Conservation & Conversations

Field Science

Wednesday, March 22
12:30 – 1:30 p.m.

theZOO
LOUISVILLE

SCIENTIFIC FIELD WORK

Field Work is science done outside a lab or classroom environment. Social and natural science both utilize field work to examine research questions in the real world and test hypothesis through observation and experimentation. In the social sciences (like economics, anthropology or history), field work is often limited to observation or the collection of written or oral information — but even in the social sciences, experimentation is possible. Field work can be done by a group or an individual and often involves long periods of observation either of animals, plants and people in their native habitats or of the results of experimentation.

WHAT COUNTS AS FIELD WORK?

Observations

What do you see? What do you smell? What do you hear? Observations done in the field using any format are valuable sources of scientific information. Whether you are looking for the foraging behavior of a rare animal species or recording your sibling's reaction to a prank, what you learn today can help further humanity's science knowledge going forward.

Experiments

Field experiments are more often found in soft or social sciences than in a hard science and bridge the gap between controlled conditions in the lab and observing subjects in their natural setting without limits. Often experiments that involve animal behaviors are designed and conducted to determine if a behavior seen in human care (at a zoo, sanctuary or rehabilitation center) is a natural behavior to a species or one prompted by human interaction. Other times experiments are to determine how humans or animals will react to specific stimulus such as noise levels or visual indicators like scarecrows.

Sample Collection

Collecting useful samples is an important step in any sort of research. Samples are a broad category that can cover many types of material, anything from taking an audio sample of noise in an area or soil and water samples can be considered a sample and collected by researchers. This material will provide support to your hypothesis or let you know that you are working in the wrong direction. Here at the zoo our animal staff frequently collect fecal, urine and fur/hair/feather/skin samples from our animal ambassadors and send them for medical testing or for research partnerships with scientists from other institutions.

Excavation

Excavation is a term used primarily in archeology or paleontology and refers to the process of digging up artifacts, biofacts, specimens or any other term you can think of to describe objects that can tell us about the built and natural world in the past (recent and distant). When doing any type of excavation, it is important to follow all appropriate protocols for data recording and to be supervised by a professional in the field you are interested in. To identify an object, much of the data we need is in the soil around it. Improperly recording the depth and position of a found item or even just removing the object from the soil can be incredibly damaging to the object and to its research value.

Interviews

A very specific form of sample collection most often seen in the soft or social sciences: interviews let scientists collect qualitative data. Interviews can be done at any point during the experimental or scientific process and can be used both to give direction to research and to determine the success or failure of an experiment or question. Interviews can even be used to collect samples of information from eyewitnesses to create primary source accounts of events.

QUALITATIVE AND QUANTITATIVE DATA

- **Qualitative Data** is information that cannot be counted, analyzed or collected using numbers. This type of data can be collected in audio/visual recordings, oral history interviews, photographs, any method that is not numerical!
- **Quantitative Data** is information that can be collected numerically. This type of data is anything where each piece of data has a unique numerical value, information like height, weight, volume of liquid and chemical concentrations in the atmosphere are all considered quantitative data.

Your Louisville Zoo Connection

The Louisville Zoo has formal and informal relationships with a variety of researchers and institutions to help us better support and care for our animal ambassadors. Every year, we learn more about what keeps animals in human care safe and healthy and how we can adapt that to animals roaming free in the remnant wild. Over the decades, your Louisville Zoo has built relationships with research scientists like **Dr. Brent White** and others at **Centre College** and with Zoo professionals like **Dr. Erin Curry** of the **Center for Conservation and Research of Endangered Wildlife (CREW)** at the **Cincinnati Zoo.** These long-standing relationships allow us to do research over multiple years and author peer-reviewed scientific papers. We also get requests from researchers for help with short term projects where we contribute access to animals. Individual employees at your Louisville Zoo are also participating in various research initiatives like working with Kentucky Department of Fish and Wildlife on a statewide reptile survey or working with the **IUCN** on a species assessment.

SOFT VS. HARD SCIENCE

Hard and soft science are informal terms used to differentiate scientific fields. **Hard sciences** are typically considered to be fields of study/exploration that use the scientific method and experiments to test theories in natural or physical science and rely heavily on math and quantitative data. So, people working in or studying fields like biology, chemistry, physics and astronomy are in the "hard" sciences.

Soft sciences rely more heavily on qualitative data and are often considered more subjective or open to interpretation, despite their inclusion of empirical tests and analysis. Fields like political science, archeology, anthropology and psychology are all considered "soft" sciences despite their rigorous standards

FIELD BIOLOGY

Natural science is split into distinct areas that all benefit from applied or field study outside a laboratory setting and focus on the rules of the natural world and the study of the universe. The areas of natural science are defined as astronomy, biology, chemistry, earth science and physics as broad categories and can be further subdivided into more specific categories like astrophysics or botany. Biology is the area of natural science most related to the conservation and scientific work the Louisville Zoo participates in as an organization. Field biology is an intensive field of study that requires patience and dedication and often a willingness to look a little silly in public spaces.

Our Recent Publications

- IUCN Red List: Cuban Crocodile
- Faecal Glucocorticoid Concentrations during ACTH Challenge Tests in Captive Grizzly Bears (Ursus arctos horribilis) and Polar Bears (Ursus maritimus)
- Serum Cortisol Concentrations Associated with Artificial Insemination Events in an African Elephant (Loxodonta africana)
- Cortisol secretion in an African Elephant Loxodonta Africana Calf Including Evidence for a Foetal Surge

HOW YOU CAN PARTICIPATE

- Buy a ticket or a membership to the Louisville Zoo! A portion of every admission ticket and membership gets put into the Louisville Zoo's conservation fund. The money supports our CARES grant funding which helps zookeepers participate in field research or professional development they might be unable to otherwise. We also provide funds to conservation partner organizations like Polar Bears International, Ocearch and Snow Leopard Trust.
- Participate in a citizen science project! In field biology, most citizen science projects will involve observations. You can check citizenscience.gov (the official federal resource for finding citizen science projects), contact the relevant departments at colleges and universities near you to find professors looking for volunteers, and you can check apps like Zooniverse, iNaturalist or Merlin Bird ID to find national plant or animals counts you could contribute to or datasets you can help researchers analyze. For any amateur archaeologists, you can contact the Kentucky Archaeological Survey to find current dig sites and learn how to get involved in excavations. If you are interested in starting your own citizen science project in support of research or a cause you find meaningful, you can read through the Citizen Science Manual put out by the Emmett Environmental Law and Policy Clinic at Harvard Law School for some help getting started.

Live Virtual Conversations on Field Science

STEMinist Careers

Wednesday, March 22, 12:30 – 1:30 p.m.
Join the conversation for an overview of field science and a discussion about working in a STEM field as a female presenting individual and the ways current professionals are reaching out to support the next generation.

https://meet.google.com/jat-esxu-xnt
(US) +1 423-588-1477 PIN: 572 187 702

Science in the Park

Wednesday, July 26, 12:30 – 1:30 p.m.
Join the conversation as we explore the many ways field science takes place on public lands! City, state and national parks are some of the most well-known examples of conservation land and often help to form wildlife corridors that scientists can use when studying specific plant and animal species. Parks, like zoos, are not just for recreation and we're excited to share all the ways they can be used to help better the bond between people and the planet.

https://meet.google.com/csw-emjp-nhi
(US) +1 570-844-0991 PIN: 389 583 324

Active Restoration

Wednesday, Nov. 15, 12:30 – 1:30 p.m.
Join the conversation as we explore what it means to participate in an active ecological restoration project. We'll be joined by Evan Patrick, Natural Areas Manager at the Bernheim Arboretum and Research Forest as he shares all the ways scientists and conservationists work together to keep the forest healthy and what we can learn before during and after an active restoration project about keeping the environment healthy.

https://meet.google.com/bub-rajn-wnm
(US) +1 929-324-2850 PIN: 887 117 275

LEARN MORE ABOUT LIFE IN THE FIELD

In Print

- **Braiding Sweetgrass** by Robin Wall Kimmerer
- **Gathering Moss** by Robin Wall Kimmerer
- **Primates** written by Jim Ottaviani and illustrated by Maris Wicks
- **The Arbornaut** by Meg Lowman
- **Maria Sibylla Merian: Artist, Scientist, Adventurer** by Sarah B. Pomeroy and Jeyaraney Kathirithamby
- **An Immense World** by Ed Yong
- **Tenacious Beasts** by Christopher J. Preston
- **The Field Guide to Citizen Science: How You Can Contribute to Scientific Research and Make a Difference** by Darlene Cavalier, Caren Cooper, Catherine Hoffman

On Video

- **PBS Terra: Antarctic Extremes**
- **PBS NOVA Official (YouTube)**
- **SciShow Kids: Be a Field Scientist!**
- **A Day in the Life of an Aquatic Field Scientist**
- **What Field Work is Really Like** (Warning for swearing, fast camera movement, and shaky camera work)
- **Getting Messy with Field Science in the Galapagos Islands**

Online

- **The Joys and Hazards of Fieldwork**
- **What is Fieldwork?**
- **Young Seals Keep Getting Eels Stuck Up Their Noses, and Nobody Knows Why**
- **Salamanders and Other Amphibians are Aglow with Biofluorescence**
- **The Field Book Project**
- **Field Experiments, Explained**
- **Interviews in the Social Sciences**

From a Podcast

- **Ologies**
  - **Ologies - Acoustic Ecology (NATURE RECORDINGS) with Dr. Eddie Game**
  - **Ologies - Indigenous Pedology (SOIL SCIENCE) with Dr. Lydia Jennings**
  - **Ologies - Environmental Microbiology (TESTING WASTEWATER FOR DISEASES) with Dr. Amy Kirby**
- **The Field Guides**
- **Citizen Science**
- **STEM Women in KidLit**