



Volume 16, Number 3  
Third Quarter, 2022

*The*



*quatic*

*eterinarian*



**WHO ARE WE****MISSION**

The Mission of the Association is to serve the discipline of aquatic veterinary medicine in enhancing aquatic animal health and welfare, public health, and seafood safety in support of the veterinary profession, aquatic animal owners and industries, and other stakeholders.

To fulfill this Mission, the World Aquatic Veterinary Medical Association has established the following:

**Objectives**

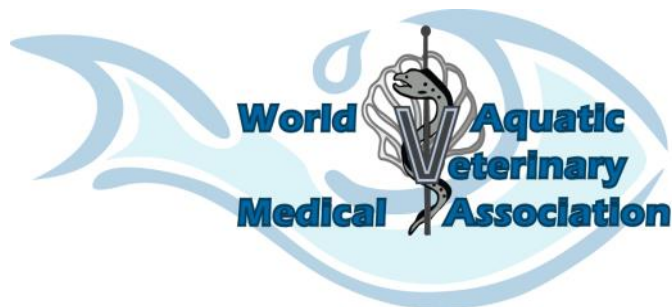
1. To serve aquatic veterinary medicine practitioners of many disciplines and backgrounds by developing programs to support and sustain members, and the aquatic species industries that they serve.
2. To identify, foster and strengthen professional interactions among aquatic medical practitioners and other organizations around the world.
3. To be an advocate for, develop guidance on, and promote the advancement of the science, ethics, and professional aspects of aquatic animal medicine within the veterinary profession and a wider audience.
4. To optimally position and advance the discipline of aquatic veterinary medicine, and support the practice of aquatic veterinary medicine in all countries.

*The ideas presented in this publication express the views and opinions of the authors, may not reflect the view of WAVMA, and should not be implied as WAVMA recommendations or endorsements unless explicitly stated.*

*Information related to the practice of veterinary medicine should only be used within an established valid Veterinarian-Patient-Client Relationship.*

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**Cover Photo by Nick Saint-Erne:**

*Lionfish at the Shark Reef Aquarium  
 at Mandalay Bay Hotel  
 Las Vegas, Nevada USA*

*See article on pages 20-24*



Get The Fuller Picture From WAVMA WebCEPD Online Webinars

**WAVMA’s WebCEPD Program - Webinars for Global Aquatic Veterinary Education**

*Given by leading experts, WAVMA’s real-time and recorded WebCEPD webinars are intended as educational programs on key aquatic veterinary issues and techniques to hone the knowledge and skills of aquatic veterinary students and practitioners.*

<https://www.wavma.org/WebCEPD>

**Discover core knowledge, skills & experience needed to become a WAVMA Certified Aquatic Veterinarian (CertAqV)**

Did you know that WAVMA’s **CertAqV Program** offers members the opportunity to become recognized and certified as having competency in 9 core areas deemed necessary to practice aquatic veterinary medicine? Find out more information online at:  
<http://www.wavma.org/CertAqV-Pgm>.

**Editor’s Note**

While this year has been much better than the last two, since the COVID-19 prevalence has lessened, it is sad in the loss of important aquatic veterinarians, as we reported on the passing of Dr. Sam Ridgway last issue, and now the death of Dr. Donald Abt (page 25).

As the founder of the AQUAVET Program, Dr. Abt has probably influenced more aquatic veterinarians than any other veterinarian. I, myself, attribute my successful career to having attended AQUAVET after my second year in veterinary school. Now, I am happy to give back by being a lecturer at that wonderful program (see the AQUAVET report in the previous issue) and information on page 24.

This issue also has important information about the WAVMA Conference and Annual General Meeting. See our President’s Report (pages 5 and 7) and the Meetings Committee Report (page 11) as well as advertisements on pages 6 and 31 for details. We hope you can attend the WAVMA Conference in person in South Africa, or virtually online.

While I was attending the SuperZoo Pet Trade Show in Las Vegas in August, I had the opportunity to see my friend Jack Jewell, Curator of the Shark Reef Aquarium, and take a tour with my colleagues from LiveAquaria. See the report on pages 20-24. The photo below was taken in the Shark Reef Aquarium.

**Nick Saint-Erne, DVM, CertAqV**  
Executive Editor  
[TAVeditor@wavma.org](mailto:TAVeditor@wavma.org)



Download a QR reader onto your Smart Phone and scan the Quick Response Code to the right. It will take you to the WAVMA.org website page for accessing all of the past WAVMA Newsletters.



You will need your WAVMA User ID and Password to access the most recent issues of *The Aquatic Veterinarian*.

The latest editions are available for download at <https://www.wavma.org/TAV-Current-Issues>.

Past years’ editions are available for download at <https://www.wavma.org/TAV-Archives>.



*The Aquatic Veterinarian*

The Quarterly Magazine of the World Aquatic Veterinary Medical Association

**Consider promoting your products, services or programs to aquatic veterinarians, veterinary students, nurses & paraveterinary professionals throughout the world**

**Advertising Rates (per issue)**

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**WAVMA Members** can place a free 1/8 page (business card size) advertisement in the TAV. Contact [TAVeditor@wavma.org](mailto:TAVeditor@wavma.org) for information on advertising and payment options.

### President's Report

Our Executive Board meeting was held on the 25th of September. Topics discussed included reviewing ISAAH 9 activities, upgrading the CertAqV system, and preparing a draft questionnaire to send to members regarding the Strategic Plan Review. If you have anything you would like to be discussed at future EB meetings, please contact [administrators@wavma.org](mailto:administrators@wavma.org) or your Director at Large (see [www.wavma.org/WAVMA-Leadership](http://www.wavma.org/WAVMA-Leadership) for their contact details).

The ISAAH 9 Symposium took place in Santiago, Chile in September, of which WAVMA was a partner. The symposium included an all day aquatic medicine workshop in conjunction with the AAFV (<https://fishvets.org>) on Columnaris Disease. The abstract book for the whole conference is available to download from [www.isaah9.com](http://www.isaah9.com).

While at the ISAAH Symposium, Executive Board members met with Chilean MEVEA colleagues (<https://mevea.cl>) to discuss areas of collaboration and we also were able to meet with local company representatives. Discussions were held with two universities to assist setting up WAVMA Student Chapters. Full reports of these activities will likely be given in upcoming editions of *The Aquatic Veterinarian* and information on WAVMA Student Chapters can be found at: [www.wavma.org/WAVMA-Student-Chapters](http://www.wavma.org/WAVMA-Student-Chapters).

Coming up later this year is the WAVMA Conference from the 3rd to the 7th of December 2022 in South Africa. This conference will be both "in-person" and "virtual". Please visit <https://wavma2022.co.za> for further information.

To register for the conference, go to: <https://wavma2022.co.za/registration/>.

Abstract submission for programs to present at the conference is now open. Submit your abstracts here: <https://wavma2022.co.za/abstract-submission/>. You can also sign up for Conference News Updates at <https://tinyurl.com/222syjrf>.

In addition to the aquatic veterinary lectures, there will be a workshop presented by veterinarians to local fish farmers. Information on the Farmer Workshops is available on WAVMA's Blog page.



As the WAVMA Conference will occur before the next issue of *The Aquatic Veterinarian* is published, be sure to check out the [WAVMA.org](http://WAVMA.org) website for the latest information on the conference and our Annual General Meeting to be held there.

We are also organizing a strategic planning session prior to the Conference to discuss the future of WAVMA programs. We encourage all members to provide us with feedback to discuss at this meeting. WAVMA has come a long way in its first 15 years, and the future years will be even better - with your help and input!

**Dr Gillian Taylor**  
WAVMA President 2022  
[President@wavma.org](mailto:President@wavma.org)



#### IMPORTANT DATES

Deadline for abstract submission: 21 October 2022

Abstract acceptance notification: 30 October 2022

Oral (PowerPoint) presentation submission: November 15, 2022

- The Congress Committee invites abstracts for presentations that address programs dealing with ***Advancing Aquatic Animal Health and Veterinary Medicine through Global Connections***, including case studies and research results. Presentations can be either an oral presentation or a poster.
- Papers reviewing recent advances, or relating to research into matters concerning relevant topics that may be of interest to veterinarians and producers, will be considered.
- **Private practitioners, State Veterinarians, Agricultural Scientists, Para-veterinarians, Academia as well as veterinary and aquatic students are encouraged to submit abstracts.**
- Papers relating to the main theme will get priority if an oversupply occurs.
- Single case reports will be accepted if of exceptional interest.

#### GUIDELINE TO AUTHORS:

The abstract must be a complete but concise synopsis of the content that will be both informative and useful to the potential audience. The format for the abstracts is flexible but should contain a clear objective, methods and results (where applicable) and a logical conclusion. Two independent people will review abstracts and successful authors will be notified within two weeks following the deadline for submission. Authors must accept the terms and conditions for speakers. Abstracts that do not comply with the following format will be returned to the authors for corrections:

1. Must be in English and typed in MS-word format. Abstracts (including presentation title, authors names and affiliations, and any figures, tables or references) may not exceed one page (click to see example).
2. Script must be in 12 Times New Roman font, with single spacing, single column and left justified **if not submitted electronically**
3. Must clearly indicate the author's name. Write names of authors in the order of last names and asterisk (\*) the person who will be the presenter.
4. Must clearly indicate the organization (name and location of institution, clinic, practice etc.). If the affiliation of co-workers differs, indicate the names and affiliations by corresponding numbers (Superscripts).

Abstracts must be submitted through the website here: <https://wavma2022.co.za/call-for-abstracts/>

Scientific Committee: WAVMA

Enquiries: [conferences@vetlink.co.za](mailto:conferences@vetlink.co.za)

### WAVMA Conference and Annual Meeting Update

Dear WAVMA members and friends,

Hoping you are all well, thriving in your activities and interests and making waves within our aquatic veterinary world.

It has been a very busy quarter at WAVMA, with focus very much on the upcoming WAVMA conference in Pretoria, South Africa in early December 2022. Despite new grey hairs, it has been revealing to me, not only to see the overwhelming interest and excitement from colleagues on the African continent, but also the attitude from global colleagues to support and invest personally in this initiative.

I have just received a call of help from an African Catfish farmer with unexplained mass mortalities. His State-vet could offer no more than suggesting he reduces stocking density. He has no skilled aquatic veterinary support to work up a case, run water tests, check for parasites, perform biopsies or histopathology etc. There are no local aquatic diagnostic laboratories to support this clinical workup.

Local Koi hobbyists struggle with recurrent mortalities from simple syndromes like Monogenean Fluke burdens. Recurrent blind overuse of pond chemicals is now leading to “Superflukes” that are resistant to treatments. Veterinarians are needed by fish farmers and hobbyists to diagnose and treat accurately and appropriately, and educate on the danger of Antimicrobial Resistance.

Such is the need and gap in Africa, and other parts of the world. We recognize the invaluable roles that veterinarians and para-veterinarians can play, and it doesn't take much time. Over the last few years in South Africa, we have started building aquatic modules and electives into the veterinary curricula. At the end of this year, around 50 final year veterinary students will have enrolled in our aquaculture elective course.

Our Veterinary Technicians are receiving their first week of aquatic training next week, our farmers will receive the first ever aquatic health workshop as part of our WAVMA conference. And some local vets have completed the CertAqV program.

And so the capacity builds. Farmers that are trained and skilled can engage in routine health surveillance programs that, in turn, support veterinary diagnostics and laboratory development, and strengthens the connection between clients and veterinarians and builds the overall network.

I encourage you to register for our conference, submit an abstract or two, and share your skills and knowledge to enrich and connect our global aquatic veterinary community. The conference will be a hybrid event, so online attendance and recorded presentations are accommodated. We have a wonderful globally-representative speakers list developing and a broad program inclusive of our annual KoiPrax workshop, wet labs, farm visits, and a One-Health post-conference package to the world-renowned Hans Hoheisen Wildlife Research Station.

I thank my fantastic EB team for all their hard work over the last few months, a big congratulations to our new CertAqV graduates and renewals, a welcome to our new members, and a big thanks to our committees for effort and personal time invested in growing and developing our organization, arranging excellent high-quality webinars, marketing and promoting our association, and always looking to expand upon what we can offer.

Looking forward to seeing you at the conference...

Gillian

**Dr Gillian Taylor**  
WAVMA President 2022  
[President@wavma.org](mailto:President@wavma.org)

The image is a promotional banner for the WAVMA World Aquatic Health Conference 2022. It features a dark blue background with a map of Africa in the center. The text 'WAVMA | University of Pretoria' is at the top left, followed by 'WORLD AQUATIC HEALTH Conference 2022' in large white letters. Below the map, it says 'HYBRID EVENT'. At the bottom, it states '3 - 7 DECEMBER 2022' and 'FUTURE AFRICA CAMPUS | UNIVERSITY OF PRETORIA | SOUTH AFRICA'. A QR code is located in the bottom right corner. Logos for the University of Pretoria and the World Aquatic Veterinary Medical Association are also present.

### Secretary's Report

Dear WAVMA members,

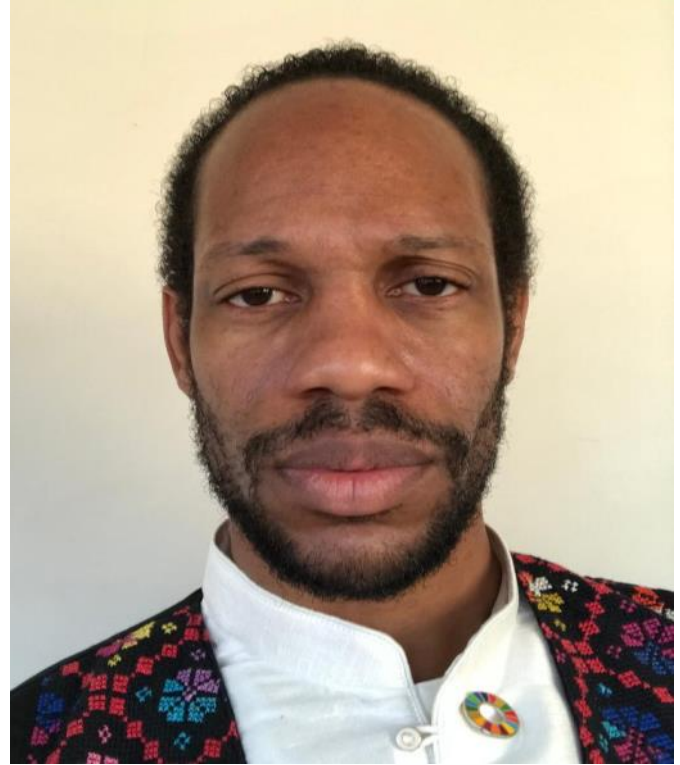
The current board under the astute leadership of Dr. Gillian Taylor has brought us into the second half of 2022. This, as should be pointed out, is during the COVID-19 pandemic that has had a toll on all our lives in various ways. With online programs increasing in demand because of the pandemic, WAVMA has strived to continue serving its members in this way through the webinars. The CertAqV program was not affected by this and in fact continued to expand in the number of applications and gauging the interest of aquatic veterinarians globally. To this end, the board is supporting the Credentialing Committee in its quest to streamline the process for greater efficiency and effectiveness.

The third quarter to my mind was special primarily because with the waning for the COVID-19 pandemic and the easing of travel globally, we were able to contribute our expertise at international meetings. One was the 71st International Veterinary Students Association Congress, which was held from July 17-27, 2022. At this encounter Dr. Laura Urdes and Dr. Devon Dublin gave presentations on animal welfare and the role of veterinarians in pandemics, respectively. The other was the 9th International Symposium on Aquatic Animal Health held from September 5-8, 2022, where Dr. Claudia Venegas, Dr. Stephen Reichley and Dr. Bartolomeo Gorgoglione participated.

We look forward to the remaining months of the year when WAVMA will have a global presence at the World Small Animal Veterinary Association's 47th Congress to be held in Lima, Peru from the 29th to 31st, October, 2022. Like the events I highlighted before, this one will be held in a region where WAVMA needs to become more available.

We cherish the work that our Directors-at-Large are doing, each of whom carries out a mandate of promoting the work of our organization in the various regions, namely, Asia and the Pacific, the Americas, Europe, Africa and the Middle East. The latter of which will be the focus of the organization as we prepare to host our Annual Congress in South Africa from December 3-7, 2022. This event will be held in a hybrid method, allowing all members and interested persons to participate either in person or online.

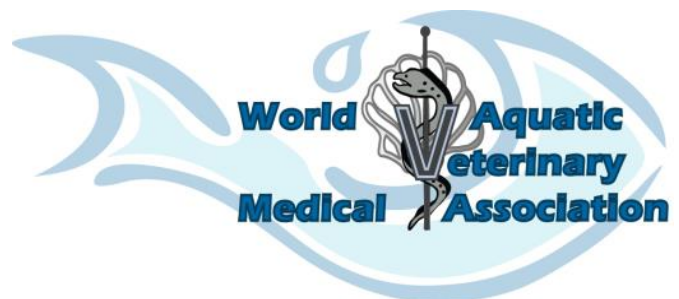
Throughout the year, the Communications Committee, Meetings Committee, Credentialing Committee, Education and Student's Committee and WAVMA Fellows have collectively assisted in the smooth functioning of the organization, under the guidance of the Executive Board. I thank all members that contribute by sitting on one of these committees. Your work is remarkable and valuable to our noble cause.



As we continue toward the end of the year, I wish to reiterate my appeal to members to publish in *The Aquatic Veterinarian*, which is a great avenue to let others know what you have been doing and the interesting cases that you may have worked on.

In the final quarter of 2022, I will offer a secretarial review of the year under the presidency of Dr. Gillian Taylor, with whom I had the pleasure of working with as secretary for 2022.

**Devon Dublin, PhD, DMVZ, MSc, CertAqV**  
WAVMA Secretary  
Governance Coordinator  
WWF-Guianas  
2-37-17 Midorigaoka  
Kushiro, Hokkaido,  
285-0814, Japan  
[Secretary@wavma.org](mailto:Secretary@wavma.org)





**New WAVMA Members - 3rd Quarter****Full Members**

Marie Kubiak  
Irene Naigaga  
Greta Doden  
Sarah Dougherty  
Carolina San Martin  
Ginger Tansey  
Laura Kellow  
Alex Park  
Brandon Louth  
Cheyenne Bone  
Pierre Cadot  
ANA CRISTINA ESCALEIRA  
Elena Contador  
Robin Bast  
ZoÃ Stacey  
Sunita Awate  
Diane Moon  
Katrina Murray

**New Graduate Full Members**

OMARA ANDREW RWOT  
NURNAJWA ATIQA SALLEHUDDIN  
Katelyn Wilcox  
Vianca Naidu  
Jacquelyn Burnside  
Jorge Polanco  
Kafula Kangwa  
Kathryn Smith

**Affiliate Members**

Matthew Pope

**Student Members**

Garry Lasaga  
Bashir Katumba  
Jonathan Atutambiire  
Joseph Lokure  
Begul Karakoc  
Lucy Robson  
Olivia Wilson  
Aileen Nimick  
Terezia Gachalova  
ZAINABU KILUSUNGU  
Meriam Msatilomo Phiri  
Mackenzi Mills  
Tryssa de Ruyter  
Rachel Corin  
Ojo Oke  
Patrick Farias  
Zachary Reynolds  
Laura Abreu  
Sylvia Kimmel  
Zana Watkins  
Samuel Good  
Michael Migliore  
Samantha Reynolds  
Meg Oesterling  
Adam Frosolone  
Brittney Graham  
Guillermo Diaz  
Nichole Siegner  
Melissa Vaughn  
Michael Brooks

**Student Members  
-continued**

Rachel Fost  
JingHan Wu  
Ryan Phoenix  
Lindsay Geiger  
Khelsea Bahr  
Monica Rodriguez  
Adrienne Camero  
Jason Gutmann  
Makala Perkins  
Breanna Hogle  
Kate Alexy  
Nahir Roman-Rodriguez  
Melanie De Leon  
Alexandra Prince  
Jennifer Krupa  
Malika Singh  
Carla Blain  
Victoria Hoaglin  
Allison Holtzclaw  
Julia Andrade  
Chaia Ona  
Lauren Smith  
Paula Cruz  
Sarah Knizner  
Treg Brown  
Caroline Vangi  
Grace Johnston  
Brooke Bridges  
Hailey Wiper  
Ashlyn Dykes  
Giselle Bedasse  
Sydney Garcia  
Elizabeth Williams  
Anne Manganiello  
Siobhan O'Sullivan  
Adina Brucie  
Jared McFadden  
Julieta Flores Rodriguez  
Pamela Galera  
Sarah Mikhail  
Lexi Calderon  
Helena Curbelo  
Alexandria Stevens  
Kaylee Kalilimoku  
Ari Streeter  
Carmina Craciun  
Hannah Boone  
Nicole Osorio  
Lauren Ayres Martinez  
Krystal Keuler  
Miranda McBride  
Abigail Dobbs  
Audrey Fry  
Kaylee Kalilimoku  
Cassidy Fox  
Landis Pujol  
Lilliana Vazquez  
Gabrielle Perez  
Jiashi Feng  
Alyssa Howell  
Drew Bobey  
Heather Macfarlane  
Sydney Dion

**Student Members  
-continued**

Macey Cropski  
Bashir Katumba  
Carolina Alvarez  
Aruni Meedeniya  
Reegan King  
Jacqueline Langley  
Cerys Herapath  
Andre Nguyen  
Araceli Gonzalez  
Lucy Groves  
Kelly Asa  
Haley Taber  
Natalie Martinez  
Kendol Davis  
Yoandy Coca

**Executive Board Responsibilities**

The WAVMA Executive Board consists of the President, Immediate-Past President, President-Elect, Secretary, Treasurer and Directors. The Executive Board will provide oversight and approve all fiscal and administrative activities of WAVMA and its committees, programs and services in accord with the Bylaws, and facilitates the development and implementation of WAVMA programs.

The President will: Schedule, draft agendas and preside over the Executive Board meetings; Monitor and facilitate implementation of all active WAVMA and Committee programs, services and other initiatives; serve on the Budget Committee; Provide an update of WAVMA activities for the association's quarterly publication; Work with the Meetings Committee to finalize and implement the WAVMA Annual General Meeting; Preside over the WAVMA Annual General Meeting.

The President-Elect will: Assume the President's responsibilities in the absence of the President; Serve as a member of the Budget Committee; Identify at least one new WAVMA program or initiative to implement during his/her 3-year tenure; Assist in facilitating and implementing active WAVMA programs and initiatives during his/her 3- year tenure;

The Immediate Past-President will: Assume the President's responsibilities in the absence of the President and President-Elect; Assist the President-Elect and other Board members in developing or implementing new or existing WAVMA initiatives and programs.

The Secretary will: Serve as the primary WAVMA point of contact for the public; Inform members of WAVMA programs & initiatives; Assist the developments and distribution of WAVMA official correspondence; Serve as Chair of the Communications Committee;

The Treasurer will: Maintain all WAVMA bank accounts and bookkeeping, receive all payments, and pay all approved expenses; Chair the Budget Committee and facilitate the development of an annual budget

Directors will: Represent individual WAVMA member's general interests in their geographical regions.

### Join A WAVMA Committee

All of the great programs and features you get from WAVMA membership are provided by volunteers. We are always looking for more helpers, whether veterinarians, veterinary students or veterinary nurses, to join us on the committees. If you are not interested in running for office, but would like to provide your input and guide the future of WAVMA, join one of our committees (no previous experience necessary!). See a list of our committees on page 12. Contact our Secretary or the committee chair for more information about the committee and the dates of the next meeting (also done via web conference). All are Welcome!

Join a WAVMA Committee today!

**TO SUPPORT FUTURE STUDENT SCHOLARSHIPS,  
 PLEASE MAKE A DONATION TODAY  
 TO THE SCHOLARSHIP FUND!**

[WWW.WAVMA.ORG/SCHOLARSHIPS](http://WWW.WAVMA.ORG/SCHOLARSHIPS).

### WAVMA Committees

As a member-driven organization, WAVMA relies on volunteers to help implement programs useful for all members. Any WAVMA member can volunteer on a Committee to help shape the direction of the Association, meet new colleagues, forge valuable and lasting relationships, and help address key issues affecting aquatic veterinary medicine today. To find out more about serving on a Committee, please contact the Committee Chair or the WAVMA Secretary.

#### Budget and Finance Committee

This Committee develops and regularly revises the Association's annual budget and assists the Treasurer, as necessary, in developing the Association's annual financial reports and tax materials.

This Committee shall consist of the Treasurer (Chair); the President-Elect; and one other member of the Executive Board who will volunteer to serve a one-year renewable term.

Chair: Wes Baumgartner, [Treasurer@wavma.org](mailto:Treasurer@wavma.org)

#### Communications Committee

This Committee manages the communications among members and others involved with aquatic veterinary medicine. It oversees the listservs, membership lists, publication of WAVMA's quarterly journal *The Aquatic Veterinarian*, e-News, Facebook, Twitter, LinkedIn and other social media accounts.

Chair: Morag Clinton, [Secretary@wavma.org](mailto:Secretary@wavma.org)

#### Credentialing Committee

This Committee oversees and administers the Cert-AqV Program for credentialing aquatic veterinary practitioners, and evaluates aquatic veterinary educational programs useful to members.

Chair: Matthijs Metselaar [CertAqV-Admin@wavma.org](mailto:CertAqV-Admin@wavma.org)

#### Meetings Committee

This Committee oversees and coordinates logistics for WAVMA-organized or sponsored aquatic veterinary educational meetings, including the Annual General Meeting.

Chair: Julius Tepper, [cypcarpio@aol.com](mailto:cypcarpio@aol.com)

#### Membership Committee

This Committee oversees membership issues to optimally serve members and the organization.

Chair: Chris Walster, [Administrators@WAVMA.org](mailto:Administrators@WAVMA.org)

#### Education & Student Committee

This Committee facilitates networking between student members and helps development of educational programs and services.

Chair: Bartolomeo Gorgoglione, [BartGorg@msu.edu](mailto:BartGorg@msu.edu)


**Just Exotic**

Exotic species webinars, Instructional videos, Care sheets & Fact sheets



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  justexotics1

**Fellows Advisory Council**

A WAVMA Fellow is someone who has conferred on them the honorific: *WAVMA Distinguished Fellow*. The Fellows Advisory Council is composed of WAVMA Distinguished Fellows who are current WAVMA members and who wish to contribute to the development of WAVMA. The Chair of the Fellows Committee will be the Fellows Representative to the Executive Board.

The Fellows Nomination Subcommittee (FNS) is a subcommittee of FC and evaluates applications for the WAVMA Distinguished Fellow and forwards a recommendation for a WAVMA Distinguished Fellow to the EB. The 2022 Distinguished Fellow will be announced at the Annual General Meeting in South Africa, the first week of December 2022.

Current Distinguished Fellows are:

- Peter Merrill (2012)
- Ronald Roberts (2012)
- David Scarfe (2012)
- Julius Tepper (2012)
- Christopher Walster (2012)
- Grace Karreman (2013)
- Marian McLoughlin (2013)
- Dusan Palic (2013)
- Mohamed Faisal (2016)
- Nicholas Saint-Erne (2017)
- Richmond Loh (2018)
- Laura Urdes (2019)
- Devon Dublin (2020)
- Gregory Lewbart (2021)

**Laura Urdes**, PhD DVM CertAqV  
Fellows Advisory Council Chair

**Meeting Committee**

Following up from my last report in July, the meetings schedule for 2022 was continued by our participation in ISAAH9, the once every 4-year event organized by the Fish Health Section of the American Fisheries Society, which took place from Sept. 04-08, 2022 in Santiago, Chile. WAVMA collaborated with the American Association of Fish Veterinarians to organize a daylong series of talks on Monday, Sept. 05. Stephen Reichley and Claudia Venegas attended, along with several other WAVMA members who presented on the targeted topic of Columnaris Disease.

From Oct. 29-31, 2022, the World Small Animal Veterinary Association will hold its Congress in Lima, Peru. As a co-sponsor of this annual event, WAVMA will again have a dedicated schedule of aquatic talks presented by Ladislav Novotny and myself.

To end the meetings calendar, plans are in place for the WAVMA Conference and Annual General Meeting, including KoiPrax4, to be held in Pretoria, South Africa the first week of December 2022. This is shaping up to be an exciting event, with both local and international speakers and attendees.

For KoiPrax4, to be held on the 3rd conference day of Dec. 6th, both Nick Saint-Erne and I will be presenting talks on differing aspects of the topic of the Koi Life Support System: Introduction to Koi Pond Management and Current Clinical Problems Associated with the Koi Habitat. Further information is available on the WAVMA website. We look forward to meeting you there!

**Julius M. Tepper**, DVM, CertAqV  
Meetings Committee Chair

*The Aquatic Veterinarian* is meant to be read as a 2-page spread (like a paper magazine!). To view it this way on your computer, open the pdf document using Adobe Acrobat or Adobe Reader, then go to the menu bar at the top of the computer screen and click on View, then Page Display, then Two Page View. Adjust the size on your screen so you can see both pages side by side.

Make sure that the first page is viewed by itself. That will allow you to scroll through the issue seeing the cover page by itself first, followed by two pages side by side for the rest of the issue. Doing this, you will be able to see the Centerfold in all its ginormous glory!

**WAVMA Shop**

A number of WAVMA branded items (including shirts, mugs, caps) are available at the WAVMA Store. Get yours today!



Go to: <http://www.wavma.org/Shop>

### Credentialing Committee

The WAVMA Aquatic Veterinarian Certification Program identifies the core competency or subject matter areas needed to practice aquatic veterinary medicine, and recognizes those veterinarians who have acquired the necessary knowledge, skills and experience (KSE) from a variety of sources, in the following 9 core subject matter areas:

1. Aquatic Environment and Life Support Systems
2. Taxonomy, Anatomy and Physiology
3. Husbandry and Industries
4. Pathobiology and Epidemiology of Aquatic Animal Diseases
5. Diagnostics and Treatment of Aquatic Animal Diseases
6. Clinical Veterinary Experience and Client Communications
7. Public Health, Zoonotics and Seafood Safety
8. Legislation, Regulations, and Policies
9. Principles of Aquatic Animal Welfare

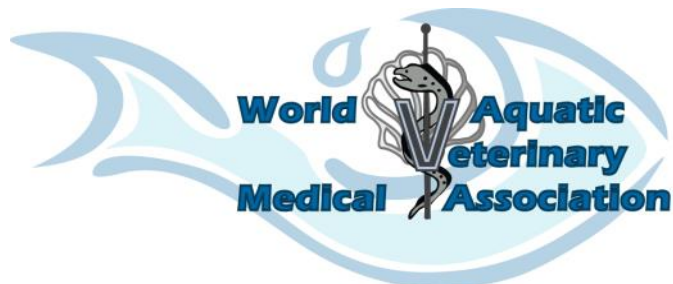
For CertAqV Program Description [Click here](#) to download, or go to [WAVMA.org/CertAqV-Pgm](http://WAVMA.org/CertAqV-Pgm).

Individuals who desire to participate in the WAVMA CertAqV Credentialing Program will first need to register and pay the US\$250 administrative fee. When registering you will select a mentor to assist and guide you through the requirements. After you have registered, you will receive an e-mail on how to download a document to record where you have obtained sufficient KSEs (knowledge, skills and experience/education) in each of the 9 modules or subject areas. You have up to 2 years to complete these.

When your mentor is satisfied you have sufficient KSE credits, he/she will request the WAVMA Credentialing Committee to evaluate these. Once the Committee and the WAVMA Executive Board have evaluated these and are satisfied you meet all requirements, you will be notified and mailed a certificate suitable for framing and display.

If you have questions about the Certification process, please send me an email.

**Dr. Matthijs Metselaar** DVM PhD CertAqV MRCVS  
Credentialing Committee Chair  
[CertAqV-Admin@wavma.org](mailto:CertAqV-Admin@wavma.org)



### Certified Aquatic Veterinarians

Jessica Allen	USA
Sara Alves	USA
Chelsea Anderson	USA
June Ang	Singapore
Nimrod Arad	USA
Brenda Arras	USA
Farah Gonul Aydin	Turkey
Romualdo Balagapo	Philippines
Sarah Balik	USA
Marcello Balzaratti	Italy
Jo Bannister	Australia
Madison Barnes	St. Kitts & Nevis
Michelle Barnett	USA
Christa Barrett	USA
Heather Barron	USA
Giana Bastos-Gomes	Hong Kong
Julia Bauer	Germany
Mariah Beck	USA
Trista Becker	USA
Jenice Bell	USA
Heather Bjornebo	USA
James Bogan	USA
Pierre-Marie Boitard	France
Serena Brenner	USA
Erika Brigante	St. Kitts & Nevis
Tessa Brown	USA
Faith Burgos	USA
Todd Cecil	USA
Bryony Chetwynd-Glover	UK
Prakan Chiarahkhongman	Thailand
Dana Clark	USA
Annie Clift	USA
Dondrae Coble	USA
Michael Corcoran	USA
Emily Cornwell	USA
Galaxia Cortes-Hinojosa	Chile
Rebecca Crawford	St. Kitts & Nevis
Rubén López Crespo	Mexico
Charles Cummings	USA
Nadav Davidovich	Israel
Manuel De la Riva Fraga	Spain
Darren Docherty	UK
Simon Doherty	UK
Christina Dover	USA
Devon Dublin	Japan
Freeland Dunker	USA
Michael Dutton	USA
Jacqueline Elliott	USA
Ashley Emanuele	USA
Azureen Erdman	USA
Maribel Escobedo	Mexico
Antonella Fabrissin	Italy
Mohamed Faisal	USA
Erika First	USA
Lindsay Francis	USA
Ari Fustukjian	USA
Cherissa Garcia	United Arab Emirates
Erika Gibson	USA
Danielle Godard	USA
Christopher Good	USA
Bartolomeo Gorgoglione	USA
Krystan Grant	USA
John Griffioen	USA
Miguel Grilo	Portugal
Stephanie Grimmett	UK
Katharina Hagen-Frei	Switzerland
Alex Hall	USA
Katharine Haussman	USA

Orachun Hayakijkosol	Australia
Eileen Henderson	USA
Chelsea Hester	USA
Nora Hickey	USA
Karlee Hirakis	Australia
Kelsey Hoag	USA
Emma Houck	USA
John Howe	USA
Aivee Huynh	Australia
Kerryn Illes	New Zealand
Adrien Izquierdo	USA
Leslie Jarrell	USA
Jimmy Johnson	USA
Kelsey Johnson	USA
Sharmie Johnson	USA
Kasper Jorgensen	Denmark
Brian Joseph	Canada
Hali Jungers	USA
Parinda Kamchum	Thailand
Kyle Kansman	USA
Fritz Karbe	Germany
Sherri Kasper	USA
Elizabeth Kaufman	Israel
Denyse Khor	Singapore
Amy Kizer	USA
Jessica Koppien-Fox	USA
Jack Kottwitz	USA
Laura Krogman	USA
Lana Krol	USA
Marie Kubiak	UK
Diya Lake	Mauritius
Krista Ann Lee	USA
Veronica LePage	Canada
Elizabeth Leuchte Rising	USA
Sarah Lietzke	USA
Jan Linkenhoker	USA
Eric Littman	USA
Richard Lloyd	UK
Richmond Loh	Australia
Alfonso Lopez	Singapore
Ruben Arturo Lopez Crespo	Mexico
Jordi Lopez Ramon	Spain
Amber Lum	USA
Adolf Maas	USA
Raphael Malbrue	USA
Paul Manensis	Canada
David Marancik	Grenada
Victoria Maroun	USA
Laura Martinelli	USA
Robert Martinez	USA
Alexandra Mason	USA
Colin McDermott	USA
Alicia McLaughlin	USA
Celia Megdal	USA
Larissa Menke	USA
Matthijs Metselaar	UK
Sonja Miles	UK
Tim Miller-Morgan	USA
Haitham Mohammed	Egypt
Alissa Mones	USA
Danny Morick	Israel
Charlene Morotti	USA
Lucie Nedved	Australia
Ross Neethling	UK
Jenifer Nix	USA
Sally Nofs	USA
Ladislav Novotny	Czech
Massimo Orioles	Italy
Alec Ortiz Colosi	USA

Dušan Palić	Germany
Brian Palmeiro	USA
Veronica Pardini	USA
Christine Parker-Graham	USA
Lily Parkinson	USA
Chris Payne	USA
Melanie Peel	USA
Ayanna Phillips	Trinidad & Tobago
Ashley Powell	USA
Jena Questen	USA
Eva Quijano Cardé	USA
Janis Raines	USA
Atisara Rangsichol	Thailand
Zachary Ready	USA
Aimee Reed	USA
Stephen Reichley	USA
Nuno Ribeiro	Portugal
Julianne Richard	USA
Camille Richie	USA
Michelle Rivard	USA
Rifky Rizkiantino	Indonesia
Patinan Rookkachard	United Arab Emirates
Komsin Sahatrakul	Singapore
Nick Saint-Erne	USA
Sonja Saksida	Canada
Jessie Sanders	USA
Sasha Saugh	South Africa
David Scarfe	USA
Neha Shah	India
Khalid Shahin	UK
Galit Sharon	Israel
John Shelley	USA
Chris Shirkey	USA
Constance Silbernagel	USA
Melissa Singletary	USA
Esteban Soto	USA
Brandon Spolander	South Africa
Elizabeth St. Germaine	USA
Brittany Stevens	USA
Chairat Sumgorthong	Thailand
Win Surachetpong	Thailand
Tanatporn Tantiveerakul	Thailand
Gillian Taylor	South Africa
Alissa Tepedino	USA
Julius Tepper	USA
Sharon Tiberio	USA
Miranda Torkelson	USA
Norrapat Towanabut	Thailand
Alexandra Troiano	USA
Laura Urdes	Romania
Julian Vaillard Cerdio	Mexico
Greta Van de Sompel	Belgium
Claudia Venegas	Chile
Zachary Waddington	Canada
Sarah Wahlstrom	USA
Chris Walster	UK
Scott Weber	USA
Marcus Webster	USA
Trista Welsh	USA
Michael Wenninger	USA
Peter Werkman*	Holland
Laura Whalen	USA
David Wilbur	USA
Sarah Wilson	USA
Howard Wong	Hong Kong
Sarah Wright	USA
Taylor Yaw	USA
Irene Yen	USA

To initiate a new Student Chapter, download the [WAVMA Student Chapter Guidelines](#)

A Spanish version of the Student Chapter Guidelines can be [downloaded from the WAVMA website](#).

**PROGRAMS AVAILABLE TO STUDENT CHAPTERS:**

- Assistance in organizing and promoting Chapter programs and activities.
- Access to recorded webinars and live web-based presentations from experts around the world.
- Low annual WAVMA Student Membership (\$25) - 50% Chapter member's dues may be available to support Chapter-organized activities.
- Reduced rate (50% off) WAVMA Full Membership the year after graduation.
- John L. Pitts Aquatic Veterinary Education Awards Program
- Access to WAVMA member-only programs.
- Aquatic veterinary externship and job listings.
- WAVMA promotional flyers, brochures and other materials for distribution to other students.
- Free or discounted registration for WAVMA meetings, conferences or educational webinars.
- Participation in the WAVMA Certified Aquatic Veterinarian (CertAqV) Credentialing Program.
- Access to WAVMA e-mail listservs, including Members-L, and Student-L.

A list of all current WAVMA Student Chapters is available on the website:  
<https://www.wavma.org/WAVMA-Student-Chapters>

Consider joining the [WAVMA Chapter Facebook Group](#) to find out what's happening in other Chapters.

**TO SUPPORT FUTURE STUDENT  
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[WWW.WAVMA.ORG/  
 SCHOLARSHIPS.](http://WWW.WAVMA.ORG/SCHOLARSHIPS)

**WAVMA Student Chapters**

**University of Pretoria**, Onderstepoort [Faculty of Veterinary Science](#), South Africa (established 2017)

**Murdoch University**, [School of Veterinary & Life Sciences](#), Australia (established 2014)

**University of Sydney**, [School of Veterinary Science](#), Australia (established 2014)

**Auburn University**, [College of Veterinary Medicine](#), USA (established 2013)

**Colorado State University**, [College of Veterinary Medicine & Biomedical Sciences](#), USA (est. 2019)

**Cornell University**, [College of Veterinary Medicine](#), USA (established 2019)

**Michigan State University**, [College of veterinary Medicine](#), USA (established 2021)

**Mississippi State University**, [College of Veterinary Medicine](#), USA (established 2014)

**The Ohio State University**, [College of Veterinary Medicine](#), USA (established 2018)

**Oregon State University**, [College of Veterinary Medicine](#), USA (established 2017)

**Ross University**, [School of Veterinary Medicine](#), St. Kitts & Nevis, West Indies (established 2015)

**St. George's University**, [School of Veterinary Medicine](#), Granada, West Indies (established 2018)

**Tuskegee University**, [School of Veterinary Medicine](#), USA (established 2012)

**University of California**, [Davis School of Veterinary Medicine](#), (Established 2020)

**University of Georgia**, [College of Veterinary Medicine](#), USA (established 2015)

**University of Illinois**, [College of Veterinary Medicine](#), USA (established 2018)

**University of Pennsylvania**, [School of Veterinary Medicine](#), USA (established 2020)

**Western University of Health Sciences**, [College of Veterinary Medicine](#), USA (established 2014)

**University of Edinburgh**, [Royal \(Dick\) School of Veterinary Studies](#), Scotland UK (established 2020)

**University of London**, [Royal Veterinary College](#), England UK (established 2021)

**Ankara University**, Faculty of Veterinary Medicine, Turkey (established 2022)

**Makerere University** College of Veterinary Medicine Animal Resources and Biosecurity (established 2022)

**St. Matthew's University** School of Veterinary Medicine West Bay, Cayman Islands (established 2022)

**WAVMA Necropsy and Core Skills Workshop**  
with Dr Richmond Loh

On August 30th, Murdoch University WAVMA Student Chapter hosted a necropsy workshop with Dr. Richmond Loh. This event included a guided dissection and clinical examinations of a variety of fish including goldfish, koi, tilapia, and hilsa.

Dr. Loh generously provided several pathological specimens to highlight interesting clinical presentations that students were able to dissect.

During this event, participants were also given the opportunity to use microscopes to examine several pathological slides prepared by Dr Loh to gain a better understanding of both topical and enteric diseases in fish.

An enormous thank you to Dr Richmond Loh for coming down, to our attendees, and like always, a massive shoutout to our WAVMA sponsors!

Ting Foo  
Murdoch University

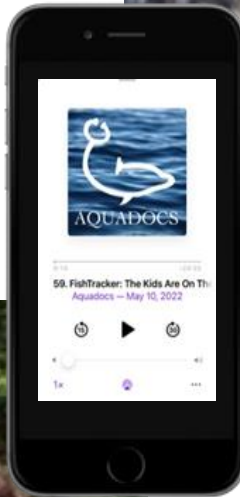


**John L. Pitts Aquatic Education Award Report:**  
Michelle Greenfield

My name is Michelle Greenfield, and I am a 4<sup>th</sup> year veterinary student at the Cornell University College of Veterinary Medicine. I am truly honored to be selected as a 2021 John L. Pitts Scholar. With the support of WAVMA and the entire Pitts Scholarship Committee, I have been able to pursue my interest in aquatic veterinary medicine and further develop novel educational and research tools for students and professionals interested in aquatic medicine.

In September of 2020, I launched Aquadocs, a podcast focused on aquatic veterinary medicine. Since few veterinary schools offer courses or educational opportunities in aquatic medicine, I wanted to provide a free and easily accessible resource where students and professionals can readily and routinely engage with aquatic-focused material. On each podcast episode, I interview veterinarians and other aquatic animal health experts about their experiences in the field. Episode topics include aquaculture, marine flora and fauna, marine mammals, cutting edge research, private practice, and advice for students. To date, I have published over 60 episodes, which have more than 30,000 downloads and are reaching listeners in 100+ countries.

When I started Aquadocs, I never dreamed how many people would tune in. I love receiving notes from high school and college students asking questions about episode topics and describing how they now want to pursue aquatic medicine because of this podcast. I am extraordinarily

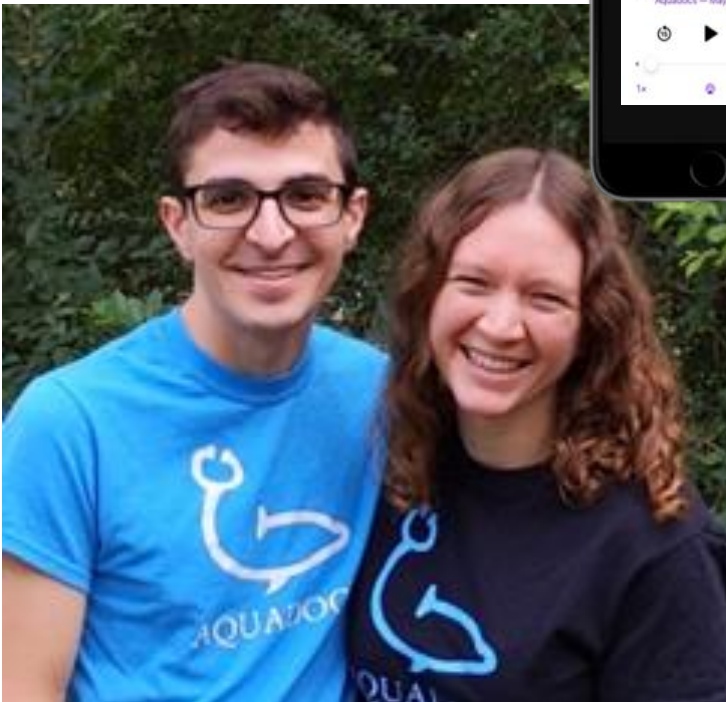


grateful to all my listeners who have supported me since its creation and to all the guests who have helped Aquadocs become what it is. And of course, I am thankful to WAVMA and the American Association of Fish Veterinarians (AAFV) for partnering with me to help educate students across the world interested in aquatic veterinary medicine.

In addition to publishing podcast episodes, I am grateful to this award committee for providing me the financial assistance to pursue my research. As part of my mission to develop educational resources, I am working on a novel research podcast that will take listeners on a research journey from innovation to publication. For this project, I am comparing the effects of various environmental parameters on populations of wild Alaskan Stellar sea lions from 1961–2016.

To demonstrate the importance of having freely accessible scientific educational content, each step of the research process – from study design to manuscript submission – will rely on publicly available data and resources, which will be shared and discussed in real time on episodes of Aquadocs Podcast. This unique educational tool will provide a platform for podcast listeners to ask questions, receive advice, and communicate openly and freely about the scientific process.

While this project is still in its infancy, I am so excited for its potential! I am bringing in





research experts to share their tips and tricks and am hopeful that students from all over will benefit from this project. Episodes will appear on Aquadocs sometime next year, so keep your eyes and ears out for that. In the meantime, check out seasons 1-3 of Aquadocs on

your favorite podcasting streaming site ([Google](#), [Spotify](#), [Apple](#)) and check out the website at: [www.aquadocspodcast.com](http://www.aquadocspodcast.com). And if you are interested in being on the podcast, want to nominate a colleague, or have any questions, please send me an email! I would love to chat ([mg2375@cornell.edu](mailto:mg2375@cornell.edu)).



WAVMA is excited to partner with Aquadocs Podcast



Looking for new and on-the-go ways to learn about aquatic medicine? Check out Aquadocs podcast hosted by Michelle Greenfield where aquatic animal health experts share their research, clinical cases, stories, and more.

Find episodes on Spotify and Apple/Google Podcasts and at [www.aquadocspodcast.com](http://www.aquadocspodcast.com)  
Follow us on Instagram and Facebook @aquadocspodcast



**John L. Pitts Aquatic Veterinary Education Award**  
Carrick Anderson  
UG School of Veterinary Medicine  
Pacific Northwest Salmonid Externship Program

After two years of organising, and a few COVID issues later (I won't go into detail, I'm sure everyone is bored of hearing COVID related excuses and delays by now), I managed to spend two weeks with a whole variety of professionals through the PNWSEP. I graduated as a vet from the University of Surrey in 2022 and I am beginning the next phase of my studies at the University of Stirling, with an MSc in Veterinary Aquaculture, this coming autumn.

Having landed in Seattle, my initial surprise was the distance I needed to cover in my rental car to get to the Eagle Fish Hatchery, in southern Idaho. Being from the UK, what looked like a small journey on the map turned into a near 600-mile trip. A tank of fuel later, I arrived filled with excitement, ready to tackle (excuse the pun) whatever the scheduled week had in store.

I spent day one learning a great deal about the work performed on Eagle campus, and how they, as part of Idaho Fish and Game, drive sustainable management of the State's fish and wildlife stocks. The inclusion of indigenous tribal communities in discussions and plans was particularly interesting. This was a completely new consideration that is not a factor in the UK. It was fascinating learning how Idaho Fish and Game walk the political tight rope, make decisions on the state of the current stocks and predicted salmon returns, and estimate how many eggs hatcheries should be aiming to collect.

A major problem salmon face on their return to their spawning grounds is the development of hydroelectric dams. Salmon species can pass up as many as 8 dams on the Columbia and Snake Rivers, so it is vitally important that these companies are compliant and adhere to regulations.

The rest of the week I spent on the road at various hatchery facilities, helping with the fish health sampling, most crucially for Bacterial Kidney Disease (*R. salmoninarum*), for which every breeding female must

be tested. Being part of such a well-oiled machine was an enjoyable and novel experience. I love learning from professionals who have perfected their craft through years of practice, and this was no different. The site managers and staff were hugely knowledgeable (not to mention extremely fast at processing the eggs and presenting them for health samples).

Before I knew it, my week at Eagle Fish Hatchery had passed, and I was on the road again up to the stunning Hood River. After a sunset hike and a visit to the Oregon Zoo, I arrived at Little White Salmon Fish Hatchery. Here we spent the day visiting a tribal hatchery facility. Again, I loved learning about the dynamic between the indigenous tribes, salmon, and the state. Due to reports of poor performance and increased

mortality rates, we retrieved five fish for necropsy. Although not entirely conclusive, there was a strong suspicion that Bacterial Cold Water Disease (*F. psychrophilum*) was driving these observations. The second day at LWS was spawning day. The scale of the spawning at LWS was completely different to what I had experienced in Idaho, where we spawned an average of 20 salmon per day. At LWS we spawned over 160 Chinook Salmon per day, again performing similar health sampling on all the females.

I continued my journey northwards to Olympia, where I was fortunate to spend time with the knowledgeable and super energetic Dr. Nora Hickey (and her cat Winnie!). I learned

a great variety about drug regulations, disease diagnosis and control, and just had an all-round exceptional time. Another spawning session north of Seattle, and I started to feel comfortable and could begin to analyse each hatchery, their intricacies, what they did well, and perhaps what they could possibly improve.

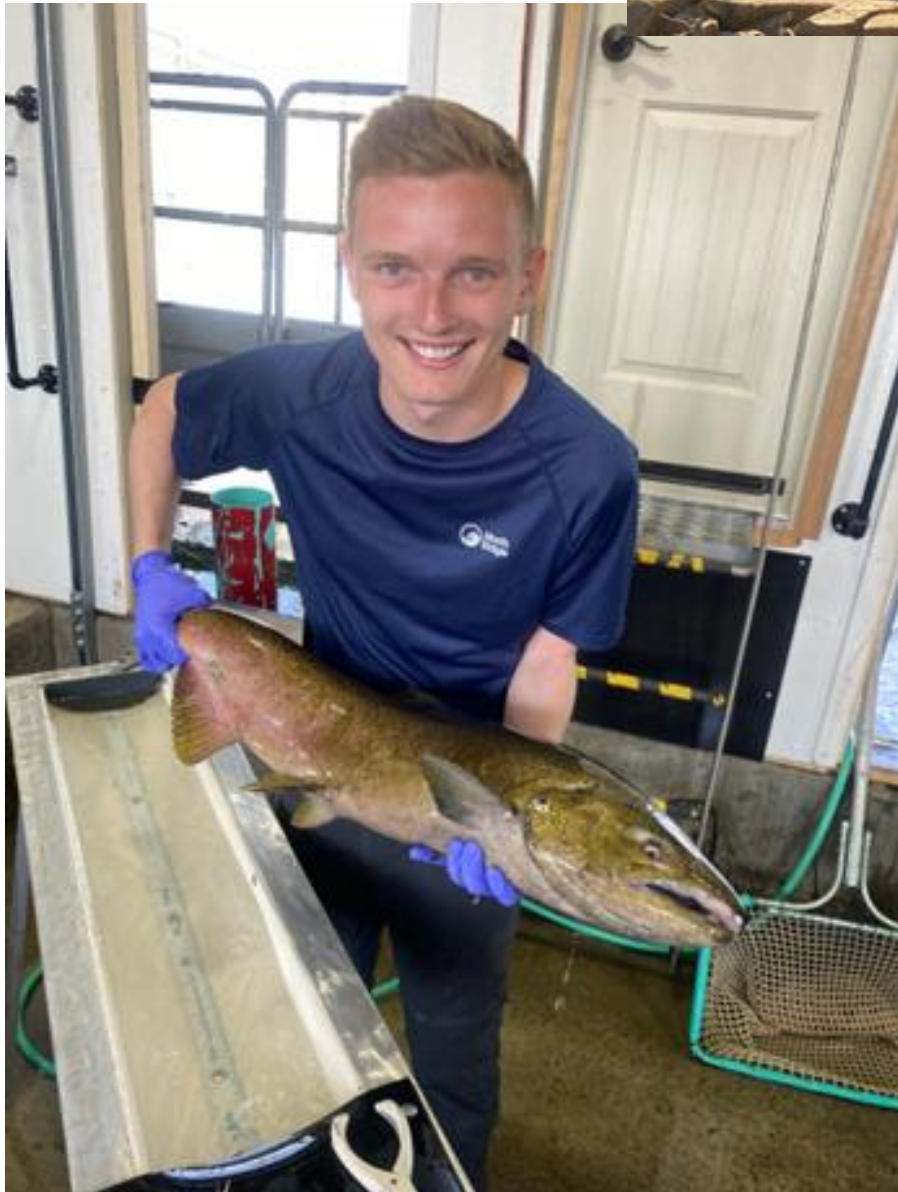
My final day of the program was a visit to a commercial facility, which was in the process of vaccinating all their Steelhead (approximately 120,000 fish!), prior to transfer into Puget Sound. This was another incredible learning experience, and it was fascinating to note the differences in practice between commercial and state-run facilities. With different objectives, and an entirely different scale all together, I felt like this was a great way to finish my experience in the Pacific Northwest.



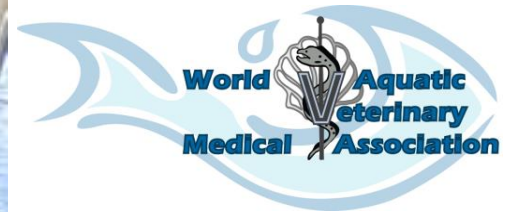
I felt a tinge of sadness that I couldn't have spent more time in each place, or possibly explored the region's aquaculture further. However, for a two-week placement, I learnt more than I ever could have imagined. I would like to reiterate my thanks to all whom I spent time with at Idaho Fish and Game, as well as those in Washington State.

I would also like to extend huge thanks to the team behind the John L. Pitts Scholarship programme, whose generous sponsorship contributed significantly to my experience, and allowed me to become the first overseas extern that this program has welcomed! I'm hugely excited to be continuing my aquaculture journey at the University of Stirling and the further opportunities to come.

Thanks all, once again  
Carrick Anderson



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[WWW.WAVMA.ORG/  
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Discover core knowledge, skills & experience needed to become a **WAVMA Certified Aquatic Veterinarian (CertAqV)**

Did you know that WAVMA's **CertAqV Program** offers members the opportunity to become recognized and certified as having competency in 9 core areas deemed necessary to practice aquatic veterinary medicine?

Find out more information online at:  
<http://www.wavma.org/CertAqV-Pgm>.



*Large aquariums at the Shark Reef, in Mandalay Bay Hotel, Las Vegas, Nevada USA.  
Photos by Nick Saint-Erne*





**Shark Reef Aquarium**  
Mandalay Bay Hotel  
Las Vegas, Nevada USA

Shark Reef Aquarium is the first and only facility in Nevada accredited by the Association of Zoos & Aquariums. The AZA is dedicated to the advancement of zoos and aquariums in the areas of conservation, education, science and recreation. The AZA accreditation ensures that an institution is dedicated to providing excellent care for animals.

The Shark Reef Aquarium opened in the year 2000, and has more than 2,000 animals on display, including sharks, giant rays, endangered green sea turtles, piranha and a Komodo dragon. They also have a large aquarium that allows certified SCUBA divers to swim with the sharks! This unique exhibit gives you the chance to dive with a higher concentration of exotic sharks than you'd ever find in the wild.

Shark Reef Aquarium is committed natural resource conservation and has implemented many initiatives to reduce our impact including; converting exhibit lighting to LED, installing variable frequency drive motors on our pumps, recycling exhibit water, sorting trash to divert for recycling and buying sustainable seafood.

The Aquarium Curator, Jack Jewell, also sponsors and annual Aquarium Medicine seminar, three days of information packed presentations centered on practical applications of aquatic medicine in day-to-day situations at public aquariums. The seminar offers a fully "hands-on" wet lab. This is an outstanding opportunity for C.E. credit and offers participants the chance to network and work side-by-side with some of the best aquatic veterinary specialists in the country.

Shark Reef Aquarium  
3950 S Las Vegas Blvd.  
Las Vegas, NV 89119

<https://mandalaybay.mgmresorts.com/en/entertainment/shark-reef-aquarium.html>



*Nick Saint-Erne with Kelly Melder, Matt Rice and Patrick Largey visiting the Shark Reef Aquarium at the Mandalay Bay Hotel, while attending the SuperZoo Pet Trade Show in Las Vegas. August 2022.  
Photo by Nick Saint-Erne*



*Decorations around the ceiling of the exhibits (above) reflect the diversity of animals on exhibit, including alligators and crocodiles, as well as a Komodo dragon (below). All photos in this article by Nick Saint-Erne.*





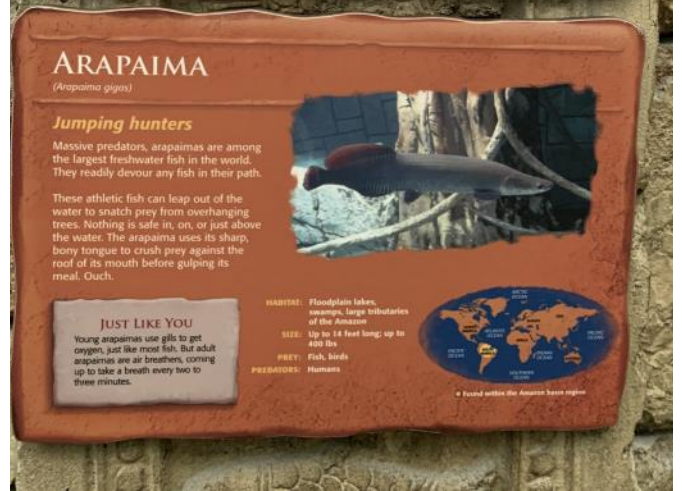
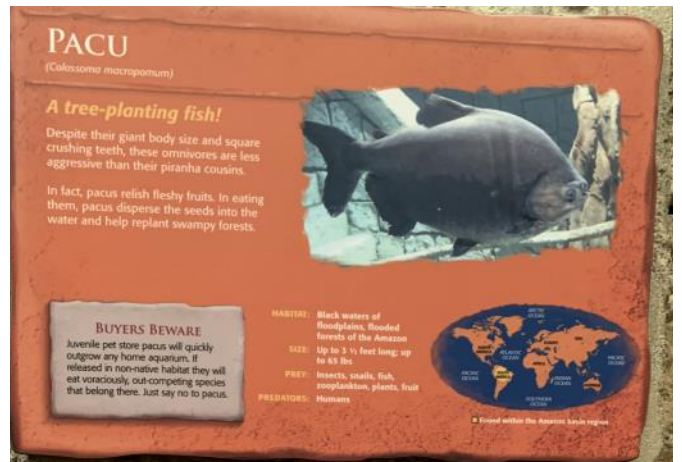
It was interesting to see the display of live desert pupfish, a highly endangered fish species endemic to one pool of water in Nevada.

For the adventurous SCUBA divers, you can literally swim with the sharks!



South American Pacus were commonly sold in fish stores for home aquariums, because they look like piranhas, but are herbivores. Most stores no longer sell them due to their large adult size making them hard to keep in small aquariums.

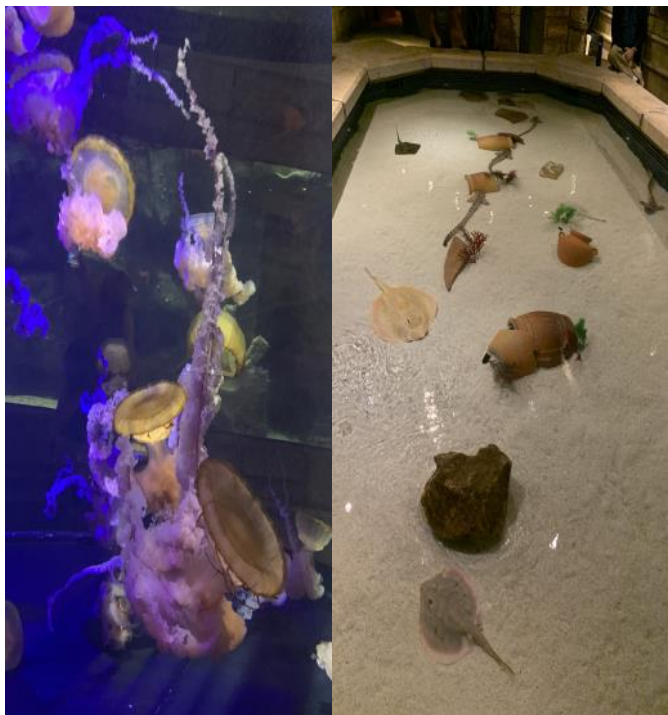
Arapaimas, another massive freshwater fish, is now being cultured for food production.





A tunnel through the large shark aquarium allows visitors to see them in surround tunnel-vision!

There are many varieties of sea jellies as well as a touch-tank where one can get up-close to rays.



**AQUAVET® I and II - 2023**

AQUAVET® is historically sponsored by the University of Pennsylvania (co-founder Dr. Donald Abt, 1936-2022) and Cornell University (co-founder Charles Rickard, D.V.M., M.S., Ph.D., 1922-1993).

Courses are held at Roger Williams University, RI.

**AQUAVET® Course Information:**

**AQUAVET® I - Introduction to Aquatic Veterinary Medicine; 4 week course**

28 May to 24 June 2023

**AQUAVET® II - Comparative Pathology of Aquatic Animals; 2 week course**

28 May to 10 June 2023

**AQUAVET® Summer fellowship; Duration: 8 weeks**

**Location: Roger Williams University - Bristol, RI**  
Classrooms and labs; Library

**Tuition covers course work, housing and most meals**

**Housing – suites with kitchen and 2 bedrooms**  
4 students per suite

**Meals – cafeteria meal plan:**  
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Cornell University  
College of Veterinary Medicine  
Microbiology and Immunology  
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Telephone 609-350-3044  
email: [aquavetmail@gmail.com](mailto:aquavetmail@gmail.com)  
[www.aquavet.info](http://www.aquavet.info)





### Donald Abt Obituary

We share the sad and heartbreaking news that Dr. Don Abt passed away on Wednesday 27 July, 2022. Many IAAAM and WAVMA members owe much, if not their entire career to Don, and few would argue that no one has made a stronger impact on aquatic animal medicine.

A native New Englander, Don obtained a BS in Zoology from the University of Massachusetts and is a 1961 graduate of the University of Pennsylvania School of Veterinary Medicine. For 3 years, Don taught anatomy at Penn and worked on bovine lymphosarcoma. After doing graduate work in biostatistics and epidemiology Don taught both of these subjects to Penn veterinary students before becoming the Associate Dean for Academic Affairs, where he was instrumental in implementing the novel core elective curriculum.

For the next 19 years Don continued to teach and serve in the Associate Dean's role. In the fall of 1989 Don and his loving wife Sandy moved to Falmouth, MA (his adopted hometown) and Don became the Director of the University of Pennsylvania's Laboratory of Aquatic Animal Medicine and Pathology at the Marine Biological Laboratory in Woods Hole, MA. Don served in this role until 1999. Certainly, all of this would make for a full academic career and then some.

But Don had another job, and for many reading this, a most important one. Don was the founding Director of the AQUAVET® program that began in 1976 and has helped train many of the current and future leaders in our field. Don held the role of AQUAVET® Director for 25 years and officially retired in 2001 as Professor Emeritus of Aquatic Animal Medicine and Pathology.

However, retirement didn't slow Don down and he continued teaching in the AQUAVET® program and having a positive and lasting impact on the hundreds of students that were lucky enough to learn from and spend time with him (especially at the famous end of course clambakes he hosted every year!). Don was also an IAAAM President, a lifetime IAAAM member, and the first recipient of the William Medway Award for Teaching Excellence.

Don was much more than a veterinarian, teacher, mentor, administrator, and amazing father. For almost five decades he was a member of the Coast Guard Auxiliary (Falmouth) Flotilla 11-02 and served many capacities in this role including Flotilla Commander. He received many awards and accolades including an auxiliary operational excellence ribbon, two operations service awards, 23 public education awards, a vessel examiner award, a Coast Guard bicentennial ribbon, five Coast Guard meritorious team commendations, a Coast Guard meritorious unit commendation, four Coast Guard unit commendations, the Department of Transportation Secretary's



Sandy & Don Abt

outstanding service ribbon, a flotilla meritorious achievement ribbon, a special operations service ribbon, 10 sustained auxiliary service awards, and the 911 Department of Transportation Award. Don was also active in his church, the First Congregational Church of Falmouth, where he diligently served as the parliamentarian for many years.

Don leaves a strong and lasting legacy; he was so proud of everyone in our field and how far aquatic animal medicine has come. Rest in peace Dr. Abt.

Don is survived by his wife Sandy, son David and his wife Debby, daughter Debbie (also a veterinarian) and her husband Bill.

Memorials may be made to:  
[Veterinary Student Scholarship Fund, University of Pennsylvania School of Veterinary Medicine](#),  
 3800 Spruce St., Philadelphia, PA 19104,  
 or [Sea Education Association](#),  
 171 Woods Hole Road, Falmouth, MA 02540.

Written by Dr. Greg Lewbart

*Dr. Rickard (left) & Dr. Abt (right) at AQUAVET 1982*



**FISH INNOVATION LAB ANNOUNCES  
 NEW DEPUTY DIRECTOR:  
 DR. STEPHEN REICHLEY  
 OF MISSISSIPPI STATE UNIVERSITY**

The Feed the Future Innovation Lab for Fish is pleased to announce that Stephen Reichley of Mississippi State University will serve as the program's new deputy director. Reichley is the associate director of the Mississippi State University Global Center for Aquatic Health and Food Security and an assistant professor at MSU's College of Veterinary Medicine Department of Pathobiology and Population Medicine.

As deputy director, Reichley will support the Fish Innovation Lab management entity in the technical administration of its 20 active projects in 11 countries. Reichley also will continue to serve as the lab's risk mitigation specialist, overseeing approaches to reduce and mitigate risk to fish production systems across the lab's activities.

"The Feed the Future Innovation Lab for Fish is making tremendous strides at alleviating poverty and improving nutrition through the inclusion of fish in vulnerable populations around the world," Reichley said. "I am honored and humbled to step into this leadership position. I look forward to leveraging my experience and network to continue to advance the impactful activities of the lab."

Stephen Reichley also provides support for the Marine Mammal and Sea Turtle Conservation, Recovery, and Monitoring Program and collaborations with the Food and Agriculture Organization of the United Nations. He provides diagnostic services, teaching, student mentorship, and other university and college services.

Reichley is currently the immediate past president of the World Aquatic Veterinary Medical Association and is a director-at-large for the American Association of Fish Veterinarians. He also serves on the Technical Standards Committee of the American Fisheries Society Fish Health Section. He has experience in the production of many aquatic species, numerous scientific publications related to aquatic animal health, and has given lectures and seminars throughout the world.

Prior to joining the lab, Reichley was the director of R&D and fish health for Clear Springs Foods, the largest producer of freshwater rainbow trout in the United States. His responsibilities included oversight of all R&D activities; clinical health and welfare of 45+ million fish across brood, hatchery, and grow-out operations; and oversight of the Diagnostic and Research Laboratory as well as the Water Quality and Analytical Laboratory.

Reichley received his BS from The University of Findlay, his DVM degree from The Ohio State University, and PhD from Mississippi State University. He is a Certified Aquatic Veterinarian (CertAqV) from the World Aquatic Veterinary Medical Association.



**Tell us about your background and interests.**

I received my DVM degree from The Ohio State University. During my time at Ohio State, I was fortunate to serve as an intern at the Food and Agriculture Organization of the United Nations in Rome. I also spent time in Europe at a variety of private companies, government organizations, and academic institutions. Before joining the Fish Innovation Lab, I served as the Director of R&D and Fish Health for the largest producer of freshwater rainbow trout in the United States. My research and outreach interests involve all aspects of improving aquaculture production, with particular interest in risk mitigation.

**How does your background in aquatic animal health at Mississippi State University help your approach at the Fish Innovation Lab?**

Mississippi State University College of Veterinary Medicine has a long-standing reputation of advancing food fish aquaculture and aquatic animal health. We have one of the largest teams of aquatic animal health specialists among U.S. colleges of veterinary medicine.

Complementing this group are our engaged researchers and clinicians, many of whom are board-certified veterinary specialists. This strong team positions us well for interdisciplinary approaches to implement the Fish Innovation Lab's research and capacity-building goals. In addition to my role at Mississippi

State, I am fortunate to serve as president of the World Aquatic Veterinary Medical Association. I look forward to using this experience and network to further advance collaborative efforts.

**In your view, what are the most pressing challenges related to food and nutrition security worldwide and what are some ways we can overcome these challenges?**

There are many global challenges related to food and nutrition security. I think two of the most pressing are finding ways to increase productivity, efficiency, and resiliency of aquaculture and fisheries; and improving access and availability of diverse, high-quality food to all populations. These are not easy challenges to overcome, especially given the diversity of societies around the world, and the many unique as well as shared obstacles they face. We can overcome these challenges by approaching them with multidisciplinary teams comprised of individuals with unique professional and societal perspectives.

**What do you wish other people knew about fish and/or food security?**

I wish people more fully understood the health benefits of eating fish and fish products for everyone – men, women, pregnant or nursing women, and children. With increased understanding, I hope people could make behavioral changes to include these nutrient-dense food sources in their diets. I also wish people appreciated the vital role fish and fish products play in the food security of many people, particularly in developing nations and economically disadvantaged populations.



**If you weren't a professor, what other careers might you have pursued?**

Being a professor and researcher was not what I envisioned when I first developed an interest in veterinary medicine. At the beginning of my veterinary program, my career aspirations were to become either a veterinary surgeon focusing on orthopedics or a companion animal general practitioner. Since developing an interest in aquatic animals, if I were not in academia, I would likely be involved in food fish aquaculture production like I was before joining Mississippi State.

**What are your hobbies or activities outside of work?**

Outside of work, I enjoy anything related to outdoor activities and traveling. I also enjoy cooking, especially dishes from different cultures. Reading is also something I thoroughly enjoy, typically alternating between nonfiction and fiction books on a variety of topics.

**What is on your bucket list? (What do you hope to do, accomplish, see, experience, etc. in your lifetime that you haven't yet?)**

Traveling and experiencing different places and cultures have always been high on my bucket list. I have been fortunate to visit most of the states in the United States (I have six left) and numerous countries. I look forward to the opportunity to continue my travels as part of my role at the Fish Innovation Lab, meeting new people, and expanding my cultural perspectives.

**If you would like to, tell us about your family, where you are from, and any personal details you would like to share.**

I was born and raised in Ohio, where my family still resides. I am the outlier of the family currently living in Mississippi after a stint in Idaho.

Information provided by websites:

[Stephen Reichley | Feed the Future Innovation Lab for Fish \(msstate.edu\)](https://www.fishinnovationlab.msstate.edu/directory/stephen-reichley)

<https://www.fishinnovationlab.msstate.edu/directory/stephen-reichley>

[Meet the Risk Mitigation Specialist: Stephen Reichley | Feed the Future Innovation Lab for Fish \(msstate.edu\)](https://www.fishinnovationlab.msstate.edu/newsroom/2021/02/meet-risk-mitigation-specialist-stephen-reichley)

<https://www.fishinnovationlab.msstate.edu/newsroom/2021/02/meet-risk-mitigation-specialist-stephen-reichley>

["Career Areas of Emphasis" encourage exploration: DVM Student hooked on aquatic veterinary medicine | College of Veterinary Medicine \(osu.edu\)](https://vet.osu.edu/cvm/career-areas-emphasis-encourage-exploration-dvm-student-hooked-aquatic-veterinary-medicine)

<https://vet.osu.edu/cvm/career-areas-emphasis-encourage-exploration-dvm-student-hooked-aquatic-veterinary-medicine>

**Maroon Clownfish (*Premnas biaculeatus*) infested with *Uronema marinum*: A case report**

Alex J. Hall

BVetMed Candidate '23

**Abstract:** As the popularity of home aquaria continues to increase, so does the prevalence of infectious diseases. Recently, the number of importers has also dramatically increased, creating new entry points for infections to enter the fish trade.

Scuticociliates, particularly *Uronema marinum*, have taken advantage of close-quarter shipping and containment. They can spread incredibly quickly between fish in close contact, causing hemorrhagic-necrotizing lesions and almost certain death if untreated. Fish generally present with external lesions from *U. marinum*, however, on occasion, an internal/systemic disease is possible.

**Introduction:** Fish infested with *U. marinum* can present with many different symptoms, red-banded hemorrhagic lesions being the most characteristic. However, one may see infested fish gasping for air, scraping along the surfaces of rocks or decor, and may appear duller colored due to excess mucus formation. To confirm a *U. marinum* diagnosis, microscopy can be used on tissue samples.

Ranging from 20-60 x 10-40 µm in size, these barrel-shaped organisms are heavily ciliated except for the frontal plate. These organisms generally have one sizeable contractile vacuole surrounded by smaller vacuoles (Petz et al. 1995, Song & Packoff 1997). These protozoa can be extremely hard to treat because they have a fast, direct lifecycle. Adding to the difficulty, *Uronema* sp. can survive in the environment, making fallow treatments unsuccessful (Mayer & Palmeiro 2013).



*Initial presentation:*  
 Notice the grey appearance around the operculum and excess mucus on skin.

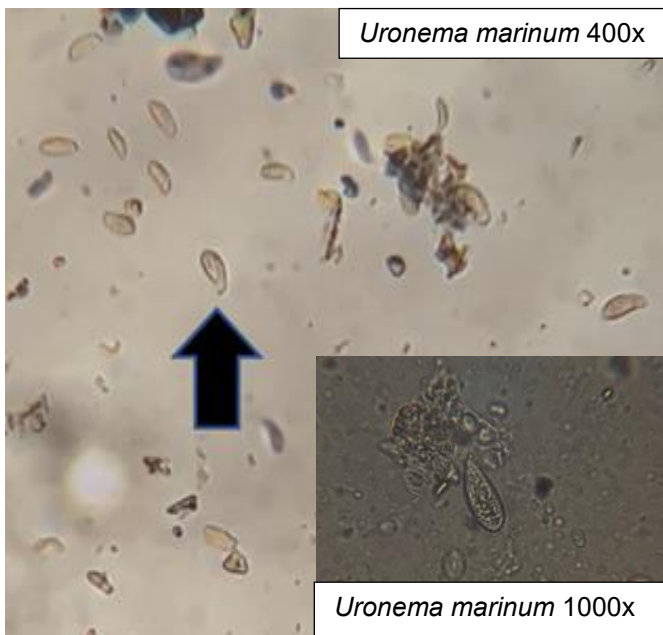
**Case Presentation:** A Maroon Clownfish was placed in quarantine due to an abnormal dull coloration. At this time, the fish seemed perfectly healthy in all other manners, including activity, mentation, and food intake. A skin/scale scrape was performed, and the sampled mucus was examined. Microscopy revealed a moderate scuticociliatosis infestation, later identified as *U. marinum*. Fortunately, a fecal sample was obtained immediately after diagnosis, confirming the presence of the protozoa also in the gastrointestinal tract.

**Treatment:** The fish was treated with a Copper immersion at 2.0 ppm in an isolated system with a salinity of 1.028 g/kg. The emersion at this concentration continued throughout the treatment, and the tank was sterilized every two days.

During the system sterilization, the fish would be removed for baths. The first two baths were freshwater (77°F for 30 minutes) and then a formalin bath at 200 ppm for 40 minutes every second day. A skin/scale scrape on day 5 revealed a decreased parasite burden. However, a mild infestation was still present.

To combat the internal protozoa, the clownfish was treated with intramuscular injections of Metronidazole (5 mg/kg q72h for four weeks). Fecal samples on days 14 and 20 showed a decreasing parasite burden. A skin/scale scrape and mucoid examination on day 21 revealed a very mild infestation.

Unfortunately, starting from days 26-30, the medications could not be given due to external circumstances. On day 30, a sizeable ulcerative lesion appeared on the lateral aspect of the fish. Honey was applied to the ulcer as an osmotic and antimicrobial barrier. However, the fish passed away on day 32.



*Uronema marinum* 400x

*Uronema marinum* 1000x

Discussion: The combination therapy appeared to be effective in treating the external and internal *U. marinum* infestation. Had the treatment not been impeded, this fish had the potential to make a full recovery. Further work must still be done to understand Scuticociliate systemic diseases better.

References:

Mayer, J. & Palmeiro, B. (2013). Protozoal Ectoparasites (Ciliated and Flagellated). In *Clinical veterinary advisor: Birds and exotic pets* (pp. 33–34). Elsevier/Saunders.

Petz W., Song W., Wilbert N. 1995. Taxonomy and ecology of the ciliate fauna (Protozoa, Ciliophora) in the endopagial and pelagial of the Weddell Sea, Antarctica. *Stapfia*, 40:1-223.

Song W. & Packroff G. 1997. Taxonomische Untersuchungen an marinen Ciliaten aus China mit Beschreibungen von zwei neuen Arten, Strombidium globosaneum nov. spec. und S. platum nov. spec. (Protozoa, Ciliophora). *Arch. Protistenk.*, 147:331-360.

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*The Aquatic Veterinarian* is meant to be read as a 2-page spread (like a paper magazine!). To view it this way on your computer, open the pdf document using Adobe Acrobat or Adobe Reader, then go to the menu bar at the top of the computer screen and click on View, then Page Display, then Two Page View. Make sure that the first page is viewed by itself. That will allow you to scroll through the issue seeing the cover page by itself first, followed by two pages side by side for the rest of the issue. Doing this, you will be able to see the Centerfold picture in all its ginormous glory!



**Questions & Answers from the WAVMA Listserv**  
[WAVMA\\_Members-L@wavma.org](mailto:WAVMA_Members-L@wavma.org)

**Angelfish Lesions**

Hi all,

My friend in Florida has a freshwater angelfish that is a few years old. I can't really do anything for it because I am in Pennsylvania, but I said I would ask for ideas on what this could possibly be. The fish first developed some raised lesions on the pectoral fins several weeks ago. These disappeared after a course of Melafix. Over the last few weeks it has developed raised lesions under the skin and its left operculum has sunken in within the last couple of days. The fish is still eating and behaving normally.

It is kept in a 10 gallon aquarium with a second angelfish that is not showing any lesions, a single cory cat, and a small pleco. She does a 25% water change weekly and has started adding a tablespoon of aquarium salt with the water changes. She tested the water with test strips and got the following:

Ammonia -"safe levels" - didn't specify what this meant but I assume the test is qualitative

Nitrite 0 ppm

Nitrate 0 ppm

pH 7

Total alkalinity 180

Total hardness 75

I personally don't like to use test strips because I question the accuracy (I know nitrate shouldn't be 0). I was just wondering what could possibly make the operculum sink like this? The top differential I had was Mycobacteria, but also thought of some of the skin/gill parasites like ich, since it has raised lesions as well. I'm also aware that some husbandry issues need to be addressed. I don't see enough fish, sadly, so I really have never seen anything like this before. The lesions are circled in the photograph.

Thanks for any ideas,

**Jenifer Nix, BVSc**  
[Jnix@hawaii.edu](mailto:Jnix@hawaii.edu)

Hi Jennifer,

What size are the fish? Also, what is the temperature of the tank water? Freshwater Angelfish require slightly higher temperatures than other freshwater fish. If the temperature is too low, they can become stressed and more susceptible to diseases. I would ask her about this to see if it could be a factor.

**Sarah Nelson**

Hi Jennifer,

Nitrates of zero is possible, commonly in heavily planted tanks. "Safe ammonia" is likely one of those in-tank gauges. I suppose it would take into consideration the pH of the water in how it displays colour changes.

You're quite right, the waxing and waning clinical signs of skin disease is highly suggestive of mycobacteriosis. They may get different clinical presentations in other fishes in the population depending on which organs are worst affected. See my video:

[https://youtu.be/RW\\_U4vtO5k](https://youtu.be/RW_U4vtO5k)

Yours sincerely,

**Dr Richmond Loh**

DipProjMgt, BSc, BVMS, MPhil (Pathology), MAN-ZCVS (Aquatics & Pathobiology), CertAqV, Distinguished Fellow WAVMA.

Aquatic Veterinarian & Veterinary Pathologist.

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# World Aquatic Health Conference 2022

**Early bird registration is now OPEN**

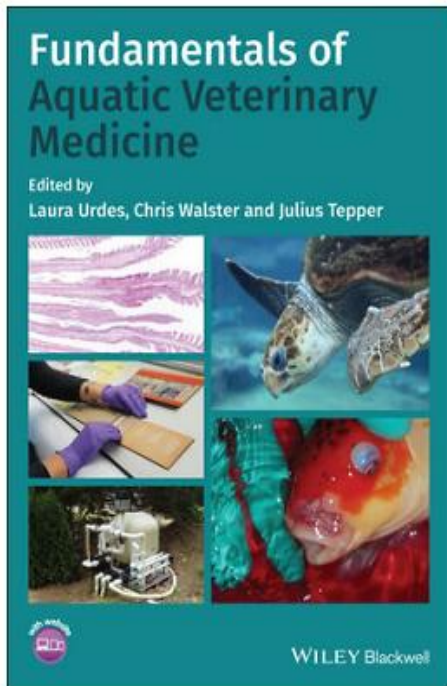
**3-7 December 2022**

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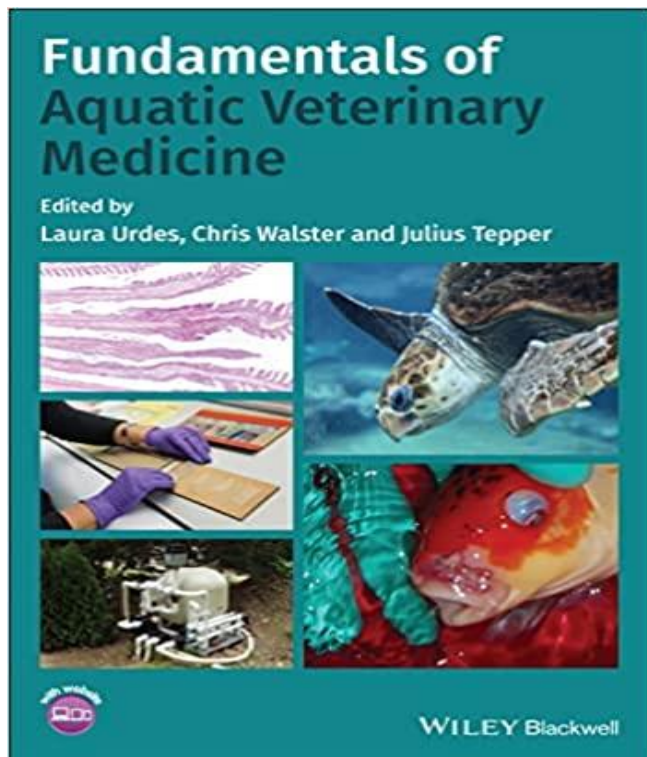
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- Chapter 5** - Epidemiology of Aquatic Animal Diseases
- Chapter 6** - Diagnostics and Treatment of Aquatic Animal Diseases
- Chapter 7** - Clinical Veterinary Experience and Client Communication
- Chapter 8** - Public Health, Zoonoses and Seafood Safety
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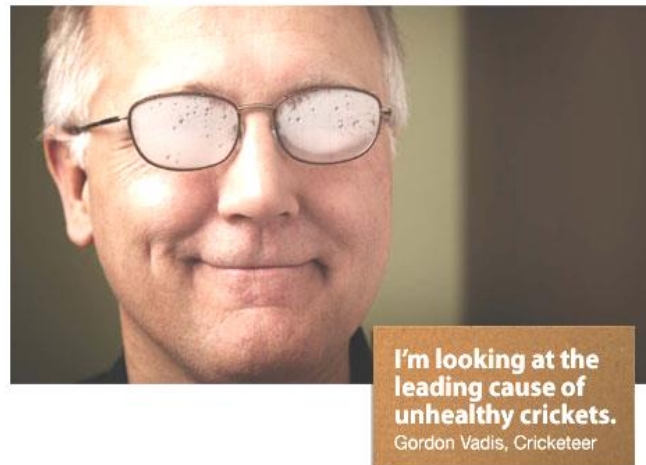


*Fundamentals of Aquatic Veterinary Medicine* covers the competencies necessary to assure the highest quality of aquatic veterinary services. This book provides systematic, practical guidance on the treatment of aquatic mammals, amphibians, fish, and invertebrates in veterinary practice.

Covering the nine core areas of the WAVMA Certified Aquatic Veterinarian (CertAqV) Program, this comprehensive clinical reference covers taxonomy, anatomy and physiology of aquatic species, water quality and life support systems, diagnostics, treatment, and prevention of aquatic diseases, and more. Designed to help readers acquire and demonstrate the necessary knowledge, skills, and experience to be competent in aquatic veterinary medicine, this authoritative guide:

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**MEETINGS OF INTEREST TO  
AQUATIC VETERINARIANS**

Veterinarians attending these meetings may be awarded veterinary CE/PD credit towards annual re-licensure or re-registration to practice veterinary medicine. Individuals should check with the organizers to see if CE/PD certificates are provided.



**47<sup>th</sup> World Small Animal Veterinary Association Congress & XVIII FIAVAC Congress (WSAVA 2022)**  
29–31 October 2022  
Lima, Peru  
<https://wsava2022.com/>

Experience an event that is so much more than just a Congress - join the gathering of the global veterinary community at WSAVA 2022 in beautiful Lima, Peru! Become part of this long-awaited in-person meeting, where international veterinary experts, technicians and students will come together to collaborate and share knowledge on the latest in veterinary medicine and care for small companion animals.

You can find this year's [Scientific Program](#) online and review all the sessions that are going to be presented from global working groups and committees, veterinary organizations, plus exclusive streams in Spanish.

Additionally, abstract submission is open, so if you have recently concluded a study and have groundbreaking results to present, we would love for you to contribute your work to WSAVA 2022. Take the opportunity to showcase your study findings in front of a global audience and make an impact on veterinary medicine, and pet care.

**Key Dates:**

[Early Bird Registration Deadline: 6 October 2022](#)

For the latest congress news & registration information visit the official WSAVA 2022 website: <https://wsava2022.com/>



**47th WSAVA World Congress - 2022**

Dates: 29-31 October 2022

Lima, Peru

See: [WSAVA](#)

**48th WSAVA World Congress - 2023**

Lisbon, Portugal

**49th WSAVA World Congress - 2024**

Shanghai, China



**AAFV Live Conference**

October 21-23, 2022

St. Augustine, FL

The American Association of Fish Veterinarians (AAFV) is holding their annual conference on October 21-23, 2022.

Friday, October 21: Fish Necropsy Lab

Saturday, October 22: Lecture Day (8 AM – 5 PM)

Sunday, October 23: Fish Surgery Lab

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26-29 April

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**38<sup>th</sup> World Veterinary Association Congress  
26 to 29 April 2023  
Taipei, Taiwan**

The WVA is delighted to announce that the **registration for the World Veterinary Association Congress is now open!**

It has always been the goal of the World Veterinary Association Congress (WVAC) to bring veterinarians from across the globe to exchange professional knowledge.

The 38<sup>th</sup> World Veterinary Association Congress will explore fields in clinical veterinary medicine, veterinary public health, animal welfare, and academic research. Other topics include swine, equine, poultry, exotic pets, and more.

More info and registration: [HERE](https://worldvet.org/news/wvac2023-registration-is-now-open/):  
<https://worldvet.org/news/wvac2023-registration-is-now-open/>

[wva\\_assistant@worldvet.org](mailto:wva_assistant@worldvet.org)  
<http://www.worldvet.org/>

**WORLD AQUACULTURE SINGAPORE**  
Singapore – Nov 29 – Dec 2, 2022

Asia’s leading international conference and exhibition on aquaculture will be taking place as planned in Singapore from November 29-December 2, 2022, as an in-person meeting. Over 200 [exhibitors](#) have already signed up in a strong show of confidence and support for the event and the industry. Registration for the conference remains open with early bird categories still available. The deadline for abstract submission and call for papers has been extended to September 1, 2022. Still time to [submit abstracts](#).

***Connectivity for good: why better connected fish farms will lead to healthier fish webinar***  
Wednesday 2 November 2022,  
2pm-3pm (UK time).

For free registration or to find out more, please go online to <https://content.krucial.com/connectivity-for-healthier-fish-webinar-sign-up> or scan the QR code below.



# AAFV'S 10TH ANNIVERSARY CONFERENCE

## Fish Medicine CE Schedule



22/OCTOBER/2022

**8:00 BREAKFAST & CHECK IN**  
Ham, Egg & Cheese Croissants  
Bagel with egg, tomato, avocado & cream cheese  
Served with Fresh Fruit Salad, Coffee & Orange Juice

**8:15 WELCOME**  
Dr. Nora Hickey, 2022 AAFV President

**8:30 ADVANCED FISH MEDICINE TRAINING: THE FORMATION OF AN ABVP - FISH PRACTICE, AVMA RECOGNIZED VETERINARY SPECIALTY**  
Dr. John Shelley

**9:00 WHAT VETERINARIANS NEED TO KNOW ABOUT FISH FARMERS**  
Paul W. Zajicek

**9:30 RISK ASSESSMENT OF FISH MOVEMENTS FROM USA GREAT LAKES REGION DURING A VIRAL HEMORRHAGIC SEPTICEMIA OUTBREAK**  
Dr. Myron Kibus

**10:00 STRATEGIES TO IMPROVE FISH VACCINATION**  
Dr. Katharine "Ono" Onofryton

**10:30 BREAK**

**11:00 HOW TO MAKE FISH PRACTICE PROFITABLE**  
Dr. Jessie Sanders

**11:30 DIAGNOSTIC IMAGING IN PET FISH**  
Dr. Jessie Sanders

**12:00 LUNCH**  
Caribbean Chicken Breast or Mojo Pulled Pork or Roasted Veggies in Pesto Sauce (V)  
Served with Yellow Rice (V), Black Beans (V) & Roll (V)

**BROWSE SILENT AUCTION ITEMS & SPONSOR TABLES**

**FLORIDA AQUARIUM VIDEO**

**1:30 HEMATOLOGICAL PARAMETERS IN FLORIDA POMPANO (TRACHINOTUS CAROLINUS) SUPPLEMENTED WITH B-GLUCAN AND PEDIOCOCCUS ACIDILACTICI SYMBIOTIC**  
Dr. Ashley Morgan

**2:00 DEVELOPING A THROMBOELASTOGRAPHY ASSAY IN ELASMOBRANCHS**  
Kayla Bonadie

**2:30 HISTOPATHOLOGICAL ANALYSIS OF LOCALLY ADMINISTERED LIDOCAINE VS SALINE IN THE ARMS OF A CEPHALOPOD, EUPRYMNA BERRYI.**  
Heather (Lane) Morrison

**3:00 BREAK**  
**SILENT AUCTION ENDS**

**3:30 AQUATIC CLINICAL CASES IN A MIXED ANIMAL VET PRACTICE**  
Dr. Jena Questen

**4:15 DO FISH FEEL PAIN? NOCICEPTION, ANALGESIA, AND WELFARE IN FISH**  
Dr. Ashley Emanuele

**PAY FOR SILENT AUCTIONS ITEMS & PREPARE FOR EVENING BOAT RIDE!**

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