblisher or a publarian is a person who works in a library or in an information center. They contribute to the writing and publication process of scientific authors in the widest sense. There are two reasons why liblishers and publarians are introduced to you as our new job titles and why librarians are able to contribute to the writing and publishing process in their institutions:

1. The transformation within the publishing process.
2. The librarian's future position.

Both reasons are consequences of the so called Digital turn.

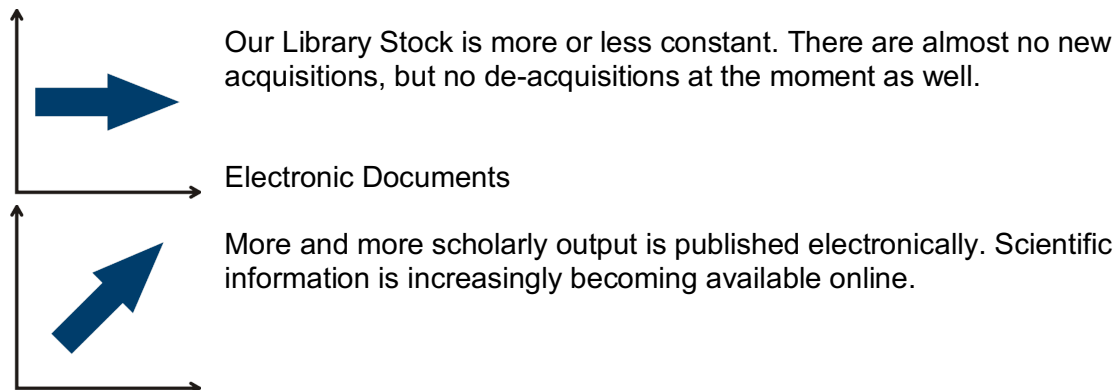
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Printed Aquisitions

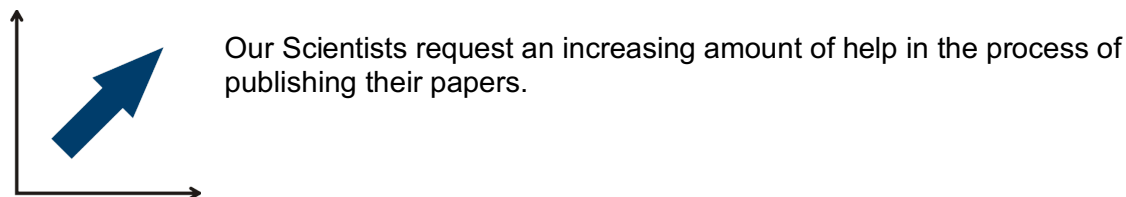


Our library's acquisitions are decreasing, due to the cancellations of major scientific publishers. Background is the German project "DEAL."

Library Stock



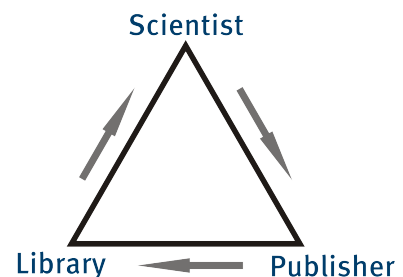
Publishing Requests



Digital Turn

By the digital turn a new model of publication process has been developed and the transformation process is still going on (Keller, 2016b).

To see the differences let's have a look at the traditional publishing process first. The scientist is in the role of the creator of scholarly output and wants to publish his or her findings and results. Scholarly communication is a vital element of science, so the scientist gives the documents to the publisher for distribution.



Publishers manage the process of scientific publication; new findings are reviewed for quality and then presented to the rest of the scientific community.

Libraries acquire the scientific literature from the publisher and provide it to the scientist. The scientist can access the online subscriptions or use the printed library stock. The role of every stakeholder is clearly defined.

The model of traditional publishing process is no longer as it was for the last centuries, due to the digital turn.

New Publishing Process

Within the new publishing process, we see boundaries blurring.

The role of the scientist is similar to the traditional process. He is still in the position of the creator of scholarly output. He wants to present his findings to the scientific community. Now, as illustrated by the figure, many online suppliers as well as publishing platforms are available.



Furthermore, there is a high dynamic within the information environment. With new online distribution channels, the traditional mediator role of scientific publishers has come under scrutiny. The scientist can choose between different options to distribute his knowledge. The transformation to open access publishing definitely has a strong impact on our work, as I have seen for myself already within the last few years. The journal *Science* announced recently that a “bold open-access push in Germany could change the future of academic publishing” (Vogel & Kupferschmidt, 2017). The authors refer to the project “DEAL.”

Along with many German institutions, the Institute for Baltic Sea Research is participating in the project “DEAL.” Our institution cancelled all Elsevier subscriptions in 2017 and intends to cancel all SpringerNature and Wiley subscriptions as well. Instead of buying subscriptions to specific journals, consortium members want to pay publishers an annual lump sum that covers publication costs of all papers whose first authors are at German institutions (Vogel & Kupferschmidt, 2017).

The consequence is that there is less and less need for library’s to manage journal subscriptions. Furthermore, the full texts are stored in digital archives by the publisher. When you look at this new publishing process, where do you see the library? The position of the library has changed. As roles and responsibilities get sorted out, we as librarians are testing the waters to identify what present and future role we may have (Gold, 2007). To stay visible within this new publishing process is one of the most crucial challenges we are facing (Australian Library and Information Association, 2014).

Services in the library of the Leibniz-Institute for Baltic Sea Research

The Leibniz-Institute for Baltic Sea Research is an independent research institution specializing in interdisciplinary study of coastal oceans and marginal seas. The library is responsible for the needs of more than 130 researchers, which include Marine Geologists, Marine Chemists, Physical Oceanographers, and Biological Oceanographers.

- Reference management: We offer assistance and instructions in EndNote.
- Publication media: Match the medium to the message, so that the research will be received by a broader audience. What can be the most appropriate media or publication type – a journal article, data journal, fact sheet on a website, professional book, video...? Help to promote discipline-specific resources, because sometimes researchers are not aware of all options.
- Keywords: We emphasize the importance of keywords, because keywords are added value for the paper. Furthermore, keywords are additional hooks for the search engine, improving the chances that your paper will be seen by the people you will address.
- Copyright

Services in the library of the Leibniz-Institute for Baltic Sea Research

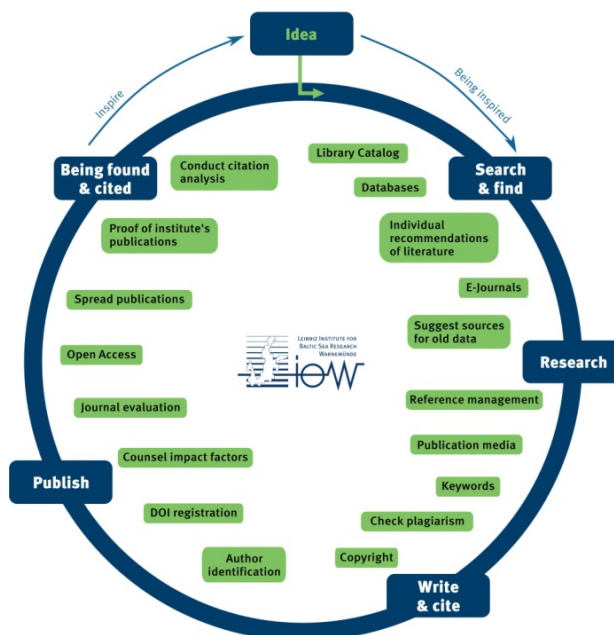


Illustration: Christian Heene & Olivia Diehr, 2017
based on Regina Goldschmitt (2014)
DOI: 10.12754/misc-2017-0001

- While writing: How to avoid plagiarism? Help the scientists comply with good scientific practice.
 - While publishing: Help in choosing the right licenses to protect intellectual property.
- Author identification: Provide information on ORCID and author identification.
- DOI registration: This has been integrated to our library's service. The IOW library registers DOIs for digital documents, including datasets, published by the IOW.
- Journal evaluation: Finding the right journal, how to determine predatory journals, and counsel impact factors other journal evaluation indicators.
- Open Access: Provide advice on Creative Commons licenses, funding, and repositories.
- Spread publications: Distribution within the Leibniz Open Repository.

Author Support

During the last years we have experienced more and more questions about publishing issues. In order to offer services for authors in a professional way, special skills are needed that often differ significantly from traditional library function ranges. The librarian's role can be informing as well as educating. How far you can guide authors through the writing process depends on your background. Once again, and illustrated as Docking points, our contributions to the writing and publishing process.



All our contributions to the writing and publishing process are inquiry-driven and based on individual consultation.

The new model of scientific publishing demands new skills from both the authors and the libraries, which may be summarized by the term publishing competence (Keller, 2016a).

Two books which are especially helpful for authors, librarians and information professionals, are recommended:

- Allen, M. (2016). *Essentials of publishing qualitative research*. Walnut Creek, California: Left Coast Press.
- Style Manual Subcommittee Council of Science Editors. (2014). *Scientific style and format: The CSE manual for authors, editors, and publishers* (8th ed.). Chicago: Council of Science Editors in cooperation with The University of Chicago Press.

Case Examples

To illustrate our services by some situations in our daily work, here are some examples of when librarians enter the stage and contribute to the writing and publishing process.

1) Senior Scientist #1:

"My paper was rejected by the preferred journal. Because it covers an important recent event – a Major Baltic Inflow – it should be published without any major delay in an appropriate journal. What is your recommendation on other journals I can submit my manuscript to?"

In this case speedy publication was an important consideration for the author. Also, the ranking of the journal had to be considered for his career. We performed searches in Web of Science, determined the scope of several journals and could give recommendations.

2) Professor:

"I am about to publish an encyclopedia as editor. Would you please check the bibliographic data of my reference list?"

We checked for complete bibliographic data, which was a lengthy task because of the many references. For a thorough check, in certain cases some entries of the reference list even had to be ordered through Interlibrary Loan.

3) Senior Scientist #2:

"The submission process becomes complicated and more complex. I am a co- author, but I can't check the status of a submitted Elsevier article."

"The publisher asks me for my ORCID, but I don't have any. Do I need an ORCID, what is it for? How can I link my former publications with ORCID?"

This was a situation where it was best to meet the researcher in her office, to give her the needed assistance in her working area. The advantage was that the registration process could be completed together, making it possible to help with any questions arising in the process.

4) Scientist:

"I am writing an article and I would like to reuse a figure I already published in a Springer journal. Could you check if I can do that?"

Although there is the right to cite, sometimes these questions are tricky. In case there is uncertainty about the copyright, the publisher needs to be contacted to get more information.

5) Senior Scientist #3:

“How can I write a scientific paper with EndNote by using the tool Write&Cite? My reference list is different than described in the author guidelines. Can you help me editing the output style?”

In the library, we use EndNote for our publication database, so we are able to help in many cases. This was a situation as well where it was helpful to meet the scientist in her office to edit her personal EndNote desktop settings.

Tips & Pitfalls

- Focus your contributions about writing and publishing on essentials. There is no need to educate the world about publishing in detail. Avoid information overload (Allen, 2016).
- Provide tailored service, and have a look with fresh eyes at the specific situation.
- Interact with authors in face-to-face mode, prefer individual consultations, and implement your experiences into your personal knowledge base. Work like an advisor or guide (Tappenbeck, 2012).
- Know the scholarly environment of your scientists, and know the publishing landscape as well (Style Manual Subcommittee Council of Science Editors, 2014).
- Understand your limitations, and recognize when contacting other experts is appropriate.
- Collaborate with other information professionals and scientists.
- Trust matters! Documents and data are unpublished, so consider and respect confidential information.
- Trust in your competence and keep on learning.

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Meeting the Fairy: Think in New Ways to Create New Resources

Olivia Karin Diehr

Leibniz Institute for Baltic Sea Research (IOW)
Seestrasse 15, 18119 Rostock, Germany

Abstract

The aim of this workshop is getting the participants to start thinking in new ways and encouraging their creativity about how they approach their work routine. The workshop leader will slip into the role of a beneficent fairy. Based on several short activities, and with a little help from the fairy, the participants may re-discover their work-related wishes. The subjects will be created by the attendees themselves during the workshop.

Keywords: Personal professional wish, inspiration, motivation, career, beneficent fairy, collage, workshop.

Workshop equipment

Easels (minimum 1 per 10 attendees) and poster paper, 2 regular sheets of paper for everybody (Letter or A4 size), pencils, markers, scissors, glue sticks, post its, colored sheets of paper, several journals with images to cut.

Workshop time: 90 minutes.

Procedure

1) Introduction

Give an introduction by introducing yourself as a beneficent fairy. Start with sentences like: *"Imagine, I am a fairy, and I will fulfill one personal professional wish. Everybody has a wish for free, and sooner or later, the wish will come true"*. Motivate everybody to think about their personal professional wish, regardless of money, time, implementation, position, utility. You may give an example to encourage the audience. Go further by asking everybody to describe his or her ideas about an excellent career. Start with sentences like: *"Imagine you are 90 years old and you look back on your career, which was excellent. Describe your idea of your excellent career as an information professional. It was excellent because of what? Create a collage"*. Formulate it as an invitation, not an order. This collaboration will be open, every IAMSLIC member will be asked to take part in the way he or she wants to do.

2) Work in groups

Collect, group and pin all wishes on easels. The attendees are invited to illustrate their excellent career by a collage. Use journal images, slogans, paper art for creating collages. Offer appropriate time and place for fruitful interactions.

3) Presentation

The collages may be presented by the creators. The attendees may tell a little story, highlight their preferences or describe personal aims. Offer time for discussion and feedback. Summarize the results, take pictures of it.

4) Footprints

During the workshop the attendees receive new inspiration for their daily work. They will learn a lot and they may identify new ideas and aims. How to take these ideas home and implement them into our work? Introduce the 72 hours rule for change management.

“A magic dwells in each beginning” (Herrmann Hesse). It is essential to take the first step within 72 hours after the workshop. Give everybody time to think about: Within the next 72 hours I will {take step 1 towards my goal}...

Exercise for the attendees: *Take a sheet of paper and draw your footprints, cut it out and write down on your right footprint the step you will make within the next 72 hours. On your left footprint write down how you will reward yourself for this effort. Take the footprints home/to your office. They will serve as a reminder.* First steps should be:

- clear, simple
- specific, precise
- legal
- with love
- in my power

5) Magic reminder

After 14 days, send an email to the workshop participants reminding them to stay focused on their aim. Encourage them to put their collage into action step by step. You may ask the participants how much progress they made already or if they encountered any problems along their way.

SCIENCE LITERACY WEEK: BUILDING PARTNERSHIPS

THROUGH A PASSION FOR DISCOVERY

Mayu Ishida

Woodward Library
University of British Columbia
2198 Health Sciences Mall
Vancouver, BC V6T 1Z3
mayu.ishida@ubc.ca

Arielle Lomness

Okanagan Library
University of British Columbia
3287 University Way
Kelowna, BC V1V 1V7
arielle.lomness@ubc.ca

Sally Taylor

Woodward Library
University of British Columbia
2198 Health Sciences Mall
Vancouver, BC V6T 1Z3
sally.taylor@ubc.ca

Mathew Vis-Dunbar

Okanagan Library
University of British Columbia
3287 University Way
Kelowna, BC V1V 1V7
mathew.vis-dunbar@ubc.ca

Abstract

Launched in 2014 by a graduate of the University of Toronto who reached out to libraries in his city, Science Literacy Week now partners libraries, museums, and universities across Canada through a passion for discovery and sharing. The week-long event unites inquiry and zeal, highlighting Canadian scientists and science communicators. Librarians at the University of British Columbia (UBC) joined the foray in 2015, venturing out of their comfort zone to organize events and displays celebrating the wonders of science. The first year saw a modest book display and a few exhibits, but the event has grown to include a Wikipedia edit-a-thon, a Science Expo, a Living Library, and a coding workshop. We'll share how this was achieved through collaborations

within the library, with campus groups, and beyond UBC. Join us as we explore the secret ingredients that have contributed to a fun and successful annual celebration.

Keywords: Science Literacy, Wikipedia, academic libraries, collaboration

Introduction

Science Literacy Week (<http://scienceliteracy.ca/>) is a week-long celebration of science-based activities in September that highlights outstanding scientists and science communicators across Canada. It was started in 2014 by Jesse Hildebrand, a newly minted graduate of the University of Toronto who is passionate about science, books and libraries. In the first year, Jesse persuaded four institutions to participate, including the University of Toronto Library and the Toronto Public Library. In 2015, he decided to take it nation-wide and invited libraries, museums, universities and science organizations to join. Each year it continued to grow, and now in 2017, it is supported by a major federal funding agency, the National Sciences and Engineering Research Council of Canada (NSERC).

In this paper, we will share our rationale for participating, describe the collaborations within and beyond our libraries at the University of British Columbia, and divulge the secret ingredients to success.

Rationale

When we received the invitation to participate in 2015, our initial reaction was one of hesitation since September is a busy time of year for academic libraries, and the activities were not part of our traditional programming. Jesse's passion was contagious, however, so we took the opportunity, started small, and have built on our efforts in subsequent years. Besides his enthusiasm, why did we jump on board?

We all share a passion for science and so the opportunity to celebrate it was appealing, but in 2014 we also felt an acute need to highlight the importance of scientific research. Science, math and technology underpin all aspects of our lives. As one student commented on one of the displays, "[science] is relevant to every aspect of the world." Whether in the pursuit of policy to drive sustainability within our physical environment or establish equity amongst peoples, the application of scientific principles and an understanding of scientific methodologies is critical for an analysis and interpretation of information and critical decision making, both at an individual and a societal level. At the time, however, the Canadian government had shifted funding from basic science to applied research, and was muzzling federal scientists and closing federal science libraries (Amend & Barney, 2016).

A number of other factors related to science education spurred on our participation. While Canada is ranked as a top performer in science literacy, this is not the case across the globe or even close to home (OECD, 2016). At the same time, any one nation's ranking in science literacy is brought into question when we tease apart what is meant by scientific literacy and how we measure not only one's knowledge of scientific principles and methodologies, but how this

manifests itself in our daily lives, from personal to societal choices in social policy, economics, and politics (Bauer, Allum, & Miller, 2007).

Scientific literacy can be understood in many ways, and on a sliding analytical scale. This covers simply knowing more science, developing an ability to interpret and evaluate scientific outcomes and theories, and having the ability to abstract one's scientific knowledge and principles, ultimately being able to bridge one's knowledge of science and its methods to other areas of practice (Laugksch, 2000; Sapp, 1992). There are issues of concern across each of these notions of science literacy, from tests that demonstrate an ongoing lack of scientific knowledge on a global basis (OECD, 2016) to populations who have increased science literacy yet are highly skeptical of scientific discoveries, especially when these scientific understandings are politically or religiously charged (Drummond & Fischhoff, 2017; Kahan et al., 2012).

Ultimately, working to move the discussion of science literacy beyond simply knowing more science and engaging in a discourse that captures the broader implications of being scientifically informed factored heavily into why and how we participated in Science Literacy Week. Our participation also furthered our strategic goals by growing collaborations with campus and community partners to advance scientific teaching and learning (UBC Library, 2015). The event was also an opportunity for the library and librarians to directly build on our role as educators of information literacy; and engaging in critical conversations around science literacy, with information literacy as the background, contributes to a general heightened sense of literacy (Podgornik, Dolničar, & Glažar, 2017).

Collaborations

Leading an event such as Science Literacy Week provided an excellent opportunity for us to collaborate with colleagues in the library, across campus and beyond the institution.

As a large institution, we were fortunate to have multiple libraries and units participate. Woodward Library (Vancouver campus) and the Okanagan Library (Okanagan campus) were natural partners as both libraries directly support students and faculty in science, engineering and health. We were joined by the Education Library (Vancouver campus), which promotes science and maker activities to the education students, many of whom will teach science in the classroom. Librarians from the three locations met early on to share ideas, and although we ran separate activities, we used one LibGuide (<http://guides.library.ubc.ca/scilit17/>) to promote all events. In addition, the Library's conservation staff participated in the Woodward Library Science Expo, sharing the biology and chemistry of preservation, and last year the Xwi7xwa Library (Vancouver campus) created a book display on Indigenous science. One future goal will be to partner with more branches since science touches all disciplines.

As librarians, we benefit from the expertise of other professionals within the institution. UBC

Library Communications worked on a promotional campaign that meant outreach to departments, digital signage around campus, social media, and several articles about events in the student newspaper. The UBC Information Technology (UBCIT) unit has been incredibly supportive in supplying and setting up equipment. As I've learned from a colleague, it is important to invite these groups into the planning early in the process as they have much to contribute and require sufficient lead time to deliver.

We realize that we could not have achieved what we have in both 2016 and 2017 without the energy and creativity of our newest colleagues on both campuses. Despite it being arguably the busiest time of year, they took on the extra work of planning and orchestrating events. It was wonderful to have new ideas for events such as the Living Library, and the addition of art into the mix such as the I Love Science felt board and the Dress-as-a-Scientist photo booth.



Figure 1. Photo: 2017 Science Expo at Woodward Library

In addition to a dedicated team at our institution, we have many enthusiastic students, faculty and staff who are passionate about their work and about education. Engaging them is an excellent way to provide a venue to highlight their work while opening new avenues of involvement with the library. Many of our activities are geared toward giving young scholars the opportunity to practice communicating what they do, increasing their own and their peers' science literacy. By involving students and groups already engaged with the library (e.g. employees, advisors, researchers), we were able to leverage their passion for both libraries and science.

In 2017, across both campuses, we worked with over a dozen student and campus groups. Two activities that highlight this engagement include a Science Expo at Woodward Library and display tables at Okanagan Library.

The Science Expo, hosted at Woodward Library, invited numerous campus partners to participate in sharing their work and contributing to scientific inquiry and exploration. Partners included the Beaty Biodiversity Museum who shared not only the work that the museum does but the educational programming they make available to the campus and the broader public, and Open Science Network, an interdisciplinary group committed to science outreach.

The Okanagan Library ran a series of display tables called “Show me something I’ve never seen before” which showcased diabetes, women in science, and health and wellness research within the library. The diabetes table was organized by the Okanagan Biochemistry Course Union, one of whose members is also a student employee at the library. As participants enjoyed homemade cupcakes, course union members revealed the body’s secrets by describing the biochemical pathway from sugar consumption to the onset of diabetes. This was a unique opportunity for these undergraduate students to share their passion for science and for the library to bridge relationships with the student body.

In 2017 we made headway in engaging faculty as well as students. Previously, faculty had been tangentially involved in Science Literacy Week through faculty recommended book displays. This year we launched a library produced podcast series, Frequencies (<http://apple.co/2yuBbl5>), aimed at providing a critical view of faculty research in the sciences, and faculty analyses of how we understand and instruct science literacy in the classroom.

This opportunity helped to build another level of relationship between faculty and librarians, providing a new avenue for engaging and supporting their research. At the same time, it provided faculty with a new venue for disseminating their scholarly outputs and functions. Perhaps most significantly, the format created the opportunity to move the discussion of science literacy beyond the walls of the academy and past Science Literacy Week. Not being tied to a fixed time and venue like a lecture, the library achieved international reach, and the content continues to be accessed long after Science Literacy Week has ended.



Figure 2. Photo: 2017 Biochemistry Course Union cupcakes

For 2017 Science Literacy Week, we were able to connect with expertise outside UBC by partnering with BCcampus, other BC academic libraries, and Ladies Learning Code to program two main events, a Wikipedia edit-a-thon and a coding workshop.

Woodward Library hosted a Wikipedia edit-a-thon as did our colleagues at British Columbia Institute of Technology, Douglas College, Kwantlen Polytechnic University, and Simon Fraser University. The event was sponsored by BCcampus, an organization that supports universities and colleges in the province of British Columbia by sharing resources for open education and technology-enabled teaching and learning. Under the theme of Science and Scientists from British Columbia, we edited 40 articles together across multiple campuses. The benefit of a Wikipedia edit-a-thon is that the articles created or edited by participants will be accessible and useful to the public. The edit-a-thon dashboard (Engle & Miller, 2017) continues to track the number of views of these articles even after the event.

Woodward Library partnered with Ladies Learning Code (now called Canada Learning Code, <https://www.canadalearningcode.ca/>), a not-for-profit organization which promotes technical skills among women and youth. We hosted a coding workshop on September 23, which was the National Learn to Code Day and coincided with the Science Literacy Week. The workshop was well attended with 25 participants. There was one instructor and nine assistants; the high assistant to participant ratio meant that participants' questions were promptly answered.

A number of factors led to the success of the coding workshop. The content was specifically

developed for the National Learn to Code Day and addressed popular topics like artificial intelligence and big data to draw participants both inside and outside our home institution. The timing was ideal because having it on a Saturday meant that it did not conflict with classes. The promotion reached a wider audience because we could advertise the event through the communication channels of both UBC Library and Ladies Learning Code. The academic space appealed to attendees because it was different from the usual venues of technology companies. The workshop was held in the Lillooet Room, an attractive space that is part of the refurbished core of the 1925 Main Library.



Figure 3. Photo: 2017 National Learn to Code Day workshop at UBC Library

Going Forward

Building on our successes, we look forward to expanding our involvement in Science Literacy Week in the years to come. On both campuses we endeavour to continue building stronger and more fruitful relationships with other parties involved in science education, across the university and across the communities.

In Vancouver we are keen to partner with the local science centre to offer a Wikipedia edit-a-thon in the evening. We hope that the beautiful space and timing will attract new audiences and increase participation. For the Science Expo, we may invite daycares and schools on and near the campus to reach families in the university neighbourhoods. The University Neighbourhoods Association (<https://www.myuna.ca/>) would be an ideal partner to promote the Science Literacy Week events to local families.

In the Okanagan, where in the last several years we have been making efforts to work collaboratively with the local public library system, the Okanagan Regional Library, we see Science Literacy Week as an excellent opportunity for joint programming, an opportunity that can help to ground the work of the university within the community and one in which the community can derive direct benefit from the scholarly outputs of the university.

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Intersecting Stories: Exploring the History of Marine Exploration, Oceanography, and Women in Science through a Small Historical Research Vessel Data Archive

Kathryn Lage

MLML/MBARI Research Library
Moss Landing Marine Laboratories / Monterey Bay Aquarium Research Institute
8272 Moss Landing Road
Moss Landing, CA 95039

Abstract

The MLML/MBARI Research Library at Moss Landing Marine Laboratories has begun a project to process and analyze a small archive of records and data from Jacques Cousteau's 1972 expedition to the Antarctic Peninsula on the research vessel *Calypso*. This paper explores the multiple stories embedded in this small archival collection of papers and data from Dr. Ellen Weaver. It tells the story of a collaboration between Jacques Cousteau and a researcher at NASA Ames, illuminating early research on chlorophyll fluorescence and remote sensing measurements of phytoplankton. It reveals the contributions of a pioneering woman scientist who was a faculty member at San José State University and an influential biochemist. And it also tells the story of an archive of oceanographic data, the challenges of processing it and its usefulness for modern-day research. This project brings together collaborators with expertise in information science, biogeochemistry and physical oceanography to work across disciplines to explore the historical and scientific aspects of this archive. The paper presents initial activities to evaluate and process the paper-based data sheets, strip charts, and ship's log that make up this archive.

Keywords: Ellen C. Weaver, *Calypso* (Ship), oceanography -- research, women in science -- United States, archival materials

Introduction

One Tuesday morning the late fall of 1972 Dr. Ellen Weaver received a "startling proposition" (Weaver, 2009, p. 1). Could she be on a plane bound for Buenos Aires on Saturday morning, with a fluorometer? Captain Jacques Cousteau was preparing for another of his famous ocean cruises on the ship *Calypso* and wanted to install the oceanographic instruments Dr. Weaver had been working with at NASA Ames. (E. C. Weaver, 2009, "hJ.Y. Cousteau, Part 1," p. 1)

Cousteau had heard about the work Ellen Weaver and John Arveson at NASA Ames had been doing using first airborne and then satellite imagery to detect the presence of chlorophyll in water. They were using a fluorometer analyze water samples in order to ground-truth measurements of chlorophyll made

using remote sensing imagery. Cousteau was interested in continuing that research on his upcoming *Calypso* cruise to the Southern Ocean. Dr. Weaver agreed to go to Buenos Aires to install her instruments and train the crew responsible for them. Each day the data and the ship's log were to be sent back to her in Mountain View, California at NASA.

In 2010, Dr. Weaver sent a small archive of these data and documents from the *Calypso* Cruise and a four-part essay she had written about her experiences to Moss Landing Marine Laboratories (MLML) on California's Central Coast where it was deposited in the MLML/MBARI Research Library.

This paper explores several narratives embedded in this archival collection. It tells the story of a collaboration between Jacques Cousteau and a researcher at NASA Ames, illuminating early research on chlorophyll fluorescence and remote sensing measurements of phytoplankton. It reveals the contributions of a pioneering woman scientist who was a faculty member at San José State University and an influential biochemist. And it also tells the story of an archive of oceanographic data, the challenges of processing it, and its usefulness for modern-day research.

The Archival Collection

The Ellen C. Weaver Collection consists of two boxes of original strip charts of underway cruise data, handwritten meteorological observations and other data sheets, Dr. Weaver's essay, the ship's log, NASA communiqués, and other documents. It was added to the Library in 2010 and many documents were scanned at that time. However, it has not been fully inventoried or evaluated for preservation needs. The collection contains many types of documents, some printed with fugitive ink and on acidic paper in acidic housing, as shown on the photograph below. I plan to assess the documents for conservation and storage needs and treat them accordingly. After that has been done, I will scan all the documents in the archive and create metadata and finding aids. It will be made available through Moss Landing Marine Laboratories' institutional repository and shared widely through appropriate portals.

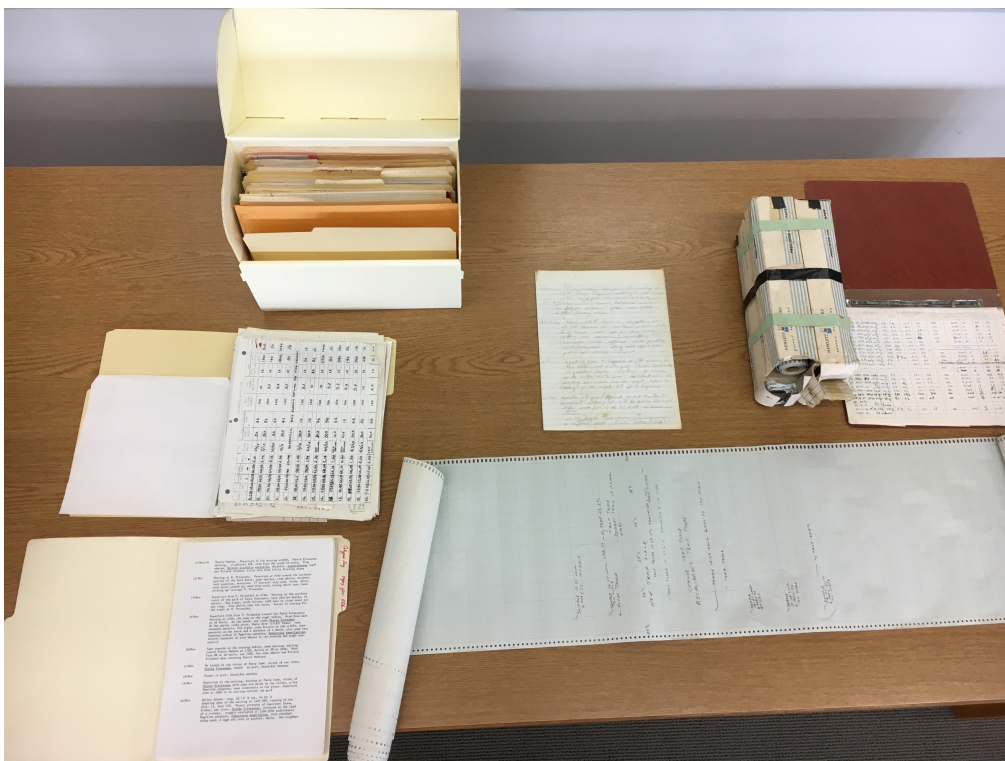


Figure 1. Photograph of papers and data sheets from the Ellen C. Weaver Collection, MLML/MBARI Research Library

Early Research & Career

Dr. Ellen C. Weaver (1925-2011) was a chemist, biologist, geneticist, and plant physiologist, who had a varied career in science. Ellen was a skilled musician and skier and a dedicated conservationist and environmentalist ("Ellen Weaver Obituary," 2011). In 1945, she received her BA in Chemistry from Flora Stone Mather College at Western Reserve University. After she graduated she worked as an analytical chemist for the Manhattan Project in Oak Ridge, Tennessee for two years. She returned to school and received an MA in Biological Sciences from Stanford University in 1952 and a PhD in Genetics from University of California, Berkeley in 1959. After working for Standard Oil of Ohio and the Stanford Biophysics Lab, Ellen took a job at NASA Ames Research Center in the 1960s. (Marshall, Herzenberg, Howes, Weaver, & Gans, 2010, p. 230-231.) She started as a part-time instructor at San José State University in 1969 and in 1970 moved to a tenure-track faculty position. Around this time, she and her collaborators published one of many articles on their research into remote sensing of chlorophyll and temperature. (Arvesen, Millard, & Weaver, 1973)



Figure 2. Ellen Weaver, in front of the Research Vessel Calypso in Buenos Aires, Argentina, 1972

(photograph from Ellen C. Weaver Collection, MLML/MBARI Research Library)

Dr. Weaver and Jacques Cousteau

Jacques Cousteau was interested in knowing more about the Antarctic waters and the life they supported. Four days after the Tuesday phone call to NASA Ames from Cousteau, Dr. Weaver was on a plane bound for Buenos Aires. Ellen explained to Cousteau how photosynthesis works and how the fluorometer measured the presence of chlorophyll, which signifies that photosynthesis is taking place. Dubbed “Madame Chlorophyll” by Cousteau’s wife, she explained that the fluorometer shines a blue light on a constant stream of water flowing through the instrument. Chlorophyll fluoresces bright red under the light and the fluorometer she would install could measure even very small amounts of chlorophyll. As Ellen tells it, Cousteau was an intelligent and attentive student during her lecture. (E. C. Weaver, 2009 “Cousteau, Part 3,” p. 1)

Dr. Weaver set up a Turner fluorometer on the ship—no small feat as she had to adjust for a mismatch in the fluorometer’s power requirements and that available on board, purchase and calibrate new parts locally, and (with assistance from an uninterested crew) drill through the ship’s hull to complete the installation. Since she was not invited to accompany Cousteau on the cruise, she trained the ship’s doctor to maintain and run the instruments and showed him how to extract and measure chlorophyll from water samples. Dr. François would transmit the data to NASA each day (E. C. Weaver, 2009).

Dr. François spoke no English and Dr. Weaver spoke no French (E. C. Weaver, 2009, "Cousteau, Part 3," p. 2); the sketch reproduced below may have been a way to bridge the language gap and explain that transmission. The *Calypso* is on the left: the data is transmitted up to a satellite and back down to Ellen in Mountain View CA.

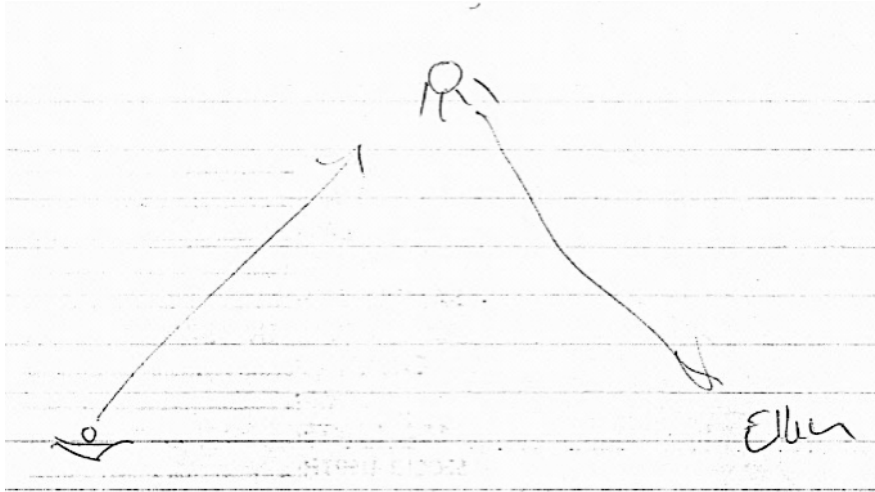


Figure 3. Sketch from the Ellen C. Weaver Collection, MLML/MBARI Research Library

NASA touted their collaboration with Captain Cousteau in a press release, noting their research would investigate “how spaceage [sic] technology can be used in oceanographic investigations to define biologically productive ocean regions” (Miller, 1973, p. 1).

The *Calypso* began her 10-month South American cruise in November 1972 in Puerto Madryn, Argentina, and ended in Galveston, Texas. Continuing south along Argentina, the *Calypso* journeyed around Cape Horn, through Drake’s passage and explored the Antarctic Circle, filming all the while. Data collection continued, although it seems from gaps in the data that for some time the fluorometer was not working. On Feb. 11, the *Calypso* was damaged by huge ice floes in a storm. In spite of this, after some repairs and with satellite weather forecasting support from NASA, she made it back to Punta Arenas, in the southern tip of Chile, and then eventually back north in the Pacific Ocean, through the Panama Canal, and back to Galveston, TX.

Data collected throughout the cruise included underway temperature and fluorescence intensity measurements, secchi depth measurements of the transparency of the water, weather conditions, and water samples upon which additional fluorescence analysis was performed by Dr. François. The log kept by Dr. François also provides observational data, noting weather and sea conditions and animals sighted.

12/Nov/72	Puerto Madryn. Departure in the morning at 0600. Puerto Pyramides mooring, cloudiness 50%, wind from the south 25 knots. True whales, <u>Baleine glacialis australis</u> , dolphins, <u>Lagenochyneus</u> (sp?) one Fitzroy dolphin, flora rare with little floating algae <i>5 miles from shore</i> <i>Sea slat</i>
13/Nov	Mooring at P. Pyramides. Departure at 0700 toward the northern portion of the Gulf Nuevo, same species, true whales, dolphins very numerous, merralmie (? species) very weak winds, afternoon winds picked up, wind from east; strong white caps (seas picking up) moorage P. Pyramides
14/Nov	Departure from P. Pyramides at 0730. Mooring on the northern coast of the gulf of Punta Comorants, very shallow depths, 10 meters. Few algae, sandy bottom; 100% sun; no cloud cover all day long. Some whales near the coast. Return to mooring for the night at P. Pyramides. <i>Rough</i>

Figure 4. Ship's log entries from the beginning of the cruise. From the Ellen C. Weaver Collection, MLML/MBARI Research Library.

Academic Life, Administration, and Activism

Dr. Weaver's research on photosynthesis and the measurement of chlorophyll using remote sensing has been influential in the field. Early on, as Ellen noted in an interview in 1991, she "worked in the lab that made the major breakthrough of biochemical mechanism of photosynthesis" (Schatz, 1991, p. 8) during her graduate work at UC Berkeley. This was Professor Melvin Calvin's lab, who would later win a Nobel Prize for his work on photosynthesis (the Calvin Cycle is named for him). Ellen's first article published in *Science* was in 1963, while she worked in the Stanford Biophysics Laboratory. She went on to publish two more articles in *Science*, one in *Nature* among her total of 14 scientific articles. Her article with Arvesen and Millard in 1973 has been cited 21 times in Scopus and 51 in Google Scholar and is still being cited today—20% of the citations in Scopus were from 2010 on, showing the long-lasting impact on the field.

In spite of Dr. Weaver's impressive pedigree, she recounts many incidents of discrimination that impacted her career. Although she published an article in *Science* during her time at the Stanford Biophysics Laboratory, she was told the Stanford biology department was "not ready to hire a woman faculty member" (Marshall et al., 2010, p. 230). Even after she had secured a tenure-track faculty position at San José State University, she recounted hearing from other faculty members that the Dean of Science "had vowed" she would not get tenure and posited that the convincing element of her dossier was a letter of recommendation from none other than Jacques Cousteau to the president of the University (Weaver, 2009, "JYC Comes to Visit," p. 3)

As Ellen's career progressed she took on administrative roles at San José State University, becoming a strong advocate for women in science. In a 1971 response to an article published in *Chemical and Engineering News* she wrote a spirited defense of the scientific abilities of women, excoriated men who "express admiration for my successful combining of doing

research and staying feminine” and yet who do not work toward including women as full colleagues in science, and pointedly remarked that men are afraid that a woman would prove to be a better scientist than they, should she be allowed to fully participate in scientific work (E. C. Weaver, 1971, p. 4). In the 1970s Ellen was Director of the SJSU Foundation, Interim Executive Vice President, and Associate Dean for Development at San José State University (“Ellen Weaver Obituary,” 2011). She was active in California SeaGrant and on the governing board of Moss Landing Marine Laboratories. She advocated for the inclusion of more women in administration in academia (E. Weaver, 1979). She retired from San José State University in 1991, but continued her service to the profession and advocacy in her role as president of the Association of Women in Science (AWIS). She served as President of AWIS from 1992-93 and was elected as a Fellow of the AWIS in 1996. Her advocacy was honored by the Northern California chapter of AWIS with an award in her name, given to an early career scientist who helps others (Association for Women in Science, n.d.)

Future Research with the Weaver Archive

My future research with this archive is inspired by Dr. Weaver herself, as portrayed by a student quoted in San José State University’s *Spartan Daily* who noted that Dr. Weaver “is always a whirlwind [sic] of activity and [has] a sense of enthusiasm that follows her” (Schatz, 1991, p. 8).

As I process the archive, I will also conduct more biographical research and investigate the existence of related archives that might provide more information about Ellen’s career or this *Calypso* cruise. Most importantly, I want to make the archive and the historical data available to others for future research. Towards that end, a primary project goal is to convert the paper data sheets to digitized data, ready for use in quantitative analysis. I plan to research how to automate the conversion of the hard-copy tabular data to digitized spreadsheets, as well as the more complex conversion of the continuous data depicted on the strip charts.

One research project in the planning stages that will use the digitized data aims to analyze data from this 1972 *Calypso* cruise and a Moss Landing Marine Laboratories (MLML) cruise to Antarctica on the R/V *Point Sur* in 2011. MLML Physical oceanographer Professor Tom Connolly and I plan to work with students in his marine science data analysis class to analyze the data from the two cruises with overlapping transits, 40 years apart. This paper has only touched upon the ways in which this small archival collection can contribute to research in the history of women in science, the legacy of Jacques Cousteau, and climate change in the Antarctic. When the Weaver Collection has been fully processed and made available through the MLML/MBARI Research Library it will be accessible to researchers in these fields and more.

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Undergraduate Material in Science Libraries: Current Practices

Alisa Lazear

University of British Columbia

Abstract

The digital age has changed the way we share and store scholarly material. Undergraduate material is increasingly being deposited in institutional repositories or made accessible online, allowing for this research to be widely available to other scholars. This can create opportunities and challenges for libraries. To better understand the current methods used in science libraries for the collection, access, and preservation of undergraduate material, a pilot survey was conducted of the Cyamus regional group. Now we are interested in gathering a clearer picture by surveying the entire IAMSLIC membership. Marine and aquatic libraries in university institutions are the target audience for our survey with the aim of understanding current methods and challenges specific to science libraries. Examining current process and challenges will offer new perspectives on the issues associated with having undergraduate material online and will provide an opportunity to understand our evolving responsibilities as librarians. The presentation at the IAMSLIC conference illustrates the results of this study and discuss how changes in access, preservation, and collection have benefited or harmed the scientific community.

From Ideas to Creation: Using 3D Technologies for Innovative Research

Michelle Leonard

Neelam Bharti

University of Florida

Abstract

Historically, libraries have always been very open, inclusive, and creative about community participation and knowledge sharing. Recently, libraries are getting more involved in collaborative research and assisting with the applications of innovative emerging technologies for exploration, grant activities and curriculum design. One example of an emerging technology is three-dimensional (3D) printing, with over 425 libraries in the United States offering some level of such services. Furthermore, 3D printing provides a new creative and innovating platform for almost every discipline in education and research and has far reaching impact with substantial impact on the field of marine science. For example, a 3D printed model of a coral reef mimics the natural site to imitate ocean microbiome space, and 3D printing models have been used as fish tags to catch big fishes. This interactive presentation will demonstrate technologies in the libraries, staffing and training, collaborative initiatives with students and researchers, where to find models and application in marine science.

Keywords: 3D printing, marine science, library services

Blurring the Edges of Disciplines - Art and Science

Anne K. Moser

UW-Madison, Wisconsin Water Library

1975 Willow Dr., 2nd floor

Madison, WI 537106

akmoser@aqu.wisc.edu

Abstract

Wisconsin Sea Grant (WSG)-supported research is ultimately relevant to people of all backgrounds, regardless of age, socioeconomic status, or education level. WSG seeks out a diversity of collaborators to reach a diverse range of audiences with its outreach and education efforts with the ultimate goal of inspiring a science-informed society. As an outreach component of WSG, the Wisconsin Water Library has held several events in recent years with an art and science focus. This paper highlights recent multidisciplinary activities where unique collaborations were forged and surprising common ground was found between artists and scientists approaching wicked problems related to water. The paper will place these projects in the context of libraries and scientific illustration in general and will detail the purpose, partnerships, successes and challenges of two recent and one future projects.

Keywords: Art and Science; scientific illustration; medical illustration; artists' books; science—social aspects; marine debris; communication in science.

Context

While the idea of scientists and artists working together may sound like a 21st century concept, the history of these two disciplines working in tandem or as one is a long one. In a way, we may consider it to have been in practice for more than 30,000 years. In prehistoric history, humankind strove to document the world around them and as we move forward through time, this collaboration expanded to the surgical theater, the laboratory, and the natural world.

1) We start this story in the caves of southern France. In the Chauvet-Pont-d'Arc Cave, we see evidence of humans drawing what they observed around them. The cave is filled with some of the world's best preserved figurative cave drawings (<http://whc.unesco.org/en/list/1426>). The drawings include representations of at least thirteen distinct animal species. These cave drawings, and many others in this region and beyond, show one of human's first stab at documentation, a time-honored tradition in science.

Anatomical Illustration

Documentation was also one of the reasons that artists were invited into the clinical, surgical and post-mortem theaters. Physicians needed anatomical drawings because there were no MRIs or x-rays or machines to document what the pioneers in medicine were observing (<https://www.ncbi.nlm.nih.gov/pubmed/100890383>). The image of the skull (below) is an example of how artists first documented the human form. The great artist, scientist, and inventor Leonardo da Vinci drew this sketch with precision in the years around 1488-1489 with a keen eye toward the dimensions. Though the full story of da Vinci's fascination with the human body is not known, we are lucky to have collections of his sketches and drawings to see examples of what early practitioners of the new science of medicine were seeing and experiencing.

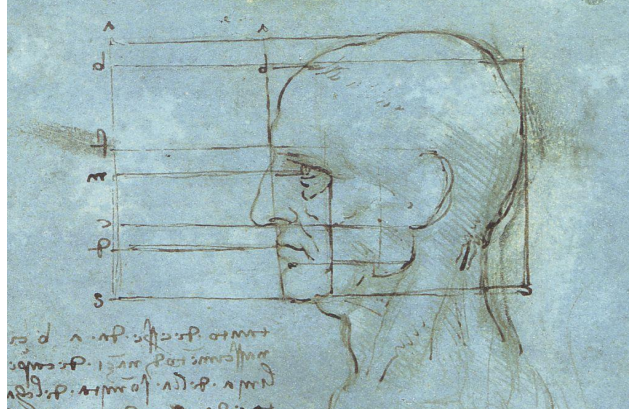


Figure 1. Source: <https://commons.wikimedia.org/w/index.php?curid=59571>

We can contrast his rendering with this second example just one hundred years later. We see how far anatomical illustration and our understanding of the human body had advanced.

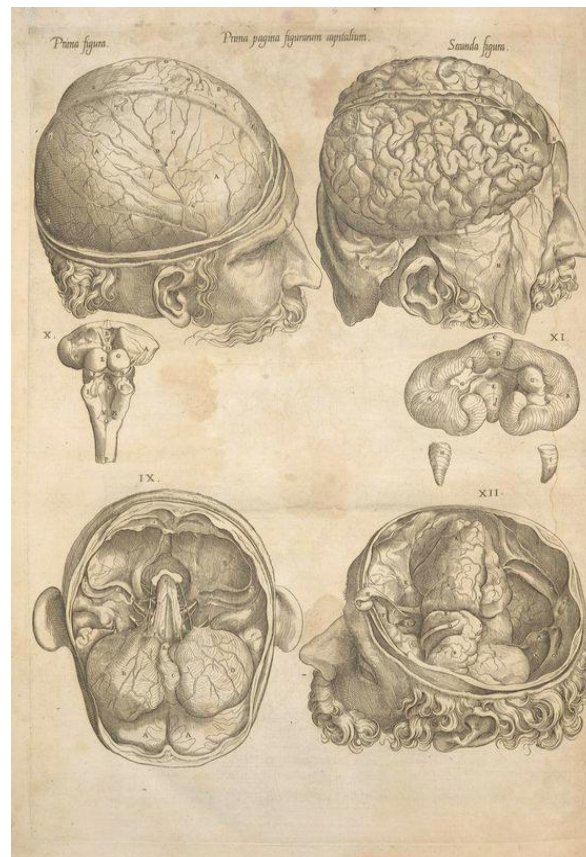


Figure 2. Source: Rare Book Division, the New York Public Library. "Prima pagina figurarum capitalium [Human brain]" The New York Public Library Digital Collections. 1545.
Source: <http://digitalcollections.nypl.org/items/510d47dd-f399-a3d9-e040-e00a18064a99>

It is helpful to remind ourselves how far medicine and imaging of the human form have advanced. We can see that progress when with a look at images taken with (fMRI) Magnetic Resonance Imaging and computational models.

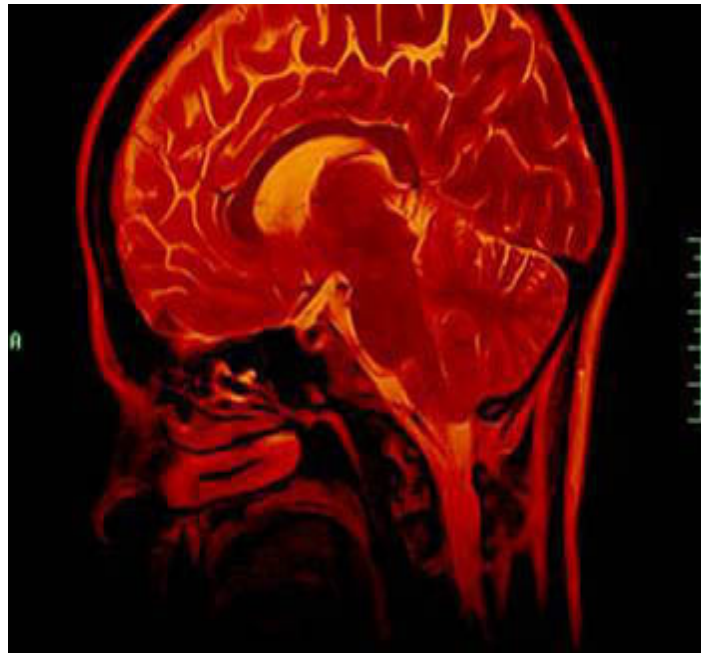


Figure 3. Source: Getty images (2017).

Medicinal Herbs Illustration

Scientific illustration of plants was another important development in the advancement of medicine and a second example where artists and scientists work in tandem. These illustrations gave early practitioners of medicine the means to identify drugs to treat a wide range of ailments. Before the pharmaceutical industry produced our drugs, society relied on plant life found in surrounding fields and forests to treat common (and not so common) pains and aches. Today, these drawings are considered art masterpieces and the detail and accuracy are astounding.



Figure 4. Köhler's Medizinal-Pflanzen in naturgetreuen Abbildungen mit kurz erläuterndem Texte

Source: <http://biodiversitylibrary.org/page/303628>



Figure 5. Arabic manuscript of the work of Dioscorides from Baghdad dated 735H/1334
Source: ©The British Library

Biological Illustration

Early biological illustrations have also produced art works considered to be masterpieces that were created for scientific purposes. The body of work by the great John J. Audubon is an excellent example. As we see below, his illustration of the Great Blue Heron, when paired with a modern photograph, reveals mastery as both a painter and a scientist.



Figure 6. Source: John J. Audubon's *Birds of America* – Illustrations made between 1827–1839



Figure 7. Source:

https://commons.wikimedia.org/wiki/File:Great_Blue_Heron_showing_off_for_the_camera_3396-001.jpg

We see the same beauty and scientific accuracy if we turn our eyes to the underwater world. This illustration of the Flying Gurnard (a favorite of the author of this paper) is an excellent example.



Figure 8. "Allgemeine Naturgeschichte der Fische (General natural history of fishes) by author/illustrator Marcus Elieser Bloch (1723-1799).

Source: <https://blog.library.si.edu/2015/07/blochs-allgemeine-naturgeschichte-der-fische/#.WdPgi9FOmUI>



Figure 9. Source: https://en.wikipedia.org/wiki/Flying_gurnard

We have included a favorite fish found in the Upper Midwest - the sturgeon - to illustrate the same artistic mastery and scientific accuracy of a species found throughout freshwater ecosystems.

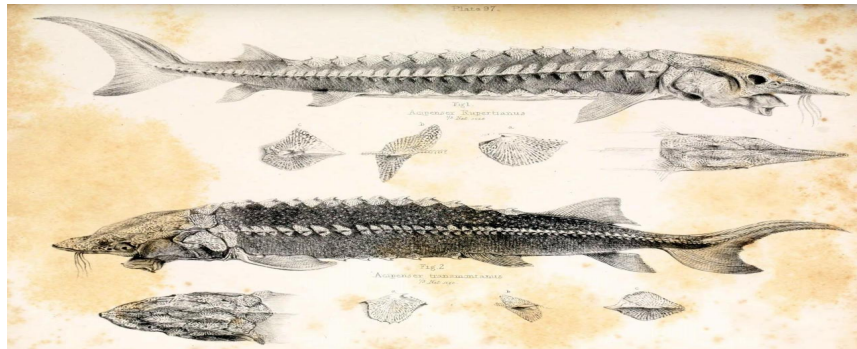


Figure 10. *Fauna Boreali-Americana; or the Zoology of the Northern Parts of British America*. John Richardson, 1836. White sturgeon (top) and Lake Sturgeon (bottom)
Source: <https://archive.org/details/faunaborealiamer01rich>



Figure 11. Source: Tennessee Aquarium

How is scientific illustration used today?

Kalliopi Monoyios (Kalliopi Monoyios 2015. 5 Reasons Your Camera Won't Steal My Job. <https://blogs.scientificamerican.com/symbiartic/httpblogsscientificamericancomsymbiartic201107125-reasons-your-camera-wone28099t-steal-my-job/>.) gives us several examples of how scientific illustration is used today. They are used for creating cutaways in scientific publishing; for images of things that no longer exist; for items that cannot be photographed; and for creating diagrams that show scientific process. In certain instances writers and editors of scientific books and texts choose scientific illustration for artistic effect. Institutes and organizations that use scientific illustration today include museums, publishers, the movie industry, game developers, government agencies, and parks and nature centers.

What do libraries have to do with it?

There are many examples of libraries leveraging their collections in an artistic fashion to further their mission, especially with digital materials. One champion is the Biodiversity Heritage Library (BHL), a consortium of natural history and botanical libraries that cooperate to digitize the legacy literature of biodiversity held in their collections and to make that literature available for open access and responsible use as a part of a global “biodiversity commons.” Their web presence is a great example of the science and art intersect.

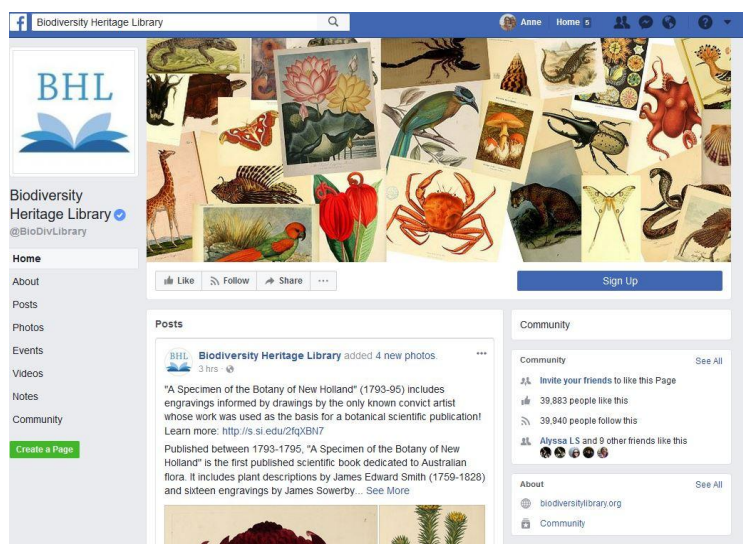


Figure 12. Biodiversity Heritage Library [Facebook page] (n.d.). Retrieved October 1, 2017, from <https://www.facebook.com/BioDivLibrary/> Screenshot by author.

In Wisconsin, the Ebling Health Sciences Library at the University of Wisconsin-Madison has been involved in the science and art intersect for many years, with an on-staff curator creating exhibits on anatomical and scientific illustrations. The library hosted a recent exhibit in support of the common book read (*Go Big Read*) on the UW-Madison campus. *Go Big Read* chose the graphic novel *Radioactive* in 2013 and this exhibit highlighted the use of radioactivity in medicine over the years.

Fallout: The Mixed Blessing of Radiation & the Public Health

November 1, 2012 - August 31, 2013

Historical Reading Room and 3rd Floor Gallery

Extended Again!

"Fallout" is an examination of subjects such as the early use of x-rays in diagnosis & treatment, occupational hazards of working with radiation, the military use of x-rays, the history of tanning, a UW connection with Marie Curie, bomb shelters in the 1960's, the bombing of Hiroshima & concerns with nuclear accidents like Three-Mile Island, UW's Departments of Medical Physics & Radiology, shoe fitting fluoroscopes and the like.

The exhibit is supported by artifacts, journals, books, and other ephemera from Ebling's Rare Books & Special Collections and materials from other campus libraries and UW's Radiology Department.

"Fallout" was imagined in conjunction with UW's Go Big Read common reading program, this year's book is *Radioactive* by Lauren Redniss.

The exhibit is open when the library is open.

Hours:

Monday – Thursday: 7:30 AM – 11:15 PM

Friday: 7:30 AM – 5:45 PM

Saturday: 10:00 AM – 5:45 PM

Sunday: 10:00 AM – 11:15 PM

[More information about the exhibit](#)

[View/Print Poster](#)

Questions about this event? Contact Micaela Sullivan-Fowler for more information at micaela.sullivan-fowler@wisc.edu or 262-2402

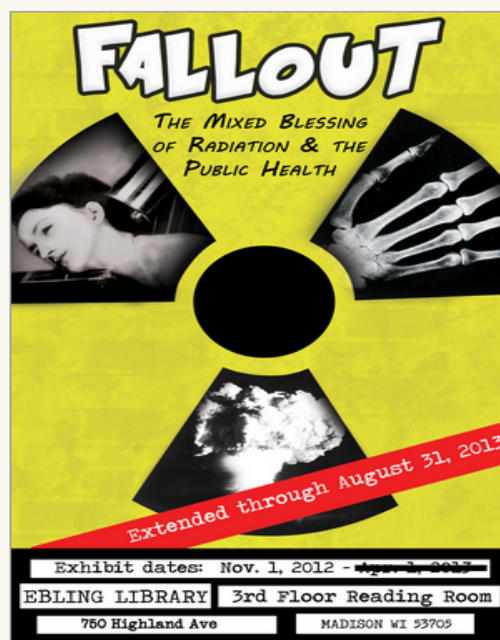


Figure 13. *Fallout: The Mixed Blessing of Radiation & the Public Health* [Announcement] (n.d.). Retrieved October 1, 2017, from <http://ebling.library.wisc.edu/artatebling/index.php> Screenshot by author.

Using Art and Science Together To Inform the World about Wicked Problems

For the Wisconsin Water Library at UW-Madison, interest in bringing these disciplines together has been a result of the library's outreach and education mission and its work with children. The library resides within the Aquatic Sciences Center, the administrative home of the Wisconsin Sea Grant Institute. The mission of Wisconsin Sea Grant (WSG) is to promote the sustainable use of Great Lakes resources through research, education and outreach. As an outreach function, the Wisconsin Water Library participates in education and outreach to Wisconsin residents of all ages to heighten awareness of the Great Lakes and Wisconsin's water resources. The library does this in a variety of ways and in the 2018-2022 WSG Strategic Plan the library includes a specific objective related to the art and science intersect: **to use the arts and humanities to achieve a science-inspired society.**

The genesis of the library's work with art and science was born out of the library's ongoing work with children ages three through nine. The library has offered library story times to children three through nine with a strong emphasis on science. There the library has observed how children approach scientific concepts with an open mind, an interdisciplinary nature and an artistic flair. Some examples from recent programs follow.



Figure 14. Photo by Anne Moser



Figure 15. Photo by Anne Moser

This objective to bring art and science together will provide the library an interdisciplinary platform to discuss Great Lakes issues with a goal to reach a more diverse audience and to work with more diverse collaborators. The library believes both disciplines approach society's wicked problems in distinct but complementary ways. And with these collaborations, both disciplines stand to benefit from each other: a scientist has the potential to bring scientific legitimacy and accuracy to an artist's environmentally-focused body of work and an artist has a unique potential to give a scientist a new way to communicate their findings.

The library sees at least four opportunities to intersect art and science through her work as an outreach librarian. 1. Creating visual arts (painting, sculpture etc) programming that communicates scientific concepts and research findings; 2. Seeking out and supporting education projects funded by WSG that bring art into the WSG portfolio of projects; 3. Combining science with literature to communicate scientific concepts and research findings; and 4. Creating opportunities in the performing arts arena, in formats including film.

Current and future projects

To date, the Wisconsin Water Library has had several successful art and science projects, two of which are highlighted here. The first, the **Poly Pledge**, was a collaboration with two Master in Fine Arts (MFA) students participating in a public art seminar that included an interactive art piece and a public discussion. The second project, **Title/Tidal**, was an artists' book exhibit which included a public talk about the meaning of water as inspiration. The library is also currently planning a 2018-2019 art exhibit on the lake sturgeon which will be discussed briefly.

The Poly Pledge

In early 2016, the Wisconsin Water Library collaborated with two UW-Madison Masters in Fine Arts (MFA) students on their project, the Poly Pledge. The Poly Pledge was born out of conversations with one of the students interested in the effect of plastics in area waters. During the following semester, she enrolled in a public art seminar and was inspired to create an art piece around the topic. The artist, Leigh Garcia, partnered with another student in the class, Pete Bouchard, to create a vending machine that was installed around the UW campus with the intent to create conversation around plastics in water. Visitors to the piece made a pledge to reduce their use of plastic over the next month and in return received a reusable shopping tote as a gift for making the pledge. While interacting with the piece, the artists had a chance to converse with the person about the environmental challenges relating to marine debris. After its install, the library hosted an event and invited Leigh and Pete to talk about the project with Tim Hoellhein, a researcher from Loyola University in Chicago, speaking on his work on investigating plastics in Lake Michigan.

The project was successful because the artists and the librarian were able to meet and talk with several hundred students from the university about the science of plastic in area waters. It raised visibility for the topic to an audience that may not hear the message. One of the biggest challenges was helping the artists understand the scope and limits of the research on the issue and convince them to include some nuance to their message. Collaborators on the project included the University of Wisconsin Department of Art, Loyola University in Chicago and several supermarkets in the Madison area. Images from the project follow.



Figure 16. Photo of the machine in action, UW-Madison, West Campus Mall.
Photo by Anne Moser



Figure 17. The machine with the artists, Pete Bouchard (left) and Leigh Garcia (right)
Photo by Anne Moser

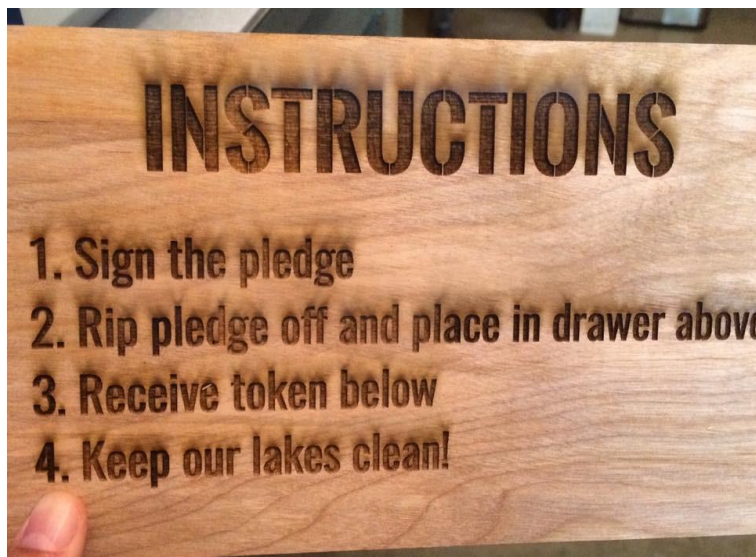
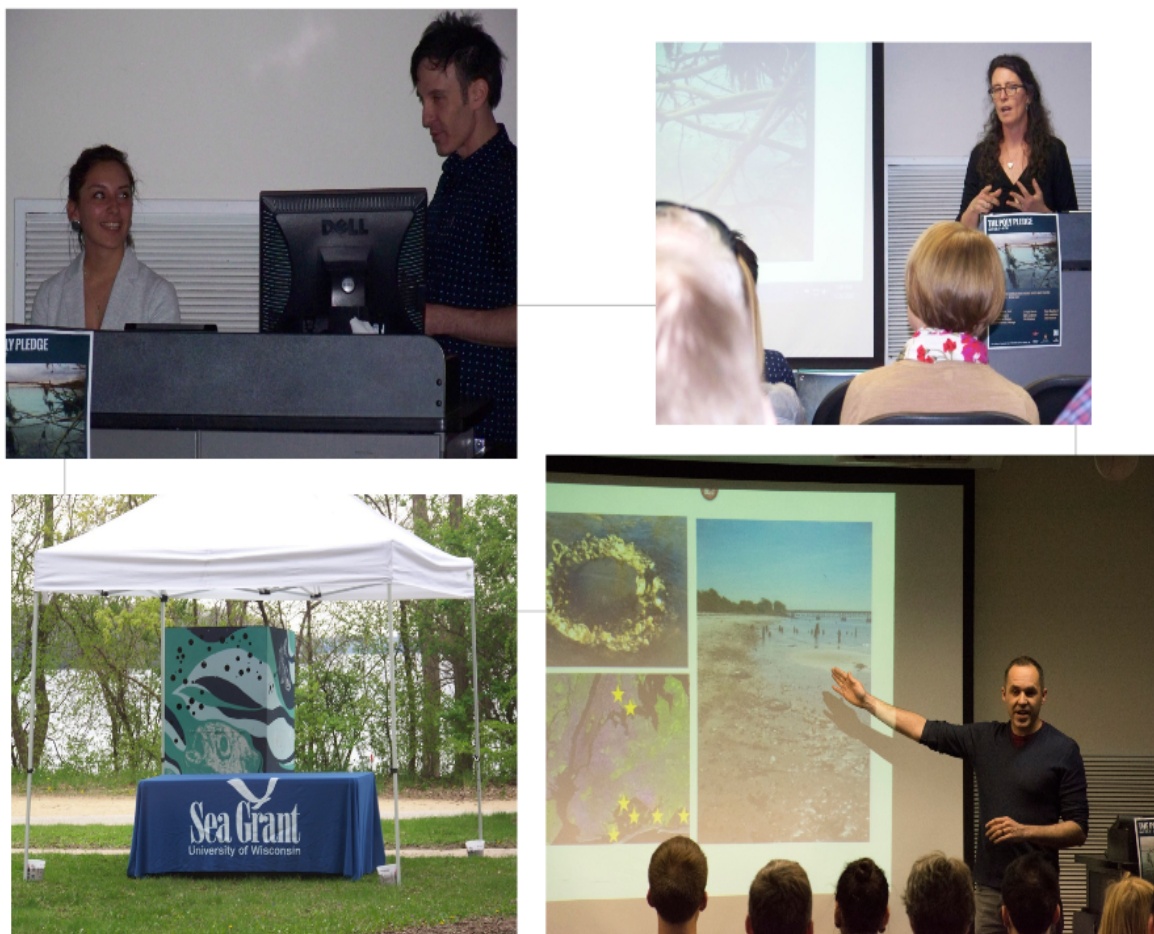


Figure 18. Pledge instructions.
Photo by Anne Moser



*Figure 19. Images from public event.
Photos by Sigrid Peterson*

Title/Tidal

In late 2016, in collaboration with the Kohler Art Library at UW-Madison, the Wisconsin Water Library curated 30 pieces of artists' books from Kohler's permanent collection for an exhibit in the library's space. Lyn Korenic, librarian at Kohler, Water Library student assistant Sigrid Peterson and Anne Moser curated pieces around the theme of water. The works, by artists from around the world, focused on a wide range of themes and addressed several wicked environmental problems. The exhibit ran for almost three months and concluded with a public talk by a world-renowned limnology scholar and an artist on the faculty of the UW's Art Dept. The primary purpose of the collaboration was to highlight the art pieces in the art library's collection. In addition, the curators hoped a new audience was created for both water science and water art. Partners included the UW-Madison Department of Art, the Center for Limnology, Kohler Art Library and the UW-Madison Libraries' Friends of the Libraries that generously supported the public event.



Figure 20. "Red Tide" gouache on paper, 5.5" x 7" © Karen Hackenberg 2009
Source: <http://karenhackenberg.com/>

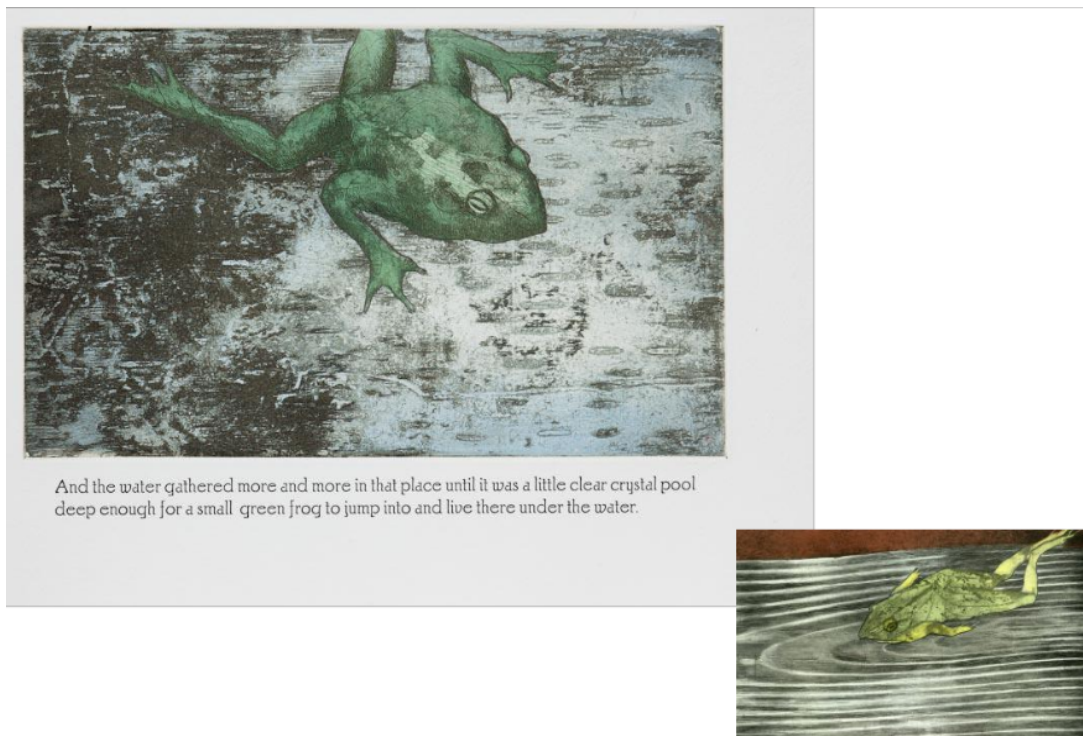


Figure 21. The exhibit in the Kohler Art Library at the UW-Madison.
Photo by Anne Moser

This first collection of pieces from the exhibit is included to show the beauty of the books and the artists' gorgeous interpretation of water. Their subject matter covers the action of water flowing, one of its most endearing inhabitants, the fun of going to the beach, and the beauty found in and around a freshwater lake.

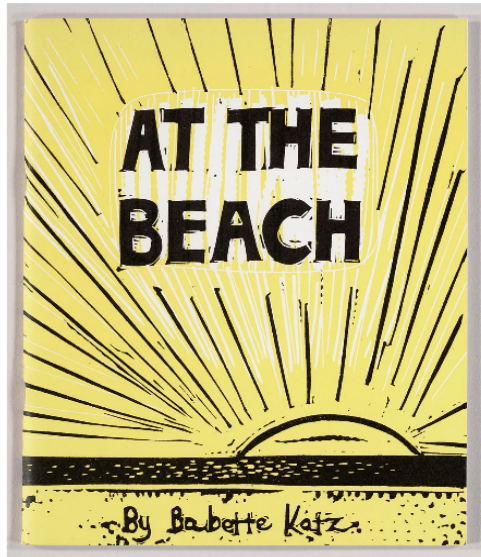


Figure 22. "Channel and Flow" by Sarah McDermott



Page from Margaret Wise Brown, *The Little River*, with illustration by Michael Kuch, Two Ponds Press, 2012

Figure 23.



At the Beach by Babette Katz, 1988

Figure 24.

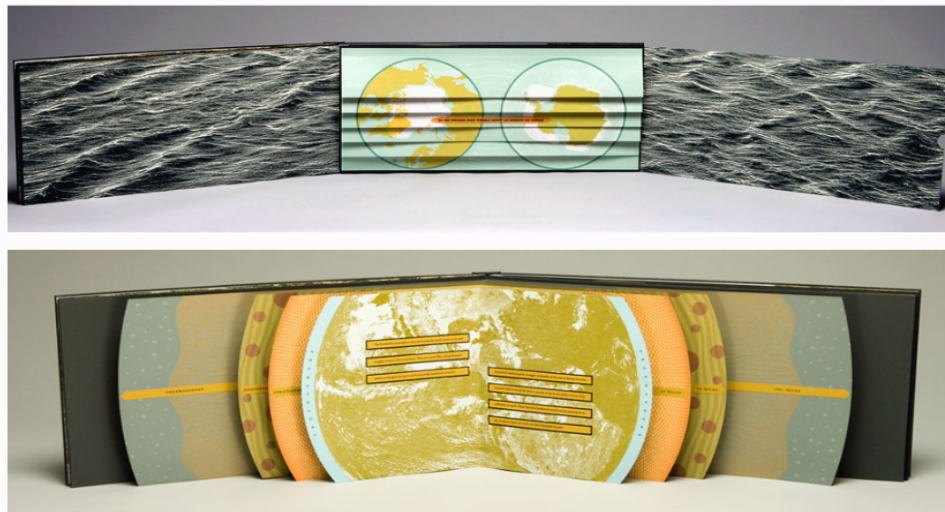


Lyn Hejinian and Emilie Clark, *The Lake* (2004)



Figure 25.

But not all the works would be considered aesthetically pleasing in a traditional sense. Some seemed to be created to evoke an emotional response or to communicate about environmental concerns or both. For example, Julie Chen's *Panorama* addresses the artist's concern about climate change.



Panorama by Julie Chen 2008

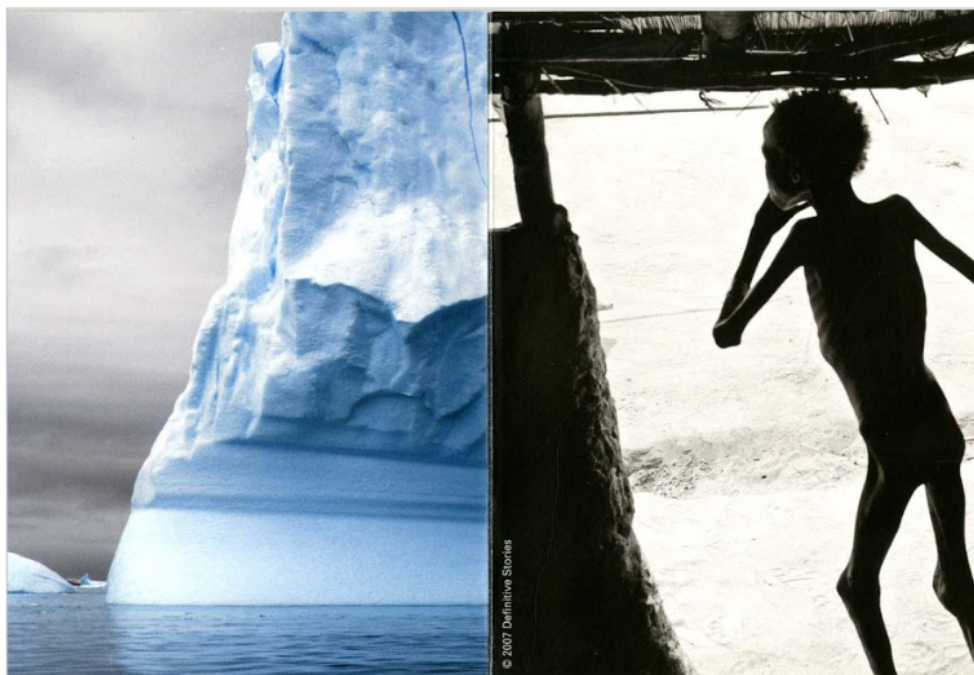
Figure 26.



Panorama by Julie Chen 2008

Figure 27.

Colin Finlay's work juxtaposes his photographs of melting icebergs (presumably due to climate change) with his photographs of starvation in Darfur, making a visual link between the two issues.



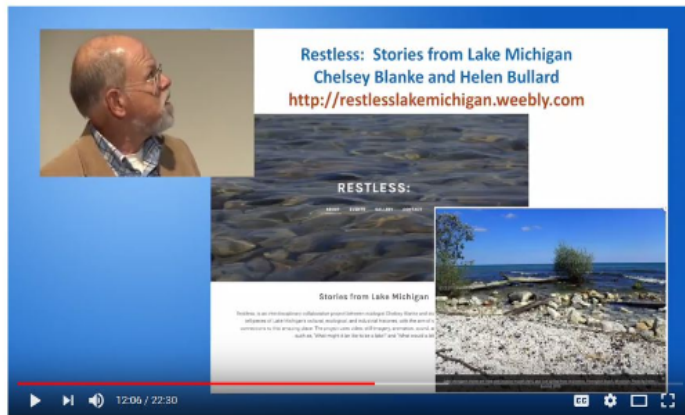
Colin Finlay. $12^{\circ}N \times 23^{\circ}E$, $64^{\circ}S \times 60^{\circ}E$. S.I.: Definitive Stories, 2007.

Figure 28.

To highlight the exhibit and to continue the conversation, a public talk was held at the end of the exhibit, with Steven Carpenter, a limnologist and Sarah FitzSimmons, an artist, invited to talk about water as a creative force in their work. The project was a success if measured in the conversations and networking that was a result of seeing the exhibit and hearing from the two renowned scholars. The exhibit reached a new audience of scientists, artists, librarians and the public.

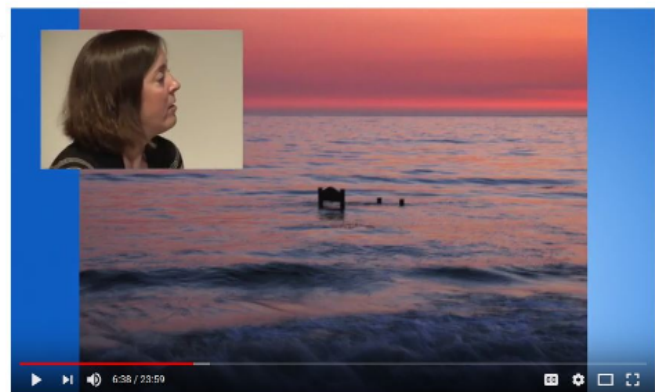


Figure 29.



FLUX: Water, Art and Science Part Two: Steve Carpenter

102 views



FLUX: Water, Art and Science Part One: Sarah Fitzsimons

104 views



Figure 30.

Living Memory: Portraits of The Lake Sturgeon

For 2018 and 2019, the library is collaborating with two University of Minnesota-Duluth faculty artists on an exhibit they curated on the lake sturgeon. The collection of black and white art pieces will be presented at the Thelma Sadoff Center for the Arts in Fond du Lac, Wisconsin and at gallery space at UW-Madison. Both exhibits will include science and art presentations, and program planning is under way. Due to copyright restrictions, the images are unable to be included in this paper.

ACHIEVING REVOLUTIONARY LIBRARY TRANSFORMATION INCREMENTALLY

Elizabeth Ann R. Peimer

Corporate Research and Information Center
Naval Undersea Warfare Center Division Newport
1176 Howell Street
Newport, RI 02841
elizabethann.peimer@navy.mil

Kelsey Sawyer & Kendalyn Banks

Corporate Research and Information Center
ICI Services Incorporated
1176 Howell Street
Newport, RI 02841
kelsey.sawyer.ctr@navy.mil

Abstract

Over the past five years, the Naval Undersea Warfare Center Division Newport Corporate Research and Information Center (CRIC) has been transformed into a 21st century information and resource center, offering streamlined on-demand library resources and extensive information management services via the Research Commons, an online digital library platform and institutional repository intended to support mission requirements by increasing cross-command research collaboration and knowledge sharing.

In 2012, the command considered shuttering the library. Leadership accepted an eleventh hour proposal to incrementally transform services while cutting resources, and in less than five years the CRIC has become the most progressive Warfare Center library and a hub for innovation. Progress has been strategically incremental, both to overcome limited resources and to prevent service innovations from alienating our users. This paper explains how this was accomplished, from early planning to execution, and the processes we put in place to identify and evolve services in anticipation of our users' needs.

Keywords: Corporate libraries, library administration, strategic planning and evaluation, organizational change, case studies

Introduction

In 2011, the Naval Undersea Warfare Center Division Newport (NUWCDIVNPT) library was in crisis. After a decade of declining use, budget overruns, inventory issues, and multiple staff retirements, Command Leadership considered shuttering the library. Leadership accepted an eleventh hour proposal to incrementally transform services while cutting resources, and in less than five years the library, now known as the Corporate Research and Information Center (CRIC), has become a very progressive science and technology library, and is hub for research innovation. Progress has been strategically incremental, both to overcome limited resources and to prevent service innovations from alienating users. This paper relays how this was

accomplished, from early planning to execution, and the processes put in place to identify and evolve services in anticipation of our users' needs.

Background

The Naval Undersea Warfare Center Division Newport (NUWCDIVNPT) and its predecessors have been in operation since U.S. Naval Torpedo Station was founded in 1869. NUWCDIVNPT is the "Navy's full spectrum research, development, test and evaluation, engineering, and fleet support center." NUWCDIVNPT provides the "technical foundation that enables the conceptualization, research, development, fielding, modernization and maintenance of systems that ensure our Navy's undersea superiority" (Naval Sea Systems Command NUWC Newport Division, 2017). Since its inception, NUWCDIVNPT has maintained a small research library. Its mission of providing "undersea superiority: today and tomorrow" requires that their over 5,000 government and contract engineers, scientists and technical personnel have unfettered access to the best available science (Naval Sea Systems Command NUWC Newport Division, 2017). For nearly a century, its small research library provided these services, but by 2011 the NUWCDIVNPT library was in crisis. After several decades of declining use, budget overruns, inventory issues, and multiple staff retirements, Command Leadership considered closing the library. How could an organization tasked with maintaining undersea superiority consider eliminating its library? Wouldn't that be cutting off its personnel's access to research? By 2011, the answer was unfortunately no.

After over a century of operation, weathering many challenges, from wars and storms to budget crises and consolidations, the NUWCDIVNPT library, like many others, had failed to evolve with the changing needs of its users and technology. While the library was an early adopter of new technology, none of it had been fully integrated into their processes. As a result, in 2011 the library was still using physical card catalogs and paper checkout for a portion of its circulation. The library had a barely operational integrated library system and did not have the resources to procure and catalog incoming material.

Because the library didn't have a collection policy, the physical collection had not been weeded in over 20 years and less than 100 new items were added to its collection annually. The library had some electronic subscriptions, but most were inaccessible to users from their desktops. There was an online repository, but it was down for service more often than it was operational. For all these reasons, personnel had turned to other sources for their research, with some departments even maintaining their own ad-hoc collections or subscriptions to external libraries.

After an audit was completed in 2011, several options were presented to Command Leadership. Doing nothing was not an option since the library was a significant drain on command resources. Options included:

1. Rehabbing existing library processes so that they were at least functional (the cost for this option was very high with limited return on investment);

2. Shutting the library (donating the collection to other federal libraries, leaving departments and personnel to continue to fend for their own research); or
3. Reallocating resources to incrementally transform library services (this included reducing the library budget).

In the end, Leadership accepted an eleventh hour proposal to incrementally transform services while cutting budget resources. This option required reporting annual benchmarks toward improvement. The transformation proposal included data from a brief community research needs assessment, so Leadership was aware that their personnel required access to the best available science to maintain and innovate products for the Fleet. They were also aware that if the proposed library transformation was successful, the model could prove beneficial for other struggling Warfare Center libraries.

Early Planning

Over the last six years, the entire library has been revamped. Costs have been lowered and services and resources have been expanded. This was accomplished by integrating program evaluation, planning, and continuous improvement efforts together. Early Planning included a Community Needs Assessment; Collection Evaluation; Tasking Identification and Staff Alignment; and Resource Evaluation.

The above actions can't be described as revolutionary; after all, these are library management basics. However, within this library, the idea of getting back to the basics was revolutionary, in that the need and rationale for library and research services were being redefined from scratch. The above actions were executed not from the perspective of a failing library, but as if the library didn't exist at all. Consequently, the results were untainted by the issues previously plaguing the library, providing the library the freedom to completely redefine its mission.

One team was tasked with evaluation (the mission team), while another team was examining the current state of the library (the library team). The library team's early planning efforts were very similar to the mission team's, except they were examining the who, what, where, when, why and how for each and every service, transaction, and resource.

Below is an outline of the combined early planning effort.

- *Community Needs Assessment:* A needs assessment was executed which assumed the library didn't exist, and simply examined community needs. The assessment looked not just at current needs, but also how needs evolved with programmatic requirements so that the library could use that information to define a process for anticipating future needs. A gap analysis was also completed which examined the current collection vs. user-identified needs. The methodology used for this assessment relied on a range of strategies to thoroughly gather as much data and metrics as possible. Staff completed a population analysis to identify potential user groups, conducted consultations and interviews with past, present, and non-users, and conducted a command-wide user survey. Staff also collaborated on a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis.
- *Collection Evaluation:* Early planning included an examination of the collection, covering what the library possessed, processes for collecting and circulating material, along with costs (purchasing and maintenance) and usage. Disaster planning and continuity of operations processes were also examined.

- *Task Identification and Staff Alignment:* Each working process was identified, with the purpose and rationale of each clearly defined. This information was used to eliminate duplicative and unnecessary tasks and to streamline core tasking. Standard operating procedures were developed and circulated to personnel to ensure tasks were completed in a consistent manner. Additionally, staff was able to update these SOPs as needed to further refine processes and share lessons learned. Lastly, knowledge, skills and abilities were identified and shared. The library had a small staff and they were often pigeonholed into their tasking. Sharing this information enabled cross training and professional development, while eliminating task rice bowling.
- *Resources Evaluation:* Resources examined included traditional resources, such as budget, physical space, library systems, and the number of staff, but also the staff's knowledge, skills and abilities.

The idea was to identify all resources in order to do more with less.

Execution

Once all data had been gathered and documented, the teams came together to generate general, collection, service, space/facility, and other recommendations. These recommendations were combined into a plan of action. The plan was anchored by specific milestones, which were reportable to leadership, but also gave the staff the ability to redefine tasking as needed. Again, this sounds less-than-revolutionary, but gathering and consolidating the data in this manner allowed the library team to come to a consensus on a new vision for the library. In the span of a few months the library team went from not wanting any change, to proposing an entire new model for the library.

The 2011 Needs Assessment Report included the following finding:

“Many of the identified needs do not fall within the scope of a traditional library, but rather within the scope of a special library or business information provider. The results of the assessment indicate that the Division Newport community needs a flexible, responsive client/customer focused research and information service provider which is tailored to meet the evolving needs of the community.”

With limited staff, time, and financial resources, the entire plan had to be executed incrementally, over a period of five years (at a minimum). Navy compliance areas took priority, and budgetary constraints made overhauling any one program or process fiscally unfeasible. Each year, the library has to accomplish several key tasks to remain on schedule. The plan of action allowed staff to work toward incrementally transforming services. In some cases, this required maintaining outdated services until they could be mothballed. In others, it required making minor modifications to a process over a period of years until a new service was in place. This was a slow and steady process, but enabled the staff to slowly revamp all services and collections

By all services and collections, we do mean all. Library programs and budgets were slowly realigned as the plan was executed. Since only a small subset of the existing technical library services actually met community needs, the library was reorganized and rebranded.

In 2012, the library was rebranded as the Corporate Research and Information Center (CRIC) in conjunction with a larger departmental re-branding to Corporate Operations. The CRIC was

more than a rebranding effort; the reorganization defined the library's place within the larger context of NUWCDIVNPT's organizational mission of maintaining undersea superiority through research and innovation. The new CRIC mission, "Providing the Division Newport community with access to research and information products and services," intentionally did not use the term *library*.

Organizationally, the CRIC includes a Science and Technology Library, an Archive, and a line of direct work (providing research and information services directly funded by customers). Each area has its own programmatic mission, dedicated budget and staff so that they could focus on meeting current needs and remain flexible enough to meet evolving needs.

It is important to note that the plan also took into account the potential for resource delays. In retrospect, this was key to the plan's success, because during the next several years the library had to cope with both federal sequestration-related furloughs and a contract gap that left the library minimally staffed for several months. Planning for resource delays enabled the library staff to shuffle the plan of actions and milestones and report progress, even in very lean years.

As you can imagine, a reorganization of this magnitude required a committed and patient staff. It also required a staff that was technically versatile, competent in multiple areas, and had initiative (the ability to work independently and proactively). These demands took a toll, and there was significant staff turnover in years one and two. By year three the staff had stabilized and formed a cohesive team, driven toward the long term goal of transforming the library.

Below is a short list of some of what was accomplished year by year, from early planning to execution, along with processes put in place to identify and evolve services in anticipation of user's needs. Keep in mind that during this time staff were also maintaining current processes and proving ongoing customer services.

Year One: 2011 – Planning, Documentation, Triage

- Submitted a proposal to command management to revamp library services.
- Completed a 365 degree community needs assessment (initiated bi-annually thereafter).
 - Library staff completed user interviews in support of the Organizational Needs Assessment. This was a useful vehicle for outreach, as the library was getting out into the community for the first time in years. They also met with the few heavy users to assure them that their needs would continue to be met as the library evolved.
 - Completed Organizational Needs Assessment Report defining both short and long term goals. It also included room for "just-do-it" actions, so staff was empowered to identify, propose and correct service and resource issues on the fly.
- Documented Plan of Action & Milestones (POA&Ms) and tasking.
- Defined a library collection policy, which was then posted to the library's website for feedback.
- Assessed the integrated library system's (ILS) ability to meet requirements. Pushed updates to keep it functional for another 12-18 months while other solutions were evaluated.
- Organized library functions into discrete programs, with separate staff, budgets and mission requirements.

- Completed triage actions on the library website (hosted as part of the command's internal SharePoint site) to update links and fix basic usability issues.
- All tasking was evaluated and reassigned to staff, based on knowledge, skills, and abilities. Duplicate and unnecessary tasking was omitted wherever possible; however, all staff were also cross trained. This ensured task coverage and also prevented task rice bowling.
- Reviewed existing analog interlibrary loan (ILL) process and implemented temporary improvements to increase tracking.
- Budget was pushed forward as-is for one year only to provide additional time to review financial needs, requirements, and to negotiate with vendors.
- A common email address accessible to all staff and phone number that rings at all staff members' desks were set up. This ensured that all customer inquiries were addressed promptly.

Year Two: 2012 – Streamlining

- Executed the recommendations from our 2011 needs assessment report. This included a thorough weeding of the physical collection and reviewing all subscriptions. Temporary staff were hired to quickly process uncatalogued material and minimize library downtime.
- Eliminated many subscriptions that were barely used or unused, focused selection on digital resources, and implemented document delivery service to fill in resource gaps.
- Renovated physical facilities and improved individual staff working areas to facilitate customer consultations. Also updated to more modern furnishings and cubicles. Added additional meeting spaces for users. This moved the library from a traditional stacks floorplan to a more open maker and meeting space floorplan.
- Revamped the ILL turnaround times by simplifying the associated processes and adding document delivery services.
- Centralized access to all journal and database subscriptions to our command's internal site. While utilizing the existing SharePoint website was not a long-term solution, it was an effective way to quickly consolidate research access points and enable users to have desktop subscription access.
- Staff skills assessment and development was completed. Staff began to attend professional development activities and reach out to local library counterparts (neither had previously been done). The library began publicizing library staff members' research skills as a key service the library could provide (time and cost savings associated with obtaining skilled research assistance).
- The library's book collection was re-organized to facilitate easier browsing (bookstore model).
- Evaluated commercial off the shelf ILS tools.
- Began participating in outreach efforts (i.e. command new hire training) and hosting user events to publicized services and resources (All were tailored to user needs).
- Partnered with solo librarians across the command to ensure their needs were being met.
- Developed a list of metrics based on staff tasking. All staff had to monitor tasking and report weekly on progress. This included the time it took to complete certain tasks. This information was then used to further streamline tasking where possible. Metrics were also shared with management to demonstrate progress.

Year Three: 2013 - Rebranding and Outreach

- Planning and development was underway to develop an internal ILS, involving

- stakeholders from across the command. No commercial off-the-shelf ILS could meet the command's rigorous requirements. The library staff led this effort and coordinated with developers on an aggressive schedule to develop, test, and launch a tracking tool to replace the ILS within 6 months.
- Upgraded the library's website further to index all resources and paved the way for migrating to another website platform in future years.
- The command's entire subscription package was reviewed and revamped to meet the current user needs. The focus was on developing a collection that both met users' needs and also provided unique, hard-to-acquire resources to increase the value of the library's collection to other institutions participating in ILL.
- As the more prominent issues were resolved, emphasis shifted towards advertising staff and services. Expanded outreach efforts included presentations at user orientations and emails to users and needs assessment participants. All outreach materials emphasized the re-branding effort, noting the name change and available services, particularly how requests could now be filled faster than ever before via a combination of ILLs and document delivery.
- During 2013, federal sequestration caused government furloughs, which hampered some progress and required several milestones to be moved out.

Year Four: 2014 – Investing in New Tools and Solutions

- Completed development, testing and migration to new homegrown ILS. Inventoried all material and manually quality checked and updated records to restore data lost during the migration.
- Continued to refine subscriptions and cut costs through a combination of vendor negotiations and leveraging partnerships with other institutions.
- Completed a full review of material and weeded the collection based on the updated collection policies.
- The library's holdings were updated in OCLC Worldshare (a manual process, since our ILS is not public), which significantly increased ILL requests. This has since been completed annually.
- Continued outreach efforts. This included writing articles about library resources and services for our command newsletter, participating in new hire outreach, hosting several information sessions and contributing to command knowledge management efforts.
- During 2014, a contract interruption left the library minimally staffed for nearly four weeks. That, combined with higher than average government leave and the departure of several library staff, challenged progress. While there was headway made in 2014, several milestones were pushed out.

Year Five: 2015 - Potential for Growth

- From spring to summer of 2015, half of the contractor staff (3 individuals) resigned. The positions were backfilled and new staff was trained in all library procedures. Due to the unique mission of the library, and the fact that it is staffed by contractors, replacing staff typically takes 8-10 months (from advertisement through completion of position training).
- Completed a command-wide Needs Assessment. While the results indicated demonstrable progress since the 2011/12 Needs Assessment, the resulting analysis yielded a wide range of new recommendations based on user feedback. While many

projects were already in progress or in beginning phases, the plans for implementing them were tweaked to meet emerging requirements and needs.

- Obtained funding for the development of a Drupal site to replace the existing library website. Developed related plans of action and milestones to develop and launch the site in 2016. This also required renegotiating some vendor agreements to accommodate usage. Although the site wasn't launched until early 2016, all of the groundwork was laid in FY15, including researching and entering the research guides and other content.
- Began to share lessons learned with other libraries within the NAVSEA organization who had similar struggles, starting collaborative relationships with others in our community.
- Launched new on-demand research service enabling the library to quickly obtain any resource required by a user (most within 24-48 hours).
- After attending a demonstration of the homegrown tracking tool, Naval Surface Warfare Center Carderock purchased and implemented it for use at their command.
- By the end of FY15, the library was utterly transformed and no longer at risk of closing. Even with many hurdles, significant progress had been made. The library had been transformed, and in doing so had proven its research value to the command; it was now a highly progressive library and a hub for research innovation. So much so that other Warfare Center Libraries began to reach out to obtain the strategies, plans of action, and lessons learned from the transformation. This is significant, because during the same period of time two other warfare Center libraries had been shuttered (Naval Surface Warfare Center Crane and Naval Surface Warfare Center Corona).

Year Six: 2016 – Launching New Tools & Solutions

- Launched the new library website, called the Research Commons, and migrated all subscription access content to the new digital library platform. The Research Commons is a full service digital library and a sub-program within the science and technology library. Unlike previous library sites, the Research Commons is continually updated and was developed internally by library staff. Local development and maintenance means the site can be tailored to users' evolving needs without the help (or funding for) an external developer. This site was also hosted so that it could be accessed by approved individuals outside our VPN network.
- To increase awareness of the Research Commons and how it fit within the scope of other library services, significant outreach efforts were completed (via all-hands email, internal news stories, digital signage, and live demonstrations to user groups and departments).
- Within the Research Commons, we launched research guides tailored to command technical warrant areas, which included literature reviews (updated monthly) publicizing new publications of interest.
- Within the Research Commons, we launched professional development guides. Similar to research guides, these profiled career development, management resources, and links to other internal networking and collaboration tools. The science and technology population of the command is only around 800-1,000 individuals. These professional development guides target the other 4,000 employees, providing them with resources to help them advance their careers.
- Developed a proposal and plan for implementing a digital repository as part of the Research Commons. Obtained funding and began development of an Islandora repository for command generated technical material and grey literature.

- Continued updates to the physical space by upgrading the library's old conference room into a multimedia research space.
- After attending a demonstration of the Research Commons, Naval Surface Warfare Center Carderock purchased and expanded use to their command. This opened the door to increased cross-command research collaboration and reduced duplication of efforts across commands.

Year Seven: 2017 – Continue Launching New Tools & Solutions, Continuous Improvement

- Developed and launched the Research Commons digital repository, which fulfilled a need for online access to technical reports and grey literature. Began a large-scale digitization of command-produced technical reports and documents, with plans to expand our digital collections to include additional commands.
- Continued emphasis on strategic alignment. The digital repository is the first centralized effort to systematically collect and codify institutional knowledge, and is highly supported by center management.
- Weeded the book collection to remove outdated and electronically available material. This created additional space for new book purchases to increase the value of our collection for our local users and ILL.
- Started a Warfare Center Community of Practice for libraries to bring together library representatives from across the Warfare Centers to share their best practices and lessons learned. Also launched a webpage for participants to share information and an email listserv.
- In the process of collaborating with another other warfare center to combine subscriptions, which will reduce costs and increase the number of available resources. The joint subscription partnership will be launched in FY18.
- Began outreach efforts to collaboration with other warfare centers to provide access to the Research Commons and digital repository, potentially diversifying funding sources to improve sustainability.
- Continued updates to the physical space by adding additional computer kiosks for users, reducing the physical stacks footprint, adding additional seating for staff, and creating additional meeting and research space for users.

Continuous Improvement

While the most important and dramatic changes have been implemented, we continue to make strides towards increasing access to research and facilitating cross command collaboration. To that end, continuous improvement is fundamentally integral to our processes. The following actions outline some of the methods used to continually improve and evolve our services.

- *Needs Assessments*: Continue to execute bi-annually and both report and document the results and plans of actions required to continue incremental improvements.
- *Plans of Action and Milestones*: Update, at least annually, a plan of action and milestones for the coming year.
- *SOPs*: Review and update all staff processes, at least annually, to ensure consistency across services, avoid redundancy and identify ideas for improvement. The collection development policy should also be reviewed and updated at least annually.
- *Metrics*: Maintain regular metrics for benchmarking services and subscriptions, which can then be used to demonstrate value and progress.

- *Staff Development*: Maintain staff's awareness of new publications, resources and technology in command research and associated staff professional development efforts.
- *Communication*: Empower staff to share ideas for improvement through frequent formal and informal communication. Maintain open lines of communication with Command Leadership, with users, and with other library partners.
- *Outreach*: Not only to market the library, but to maintain a continual stream of user feedback.
 - Communicate new products and services. Traditional modes are scheduled as part of our annual plan of actions and milestones update. This includes user briefs, posts, newsletter articles, etc.
 - Embrace internal social media tools such as chat and wikis to promote library services, as well as provide direct reference service on the fly (staff are given the freedom to post and respond to comments).
 - Engage heavy users and new users in the development processes. Process changes must be designed to meet the needs of multiple generations of users (with an eye on phasing out older generation accommodations down the road).
 - Facilitate alternative outreach programs, such as journal clubs, research round tables, and working groups.
 - Partner with as many different libraries and organizations as possible.
- *Technology*: Maintain awareness of technology and how it can be utilized to enhance services. Provide staff the freedom to test new technology for potential implementation.
- *Sharing*: In opening the lines of communication, ensure communications are transparent and complete. Allow others to learn from our mistakes, so that they will share theirs to all our benefit.
- *Calculated Risk Taking*: Make risk taking a part of the culture by providing a forum to explore ideas, embrace failure, and document efforts. This needs to come from the top, so staff will be brave enough to take risks.

Conclusions and Going Forward

Over the past five years, our organizational culture has shifted to emphasize the value of high-velocity learning, sharing knowledge, and collaboration. This presents many opportunities for the library to expand services and products to directly support collaboration between users and across commands. By providing a baseline access to research and eliminating departmental research silos, our intent is to improve research communication, reduce research costs, and facilitate new discovery. As we move towards the future, we plan on expanding repository services to support digital access to all material, while engaging our user population to foster open lines of communication.

This case study demonstrates that revolutionary transformation of a library is possible, even with limited time, staff, and resources. We began in crisis, with irrelevant, unmanageable and largely un-used collections. Through strategic evaluation and planning, we were able to morph our physical space to support collaboration and emphasize staff services, and to develop a fully-fledged digital library and repository directly supporting command research activities. Transparency and communication were instrumental in uniting staff towards the common goal of improvement. Since the library was on the brink of elimination after a decade of stasis, almost any action was better than doing nothing. Staff suddenly had the agency and freedom to change and improve processes, leading to rapid improvements in services and resources. Frequent feedback to and from Leadership about the status of tasks provided positive reinforcement to

keep the staff motivated over the years. Organizational alignment followed organically from community surveys and needs assessments, and directly supported buy-in from command management. Consistently gathered metrics supported our mission and continue to guide our future endeavors.

Users are the driving force of the library, and users also change. By explicitly engaging and observing our user population through codified procedures, we can adjust services and resources to meet evolving needs to ensure that the library remains highly relevant and at the core of our research community.

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Scoping Marine Science Libraries: Understanding the Evolving Environment

Zoe Pettway Unno

University of Southern California

Abstract

Marine science libraries are an integral element of the research landscape and contribute to the understanding of the environment and ecosystems. These libraries are an important resource available to the community of researchers. Yet some marine science libraries have persisted and continue to thrive while others have ceased to exist beyond the electronic resources they provide. This scoping study will examine the current state of marine science libraries to identify best practices and services. The results will address:

1. Why have some marine libraries persisted when others have ceased their operations?
2. What are the core requirements of marine libraries that persist and how can they be applied to other libraries?

As the research landscape changes, it is important to ensure that the marine science libraries offer the researchers the resources and programs they need.

COLLABORATIVE ACCESS TO AQUACULTURE AND FISHERIES SCIENCE INFORMATION: MALAWI'S EXPERIENCE

Geoffrey Francis Salanje

Lilongwe University of Agriculture and Natural Resources
P.O. Box 219 Lilongwe

MALAWI

Email: gsalanje@bunda.luanar.mw or salanje@yahoo.com

Abstract

There is a lot of information on aquaculture and fisheries in the world. Most of this information is generated through research conducted by scientists and scholars, among others. The information is available in electronic and printed forms. The use of information and communication technologies (ICT) has eased the access of aquaculture and fisheries science information in electronic form through the use of the Internet, intranets, CD-ROMs or computer databases. Printed information is still available, but with limited accessibility because the information is often located on one place. Accessing aquaculture and fisheries science information has its challenges especially in Malawi. Some of the challenges are lack of locally generated information available online, inability by libraries and information centres to acquire all the needed information, reluctance by researchers, scientists and students to deposit information generated to libraries and information centres, unavailability of ICT equipment for accessing online information; and lack of knowledge by users on where and how to find the information they need. These challenges could be resolved if there could be a close working relationship between librarians on one hand and aquaculture and fisheries scientists on the other. This would ensure that all the information generated by scientists is captured and collated into well-known locations. At the same time information, that scientists are not aware of could be unearthed by librarians for their use.

Keywords: Information, information and communication technology, online information, printed information, Internet, and electronic information, information literacy skills, digital repositories

Introduction

Aquaculture and fisheries science information in Malawi is mostly used for teaching, learning, decision making and research for increasing knowledge. The information is available in libraries and information services and also online. Researchers need the information for literature review among other things; scholars also need it for teaching and learning. Accessing such information by users varies from one institution to another for a number of reasons.

Some Sources of Aquaculture and Fisheries Science Information

In Malawi most users access the following information resources:

- *Printed Library Materials*

Malawi has about eight institutions that work directly in the aquaculture and fisheries science sector and have libraries. Their collections vary for a number of reasons, some of which are the size and availability of budgets for the purchase of books and subscribing to periodicals.

Library	Total Collection	Aquaculture and Fisheries Science materials (%)
Chancellor College	550,376	0.15
Chitedze Research Station	20,944	1
Fisheries Research Unit (Monkey-Bay)	9,098	72
LUANAR Libraries	80,500	5.1
Malawi College of Fisheries	15,223	67
Malawi Marine College	8,653	81
Mzuzu University	47,987	4.5
National Aquaculture Centre	12,870	75

Table 1: Libraries and Their Collections.

- **CD-ROMs (Mostly Abstracts)**

ASFA (Aquatic Sciences and Fisheries Abstracts) and ABAFR (Aquatic Biology, Aquaculture & Fisheries Resources)

- **E-resources**

There are a number of electronic resources available online accessible by scientists and others. They contain peer reviewed full text journal articles. Some of them are:

- i) [Fishbase](#)

A global biodiversity information system on finfishes. Its initial goal to provide key facts on population dynamics for 200 major commercial species has now grown to having a wide range of information on all species currently known in the world: taxonomy, biology, trophic ecology, life history, and uses, as well as historical data reaching back 250 years.

- ii) [Fishes of Malawi](#)

This is a scientifically oriented, noncommercial site devoted to a fascinating trove of tropical biodiversity — both the largest lake-fish fauna and the largest vertebrate species group on earth — the cichlids of southeastern Africa's Lake Malawi. (It is Lake Nyasa or Niassa to the people of Tanzania and Mozambique, who share this giant rift lake with Malawi.)

- iii) [Aquatic Commons](#)

A thematic digital repository covering the natural marine, estuarine /brackish and fresh water environments. It includes all aspects of the science, technology, management and conservation of these environments, their organisms and resources, and the economic, sociological and legal aspects. It is complementary to OceanDocs, which is supported by the Intergovernmental Oceanographic Commission (IOC)/ International Oceanographic Data and Information Exchange (IODE) specifically to collect, preserve and facilitate access to all research output from members of their Ocean Data and Information Networks (ODINS).

- iv) [Research4Life](#) a collective name for the four programs – Hinari, AGORA, OARE and ARDI – that provide developing countries with free or low cost access to academic and professional peer-reviewed content online.

1. [AGORA](#) (Access to Global Online Research in Agriculture)

Access to Global Online Research in Agriculture (AGORA) is a program by Food and Agricultural Organization (FAO) aimed at providing free or low cost access to major scientific journals in agriculture and related biological, environmental and social sciences to public institutions in developing countries. Launched in October 2003, AGORA provides access to 1900 journals from the world's leading academic publishers.

2. [HINARI](#) (Access to Research in Health Programme)

HINARI Programme set up by World Health Organization (WHO) together with major publishers, enables developing countries to gain access to one of the world's largest collections of biomedical and health literature. More than 8,000 information resources (in 30 different languages) are now available to health institutions in 105 countries (including Malawi), areas and territories benefiting many thousands of health workers and researchers, and in turn, contributing to improve world health.

3. [OARE](#) (Online Access to Research in the Environment)

Online Access to Research in the Environment (OARE), an international public-private consortium coordinated by the United Nations Environment Programme (UNEP), Yale University, and leading science and technology publishers, enables developing countries to gain access to one of the world's largest collections of environmental science research.

Over 2,990 peer reviewed titles owned and published by over 340 prestigious publishing houses and scholarly societies are now available in more than 100 low income countries. Research is provided in a wide range of disciplines.

iv. [TEEAL](#) (The Essential Electronic Agricultural Library)

The Essential Electronic Agricultural Library is a digital collection of research journals for agriculture and related sciences. Researchers, students, faculty and librarians can discover and access thousands of full-text PDF articles without the use of the Internet. TEEAL is available to institutions in low income-eligible countries.

Local Digital Repositories

Some libraries in Malawi such as LUANAR, Mzuzu University, National Archives and National Library Services; and other institutions such as Pact–Malawi have created 20 digital repositories. These collections have a total of about 5,000 documents, mostly scanned from printed copies. Some of these collections are available online and contain certain percentages of aquaculture and fisheries information.

Challenges in Accessing Aquaculture and Fisheries Science Information

There are a number of challenges that hinder users accessing aquaculture and fisheries information in Malawi.

The first challenge is the limited amount of locally generated information available online. Most of the scientific information is available in printed form that needs digitization. However, not all libraries and information centres have appropriate and adequate equipment for digitization. They may also not have any platform to publish the electronic information. Others grapple with some issues to do with intellectual property rights for the materials to be scanned or put them online.

There are some initiatives aimed at increasing locally generated information accessible online. One of these is on a joint project known as '*Situation analysis of conservation, management and dissemination of institutional knowledge*' by Bunda College Library and CAB International of United Kingdom; it is aimed at locating and collating locally generated scientific materials for digitization and creating a full-text database online. Scientific materials are located and collected from six scientific institutions, namely Chitedze Agriculture Research Station (CARS), Forestry Research Institute of Malawi (FRIM), LUANAR, National Aquaculture Centre (NAC), Tea Research Foundation (TRF), and World Fish Center (WFC). These institutions were chosen based on the number of scientific publications they produce. The end product is a database called: [Global Agricultural Research Archive \(GARA\)](#) which so far has 484 full-text publications from Malawi, some of which are on aquaculture and fisheries collected from local aquaculture and fisheries science institutions.

Another initiative to increase local content online is the creation of digital repositories mentioned above.

The other challenge is the inability of libraries and information centres to acquire relevant information because of limited or lack of funding. In a survey of eight research and academic libraries such as Chancellor College, Chitedze Research Station, LUANAR Libraries, Malawi College of Fisheries, Malawi Marine College, Fisheries Research Unit, Mzuzu University and National Aquaculture Centre, 50% of them have annual budgets for acquiring books and subscribing to periodicals. However, having a budget is one thing and utilizing the funds on the budget is another.

Library	Books and Periodicals Budget
Chancellor College	YES
Chitedze Research Station	YES
Fisheries Research Unit (Monkey-Bay)	NO
LUANAR Libraries	YES
Malawi College of Fisheries	NO
Malawi Marine College	NO
Mzuzu University	YES
National Aquaculture Centre	NO

Table 2: Libraries with and without budgets for books and periodicals.

For locally produced publications, librarians are supposed to visit scientific institutions to solicit publications in aquaculture and fisheries. Most institutions give out their publications for free, but they may sell some.

Reluctance by researchers, scientists and students to deposit information in libraries and information centres is another challenge. It seems there is no law that mandates scientists to deposit their work; the only existing law is the one which compels publishers and producers of local publications to deposit copies in the National Archives of Malawi. However, it is not easy to enforce the law. Some scientists do not receive any incentives if they deposit materials in libraries and information centres.

Unavailability of reliable Internet connectivity and expertise in online information searching and retrieval skills due to lack of or limited funding is also a challenge in Malawi. For users to be able to access online information in aquaculture and fisheries, they need to be connected to an Internet. Most scientific institutions are connected to the Internet, but most have slow connections due to inadequate bandwidth, or the Internet is not accessible by all who need it. High bandwidth calls for more monthly subscriptions which most institutions do not afford. As an example, LUANAR pays a monthly subscription of US\$15,200 for 45mbps symmetric downlink and uplink. Low bandwidth leads to difficulties in searching and downloading scientific information available online. Some information users may not have the expertise to search and retrieve quality information online.

Finally, lack of knowledge by information users on where and how to find the information they need is a challenge. Most libraries do not conduct information literacy skills sessions to impart knowledge and skills to users on how to search and retrieve information they need in the shortest time possible. Users are sometimes overwhelmed with the amount of information that they get on the Internet or when they visit libraries or information centres. Others may not know where to start from searching and retrieving the information they need because they lack information literacy skills. In a questionnaire administered to 14 postgraduate students and academic staff in the field of fisheries at the then Bunda College of Agriculture, Kaunda and Limuwa (2007) found that more than 50% of the respondents stated identification of articles related to their work was the number one problem while 38% identified sourcing of journal articles to be their major problem.

Collaborative Effort for Accessing Information

Collaborative access to information in aquaculture and fisheries science was an answer to the challenges outlined above. First, there is a close collaboration between scientists or researchers and librarians who are either producers or users of information. Each one of them has a role to play.

Scientists' or Researchers' Roles

Scientists are required to voluntarily deposit their work in libraries and information centres so that they are widely accessible. However, from time to time librarians also go to scientists to collect the papers. Some scientists have given permission to librarians to digitize their works and make them available online. Scientists as producers of aquaculture and fisheries information own intellectual property rights for their work.

Scientists or researchers are required to attend information literacy skills sessions conducted by librarians. They also do seek assistance from librarians on how to search and retrieve information.

Librarians' Roles

Librarians collate and organize all the scientific information. They use their skills to sift through the information based on the mandates of their libraries, taking into consideration

The needs of their users.

Librarians are required to seek permission from owners of intellectual property rights to create digital libraries and put them online. As stated above, there is not much information on Malawi's aquaculture and fisheries available online. Creating digital repositories increases access to electronic resources.

Considering that most users may not have the skills to search and retrieve information, there is a need to regularly conduct information literacy skills sessions. Information literacy skills sessions guide library users how and where to find information they are looking for in the shortest time possible. Users are also able to evaluate the information they retrieve. Librarians are always available to assist their users to search and retrieve information they need.

If a similar study to the one mentioned above (Kaunda and Limuwa, 2007) were repeated today, the results will definitely be different because there has been a lot of collaborative effort amongst librarians and scientists in information literacy skills.

Secondly, there is strong collaboration among librarians working in aquaculture and fisheries science institutions in Malawi. They share documents produced by respective institutions both in printed and electronic form; and has strengthened LUANAR's role of being a national focal point for aquaculture and fisheries science information. The librarians assist each other in searching and retrieving information as requested by users from respective institutions. The collaboration among these librarians has facilitated the creation of two digital repositories with local content. The repositories are [LUANAR Digital Repository \(LDR\)](#) and [Pact – Malawi Repository](#) respectively.

	Received from other institutions	Sent out to other institutions
Requests	47	12
Requests satisfied	38 (84%)	9 (75%)

Table 2: Requests to and from LUANAR Libraries in 12 months.

Finally, librarians from the eight institutions enhance their information literacy skills through regular contacts such as physical meetings and training workshops. In the meetings, the librarians sharpen their information literacy skills and share knowledge, skills and any other new information sources. In the last 12 months they have met twice.

Conclusion

Collaborative information access has assisted both scientists and librarians alike to enhance their information literacy skills and increased their knowledge of the various information sources. It has also assisted in collating and managing locally generated information through the creation of repositories.

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Factors Associated with the Information-Seeking Behavior of the Filipino Scientists, Researchers, and Research Staff at SEAFDEC/AQD

Daryl Lustracion Superio^{1,2}
dlsuperio@seafdec.org.ph

¹ Southeast Asian Fisheries Development Center, Aquaculture Department, Tigbauan, Iloilo, 5021 Philippines

² College of Education, Central Philippine University, Jaro, Iloilo City, 5000 Philippines

Extended Abstract:

This study was the continuation of the study of Superio *et al.* (2018), which aimed to describe the information-seeking behavior of aquaculture scientists at the Southeast Asian Fisheries Development Center, regarding their information searching and information using behaviors. In that study, it was found that aquaculture researchers visit the physical library less often. However, remote library services such as email and phone reference services were highly utilized, while when searching for information the Internet was highly preferred over the Library and its databases. On the other hand, the combination of both print and electronic formats was highly preferred when reading.

The current study aimed to determine the factors that affect the behaviors of the respondents. The factors tested were: personal, such as age, sex, educational attainment and specialization; work or role-related, such as length of employment, designation, research experience and other research interest; environmental, such as distance of the office or laboratory from the library and Internet access; and psychological, which is their confidence in finding information.

It was found that majority of the aquaculture researchers who used or visited the library frequently in the last 12 months were the respondents who were younger, male, with lower educational attainment, with shorter lengths of employment, and with lower designations. Likewise, the respondents who had less research experience use or visit the library more often. Similarly, the respondents who are farther from the library and with Internet access in their offices or laboratories only use or visit the library more often. Moreover, a greater proportion of the respondents who were very confident that they could find all the information that they need for their research use or visit the library more often. The result suggests that those who use the library more frequently are more confident that they could find all the information that they.

When given an option to choose between the library and the Internet to begin their search process, greater proportions of aquaculture researchers who preferred to start with the Internet were those who were younger, male, and with lower educational attainment. Likewise, greater proportions of the respondents who have shorter length of employment, lower designation, less research experience, and those who are farther from the library preferred to use the Internet than the library to begin their search process. Moreover, those who preferred to use the Internet to begin their search process were less confident compared to those who prepared to use the library to begin their search process. The result suggests that asking the assistance of a librarian increases the confidence of the respondents that they could find all the information that they need.

Information-Seeking Behavior (ISB) of IAMSLIC Members in Response to a Query

Daryl L. Superio^{1,2*}, Mary Grace H. Oliveros^{1,2}, and Vince Ervin V. Palcullo¹

¹ Southeast Asian Fisheries Development Center, Aquaculture Department, Tigbauan, Iloilo, 5021 Philippines

² College of Education, Central Philippine University, Jaro, Iloilo City, 5000 Philippines

* Corresponding author: dlsuperio@seafdec.org.ph

Abstract:

Using a three-part survey instrument, a quantitative study was conducted to determine the information-seeking behavior of the members of the International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC) in response to queries. Specifically, the study aimed to determine if aquatic science librarians, like other professionals, would opt to go to the Internet first rather than library databases when searching for information (Jamali & Asadi, 2010; Niu et al., 2010; and Superio *et al.*, 2018). Likewise, the study documented the most commonly used websites, open access databases, and repositories used by the respondents. All of the IAMSLIC members were included in the study. An online survey instrument was used. After 40 days, 76 valid responses had been received. Findings of the study revealed that regardless of the librarians' gender, age, educational attainment, position or designation, regional group affiliation, and library type, they would prefer to use their library's online public access catalog (OPAC) first when searching for information. Moreover, Aquatic Commons, FAO Fisheries and Aquaculture Statistics (FAO Stat), and OceanDocs were the most commonly accessed open access databases and repositories. IAMSLIC established the Aquatic Commons, so it was no surprise that it was the most frequently accessed repository by the IAMSLIC member librarians. The results also suggest that academic social-networking sites (SNS), specifically ResearchGate and Google Scholar, were essential search tools for some of the respondents. Google Scholar has made searching and retrieval of scholarly articles easy.

Keywords: Aquatic science librarian, aquatic science libraries, IAMSLIC, information behavior, information resources, Internet.

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**FACING THE CHANGE IN THE SCIENTIFIC PUBLISHING LANDSCAPE:
VIETNAM INSTITUTE OF OCCEANOGRAPHY LIBRARY SUPPORT FOR RESEARCH
OUTPUT
(The Case for Low Income Countries)**

Dang Thi Hai Yen

Librarian of Vietnam Institute of Oceanography (VAST)

Abstract:

The academic publishing system makes possible the communicating and sharing of new science and research findings to the science community. The outputs of research are the results of this system. The landscape of scientific publishing has continually evolved over the past years. Open access and citation databases are set to bring a revolution to science publishing, and science should not be “locked.” The rapidly changing landscape of scientific publishing has positive effects on both authors and publishers: there is higher pressure on scientists to publish; publishers of scientific journals can now use electronic publishing as the main way to present research results; open access makes research more available; and citation databases and reference management tools make it easy to manage easy to manage citations. However, there are also challenges for low income countries in the new publishing model. Today, peer review panels of international scientific publishers require the use of references found in high-level, peer-reviewed citation databases. In the case of low income countries, local journals are often physically and digitally locked in traditional libraries, and are not open access, making it difficult to generate citation databases for articles from local journals. This paper discusses marine research output in Viet Nam and offers suggestions for solutions to improve academic publishing in VNIO.

Keywords: Scientific publishing, Vietnam Institute of Oceanography.

Introduction

‘Scientific publications reflect the scientific output of a country. Scientific journals are one of the most effective and important ways for scientists to communicate the results of their research. The quality of scientific journals is an important indicator of the scientific power of a nation’ (Lu, 2004).

The purpose of this presentation is to summarize the status of international scientific publishing in marine science in Vietnam, and to discuss some efforts to improve citation management and authorship skills in the Vietnam Institute of Oceanography. In addition, it is hoped this presentation will stimulate the sharing of scientific publishing experiences in other countries.

The change in the Scientific Publishing Landscape

The academic publishing system is the way to communicate and share new research findings. The scholarly publishing/academic publishing outputs of research share new science, innovations, research findings, and project results with the international science community

(FAO/AGORA, 2017). The landscape of scientific publishing has continually evolved over the past years. Open access and citation databases have brought a revolution to science publishing, where science should not be “locked” behind subscription firewalls. These rapid changes have had positive affects for both authors and publishers: the changing landscape has offered scientists more opportunities and added pressures on scientists to publish; publishers of scientific journals can now use electronic publishing as the main way to present research results (Stigbrand, 2017); open access is making research available to all; and citation databases and reference management tools make it easy to manage citations (Fest, 2017).

Challenges for Low Income Countries in the New Publishing Model

However, there are also challenges for low income countries in the new publishing model. Here, many factors affect the international publication process: research funding and article-processing charges; language barrier (when English is not the native/official language); authorship skills; etc. It is important to highlight are the issues of citation management and language barriers. Today peer review panels of international journal scientific publishers prefer references that can be found in citation databases, with full text if possible. In the case of low income countries, local paper-based journals are locked in traditional libraries and are not available in digital form or open access. The question is how to encourage citations for articles from journals in local languages only, and how to make this local language scientific information accessible worldwide.

Case Study of Marine Science Research in Viet Nam

National Research Output:

Using the Oceanographic Library Catalogue of Viet Nam Institute of Oceanography, marine science research outputs from four Institutes belonging to the Vietnam Academy of Science and Technology (VAST) revealed **2,159** national language papers published from 1990 – 2017 in VAST’s publications as follows:

- **516** National language papers were found in VAST Online Journal Systems (VOJS)
<http://vjs.ac.vn:>
 - Journal of Marine Science and Technology
 - Journal of Sciences of the Earth
 - Journal of Biology
 - Journal of Biotechnology
- **925** National language papers found in:
 - Collection of Marine Research Works (22 volumes)
 - Collection of Research Works: Marine Resources & Environment (11 volumes)
 - Contributions of Marine Geology & Geophysics (9 volumes)
- **589** National language papers found in:
 - Proceedings: National Scientific Conferences on Marine Geology (2 volumes)
 - Proceedings of National Conferences on Marine Science & Technology (8 volumes)
 - Proceedings of National & International Conferences on “Bien Dong” (4 volumes)
 - Proceedings of National symposium on Marine Biology (1 volumes)
- **129** Books/monographs

International research output (VAST, 2015 & 2016):

Statistics of scientific publications from VAST Marine Science Institutes in 2016& 2015: **197** international papers ISI reviewed (* & **):

Year 2016

No.	Units	International academic publication (in English)				National language articles	Monographs
		ISI		ISSN	The total number of international articles		
		SCI	SCI-E				
	Institute of Marine Biochemistry	19	24	8	51	60	
	Institute of Oceanography	7	4	3	14	58	1
	Institute of Marine Environmental Resources	4	5	5	14	35	5
	Institute for Marine Geology and Geophysics		5	3	8	23	3
The total number of publications		30	38	19	87 (*)	176	9

Year 2015

Year 2010

No.	Units	International academic publication (in English)				National language articles	Monographs
		ISI		ISSN	The total number of international articles		
		SCI	SCI-E				
	Institute of Marine Biochemistry	25	35	10	70	90	
	Institute of Oceanography	4	6	9	19	68	1
	Institute of Marine Environmental Resources	3	5	5	13	38	
	Institute for Marine Geology and Geophysics	3	1	4	8	73	1
The total number of publications		35	47	28	110 (**)	269	2

(Sources: Table 3 and 4: Statistics on scientific publications and intellectual property of units under the Vietnam Academy of Science and Technology (VAST) year 2015 and 2016, in VAST annual reports 2015 & 2016).

Based on the analysis of the 2,159 national & international papers and direct discussions with scientists at meetings on publishing issues, etc., some comments follow:

- The Marine Science Institutes within VAST have published many publications in *national* marine research publications; however, raising the number of *international* papers faces many challenges. Of course, many factors affect international publication; this paper focuses on authorship skills and management of citations.
- The highest number of international scientific publications in the group of Institutes focusing on marine science in the Academy of Sciences and Sciences of Vietnam are from the Institute of Marine Biochemistry. These publication outputs are from the Research Findings Group. The citation references in these articles are mostly from international publications and can be found in international citation databases; this is one of the important factors for the support of the journal peer review panel.
- Research outputs from the Institute of Oceanography, Institute of Marine Environmental Resources, Institute for Marine Geology and Geophysics belong to the fundamental research and project results. These scientific publications require citations to many materials related to Vietnamese and adjacent waters. Most of these references are in Vietnamese and are often physically and digitally locked in traditional libraries so are not accessible and not found in international citation databases. This is a big obstacle for the author and journal peer review panel in reviewing these papers for publication.
- The scientific citation databases and Institutional repositories have been developed in many countries with diversified scales serving the needs of study, research and scientific management in a country. Some citation databases have a global reach such as the database systems of Web of Science, ISI, Scopus, PubMed, Google Scholar and also the ASEAN Citation Index - ACI. Thanks to these global citation databases, the international scientific publication status of Vietnam can be fully analyzed. However, the number of articles published in the national scientific journals system - a national endogenous resource - has not been analyzed because until now they have not been managed by national cited databases or institutional repositories that are accessible worldwide. Therefore, management and evaluation of the quality of scientific publications and information dissemination of Viet Nam on World Wide Web have been very limited.

Some Solutions:

VAST supports for research output:

Their goal is to improve the quality and reach of academic publishing. Activities on scientific information support have been focused by VAST:

- **VAST's Digital library** <http://elib.isivast.org.vn/> has been deployed since 2009. Every year VAST registers journal databases from ScienceDirect, SpringerLink, ProQuest Central (ProQuest XML), and some new additions: Agriculture Sciences and Foods, Environmental Sciences, Physics and Astronomy.
- **VAST Online Journal Systems (VOJS)** <http://vjs.ac.vn/> has been deployed to manage journals copyright by VAST. This uses Open Journal Systems 2.3.6.0, an open source journal management and publishing software developed, supported, and freely distributed by the Public Knowledge Project** under the GNU General Public License.

***Public knowledge project (PKP) is a multi-university initiative developing (free) open*

source software and conducting research to improve the quality and reach of scholarly publishing <https://pkp.sfu.ca/>.

- **VAST Journals**

- Advances in Natural Sciences: Nanoscience and Nanotechnology
- Vietnam Journal of Earth Sciences
- [Communications in Physics](#)
- Vietnam Journal of Mathematics
- [Vietnam Journal of Mechanics](#)
- [Journal of Biotechnology](#)
- [Vietnam Journal of Chemistry](#)
- [Journal of Biology](#)
- [Journal of Computer Science and Cybernetics](#)
- [Vietnam Journal of Science and Technology](#)
- Journal of Marine Science and Technology

VNIO Library Supporting Research Output

- To build a VNIO institutional repository with records of both national and international papers and publications of VNIO that will be indexed by all the major search engines and harvested by services such as Google Scholar (Digital library Institute of Oceanography of Viet Nam at <http://113.160.249.209:8080/dspace/?locale=vi>).
- To submit Vietnamese marine science papers to the repositories *OceanDocs* (IOC/IODE/Unesco) and *Aquatic Commons* (IAMSLIC). Both repositories are also harvested by Google Scholar, Scopus etc., thus achieving the goal of making available scientific citations and the full text for Vietnamese local publications within these global citation databases.
- Access for developing countries to gain access to a digital library collection: Agora – journals (FAO); Open Science Directory – journals (IOC/IODE); etc.
- To utilize and build researchers' awareness of capacity development programs for low income countries.

Training Programs

- Research4Life: Authorship Skills supporting developing country researchers in publishing their work;
- Program Research4Life by UN: Capacity development for low income countries to adapt the new scientific publishing landscape:
 - ✓ 30-50% full text papers via AGORA (FAO), AGRIS (FAO), OARE (UNEP), ARD (WIPO), Open Science Directory (Unesco/IOC and EBSCO)
<http://www.aginternetwork.org> (FAO/AGORA)
<http://www.opensciencedirectory.net/> (Unesco/IOC)
agris.fao.org/ (FAO)
[Directory of Open Access Journals - https://doaj.org/](https://doaj.org/)
[Directory of Open Access Books: DOAB - www.doabooks.org/](http://www.doabooks.org/)
 - ✓ Training courses on authorship skills: How to read and write scientific papers, intellectual property, reference management tools... via training programmes by [Agora](#)/FAO
 - **AuthorAID programm: Supporting Developing Country Researchers in Publishing Their Work** - <http://www.authoraid.info/en/>
 - ✓ - Proposal-paper writing (Advice from Peer Reviewers)
 - ✓ - Writing a well-Integrated grant proposal

(The AuthorAID community: over 15,000 researchers from around the world; Vietnam: 135 members)

Suggestions and Discussion:

- To enhance capacity and improve international research outputs/international academic publishing in marine scientific community of low income countries, UNESCO/IOC needs organize training courses on authorship skills for young scientists.
- To generate citation databases via OceanDocs to share local research outputs from low income countries (and non-English speaking countries) on the World Wide Web. The solution is to provide rapid dissemination of ocean research and knowledge, to promote publishing, and project funding continuation/partners (Simpson, 2017). An International peer review panel could access national research outputs in low income countries.
- To call for information sharing from Westpac marine libraries via OceanDocs.
- To solve WESTPAC and OBIS biodiversity needs through networking libraries and OceanDocs by contributing/sharing/managing the marine biodiversity information of Westpac from research papers published via networking libraries of Westpac, OceanDocs, OBIS; to solve information gaps in marine biodiversity databases necessary for WESTPAC countries.

Acknowledgments:

The author wishes to acknowledge the Programme OceanDocs of UNESCO/IOC/IODE, and the Research4Life/FAO/AGORA program training for low income countries for capacity building on strategies and skills to adapt to the changing in scientific publishing. The author also wishes to acknowledge Ms. Pauline Simpson – UNESCO/IOC/IODE/OceanTeacher for useful comments on my manuscript. Finally, the author wishes to acknowledge IAMS LIC for organizing the Conferences offering the opportunities to exchange information and experiences in the field of marine information management

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KEYNOTE, PANELS, AND DISCUSSION GROUPS

Keynote: The Wonderful World of Corals: Harnessing Basic Science to Address an Ecological Crisis

Ruth Grant
University of Hawaii at Manoa

Coral reefs in Hawaii and across the globe continue to decline in health due to intensifying climate change, resource extraction and pollution. Although the future looks bleak, certain corals and reefs are not only surviving but thriving in conditions that kill others. Dr. Grant unveiled the complex biology that underpins this natural variation in the response of corals to stress. She discussed how this knowledge can be harnessed to develop tools that build resilience on reefs, arresting and improving the prognosis for coral reefs.

Panels

Drupal/Islandora User Discussion Group.

Led by **Elizabeth Ann RZ Peimer**, Naval Undersea Warfare Center, Division Newport.

Forum to discuss Drupal/Islandora challenges, lessons learned, and make connections with other implementers in the IAMSLIC community.

Making Waves and Breaking Through – Promoting Innovation in the Library Discussion Group.

Led by **Zoe Pettway Unno**, University of Southern California

Libraries exist in a transformative and interdisciplinary world and can drive critical information shifts through innovative services and programs. Yet, library personnel may lack the necessary funding or the support of colleagues to break through and succeed. In order to promote innovation, it is important to develop the skills to envision new opportunities. Blurring the edges of diverse settings that have similar user expectations and applying ideas presented in Fred Lee's "If Disney Ran Your Hospital" to the library, participants will discuss how to create an innovation environment through imagination, anticipations of future needs, and understanding of the user experience.

POSTERS

Daniel Oviedo Juárez

Universidad Nacional Autónoma de México

Digitalization of Thesis Collection

One of the most important grey literature collections of the Biblioteca Regional en Ciencias del Mar (BRCM) is made up of its theses. According to the latest count, it consists of 1,243 volumes, donated by graduated students of the Instituto de Ciencias del Mar y Limnología, UNAM, and other institutions in Northwest Mexico. This collection has been developed since the creation of the BRCM in 1976, but since 2000 its electronic catalogue has included full-text access. A search of 126 theses in the TESIUNAM database recovered only 5.4% in electronic format, meaning that only four out of ten theses was available electronically. A plan was undertaken to digitize and make them accessible. It consisted of three actions: (1) First, scanning the thesis collection of the BRCM; (2) requesting that the Biblioteca Conjunta en Ciencias de la Tierra (BCCT) create a database for the BRCM thesis collection; and (3) presenting this need to the researcher of the ICMyL UA Mazatlan at the XXCII Reunion Academica Annual. The results: From November 2016 to the present, 127 theses are already in electronic format.

Lisa Raymond

Audrey Mickle

Woods Hole Oceanographic Institution

Making Connections with Linked Open Data

The MBLWHOI Library is participating in an NSF EarthCube grant called GeoLink. The project brings together experts from the geosciences, computer science and library science to develop Semantic Web components that support discovery and reuse of data and knowledge. The Library collaborated with scientific users, data managers, DSpace engineers, experts in ontology design patterns, and user interface developers to make the Woods Hole Open Access Server (WHOAS), a DSpace repository, available as linked open data. The Library also created a component (widget) that will display in repository records that have related information in one of the partner resources. WHOAS includes hundreds of technical reports, theses, and articles, many with cruise information listed as a subject. Javascript was added to the page that looks for a subject meta tag indicating a cruise, grabs the string, and searches GeoLink for cruises with matching labels. All of the code the Library developed is freely available in GitHub.

Amanda Whitmire

Hopkins Marine Station of Stanford University

Implementing a 3D Printing Service at a Marine Biology Library

As methods of research and scholarship evolve, so must library services and infrastructure. Discussion with faculty, graduate students and postdoctoral researchers at our marine biology research station revealed a pervasive need for 3D printing technology across several research groups, even those conducting primarily laboratory work. Members of the community reached out to me to explain how they would make use of 3D-printed materials, and what their specific needs are. Needs range from making custom field and laboratory equipment to replicating the shape of marine animals (*in toto* or their various parts) for testing hydrodynamics or biomechanics in the lab. Many researchers here are already engaged in 3D printing, but currently order prints from a 3rd party supplier or use facilities on our main campus. All expressed great enthusiasm and support for having a local 3D printer. This poster described the rationale for and process of acquiring a 3D printer for our library, including how I selected a model from the wide range of options available.