

Institute for Conservation Medicine Newsletter

Summer 2025



Welcome

Director, Dr. Sharon L. Deem

One thing I know is that the first half of 2025 was full of surprises. For ICM, this included the loss of federal funding from our Institute of Museum and Library Services (IMLS) grant, which has helped us bring One Health education and experiences to high school students in the St. Louis region. Additionally, the May 16 tornado that devastated the area has led to impacts on the plant, animal, and human communities of St. Louis. The loss of 3,000 trees in Forest Park alone has been hard to witness. However, rest assured that through our work in the St. Louis Box Turtle Project and the Forest Park Living Lab, we will continue to work for the health of urban wildlife in our city.



Animal Spotlight

Galapagos Tortoise Hatchlings

In the world of conservation, few signs offer more encouragement than new births. Earlier this year, Sharon and Ainoa traveled to the Galapagos to monitor nests and the 41 new hatchlings at the Galápagos Tortoise Movement Ecology Program field site. In the USA, at the Philadelphia Zoo, 4

Galapagos tortoise hatchlings made national headlines. These baby ambassadors have given hope to the international community for the continued survival of these remarkable animals. The Philly hatchlings have also raised public awareness (see Sharon and Steve Blake's comments to St. Louis NPR*).

Galapagos Tortoise Hatchling Facts:

- Female tortoises lay two to 20 billiard-ball-sized eggs at a time.
- Free-living tortoises lay eggs two to four times per season.
- The temperature during incubation determines the hatchling's sex.
- Lower temperatures produce males. Higher temperatures produce females.
- Eggs take four to eight months to hatch.
- These babies may live for 100 to 200 years!

*Link to article: <https://www.npr.org/2025/04/09/nx-s1-5355154/galapagos-tortoises-philadelphia-zoo>



Free-living Galapagos tortoise eggs



Free-living Galapagos tortoise hatchlings

Featured Project

One Health in Brazil

The ICM has collaborated with Dr. Lilian Catenacci since 2015. Lilian is a Brazilian wildlife veterinarian with a Ph.D. in viral epidemiology and is on the faculty at the Federal University of Piauí in northern Brazil. She works tirelessly to spread the One Health and conservation medicine message in her country.

Lilian and her students study arbovirus infections in primates and wild birds of the Brazilian Atlantic Forest, while investigating the role of mosquitoes in transmitting these viruses to animals and humans. As if that isn't enough, Dr. Lilian maintains a very active public outreach program. She works with local agencies teaching best practices for keeping people safe from infectious agents without harming wildlife. We're proud to report that this year is the second year in a row that ICM is able to build Lilian's capacity by helping fund the salary of her first research / laboratory manager, Osmaikon Lisboa.



Dr. Lilian Catenacci and student



ICM educators, Grace Warshaw and Ellie Noll, leading a training exercise with our Brazilian colleagues



One Health Fair, Piaui, Brazil April 5, 2025

educational materials to the public at their local zoo. Each visitor that attended the fair received a small native tree to take home. It was so successful that they're already planning a second event.

In August, ICM Lab Manager Kathleen Apakupakul and Sharon will travel to Brazil to co-lead a molecular laboratory workshop and deliver a talk on One Health at the university. Kat and Sharon are thrilled to spend time with Lilian and visit her field sites.



Sharon (left) and Ainoa taking samples for microbiome study

Project Updates

Galapagos Tortoise Movement Ecology Programme (GTMEP)

Sharon and Ainoa had a successful trip to Galapagos in February. They spent three weeks working with Emily Donovan (Southern Illinois University, Carbondale Ph.D. student), Courtney Pike (current GTMEP PI), and field staff Freddy and Cristian. During this visit, they helped Emily wrap up her Ph.D. research on reproductive fitness and collected samples needed for the next phase of the microbiome study. Sharon also had a number of meetings with Charles Darwin Foundation leadership to discuss the future of the GTMEP. They spent multiple days at the Cerro Fatal field site. Sharon's favorite part of this trip was the day of torrential rain at Cerro Fatal and being witness to how quickly a landscape changes.



GTMEP field staff Freddy (left) and Cristian inspecting tortoise nests and hatchlings

We're excited to announce that giant tortoises were the 2025 featured animal for ZOOFARI, the Saint Louis Zoo's most important fundraiser (June 20). Sharon wrote an article about "the purpose behind the party" for the spring 2025 issue of the stlzoo member magazine.



St. Louis Box Turtle Project (SLBTP)

Each spring, we're eager to get back in the field and see our box turtles emerge from brumation. This year, Tom the three-toed box turtle led us in a game of hide and seek. His radio tag failed, so we couldn't find him using our telemetry devices. Ellie Noll (ICM Educator) found him a few days after his tag failed, and we were able to replace it with a new working tag. Tom has a special place in our hearts. He's the longest tagged box turtle in the SLBTP. We first met Tom in 2013 in the Deer Lake Savannah, and we have been monitoring his health ever since.



Tom, the three-toed box turtle, Forest Park

Staff from our project partner, Forest Park Forever, come into contact with Forest Park box turtles more regularly than we do. To improve our mark/recapture data for the project, the team has started collecting data on turtles they see and notching new turtles that we have not met before. It's become a very rewarding project for both teams.

Our box turtles continue to be conservation ambassadors, connecting people to nature through hands-on field experiences. This spring, a group of high school students from Francis Howell North chose the ICM for their journalism project and we took them into Forest Park to visit some of our box turtles. In addition, Jamie Palmer, ICM Lead Technician, led a local corporate group in a box turtle tracking event. And this summer, our two ICM college interns will be actively involved in SLBTP activities.

Madagascar Tortoises

As most of you know, we are working with partners within the Association of Zoos and Aquariums community to improve the health of Madagascar tortoises confiscated from the pet trade. Recent cyclones in southern Madagascar have made this work exponentially more difficult. This spring, massive flooding in southern Madagascar hit one of the tortoise holding sites where more than 10,000 tortoises live. Over 1,000 animals have died and there is major damage to infrastructure. The people of the region were hit incredibly hard but have rallied together to rebuild the tortoise center. We are in awe of their strength and resilience. A bright spot during this hard time is that we recently received \$50,000 from the Morris Animal Foundation through their emergency fund. This funding was granted to investigate a mortality event at this holding site that occurred before the flood.



Response team rescuing tortoises from floodwaters at TSA center, Madagascar.



Forest Park Living Lab (FPLL)

Dr. Stella Uiterwaal (former FPLL Lead Scientist) was lead author on a paper titled 'Reduced thermoregulatory ability contributes to increased mortality in urban box turtles (*Terrapene* spp.)' published in the *Journal of Thermal Biology*, Volume 130. We analyzed 10 years of data to show that box turtles in an urban park are less effective thermoregulators than their rural counterparts during both hot and cold temperature extremes, likely due to lower habitat quality and reduced movement capacity in the urban environment. We weren't surprised to identify that turtles experiencing extremely cold body temperatures in the winter are less likely to survive the subsequent year. As urbanization continues to degrade landscapes, and as climate change increases the occurrence of temperature extremes, we need to better understand environmental extremes on wildlife in human-altered environments.

Additional updates on FPLL research can be found at <https://www.forestparklivinglab.org/news>

Cuban Crocodiles

If you're an avid follower of our Cuban crocodile work, you may remember that in October of 2024 we successfully exported crocodile samples out of Cuba and into the U.S. for disease testing. Etiam Perez Fleitas, Zapata Crocodile Farm lead biologist, carried the samples safely to St. Louis. This success was many years in the making, and we are so proud of our team's determination. We have begun disease testing on the samples, having already identified the presence of West Nile virus in the crocodiles sampled. The rest of the current testing will be performed in the ICM lab. Expanding on this first health study, we received a Saint Louis Zoo WildCare Institute Field Conservation Research grant to continue sampling crocodiles in Cuba for disease testing. Our goal is to compare farmed and free-living crocodiles of both native species, Cuban and American crocodiles. This will be the first-ever disease identification performed on either species outside of a Zoo setting.

Jamie and Sharon were invited to participate in Cubambiente 2025, the International Convention on Environment and Development in Havana, Cuba (July 1-5). Several other members of the AZA Saving Animals From Extinction Cuban Crocodile group will also attend. Jamie will give two presentations at the conference; on hematology/blood chemistry and identification of infectious diseases in Cuban crocodiles. The SAFE group will have its strategic planning meetings while in Cuba. After the conference, Jamie and Sharon will travel to Zapata for a tour of the crocodile farm as we reassess how ICM may best help the long-term survival of the Cuban crocodile.

Outreach & Education

Community engagement is a key piece of the ICM's mission. We regularly take time away from the field and the lab to spread the word about One Health and conservation medicine. Here's a glimpse of our 2025 outreach activities thus far (and there is much more to come!):

- One Health Fair
 - ▶ On April 5th, the ICM held our annual One Health fair at the Saint Louis Zoo.
- Volunteering at Local Community Events
 - ▶ Earth Day celebration at Forest Park
 - ▶ Endangered Species Day event at Saint Louis Zoo
 - ▶ Green Living Festival at Missouri Botanical Garden
- Presentations at Professional Conferences
 - ▶ Midwest Fish & Wildlife Conference
 - ▶ North American VMX Veterinary Meeting & Expo
 - ▶ North American Bison Summit
 - ▶ EAZWV European Zoo & Wildlife Health Conference, Hungary
- Guest lecturing at local universities
 - ▶ Washington University, St. Louis
 - ▶ Southern Illinois University, Edwardsville
 - ▶ Complutense University of Madrid, Spain



Kate Bureson, ICM Admin Asst., (right) and other Zoo staff, Earth Day, Forest Park



Sharon moderates panel discussion of 'Careers in Wildlife Health and Conservation'.



Grace shared the ICM mission with Saint Louis Zoo guests



(L-R) student volunteer, Sharon, Ellie, and Grace at One Health Fair, Saint Louis Zoo

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

One of the education projects we are most proud of is the One Health Education program for high school students.

Year three of our Institute for Museum and Library Services (IMLS) grant's school year portion has come to an end. Six students from three area high schools participated as paid interns and developed lesson plans focusing on a local One Health case study of their choosing. Unlike previous years, each pair of students selected different topics including the effects of



Mike Dawson, Saint Louis Zoo Educator, practicing environmental sampling with students from Jennings High School

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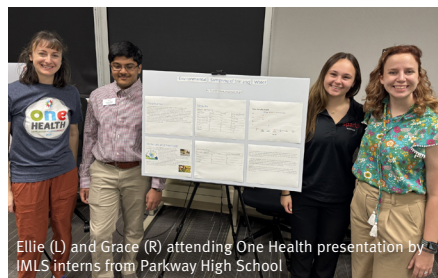


light pollution, forever chemicals (PFAS), *E.coli* outbreaks in the Saint Louis area, and building energy performance standards as they relate to climate change. They then taught their peers the lessons they developed surrounding these case studies, as well as an environmental sampling lab. These lessons will go through an additional review process before being shared online for any educator to utilize in their classroom.

This year was full of successes such as an excellent intern selection process, greater involvement of the school mentors in addition to the Saint Louis Zoo mentors, and five of the six interns continuing into the summer internship. Additionally, our Conservation Education Liaison, Grace Warshaw, gave a 60-minute presentation at the National Science Teaching Association's (NSTA) annual conference in Philadelphia. She shared the work from the first 2.5 years of the project and encouraged attendees to look forward to those student-designed lesson plans. Outside of her presentation she talked about One Health with anyone who would listen and shared about additional ICM projects.



Grace sharing program information at NSTA conference



Ellie (L) and Grace (R) attending One Health presentation by IMLS interns from Parkway High School

we would be unable to continue supporting our part-time zoo educator, school mentors, and summer interns. We pushed through that disappointment and found a solution: the Institute for Conservation Medicine would fund the remainder of the program's activities through August 2025. This would not be possible without the generous contributions from our donors. We are hosting five summer local high school students to help them continue to grow into the next generation of one health practitioners – tomorrow's change makers.

Media Articles

Sharon was interviewed on St. Louis Public Radio about 'Highly Pathogenic Avian Influenza'.
<https://www.stlpr.org/show/st-louis-on-the-air/2025-03-25/bird-flu-should-be-on-all-our-minds-says-st-louis-zoo-epidemiologist>



ICM was mentioned as a collaborator in this feature story on giant tortoises in 'Galápagos: Face to face with a century-old giant' in Canadian Geographic.

<https://canadiangeographic.ca/articles/face-to-face-with-a-century-old-giant/#:~:text=The%20story%20of%20Lonesome%20George,the%20age%20of%20about%20100>

Dr. Stephen Blake, SLU professor and Zoo adjunct scientist, was interviewed by the Wildlife Society for an article titled 'Invasive cedar impedes Galapagos tortoise migration', which refers to research published by Steve, Sharon, and Ainoa.

<https://wildlife.org/tws2024-invasive-cedar-impedes-galapagos-tortoise-migration/>

An article on Gislayne Mendoza (Galapagos lab tech who spent 3 months with the ICM in 2024) and her work with the GTMEP was published by the Galapagos Conservation Trust. This article highlights the paper we published furthering our understanding of infectious diseases in Galapagos tortoises.

<https://galapagosconservation.org.uk/viral-prevalence-in-giant-tortoises-an-interview-with-gislayne-mendoza-alcivar/>

Funding

With recent cuts in Federal funding, ICM has taken a few financial hits in 2025. Our Institute of Museum and Library Services (IMLS) grant was abruptly cut during its 3rd year. In addition to our IMLS funding setback, the National Science Foundation (NSF) and Department of Energy (DOE) grants that we applied for are no longer available. We applied to these two grants in an effort to fund our work within the Forest Park Living Lab and tick-borne disease research in Missouri, respectively.

However, we are very thankful for the Morris Animal Foundation emergency grant and the two Saint Louis Zoo WildCare Institute Field Research for Conservation (FRC) grants awarded. These grants help fund health and conservation work in Cuba, Galapagos and Madagascar.

Lastly, now more than ever, we are appreciative for all our generous supporters. Your contributions help ensure that we continue to work for healthy animals and healthy people. A special thank you to those of you that recently contributed to the ICM General Endowment Fund.



Ellie (center) and four IMLS summer interns turtle-tracking in Forest Park



Publications

We continue to share the results of our research within the scientific community. So far, we've published 11 new research papers in 2025. ICM staff, students, and adjunct scientists indicated in bold:

- **Apakupakul K., Nieto-Claudin A.,** Rakotonanahary T.F., **Catenacci L.S.,** Rasambainarivo F., Randrianarisoa S., Sacristán C., Madueño E., Raphael B.L., and **Deem S.L.,** 2025. Molecular Identification of *Mycoplasma agassizii* in Confiscated Tortoises in Madagascar. *Journal Wildlife Diseases*. Vol 61, Pages 258-261. [DOI: 10.7589/JWD-D-24-00040](https://doi.org/10.7589/JWD-D-24-00040)
- Bamunuarachchi G., **Najera F.,** Aziati I.D., **Palmer J.L.,** Biro E.G., Wang D., **Deem S.L.,** Boon A.C.M., and Adalsteinsson S.A. 2025. Serosurveillance Identifies Bourbon Virus-Neutralizing Antibodies in Bobcats, Coyotes, and Red Foxes in Missouri. *Vector-Borne and Zoonotic Diseases*. Vol. 25, No. 4, Pages 287-294 [DOI: 10.1089/vbz.2024.0076](https://doi.org/10.1089/vbz.2024.0076)
- Brunner T.J., **Deem S.L.,** Stevens C., Romano Noriega J., and **Nieto-Claudin A.** 2025. *Aphanoascella galapagosensis* Shell Lesion Coverage of Free-Living Galapagos Tortoises: Implications for Health and Conservation. *Journal of Wildlife Diseases*. [DOI: 10.7589/JWD-D-24-00118](https://doi.org/10.7589/JWD-D-24-00118)
- **Deem S.L.** 2025. Chapter O: Veterinary Medicine and One Health. Diversity, Equity, and Inclusion in Veterinary Medicine, First edition. John Wiley & Sons Publishing. Pages 163-169. [ISBN: 978-1-394-21710-6](https://doi.org/10.1002/9781119421710.ch16)
- Donovan E.B., **Blake S., Deem S.L.,** Moldowan P.D., **Nieto-Claudin A.,** Cabrera F., Peñafiel C., and Bastille-Rousseau G. 2024. Using Non-Continuous Accelerometry to Identify Cryptic Nesting Events of Galapagos Giant Tortoises. *Animal Biotelemetry* 12, 32. [DOI: 10.1186/s40317-024-00387-w](https://doi.org/10.1186/s40317-024-00387-w)
- Lobato O.L., Nogueira T.D., Tavares Lima T.E., de Costa Andrade F.J., Guimarães de Macedo M.G., Pereira R.D., Xavier J., Amorim M.R., Barbosa P.P., da Rocha A.S., Silva S.D., Alcantara L.C.J., de Souza W.M., Proenca-Modena J.L., Costa E.A., Lima Neto A.S., Feitosa L.C.S., Cruz M.D.P., de Sousa Silva S.M.M., França Baêta S.D., e Silva Vieira M.A.D., **Deem S.L., Catenacci L.S.** 2025. Orthoflavivirus nilense surveillance in the State of Piauí, northeastern Brazil. *Mem Inst Oswaldo Cruz, Rio de Janeiro*, Vol. 120: e240218. [DOI: 10.1590/0074-02760240218](https://doi.org/10.1590/0074-02760240218)
- **Mendoza-Alcívar G., Deem S.L.,** Esperón F., and **Nieto-Claudin A.** 2025. Viral Prevalence in Galapagos Giant Tortoises. *Journal of Wildlife Diseases*. Vol. 61(2), Pages 542-547. [DOI: 10.7589/JWD-D-24-00177](https://doi.org/10.7589/JWD-D-24-00177)
- **Nieto-Claudin, A.,** Zeas-Bermeo, S., Guillén-Liger, M. P., **Deem, S. L.,** Sacristán, C., **Mendoza-Alcívar, G.,** & Caroca-Cáceres, R. 2025. Fungi Matter: *Aphanoascella galapagosensis* Associated with Carapace Lesions in Free-Living Galapagos Tortoises. *Mycopathologia*, 190(3), 1-10. [DOI: 10.1007/s11046-025-00955-5](https://doi.org/10.1007/s11046-025-00955-5)
- Saggese M.D., **Deem S.L.,** Ferreyra H., Romano M.C., Ferreyra-Armas M.C., Vanstreels R.E.T., Halperin P., Guida N., Moras E.V., Nosedá R.P., and Uhart M.M. 2025. Health Assessment of Three Species of Free-Living Raptors Inhabiting a Pampas Agroecosystem in Central Argentina. *Journal of Raptor Research*. 59(1):jrr2425, Vol. 59, No. 1, Pages 1-18. [DOI: 10.3356/jrr2425](https://doi.org/10.3356/jrr2425)
- **Uiterwaal S., Palmer J.L.,** Farook S., **Deem S.L.,** Taylor C., and **Blake S.** 2025. Reduced thermoregulatory ability contributes to increased mortality in urban box turtles (*Terrapene* spp.). *Journal of Thermal Biology*, Volume 130, 104135. [DOI: 10.1016/j.therbio.2025.104135](https://doi.org/10.1016/j.therbio.2025.104135)
- Worsley-Tonks, K.E. L., Angwenyi, S., Carlson, C., Cissé, G., **Deem, S.L.,** Ferguson, A.W., Fèvre, E.M., Kimaro, E.G., Kimiti, D.W., Martins, D.J., Merbold, L., Mottet, A., Murray, S., Muturi, M., Potter, T.M., Prasad, S., Wild, H., and Hassell, J.M. 2025. A framework for managing infectious diseases in rural areas in low- and middle-income countries in the face of climate change – East Africa as a case study. *PLOS Glob Public Health* 5(1): e0003892. [DOI: 10.1371/journal.pgph.0003892](https://doi.org/10.1371/journal.pgph.0003892)

Employee Spotlight

Ainoa Nieto Claudín

DVM/Ph.D. - Associate Researcher



Ainoa has been passionate about wildlife since she was a kid. From the age of 5, she knew she wanted to be a veterinarian. Over time, she observed how humans were impacting the planet and protecting wildlife and their habitats became her passion and leitmotif. From 2011 – 2022, Ainoa lived in Galapagos. Her favorite part of being a wildlife vet is being in the field, forest and ocean, working with animals in their natural habitats and feeling part of their world. Ainoa also enjoys working on hands-on educational and outreach activities.

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Ainoa's Notes on Life on Galapagos:

- When you live in a place with limited space and resources, you rethink habits and learn to make intentional choices about everything from importing food to managing waste. You become very connected to and protective of your environment.
- Work with tortoise hatchlings is a unique privilege. "Helping these babies as they start life, and wondering how many will reach adulthood and be alive in 100 years is a thrilling thought."

Since 2016, Ainoa has been funded by the ICM and assisted with our efforts in Galapagos, Madagascar, and Cuba. Her knowledge and dedication to conservation medicine have been integral to our success over the last nine years. One of Ainoa's favorite experiences with the ICM was "Working in one of the most remote areas of southern Madagascar with an incredible team of female scientists; learning and sharing with them."

In July, we will say farewell to Ainoa as she moves on to the next chapter in her career. She plans to continue working on global wildlife conservation, promoting One Health initiatives, supporting local communities, and gender equity. We wish her the best and continued success in the future.



Ainoa with Galapagos tortoise nest and hatchlings

We hope you enjoyed this newsletter. Thank you for supporting the ICM. Your support helps us continue our work and support for the next generation of conservation medicine practitioners.

If you would like to contribute to support the ICM, please go to the Saint Louis Zoo website (stlzoo.org), select GIVE in the upper right, and select "General Gifts and Conservation Contributions" near the bottom. Under Ways to Give, use the dropdown menu to select the Institute for Conservation Medicine. We are also happy to accept old fashioned paper checks mailed to:

Institute for Conservation Medicine
Saint Louis Zoo
P.O. Box 790290
St. Louis, MO 63179-0290

To learn more about how you can contribute to the future of the ICM, contact Director Dr. Sharon Deem at (314) 646-4708 or deem@stlzoo.org. Our wish list includes paid internships, post-doctoral fellows, and a mobile molecular lab to assist Dr. Lilian Catenacci with her One Health research in Brazil.

For more information on the Institute for Conservation Medicine, visit stlzoo.org/ICM.

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.