



# How Zoo Atlanta's Animals are Aiding the USF&W Forensics Lab in the Fight Against Illegal Animal Trafficking



## How It Works:

My contact at the lab is a wonderful woman named Doina Voin. She makes sure everything is as easy as possible for getting samples to the lab. She provides me with forms to fill out listing what is being sent, she sends me a cooler with ice packs when I am ready to ship carcasses and even includes bags and Fed Ex labels already filled out! For blood samples, vials are provided and for the hair samples, little baggies with labels on them are ready to go. It can't get much easier than this!

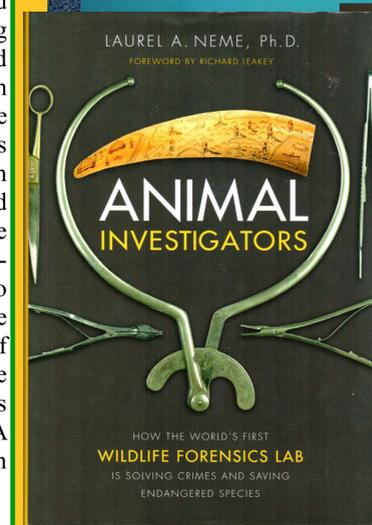
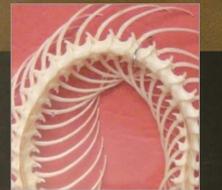
By Stephanie Earhart  
Hospital Keeper  
Zoo Atlanta

## Abstract

One of the projects I am responsible for as hospital keeper at Zoo Atlanta is combing through the approved research requests to find out which ones need assistance from the veterinary department. Usually this means I read through the submissions and find out which ones request biological samples from the animals. When a planned immobilization occurs, the veterinarians or the veterinary technicians draw blood for various lab tests both run in-house and sent to outside labs. What may not be realized is that the blood collected is probably used for more than just the standard health check. It might be used by a researcher who is monitoring the cardiac health of their gorilla collection, or maybe a different researcher is testing testosterone levels in their meerkat mob.

My main interest lies with a research project submitted by the US Fish and Wildlife Service Forensics Lab in Ashland, Oregon. Smuggling and poaching of animals and their body parts has an immensely negative impact on the wild populations of the animals we work with on a daily basis. Everything from rhino horns used as an aphrodisiac to live parrots collected for the pet trade are consistently transported via smuggling operations. What may not be known, is that in the process of apprehending and prosecuting those guilty of such crimes, law enforcement must be able to prove that what they have confiscated is actually from a protected species. If the only evidence seized are some feathers on a decorative fan or a bag of mystery powder, how does the Forensics Lab prove those items are from a Macaw or a Rhino? This is where Zoo Atlanta helps out. When we draw blood from our animals during routine health exams (immobilization or voluntary), we can set aside a few drops of the blood to provide USFW with a known sample. Another way we provide known samples is by sending actual carcasses to USFW after a necropsy has been complete. From the carcass, they can collect tissue samples (for DNA materials), feathers, hair, teeth, nails and claws for comparison to artifacts in question.

By providing these samples to the Forensics lab, our animals provide valuable materials that help prosecute those people who are taking a toll on wild populations on the same animals we work with on a daily basis. It is another way animals in captivity can help their wild counterparts.



## How the Items are Used at the Lab:

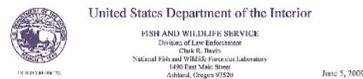
We have extensive databases of wildlife materials/parts incorporated in our reference material collection: tissue, hairs, osteo material, gallbladders, blood, eggs, rosewood. All these materials I have acquired, with all your help !!!, are accessioned in our freezers and cryo freezers, follow the validation path and become permanent part of our collection, to be used as reference material in casework, developing of new laboratory protocols, competency/proficiency testing and research.

We do provide support to State Law Enforcement entities and to countries signatories to the CITES treaty. Our lab capabilities are: Genetics for species, gender and individualization, Criminalistics with Chemistry (pesticides ID), Firearms (matching), Latent Prints, Trace (paint, fibers, keratins, biles, questioned documents), Pathology (cause of death determination), Computer forensics, Digital/Audio (enhancement), Digital Imagery and Morphology with Mammals, Birds and Herps capabilities.

-email communication from Doina Voin, US Fish and Wildlife Service Forensics Lab

Acknowledgements: Doina Voin, Zoo Atlanta Keepers and Zoo Atlanta Vet Staff

References: Photos by author or USFW Forensics Lab



United States Department of the Interior  
FISH AND WILDLIFE SERVICE  
Division of Law Enforcement  
Chief R. B. Bortner  
National Fish and Wildlife Forensics Laboratory  
1400 East Main Street  
Ashland, Oregon 97520

June 5, 2009  
Stephanie Earhart, Hospital Keeper  
750 Ashland  
500 Charlotte Avenue, S.E.  
Atlanta, GA 30315-4440  
404-624-5540

Dear Stephanie:  
I would like to take this opportunity to thank you very much for your continuous support and interest in helping us build our artifacts collection, and once again to request specimens from your inventory as they become available.

The primary mission of our laboratory is to make species-specific identifications of wildlife parts and products submitted as evidence by Federal, State and International Wildlife Law Enforcement Agencies, and make like a police crime lab, to match suspect, victim and crime scenes through the examination of physical evidence. The National Fish and Wildlife Forensics Laboratory is the only forensic lab in the world dedicated entirely to wildlife, it serves both the national and international communities. Additional information on our laboratory, including our most recent capabilities and research projects, can be found at the World Wide Web at the following address: <http://www.lab.fws.gov>.

One of my responsibilities at the lab is to maintain the laboratory reference material collection of biological materials to be used in research, verification of new protocols, casework and proficiency testing.

The genetic section of our laboratory is constantly in need for comparative materials, whole blood or skeletal muscle tissue, there is a continuous request for genetic specimens, to those we collect samples in house for comparison purposes and it is important for us to be as complete in our comparative phylogenies derived for the evidence in question as possible.

We greatly appreciate any contribution you can make to our laboratory reference material collection. The zoological specimens are the backbone of our comparative studies, which in turn is vital to our forensic casework. Thank you for your continuous support of our mission, we all share in protecting wildlife in the future.

Sincerely,  
Doina Voin  
Forensic Scientist QA/QC



US Department of the Interior  
FISH AND WILDLIFE SERVICE  
Division of Law Enforcement  
NATIONAL WILDLIFE FORENSIC LABORATORY  
1400 East Main Street  
Ashland, OR 97520  
HATR SAMPLES CHECKLIST  
Please provide the following information:  
Species: \_\_\_\_\_  
Age: \_\_\_\_\_ Sex: \_\_\_\_\_  
Date of sampling: \_\_\_\_\_  
Submitting Address: \_\_\_\_\_  
Contact Person/Phone: \_\_\_\_\_  
Animal ID# \_\_\_\_\_  
See Instructions on Reverse of this Control Page

## Whole Blood samples submitted to USF&W Forensics Lab 13 Jan 2010

Common Name	Scientific Name	Identification Number	Date Collected	Remarks
Chaco Tinamou	Chloronotus pallidus	A94534	18 May 12	CARCASS
Bonaparte's Petrel	Pterodroma bonapartei	11R088	18 Aug 12	CARCASS
Red-tailed Tropicbird	Phaethon rubricauda	12-M-002		hair sample
" "	" "	12-M-003		" "
Waterhock	Sparganium angustifolium	11M-064		" "
Blue Crane	Anthus trivirgatus	A94024	2 July 12	CARCASS
Hammock Lo	Scolecophagus	A80046	18 Dec 12	CARCASS
Green Ibis	Phaethon rubricauda	12B-014	18 Jun 12	CARCASS
Cooper's Tinamou	Cryptops			5 eggs
Blue Crane	Sparganium			eggshell
Blue-headed Vulture	Cathartes aura			6 eggs
White-headed Vulture	Cathartes aura			2 eggs
White-headed Vulture	Cathartes aura			3 eggs
White-headed Vulture	Cathartes aura			1 egg

## BIOMATERIAL STANDARDS DONATION INVENTORY

Donor: Zoo Atlanta Date: 21 Aug 2012  
Address: 500 Cherokee Ave  
Atlanta, GA 30315  
Phone: 404-624-5540 Contact: Stephanie Earhart, Hospital Keeper

Attention: These specimens may be handled by whomever staff at our facility. Please include necropsy reports for biohazard assessment.

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White-headed Vulture	Cathartes aura			1 egg

\* If not a captive, please include specific location of collection and/or circumstances (with date, month, time, date, etc.)

Thank you for your contribution!  
National Fish and Wildlife Forensics Laboratory  
1400 East Main Street, Ashland, OR 97520  
(Ph: 541-482-4191 or FAX: 541-482-4593)

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ENDANGERED SPECIES RESEARCH  
Ending Species Res  
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OPEN ACCESS

## Forensic identification of elephant and giraffe hair artifacts using HATR FTIR spectroscopy and discriminant analysis

Edgard O. Espinoza<sup>1,\*</sup>, Barry W. Baker<sup>1</sup>, Tamara D. Moores<sup>1</sup>, Doina Voin<sup>1</sup>  
<sup>1</sup>National Fish and Wildlife Forensics Laboratory, U.S. Fish & Wildlife Service, 1400 E. Main St., Ashland, Oregon 97520-1310, USA

**ABSTRACT.** We investigated the utility of horizontal-attenuated total-reflection Fourier transform infrared (HATR FTIR) spectroscopy for the analysis and identification of tail hair of reputed elephant and/or giraffe origin, commonly used to manufacture indigenous artifacts (e.g. bracelets, earrings, finger rings, etc.) in the wildlife trade. We describe a prominent peak at 1022 cm<sup>-1</sup>, seen extensively in proboscidean standards and absent in giraffe samples. This absorption appears to be related to surface cysteine oxides and suggests that cysteine acid is one of the compounds useful for distinguishing elephant and giraffe hairs. While spectral libraries are helpful in determining the material class represented by suspected hair artifacts (i.e. keratin vs. plastic vs. botanical), mathematical post-processing of the spectra employing discriminant analysis provided a more useful statistical tool for differentiating elephant and giraffe hairs than relying on visual inspection of spectral peaks alone. A resulting performance index of 91.8% shows that HATR FTIR, combined with discriminant analysis, is a powerful, nondestructive, quantitative technique for distinguishing elephant and giraffe keratins often encountered in museum collections and the modern wildlife trade.

**KEY WORDS:** Elephant · Forensic mammalogy · Giraffe · Hair identification · Infrared spectroscopy · Wildlife trade  
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