

# The



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# eterinarian



*Injured Loggerhead Sea Turtle being rehabilitated at the South Carolina Aquarium. See articles on pages 16-23.*

Volume 13, Number 3  
Third Quarter, 2019



**WHO ARE WE**

**MISSION**

The Mission of the World Aquatic Veterinary Medical 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.

**OBJECTIVES**

- A.** To serve aquatic veterinary medicine practitioners by developing programs to support and promote our members, and the aquatic species and industries that they serve;
- B.** To be an advocate for, develop guidance on, and promote the advancement of aquatic animal medicine within the veterinary profession and with associated industries, governments, non-governmental entities and members of the public;
- C.** To develop and implement aquatic veterinary education programs, certifications and publications, including a credentialing process to recognize day-one competency in aquatic animal medicine;
- D.** To foster and strengthen greater interactions among: aquatic veterinarians, related disciplines, veterinary allied and supportive groups and industries, governments and animal owners.

*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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**Editor’s Note**

WAVMA has had another great year of aquatic medicine continuing education sessions under the leadership of our President, Dr. Devon Dublin. We have advanced the status of Aquatic Veterinary Medicine among our veterinary peers through our memberships in the World Veterinary Association and the World Small Animal Veterinary Association. Dr. Dublin has been our delegate to these organizations’ annual meetings, and we have been able to provide Aquatic Medicine sessions at their annual conferences. Next year, we are planning more lectures at conferences, so be sure to see page 12 in this issue for more information and contact our Meetings Committee Chair, Dr. Julius Tepper.

This summer, I had the opportunity again to present lectures on koi and tropical fish medicine at the AQUAVET program in Bristol, Rhode Island. This great program has been held for 43 years, sponsored by Cornell University [see student report by Elizabeth St. Germaine on pages 28-29].

On my way back from the AQUAVET session, I stopped at the South Carolina Aquarium and was given a great tour by Dr. Shane Boylan, their Chief Veterinarian and another lecturer for AQUAVET. See the Colleague’s Connection interview with Dr. Boylan on pages 16-19, and on pages 20-23 there is more information about the South Carolina Aquarium, especially its sea turtle rescue and rehabilitation program.

If you are interested in the AQUAVET program, go to the Cornell.edu website, and also see the information on page 39 of this issue.

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

*Dr. Shane Boylan explaining the South Carolina Aquarium’s Sea Turtle Rescue and Rehabilitation program to me.*  
*Photo by Judy Saint-Erne.*



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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>.

**Cover Photo:** Injured Loggerhead Sea Turtle being rehabilitated at the South Carolina Aquarium  
 Photograph by Nick Saint-Erne



*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**

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Free 1/8 page (business card size) advertisement  
 Contact [TAVeditor@wavma.org](mailto:TAVeditor@wavma.org) for information on advertising and payment options.



**President's Report**

Dear WAVMA members,

As autumn steps in and the leaves turn to red, we are fast approaching the end of another year. I am pleased to report that the WAVMA sponsored Aquatic Medicine stream at the WSAVA 2019 conference in Toronto on July 16, 2019 was a success, where Dr. Julius Tepper and Dr. Nick Saint-Erne covered topics on water quality, basic diagnostic techniques, and anesthesia. The 2019 WAVMA Annual General Meeting was held in this city during the conference at the Stratus Hotel on July 15th, 2019, where Dr. Laura Urdes, the 2017 WAVMA president, was given the prestigious title of WAVMA Fellow. Also, the second Ornamental Fish Scientific session, KoiPrax2 was held in Toronto, Canada on Monday, July 15, 2019. Planning has begun for next year for KoiPrax3. A call has been sent out by Dr. Julius Tepper, Meetings Committee Chair for persons interested in being speakers. If so please send him a message to [cypcarpio@aol.com](mailto:cypcarpio@aol.com).

I am pleased with the support of the Executive Board members during the year and that of the committees that carry out their specific functions. These members dedicate their time and energy to see the smooth functioning of the organization and the benefits offered to the members.

As I reported earlier, the newly constituted Education and Students Committee has begun its work under the chairmanship of Dr. Bartolomeo Gorgoglione. Under this newly established committee, several subcommittees were formed which addresses specific aspects as it relates to student affairs and education in general. Colorado State University, College of Veterinary Medicine & Biomedical Sciences, the most recently approved WAVMA student chapter was successfully processed under this committee.

A call was sent out for nominations for 2020 office bearers who will serve under the presidency of Dr. Jena Questen, who has some great plans for the year ahead in WAVMA. I encourage members to volunteer and lend your energies to the work we are doing. For the first time, the Directors-at-Large will be elected to serve with a regional mandate. This will ensure that the board is well balanced and allow for the needs of all members to be met, taking into consideration particular geographic realities. I welcome you in advance to work together with us in advancing the work of WAVMA. I thank you for your support so far this year.

**Devon Dublin**, PhD, DMVZ, MSc, CertAqV  
WAVMA President 2019  
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240-0016, Japan  
[President@wavma.org](mailto:President@wavma.org)



**Secretary's Report**

The business conducted by the Executive Board over the last few months included approving the following individuals as new or renewal of their Certification of Aquatic Veterinarians: Bryony Chetwynd-Glover, Jan Linkenhoker, Nora Hickey, Sasha Saugh, David Wilbur, Michael Corcoran (renewal) and Sharon Tiberio (renewal).

The John L. Pitts Aquatic Veterinary Education Awards Program has a new Chair, Nora Hickey, who is taking over my role in the Program. We will soon be sending out information for the 2020 applications process for the Aquatic Education Awards.

The Education and Students Committee is running well under the leadership of Bartolomeo Gorgoglione (BartGorg@msu.edu) and the Executive Board approved the formation of a new WAVMA Student Chapter at Colorado State University (see page 14 in this issue for more information).

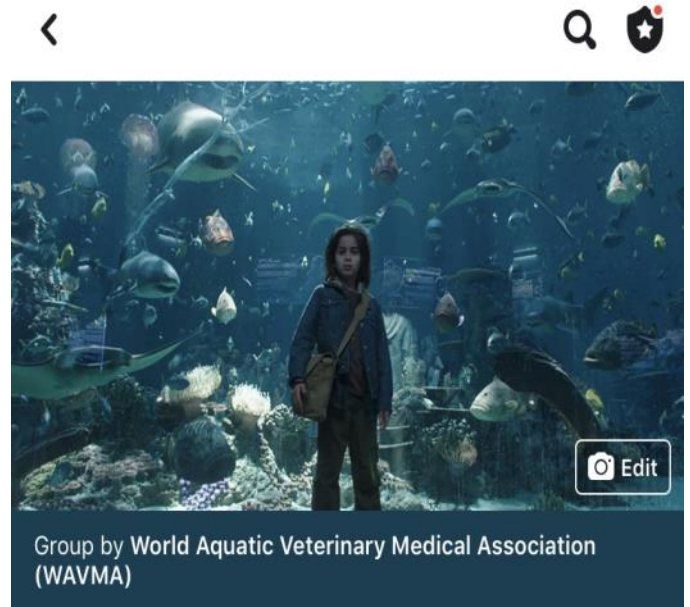
It is time for the WAVMA elections for 2020 Executive Board members, so be sure to submit an application right away for a Board position. See page 11 for more information.

WAVMA is a member of the World Veterinary Association and the WVA Elections will soon be held. Jena Questen, as President-Elect, will be the WAVMA representative for the WVA elections process.

Regarding Social Media Reform, President Elect Jena Questen received feedback at the AGM that the Members-L listserv is not fulfilling all the needs for discussion on cases and information sharing. A closed Facebook group, for WAVMA members only, was suggested as one possible augmentation. Currently, we have a newly created closed Facebook group for WAVMA CertAqVs only to discuss aquatic cases. We will see how this works out and can make future adjustments based on how it is used. This is another benefit for being WAVMA Certified as an Aquatic Veterinarian!

**Stephen Reichley, DVM, PhD, CertAqV**  
WAVMA Secretary  
[Secretary@wavma.org](mailto:Secretary@wavma.org)

*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. That will allow you to scroll thorough 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!



**World Aquatic Veterinary  
Medical Association (WAVMA)  
CertAqV's Private Chat >**

PRIVATE GROUP · 34 MEMBERS



Watch Party Photos Events Files Albums

*Above is the opening page for the WAVMA CertAqV private Facebook chat site.*

**TO SUPPORT FUTURE STUDENT  
SCHOLARSHIPS, PLEASE MAKE  
A DONATION TODAY  
TO THE SCHOLARSHIP FUND!**  
[www.wavma.org/  
SCHOLARSHIPS.](http://www.wavma.org/scholarships)

**Treasurer's Report**

This year is likely to set a record for WAVMA membership! Currently we have 534 members, about 150 more than a year ago! We have members from 85 countries around the world, from countries that begin with every letter except for LOQWXY [last year it was DLMOQVWXYZ]! So, if you know any aquatic veterinarians in Liberia, Oman, Qatar or Yemen, get them to join WAVMA! By the way, there are no countries that have English names that begin with the letters W or X.

**Nick Saint-Erne, DVM CertAqV**

WAVMA Treasurer

[Treasurer@WAVMA.org](mailto:Treasurer@WAVMA.org)**New Members—2nd-3rd Quarters 2019**

Members are the life-blood of any professional Association. Please join us in welcoming the following new WAVMA members:

**Veterinarians**

|                    |               |
|--------------------|---------------|
| Judith Farley      | Canada        |
| Antonio Longo      | United States |
| Jelena Vukcevic    | Australia     |
| Romualdo Balagapo  | Philippines   |
| Jonathan Lee       | United States |
| Chris Harvey-Clark | Canada        |
| Jenee Odani        | United States |
| Paul Manesis       | Canada        |
| Karine Rondeau     | Canada        |
| Amanda Ardente     | United States |
| Heather Barron     | United States |
| John Watterson     | Viet Nam      |
| Courtenay Bombara  |               |

**Veterinarian—New Graduate**

|                    |               |
|--------------------|---------------|
| Nikki Wuestenhagen | United States |
|--------------------|---------------|

**Vet Graduate Student, Intern or Resident Member**

|                         |                       |
|-------------------------|-----------------------|
| Tamara Kruse            | United States         |
| Anna Julia Pheils       | Saint Kitts and Nevis |
| Juliette Lacoste        | United States         |
| Akrom Hussain Choudhury | India                 |

**Vet Student Member (enrolled in Vet Curriculum)**

|                   |                       |
|-------------------|-----------------------|
| Brenda Arras      | United States         |
| Hamilton Bales    | Saint Kitts and Nevis |
| Michelle Barnett  | United States         |
| Erica Bender      | United States         |
| Elizabeth Cahill  | Saint Kitts and Nevis |
| Annie Clift       | United States         |
| Sabrina Daniels   | Saint Kitts and Nevis |
| Shawnacey Donahue | Saint Kitts and Nevis |
| Xanth El-Sayed    | United States         |
| Ethan Engelland   | Saint Kitts and Nevis |
| Jordan Esquivel   | Saint Kitts and Nevis |

|                         |                       |
|-------------------------|-----------------------|
| Mikayla Fahey           | Saint Kitts and Nevis |
| Abigail Fiske           | United States         |
| Samantha Garcia         | Saint Kitts and Nevis |
| Daniel Guevara          | Saint Kitts and Nevis |
| William Hernandez       | United States         |
| Rachael Hill            | United States         |
| Jonathan Kay Hong Hoong | Australia             |
| Jennifer Irizarry       | United States         |
| Kathryn Isbell          | Saint Kitts and Nevis |
| Linda Johnson           | Saint Kitts and Nevis |
| Bree Karns              | United States         |
| Nicole Le Card          | Saint Kitts and Nevis |
| Logan McAllister        | United States         |
| Valentin Medina         | Saint Kitts and Nevis |
| Casey Miller            | Saint Kitts and Nevis |
| Chelsey Mitchell        | Saint Kitts and Nevis |
| Stacie Munden           | Saint Kitts and Nevis |
| Lauren Penney           | Australia             |
| Corinna Ramirez         | Saint Kitts and Nevis |
| Molly Reineke           | Saint Kitts and Nevis |
| Francesca Rizzo         | Saint Kitts and Nevis |
| Kayla Rodriguez         | Saint Kitts and Nevis |
| Trinity Russell         | Saint Kitts and Nevis |
| Daniel Ruvolo           | United States         |
| Sarah Saltiel           | Saint Kitts and Nevis |
| Diana Saravia           | United States         |
| Alexis Schlamp          | Saint Kitts and Nevis |
| Emily Schleinkofer      | United States         |
| Bernadette Schwarz      | Saint Kitts and Nevis |
| Danielle Scott          | United States         |
| Ashley Sierra           | United States         |
| Meghan Smallcomb        | Saint Kitts and Nevis |
| Hannah Smith            | United States         |
| Tony Smith              | Australia             |
| Zien Tay                | Australia             |
| Laci Taylor             | United States         |
| Brook Toussaint         | Saint Kitts and Nevis |
| Emily Tucker            | United States         |
| Carol Twilley           | United States         |
| Kelly Udelsman          | United States         |
| Amanda Vegter           | United States         |
| Caroline von Waldburg   | Canada                |
| Hannah Weinberg         | United States         |
| Kendall Wyman           | Canada                |
| Jane Yodvilai           | Saint Kitts and Nevis |

**Vet Tech/Nurse Member**

|              |               |
|--------------|---------------|
| Tiffany Pope | United States |
|--------------|---------------|

**Affiliate Members (Non-Veterinarian)**

|                         |               |
|-------------------------|---------------|
| Morgan Huffman          | United States |
| Christian Agus          | Indonesia     |
| Panagiotis Karastamatis | Greece        |

Welcome to WAVMA!



## PRIVILEGES & BENEFITS OF WAVMA MEMBERSHIP

### Aquatic Veterinary e-Learning

Supporting WAVMA's WebCEPD, PubCEPD  
 CertAqV & Clinical Cases Programs.



- Enjoy on-line *e-Learning* programs & courses to advance your knowledge & skills
- Get continuing education credit through *WebCEPD, PubCEPD & Clinical Corner*
- Discover core knowledge, skills & experience needed to become a WAVMA Certified Aquatic Veterinarian (*CertAqV*)
- Receive *discounted* subscriptions to publications & meetings
- Utilize *WAVMA's picture & video libraries* for your own presentations
- Join *listservs* to discuss clinical cases & other issues
- Mentor & be mentored to expand your and other's aquatic veterinary skills
- Publish your articles in WAVMA's quarterly journal: *The Aquatic Veterinarian*
- Find world-wide externships, internships, residencies & jobs in all aquatic vet areas
- Access *Member Directories* & have your Clinic/Hospital listed on-line
- Benefit from *Educational grants* for vet students & new veterinary graduates
- Form & participate in *veterinary school chapters* throughout the world
- Participate in veterinarian and client surveys
- Help build additional member programs by serving as an Officer, Director or Committee Member

### 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 Parliamentarian.

#### 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: Nick Saint-Erne, [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: Stephen Reichley, [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: David Scarfe, [dscarfe@ameritech.net](mailto:dscarfe@ameritech.net)

#### 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 individual members and the organization. Chris Walster, [chris.walster@onlinevets.co.uk](mailto:chris.walster@onlinevets.co.uk)

#### Education & Student Committee

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

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



**Credentialing Committee**

The WAVMA CertAqV Program is administered by the WAVMA Credentialing Committee, along with the assistance of other Certified WAVMA members who serve as mentors and adjudicators.

To be credentialed by WAVMA as a Certified Aquatic Veterinarian and utilize the CertAqV honorific, individuals must be a WAVMA member, have a veterinary degree from a nationally recognized veterinary school, college or university and have demonstrated general knowledge and competency in core subject areas that are currently considered necessary to practice aquatic veterinary medicine. Students of a nationally recognized veterinary institution of higher education can register for the program, but will not be certified or entitled to utilize the CertAqV honorific until they graduate.

Individuals that desire to participate in the WAVMA CertAqV Credentialing Program are required to:

- Register for the Program (application at <https://www.wavma.org/CertAqV-Pgm>).
- Identify a mentor to assist the registrant through the Program. The potential mentors would be available WAVMA Certified Aquatic Veterinarians.
- Provide the mentor with written evidence of satisfactory completion of each of the core Knowledge, Skills and Experience (KSE) subject areas.
- Be adjudicated by the Credentialing Committee for recognition of completion of all KSE requirements after the mentor has approved the documentation.
- Have the CertAqV certification approved by the WAVMA Executive Board.

The WAVMA Certified Aquatic Veterinarian (CertAqV) program has now certified 100 aquatic veterinarians from 25 countries. Congratulations to our newest Certified Aquatic Veterinarians:

Nora Hickey  
Sasha Saugh  
David Wilbur

There are an additional 43 other WAVMA members currently in the process of being certified. For more information, see the WAVMA website: <http://www.wavma.org/CertAqV-Pgm>.

**David Scarfe, DVM, CertAqV**  
2019 Credentialing Committee Chair  
[dscarfe@ameritech.net](mailto:dscarfe@ameritech.net)

**Certified Aquatic Veterinarians**

|                        |                   |                         |                   |
|------------------------|-------------------|-------------------------|-------------------|
| Jessica Allen          | USA               | Victoria Maroun         | St. Kitts & Nevis |
| Farah Gonul Aydin      | Turkey            | Colin McDermott         | USA               |
| Madison Barnes         | St. Kitts & Nevis | Matthijs Metselaar      | UK                |
| Heather Barron         | USA               | Tim Miller-Morgan       | USA               |
| Giana Bastos-Gomes     | Australia         | Haitham Mohammed        | Egypt             |
| Jenice Bell            | USA               | Alissa Mones            | USA               |
| Heather Bjornebo       | USA               | Danny Morick            | Israel            |
| James Bogan            | USA               | Ross Neethling          | UK                |
| Pierre-Marie Boitard   | France            | Sally Nofs              | USA               |
| Erika Brigante         | St. Kitts & Nevis | Dušan Palić             | Germany           |
| Todd Cecil             | USA               | Brian Palmeiro          | USA               |
| Bryony Chetwynd-Glover | UK                | Christine Parker-Graham | USA               |
| Dondrae Coble          | USA               | Lily Parkinson          | USA               |
| Michael Corcoran       | USA               | Ayanna Phillips         | Trinidad & Tobago |
| Emily Cornwell         | USA               | Jena Questen            | USA               |
| Rebecca Crawford       | St. Kitts & Nevis | Atisara Rangasichol     | Thailand          |
| Nadav Davidovich       | Israel            | Aimee Reed              | USA               |
| Darren Docherty        | UK                | Stephen Reichley        | USA               |
| Simon Doherty          | UK                | Komsin Sahatrakul       | Singapore         |
| Devon Dublin           | Japan             | Nick Saint-Erne         | USA               |
| Jacqueline Elliott     | USA               | Jessie Sanders          | USA               |
| Ashley Emanuele        | USA               | Sasha Saugh             | South Africa      |
| Azureen Emdan          | USA               | David Scarfe            | USA               |
| Antonella Fabrissin    | Italy             | Khalid Shahin           | UK                |
| Mohamed Faisal         | USA               | Galit Sharon            | Israel            |
| Erika First            | USA               | John Shelley            | USA               |
| Ari Fustukjian         | USA               | Chris Shirkey           | USA               |
| Christopher Good       | USA               | Constance Silbernagel   | USA               |
| Krystan Grant          | USA               | Melissa Singletary      | USA               |
| Miguel Grilo           | Portugal          | Esteban Soto            | USA               |
| Stephanie Grimmett     | UK                | Brittany Stevens        | USA               |
| Orachun Hayakijkosol   | Australia         | Win Surachetpong        | Thailand          |
| Nora Hickey            | USA               | Gillian Taylor          | South Africa      |
| John Howe              | USA               | Julius Tepper           | USA               |
| Kerryn Illes           | New Zealand       | Sharon Tiberio          | USA               |
| Jimmy Johnson          | USA               | Laura Urdes             | Romania           |
| Kasper Jorgensen       | Denmark           | Greta Van de Sompel     | Belgium           |
| Brian Joseph           | Canada            | Claudia Venegas         | Chile             |
| Parinda Kamchum        | Thailand          | Sarah Wahlstrom         | USA               |
| Fritz Karbe            | Germany           | Chris Walster           | UK                |
| Sherri Kasper          | USA               | Scott Weber             | USA               |
| Elizabeth Kaufman      | Israel            | Marcus Webster          | USA               |
| Amy Kizer              | USA               | Trista Welsh            | USA               |
| Jessica Koppien-Fox    | USA               | Peter Werkman*          | Holland           |
| Jack Kottwitz          | USA               | David Wilbur            | USA               |
| Jan Linkenhoker        | USA               | Howard Wong             | Hong Kong         |
| Eric Littman           | USA               | Taylor Yaw              | USA               |
| Richard Lloyd          | UK                | Irene Yen               | St. Kitts & Nevis |
| Richmond Loh           | Australia         |                         |                   |
| Adolf Maas             | USA               |                         |                   |
| Raphael Malbrue        | USA               |                         |                   |
| David Marancik         | Grenada           |                         |                   |



*Striped burrfish (Chilomycterus schoepfi) at the South Carolina Aquarium. Photo by Nick Saint-Erne.*

### Fellows Advisory Council

WAVMA has established a fellowship program to recognize those world-renowned veterinarians who have advanced aquatic veterinary medicine as a discipline and devoted their time and efforts to serve WAVMA's mission. The Fellows Advisory Council allows the Fellows to advise the Executive Board with guidance on WAVMA initiatives, and mentor applicants for Aquatic Veterinarian Certification (CertAqV).

Our WAVMA Distinguished Fellows are:

Dr Peter L. Merrill  
Dr Ronald J. Roberts  
Dr A. David Scarfe  
Dr Julius M. Tepper  
Dr Christopher I. Walster  
Dr Dusan Palic  
Dr Grace Karreman  
Dr Marian McLoughlin  
Dr Mohamed Faisal  
Dr Nick Saint-Erne  
Dr Richmond Loh  
Dr Laura Urdes

See: <http://www.wavma.org/wavma-fellows>.

As acting chair of the Fellows Committee, I would like to announce that **Dr. Laura Urdes** of Romania has been selected as our 2019 Distinguished Fellow inductee. Laura was president of WAVMA in 2017 and organized the fantastic WAVMA Conference and AGM in Romania during her tenure. She has been tirelessly working with WAVMA for many years, including as a member of the Executive Board, the Communications Committee and previously editing the WAVMA eNews emails. She is currently working with me as a co-editor of the text "Fundamentals of Aquatic Veterinary Medicine" to be published for the benefit of WAVMA. Please congratulate Laura Urdes as our newest Distinguished Fellow!

**Julius M. Tepper**, DVM, CertAqV  
Distinguished Fellow,  
World Aquatic Veterinary Medical Association

### Executive Board Responsibilities

The Executive Board has the responsibility for charting the course of WAVMA, fiduciary oversight of all issues, and, with input of committees, provides the oversight and approval for all WAVMA programs and services that fulfill the Mission and Objectives of the organization. The Board generally meets once a month through teleconferences, to discuss and approve WAVMA programs, services, and policies that drive the organization and issues that affect aquatic veterinary medicine. Members may submit items for discussion at the next Executive Board by contacting the [WAVMA Secretary](#).

### Education & Student Committee

ESC first meeting was held on 29th June 2019 as scheduled, with 23 members. The committee received and reviewed the application for the establishment of a WAVMA Student Chapter at Colorado State University. The full application package and approval recommendation letter was sent to President Dublin on 2nd July. The committee coordinated the review of a document with updated WAVMA ESC description. Chair Dr. Bartolomeo Gorgoglione coordinated ESC subcommittees for retrieving updated detailed info from each student chapter – work in progress.

The WebCEPD subcommittee is working on a list of people who could provide webinars for WAVMA to revitalize this valuable asset to our membership.

As a guideline for future requests, an event sponsorship request must include:

- Copy of proposed/confirmed program (with highlighted activities relevant to aquatic animals) and event schedule, logistic details, website (if available)
- Request from the interested WAVMA Student Chapter, illustrating the need and specifying their involvement
- Request for specification on how the event is supporting the educational aims of WAVMA, also including the potential number of attendees potentially interested in WAVMA membership
- Potential for WAVMA partnering with the event organizers (e.g. similar aims/membership)

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

### WAVMA VETERINARY SCHOOL CHAPTERS

<https://www.wavma.org/WAVMA-Student-Chapters>

There are 18 WAVMA Student Chapters in veterinary schools around the world. If you are a veterinary student, please join your school's WAVMA chapter, or start one if your veterinary school does not have one yet! Find out more about the veterinary school chapters on the WAVMA website, where you can download the WAVMA Student Chapter Guidelines to help create or run your own school's chapter.

Click here to get the [WAVMA Student Chapter Guidelines](#).

*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. 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!

**WAVMA Elections**

It's not too soon to think about standing for election for a 2020 officer or director on the WAVMA Executive Board. The positions of President-Elect, Secretary, Treasurer, and three directors are up for election each year. We rely on our veterinarian members to run for positions on the Executive Board to help keep the organization moving forward. The Executive Board meets monthly via GoToMeeting website and we have had board members from all around the world. It doesn't matter where you live—only that you are willing to help out!

All of the great programs and features you get from WAVMA membership are provided by volunteers. We are always looking for more helpers, whether veterinary students or graduate veterinarians, to join us on the committees as well. 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 8. Contact our Secretary or the committee chair for more information about the committee and the dates of the next meeting (also done via GoToMeeting). 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)

**Aquatic Veterinary e-Learning**  
 Supporting WAVMA's WebCEPD, PubCEPD,  
 CertAqV & Clinical Cases Programs



*WAVMA is on Facebook!*



**“Like” WAVMA's Facebook Page and join the WAVMA Facebook group to keep up-to-date with WAVMA activities and aquatic veterinary medicine topics from around the world.**

Search for WAVMA at [www.facebook.com](http://www.facebook.com).

[www.facebook.com/WAVMA](http://www.facebook.com/WAVMA)

*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. 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!

**DO YOU HAVE A STORY TO TELL ABOUT  
 HOW YOU BECAME  
 INVOLVED WITH AQUATIC  
 VETERINARY MEDICINE?**

Send your article (<1,000 words) with pictures to  
[TAVeditor@wavma.org](mailto:TAVeditor@wavma.org).

**Did you know?**

**WAVMA maintains an aquatic vet video library.** Currently the videos cover a wide range of topics, including surgical procedures, diagnostic methods and guidance on how to be an aquatic veterinarian.

The videos can be accessed at:  
<http://www.wavma.org/WAVMAs-Aquatic-Vet-Video-Library>

In addition, if you have a video that you would like to make available to other WAVMA members, kindly contact  
[WebAdmin@wavma.org](mailto:WebAdmin@wavma.org).



**Meetings Committee**

Each year, WAVMA organizes and prepares a series of lectures to create an aquatic veterinary stream at the WSAVA Congress. In 2020, this event will be held from Sept. 23- 26, in Warsaw, Poland. If you are interested in participating, please see the guidelines below. Some financial support may be available to speakers.

The World Small Animal Veterinary Association (WSAVA) Congress is attended by both veterinarians and their staff. The majority of the attendees are interested in dogs and cats primarily. We have identified a sub-group of mostly small animal and exotic animal vets with a casual to avid interest in pet fish medicine, mostly koi, and secondarily goldfish and bettas. The Scientific Committee of WSAVA must receive and approve the titles for each lecture well in advance of the meeting. If you would be interested in submitting a title or titles for review, please consider both introductory and advance topics on these species and get them to me before Oct. 15, 2019.

We are also looking for speakers for the Aquatic Veterinary Session of the Aquaculture America 2020 in Honolulu, Hawaii, February 9-12, 2020.

Abstracts for 15 or 30-minute oral presentations are invited, as this session will be offered for RACE-Approved Continuing Education for veterinarians, vet technicians/nurses and vet students. Of particular interest are presentations dealing with clinical cases and programs, services and tools that enhance aquatic veterinary practice, and fulfill aquaculture industry's and client's needs for increase production, profits and meeting regulatory requirements.

To ensure inclusion in this session, submit an abstract by October 15, 2019, on-line through WAS.org (be sure to select "Aquatic Veterinary Medicine" as the Topic) and email the abstract to the Session Coordinator (dscarfe@ameritech.net), indicating whether you prefer 15 or 30 minutes for your presentation.

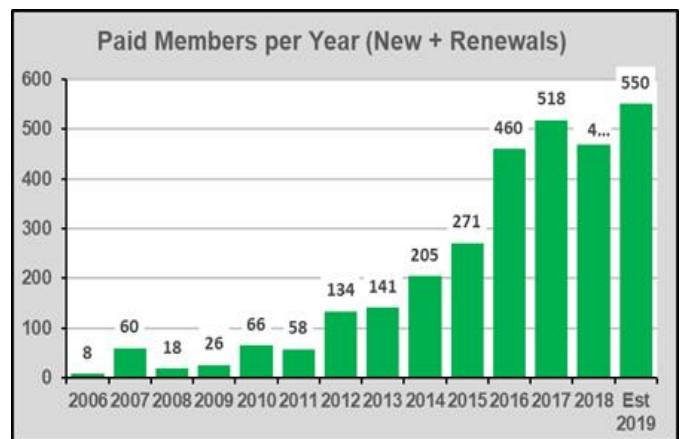
**Julius M. Tepper, DVM, CertAqV**  
Meetings Committee Chair  
WAVMA Fellow  
[cypcarpio@aol.com](mailto:cypcarpio@aol.com)



**Membership Committee**

WAVMA membership has grown each year since our inception in 2006, with the original 8 founding members. The 60 members in 2007 are considered the Charter members of WAVMA. We are continuing to grow and hope to reach 600 members next year; ten times the number of our Charter membership!

The charts below give some historical data on our membership. Slightly more than half of the members (52%) are from the United States. Australia, Canada, Saint Kitts and Nevis (Home of Ross University College of Veterinary Medicine), and the United Kingdom are the countries with the largest number of members after the USA. Overall, WAVMA has members from 85 countries around the world!



*This map of the world below shows the countries (in green) where WAVMA members live.*



We value all of our members and strive to make this organization helpful to all who want to learn more about Aquatic Veterinary Medicine.

**Chris Walster, MRCVS, CertAqV**  
Membership Committee Chair  
[chris.walster@onlinevets.co.uk](mailto:chris.walster@onlinevets.co.uk)

*Charts made by David Scarfe, DVM, CertAqV*

# *Call for Speakers*

## *Aquatic Veterinary Session*

### **Aquaculture America 2020**



**Honolulu, Hawaii**

**February 9-12, 2020**

Abstracts for 15 or 30-minute oral presentations are invited, as this session will be offered for RACE-Approved Continuing Education for veterinarians vet technicians/nurses and vet students

**Abstract Submission Deadline**  
***October 15, 2019***

Of particular interest are presentations dealing with clinical cases and programs, services and tools that enhance aquatic veterinary practice, and fulfill aquaculture industry's and client's needs for increase production, profits and meeting regulatory requirements

**To ensure inclusion in this session, by October 15, 2019:**

1. Submit an abstract on-line through [WAS.org](http://WAS.org) (be sure to select "**Aquatic Veterinary Medicine**" as the Topic),  
**and**
2. e-Mail the abstract to the Session Coordinator, indicating whether you prefer 15 or 30 minutes for your presentation  
([dscarfe@ameritech.net](mailto:dscarfe@ameritech.net))

AQUACULTURE 2020 and WAVMA are unable to subsidize registration fees, travel or hotel costs. All presenters are required to pay their own registration, accommodation and travel expenses. WAVMA members receive discount registration rates.



**WAVMA welcomes our newest Student Chapter, approved on 1st September 2019!**

Colorado State University's newly established student chapter is looking forward to providing opportunities for students to learn more about aquatic animal medicine. We already planning to host a series of events, such as a fish histopathology lab, lecture on koi medicine, and hatchery tour. We are excited to continue growing our club and appreciate WAVMA's support!

Attached is a photo of our officer team at AQUAVET. Thanks so much,

Kathryn Ziegner  
Colorado State University  
DVM Candidate, Class of 2022  
Co-President, CSU WAVMA Student Chapter  
Treasurer, Zoological Medicine Society  
Corporate Sponsor Liaison, SAVMA



The board of the WAVMA CSU Student Chapter is comprised of:  
Co-Presidents: Kathryn Ziegner & Lindsay MacDonald  
Vice President: Annie Clift  
Secretary: Amanda Vegter  
Treasurer: Danielle Scott  
Education and Outreach Coordinator: Lindsay Francis  
Faculty Advisor: Dr. Miranda Sadar.

**DO YOU HAVE A STORY TO TELL ABOUT HOW YOU BECAME INVOLVED WITH AQUATIC VETERINARY MEDICINE?**  
Send your article (<1,000 words) with pictures to:  
[TAVeditor@wavma.org](mailto:TAVeditor@wavma.org).



### Instructions for Authors and Contributors

While any information relevant to aquatic veterinary medicine might be published, we particularly invite contributions for the following regular columns in *THE AQUATIC VETERINARIAN*:

#### Colleague's Connection

An article explaining why and how a veterinarian became interested in aquatic veterinary medicine and what that veterinarian has done in their aquatic veterinary career.

#### Peer-Reviewed Articles

Original research or review of any aquatic veterinary topic. Articles will be reviewed by 3 veterinarians and comments and changes referred back to the author prior to publication. The text for an article begins with an introductory section and then is organized under the following headings:

- Materials and Methods
- Results
- Discussion (conclusions and clinical relevance)
- References (cited in the text by superscript numbers in order of citation).

#### Clinical Cases

Clear description of a distinct clinical case or situation and how it was resolved. These may be submitted for peer-review. Begin with the signalment (species, age, sex, body weight or length) of the animal or animals, followed by a chronologic description of pertinent aspects of the diagnostic examination, treatment, and outcome, and end with a brief discussion.

#### Book Reviews

Brief review of a published book, including an overview and critique of the contents and where to obtain the book.

#### Publication Abstracts

Abstracts of published veterinary and scientific journals with full citation/reference (authors, date, title, and journal volume and page numbers – ½-1 page length).

#### News

Brief synopsis or information about aquatic veteri-

nary news published elsewhere. List original source of information.

#### Legislative & Regulatory Issues

Synopsis or description of emerging legislation or regulations with information on how to access further detailed information or a link to website.

#### Meetings and Continuing Education and Professional Development (CE&PD) Opportunities

Description or synopsis of upcoming aquatic veterinary or (veterinarian-relevant) non-veterinary in-person or on-line educational meetings noting the meeting title, dates, location, and contact person or website.

#### Jobs, Internships, Externships or Residencies

Description with specific contact information for veterinary student externships and post-graduate internships or residencies at private practices, institutions, universities or organizations. Description of available full or part-time employment for aquatic veterinarians, with contact information.

#### Advertising

See advertising rates on page 4.

#### Please send articles, clinical reports, or news items to the editor by the following submission dates:

- Issue 1 – February 15 (published in March)
- Issue 2 – May 15 (published in June)
- Issue 3 – August 15 (published in September)
- Issue 4 – November 15 (published in December)

All submissions should be in 10-point Arial font, single spaced. Submissions may be edited to fit the space available.

We can also use editors to proof-read submissions or review articles. Please contact the Editor if you are interested in assisting.

The World Aquatic Veterinary Medical Association also has opportunities for members to assist with committees. Contact any member of the Executive Board to volunteer to help.



#### QUICK LINKS TO WAVMA PROGRAMS & SERVICES:

(Press control then click on item using computer mouse)

- [Online Member Directory](#)
- [Certified Aquatic Veterinarian Program \(CertAqV\)](#)
- [WebCEPD](#)
- [The Aquatic Veterinarian Journal](#)
- [Aquatic Veterinary Jobs Listing](#)
- [WAVMA Student Chapters](#)
- [Veterinary Student Externship Listing](#)
- [John L. Pitts Aquatic Veterinary Education Awards Program](#)

### **An Interview with Dr. Shane Boylan**

The South Carolina Aquarium  
 Charleston, South Carolina USA

#### **INSPIRATION:**

When did you first become interested in Aquatic Veterinary Medicine (AVM)?

I spent a lot of time with my grandfather who took me fishing often. I was probably 5 or 6 years old when I recall us catching baby blue fish "snappers," and he would open the operculum to look at the gills. He would remove the parasitic isopods saying we were helping the fish a little before returning them isopod free back into the sea. That is my first memory of aquatic animal medicine.

Who were your inspirations or instructors in AVM?

This one is easy.

I went to North Carolina State University to work on a sea turtle team, which was started and run by Dr. Greg Lewbart. During high school, I attended an open house at NCSU where I met vet students who showed me Mr. T., an eastern box turtle held together by a myriad of screws and cerclage wire. I was hooked, since I had seen many crushed turtles dying on the side of the road as a kid.

Day 1 in vet school, I introduced myself to Dr. Lewbart so I could learn from the best. I remember we did a necropsy of a stingray that first week which had amyloodinium. Dr. Lewbart had the excitement of a young child because at that time, he had not seen the dinoflagellate infect elasmobranchs. This memory is funny now 15 years later as I've battled amyloodinium in elasmobranchs quite a lot. That day taught me we are still learning about fish medicine, which is why I love this discipline. I still talk frequently to Dr. Lewbart, whether it's about fish, amphibians, reptiles, travel, fishing, and basketball depending on the occasion. He is part of my family.

I had the pleasure of also having Dr. Craig Harms as one of my instructors. He intimidates most students given his intelligence, but I've always found Dr. Harms to be very approachable. As a vet student, I helped care for some of his research projects and learned his great strength is his preparedness. He thinks through everything, plans far in advance, and gets setup early. It is something I strive to do, although my job at an aquarium doesn't allow this too often.

Dr. Harms taught me fish surgery one-on-one as a vet student. I recall I was preparing a sterile surgical field on my koi when a fly landed right where I had prepared to make an incision. I recall freezing at that moment with no idea how he would react. He said in his deep voice "flies have no respect for the sterile field," and we both laughed. After that joke, everything was calm again. That's a good teacher.

Dr. Michael Stoskopf is the last part of "my three dads" during vet school at NC State. He allowed me to attend the zoo resident rounds for my 4 years, which



was critical in my success. He taught me to read the literature, wherever that information exists, and adapt it for your purposes. There has never been a problem where he has not been able to offer some clinically useful insight. He encouraged the "out of the box" thinking that has helped me find solutions to problems that traditionally don't respond to standard medical therapies. That is most of fish medicine!

I cannot forget to mention my rotation with the University of Florida's Dr. Roy Yanong and Debbie Poudner. I did A LOT of ornamental fish medicine and learned to hone my diagnostics skills with the mentorship of the Florida Tropical Aquaculture Lab staff (FTAL). These two have become family, and we chat cases and life all the time. I really got my confidence in starting medical programs during my rotation at FTAL. I learned critical lessons in lab design and diagnostic priorities while learning fish medicine. I use the skills I learned with Roy and Debbie daily.

#### **EDUCATION:**

Where did you receive your Veterinary Degree?

NC State University CVM

Did your initial Veterinary training include Aquatic Veterinary Medicine classes? Yes, plenty!

What were your early resources (books, educational programs)? I read Noga's book *Fish Disease* starting my first year in vet school. Stoskopf's *Fish Medicine* was next.





What kind of AVM are you involved in now (food fish, pet fish, research, teaching, government, aquaculture industry, public display aquarium, others)?

Public display aquarium—The South Carolina Aquarium.

What were some of the interesting cases you have worked on?

Due to brevity issues (I was called “Not Quiet Shane” at NC State), I’ll cite some of my favorite cases I wrote up. My all time favorite case is a goliath grouper that had a ruptured swim bladder that we fixed with a blood patch. I’m still writing that paper. Here are some other interesting cases that have been written up:

Boylan SM, Harms CA, Waltzek T, Law JM, Garner M, Cassell J, Fatzinger MH, Govett P. Clinical report: hyperplastic adipose lids in mackerel scad, *Decapterus macarellus* (Cuvier). Journal of fish diseases. 2011 Dec;34(12):921-5.

Boylan SM, Camus A, Waltzek T, Yarbrough L, Miller SR, Howard S. Liquid nitrogen cryotherapy for fibromas in tarpon, *Megalops atlanticus*, Valenciennes 1847, and neoplasia in lined sea horse, *Hippocampus erectus*, Perry 1810. Journal of fish diseases. 2015 Jul;38(7):681-5.

Boylan SM, Camus A, Gaskins J, Oliverio J, Parks M, Davis A, Cassel J. Spondylosis in a green moray eel, *Gymnothorax funebris* (Ranzani 1839), with swim bladder hyperinflation. Journal of fish diseases. 2017 Jul;40(7):963-9.

**EXPERIENCE:**

What steps led you to your present work in AVM?

After doing two years of zoo medicine right out of school on my own, I learned how to work with donors to acquire equipment and build a program from scratch. When a job opened up near my family at an aquarium doing a lot of turtle work, I threw my name in the hat. Here I am 12 years later with a medical lab built with donations, including CT, ultrasound, and radiography. It has been a long development when I consider we started off with just a microscope.





**OPPORTUNITIES:**

What changes have you seen in the field of AVM during your career?

The overall increase in information with new texts being written and new diseases identified.

What advice do you have for new vets or vet students interested in AVM?

Read the books during vet school, own fish and know your water quality backwards and forwards. Definitely do rotations through aquariums and aquatic programs. I STRONGLY recommend AQUAVET.

What do you predict for the future of AVM?

As attitudes change, we are giving fish and invertebrates their due respect. As knowledge is gained about their physiology, so follows the improvements in their husbandry and medicine. It's a very exciting time. I just hope all these species are still with us in the coming decades.

Should every veterinary practitioner have some basic knowledge about aquaculture? Yes!

What knowledge should that be? (first aid, how to euthanize a fish, other)?

Euthanasia, all life deserves a painless death if it is possible.















***The South Carolina Aquarium***

*Photos by  
Nick Saint-Erne  
June 2019*

*Top left:  
denizens of the  
tide pool touch tank;  
Bottom left:  
find the flatfish;  
Top right:  
octopus finds a house;  
Bottom right:  
albino alligators.*



### South Carolina Aquarium

The South Carolina Aquarium opened on May 19, 2000 on the historic Charleston Harbor. It is home to more than ten thousand plants and animals including North American river otters, loggerhead sea turtles, alligators, great blue herons, owls, seahorses, jellyfish, pufferfish, green moray eels, horseshoe crabs, sea stars, pythons, and sharks. The largest exhibit in the zoo is the Great Ocean Tank, which extends from the first to the third floor of the Aquarium and is the deepest tank in North America (42 feet); it holds more than 385,000 US gallons (1,460,000 l) of water and contains more than 700 animals. The Aquarium also features a Touch Tank, where patrons may touch horseshoe crabs, Atlantic stingrays, and other marine animals.

The South Carolina Aquarium utilizes its facilities to operate a sea turtle hospital to help ensure that sea turtles have a future in our oceans. The South Carolina Aquarium Sea Turtle Care Center™ aids sick and injured sea turtles in partnership with the South Carolina Department of Natural Resources (SCDNR). The SCDNR transports injured or stranded sea turtles to the hospital, after which aquarium staff and volunteers nurture the animals back to health.

A staff veterinarian can perform surgery, administer x-rays, IVs, and even provide blood transfusions to turtles that are severely anemic. As of fall 2017, a CT scanner provides Sea Turtle Care Center staff with additional capabilities. Zucker Family Sea Turtle Recovery doubled the Aquarium's capacity for treating sick and injured sea turtle patients.

Rehabilitated turtles are taken to a local beach and allowed to return to the ocean once the South Carolina Department of Natural Resources clears them for release. The average turnaround time for an injured turtle is 7–8 months. The South Carolina Aquarium has rehabilitated and released over 278 sea turtles since 2000. The McNair Center for Sea Turtle Research and Conservation serves as the Aquarium's in-house research facility especially for sea turtle knowledge.

Every stage of the turtles' journey home, from the moment they arrive at the hospital to the moment they return to the ocean, would not be possible without the support of many contributors and volunteers. The preservation of these charismatic animals is critical to the health of the marine ecosystem.

### South Carolina Aquarium

100 Aquarium Wharf  
Charleston, SC 29401

Tel. (843) 577-FISH (3474)  
Toll Free: (800) 722-6455  
[information@scaquarium.org](mailto:information@scaquarium.org)

<https://www.scaquarium.org/>



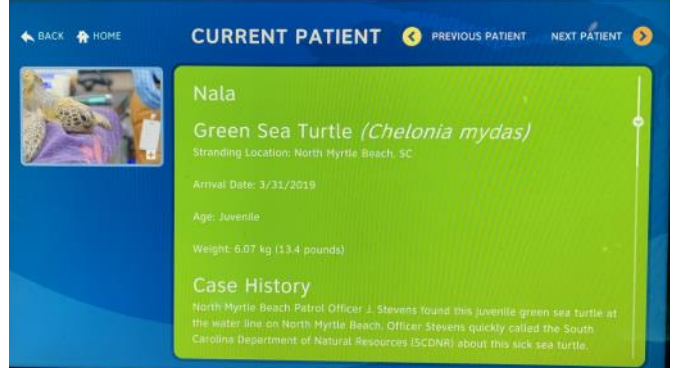
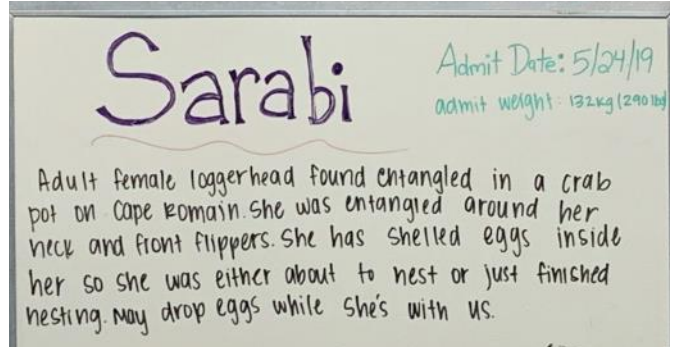
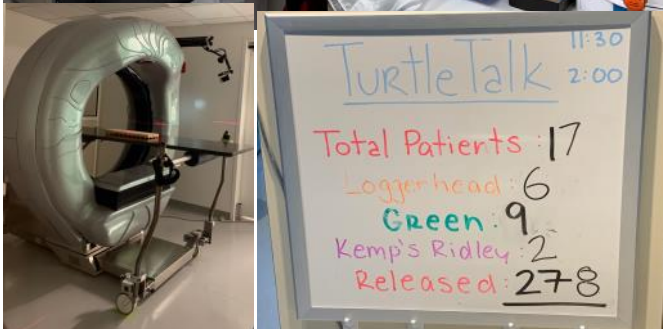


McNair Center for Sea Turtle Conservation



With Zucker Family Sea Turtle Recovery™, we've done everything to ensure that we provide the best care for sea turtles while they're at the South Carolina Aquarium, but we know their journey doesn't end here. That's why we've also committed ourselves to protecting sea turtles worldwide through the work of the McNair Center for Sea Turtle Conservation and Research.

The new McNair Center will serve as the Aquarium's in-house research facility for sea turtle information. We'll take what we've learned from 16 years of patient injuries and illnesses, and present it to the scientific community so that researchers all over the world can benefit from our knowledge and experience.





**2019 John L. Pitts Aquatic Education Award Report**  
By Bryony Chetwynd-Glover

Following graduation from Bristol University in 2017 with a degree in Veterinary Science, I have constantly been on the lookout for further education and opportunities within the aquatic veterinary field. I have a particular interest in the health and medicine of ornamental fish and species found in public aquaria, both of which are rather small areas of aquatic interest at home in the UK.

In late 2018, the opportunity came up following conversations with Dr Richmond Loh for me to travel to Perth, Australia to take part in an intensive four-day masterclass in fish health and medicine. I jumped at the opportunity and myself and Dr Arad from Massachusetts in America were the first two vets to take part in Dr Loh's fish health masterclass. The masterclass was set over four days and designed to cover most aspects of fish health and medicine. The course included both theoretical and practical work with discussion driven learning, lectures, wet labs, site visits, patient consultations and observing his university teaching. Here is what I got up to....

**Day 1:**

I had arrived in Perth the previous evening and started the first day by meeting Dr Richmond Loh and Dr Arad for the first time. After a quick introduction, the morning was spent covering introductory topics such as fish anatomy, water quality and how to pursue a career within aquatic medicine.

Dr Arad and myself had been asked by Dr Loh to prepare a list of subjects and areas we would like him to cover and concentrate on. I personally was very interested in developing my practical skills and wanted to become more confident in diagnostics and choosing appropriate treatment or therapeutic protocols. I was also very keen to learn more about how I could set up a mobile aquatic practice of my own, back in the UK. For this reason, I found one of the morning sessions picking apart Dr Loh's 'fish mobile' very insightful.

After lunch we visited three sites – a koi hobbyist, an aquatic retail store and a koi retail facility. All visits were really interactive, we conducted a 'walk round' with the owner or manager. We were able to discuss the facility in detail including some of the common issues and diseases they face and how they best treat and deal with such situations. We would also look at the filtration and life support systems present (Fig 1) at the facilities, which having only worked with small scale aquatic systems myself in the past, was very interesting to learn about and visualise.

After dinner, we were back to Dr Loh's family home for more practical work (Fig 2). We both had a large koi to necropsy and practice some clinical skills on. These skills included taking gill clips and skin scrapes, taking swabs from the kidney for bacterial culture, taking blood from the tail vein and running through the steps



*Figure 1:  
Inspecting and learning about a drum filter at one of the site visits*



*Figure 2:  
Late night necropsy and clinical skills session.  
The carcasses were of fish euthanised on humane grounds, and retained frozen for us.*



*Figure 3:  
Calculating and weighing out anaesthetic.*

of enucleation and gastric tubing. We also got to practice the treatment protocol for cutaneous ulcers. Having had several ulcer cases already through my first job, I found this particularly valuable.

**Day 2:**

Another action-packed day, today things were kicked off with a visit to one of Dr Loh's clients who had a koi with an aggressive oral mass. It was great to see a consultation in action and how Dr Loh constructed the consultation from start to finish, including how the consultation was booked and billed. Myself and Dr Arad were able to get involved and assisted by calculating anaesthetic and medication doses (Fig 3). We then got to observe cryotherapy of the oral mass where Dr Loh used a novel technique of using an 'over the counter' product intended for the use of freezing off verruca and warts.

It felt like not a minute was wasted on this course, in between visits during travel in the car, myself and Dr Arad would watch Dr Loh's "Fish Vetting Techniques and Practical Tips" on the in-car DVD player, or sit up front with Dr Loh and discuss cases. Back at the house, Dr Loh pulled out his collection of formalin-fixed specimens of fish pathology. The session was discussion led, revolving around the specimens and associated treatments. It was useful to see what the lesions looked like up close.

The rest of the day was spent furthering our practical skills learnt the day before on some of Dr Loh's fish in the garden pond. (Fig 4) I think it had become clear to Dr Loh from the previous day that our fish catching technique needed some work, so a lot of emphasis was put on catching the fish today!



Figure 4: Not as easy as it looks!

**Day 3:**

We were late starting the intended schedule for day three as overnight one of Dr Loh's koi had jumped from the pond and required urgent treatment that morning. Rather luckily or unluckily for the fish, this was a perfect opportunity for myself and Dr Arad to put into practice what we had learnt so far on the course. The fish under our care had numerous raking injuries and abrasions to the skin from contact with the ground surrounding the pond. When first found, the fish was barely breathing. Dr Loh first revived the fish by placing under a stream of water from a water feature in the original pond to help stimulate respiration. Under Dr Loh's supervision, myself and Dr Arad composed a treatment plan. Our medical intervention consisted of:

- Enrofloxacin (10 mg/kg BW) IP (intraperitoneal)
- Vitamin B12 (20 mg/kg BW) IM (Intramuscular)
- Flunixin meglumine (0.5 mg/kg BW) IM
- Dexamethasone (1 mg/kg BW) IM

Following this, we headed to our first visit of the day, to a koi farm and breeder (Fig 5). Here we got to practice our clinical skills with water quality testing and analysis of gill biopsies and skin mucous scrapes. We also acquired some fish for a short research project we were to conduct later that day. Dr Loh was keen to investigate whether adding formalin or hydrogen peroxide to bags with purchased fish at point of sale could help prevent the introduction of parasites to the soon to be new home of the fish. At the facility we found several black moor goldfish with the monogenean ectoparasite, *Gyrodactylus*. With permission from the owner we took three of these fish and transported them 'home' over 40 minutes with one of three treatment types:

- 1) a bag dosed with 0.25 ml/L of 3% peroxide
- 2) bag dosed with 0.0125 ml/L formalin
- 3) control bag with no treatment.

Dr Loh and the owner of the facility were particularly interested in hydrogen peroxide as the additive because it can also be used to boost dissolved oxygen levels. If the small study were to show success of using peroxide, this could be very useful to the owner of the facility, who often exports koi long distances by air.



Figure 5:  
Dr Arad and myself in discussion  
with the owner of the koi farm.



The afternoon and evening were spent conducting our experiment and collecting the results. Following the 40-minute transport time, the fish were skin scraped to look for parasites. In a brief summary, at those dose rates, hydrogen peroxide had little to no effect on parasitic numbers, whereas formalin showed to be more effective with no parasites found post-travel. From our very limited and small-scale experiment, formalin could be added to bags at check-out to help reduce the risk of external parasitic spread. Although very limited and small-scale, it was great to take part in. I particularly enjoyed the real-life application of the results.

The day was concluded by watching the sun set in Fremantle whilst discussing a few business-based subjects over a couple of beers (Fig 6).



Figure 6: Fremantle for sunset, beer and business talks!

#### Day 4:

Last day of the course and it was unreal how much information I had already taken on board this week. I had come with the intention of “downloading Dr Loh’s brain” and I truly felt like I had done this! I was pleased to see our three ‘guinea pigs’ from the previous day had settled into their new home very well. Unfortunately, the pond jumper we had been treating needed further attention as he was still quite lethargic and inappetent. We decided to use a gastric tube to give some food with vitamin C and repeat some of the injectable medications.

The majority of our final day was completed by finishing up on some of the subjects we hadn’t covered yet. Being a small group, the timetable had been fairly flexible, allowing us to talk in as little or as much depth on a subject as we liked. Later that evening, myself

and Dr Arad were fortunate enough to sit in on a WAVMA student chapter fish histopathology session held at Murdoch University, run by Dr Richmond Loh and Dr Susan Gibson-Kueh (Fig 7). The session was interactive and comprehensive, covering many aspects of laboratory-based fish diagnostics. Following this session, we had our final farewell dinner in central Perth before visiting Kings Park at sunset to see the beautiful panoramic views of the city.

The course had been fantastic and exactly what I was hoping for. I felt I had a much better understanding and knowledge-base than prior to the course, and that my practical skills had improved exponentially. As a bonus, we were also given complimentary copies of Dr Loh’s publications: *Fish Vetting Essentials* (covers veterinary aspects of fish health and

diseases), *Fish Vetting Medicines* (formulary book) and *Fish Vetting Techniques and Practical Tips* (instructional DVD). Most importantly, the course had reignited my enthusiasm and determination to continue my pursuit of achieving a career within aquatic animal health back home in the UK.

Fast forward to the present day and I am excited to say that off the back of this masterclass, I have setup my own mobile aquatic veterinary practice, London Aquatic Veterinary Services. I am delighted to be working in association with Dr Loh’s *The Fish Vet*, becoming the newest, British division of the team (Fig 8 and 9). I have taken so much away from the masterclass and have been able to put everything that I have learnt into practice.

Thank you to Dr Richmond Loh for firstly putting on such a brilliant masterclass but secondly for being a great ongoing colleague and mentor. Thank you again to the John L. Pitts Aquatic Veterinary Educa-





Figure 7:  
Murdoch University's WAVMA Student Chapter Fish histopathology session run by Dr Susan Gibson-Kueh (pictured) and Dr Richmond Loh.

tion award, coordinators and donors. In my case, the award has well and truly achieved some of its objectives of encouraging and supporting new graduates to enable them to explore a career within aquatic veterinary medicine, so thank you!



Figure 8: Newest member of The Fish Vet team!



Figure 9: London Aquatic Veterinary Services open for business! [www.londonaquaticvet.com](http://www.londonaquaticvet.com)

**2019 John L. Pitts Aquatic Education Award Report**

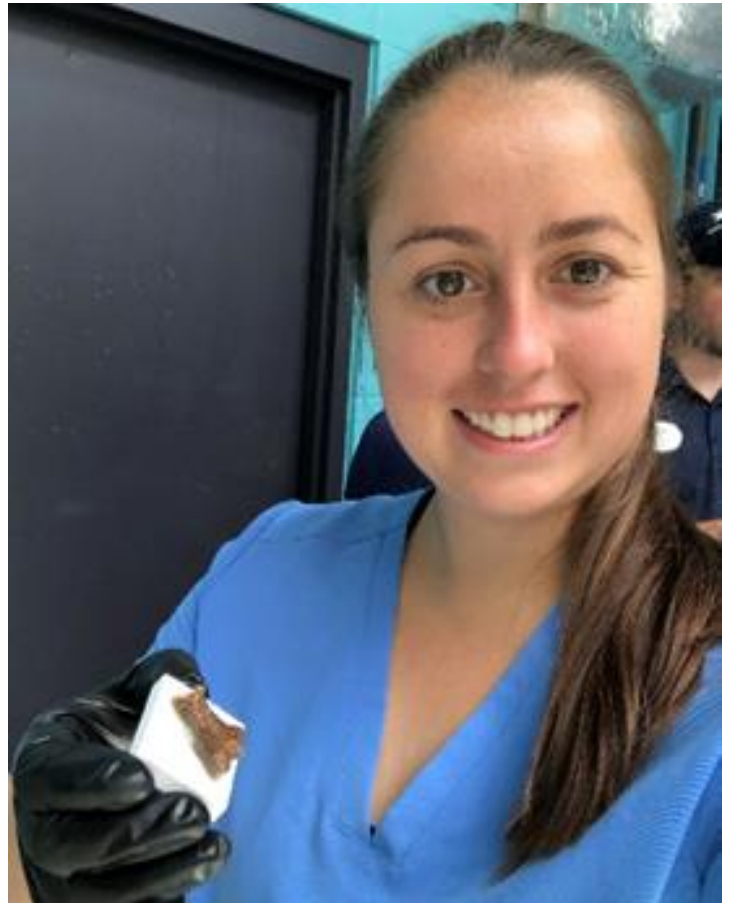
By Elizabeth St. Germaine  
 Western University of Health Science  
 College of Veterinary Medicine, Class of 2021

My name is Elizabeth St. Germaine and I am a 3<sup>rd</sup> year veterinary student at Western University of Health Sciences in California. It was an honor to be chosen as a 2019 John L. Pitts Aquatic Veterinary Education Awards recipient. The support provided through this scholarship helped me to defray some of the tuition costs of attending AQUAVET® III from June 23–July 28, 2019. The AQP3 program was an intense 5-week course focused on the clinical aspect of captive aquatic animal medicine.

The first two weeks were taught at the Georgia Aquarium, where the focus was on aquarium medicine. We performed and observed clinical techniques of anesthesia, behavioral conditioning, diagnostic lab work, endoscopy, necropsies, physical examinations, radiographs, restraint, ultrasound, and venipuncture on various aquatic animal species. One of the aspects that I highly appreciated was the quality of care provided to all animals, no matter the species, and the staff always have the best interest of the animal in mind with a strong emphasis placed on animal welfare. Before a blink of the eye our time with the Georgia Aquarium team was over and we made our way to Athens, Georgia.

The third week was taught at the University of Georgia, with a focus on endoscopy and surgery in fish and reptiles. This training was extremely valuable as working with endoscopy equipment is often not taught in veterinary school and many students do not have the chance to perform surgery on aquatic animals. Aside from the hands-on activities during this week, all the students provided a 55-minute seminar presentation. I delivered my presentation on anesthesia in marine mammals focusing on pinnipeds and the differences between the three families: Odobenidae (walrus), Otariidae (sea lions and fur seals), and Phocidae (true seals). Now with our presentations completed and some experience in surgery and endoscopy on fish and reptiles, we left the United States to head to Mexico.

The last two weeks were taught at three Dolphinaris facilities (Cancun, Riviera Maya, and Cozumel) in Mexico, where the focus was on dolphin medicine and training. We performed and observed clinical techniques that included behavioral conditioning, endoscopy, physical examinations, sample collection and analysis, and ultrasound. The most valuable part of these last few weeks was the amount of hands-on training with ultrasound and observing the voluntary behaviors that the dolphins had been trained to present for medical procedures.





The experiences at the Georgia Aquarium and Dolphinaris truly highlighted the importance of communication and relationships. Strong relationships between the veterinary team and animal caretakers/trainers allows for the highest quality of care for the animals. It is through the relationships that the animal care team has with their animals that alerts the veterinary team of the slightest change in behavior. With this information a plan is communicated and trust between the animals and caretakers allows for the completion of necessary diagnostic testing.

Along with communicating within the staff team, there is a lot of communication with the general public. The Georgia Aquarium and Dolphinaris provide great educational opportunities to their visitors, which educate them about animal welfare, conservation, and ocean health. Through these experiences I was not only able to build relationships with staff members from each of these facilities, but also with my fellow AQUAVET® III classmates from around the world.

Overall, the opportunity to participate in AQUAVET® III was an amazing experience that I will reflect on frequently. I'm extremely grateful for the support I received and want to thank the John L. Pitts Aquatic Veterinary Education Awards scholarship committee again, because without your support I would not have been able to participate. Opportunities outside of the classroom like the AQUAVET® III program allow me and other students to gain valuable technical skills and knowledge in the aquatic animal medicine field for our future success. I look forward to exploring future opportunities in aquatic animal medicine!



*Above:*  
*AQUAVET III Students*

*Below:*  
*Students and Faculty  
 at Dolphinaris in Mexico.*





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

**Trichodina Treatments**

Hi everybody,

I have a tough case with a koi pond. A resurgence this year of a previously controlled (low level) infestation of *Trichodina* protozoa in an 8000 gal. (30,000 l.) koi pond was unaffected by prolonged salt treatment at 0.6%. A second treatment with Proform-C (Malachite green and formalin) proved equally ineffective. Sampling was done shortly after treatment, so it is not likely that the problem is simply reproduction of new parasites. Anyone have any suggestions?

Thanks,

**Julius M. Tepper, DVM, CertAqV**  
 Fellow, World Aquatic Veterinary Medical Association  
[Cypcarpio@aol.com](mailto:Cypcarpio@aol.com)

Formalin and malachite green should be a good treatment for *Trichodina*. I use the 37% formalin solution at 1 ounce per 300 gallons of water (1 ml/10 gallons, or 1 ml/38 L). The Proform-C is a diluted version of formalin (% formalin), so your dose may not have been high enough. The label dose for Proform-C is 1 ml/10 gallons (the same as the full concentration product), so it is being used at a much lower dose due to the decreased concentration of formalin. You should be able to increase the dose, providing adequate aeration, and see better effect. Dilute out the salt concentration first before using higher doses of formalin.

**Nick Saint-Erne, DVM, CertAqV**  
 Certified Aquatic Veterinarian  
 Fellow, World Aquatic Veterinary Medical Association  
[nsainterne@gmail.com](mailto:nsainterne@gmail.com)

I have never had any success with FMG (formalin/malachite: 5 grams per liter, dose 20 ml per m<sup>3</sup>) nor with FMC (formalin/malachite/methylene: 5 g per liter, dose 20ml per m<sup>3</sup>) treatment for *Trichodina*. Instead I use potassium permanganate (minimum 2 ppm), or if temperature is higher and/or sturgeon in the pond Alparex/Omnipur (Colombo, Sera, based on malachite and acriflavine). By microscope you might see some *Trichodina* having a thicker outer layer, suggesting it might be more resistant to treatments.

If you use formalin based treatments, I would also suggest not to treat with it with a salinity at 6 ppm salt, for PP I would advise the same (I would use such treatments if salt is lower than 3 ppm). For the malachite/acriflavine treatment, salt at 3 ppm improves the treatment.

Good luck

**Tim Barbé, DVM**  
 Belgium

I usually don't treat mild infestations of *Trichodina* in Koi. If we have heavy infestations with clinical signs (or *Trichodinella* sp. on the gills) we use potassium permanganate. On day 1: 2g/m<sup>3</sup>, and on day 3: 1.5g/m<sup>3</sup>. Neutralize after 4 hours with sodium percarbonate (15g/m<sup>3</sup>) after each dose. This usually works well. However, to completely eradicate *Trichodina* in an outdoor pond with plants / biofilter is in my experience nearly impossible.

We never combine potassium permanganate with salt at a concentration of more than 1 ppt salinity (0.1% salt) and are careful if there are a lot of algae, due to oxygen consumption by decomposing algae. Good aeration is very important. Good thing about potassium permanganate: in case of problems it can immediately be neutralized with H<sub>2</sub>O<sub>2</sub> / sodium percarbonate.

Good luck,

**Ralph Knüsel, Dr. med. vet.**  
 fishdoc GmbH            mobil: +41 79 820 42 43  
 Schaubhus 1            office: +41 41 458 12 00  
 CH-6026 Rain            email: [info@fishdoc.ch](mailto:info@fishdoc.ch)  
 Schweiz                web: [www.fishdoc.ch](http://www.fishdoc.ch)

**Information about Proform-C**

ProForm-C<sup>®</sup> is a broad-spectrum treatment that is safe and effective for the control of diseases caused by *Ichthyophthirius* (ich), *Costia*, *Trichodina*, *Chilodonella*, *Oodinium* and fungal infections. It is a malachite green and formalin combination that is considerably less toxic to koi and goldfish than other similar products available in the market. It is formulated differently than any other malachite green & formalin mixtures.

What makes ProForm-C the preeminent product in this field is the fact that it is formulated with malachite green chloride, while all other MG&F products use the oxalate salt form, which is more toxic than the chloride form. As with any malachite green & formalin treatment do NOT use with salt levels above 0.05%.

ProForm-C<sup>™</sup> is a concentrated formulation of formalin and malachite green. It is based upon the famous Leteux-Meyer formulation, published in 1973, for treating *Ichthyophthirius* ("ich") on scaleless catfishes. Leteux and Meyer found that the formulation they developed was not only more effective in treating this ubiquitous disease, but it was less toxic to the treated fishes than either drug used separately. This is the definition of synergism.

AquaScience Research Group, Inc., improved upon the Leteux-Meyer formulation by utilizing malachite green chloride instead of the commonly used malachite green oxalate. The chloride form is less toxic than the oxalate form. ProForm-C<sup>™</sup> is also useful in the treatment of other protozoan caused diseases of fishes as well as fungal infections.



*Available in quarts (treats a 3,200 gallon system three times) and gallons (treats a 12,800 gallon system three times).*

**DOSAGE:**

ProForm-C™ is dosed at a rate of 1 mL per 10 gallons of water. One teaspoonful (≈5 mL) will treat 50 gallons of water. This produces a nominal concentration of 0.05 mg/L of malachite green and 15 mg/L of formalin.

Required treatment time is generally 3 days and bypassing the biofilter is not required. One quart treats a 3,200-gallon system three times and one gallon treats a 12,800-gallon system three times. For use with koi only—not for food fish.

**TRICHODINIASIS:**

This disease usually involves protozoa parasites on the gills and skin of the affected fishes. The diseased fishes produce excessive amounts of skin slime which causes a whitish cast to the skin color. Disease that is limited to the gills can cause severe respiratory distress. In koi, the disease may be limited to the gills. Use the standard treatment regime for ProForm-C™.

Koi Care Kennel  
5062 Gillingham Circle  
Westminster, CA USA 92683  
714.379.1623 fax: 714.379.1623  
website: [www.lymnozyme.com](http://www.lymnozyme.com)  
email: [koicarekennel@gmail.com](mailto:koicarekennel@gmail.com)

*Pro-Form-C® is a registered Trademark of Koi Care Kennel, Inc.*

<http://www.koicarekennel.com/Parasite-Treatments-Koi-Care-Kennel-Product-Line-sc-10.html>

**Trichodina Protozoa**

Several genera (*Trichodina*, *Trichodonella*, *Tripartiella*) of similar protozoa cause this disease. They are peritrichously ciliated, circular parasites (40-100 µm diameter) that are flattened ventrally. They reproduce by binary fission and have a direct life cycle. They are freely motile on the surface of the fish and can swim through the water. They live on the skin and gills of the fish, where they damage tissue with their rotating denticular (toothed) ring.

Affected fish may produce excessive mucus and develop a white cast to the skin. Small hemorrhages may appear on the skin and fins. Formalin/malachite green solution is effective in killing these parasites. Individually infested fish may be bathed in a 2% salt solution (20 g NaCl/liter water) for 5-10 minutes to remove these parasites. Decreasing organic debris and stocking densities will reduce risk of infestation.

Excerpt from *Advanced Koi Care*, 2nd edition, 2010, by Nicholas Saint-Erne, DVM.



*Side view of a Trichodina on a koi gill and a ventral view showing the denticular ring and peritrichous cilia. Photos by Nick Saint-Erne*





### Aquatic Veterinary Abstracts: Sea Turtles

Compiled by David Scarfe

#### Blood analytes of oceanic-juvenile loggerhead sea turtles (*Caretta caretta*) from Azorean waters: Reference intervals, size-relevant correlations and comparisons to neritic loggerheads from western Atlantic coastal waters

By Stacy, Nicole; Bjorndal, Karen; Perrault, Justin; Martins, Helen and Bolten, Alan.

*Conservation Physiology*. 6(10) 2018

#### Abstract

Blood analyte reference intervals are scarce for immature life stages of the loggerhead sea turtle (*Caretta caretta*). The objectives of this study were to (1) document reference intervals of packed cell volume (PCV) and 20 plasma chemistry analytes from wild oceanic-juvenile stage loggerhead turtles from Azorean waters, (2) investigate correlations with body size (minimum straight carapace length: SCLmin) and (3) compare plasma chemistry data to those from older, larger neritic juveniles (<80 cm SCLmin) and adult loggerheads (≥80 cm SCLmin) that have recruited to the West Atlantic in waters around Cape Canaveral, Florida.

Twenty-eight Azorean loggerhead turtles with SCLmin of 17.6–60.0 cm (mean 34.9 ± 12.1 cm) were captured, sampled and immediately released. Reference intervals are reported. There were several biologically relevant correlations of blood analytes with SCLmin: positive correlations of PCV, proteins and triglycerides with SCLmin indicated somatic growth, increasing diving activity and/or diet; negative correlations of tissue enzymes with SCLmin suggested faster growth at smaller turtle size, while negative correlations of electrolytes with SCLmin indicated differences in diet, environmental conditions and/or osmoregulation unique to the geographic location.

Comparisons of loggerhead turtles from the Azores (i.e. oceanic) and Cape Canaveral (i.e. neritic) identified significant differences regarding diet, somatic growth, and/or environment: in Azorean turtles, albumin, triglycerides and bilirubin increased with SCLmin, while alkaline phosphatase, lactate dehydrogenase and sodium decreased. In larger neritic Cape Canaveral turtles, aspartate aminotransferase increased with SCLmin, while the albumin:globulin ratio, phosphorus and cholesterol decreased. These differences suggest unique physiological disparities between life stage development and migration, reflecting biological and habitat differences between the two populations. This information presents biologically important data that is applicable to stranded individual turtles and to the population level, a tool for the development of conservation strategies, and a baseline for future temporal and spatial investigations of the Azorean loggerhead sea turtle population.

#### Blood biochemistry and haematology of migrating loggerhead turtles (*Caretta caretta*) in the Northwest Atlantic: Reference intervals and intra-population comparisons

By Tiffany Yang, Heather L Haas, Samir H. Patel and Ronald J. Smolowitz

*Conservation Physiology* 7(1) 2019

#### Abstract

We documented blood biochemistry and haematology of healthy loggerhead turtles (*Caretta caretta*) in the Northwest (NW) Atlantic in order to establish clinical reference intervals (RIs) for this threatened population. Blood samples were analysed from migratory loggerheads captured off the Mid-Atlantic coast of the USA in 2011, 2012, 2013 and 2016 as part of a long-term research program. Blood variables were determined using a point-of-care analyser, and a veterinary diagnostic laboratory service. We calculated 95% RIs with associated 90% confidence intervals (CIs) for each blood variable. We compared results obtained from our study of migratory loggerheads with published data for similarly sized loggerheads resident at a seasonal temperate latitude foraging area.

Significant differences in several blood variables between migratory and resident turtles provided insight on energetic and health status during different behavioural states. Temperature was significantly correlated with several blood variables: lactate, pCO<sub>2</sub>, sodium, haemoglobin and lactate dehydrogenase. Our assessment of blood chemistry in healthy loggerhead turtles in the NW Atlantic provides a baseline for clinical comparisons with turtles impacted by anthropogenic and environmental threats, and highlights the importance of identifying unique aspects of biochemical and haematological profiles for sea turtles at the intra-population level.

*Loggerhead Sea Turtle (Caretta caretta),*

Photo by Brian Gratwicke -

<https://commons.wikimedia.org/>



**Physiological changes in post-hatchling green turtles (*Chelonia mydas*) following short-term fasting: implications for release protocols**

By Duane Tomas March, Ellen Ariel, Suzy Munns and Brendan Kelaher

[\*Conservation Physiology\*](#) 7(1) 2019

**Abstract**

Relocation of sea turtle nests and the retention of post-hatchlings for head-starting programs are both commonly used to improve conservation outcomes and facilitate eco-tourism ventures. Currently, there is little literature surrounding the husbandry protocols required during these programs to optimize post-release outcomes. To assess the impact of varied feeding regimes on exercise performance, (which will hereafter be referred to as 'fitness'), forty 10-month-old captive post-hatchling green turtles (*Chelonia mydas*) were divided into four groups of 10 and fasted for either 3, 9, 10 or 15 h. The animals were then subjected to a fitness test via repetitive use of the 'righting reflex' on land.

Health assessments were conducted prior to the fitness test, including; heart rate, haematocrit (Hct), heterophil to lymphocyte ratio and the measurement of 11 biochemical analytes, including pH, partial pressures of carbon dioxide (PvCO<sub>2</sub>) and oxygen (PvO<sub>2</sub>), lactate, bicarbonate (HCO<sub>3</sub><sup>+</sup>), sodium (Na<sup>+</sup>), potassium (K<sup>+</sup>), chloride (Cl<sup>-</sup>), ionized calcium (iCa<sup>2-</sup>), glucose and urea. Results were corrected for multiple comparisons and significant differences among groups were demonstrated for temperature, pH, HCO<sub>3</sub><sup>+</sup>, iCa<sup>2</sup>, urea and lactate.

To investigate physiological relationships between analytes, correlation coefficients were calculated between fitness and glucose, fitness and lactate, glucose and lactate, pH and iCa<sup>2-</sup>, pH and K<sup>+</sup>, pH and PvCO<sub>2</sub>, pH and HCO<sub>3</sub><sup>+</sup> and Hct and K<sup>+</sup>. Following correction for multiple comparisons, significant relationships were seen between pH and iCa<sup>2-</sup> and pH and HCO<sub>3</sub><sup>+</sup>. Post-hatchling turtles appear to enter a catabolic state when exposed to short-term fasting. While this did not have a direct impact on fitness, the production of an intense energetic output from a catabolic state may induce a physiological debt. This study suggests that handling that induces a physical response should be minimized and animals should be fed within 10 hours of release.



*A green sea turtle swimming above a Hawaiian coral reef; photo from Wikipedia*

**Book Review**

***Sea Turtle Health & Rehabilitation***

Charles A. Manire, DVM,  
Terry M. Norton, DVM, DACZM,  
Brian A. Stacy, DVM, PhD, DACVP,  
Charles J. Innis, VMD, DABVP &  
Craig A. Harms, DVM, PhD, DACZM  
1,009 pages. 2017. J. Ross Publishing.  
ISBN 978-1-60427-099-0. 1,009 pages.  
Price \$295.00.

Not since Ettinger's volumes of internal medicine have I felt such awe. *Sea Turtle Health & Rehabilitation* is over a thousand pages dedicated to care of the 7 sea turtle species. As a natural history library crawler, I cannot name another nondomestic species that has received such treatment. This book is a labor of love, and the authors use well-grounded evidence-based terms.

Medical science evolved by the study of mammals that are terrestrial, warm-blooded, and fresh-water dependent. The subject of this book is an aquatic denizen that is cold-blooded, lives in salt water, and has outlived the dinosaurs. The book is organized into sections that allow readers to explore the topic from different angles, such as basic biology, medicine by organ system, medicine by pathogen, medicine by clinical presentation, procedural techniques, and special topics.

Subheadings within the extensive table of contents allow for rapid identification of relevant sections. The index consists of only 10 pages, which seems inadequate for such a large book, but the table of contents allows readers to rapidly access information. There are relevant figures and ample references throughout the book. The appendices and numerous web-based report forms provide useful rapid-access tools to assist clinical practice.

If the book has a flaw, it is that basic information and procedures are exhaustively explained. This book would be more mobile if it weighed less; however, each section contains veterinary truths and appropriate guidance. This book will make an excellent field manual for a large backpack.

Sea turtles are found in all oceans, so I hope the authors and publisher find a suitable electronic or app-based tool to disseminate this book to every shore where sea turtles are found.

Reviewed by Thomas W. de Maar, DVM  
Gladys Porter Zoo/Sea Turtle Inc.,  
Brownsville, TX, USA



**Aquatic Veterinary Medicine**

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The information on this website is provide by the AVMA Aquatic Veterinary Medicine Committee and is intended to assist veterinarians expand their opportunities in one of the fastest growing disciplines of veterinary medicine.

- [Videos & Podcasts](#)
- [Legislation & Regulations](#)
- [Aquatic Policies](#)

From:

<https://www.avma.org/KB/Resources/Reference/aquatic/Pages/default.aspx>

**Aquatic Veterinary Medicine Programs**

Aquatic veterinary medicine is emerging as a niche field of study within veterinary schools, but as the International Association for Aquatic Animal Medicine (IAAAM) points out: “No veterinary college has a comprehensive program for specializing in aquatic or marine mammal medicine.” That’s because the typical veterinary college is built around a generalized four-year program focusing on cat, dog, cow and horse medicine, but some may have elective or specialized training available in non-domestic species, such as amphibian, fish, reptiles, pet birds and even poultry, according to the IAAAM.

Students interested in aquatic medicine can turn to post-DVM work, like fellowships in aquatic or fish medicine, to gain more skills in the field. They could also seek employment opportunities in aquatic medicine, although these positions are typically hard to come by especially fresh out of school, reports the IAAAM. Another alternative suggested by the IAAAM includes gaining experience in private practice and then applying for an aquatic medicine internship in a place like the National Aquarium in Baltimore, the Florida Aquarium or another site.

Education, practical experience and volunteering can go a long way, according to the IAAAM, and to that end, we have put together a list of five outstanding aquatic veterinary programs. These are noteworthy simply for the aquatic animal health programs and services they offer. We have done our best to provide some of the most fundamental details about these programs, but offerings do vary as do the details and types of information readily available online.

- Cornell University - AQUAVET
- University of Florida
- The University of California, Davis
- The Ohio State University

Oregon State University has an Aquatic Animal Health Program available through the Hatfield Marine Science Center in Newport, Ore.

Finally, students who may be interested in the aquatic veterinary medicine field may want to consider certification offered through the American Fisheries Society. Indeed, the two certifications are available and include: the Certified Fish Pathologist and Certified Aquatic Animal Health Inspector. DVM graduates may also be interested in joining the World Aquatic Veterinary Medicine Association and eventually becoming eligible to seek board certification through the American College of Zoological Medicine.

For complete article, go to:

<https://www.vettechcolleges.com/blog/Outstanding-Aquatic-Veterinary-Programs>

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### What Does an Aquatic Veterinarian Do?

BY MARY HOPE KRAMER

June 03, 2019

Aquatic veterinarians are practitioners who specialize in the health management of marine animals and invertebrates. They are licensed animal health professionals who are qualified to diagnose and treat a wide variety of marine species that include fish, marine mammals, sea turtles, and other wildlife.

Veterinarians are accredited by federal agencies to diagnose illnesses, prescribe treatment, and implement programs for the prevention and control of disease in all marine animal species.

The typical routine for an aquatic veterinarian can vary depending on the type of marine animals they treat. General duties include: conducting basic exams and evaluations, taking samples of blood, prescribing medications, treating illnesses, handling animal emergencies, performing surgical procedures when necessary, ensuring that medical records of animals' treatments are correct and current, supervising veterinary technicians or other support staff

Aquatic veterinarians provide health care for different types of marine animals such as fish, sea lions, whales, dolphins and turtles, as well as invertebrate animals such as jellyfish, lobsters, and octopus. They may work in zoos, aquariums, or museums, or out in the field on ships, tending to patients with a variety of needs to keep them healthy. Their work may come with challenges such as tending to animals in the water while handling medical equipment; or dealing with an animal that is frightened, irritable, or heavy.

The limited number of graduates from vet programs should ensure excellent job prospects in the field of veterinary medicine. According to the U.S. Bureau of Labor Statistics, employment of veterinarians is projected to grow 19% until 2026, much faster than the average for all occupations. As a result of the rapidly expanding aquaculture industry and strong popular interest in marine parks and aquariums, the demand for aquatic veterinary services should continue to increase at a healthy rate for the foreseeable future.

Aquatic veterinarians may work in private practice, but they most frequently work for aquaculture facilities, aquariums, zoos, museums, and marine parks. They may also choose to operate a mixed practice that includes providing care for other exotic or wildlife species.

For complete article, go to:

<https://www.thebalancecareers.com/aquatic-veterinarian-125789>

### What does an Aquatic Veterinarian do?

While Doctors work to keep humans healthy and disease-free, Veterinarians offer the same treatments for our animal friends. And just as Doctors specialize in dozens of different areas, some Veterinarians concentrate on specific species. Aquatic Veterinarians focus on fish, aquatic invertebrates, and marine mammals.

As an Aquatic Veterinarian, you may or may not spend your days in and around water. Some Aquatic Veterinarians offer to treat goldfish (and other aquarium fish) in addition to their regular Veterinarian duties. Other Aquatic Veterinarians take the scuba plunge to evaluate animals in their natural habitat, at an aquarium, or in the zoo.

Of course, your skills are put to great use at a marine animal rescue facility, where you treat animals injured by passing boats, predator attacks, or natural disasters. You might deal with a massive disease outbreak at a fishery, or tend to the care of a pod of dolphins after an oil spill. Imagine treating the wounds of a massive, yet gentle, manatee! Closer to home, you could focus on koi fish, or offer immunizations to little Tommy's pet aquatic community fish.

Whoever and wherever the patient, it's your job to offer preventative medicine, give care-giving advice, and even recommend policy changes that affect aquatic populations. You give immunizations, suggest dietary changes, help endangered species repopulate, and stifle the spread of disease. This might be done at zoos, aquariums, pet stores, aquaculture farms, fisheries, or the examination room in your own clinic.

From: <https://www.careermatch.com/job-prep/career-insights/profiles/aquatic-veterinarian/>

**DO YOU HAVE A STORY TO TELL ABOUT  
HOW YOU BECAME  
INVOLVED WITH AQUATIC  
VETERINARY MEDICINE?**

Send your article (<1,000 words) with pictures to  
[TAVeditor@wavma.org](mailto:TAVeditor@wavma.org).



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>




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- Laboratory quality images and video displayed on smart phone, tablet or computer
- 1 micron resolution for beautiful images of cells
- x200 magnification on an iPad - zoom to x400 or more
- Folds to fit your jacket pocket - take it anywhere
- Uses standard microscope slides and cover slips
- Top and bottom illumination to light any sample



## ioLight

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**CONTACT**

✉ [info@iolight.co.uk](mailto:info@iolight.co.uk)

🌐 [iolight.co.uk](http://iolight.co.uk)

NEW TRAINING COURSE LAUNCHING SEPTEMBER 2018

# The Health and Welfare of Atlantic Salmon

Salmon farming is a multi-billion dollar global industry, making significant contributions to the economies of the world's major salmon producing countries. It is vital that fish farm operatives who are responsible for these fish are trained in all the main aspects of health and welfare, to ensure that their fish are free from disease and suffering, to enhance quality and productivity, and to comply with legislation.

The Knowledge Services Division of Benchmark Animal Health has worked closely with Fish Vet Group to produce an exciting and interactive online course covering the Health and Welfare of Atlantic Salmon.



## The course includes

- Principles of fish welfare
- Feeds and feeding
- Transport
- The environment and fish welfare
- Health and veterinary health planning
- Management and husbandry practices
- Killing and flesh quality

## Features and benefits

- Online course divided into bite-sized modules so you can study at your own pace
- Study on any device with internet access
- Interactive exercises and on-farm videos to create interest and test knowledge
- Questions after each module to test your understanding
- Course certificate available after successful completion of all the modules
- Optional practical sessions covering sea lice counting, gill scoring etc. to help reinforce your learning

## Pricing and further details

Individual course access is £400 plus VAT.  
 Please contact us for prices of multiple course access.  
[marketing@5mpublishing.com](mailto:marketing@5mpublishing.com)  
 tel: +44(0) 1865 237733, [thefishsite.com/learn](http://thefishsite.com/learn)



The Fish Site

Improve  
International



FishVet Group





**MEETINGS OF INTEREST TO  
AQUATIC VETERINARIANS**

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

For more information go to: <https://www.wavma.org/Aquatic-Veterinary-Educational-Meetings-Conferences-Symposia-Workshops>

**Medicine of Aquatics, Amphibians, and Reptiles (MOAAR) Symposium**

November 9-10, 2019  
Purdue University College of Veterinary Medicine  
West Lafayette, Indiana, USA

The Veterinary Exotic Animal Club invites you to the 2nd biennial Medicine of Aquatics, Amphibians, and Reptiles (MOAAR) Symposium! The Symposium will provide veterinary professionals and students the opportunity to develop the skillsets for treating aquatic, amphibian, and reptilian patients by learning from experts in these fields.

The 2019 MOAAR Symposium will be held November 9th & 10th, 2019. Two concurrent tracks: 1) Amphibian/Reptilian Medicine and 2) Aquatic Medicine will feature both lectures and wet labs.

Cara Field, DVM, PhD, DACZM of the Marine Mammal Center in Sausalito, California will discuss “Experiences in Aquatic Animal Medicine and Rehabilitation” in her Keynote Lecture. Additional speakers include: Dr. Angela Lennox, Dr. Roberta Wallace, Dr. Frank Paladino, Dr. Alejandro Morales, Dr. Carrie Ullmer, Dr. John Griffioen, Dr. Julia Becker, Dr. Jennifer Langan, Dr. Jennifer Strasser, Dr. Joseph Scimeca, Dr. Lori Corriveau, Dr. Steve Thompson, and Abigail Rosenblum.

For more information, go to:  
<https://www.purdue.edu/vet/ce/moaar.php>

**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>.

**AquaEpi II – International Scientific Conference on Aquatic Animal Epidemiology**

November 4-6, 2019  
Amari Hotel,  
Hua Hin, Prachuap Khiri Khan, Thailand

With world class speakers, the **conference scientific sessions** will cover a wide range of topics including (but not limit to):

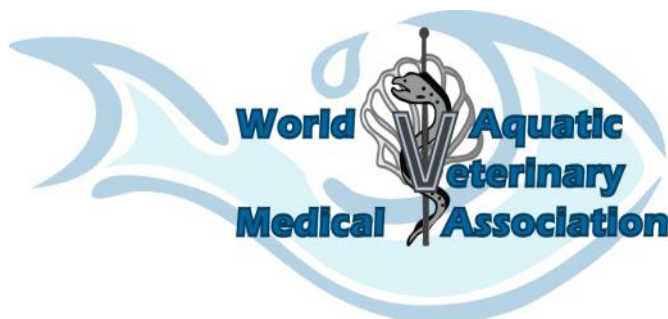
- Epidemiological investigations in clinical settings
- Risk assessment and management studies
- Molecular epidemiology
- Spatial and temporal patterns in prevalence and risk mapping
- Surveillance and disease detection
- Epidemiology of antimicrobial used and resistance
- Epidemiological based trans-boundary regulation
- Interaction of wild and farmed aquatic species - the challenges for disease control.
- Epidemiological enabling technologies; remote sensing; AI; eDNA
- Crowd sourced data: Human/social component

**Importance dates**

|                                     |                  |
|-------------------------------------|------------------|
| Abstract submission – open          | March 15, 2019   |
| Early registration – open           | June 1, 2019     |
| Deadline abstract submission        | August 15, 2019  |
| Announcement of abstract acceptance | Sept 30, 2019    |
| Early registration – close          | October 15, 2019 |
| Regular registration                | October 16, 2019 |

For more information, please visit the conference website at <https://www.aquaepi2019.com/> or contact the conference Secretariat at [aquaepi2019@gmail.com](mailto:aquaepi2019@gmail.com).

Visanu Boonyawiwat  
Secretary of the AquaEpi II-2019 Organizing Committee  
Department of Farm Resources and Production Medicine  
Faculty of Veterinary Medicine, Kasetsart University, Thailand



**23rd Biennial Society of Marine Mammalogy /  
 2nd World Marine Mammal Science Conference**

Dec 9-12, 2019

Barcelona, Spain

[More info](#)<https://www.marinemammalscience.org/conference/>[Click here for 2019 conference website](#)

**Regional Aquatics Workshop (RAW) and  
 Aquatic Animal Life Support Operators (AALSO)  
 Symposium joint conference**

March 28th–April 1st, 2020

Springfield, Missouri, USA

<http://www.rawconference.org/index.html>[Click here for conference website](#)

**The 51st annual International Association for  
 Aquatic Animal Medicine conference**

May 16-20, 2020

Tampa, Florida, USA

<https://www.iaaam.org/>[Click here for conference website](#)

**The 3rd annual Manatee Research Symposium**

dates to be announced

Gainesville, Florida, USA

**American Veterinary Medical Association  
 Conference**

July 31 - August 4, 2020

San Diego, California, USA

**Future WSAVA Conferences**

45th WSAVA World Congress

Dates: 23-26 September 2020

Warsaw, Poland

[Visit the website here](#)

46th WSAVA World Congress

Dates: 13-16 November 2021

Hyderabad, India

[Visit the website here](#)

47th WSAVA World Congress

Dates: 29-31 October 2022

Lima, Peru

**DO YOU HAVE A STORY TO TELL ABOUT  
 HOW YOU BECAME  
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 VETERINARY MEDICINE?**

Send your article (<1,000 words) with pictures to  
[TAEditor@wavma.org](mailto:TAEditor@wavma.org).

**AQUAVET® 2020**

A Program in Aquatic Veterinary Medicine

[www.aquavet.info](http://www.aquavet.info)

AQUAVET® I and II will be presented at Roger Williams University in Bristol, Rhode Island. Bristol is a picture perfect New England town about 20 minutes from Newport, RI.

AQUAVET® I - An Introduction to Aquatic Veterinary Medicine: The course is designed for veterinary students and veterinarians who have an interest in applying their veterinary training to aquatic animals.

Duration: 4 weeks – May 24 to June 20, 2020

Fee: \$2,450 for full-time veterinary students, although a program benefactor will pay \$200 for each student, bringing the cost down to \$2,250. This includes tuition, room and most meals.

AQUAVET® II – Comparative Pathology of Aquatic Animals: The course is oriented toward the pathology of vertebrates and invertebrates commonly used as laboratory animals, encountered in display aquaria, and of importance to aquaculture enterprises.

Duration: 2 weeks – May 24 to June 6, 2020 –

Prerequisite: AQUAVET® I

Fee: \$1,475 for full-time veterinary students. This includes tuition, room and most meals.

AQUAVET® Summer Research Fellow (one offered). Fellows pay no tuition for the 8 weeks of the research program itself and will be reimbursed for room and board expenses. In addition, research student will receive a stipend of \$3,800 for the research period.

Duration: 8 weeks following AQUAVET® I

Prerequisite: AQUAVET® I

Venue: Laboratory at Cornell University, Ithaca, NY.

AQUAVET® III – Clinical Aspects of Captive Aquatic Animal Medicine: The course is designed for veterinary students and veterinarians who have specific interest in working in an aquarium or dolphinarium.

Duration: 5 weeks following AQUAVET® I - June 21st to July 26th 2020 - Prerequisite: AQUAVET® I

The course will be presented in three different venues. The first two weeks are focused on all of the animals found in a typical aquarium and will be held at the Georgia Aquarium in Atlanta, GA. The next week focuses on endoscopy and surgery of reptiles and fish taking place at the University of Georgia. The final two weeks take place at Dolphinaris in Cancún, México, where students focus on dolphin medicine, including learning to take and analyze samples and hands-on learning of dolphin ultrasound. Fee: \$3,800 for full-time veterinary students. This includes tuition, room and many meals. (Actual costs are much higher, but are covered by anonymous donors.)

Applications for admission are due by January 15, 2020. The application is available on our website. You will receive an e-mail acknowledging receipt of your completed application and supporting materials.

Please visit our website at: [www.aquavet.org](http://www.aquavet.org)



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# AQUAEFFECTS



\*Available in 20", 24", 36" and 48" sizes, AquaEffects 24" Model 1 and Model 2 pictured above.

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