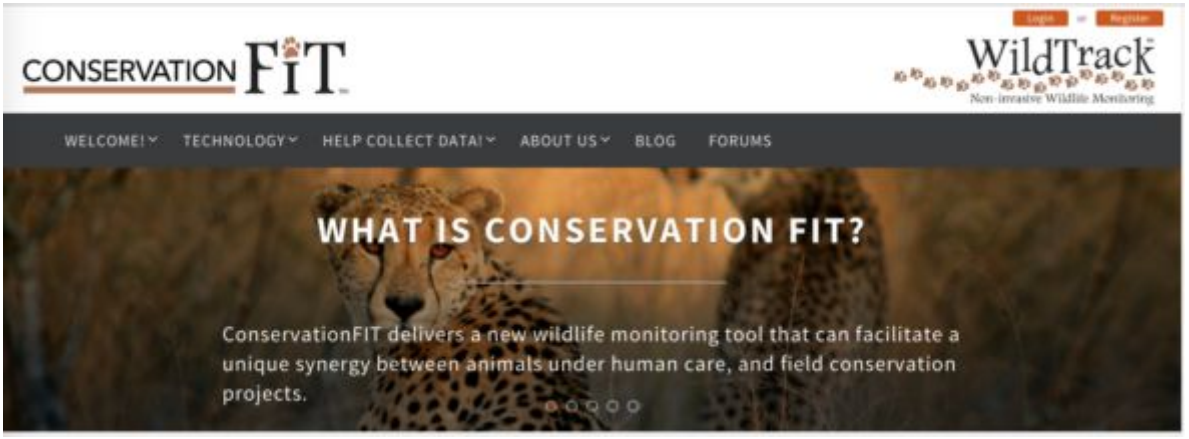
Smartphones and drones launch ConservationFIT on the International Day for Biological Diversity.

Posted by **Stuart Pimm** of Nicholas School, Duke University on May 21, 2017



Submitted by Zoe Jewell and Sky Alibhai of **ConservationFIT**

Today, May 22, is the 2017 International Day for Biological Diversity.
In the beautifully-phrased words of E.O. Wilson, world-renowned conservationist, biodiversity is "the assembly of life that took a billion years to evolve. It has eaten the storms, folded them into its genes, and created the world that created us. It holds the world steady."

Given that we depend on biodiversity for our very survival as a species, one might think we would have a good understanding of what it really constitutes. But what do we actually know of this assembly of life? Our best estimate of the number of species is 8.7 million, but there are likely millions more if micro-organisms, the bedrock for the rest, are included. We've described fewer than 15% of species, and even for the best-studied species, we have a paucity of data on their numbers and distribution. Yet these fundamental data are central to our ability to protect the biodiversity we share the planet with, before it disappears.

Take the cheetah, one of the best-studied iconic big cats, a very visible part of biodiversity. Our best cheetah range-maps still have country-sized gaps with no data.

Cheetah at N/a ‘an ku se, Namibia (Credit: N/a ‘an ku se)

This is not entirely surprising. It’s difficult to collect data on endangered species. Their remaining habitat is often inaccessible, and the animals that remain in it are themselves are elusive. Standard techniques for monitoring, including good old-fashioned observation or the more recently adopted instrumentation (collaring/tagging) are only applicable for small numbers of individuals. They’re also time-consuming and expensive. Instrumentation can also have negative effects on the individuals we study, and thence on the data we collect.

However, the advent of new non-invasive technologies, and community-friendly approaches has begun to put data points on the map. For example, iNaturalist, an online site that hosts citizen science observations, is growing contributions exponentially, and provides a platform for contributors to share images and data to collaborate more effectively.

Images of animals can be taken by anyone armed with a smartphone, or a drone. Drones have the potential to transform data collection for conservation, particularly as their cameras and aerial capacity are rapidly evolving. Legions of recreational visitors (there were 8 billion visits to protected conservation areas in 2014) can contribute to conservation and enjoy the excitement of participation, rather than just being passive observers.

Child with lion prints (Credit: Florian Weise).

But lurking on the ground right in front of our noses, there's another much-neglected means of detecting species, one that played a central part in our evolution as a species over hundreds of thousands of years: Footprints!

Some might consider the use of footprints as 'folklore', not an objective scientific approach. However, this has changed with a robust, accurate, cost-effective and user-friendly footprint identification technique (FIT) from WildTrack, that can identify at the species, individual, sex and age-class levels, using images of trails and footprint taken to a simple protocol by anyone wielding a smartphone or a drone.

Most of us don't look down much unless we want to tie our shoe laces, but for those who like to hike or visit wilderness areas, there is a huge wealth of data at our feet in the form of footprints.

Footprints are many times more ubiquitous than the animals themselves. Think of one cheetah walking 100km in the Namibian desert. He'll probably make around 400,000 footprints. An observer is 5 orders of magnitude more likely to see the footprints than the cheetah!

This is the basis of new project, launched today, May 22nd 2017, for the United Nations International Day for Biological Diversity, 2017.

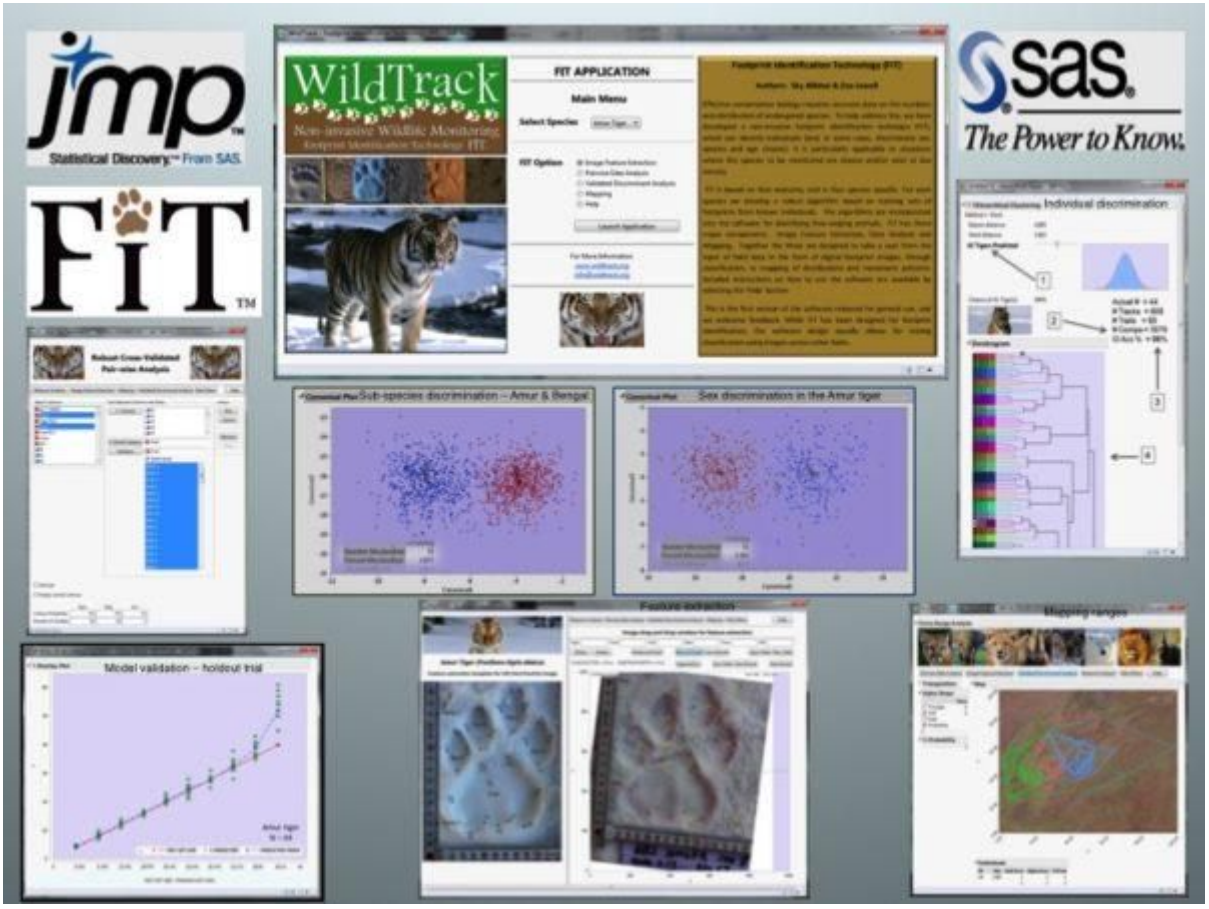
Chinese scientists measuring Amur tiger prints (Credit: Dr Guangshun Jiang).

ConservationFIT, from WildTrack, is designed to take the next step for footprint identification – to encourage citizen scientists, zoos, sanctuaries, field biologists, trackers and recreational visitors to capture and share images of footprints that they have taken either as part of their work, or recreation.

The footprints will then be used to monitor and protect the earth's most at-risk animals. iNaturalist is providing the infrastructure for data to be uploaded and shared globally.

"ConservationFIT is enormously exciting. It unites the unique knowledge of those who work in the field with endangered species and modern technologies that can now identify not just species, but individuals and their sexes. That it does so in a non-invasive way is essential when dealing with animals that are so rare", Stuart Pimm, Doris Duke Professor of Conservation Ecology, Duke University.

Observers around the world will upload their images into iNaturalist, and WildTrack will development FIT algorithms from them. Field conservation project partners will use the technique for monitoring at a local level and feed their data back to iNaturalist. Zoos and sanctuaries will be able to make a unique contribution to the process by collecting footprints from animals of known identity, sex and age, to form detailed reference databases for FIT algorithms.



Footprint Identification Technique analytics in JMP from SAS (Credit: Jewell/Alibhai).

It's a global collaborative effort. All that's needed to make a contribution is a smartphone, a keen eye, and the photo protocol available on ConservationFIT's website.

The body of data collected through ConservationFIT will not only inform on the conservation fundamentals of numbers and distribution, but will drill down to help tackle specific challenges in human-wildlife conflict and wildlife security.

"I think the programme is an exceptional and timely effort to leverage data from the global community to provide for wildlife security and wildlife welfare", Dr Stephen Lee, Chief Scientist, US Army Research Office, North Carolina, USA.

The day after the launch, WildTrack founders and Professor Stuart Pimm, the Doris Duke Chair of Conservation Ecology at Duke University, will celebrate the project launch and put the problem – and the opportunity – in perspective. The conversation will be online at ConservationFIT on 23rd May.