

AI for Earth Grantee Profile

LINC

Capturing and sharing data on lion populations

Summary

To protect a threatened species, we need to know how many animals are left and where they are. That can be extremely difficult to determine for species that are wide-ranging and very similar-looking, such as lions. The Lion Identification Network of Collaborators (LINC) is working to provide a collaborative online database to help researchers overcome this problem. Through a Microsoft AI for Earth grant, LINC is developing AI techniques to identify individual lions through images with far greater accuracy than humans could manage. With that capability, lions can be more easily tracked, managed, and protected.

Counting lions through AI for conservation

Having [lost half their numbers](#) since the 1980s, African lions were finally classified as threatened a few years ago. But to provide them with better protection, we need a better idea of how many and where they are. That's easier said than done.

The African lion population has decreased by over 50 percent in the past three decades, and the species is now classified as threatened with extinction.

Artificial boundaries such as national borders and defined conservation or study areas are meaningless to wildlife, who journey according to their own patterns and needs. Wildlife researchers and scientists, working in smaller areas within these bounds, are challenged to get an accurate picture of population numbers and movements. Are they counting different animals in each area, or the same ones ranging over a wider area? Answering that question is complicated when the animals have few distinguishing features—lions all look nearly the same even to highly-trained humans.

Capturing and sharing data on lion populations

Solving this problem is one goal of the [Lion Identification Network of Collaborators](#) (LINC), an open-source platform designed to bring together lion research across diverse conservation efforts. The brainchild of biologist Dr. Stephanie Dolrenry and systems engineer Justin Downs, LINC uses a custom web application that

combines a collaborative database, innovative AI search capabilities, and social media tools. This makes it possible for data on lions to be consolidated and retrieved by conservationists, researchers, and government wildlife management.

Currently, the LINC team is further developing AI techniques to identify individual lions. One technique maps the lion's facial features, with more precision than humans can see; the other can identify the whisker patterns, which like fingerprints are unique to each lion. These will reduce the time and human resources needed for large wildlife data collections.

“LINC creates a platform for interaction and data sharing between conservation efforts, citizen scientists, and government institutions to help shape and inform conservation policy.” – Stephanie Dolrenry

The LINC project has built a foundation that is helping to optimize the use of conservation data as well as build a strong interlinked research community. As Dolrenry explains, LINC “creates a platform for interaction and data sharing between conservation efforts, citizen scientists, and government institutions to help shape and inform conservation policy.”

About Stephanie Dolrenry

Dr. Stephanie Dolrenry has been working in conservation and field biology for over 16 years. Starting as Avian Biologist for the Arizona Fish and Game Department in 2003, she has been in the field and on the ground working globally as a field biologist and surveyor for state departments (such as the Missouri Department of Natural Resources) and universities (such as hyena researcher at University of California-Berkeley). Dolrenry now co-directs Lion Guardians, one of the most effective lion conservation initiatives in East Africa. This combined understanding of field work and organizational management has led to original research publications on carnivore behavior in *PloS ONE*, *Biological Conservation*, and *Conservation Biology*, as well as journal review and board membership for *African Journal of Wildlife Research*, Lion Recovery Fund, and the Biodiversity Fund. She has also developed new paradigms for conservation such as the collaborative lion database LINC. She has a PhD in Conservation Science, Environment and Resources from the University of Wisconsin-Madison and has been supported by grants and prizes from the National Science Foundation, St. Andrews, and Nelson Institute for Environmental Studies. She currently lives and works in the field in Kenya and is mother and caretaker of a bush baby, Alya.

About Justin Downs

Justin Downs has over fifteen years operating globally as a consultant, independent contractor, and business owner developing innate solutions that support and are supported by the end user. This focus on social and technological challenges has led to applied work in open-source software and hardware development, energy solutions, community analysis, prototyping, and fabrication. Downs's projects have spanned from conservation and AI software in Kenya, GSM communications in Mali, and off-grid energy solutions for rural communities in Nicaragua, to large-scale public art projects with David Byrne in Stockholm, London, and New York. In addition to field experience, Downs has applied a background in theory to sustainable funding strategies realized with organizations and non-profits, such as the United Nations, UNICEF, the Earth Institute at Columbia University, and Lion Guardians. This critical practice has produced press and has been noted in publications including the *Huffington Post*, *Open Source Journal*, *New York Times*, *Scientific American*, and lectures and workshops for institutions such as WCS (NYC), Rutgers University (NJ), and Princeton's Mechanical Engineering Department (NJ). Justin was born in Detroit and has lived and worked in New York since 1997.

Resources

Websites

[LINC page](#) on IEF R&D site

[Lion Guardians](#) site

[AI for Earth](#)

Press

[Microsoft and National Geographic Society announce AI for Earth Innovation grantees](#)