

# Institute for Conservation Medicine Newsletter

Summer 2021

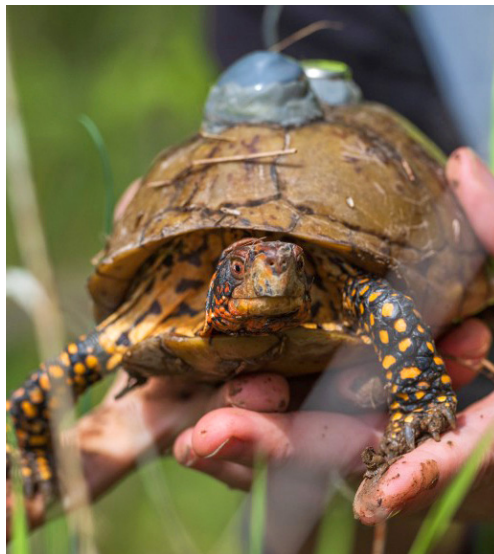


Photo by: Joshua Vela, Charles Darwin Foundation

## Research Projects

### St. Louis Box Turtle Project

Box turtle field season is officially underway with tracking occurring weekly and annual health assessments completed in May. We are currently monitoring eight turtles at Forest Park and four at Tyson Research Center!



ICM has two new collaborations related to box turtles. We received a grant from the Living Earth Collaborative at Washington University to work with Dr. Fangqiong Ling on a microbiome study involving our Forest Park and Tyson box turtles. In this study we will look at the microbiome—the microbes that call our turtles home—in turtles at the urban and rural sites, to see how these may differ. We are also discussing ways to work with

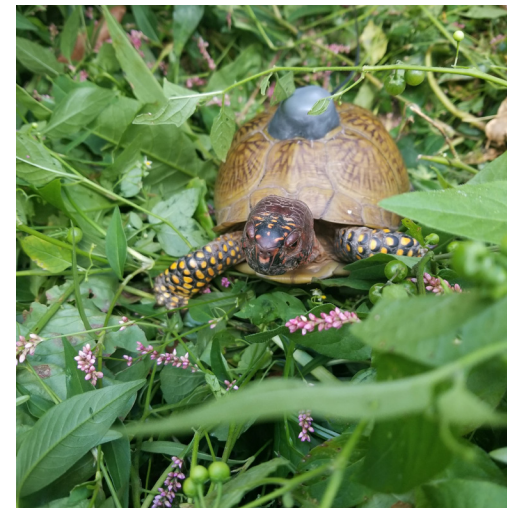
the Box Turtle Race Taskforce to help the group assess health impacts of these unfortunate races on collected turtles and the populations into which they are released.

### Aquatic Turtles at the Saint Louis Zoo WildCare Park

We completed the final report on the presence and health of aquatic turtles at the WildCare Park, and one of the key findings was that three aquatic turtles tested positive for ranavirus (frog virus 3/FV3). FV3 is an emerging pathogen of fish, amphibians and reptiles that has caused mass mortalities in box turtles and amphibians in nearby states. As a result of the 2020 findings, we developed a follow-up multi-taxa research study to learn more about the epidemiology and ecology of FV3.



One of the first steps of this new study was to find and tag box turtles at WildCare Park for the study. You may have seen some of the media stories about the turtle detection dogs we used in April, but if not, please check out the Media section. Although the dogs were not successful, we humans have since found and tagged box turtles on our own—Humans 10, Dogs 0. Throughout this field season, we will sample multiple species of turtles and frogs each month.



### Living Earth Collaborative Going Wild in Forest Park

The ICM is partnering with St. Louis University, Washington University in St. Louis, World Bird Sanctuary, and National Great Rivers Research and Education to study the movement and health of numerous species within



Forest Park. This work is funded by a Living Earth Collaborative grant, and we will study raccoons, great horned owls, mallards, fish, and of course, box and common snapping turtles. The field work kicked off in May with the tagging of snapping turtles.



Photo by: Steve Blake

## New World Canid Initiative

We have hired a two-year post-doctoral Fellow, Dr. Fernando Nájera, who will be joining the canid project at the WildCare Park in August. Dr. Nájera will develop the capture/release program for health assessments and telemetry monitoring, which will be critical in advancing the research and outreach objectives. Meanwhile we continue to monitor the camera traps at the WildCare Park and have developed a database for the thousands of photos already collected. Colleagues from the Zoo's Carnivore Department will help us categorize our camera trap photos so we can quantify the distribution of canids and their habitats at the site.

## Galapagos Tortoise Movement Ecology Programme

Things continue to be extremely busy in the Galapagos! Dr. Ainoa Nieto Claudin and Freddy Cabrera are conducting

behavior and hormone assessments to examine the impact, if any, on tortoise health and behavior in the absence of human activity due to COVID-19. They'll then explore the other side of this equation to see how human visits may influence animal health.

Karina Ramón, a local undergraduate student, has joined the Galapagos Tortoise Movement Ecology Programme (GTMEP) team and is studying the impact of trash and garbage from humans on free-living tortoises on Santa Cruz Island as part of her dissertation thesis for her biology degree. We started the collection of fecal samples to assess the amount of plastics and waste that tortoises ingest and unfortunately, the findings so far indicate that free-living tortoises near urban areas are ingesting quite a lot of plastics, and even face masks! Gislayne Mendoza, a local biotechnology expert from San Cristóbal island, also joined the team in May 2021. She is analyzing our tortoise samples in search of viruses that may compromise their health.



The GTMEP team found and tagged seven newborn babies in one day—a new record! Ainoa sampled 20 tagged giant tortoises for the annual health check in Santa Cruz, Galapagos, and 100 samples were sent to Guayaquil, Ecuador, to test for leptospirosis.

The revamped GTMEP website, [www.gianttortoise.org](http://www.gianttortoise.org) is officially live! The new website showcases the team's excellent research and education work and is a great outreach tool for making the project accessible to a larger audience.

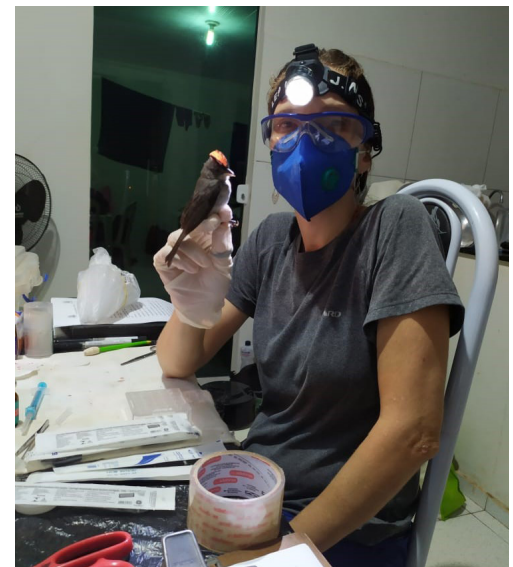


## Crocodile Research and Conservation in Cuba

At long last, the program received the import permit approval to bring Cuban crocodile samples to the U.S. once travel is possible. While there are still some hurdles on the Cuban side, this is a big win for this program, which wouldn't have been possible without the work of our Zoo Registrar Rae Lynn Halliday.

## Arboviruses in Brazil

Dr. Lilian Catenacci, our adjunct scientist in Brazil, continues both scientific research and outreach in Piauí State with the focus on zoonotic arboviruses and how they affect wildlife and humans. Her work is a perfect example of One Health in action.





Lilian, in partnership with the Animal Health State Department, Federal University of Piauí State, Health State Department and Piauí Public Health Lab organized a course entitled “Survey and notification of zoonotic neurological disorders diseases.” The main goal was to alert health professionals of neurological diseases, such as West Nile and rabies viruses. This virtual course had 4,000 participants!



Photo by: Jamie Palmer

## ICM Molecular Lab

As a part-time research technician who couldn't even access her lab last summer, Kathleen Apakupakul has been extraordinarily busy. She is building our portfolio for pathogens that we can test for in-house at the ICM lab that will not only benefit ICM-specific work, but other Zoo departments and research collaborators. In collaboration with the Herpetarium Department, Kathleen has optimized the use of diagnostic protocols to detect chytrid fungus (*Batrachochytrium dendrobatidis*) and snake fungal disease (*Ophidiomyces ophiodiicola*) on swabbed animals. This will assist with disease diagnostics of both collection and free-living amphibians and reptiles.

Kathleen has also been developing protocols for PCR pathogen screening of eDNA in water and parasite blood meals. We will be piloting these techniques

during the ranavirus project at the WildCare Park and if successful, they could provide excellent non-invasive alternatives to more invasive biological sample collection.

Last but not least, the ICM lab has also been officially recognized by Association of Zoos and Aquariums (AZA) as a supporting diagnostic lab for the AZA SAFE North American Turtles program.

## Next Generation: One Health

This spring, Dr. Jerissa Ching joined us for a virtual internship and focused on our ranavirus study of box turtles in Missouri. Jerissa graduated with her Doctor of Veterinary Medicine degree from Washington State University as well as her Master of Public Health degree from the University of Missouri this May. Two undergraduate interns, Josie Alexander (Washington University in St. Louis) and Erick Ramirez (Saint Louis University) joined us this summer at the WildCare Park to assist with the ranavirus field work. Jose Iturrizaga, a master's student at University of Missouri-St. Louis, will also help with various ICM field work as a volunteer.

## Education & Outreach

As always, Dr. Sharon Deem and the ICM team continue to spread the word of One Health to other scientists, students and the public. Just a few of our events so far in 2021 include:

- JAVMA News featured Sharon in their recent article: “The path to a career in zoo medicine and conservation”
- Sharon made presentations to the Zoo Commission and the Marlin Perkins Society on the mission and work of the ICM, with the Marlin Perkins Society members contributing great questions at the end.

- Dr. Maris Brenn-White and Sharon spoke at the Global Freshwater Summit about the connections between ecosystem health, food security, and viral emergence and One Health, respectively.

LIVING EARTH COLLABORATIVE  
CENTER FOR BIODIVERSITY  
& Evolution, Ecology and Population Biology

Presents  
**Sharon Deem**  
Saint Louis Zoo

**Turtle Conservation as a Vehicle for One Health**

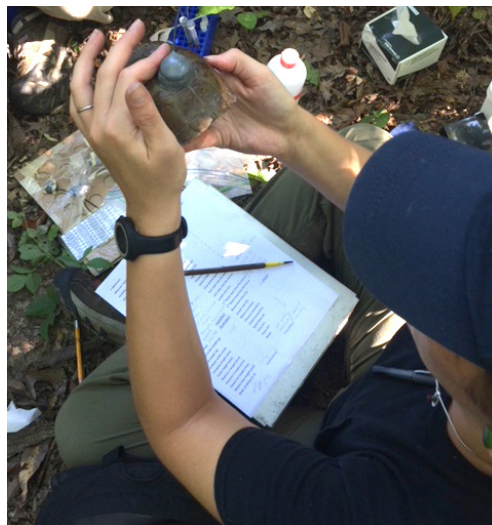
Thursday, March 4, 2021  
4:00 p.m.

- Sharon gave a talk on One Health—the relationship between climate change and the spread of infectious diseases—at the Global Health and Infectious Disease Conference at Washington University.
- Maris gave a lecture to the University of Illinois Wildlife and Ecosystem Health Course titled “One Health – A Wildlife Veterinary Perspective.”
- Keri Lammering, our Education Liaison, met with Saint Louis University and Gateway to the Great Outdoors to discuss the educational outreach component of both the St. Louis Box Turtle Project and the Living Earth Collaborative Forest Park project.

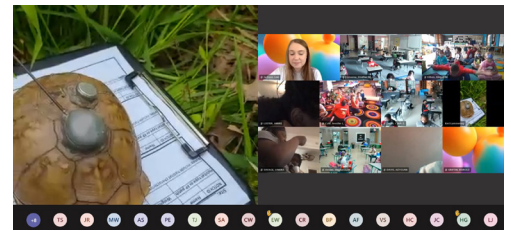


- Kathleen participated in a virtual high school career panel for the Hazelwood School District that was set up through our Zoo's Education and Volunteer Services Departments.
- AZA Reduce the Risk Campaign
  - Sharon spoke at the AZA meeting at both the general session and a focused session on how COVID-19 is changing conservation.
  - The AZA press release includes a quote from ICM on the value of One Health since it is one of the guiding principles of the campaign.
  - Sharon participated in the Ask Me Anything AZA Twitter event. Following the event, the Zoo's Public Relations & Government Affairs Director Billy Brennan and Sharon spoke to an AP journalist about COVID-19, animals and zoos. 1.1 million people were reached through this event.
- The May AZA Connect article on Preventing Pandemics featured discussions with Sharon, and she was also quoted in the Zoo and Aquarium All Hazards Partnership article about the importance of preparedness.
- Sharon gave a webinar titled, "Turtles as a Vehicle for One Health" for the weekly Washington University Living Earth Collaborative series.
- The St. Louis Science Academy Teen Science Café held a One Health-focused event where Sharon and Keri gave a presentation. Participants then broke into small groups to examine a case study based on our work with camels in Kenya.
- Lilian presented a week-long course titled, "Surveillance of arboviruses in wild animals: challenges and future perspectives" to 1,100 participants.

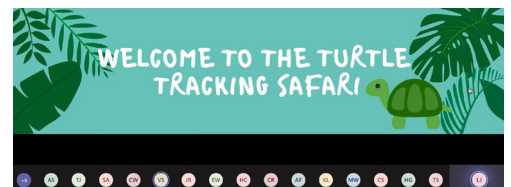
- Ainoa presented a talk to Galapagos National Park naturalist guides on tortoise health and anatomy. There was so much interest that another talk will be scheduled soon.
- Ainoa delivered a virtual talk to the Galapagos National Park rangers from Isabela Island explaining the latest tortoise health results. The rangers were very interested in the novel viruses that we found in several species.
- Lilian organized an online Charity Mega course titled, "All Together for the Conservation of Xenarthras in Piaui, Brazil." Almost 100 participants attended, and the course fees successfully raised funds to build a rehabilitation enclosure for anteaters.



ICM held its eighth annual (first virtual!) One Health Fair in April, with 14 student presenters and nearly 50 attendees. The interdisciplinary teams of students from three local universities discussed five different One Health issues with Sharon and Dr. Will Sander of the University of Illinois, kicking off the event by sharing their personal One Health paths. A big shout-out to Keri for her effort in organizing the event.



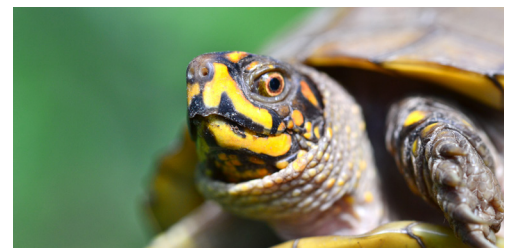
Keri and Jamie Palmer took remote learning students from Woodland Elementary School in Edwardsville, Illinois, on a virtual turtle safari in Forest Park. One hundred and fifty students tracked box turtles named Tom and Jerry via Zoom and asked really great questions. This was our second virtual turtle safari with Woodland Elementary!



Dr. Sathya Chinnadurai, Director of Animal Health, Dr. Mary Duncan, Staff Pathologist and Sharon are working with Washington University in St. Louis School of Medicine to develop an elective rotation in One Health for fourth-year medical students, which would start in 2022.

Jamie took Ronnie (Zoo docent) and Ellen Gross and their family on a turtle safari in Forest Park.

Now that most people are vaccinated in the Galapagos, Ainoa, Freddy and Anne Guezou, GTMEP Educator, are very happy to be back in person sharing activities with local students and presenting information to local guides and park rangers.





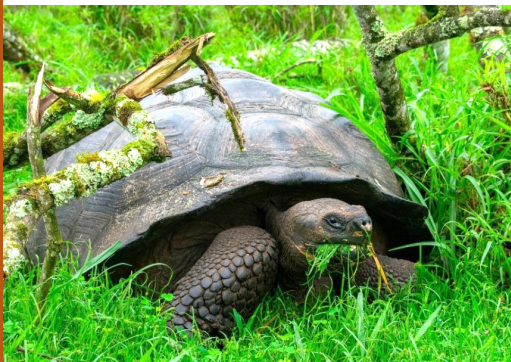
## Media

The turtle dogs have received a lot of local and national media attention. A video was also posted to the Zoo social media, and some of the interviews and stories are listed below:



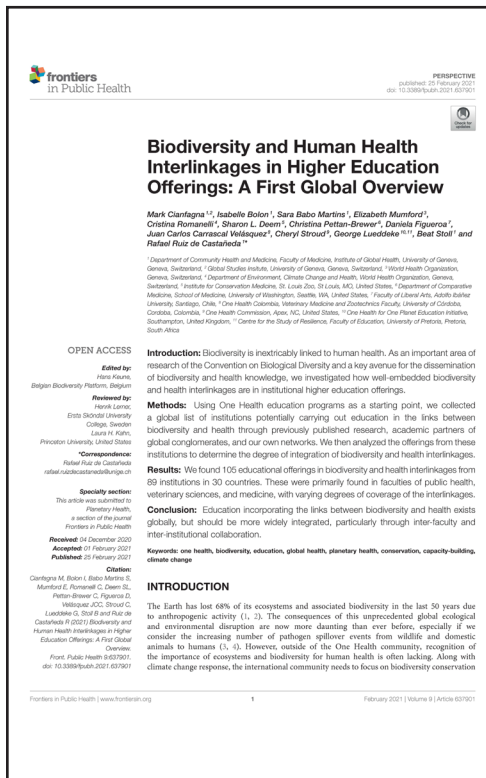
- St. Louis Post-Dispatch and stltoday.com
- KTVI/FOX 2 and KPLR News 11
- Channel 5 News (St. Louis)
- St. Louis Public Radio (website story and short audio story also aired)
- NPR affiliate KBIA (Columbia, MO)
- Bark magazine
- People magazine “Reptile-Sniffing Dogs Become Research Assistants to Help the Saint Louis Zoo Save Box Turtles.”

Leah Owens, a former ICM intern, published an amazing article on a newly described pathogen of chimps. Sharon was asked to give some thoughts on the piece and was interviewed by Anne Gibbons from Science Magazine and a journalist from a Milwaukee paper. The article was picked up by many major news groups.



## Publications

- Kathleen Apakupakul was first author with Sharon Deem as co-author on “Endogenization of a Prosimian Retrovirus during Lemur Evolution.” The article was published in the journal *Viruses*, and the study was made possible by WildCare Institute funds awarded through an FRC in 2014.
- Lilian Catenacci was first author with Hannah Paddah (former ICM intern) and Sharon Deem as co-authors on “Individual, household and environmental factors associated with arboviruses in rural human populations, Brazil.” The article was published in *Zoonoses and Public Health*.




- Sharon Deem was a co-author on the article “Biodiversity and Human Health Interlinkages in Higher Education Offerings: A first global overview” published in *Frontiers in Public Health*.

- Two papers related to Galapagos tortoises have been published. One is the second paper for Ainoa’s Ph.D. while the other was written by Evan Emmel, a former ICM intern.
  - ▶ Ainoa is first author on “Haematology and plasma biochemistry reference intervals for the critically endangered western Santa Cruz Galapagos tortoise (*Chelonoidis porteri*)” published in *Conservation Physiology*.
  - ▶ Evan was first author on “Field anesthesia and gonadal morphology of immature western Santa Cruz tortoises (*Chelonoidis porteri*)” published in the *Journal of Zoo and Wildlife Medicine*.
- Sharon Deem was co-author on “Field anesthesia of the maned wolf (*Chrysocyon brachyurus*) in Bolivia” published in the *Journal of Wildlife Diseases*.
- Emily Hardgrove, a 2020 ICM intern, was first author with Sharon Deem on “Scoping Review of Rodent-borne Pathogen Presence, Exposure, and Transmission at Zoological Institutions” published in *Preventive Veterinary Medicine*.

To learn how you can contribute to the work of the ICM, contact Director Sharon Deem at (314) 646-4708 or [deem@stlzoo.org](mailto:deem@stlzoo.org).

For more information on the Institute for Conservation Medicine, visit [stlzoo.org/icm](http://stlzoo.org/icm).



**Saint Louis Zoo**  
Institute for Conservation Medicine  
Healthy Animals. Healthy People.