

Institute for Conservation Medicine Newsletter

Winter 2023



Research Projects

Forest Park Living Lab

In exciting news: we caught two juvenile red-tailed hawks in Forest Park, “Copper” and “Herrmann.” Herrmann was named in honor of longtime ICM supporter and friend, Dr. Virginia Herrmann. We collected health samples and morphometric data. We also fitted the hawks with GPS tags so we can follow the hawks as they fly around St. Louis and surrounding areas. It is exciting to see where Copper and Herrmann have traveled so far. According to co-Principal Investigator (co-PI), Jeff Meshach of the World Bird Sanctuary, red-tailed hawks tend to go north during warmer months as the prevailing winds from the south blow them north as they soar. Copper has flown as far as Rushville, Illinois, which is over 140 miles from Forest Park! We look forward to seeing where the hawks go next; they have been great ambassadors for wildlife in our region.



Herrmann the red-tailed hawk is fitted with its GPS tracking tag.

The two tagged geese, named Fred and Fran, both received solar GPS collars. St. Louis Public Radio did a great story about the Forest Park Living Lab; see under Outreach section for more details.



Dr. Stella Uijenwaal and Dr. Sharon Deem collect samples from Steve the snapping turtle.



Students tracking box turtles with Dr. Stella Uijenwaal.

Closer to the ground in Forest Park, a fourth snapping turtle that lives in the stream just north of The Munny was added to the study. Health samples were collected and Steve, the snapper, will be tracked and monitored for the next

few years by ICM staff and students from co-PI Dr. Stephen Blake’s lab at St. Louis University. A second Canada goose was also tagged near the fish hatchery in Forest Park.

American Crocodiles in Ecuador

Jamie Palmer and Dr. Ainoa Nieto Claudin traveled to Cazaderos, Ecuador, at the request of Dr. Jose Luis Rivera (UMSL Ph.D. graduate) to lead American crocodile health assessments. This part of southern Ecuador is home to many gold mines, both illegal and legal. Jose Luis’s research takes a One Health approach to identify the effects of environmental contaminants on this isolated population of American crocodiles (*Crocodylus acutus*) as well as the overall ecosystem. Kelvin Alvarez from the Wildlife Conservation Society was also part of the team and led pilot drone work. He taught the Ecuadorian team best practices for catching and handling crocodiles.

The team captured 10 American crocodiles and conducted health assessments on each, collecting samples for genetic and heavy metal analysis, as well as baseline health data. This project is partially funded by an Ecuadorian One Health grant.



The American Crocodile health assessment team in Ecuador. Jamie Palmer and Dr. Ainoa Nieto Claudin are in the back row, center.



Canid Conservation Initiative

Dr. Ted Lawrence, an expert in spatial data analyses for conservation efforts, is consulting on the Canid Conservation Initiative. He is analyzing the data from our GPS collared coyotes and bobcats to evaluate how they are using the landscape in and around Tyson Research Center. When we captured the animals, we collected samples for exposure to rodenticides, which are often used in the area. Rodenticides can cause mortality in these top predators if they eat rodenticide-laced prey. It's an area of concern for the conservation of these, and other, predators. Our results will help advise state agencies for best practices. The rodenticide study is partially funded through a grant from the American Association of Zoo Veterinarians.

Galapagos Tortoise Movement and Ecology Programme (GTMEP)

Dr. Sharon Deem and Dr. Stephen Blake spent a month in Galapagos this summer to perform X-ray checks of nesting females on Santa Cruz Island. In spite of very difficult fieldwork, the field team took X-rays of 19 female tortoises spread across the nesting zone, often hiding in thick vegetation. This work completed the second season of a reproductive fitness study on one of the Santa Cruz tortoise species, *Chelonoidis donfaustoi*. A BBC film crew documented the work of the GTMEP team as part of a TV series on aging in the animal world. In other news, this is our 14th year of work as the GTMEP, and we are proud to announce the hire of Dr. Patrick Moldowan, the new GTMEP Principal Investigator. He is now established in the islands and leading the charge for giant tortoise conservation.



Western Santa Cruz Giant Tortoise (*Chelonoidis porteri*)



Galapagos tortoises taking a mud bath in ponds they created themselves. Such mini ponds are used by other wildlife and insects - one of many reasons giant tortoises are considered ecosystem engineers.



Missouri three-toed box turtle in Forest Park.

Box Turtles

2023 was a busy year for our box turtle work in Missouri. The team, including ICM interns, monitored Forest Park and Tyson Research Center box turtles weekly by collecting GPS, health and body

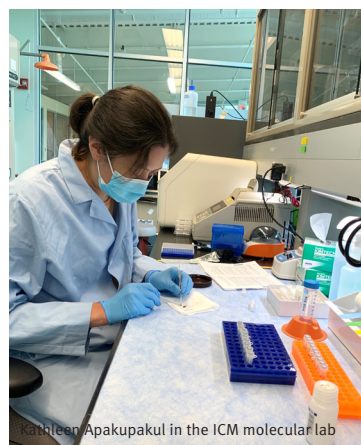
weight data. Many of our turtles were on the move this summer, travelling long distances and often to new places they haven't been before.

Our work detecting ranavirus in Missouri box turtles continues. Ranavirus is a virus first identified in amphibians but also infects turtles and can cause mortality in box turtles. There is little information on the epidemiology of this pathogen. To date, we have confirmed 16 positive cases in three-toed box turtles under care at the Wildlife Rescue Center



Three-toed box turtle with GPS telemetry tag and iButton temperature recorder

in Ballwin, Missouri. Our first publication reporting ranavirus infections in three-toed box turtles in Missouri is listed below in this report. Additionally, we developed a digital map showing where ranavirus-positive turtles are located in the state, which we shared with the Missouri Department of Conservation.



Michelle Apakupakul in the ICM molecular lab

We are sad to report that this year was also a hard one for three-toed box turtles at our two study sites. Since March of 2023, five tagged box turtles in Forest Park and two at Tyson Research Center have died. Most deaths were of undetermined cause. The more obvious causes of death, such as predation and infectious disease, were ruled out by diagnostics. The most likely

reasons for the deaths are climate-related impacts (extreme temperatures) and/or restoration work that includes controlled burns.



Institute of Museum and Library Services (IMLS) One Health Education Grant

The first year of the IMLS Grant was completed in August. It was a success with four paid interns from Innovation High School (Ferguson-Florissant) and four from Hazelwood West High School. The interns at both schools selected Environmental Racism as their One Health focus



Toni Smith, summer intern, with a three-toed box turtle.

area. They developed a two-week One Health curriculum for high school students, and one group taught the curriculum to their peers. Two of the interns also accepted paid summer internships with ICM, and they assisted with turtle tracking and outreach. Toni Smith, a summer intern, was featured in the fall issue of the Saint Louis Zoo's member magazine, *stlzoo*, and said one of her favorite parts of the internship was going turtle tracking in Forest Park and getting outside to explore nature. You might say she came out of her shell over the summer!



Dr. Sharon Deem assists Toni Smith with radio telemetry while tracking box turtles.

Conservation Education Liaison Keri Lammering, who was the lead educator on this grant, left the Zoo this year. Due to her departure, IMLS gave permission to repeat the program at these same two schools instead of two new school districts. Two interns from Innovation High School have begun their One Health research and two interns at Hazelwood West High School will start in the spring.

Outreach

- Summer turtle safaris were once again very successful. Conservation Education Liaison, Keri Lammering and the IMLS interns took many Camp KangaZoo campers into Forest Park to learn about box turtles and the surrounding flora and fauna.
- Local Spire employees signed up for a turtle safari, and Spire's media department reached out to KTVI/FOX-2 to share the story. A videographer followed the employees and ICM team as tagged turtles were tracked and data was recorded. The story aired on the [evening news](#).



Participants at the Water Festival learning how to weigh a box turtle.

- The Forest Park Living Lab team participated in the Lewis & Clark Community College/National Great Rivers Research and Education Center Water Festival in Illinois. Over a five-hour period, 117 fifth graders came through from six different classes. Kids tried their hand at tracking a plush toy box turtle, learned about owl pellets and owl adaptations for hunting, used tracking data clues to identify wildlife, and practiced weighing turtles and assessing their health. The kids seemed to have a good time, and they certainly kept everyone busy!
- The Forest Park Living Lab outreach work was covered by St. Louis Public Radio. You can listen to the story [here](#) or on [STLPR's website](#). In November, we held the fourth and last event of this educational opportunity. This outreach work was partially funded by a Taylor Geospatial Institute \$75,000 grant awarded last year.



SLU and FPLL undergraduate student Arina Martin teaching Water Festival participants about owls.

- The Zoo's new summer series event, HullabaZoo, featured our Cuban crocodile work on one of the Friday nights. It was a great success! There was so much interest at the tables, and it was fun talking about crocodiles with the guests.



- A wide variety of media sources have featured our turtle and tortoise research lately. The HEC-TV story about **box turtle races** and their potential impact on our native turtle populations is quite interesting. HEC-TV also did an excellent **overview** of box turtles and roads. Check them out on the HEC-TV website! A **Saint Louis University article**, a recent **Zoo online article** and a **Charles Darwin blog post** were also all recently published, and we appreciate all the interest.
- As part of the Zoo's Conservation Conversation series, the pre-release screening of the film, which features Dr. Deem, "Stopping the Next Pandemic" took place in October. Dr. Sharon Deem was on the panel, along with Dr. Kelly Lane-deGraaf (Fontbonne), Dr. Jacco Boon (Saint Louis University) and Krista Milich (Washington University in St. Louis). The GeoramaTV film is now available **to the public**.
- Dr. Sharon Deem gave a presentation at the Mark Mobius Lecture Series at the invitation of the Emerging Markets Investor Alliance. Her talk, "Mitigating the Impacts of Pandemics on Emerging Markets," which focused on pandemic preparedness, went well and good discussions followed.



The "Stopping the Next Pandemic" panel. From left to right: Dr. Jacco Boon, Dr. Kelly Lane-deGraaf, Dr. Krista Milich, Dr. Sharon Deem.

People

- Two staff members moved on to new adventures this year. Laura Budd moved to Canada to start her Ph.D. in livestock-wildlife interactions. Her year with the Zoo was very instrumental for helping her get to this next step in her career. Keri Lammering also left the Zoo to start a new position at Washington University in St. Louis, and her enthusiasm and educational expertise will be greatly missed.

- We were thrilled to host Dr. Kelly Souza, a veterinarian from Brazil who spent eight weeks with ICM to learn more about One Health and incorporate ideas into her Ph.D. project. Kelly runs a wildlife and exotic vet clinic in Para state, Brazil. This capacity-building project was funded by a Saint Louis Zoo WildCare Institute Field Conservation grant. Kelly gave multiple presentations on her work in Brazil: one on a method for fracture repair in turtles and tortoises that is budget friendly and effective, and one on her work with antibiotic resistance in Brazil.
- Dr. Sharon Deem was sworn in as President of the American Association of Zoo Veterinarians, and is also currently serving as an active member of the Wildlife Restoration Foundation Board.



Dr. Kelly Souza in forest park weight a box turtle with Addison Brannon.



Dr. Herrmann meeting a sea lion at the Saint Louis Zoo.

In Memoriam – Dr. Virginia Herrmann

We are deeply saddened by the passing of a dear friend and supporter of the ICM, Dr. Virginia (Ginny) Herrmann. A brilliant surgical oncologist at Siteman/Washington University School of Medicine, Ginny devoted her career to high-risk breast cancer research and surgery. Ginny was a strong supporter of the Zoo's work in One Health. She contributed significantly to the ICM through financial support starting in 2014. We developed a friendship over the years and had many conversations about our shared concern for animal and human health. She will be greatly missed. As part of our Forest Park Living Lab, a red-tail hawk is named Herrmann in her honor (see story on page 1).



Funding

We were awarded \$9,050 for a Saint Louis Zoo WildCare Institute Field Conservation grant. The grant will be used for our project, “Building Local Capacities in Galapagos: Advanced Training in Molecular Biology Techniques for One Health Projects.” This grant will allow Gislayne Mendoza, a Galapaguan from San Cristobal Island, to travel to the Zoo to work closely with Kathleen Apakupakul of the ICM laboratory and with Dr. Fangqiong Ling’s Washington University in St. Louis laboratory to advance her molecular skills. She will also be able to meet a box turtle or two!

Publications

ICM researchers were busy this season with several scientific publications:

- **Deem, S.L.,** Rivera, S., **Nieto-Claudin, A.,** Emmel, E., Cabrera, F., and S. Blake. *Temperature along an elevation gradient determines Galapagos tortoise sex ratios. Ecology and Evolution.* 2023.
- **Palmer, J.L., Nieto-Claudin, A.,** Rodriquez, G.S., Perez, E., Augustine, L., and **Deem, S.L.** 2023. *Hematology and Blood Chemistry Values in Cuban Crocodiles (Crocodylus rhombifer) housed at the Zapata Swamp Crocodile Farm, Cuba. Journal Zoo and Wildlife Medicine.* 2023. The work was partially funded by the AZA Conservation Grants Fund.
- **Apakupakul, K., Duncan, M.,** Subramaniam, K., **Brenn-White, M., Palmer, J.L.,** Viadanna, P.H.O., Vann, J.A., Adamovicz, L., Waltzek, T.B., **Deem, S.L.** *Ranavirus (Frog Virus 3) Infection in Free-Living Three-Toed Box Turtles (Terrapene mexicana triunguis) in Missouri, USA. Journal of Wildlife Diseases.* 2024.
- Blake, S., **Palmer, J.L., Brenn-White, M.,** and **S.L. Deem.** *Home ranges of box turtles in a rural woodland and an urban park in Saint Louis, MO; implications for turtle conservation. Urban Ecosystems.* 2023
- Raphael, B.L., Bartlett, S.L., Huber, N., Vetter, S.G., Perry, S., **Palmer, J., Nieto Claudin, A., Musgrave, K., Apakupakul, K.,** Rasambainarivo, F., Randrianarisoa, S., Nelson, S., Nguyen, T.T., Rakotonanahary, T.F., and **Deem, S.L.** 2023. *Use of Point of Care and Local Laboratories to Facilitate and Expedite Decision Making for Re-Wildling Chelonians. In: 21st Annual Symposium on The Conservation and Biology of Tortoises and Freshwater Turtles, Charleston, South Carolina, USA, 2023.*
- *Ramon-Gomez, K, Ron, S.R., Deem, S.L.,* Pike, K.N., Stevens, C., Izurieta, J.C., **Nieto-Claudin, A.** *Plastic Ingestion in Giant Tortoises: An example of a novel anthropogenic impact for Galapagos Wildlife Environmental Pollution.* 2023.

- Lawrence, T., Takenaka, B.P., Garg, A., Tao, D., **Deem, S.L.,** Fevre, E., Gluecks, I., Sagan, V., and Shacham, E. *A global examination of ecological niche modeling to predict emerging infectious diseases: a systematic review.* *Frontiers in Public Health.* 2023.

We hope you enjoyed our winter newsletter. It’s friends like you that help allow us to conduct the research and outreach described in these pages. If you would like to continue to support our various projects, please go to the Saint Louis Zoo website, select GIVE in the upper right, then select General Gifts near the bottom. On the online form under Ways to Give, there is a dropdown where you can select the Institute for Conservation Medicine. If that sounds like too many steps, we are happy to accept old fashioned paper checks mailed to the Institute for Conservation Medicine, Saint Louis Zoo, P.O. Box 790290, St. Louis, MO 63179-0290.

As everyone knows, conservation is about people. This is especially true for One Health. If interested in funding people power, our wish list includes paid internships, post-doctoral fellows, and even a full-time wildlife veterinarian which would move our research to the next level. We’d also love to receive funding to take our mobile molecular lab on the road to assist Dr. Lilian Catenacci with her One Health research in Brazil.

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

We can’t thank you enough for supporting animal, human and environmental health of our planet!

For more information on the Institute for Conservation Medicine, visit stlzoo.org and find us under Our Work.

Our Mission:

The Saint Louis Zoo Institute for Conservation Medicine takes a holistic approach to wildlife conservation, public health, and sustainable ecosystems to ensure healthy animals and healthy people.



Saint Louis Zoo

Institute for Conservation Medicine

Healthy Animals. Healthy People.