Quarterly newsletter of the Wildlife Disease Association

THE QUARTERLY

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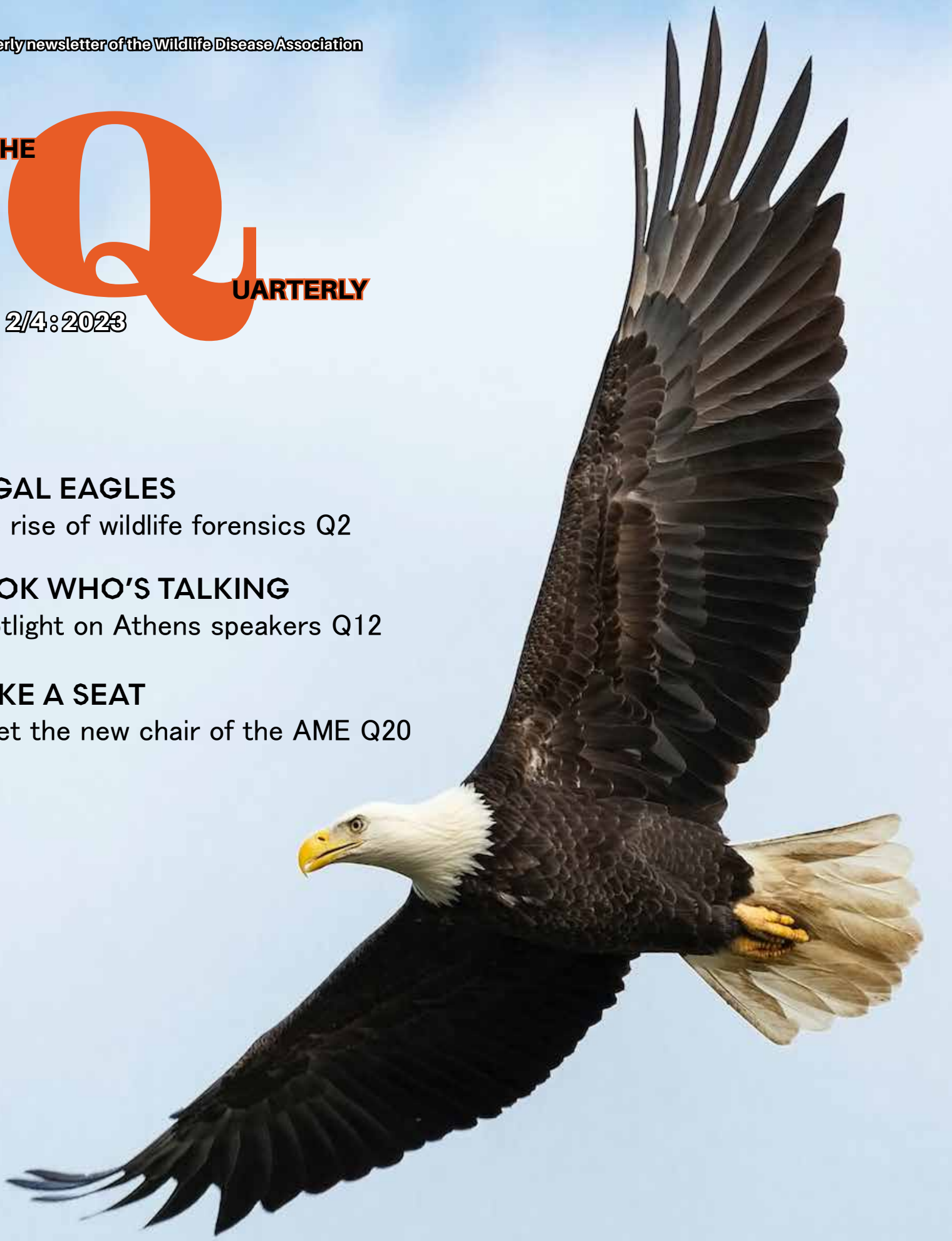

CUTTING EDGE CONSERVATION

BY LYNDELL WHYTE

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In the past two decades Hollywood would have you believe that forensics is all about lashings of luminol, constipated contemplation and boffins in basements, but the reality is the dedicated professionals who help solve wildlife crime around the world are an integral part of a global conservation collaboration, often seeking justice for a single victim and entire species.

Dr Tabitha Viner is a veterinary forensic pathologist at the US Fish and Wildlife Service's National Fish and Wildlife Forensics Laboratory, the only dedicated wildlife forensic lab in the United States. She is also the past president of the International Veterinary Forensic Sciences Association.

According to Dr Viner there is still no clear universally accepted definition of wildlife forensics.

"Taken literally, wildlife forensics is the application of scientific tests or techniques (which would include ballistics, pathology, species ID, tire tracks, etc) for the purpose of law on wild animals," she explained.

"Slightly more clear-cut, veterinary forensics is focused on seeing and documenting anthropogenic effects on animals for the purpose of law. We work under laws pertaining to abuse, neglect and cruelty of domestic animals, as well as illegal wildlife take."

At Dr Viner's lab in Oregon, a veritable ecosystem of skills is brought to bear on an investigation including morphology, genetics, chemistry, toxicology, the aforementioned ballistics and pathology and more. None of these in isolation are specifically 'forensic' in nature, but the way in which they are applied makes them so. They help confirm if a crime has been committed, often through an initial species identification, and then what that crime actually is.

"Forensics is another arrow in the quiver of conservation. It's a positive thing, protecting species and helping to enforce the law," Dr Viner said.

Working closely with more than 200 United States' Special Agents and Wildlife Inspectors, the team of 30 also collaborates with CITES and INTERPOL's Wildlife Crime Working Group.

Domestically, the lab deals primarily with species covered by federal legislation such as those that are endangered and protected, which means species identification is the holy grail from which all else flows, but it is definitely not the whole story.

"Death can be just the starting point," Dr Viner said.

For example, the federal facility was involved in the case against Duke Energy who was prosecuted in Wyoming for violating the US federal Migratory Bird Treaty Act (MBTA). It was found that two of their wind turbine projects resulted in the death of protected birds including 14 golden eagles, just one of the 1000 species covered by the legislation. A further 149 species were also victims of the infrastructure.

As a result Dr Viner and her team are currently compiling a database of injuries allowing those working in a forensic capacity to identify the difference between physical trauma caused by a wind turbine and that caused by, say, a car strike.

"It is vital to publish these findings to create a strong, solid and legal foundation."

In addition, the lab has also weighed in on oil spills and the ensuing wildlife deaths, like that which occurred with Deepwater Horizon.

"We have to prove the cause of death was the oil itself, not an underlying illness," Dr Viner said.

In cases like this the Oil Identification System which can identify the chemical composition and hence the origin of the oil, is a vital resource.

The team has also been called upon to examine domestic and wild animals under the Federal Insecticide, Fungicide and Rodenticide Act to verify they have died from a substance covered by this law.

Of all the specimens the lab receives annually, bald and golden eagles make up the lion's share, between 25 and 40 per cent, primarily due to the range of legislation which protects them.

"The vast majority of species we see are avian because

Dr Tabitha Viner undertakes a necropsy on an eagle.

there are not as many federal laws covering mammals," Dr Viner said.

Despite this, the lab has pulled fingerprints from items like wolf tracking collars and even shotgun cartridges.

Dr Viner attributes the rise in her field of forensics to the ever-increasing connections between wildlife crime and other types of trafficking like those associated with drugs and people smuggling.

"Crimes against animals are becoming a greater priority because of these links," she said.

The importance of these links is obvious to Dr Milena Salgado Lynn who is based at the Wildlife Health, Genetic and Forensic Laboratory in Sabah, Malaysia.

The Sabah Wildlife Department's (SWD) lab on the island of Borneo, currently co-managed by Conservation Medicine/EcoHealth Alliance, and Danau Girang Field Centre, was expanded in 2011 with funding from the EcoHealth Alliance in order to undertake research in wildlife health, genetics and forensics. For almost ten years the lab focused primarily on novel virus discovery and population genetics, but the recognition of the impact of the illegal trade coupled with increased pressure on the country's National Wildlife Forensic Laboratory inspired an evolution.

So in 2019 with help from TRACE Wildlife Forensics Network, Dr Salgado Lynn and her team began the process of gaining critical ISO accreditation for the SWD's forensic unit, most of the funding for which comes from the US State Department's Bureau of International Narcotics and Law Enforcement Affairs (INL).

"Wildlife crime is number four after drug dealing and arms and people, [in terms of organised crime] and very often everything is connected, so someone who is involved in wildlife trafficking will very often be involved either in drug trafficking or human trafficking or even in black market arms, because these poachers and hunters need to get their arms from somewhere," Dr Salgado Lynn explained.

"All of that at some point is of interest to the US … because once you can identify species and potentially identify the origin so you can identify the trafficking routes. That is the major thing that the US is interested in because it helps dismantle routes that are affecting not only the US but also other places.

"INL has supported the development of our forensic unit and also our intelligence unit, and our intelligence is telling us locally there is definitely a trade in song birds, and the forensic unit is already identifying species through feathers or meat, but eventually we might be able to identify the regional origin of the products."

The strategic importance of Malaysia cannot be overstated. It is a consumer country for legal and illegal wildlife products, but it's also a transport route and a source. In addition, Sabah's socioeconomic challenges and underfunded enforcement make it vulnerable to exploitation by criminal networks.

"So if you fortify a place like Sabah they have to find another route; they have to find another place to move things."

This single fact more than any other shows that these types of forensic labs are cogs in the much bigger process of tracking global crime and criminals.

While the lab's sole focus currently is DNA identification, the forensic unit also trains wildlife officers to properly collect samples. This helps maintain sample purity and minimises disease transmission.

“Some of the things we have done with the wildlife officers is try to involve them more in understanding the potential risks they have when they go into a crime scene to collect the evidence. Sometimes they are completely covered in PPE or at the minimum using double gloving or the N95 respirator, depending on what species they are seeing.

“There is definitely … very real overlap between wildlife forensics and disease transmission, but that connection hasn’t been explored in full. But that’s where a potential project … can work … simply visiting a wet market and if there are protected species being sold, which are the species and how are things being handled; understanding how the sellers and the hunters are handling this bush meat and also what type of disease can be found in these pieces of meat and carcasses. That hasn’t been done yet in Sabah …”

According to Dr Salgado Lynn, of the wildlife the forensic unit has identified, most is the product of local poaching for local consumption or trophies such as wild boar or barking deer … but things are ramping up with pangolin and sun bear products confirmed.

The unit has also encountered banteng, a type of wild cattle. It’s a totally protected species and the most endangered mammal in Sabah.

“Information indicates that these come with criminal networks. In camera traps you see the types of weapons … and the types of vehicle being used … that’s not the local hunter that lives nearby and it’s not shot to feed a family or the community.”

Then there are the more unusual cases.

“We have seen things sold as bear bile that are actually from pigs … claws we have seen are definitely sun bear and some of the teeth are definitely sun bear … but some we have seen [are] plastic.”

The growth of this vital forensic operation could not have happened without the political will to facilitate it, and fortunately for the Sabah team, that will is definitely there.

Their presence is also helping boost prosecutions, but with 70 staff, 70,000 hectares of land to oversee and less than five prosecutors, Sabah’s Wildlife Department faces an uphill battle.

“Even with those limitations prosecution was happening. Not many cases as yet have been prosecuted which have included DNA forensic reports. But at least it is starting to be incorporated.”

Dr Salgado Lynn’s team has identified illegally harvested parts from protected animals like sun bears.

As the co-founder of the TRACE Wildlife Forensics Network, Professor Rob Ogden is acutely aware of the symbiotic relationship between forensic science and law enforcement, which is why in recent years the organisation has pivoted slightly in its approach.

“The role of the forensic scientist is not to find somebody guilty but to understand and identify the evidence and help inform law enforcement and prosecutions,” he said.

“Originally we started working exclusively on lab development with countries … But we have also started moving … into the upstream and downstream processes, so from crime scene to courtroom in terms of evidence, because we were finding we would help to establish a laboratory service in a country but the evidence wouldn’t arrive in the lab in a secure fashion so the chain of custody was already broken … or in other cases we would produce a report which would be misunderstood and misrepresented in court because prosecutors and the judiciary didn’t understand how to deal with the evidence.

“We’ve got investigator awareness, we’ve got prosecutor awareness, we got crime scene capacity

and we've got lab capacity, and unless we lift those off the ground almost simultaneously, then there'll be a missing link in that chain."

Currently TRACE works with around ten governments in Africa and five in Southeast Asia in what Professor Ogden describes as "key" partnerships, but the global nature of the wildlife trade presents some significant enforcement obstacles.

"The stereotypical example is a poaching scene, but in actual fact within any crime … you may have multiple crime scenes associated with that.

"The entire process of the transport of those materials, for example out of Africa, usually to Southeast Asia, then point of sale or various points of sale in terms of the supply chain … all of those constitute potential crime scenes. So your classic image of a crime scene will be the poaching scene, but often if you are looking to investigate organised crime you are more interested in the points at which multiple poached products come together.

"That's one of the challenges … if something is intercepted in Southeast Asia and it's from Africa, you can usually tell that by the species distribution. If it's a protected species, the people who are found with it will normally be prosecuted in Southeast Asia and that will often be the end of it, but understanding exactly how it got to Southeast Asia and who was involved is important.

"If you look at the drug trade there is a big vested interest in many of the destination countries in really understanding the trade routes and forcing the investigations back up the pipeline, because it is causing a huge amount of criminality in the country where the end-user market is, but if you compare that with wildlife that's not the case. The countries that are receiving it are acknowledging that it is an illegal product but it's not causing massive damage socially … and you don't tend have quite so much impetus to address the problem at source.

"The majority of investigations are still very much based on the person who's been caught or the person who is directly implicated, rather than the higher level organised crime."

Then there's the ethical dilemma of spending millions funding labs to investigate wildlife crime in a chosen country while rapes and murders go unsolved due to a lack of human forensics capacity.

Commercial arrangements too muddy the enforcement waters.

"The big challenge is areas where you have both illegal and legal trade of the same species … like fisheries and timber. A rule of thumb is that up to 20 per cent of that may be illegal, but you've got multibillion dollar legal industries so you're trying to identify laundered material in an otherwise legal trade and that's much more difficult … species ID is no longer relevant and it becomes much more about differentiating the source and whether that source is legal or illegal in terms of harvest."

So who's winning … the wildlife or the criminals?

"It feels like with regard to the illegal trade it's probably relatively stable which is not great, but there are some pockets of good news … in terms of forensics capacity, it is increasing … in terms of its impacts on prosecution and law enforcement, that's also definitely increasing … but the global picture in terms of illegal trade is definitely mixed.

"We've still got huge issues with loss of habitat and rampant overfishing and over-exploitation of marine resources … when it comes to the illegal trade, what most of us are trying to do is buy time to allow societies in many different countries to alter their behaviours. If the demand disappears for these types of products then the impact of the illegal wildlife trade almost disappears … so it is about education, demand reduction, trying to reduce the monetary value of these products for medicinal use or ornamental value - if we can change those habits then that would be the easiest way to stop the wildlife trade.

"The goal of most forensic scientists is to almost disappear … the better we are at investigating crime, the lower the chances that someone is going to do it because it becomes more high risk … ultimately the objective is to have no wildlife crime and we'd all be out of job."

Dr Don Forrester

1937-2023

Don and Mike Kinsella in the Bob Marshall Wilderness in 2006. Mike remembers it was a place where Don was truly in his element.

On April 1, the wildlife health community lost one of its most influential members and the WDA one of its elder statesmen - Dr Don Forrester.

A WDA Stalwart - Member memories

A JWD editor in the early '80s, he was largely responsible for the current journal format as well as improving the quality of the articles and the presentation, weathering the criticism for those changes. He also served as President, Vice President, was a prominent, active member of Council and a vocal advocate for WDA values, receiving the Emeritus Award in 2004.

In addition, Dr Forrester was the first WDA officer to visit the Australasian Section (when WDA had little money and funding travel was a big deal) and be part of a large conference 'Down Under', at a seminal time in the organisation's evolution.

A Life Well Lived - Dr Mike Kinsella

Donald Jason Forrester was born January 31, 1937 in Attleboro, Massachusetts. Growing up in a rural area of Mansfield, he took to the woods at an early age and began a lifelong fascination with wildlife.

As a teen, he took a correspondence course in taxidermy and made whole mounts of woodchucks, ducks and fish. After graduating from high school, he traveled to western Washington to spend a summer as a fire lookout on towering Icicle Ridge. The following summer he worked at a wild west show, staging bank robberies and escaping by vaulting onto a running horse.

Upon graduating from the University of Massachusetts with a B.S. In Wildlife in 1958, Don once again headed west to the University of Montana in Missoula to

study lungworm-pneumonia complex in bighorn sheep under Clyde Senger. Here he met and married a botany student named Gabriele Muhling. Their next stop was the University of California, Davis where Don completed his PhD on host-parasite relations between inbred and wild mice and nematodes of the genus *Heligmosomum* in 1967. Their first son, Nathan, was born in Davis.

After a brief two-year stint at Clemson University, Don accepted a position at the University of Florida Veterinary School in Gainesville in 1969, where he would remain for the next 35 years.

He established a close relationship with Lovett Williams of the Florida Game and Freshwater Fish Commission and began a long-term study of the parasites and diseases of wild turkeys.

During this time, Don and Gabe adopted a Korean orphan they named Rebecca and had a second son, Mark.

At the end of his career, Don summarized the breadth of his studies in two landmark books; Parasites and Diseases of Wild Mammals in Florida (1992) and Parasites and Diseases of Wild Birds in Florida (2003) (with Marilyn Spalding). His peer reviewed publications approached 200. Along the way, he mentored 17 Master's students and 4 PhD candidates.

Don Forrester was a gentle and deeply religious soul and the type of Christian who practiced what he preached. Along with members of his beloved Creekside Community Church, he made multiple trips to Haiti over the years where he ministered to poor Haitians' physical and spiritual needs.

Don and Gabe took daily care of their son Mark, who had profound physical and mental deficits, for 50 years. He lost Gabe in 2017 and Mark in 2021.

We were friends for 57 years and shared one last grand adventure together in 2006 on a five-day pack trip through Montana's Bob Marshall Wilderness, where he was in his element. I choose to remember my friend on that last morning, sipping coffee contentedly by the campfire in his beloved outdoors.

Don Forrester (centre) with long time lab assistant Garry Foster (left), grad student Don Coyner (right) and Martin Young (sitting).

Formative Years in Florida - Ellis C. Greiner, Professor Emeritus

Don and I got to know each other when he took a sabbatical at Memorial University of Newfoundland in 1978 where I was a research associate.

When I returned to the States, Don asked me if I would join him in teaching veterinary students. I accepted and we began a long career of joint projects dealing with parasites of wildlife.

We taught the parasitology course together and in his first year of teaching veterinary students, he was elected teacher of the year by the sophomore class he taught.

He decided to spend his teaching efforts on a graduate wildlife disease course. This was a popular course.

While at UFL, he was editor of JWD, president of WDA, and received the organisation's Emeritus Award. He was selected to be a UF Research Fellow and upon retirement he received Emeritus status. Don continued to have graduate students and conduct research. He developed strong relationships with his graduate students.

"... in his first year of teaching veterinary students, he was elected teacher of the year by the sophomore class he taught."

Don had a broad array of species he studied, but the primary animals were wild turkeys, white-tailed deer, black bears and wading birds. During this time period, he published about 230 research publications and two major compendiums: Parasites and Diseases of Wild Mammals in Florida, and with a former graduate student, Marilyn Spalding, Parasites and Diseases of Wild Birds of Florida.

Don had a special ability for editing and he reviewed all of my research papers before submission to journals.

Don was responsible for having Martin D. Young, a world renown human malariologist visiting as a researcher in the department, primarily in his lab.

Don met botanist Gabe while they were both studying in Montana.

When I first arrived in Gainesville in 1978, his primary program was studying wild turkey blood parasites.

I was invited to go on some interesting field trips to the wilds of south Florida in a place called Fish Eating Creek. Florida Fish and Game had a nice trailer there that we used as a base camp.

During my first trip there, one of the F&G biologists took us on a ride through the wildlife area and part of this was driving though the creek.

I was a little nervous when the water depth was nearly up to my window. I think this was something that all novices experienced. We climbed out of the water and the old hands had a good laugh at the look on my face. The vehicle was fitted with a vent system that allowed moving through such deep water and was all-wheel drive.

We spent a lot of time there placing turkey poults in predator-proof cages and exposing them to mosquitos. We also used various traps to prove the potential vectors were feeding on the poults.

Yes, we also were fed upon by the biting flies we were studying.

Dr Marie-Pierre Ryser

1971-2023

It is not always clear to family members what a mother, daughter, sister, niece, or cousin does through their work, beyond the little they bring home in the evening or share at family gatherings.

Often these jobs are perceived in a cartoonish way: “she cuts up dead animals”, “she keeps watch all night in the mountains for a lynx”.

Sometimes it is because the person is not scientifically literate, sometimes it is to avoid the feeling of annoying the relatives.

Often, and it was the case for Marie-Pierre, it is by humility and modesty.

Marie-Pierre’s contribution to the influence of Switzerland and Europe in the research and conservation of wildlife at a regional and global scale has been major. To achieve this goal, which she set for herself and her colleagues, she spared no effort.

She was an exceptional scientist, in the sense that she knew how to ask the right questions and how to answer them with rigorous methods. She was particularly devoted to the lynx, an endangered and poorly known species, for which she made great efforts to seek and analyze relevant information.

Her rare talent to understand the interdisciplinary approach needed to investigate wildlife diseases made

her one of the key people in the development of the European network of experts in the field. She was part of or instigated many initiatives, and the one she was most proud of was the EWDA network she founded with Dolores, Christian and Thijs.

She was the president of the EWDA for two terms during which time all members of the board unanimously commended her for her rigor, her innovative ideas, and her kindness. Thanks to her, members of the association now benefit from research grants and clear guides for the implementation of monitoring networks.

Her commitment to sharing her knowledge and training professionals in the field of wildlife health has also extended beyond Switzerland. Her students have presented their work at numerous international conferences and have often received awards, a testament to the quality of their work.

She also gave much of her time to the students, attending workshops or conferences they organized at every opportunity, always ensuring awards and scholarships were available to them. Many of these students are now wildlife professionals and remember this charismatic mentor fondly, as the unanimous testimonials attest.

In addition to her key role in these bodies, she actively participated in several international working groups such as the Wildlife Group of the World Organization for Animal Health, to name just one. This may seem trivial to the layman, but all this work has had as much impact on the health of wildlife as on that of domestic animals and humans.

Finally, how can we not talk about her personality? With her sense of humor, her contagious laugh, her enthusiasm and her interest in others, few people who crossed her path remained unaffected by her charm. Her dedication and the bright energy she willingly shared made her more than a colleague to many of us.

She was also demanding, for herself and for others, no doubt the other side of the coin of integrity and rigor.

She leaves us all with an immense legacy.

Marie-Pierre, you leave us orphans of an exceptional scientist, an extraordinary colleague, and an outstanding friend. But your legend has only just begun and will continue to inspire many generations to come.

This is a promise we make to you and your family.

- Karin Lemberger

Pictures by Dres Hubacher from "We don't just need sharp minds – we also always need hiking boots"

Forum for free thought

With a reputation for big ideas and innovative thinking, WDA's Athens scientific program promises to be brave, innovative and utterly unique. Meet the speakers set to challenge and inspire at the 71st Annual International Conference of the Wildlife Disease Association.

The AAWV Al Franzmann Award Speaker

Sara Parker-Pauley - Director, Missouri Department of Natural Resources - Sara.Pauley@mdc.mo.gov

A native of Columbia, Pauley received both her law degree and bachelor's degree in journalism from the University of Missouri – Columbia, and did post-graduate studies in Australia as a Rotary Fellow.

Pauley began her professional career as a Policy Analyst with the Missouri Department of Conservation from 1993 to 1996. She previously served as Director of the Missouri Department of Natural Resources from 2010. She has worked as project manager for D.J. Case & Associates, a natural resources communications firm, and as a deputy director for the Missouri Department of Natural Resources.

She has been an instructor at the University of Missouri's School of Natural Resources, teaching a course in natural resource policy and administration. She also served as President of the Association of Fish & Wildlife Agencies.

Over the years, though her career path varied, it has never strayed far from her personal desire to be engaged in the stewardship of Missouri's natural resources.

Carlton M. Herman Founder's Fund, Cutting Edge Speaker

Raina Plowright - Professor, Cornell Atkinson Scholar, Cornell Atkinson Center for Sustainability :: Department of Public and Ecosystem Health, College of Veterinary Medicine, Cornell University - rkp57@cornell.edu

TOPIC: Could we prevent the next pandemic by stopping pathogen spillover?

Raina Plowright is a professor and Atkinson Scholar at Cornell University.

She leads transdisciplinary teams to develop the science of pandemic prevention through understanding the factors that lead to pathogen spillover. Her research focuses on the dynamics of zoonotic pathogens in reservoir host species, with a focus on W.H.O. priority pathogens in bats.

She was recently elected as a Fellow of the American Association for the Advancement of Science for her contributions to emerging infectious disease biology. She has been an Australian-American Fulbright Fellow, an Australian Centenary Scholar, a DARPA Young Faculty Awardee, and a David H. Smith Fellow in Conservation Research.

Keynote Speakers

Nadine Lamberski - Chief Conservation and Wildlife Health Officer for the San Diego Zoo Wildlife Alliance - nlamberski@sdzwa.org

TOPIC: Applying a One Health Approach to Conservation Programs

Dr. Lamberski leads a unified team of conservation scientists, conservation practitioners, wildlife nutritionists, and wildlife veterinary professionals, cultivating a strategic approach to conservation efforts. She is aligning SDZWA with other global conservation organizations by supporting strategic initiatives that protect and restore biodiversity; advance wildlife sustainability, health, and well-being; promote human-wildlife coexistence; share knowledge and benefits equitably; and, cultivates partnerships and conservation leaders. She is a graduate of UGA's CVM, completed an internship at the UT CVM and Zoo Knoxville and a zoological medicine residency at UCD SVM.

She worked at Riverbanks Zoo in South Carolina before joining the veterinary team at the San Diego Zoo Safari Park in 2001. In 2016, she joined SDZWA's executive leadership team. Dr. Lamberski has focused her career on the health and well-being of zoological species, as well as on the impacts of disease on the conservation of small, fragmented wildlife populations. Field experience includes studying black-footed cats in southern Africa, thick-billed parrots in northern Mexico, desert tortoises in the southwestern US, and working with partners at the Reteti Elephant Sanctuary in northern Kenya. Dr. Lamberski is a past president of the American Association of Zoo Veterinarians and is an adjunct professor at the UCD OHI and the WHC. She has contributed to over 100 scientific publications and presentations, and is currently a co-editor for Fowler's Zoo and Wild Animal Medicine textbook.

Mamie Parker - Former Head of Fisheries, U.S. Fish and Wildlife Service :: Commissioner, Virginia Department of Wildlife Resources - mamie@mamieparker.com/mamie.parker@comcast.net

TOPIC: Passion, Inspiration and Excellence in Collaboration.

Dr. Mamie Parker is a professional fish and wildlife biologist, a conservation success coach, and principal consultant at the Ecologix Group, Inc. with clients at the Maryland Port Administration, the William J. Clinton Presidential Center, the Bureau of Land Management, and U.S. Fish and Wildlife Service (FWS).

Holding a Ph.D. in limnology from the University of Wisconsin, she spent 30 years as a biologist and senior executive in the federal government, and was the first black Chief of Staff and Regional Director at the U. S. Fish and Wildlife Service. She has served in a variety of positions in Wisconsin, Minnesota, Missouri, Massachusetts, Georgia, and Washington, D.C. Appointed by Virginia Governor Terri McAuliffe, Dr. Parker serves as chair of the Department of Wildlife Resources Commission and on the Board of Directors of The Nature Conservancy-Virginia Chapter, Duke University NSOE, American University SPA, the Chesapeake Conservancy, and the Chesapeake Bay Foundation (cont'd next page).

Keynote Speakers

A member of the Board of Directors of the National Wildlife Federation, she organized and moderated a series of roundtables and a national town hall meeting on Creating Safe Spaces in the outdoors. She is currently the chairwoman of the Student Conservation Association (SCA), the first Black woman to be elected to this position. Dr. Parker has received numerous state and federal recognitions for her work, as well as awards from numerous professional organizations.

Elizabeth F. Pienaar, PhD - Associate Professor – Human Dimensions of Wildlife Conservation, Warnell School of Forestry and Natural Resources - elizabeth.pienaar@uga.edu

TOPIC: Engaging People in Disease Management – Using Social Sciences to Assess How the Public and Key Stakeholders Can Be Integrated into Efforts to Prevent the Introduction and Spread of Pathogens

Dr. Elizabeth Pienaar is an Associate Professor of Human Dimensions of Wildlife Conservation in the Warnell School of Forestry and Natural Resources, University of Georgia.

She specializes in the application of social sciences theories and methods to understand how the public and key stakeholder groups can be engaged in efforts to mitigate the invasion and disease risks associated with the live wildlife trade. She also engages in collaborative research with state and federal agencies to identify how agencies can better engage with key stakeholder groups.

Prior to her appointment to the University of Georgia, she worked at the University of Florida and New York University. She earned her PhD from the University of California – Davis.

Joanna L. Shisler, PhD - Program Officer for Symbiosis, Infection & Immunity, Division of Integrative Organismal Systems, Biological Sciences Directorate, National Science Foundation - jshisler@nsf.gov

TOPIC: NSF Funding Opportunities from a Program Officer

Dr. Joanna Shisler is a Program Director at the National Science Foundation. She started this position in 2021. Before that, she was a Professor in the Department of Microbiology at the Univeristy of Illinois in Urbana-Champaign.

Her expertise is virology and understanding how viruses evade immune responses, and how viruses are transmitted in the environment.

The purpose of this talk is to remind you about funding opportunities at the NSF and to provide this initial introduction to Joanna.

Keynote Speakers

David E. Stallknecht, PhD - Professor Emeritus - SCWDS, College of Veterinary Medicine, University of Georgia - dstall@uga.edu

TOPIC: People, Passion, and Purpose: An Influenza Story

David Stallknecht is an emeritus professor in the Department of Population Health, College of Veterinary Medicine, University of Georgia (UGA), a former Director of the Southeastern Cooperative Wildlife Disease Study (SCWDS), and a former editor of the Journal of Wildlife Diseases. He has been with SCWDS for over 40 years and a WDA member since 1988.

Dr. Stallknecht received his PhD in epidemiology and community health from Louisiana State University and his MS in wildlife biology from UGA. His research interests currently focus on the epidemiology of two diseases that directly affect wildlife health or indirectly affect domestic animal or public health - hemorrhagic disease in deer and avian influenza in ducks and shorebirds.

Welcome Adresses

Dale Greene - Dean, Warnell School of Forestry and Natural Resources, University of Georgia - wdgreene@uga.edu

W. Dale Greene became Dean of the Warnell School of Forestry & Natural Resources in June 2015.

He joined the faculty in 1986 and is known for his research and teaching focused on improving the economic and environmental performance of the wood supply chain. He was twice appointed by Governor Sonny Perdue to the Georgia State Board of Registration for Foresters, and has been active throughout his career in the Georgia Forestry Association and the Georgia Forestry Foundation. He served two terms on the Board of Trustees of the American Forest Foundation.

His recognitions include all three teaching awards given by the Warnell School, the Outstanding Research Award from the Southeastern Society of American Foresters, and the Wise Owl Award from the Georgia Forestry Association. The Society of American Foresters named him to the Georgia Forester's Hall of Fame in 2007 and recognized him as Fellow in 2022. Greene and his graduate students are three-time recipients of the National Technical Writing Award from the Forest Resources Association.

In 2017, he was awarded the International Forest Engineering Achievement Award by the Council on Forest Engineering. Greene holds a Ph.D. from Auburn University.

He received his B.S. from LSU and his M.S. from Virginia Tech. He and his wife Jeanna are forest landowners in Georgia and Arkansas.

Welcome Adresses

Tina Johannsen - Assistant Chief of Game Management, Georgia Department of Natural Resources - Tina.Johannsen@dnr.ga.gov

Dr. Tina Johannsen is a wildlife biologist currently serving as an Assistant Chief in the Game Management Section of the Georgia Wildlife Resources Division.

She is fortunate to supervise the game species, private lands, and urban wildlife programs for WRD. She holds a B.S. and M.S. in Wildlife Management from the University of Georgia as well as a Ph.D. in Wildlife Ecology from Texas Tech University.

She served as the deer and elk program coordinator for Kentucky Fish and Wildlife Resources for 8.5 years before moving back home to Georgia.

She enjoys hunting deer, turkey, and waterfowl with friends and escaping the office to handle any kind of critter or just be outside.

Lisa Nolan - Dean, College of Veterinary Medicine, University of Georgia - Lisa.Nolan@uga.edu

Dr. Lisa K. Nolan is the Georgia Athletics Association Distinguished Professor and Dean of the University of Georgia's College of Veterinary Medicine.

Prior to joining UGA, she served as professor and Dean of Iowa State University's College of Veterinary Medicine. She was also the Gehrts Presidential Professor and Founding Director of the Great Plains Institute of Food Safety at North Dakota State University.

Nolan has received several honors over the course of her career, including being named a Fellow of the American Association for the Advancement of Science, Fellow of the American Academy of Microbiology, honorary diplomate of the American Veterinary Epidemiology Society, honorary member of the American Association of Food Safety and Public Health, Distinguished Educator from the Blue Key National Honor Society, Distinguished Alumna from the UGA College of Veterinary Medicine and Valdosta State University.

She has also received the Philbro Animal Health Excellence in Poultry Research Award, been named to the American Association of Avian Pathologists Hall of Fame and recognized as a Female Pioneer in Poultry Medicine.

Her research centers on bacterial diseases that impact animal health, human health and food safety. In particular, she studies the *Escherichia coli*. that cause avian colibacillosis and human urinary tract infections, neonatal meningitis and sepsis.

Nolan earned her B.S. in Biology from Valdosta State College and D.V.M., M.S. and Ph.D. from the University of Georgia's College of Veterinary Medicine.

Anna Langguth EWDA Student Chapter Chair

Collaboration key for workshop

The 2023 workshop organised by the European Wildlife Disease Association's Student Chapter was held at the Autonomous University of Barcelona (UAB) in Spain, from April 1 to 4. Focusing on "Combining talents, sharing knowledge: Emerging Infectious Diseases in the Age of One Health", this year's event welcomed participants with and without a medical background, and aimed to promote collaboration between different specialties in wildlife health early in students' careers.

While talks from a diverse range of speakers (veterinarians, biologists, and legal specialists) emphasised the multidisciplinary nature of the workshop, the option to participate online as well as in person made this event truly inclusive for all European WDA students.

Participants were also able to investigate a "wildlife disease outbreak" themselves. Splitting into groups and guided by four experienced mentors (Karin Lemberger, Thijs Kuiken, Károly Erdélyi, and Ruth Cromie), students scoured the UAB campus for (mock) "bodies".

**LEFT PAGE: TOP: Ruth Cromie's group describe their investigation;
CENTRE: Students listening to a talk by Karin Lemberger;
BOTTOM: Irene Torres and Karin Lemberger demonstrate the post-mortem examination of a ruminant to students.
THIS PAGE: TOP: Group photo taken the UAB campus (excl. Loïc Palumbo, photographing);
CENTRE: Students investigate a disease outbreak in wild boar with their mentor, Károly Erdélyi;
BOTTOM: Students prepare for field investigations with their mentor, Ruth Cromie**

Groups were also able to perform a post-mortem examination on an actual carcass generously donated by collaborators from UAB's Wildlife Ecopathology Service (SEFaS).

In the spirit of collaboration, we were provided with assistance by the local student association AVAFES (Associació de Veterinaris per a l'atenció de Fauna Exòtica i Salvatge/Association of veterinarians for the care of exotic and wild fauna), who was instrumental to this workshop by communicating the event to Spanish students within their network, and in helping with local organisation.

Overall, this year's workshop was a great success – not only in bringing people back together after a period of social isolation over the past few years, but also in terms of promoting multidisciplinary collaboration amongst professionals in the field of wildlife health. We strongly feel that this is the inherent spirit of the WDA, which is enthusiastically carried on by the next generation of wildlife health professionals, and we are very much looking forward to future events like these.

Dr Shaleen Angwenyi, BVM, MSc

Love of wildlife an endless inspiration

Dr Shaleen Angwenyi is a wildlife veterinarian and researcher who uses her unique blend of passion and technical expertise to promote the health of the heritage that is our wildlife and the ecosystems to which they belong.

She's also the new chair of the Wildlife Disease Association Africa and Middle East Section, so let's find out a little more about her.

1. What inspired you to join the wildlife health sector? What aspect of the sector are you particularly passionate about?

I was born and raised in Nairobi and had the privilege and blessing to have parents who encouraged me and my siblings to visit different parks and reserves across the country. Having this exposure sparked my interest in wildlife and the desire to want to work with them someday. As a teen I used to volunteer at a veterinary clinic close to home during the holidays and enjoyed the opportunity to work with different animals.

I managed to pursue both my passions (for veterinary medicine and wildlife) through studying Veterinary Medicine for my undergraduate and Wildlife Health and Conservation for my master's.

The wildlife health sector has been a dream field to join. I am particularly passionate about wildlife disease surveillance as conservation efforts have mostly been focused on security and anti-poaching, yet diseases are also a threat to wildlife populations, capable of causing high mortalities and lowering population growth rates.

Disease surveillance in wildlife populations is key to identifying diseases of concern and their epidemiology and in turn, instituting management protocols well in advance of any outbreaks that may occur.

2. What has been the highlight of your career so far? Tell us about your best day on the job?

It is difficult to pick a single highlight. I genuinely have so many. Any time I've gotten to treat a zebra or elephant and watched it gradually recover, to the adventures of collaring lions at night under only the light of our vehicles' headlights, to translocating lions and Grevy's zebras to expand their habitat ranges. Every intervention is a highlight in its own way.

Perhaps I could share two highlights in more detail. The first was the opportunity to organize an international workshop on endangered ungulate medicine in Kenya last October. The week-long workshop saw wildlife veterinarians, veterinary technicians, nutritionists, and conservationists from around the world discuss the health and conservation of hirola and mountain bongo, both critically endangered species native to Kenya.

Second, my best field days include any days I get to interact with wildlife rangers. These are the people who have taught me the most in this field, and not to mention have kept me alive! They are the most selfless, determined, and dedicated personnel in the wildlife sector and play one of the most vital roles in wildlife health and conservation.

3. Can you share some of your most recent research?

Yes! I'm currently researching the correlation between the stress associated with conservation management activities involving immobilization and capture of black rhinos and fecal shedding of *Clostridium perfringens*. I'm still at the beginning of the research but I'm looking forward to seeing what we find and how that can inform rhino conservation management activities in the future.

Though not research, I am also part of a team currently piloting a wildlife health platform aimed at connecting people working in remote landscapes and their observations of animal health, to decision-making in conservation, veterinary medicine, and public health. This platform hopes to give the rangers on the ground the ability to report disease syndromes in wildlife in real-time to the relevant stakeholders (ie, wildlife veterinarians, epidemiologists, conservancy managers), to enable prompt response to wildlife

disease reports and therefore prevention and/or control of outbreaks in wildlife populations using a One Health approach.

4. What do you see as the biggest challenges in your field, your section and more broadly in wildlife health globally?

Insufficient funding, limited resources, and inadequate capacity for wildlife health surveillance, research, and conservation efforts pose significant challenges. Many regions lack the necessary infrastructure, trained personnel, and funding to effectively address wildlife health issues and implement conservation measures. Perhaps an emerging concern now is the susceptibility of wildlife to various diseases and pathogens, including viral, bacterial, and fungal infections. The emergence and spread of diseases, such as zoonotic diseases pose significant challenges to wildlife health.

Finally, I'd mention climate change as a big challenge both within our section and globally. The impacts of climate change, including rising temperatures, changing rainfall patterns, and extreme weather events, can have detrimental effects on wildlife health. Species are facing challenges such as altered habitats, disrupted migration patterns, shifts in the distribution of diseases and pathogens, and reduced availability of food and water resources.

Addressing these challenges requires a multi-faceted approach that includes habitat conservation, wildlife disease monitoring and research, sustainable wildlife management practices, public awareness and education, policy interventions, and international collaboration.

5. Your section draws a lot of global attention when it comes to wildlife, what are some of the benefits and disadvantages of working with animals so many feel they know?

The countries represented under our section are truly blessed to host an array of unique species that receive a lot of love and attention globally. Working with wildlife can be a rewarding and fascinating experience with lots of adventure and learning. We get to connect with nature and the environment, and conserve and protect endangered species and ecosystems, preserving biodiversity and maintaining ecological balance.

Additionally, we also have close interactions with different wildlife species which gives us a deeper understanding and appreciation for animal behavior, communication, and social structures.

Of course, there are disadvantages that come with our work, as with any other job/career. Working with wildlife can be physically demanding and emotionally challenging, often requiring us to work in remote and challenging environments, strenuous activities, long hours, and exposure to extreme weather conditions. The fieldwork constraints requiring extended periods away from home lead to personal sacrifices affecting one's personal life.

It is also challenging when people do not understand how the context between their country and our continent differs in respect to practices such as differences in availability of resources from infrastructure, equipment and even access to funding and veterinary drugs. There are limited job opportunities with those offering stable income and long-term career prospects being competitive and scarce.

6. Shaleen, you joined the WDA a little over two years ago, what drew you to the organisation?

I've always had a passion for wildlife and conservation efforts. Earlier in my career I read about a lot of wildlife conservation efforts being focused on security through promoting awareness of the effects of hunting and the illegal wildlife trade. Though this was and still is important, I didn't find much focus being directed towards monitoring wildlife health and conducting disease surveillance. WDA offered a platform through which I could network with wildlife professionals ranging from veterinarians to researchers who were more focused on the health aspect of wildlife conservation. Building these professional relationships has been vital, particularly as I was just beginning my career.

I was also interested in playing a role in engaging students, particularly veterinary students, in wildlife health topics as our curriculum mostly focused on domestic animals. Using WDA membership and resources, I was able to do this as the Student Representative for the AME section.

7. As a wildlife professional, what do you see as the most significant benefits of belonging to the WDA family?

WDA offers valuable educational experiences through workshops, lectures, and other activities, attracting individuals who have a thirst for knowledge in this field.

The association also offers support in wildlife conservation and research through multiple grants and awards, updating members through newsletters, sharing jobs and educational opportunities.

The waived page charges for articles submitted to the Journal of Wildlife Diseases is also a significant benefit as being able to communicate research findings to scientists across the world is vital in our field as a lot of new information is being discovered across the wildlife sector.

8. You recently assumed the role of Chair of WDA-AME, so can you tell us a little about your section?

WDA-AME focuses on the wellbeing of African and Middle East wildlife with programs and activities designed to be a catalyst for wildlife disease researchers and community members who play one of the most valuable roles in wildlife conservation.

We strive to build productive relationships and make a positive impact with all our pursuits. Our Board consists of wildlife veterinarians, epidemiologists, university lecturers, molecular biologists and students who bring different perspectives to achieve our common goals.

9. What are your hopes for your tenure? Are there any specific goals you see as vital for the section to achieve?

We hope to increase our section membership to attain a critical number that will allow us to thrive. We also aim to improve the interconnectedness within the section, engaging and partnering with more countries and organizations. More specifically we hope to be able to host an international conference within our tenure to bring together students and professionals from the wildlife health and conservation field across the world to discuss important wildlife health and conservation topics.

10. What advice would you give someone considering a career in wildlife health?

It's important to note that the benefits and disadvantages of working in wildlife health can vary depending on the specific role, location, and individual perspectives. Working with wildlife is a deeply personal experience, and while it can be immensely rewarding, it is essential to consider the challenges and commitments involved before pursuing a career in this field.

11. Finally, what inspires you?

Nature. How can you spend so much time in the woods and wilderness and not feel inspired to take on a new day and make a change? It's in the gentleness of a lioness playing with her cubs to the fierceness she portrays when hunting prey. The protectiveness of an elephant herd with a new calf and the sheer strength with which they effortlessly shake and bring down massive trees, providing food for other species. Finally, though we don't do our work for recognition, inspiration comes from both the local and global communities that see the work we do as wildlife health professionals, appreciate the lengths we go through and show their gratitude and appreciation for the same.

Benefits of new joint mentoring program are flowing both ways

MENTOR - Anna Salazar Casals

When this mentoring adventure started, I was a bit nervous. Although I supervise veterinary interns at my work place (Sealcentre Pieterburen), the challenge this mentoring program brought to my life gave me a boost. I was concerned about my capacities to mentor and the kind of mentee I would get. I did not know what to expect. Would I enjoy the experience? Would my mentee and I click? What would my mentee need from me?

All these questions and doubts vanished within the first five minutes of the first meeting with Janina. Once we started talking, I realised I had in front of me a very passionate woman, with a brilliant future in front of her, who had already decided what her initial path would look like and only needed some support from my side.

Janina is kind, honest and humble. I am enjoying every minute of our meetings and I hope she is getting the support she needs from me. It is clear from my point of view that Janina knows what she wants. She is discovering the veterinary profession in the best way possible; by doing internships, courses, workshops and volunteering in different countries, facilities and with the most diverse group of people. Janina has an incredibly inquisitive mind that I am sure will bring her far in her professional development.

As a mentor, my only task has been to help her organise a bit her future immediate steps, set short term achievable goals, and encourage and reassure her. I feel I have learned as much from Janina as I have taught her. Her positivity and strength have been refreshing to me and I am sure Janina has a bright and brilliant future in front of her.

I hope this mentoring program continues in the coming years. Helping veterinary students in their early career steps is a wonderful way to develop the veterinary profession further. A path that might seem a steep climb or an impossible jump, becomes easier and much simpler with a helping hand. I am sure Janina and I will stay connected as the bond we have created through this program is powerful and positive. I cannot wait to see where Janina goes now and where our relationship will bring us!

ABOUT THE MENTORING PROGRAM

The Mentoring Program is a collaboration between the Wildlife Disease Association (WDA), the European Association of Zoo and Wildlife Veterinarians (EAZWV) and the European Association of Avian Veterinarians (EAAV) that aims to promote the sharing of knowledge and skills, helping to maintain strong connections between the professionals of each organisations.

The objective of this program is to connect students and recent graduates with professionals of the free-ranging and captive wildlife field so they can receive guidance on their early careers.

As well as providing members of the three associations with mentorship from already-established professionals, the project also aims to motivate these new professionals to take a more active role in their fields and their associations, creating positive feedback that encourages communication and scientific exchange.

Participants come from 25 different countries and all six inhabited continents. The WDA has a wonderful representation on the program, with 20 mentors and 19 mentees being members of the association.

MENTEE - Janina Steiner

Having Anna as my mentor has been fulfilling professionally as well as personally. Not only did I gain a mentor to guide me through my early career, but also a great friend and colleague who I can rely on in every situation.

Despite being as far away from each other as possible during the first months since starting the mentor-mentee relationship, we stayed in close contact via online meetings. Anna was always virtually available to me while I was doing my placements in Australia. She helped me whenever I needed advice, encouragement or a good laugh.

We were finally meeting in person for the first time at the Zoo and Wildlife Health Conference in Valencia in June, where we had the opportunity to connect even further. We had a lot of fun together and promised to stay in close contact even after the mentorship program has ended.

Being at that stage of my life - done with my studies and ready to jump into the work field - is sometimes an emotional whirlwind, and I often find myself wondering if it's all going to work out for me. My interests in the field of wildlife medicine are still very broad. I want to try out as much as possible and I would love to have it done by tomorrow because sometimes I feel like I'm running out of time despite just starting my career.

Anna is my safe haven who calms my nerves, gives me the reassurance I need and reminds me that I have all the time in this world to figure out what I want from my life. Sometimes all you need is a person who pushes you a bit into the right direction and I couldn't think of a person who pushes me better than Anna.

Being paired with Anna was great luck and I can't wait for more motivating and inspirational sessions and Gin and Tonics with her in the future.

Janina (left) and Anna finally met face to face for the first time in June at the Zoo and Wildlife Health Conference in Valencia. Both agree the experience has been extremely beneficial with each drawing inspiration from the other.

Dr Barry Hartup, Research Associate – Conservation Medicine - International Crane Foundation

WDA's landmark gift sows seeds for biodiversity

MAIN IMAGE: Otter Creek at Baxter's Hollow, TNC's largest Wisconsin preserve in the Baraboo Hills. Picture: Steve Meyer. FAR RIGHT: Volunteers conducting reforestation activities at a TNC workday in the Baraboo Hills. Picture: Emily Mills/TNC. RIGHT: A controlled, prescribed fire being set to improve habitat sustainability in Baxter's Hollow reserve in the Baraboo Hills. Picture: Emily Mills/TNC.

As part of the planning for the 70th International Conference of the WDA in Madison, Wisconsin, and with WDA Council approval, a $5000 donation was made to the Wisconsin Chapter of The Nature Conservancy (TNC) to support their Baraboo Hills project.

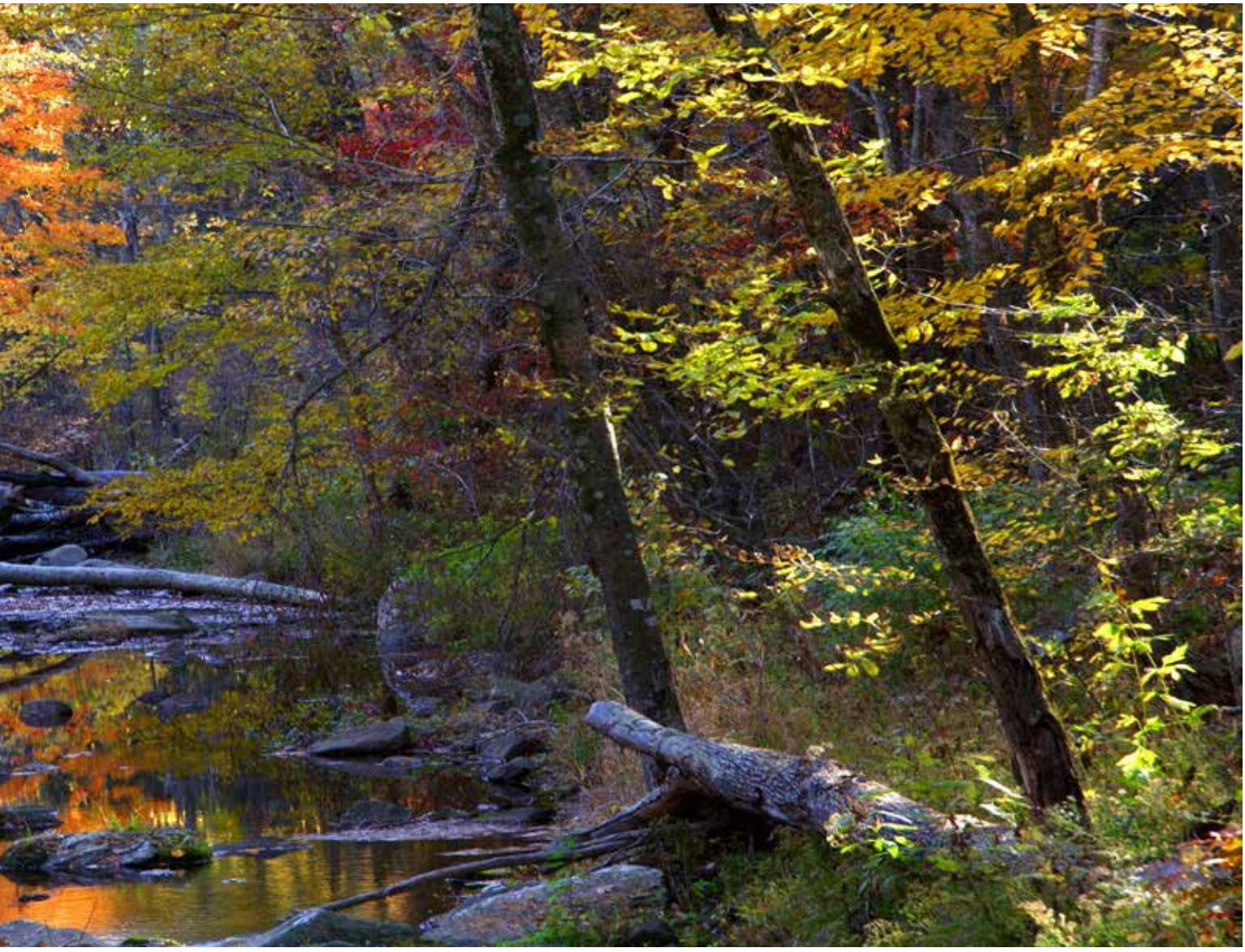
For over 50 years, TNC has been working with many conservation partners and private landowners to help protect a large block of forest across the Baraboo Hills totaling over 5600 ha (in addition to 8000 ha of Wisconsin state managed lands at Devils Lake State Park and Sauk Prairie Recreation Area, and 1500 ha of conservation easements held by a local land trust).

From an aerial view, the Baraboo Hills are one of the most extensively forested areas in the region, supporting over 26 distinct natural communities, and providing a critically important block of nesting and stopover habitat for many forest interior neotropical migratory songbirds. The Baraboo Range is a designated US National Natural Landmark, and an ecologically unique area well known for its biodiversity, including more than half of Wisconsin's native plants.

TNC's current stewardship efforts are focused on restoring, promoting and perpetuating the biodiversity harbored in the oak ecosystems of the Baraboo Hills through actively thinning and restoring overcrowded oak woodlands, planting old fields to expand the forest block, and re-introducing prescribed fire that has played an essential role in helping maintain healthy oak ecosystems for thousands of years.

WDA's gift in support of this work will be utilized to help defray the cost of restoration contract expenses (TNC regularly utilizes the assistance of contractors to help complete tree thinning, brush removal, and select treatment of invasive plants) and to cover cost of purchasing tree seedlings and supplies and staff coordination for tree planting projects. WDA's gift will go some way towards improving the climate resiliency of these lands.

We thank all of the attendees at last year's conference for your support of this gift and for investing in the conservation of biodiversity among the places we meet.

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Dear colleagues, it is with great satisfaction that we invite you to participate in the VI Biennial WDA Conference - Latin America Section - 2023. It will be held from November 13 to 17, 2023, and will be held in Antigua, Guatemala. During the Conference, researchers from all of Latin America will gather to share their findings and initiatives, attend a pre-conference forum with the participation of social and political figures, participate in pre-conference workshops, and socialize among colleagues. The main topics addressed will be: One Health, Conservation Medicine; Infectious and non-infectious diseases in wildlife; Antimicrobial resistance in wildlife; Education, culture and society and Ecology of diseases. We hope you can join us during our enriching exchange. We look forward to seeing you!

Estimados colegas, con enorme satisfacción queremos extenderles la invitación para participar de la VI Conferencia Bienal de la WDA – Sección Latinoamérica – 2023. Esta se llevará a cabo entre los días 13 al 17 de noviembre de 2023 y tendrá como sede la ciudad de Antigua, Guatemala. Durante el encuentro, investigadores de toda Latinoamérica se reunirán para compartir sus hallazgos e iniciativas, asistir a un foro previo al congreso con la participación de figuras sociales y políticas, participar de talleres pre-conferencia y promover la socialización entre colegas. Los principales tópicos abordados serán: Una Salud, Medicina de la Conservación; Enfermedades infecciosas y no infecciosas en fauna silvestre; Resistencia antimicrobiana en fauna silvestre; Educación, cultura y sociedad y Ecología de enfermedades. Esperamos que puedan compartir con nosotros durante nuestro enriquecedor intercambio. ¡Los esperamos!

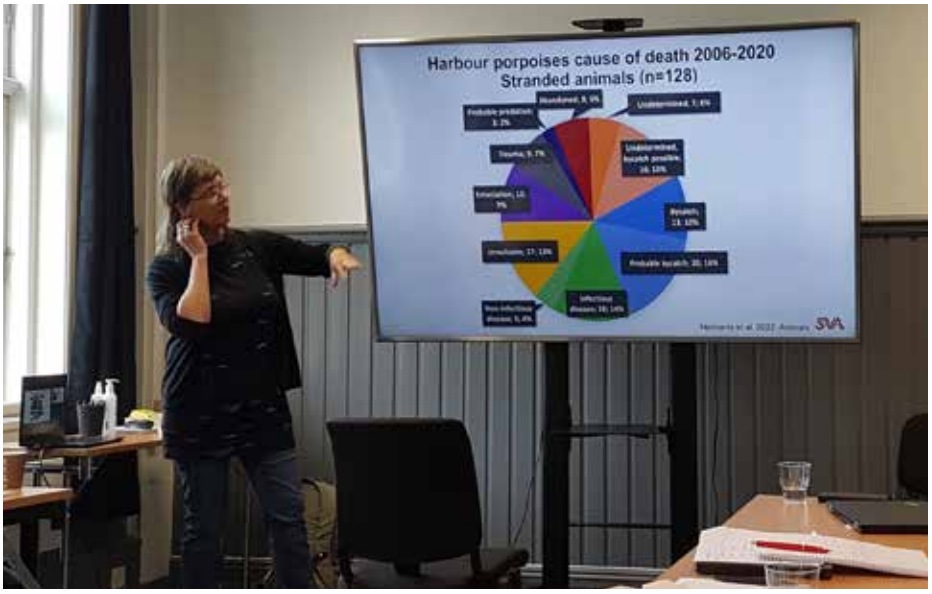
Prezados colegas, com grande prazer queremos convidá-los a participar da VI Conferência Bienal da WDA - Seção América Latina - 2023. Ela será realizada de 13 a 17 de novembro de 2023 em Antígua, Guatemala. Durante o encontro, pesquisadores de toda a América Latina irão se reunir para compartilhar suas descobertas e iniciativas, participar de um fórum pré-congresso junto a figuras sociais e políticas, participar de workshops pré-conferência e socialização entre colegas. Os principais tópicos abordados serão: Saúde Única, Medicina da Conservação; Doenças infecciosas e não infecciosas em animais silvestres; Resistência antimicrobiana em animais silvestres; Educação, cultura e sociedade e Ecologia de doenças. Esperamos que se juntem a nós e possam formar parte do nosso enriquecedor intercâmbio. Ficamos no aguardo de vê-los!

Images AAVAA/stock.adobe;Manshagraphic/stock.adobe

An odyssey in Oscarsborg

The NWDA's biannual meeting was a great success with wonderful people, presentations and discussions. Twenty-two people joined us with one part-time on the phone. Historic Oscarsborg was the backdrop of the meeting which also met the requirement of an island location for NWDA meetings. We started with a lunch gathering and short tour at the new Norwegian Veterinary Institute facilities at Ås before travelling by boat to Oscarsborg fortress and hotel for two more days of meetings. Presentations explored health and disease surveillance and wildlife diseases across a variety of species in Sweden, Norway, Finland and Denmark, the impacts of lead, and wildlife in backyards as well as specific conditions impacting wildlife in the region.

- Jørn Våge, chair, NWDA



TOP: Conference delegates toured the new Norwegian Veterinary Institute facilities at Ås.
LEFT: Aleksija Neimanis presents Findings from health and disease surveillance of marine mammals in Sweden.
ABOVE: Delegates travelled by ferry to Oscarsborg.

TOP: The historic fortress of Oscarsborg was the venue for the biannual NWDA conference. The section always chooses an island venue for its conferences.
LEFT: Marja Isomursu discusses Wildlife diseases in Finland in 2022.
BELOW LEFT: Bjornehiet or the Bear's Den, located in the new NVI, features frescos of the region's old waterways with large representations of the brains of Norway's large carnivores suspended from the ceiling. In the evenings the room is lit so passers by can enjoy the art through large glass windows.
BELOW RIGHT: Jørn Våge transfers the role of NWDA chair (through the ceremonial antler gavel) to Anne Sofie Vedsted Hammer, the new office bearer.

Examining PRNP gene frequencies and 'resistance' to chronic wasting disease

Multiple studies have demonstrated that various alleles of the cervid prion protein (PRNP) gene affect chronic wasting disease (CWD) progression.

In white-tailed deer (*Odocoileus virginianus*), a putative "resistance" allele encodes serine at amino acid 96 (96S) of the prion protein instead of the more common glycine (96G). Similarly, in mule deer (*O. hemionus*), a putative "resistance" allele encodes phenylalanine at amino acid 225 (225F) instead of serine (225S).

CWD has been found at lower abundance in heterozygous white-tailed deer with the 96S allele (96GS) and heterozygous mule deer with the 225F allele (225SF); CWD in homozygous 96S or 225F deer is rare (Johnson et al. 2006, Jewell et al. 2005). In experimental challenge studies all deer with 96S or 225F alleles (heterozygous or homozygous) contract CWD (Johnson et al. 2011, Wolfe et al. 2014, Plummer et al. 2017), but the presence of 96S or 225F, respectively, extends the incubation period. Although a prolonged incubation period may allow additional time for CWD+ deer to reproduce, it also increases opportunities for disease transmission and may allow disease prevalence to rise to a new equilibrium within endemic regions.

To increase our understanding of the potential impacts of disease-modifying alleles on CWD, the USGS National Wildlife Health Center and the Wisconsin Department of Natural Resources are examining PRNP gene frequencies in white-tailed deer to assess whether the relative abundance of Wisconsin deer expressing 96S has changed since the beginning of the epizootic. However, even if populations are shifting to higher frequencies of 96S or 225F, the resulting CWD epizootic trajectory may not be improved. Genetic resistance that can prevent infection by specific strains of pathogens must be distinguished from resistance that can prevent infection by all strains of that pathogen.

In the context of CWD, the disease-modifying properties of 96S or 225F must be evaluated within a broader paradigm not only of the strains of CWD in circulation today, but also those that could arise in the future. For example, white-tailed deer with histidine at PRNP allele 95 give rise to a new emergent strain of CWD (termed H95+) when they are infected with the "wild-type" strain of CWD currently spreading in white-tailed deer. This H95+ CWD strain is likely to have very high attack rates in 96S deer (Duque Velasquez et al. 2015, Duque Velasquez et al. 2020). Similarly, serial passage of CWD in 225F mule deer could stabilize a new strain adapted to 225F mule deer. Emergent strains of CWD prions may also have expanded host ranges and enhanced zoonotic potential (Herbst et al. 2017).

If the putative "resistance" to CWD can be demonstrated, it should likely be considered temporary. As was observed with COVID-19, the evolutionary pattern of host resistance followed by pathogen adaptation is typical for infectious diseases and there are no known reasons to except CWD from this paradigm. The only known genetic modification that can induce general resistance to all prion strains are mutations that ablate expression of the mammalian prion protein. The resistance of cervids or other mammals to prion disease is a continuum of vulnerability that reflects both the host's prion protein sequence and the specific prion strain it is exposed to.

For more information, please contact Allen Herbst (aherbst@usgs.gov).

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USGS National Wildlife Health Center facility modernization is underway

Figure 1. Conceptual illustration of the future USGS National Wildlife Health Center, courtesy of Flad Architects.

In the Consolidated Appropriations Act, 2021 (PL 116-260), $55,500,000 was appropriated by Congress for the first phase of renovation at the USGS National Wildlife Health Center (NWHC). This appropriation supports the work of NWHC and its important role in zoonotic research, detecting novel pathogens and emerging infectious diseases, developing rapid diagnostic tests, conducting disease surveillance, and designing vaccines used to control diseases in wildlife.

The new NWHC facility to be designed by Flad Architects, will be a single, integrated, multistory, state-of-the-art building that includes offices, laboratories (BSL-2 and BSL-3 biocontainment), and vivarium (ABSL-2, ABSL-3, and ABSL-3 Ag).

The new building will be constructed on the current NWHC site in Madison, Wisconsin with its existing facilities oprerating until the new building is ready.

Flad has divided the design process into several phases, including Pre-design (16 weeks), Schematic Design (16 weeks), Design Development (24 weeks), and Pre-Final Construction Documents (24 weeks) with the full process, which began in November 2022, scheduled to take approximately two years. Each design phase incorporates an increasing level of detail as work progresses towards production of shovel-ready construction plans. The initial Pre-design phase was completed in early January 2023, and current design status for our new building includes basic floor plans and adjacencies to optimize workflows in the laboratory, office, and support spaces, initial sizing (square footage), and location of the building on the site (Figure 1).

Based on this Pre-design effort, Flad's cost estimate has been preliminarily reviewed by the USGS and design is progressing through more detailed phases.

For more information, please contact LeAnn White (clwhite@usgs.gov).

For additional information on the USGS National Wildlife Health Center see the following links:

- ***Main website:*** *www.usgs.gov/nwhc.*
- ***Disease Investigation Services:*** *www.usgs.gov/nwhc/services.*
- ***Report Mortality Events and Submit Specimens:*** *www.usgs.gov/NWHC/submit.*

To view, search, and download ***historic and ongoing wildlife morbidity and mortality event records*** *nationwide visit the Wildlife Health Information Sharing Partnership event reporting system (WHISPers) online database: http://whispers.usgs.gov/*

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