WILDLABS.NET

[The conservation technology network]

COMMUNITY REVIEW 2018/19

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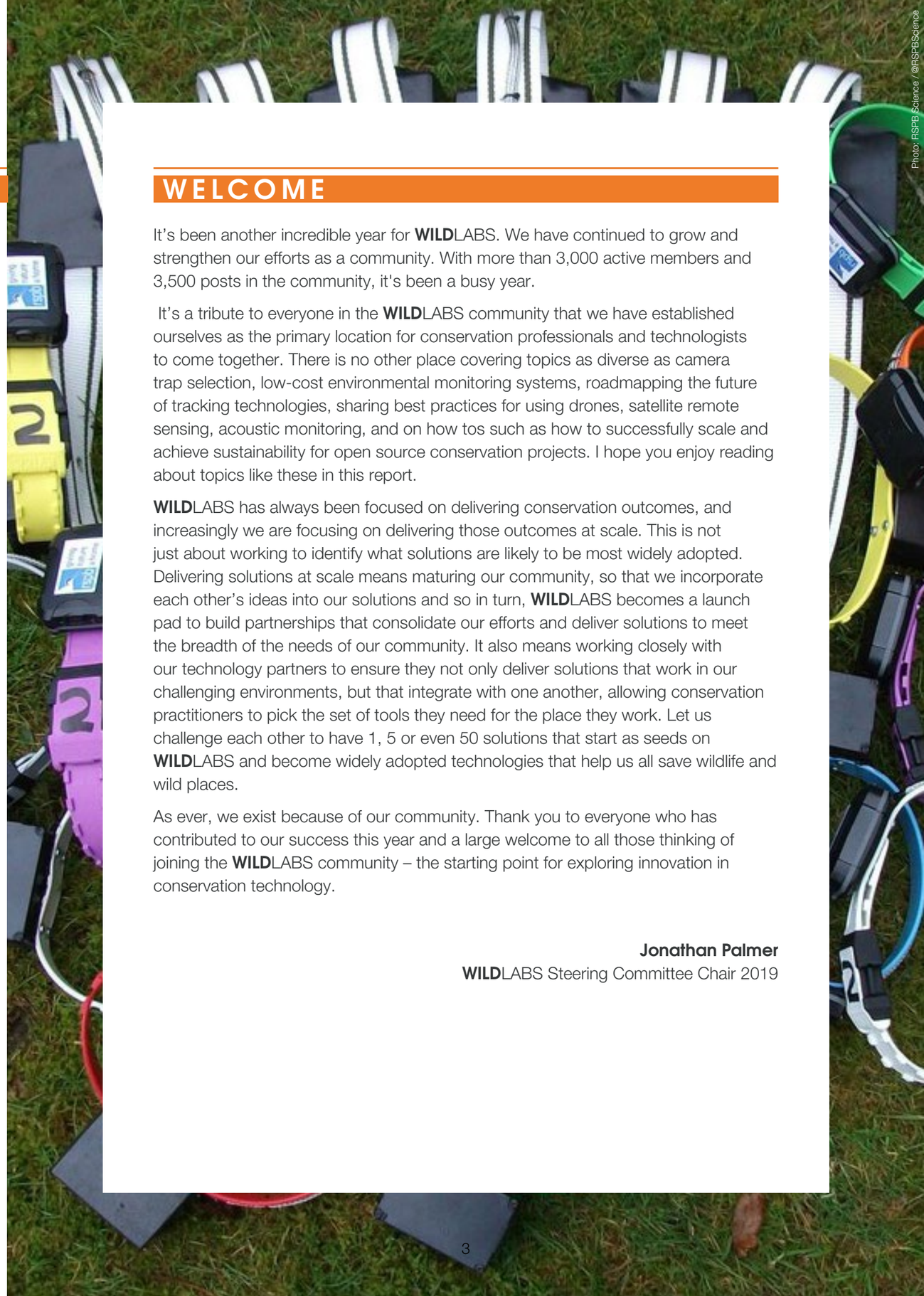
Cover image, taken by Alberto Montejo: "After setting some camera traps in cacao agroforestry of the Atlantic Forest, I usually share the photos with the workers and family. They are always excited about wildlife!"

Alvaro García-Olaechea, Peru



WELCOME

It's been another incredible year for **WILD**LABS. We have continued to grow and strengthen our efforts as a community. With more than 3,000 active members and 3,500 posts in the community, it's been a busy year.

It's a tribute to everyone in the **WILD**LABS community that we have established ourselves as the primary location for conservation professionals and technologists to come together. There is no other place covering topics as diverse as camera trap selection, low-cost environmental monitoring systems, roadmapping the future of tracking technologies, sharing best practices for using drones, satellite remote sensing, acoustic monitoring, and on how tos such as how to successfully scale and achieve sustainability for open source conservation projects. I hope you enjoy reading about topics like these in this report.

WILDLABS has always been focused on delivering conservation outcomes, and increasingly we are focusing on delivering those outcomes at scale. This is not just about working to identify what solutions are likely to be most widely adopted. Delivering solutions at scale means maturing our community, so that we incorporate each other's ideas into our solutions and so in turn, **WILD**LABS becomes a launch pad to build partnerships that consolidate our efforts and deliver solutions to meet the breadth of the needs of our community. It also means working closely with our technology partners to ensure they not only deliver solutions that work in our challenging environments, but that integrate with one another, allowing conservation practitioners to pick the set of tools they need for the place they work. Let us challenge each other to have 1, 5 or even 50 solutions that start as seeds on **WILD**LABS and become widely adopted technologies that help us all save wildlife and wild places.

As ever, we exist because of our community. Thank you to everyone who has contributed to our success this year and a large welcome to all those thinking of joining the **WILD**LABS community – the starting point for exploring innovation in conservation technology.

Jonathan Palmer
WILDLABS Steering Committee Chair 2019

INTRODUCTION

WILDLABS is the first global, open online community dedicated to conservation technology

With seed funding from tech sector giants Arm and Google.org, our conservation partners launched the **WILD**LABS community platform in 2015 to encourage and enable more open sharing of information about the use of technology to fight against illegal wildlife trade and the myriad other pressing issues facing our planet.

The mission of **WILD**LABS is to resolve conservation issues through technology. The platform brings together a community of conservationists, technologists, engineers, data scientists, entrepreneurs and thought leaders.

WILDLABS aims to build and support an active cross-sector community of conservationists and technology experts who use the **WILD**LABS online platform to:

1. Share information to increase transparency and reduce inefficient replication of effort
2. Ask and answer questions to share best practice, to increase efficiency and effectiveness of technology deployment to address conservation challenges
3. Collaborate to improve existing technologies or develop new technologies that address identified conservation needs

The problems faced by our planet and the challenges facing conservation cannot be solved by any one sector working in silos. To find solutions will need new voices and new approaches. Together, we can build the solutions needed.

"Doing some maintenance on the Arribada Initiative Arboreal Monitoring Platform at the CREES Foundation Manu Learning Center in the Peruvian Amazon! This camera system uses wifi for near-real time access to your canopy photos. Another great use of #Tech4Wildlife."

Anne Dangerfield, USA

COMMUNITY SNAPSHOT

3,235 active members

760 active conversations eliciting 2,990 replies from 467 members

100,650 visitors from 170+ countries have viewed 403,584 pages

4 winners selected from 37 entries in our IWT Accelerator Programme

At **WILD**LABS, we are building a community around conservation technology. Over the past four years, we've seen our community thrive, bringing together over **3,000** global members who openly share information and collaborate on technology solutions to pressing conservation challenges.

Wildlife conservationists and tech geeks are currently using over **750** discussion threads in tech and conservation challenge specific groups. Information shared in **3,750** member posts and **476** curated resources in our community have been viewed over **400,000** times by **100,000** visitors, helping to democratise access to lessons learned and crowd-source advice from engineers and scientists.

Through our Virtual Meetups and in-person workshops, we have brought together leading engineers and conservation practitioners, along with hundreds of participants across the globe. In these events, our members discuss today's cutting-edge conservation technologies and roadmap future development priorities.

> This community that you've built is amazing. It's the community I've always wanted but never knew it.
>
> I'm not sure if people tell you this all the time, but the bridges you're making have probably already had a huge impact on wildlife conservation. It's also likely put me down the path of working in wildlife research and conservation as well.
>
> **Akiba,** Japan

Q. What are the main benefits for you from participating in the **WILD**LABS Community?

Abhilash Krishnan, India
It is the go-to forum for the latest in convergence of tech and wildlife conservation. Being open access it's a great place to collaborate on concepts, ideas and hypthesis.

Simone Ferlin, Sweden
I am learning how to apply my skills in conservation, which was once a hobby and I did not have the right infromation to make a profile like mine (technical) useful for ecologists and biologists.

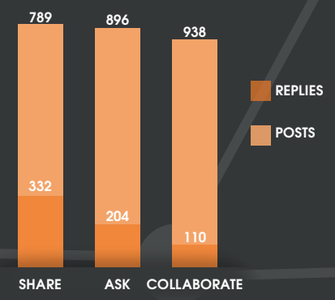
Rob Appleby, Australia
It's a wonderful community of conservation-minded experts in a variety of fields and represents an opportunity to engage together efficiently and effectively.

Randy Vinluan, Phillippines
To learn about tools and techniques that could inform my organisation's conservation work.

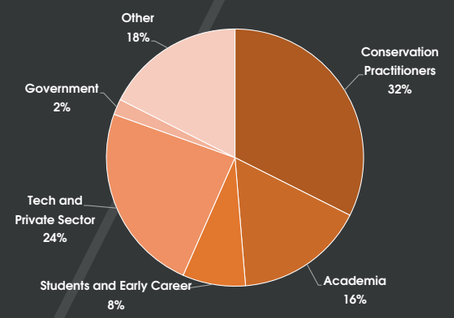
Rachel Skubel, USA
Being able to see new and emerging ideas, and where my own ideas and knowledge might be applied on emerging problems

Jorge Valenzuela, Chile
To be in touch with people working and developing new ideas to find solutions to conservation problems

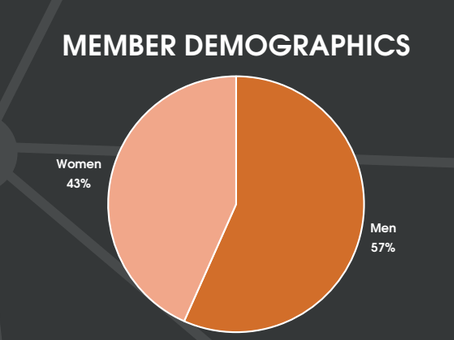
DISCUSSION THEMES



MEMBER BACKGROUNDS



MEMBER DEMOGRAPHICS



OUR COMMUNITY

WILDLABS has evolved into a thriving platform for over 3,200 global members who are building community, crowd-sourcing ideas and information, and collaboratively developing solutions.

WILDLABS TIMELINE

2015

Metrics
- Active Members: **369**
- Activity: **206** posts, **3,832** users, **21,617** pageviews
- Maturity: **Stage 1***

Key Activities
- Early users involved in designing platform and prioritising functionality before launch.
- **WILD**LABS **launches** at the WWF Fuller Symposium for Science in November, 2015.

2016

Metrics
- Active Members: **1,212**
- Activity: **921** posts, **17,084** users, **82,568** pageviews
- Maturity: **Stage 1-2***

Key Activities
- First **#TechWildlife Photo Challenge** launched (annual event, p16)
- We leveraged regional meetings and international conferences to connect with members and facilitate in-person networking opportunities. In 2016 this included **IUCN World Conservation Congress**, Hawaii and monthly local meetups in Cambridge, UK
- **Zoohackathon** 2016

2017

Metrics
- Active Members: **1,906**
- Activity: **1,054** posts, **22,501** users, **95,345** pageviews
- Maturity: **Stage 2***

Key Activities
- **HWC Tech Challenge**: two prizes of €30K mobilised engineers, designers and makers to create new or improved tools to prevent conflict between humans and wildlife (update, p. 30)
- **WILD**LABS in-person workshops and networking events at **SCB ICCB** 2017, Colombia and **London Zoohackathon** 2017.

2018

Metrics
- Active Members: **2,611**
- Activity: **625** posts, **26,842** users, **100,095** pageviews
- Maturity: **Stage 2-3***

Key Activities
- **WILD**LABS Partnership formalised
- **WILD**LABS.NET platform upgrade
- **Virtual Meetup Series** provides space for the global community to actively learn and exchange experiences on a range of topics (p22)
- Supported the technology strand of work at UK Gov. IWT Conference, leading to launch of the **WILD**LABS **Tech Hub** (p32)
- First **WILD**LABS **Community Survey** begins mapping conservation tech ecosystem

2019

Metrics (Sept)
- Active Members: **3,235**
- Activity: **944** posts, **30,281** users, **103,959** pageviews
- Maturity: **Stage 2-3***

Key Activities
- Second **WILD**LABS **Community Survey** (p38)
- Virtual Meetups continued (p22)
- **WILD**LABS Tech Hub **Accelerator program** supports four winners to scale solutions to IWT (p32)

*A. Iriberri and G. Leroy, "A Life Cycle Perspective on Online Community Success", ACM Computing Surveys, 41 (2), Article 11, 2009. doi: 10.1145/1459352.1459356

"Yesterday we had a #Tech4Wildlife trifecta while working a group of minke whales in Andvord Bay. Whales were tagged, then imaged with drones, & detailed prey mapping completed. Field work win!"

Duke Marine Lab UAS, Antarctica

SHARE

Our members share information to increase transparency and reduce inefficient replication of effort

Technology has major potential to address threats to wildlife and wild places, if it's field-adapted, affordable and scalable.

However, information on technology tools with conservation value is often siloed within major tech and conservation organisations, research institutions and the private sector. Media stories, journal articles and other resources make learning accessible, but these only tell part of the story - often focusing on successful outcomes and glossing over failures or challenges overcome along the way.

In our Community Survey 2019, our members told us that the most important value **WILD**LABS needed to deliver was to promote information sharing among practitioners on conservation technology.

By centralising resources, information and expertise in a global online hub, **WILD**LABS is helping to break down the information silos for the benefit of our 3,000+ active community members, and the 90,000 users who have accessed information on the site.

"For **WILD**LABS & #Tech4Wildlife: a drone equipped with 3D camera for producing footages to be used in campaigns for raising awareness regarding the importance of Amazon River dolphin. By Mauro/AFP"

Marcello Costa, Brazil

SHARE

In 2018-19, we posted 126 resources, which included 77 career, learning and funding opportunities and 49 in-depth case studies and interviews. Across the site, 2,972 conservation tech relevant links and documents have been posted, with this information accessed 55,028 times.

To support our members and the broader community of people who visit the **WILD**LABS platform, our editorial team curates career, learning and funding opportunities relating to conservation tech into a centralised hub. To facilitate learning exchange and increased transparency around how technology is being used in the field, we also invite experienced members to contribute long-form case studies, thought pieces and interviews.

In 2018-19, the top 5 most visited resources were:

1. **Thermal imaging, drones, and sea turtles: a case study using FLIR's new Duo Pro R camera**
2. **Instant Detect 2.0: A Connected Future for Conservation**
3. **Conservation Technology User Guidelines Issue 4: Satellite remote sensing for conservation**
4. **HWC Tech Challenge: Thermopile Sensor Project**
5. **WILDLABS Virtual Meetup Recording: Next Generation Wildlife Tracking**

In our 2019 Community Survey, our members ranked in depth articles as the most valuable content accessed through **WILD**LABS, with 90.7% of respondents marking them as extremely (62.96%) or moderately (27.78%) useful. Our regular Community Digest emails and the discussion forums were also highly valued, with 57% (emails) and 50% (forums) of respondents marking them as extremely useful.

> "I like finding out about new and emerging technologies that may be useful to me or my colleagues. I also look forward to sharing some of the technologies that my team is developing, once we are a little further along.
>
> **Blaire Costello**
> Germany

This feedback supports the value of a community led approach to building an information hub to foster transparency and collaboration. Increasingly, our members are becoming curators of the most valuable information, using the community forums and their profiles to share links and documentation for the benefit of everyone.

Across the site, 2,972 conservation tech related links have been posted. These links have been clicked on 45,678 times and direct users to member project sites, github repositories, peer reviewed articles and data repositories. Members have shared 282 documents that include best practice guides, instructional documentation, and project information. Our members have downloaded these documents 9,350 times.

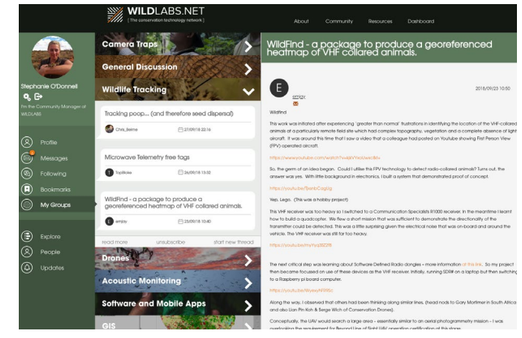
NEW FEATURES

Introducing your new Dashboard

In 2018, with generous support from The Royal Foundation, we upgraded the **WILD**LABS platform. Responding to member feedback, at the heart of this was a new Dashboard that gives our members access to information from across the **WILD**LABS community. In the one place, members can browse new conversations in the community, see the latest activity in their groups, access the new bookmark tool to save resources like funding opportunities or in depth case studies for easy access later, and much more.

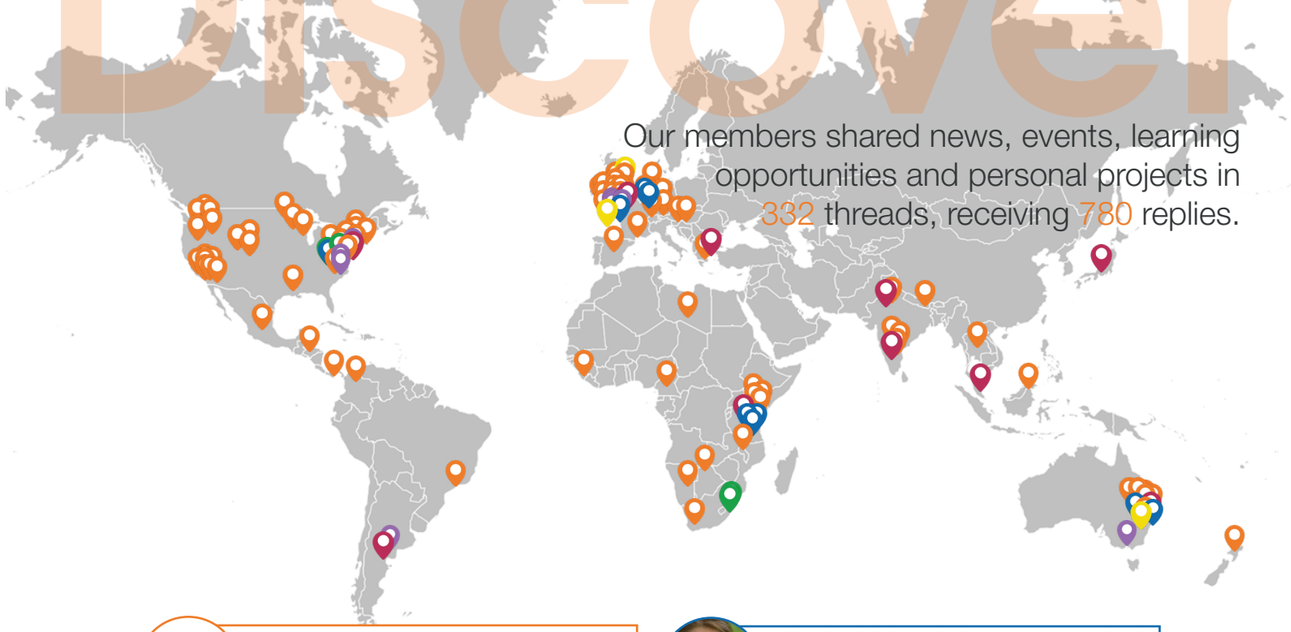
Alongside the dashboard, behind the scenes we rebuilt large parts of the site to improve performance and navigation to the right information. This included a new member directory, introduced a new free tagging scheme, and enhancing our profile pages so members can share and discover more relevant information about their work.

These improvements are all aimed at breaking down silos and making it easier to find information, access support and get involved. The significant, consistent growth in activity on the platform since launch, coupled with direct member feedback, indicates we've delivered on these objectives.



DISCOVER

Our members shared news, events, learning opportunities and personal projects in 332 threads, receiving 780 replies.



Welcome to WILDLABS
99 replies, 1,866 reads

Our 'Welcome thread' is the first point of entry into **WILD**LABS community, where new users check in to introduce themselves, sharing what they're working on and flagging the skills they have to offer projects that might be looking for help.

Foxlight to deter pumas, but how about Andean foxes?
11 replies, 76 reads, 26 link clicks

An article shared by Femke Hilderink and Nilanga Jayasinge sparked an exchange of experience between members with experiences using predator deterrent devices in Australia, Tanzania, USA, Sri Lanka, India and the Netherlands.

New Mobile App for Reporting Illegal Ivory
3 replies, 250 reads, 86 link clicks

Sue Orloff shared that Biologists without Borders has developed a new mobile app, i of the Elephant, that allows concerned people to report where ivory is being sold. Their goal is to compel sellers to be more responsible and enable consumers to choose environmentally conscious stores.

Drones for GIS - Best Practice
8 replies, 469 reads, 251 downloads

Adrian Hughes and his team at RSPB regularly update this thread with the latest Best Practice Guides for using Drones for GIS they develop. Megan Ossmann joined to share her beginner's guide to processing imagery in Drone Deploy, prompting other members to join and add their own experiences to this evolving discussion.

Drone Based Orangutan Tracking
3 replies, 73 reads, 63 link clicks

Upon discovering the **WILD**LABS Community, Dirk Gorissen started a new thread to share his work tracking Orangutans with in Borneo, with the aim of finding other members working in the space. He's now been connected with a number of members relevant to different parts of his project.

Are you working on an open source project?
8 replies, 159 reads, 117 link clicks

Ahead of our second series of Virtual Meetups, we put a call out inviting members to share their work. They responded by sharing open acoustic recorders, drones, a wildlife trade inspection platform and a Passive InfraRed (PIR) based motion sensor, among others.

PHOTO CHALLENGE

How are you using #TECH4WILDLIFE?

Throughout this Community Review, we have featured images shared by our community in the #tech4wildlife photo challenge. To find out more about technology and conservation projects showcased in the images, check out the information and links in the captions.

A picture says a thousand words, so take a photo this World Wildlife Day and share how you're using #Tech4Wildlife!

Every year, we celebrate World Wildlife Day on March 3 by asking our conservation tech community to share photos showing how they are using technology in the field or lab, using the #Tech4Wildlife hashtag.

Through the sharing of these photos, we discover new people and projects who are pushing technology to provide better tools to help us understand, monitor and protect our natural world. In four years, our community has shared hundreds of photos and videos. We've seen over 6,000 tweets around the hashtag, with more than 700 photos and videos posted showing how they're using tech in the wild.

Our members have shared photos of proximity loggers on Tasmanian Devils in Australia, open source sensors monitoring penguin colonies in Antarctica, tiny tags tracking desert bats in Kenya, drones studying orangutan nesting habits in Indonesia and camera traps capturing Jaguar in Bolivia.

In 2019, the World Wildlife Day the was around celebrating life in the world's oceans, so it was fitting that our top #Tech4Wildlife honour was taken out by Regina Eisert with her incredible photos from her work in Antarctica (p38). Regina went on to share that with the help of Anthony Powell, they built a multi-media whale trap combining acoustic monitoring with surface and underwater camera traps. Regina's team work off the sea ice in McMurdo Sound, which provides excellent conditions for setting 'whale traps'. In her words: 'Stable sea ice, lots of whales, and water as clear as gin'. She wrapped up her #tech4wildlife entry with a powerful video of a minke whale captured under the ice with their whale trap.


Photo: A. Hasselmann / R. Eisert @TPAonice


Photo: Andrew Barnas / @andrewbarnas


Photo: Zoe Lieb / @zoelieb


Photo: David Hamilton / @davidghamilton1


Photo: Nuno Negres / @NunoNegres

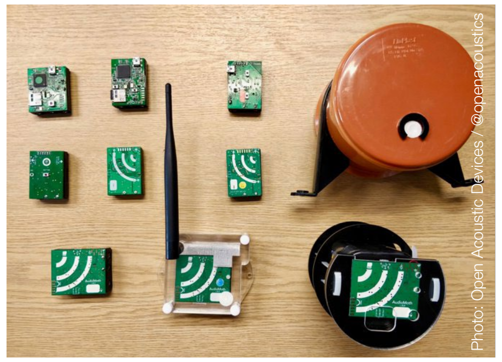


Photo: Open Acoustic Devices / @openacoustics


Photo: WILDLABS / @wildlabsnet


Photo: Dr. Rachael Orben / @RachaelOrben


Photo: Duke Marine Lab UAS / @MarineUAS - NOAA Permit No. 14809-03

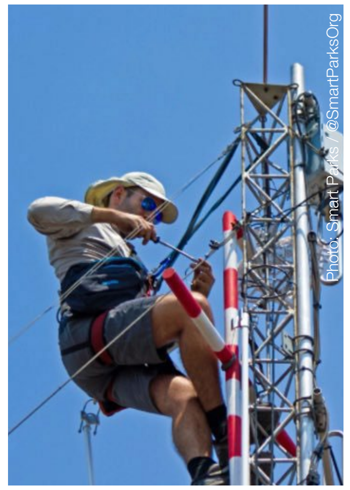


Photo: Smart Pa…

ASK

Our members ask and answer questions to share best practice, to increase efficiency and effectiveness of technology deployment to address conservation challenges

Too often, funding limitations, time and organisational barriers mean that the data and lessons learned from research and field tests of technology tools are siloed and not shared effectively. Predictably, this leads to unnecessary duplication as new technology users encounter the same challenges faced by others.

To address this challenge, field based colleagues told us that they needed a kind of Facebook-meets-Reddit on conservation tech, so that rangers using drones in Africa could share learning with biologists using quads for dolphin monitoring in Brazil, and obtain real-time advice straight from techies in Silicon Valley, USA.

With **WILD**LABS, we have built an online platform that supports a global network of experts to connect and provide advice on technology tools for specific conservation needs. Through the community, conservationists are connecting directly with technology experts, explaining the challenges they face and sourcing support to solve these problems.

The **WILD**LABS Virtual Meetup Series pulls these connections into real time, inviting community members along with leading engineers, conservation practitioners and academics into a virtual room to discuss today's cutting-edge conservation technologies. These virtual events compliment in-person workshops and events at conferences like the London IWT Conference 2018 and SCB ICCB 2019, opening up participation to a broader cross-section of the community so that members without the capacity to travel can participate in the discussions that are shaping the future directions of the conservation technology sector.

"We have been developing open source wildlife GPS tags that will be deployed on sharks in Belize and whales in Antartica later this year. Many more partners coming on this effort soon, to help to change the tracking industry overall"

Shah Selbe, USA

ASK

Our members have asked 204 questions, receiving 692 replies and a 76.5% answer rate. This dialogue is crucial in supporting members to share best practice to increase efficiency and effectiveness of technology deployment to address conservation challenges.

Can anyone help advise me about setting up a cheap, remote weather station for research in an area of northern Tanzania?

27 replies
Claire Hoffman's question sparked a discussion across **WILD**LABS and twitter, becoming a valuable resource for anyone looking for cheap, remote weather station setups.

Camera Trapping Software - what are you using?

19 replies
Nils Ratnaweera is dealing with huge amounts of Camera Trapping data in different contexts. He needed to move on from spreadsheets for managing annotation of image data. Since switching costs are high, he ran a poll asking what software members were using and shared back the results.

What are the best sensors and cameras to install along fence gaps in a conservancy?

8 replies
Damian Otieno requested recommendations about infrared and thermal cameras for use along the perimeter fence of a conservancy. The aim is to aid remote assessment and evidence capture of suspected incursions.

Answer

Can you help advise about constructing camera traps myself?

7 replies
Toby Barton received detailed advice on constructing camera traps for a project focusing on democratising ecological monitoring for indigenous ranger groups and increasing what we know about the Australian natural landscape.

Researching most affordable GPS chips with sensor capability

6 replies
Malou Anderson-Ramiez was looking for the most affordable GPS chip on the market now, capable of also having a sensor chip that senses and measures body temp and/or heart rate of large mammals. She had fantastic advice and will report back as she progresses.

Should I use a drone mounted NDVI camera for mapping for algal blooms?

4 replies
Chippie Kislik sought advice about using an NDVI camera and drones to map algal blooms. She received advice from experts at RSPB and WWF, helping her overcome the challenge of mapping water bodies with drones.

How to build my VHF tags from scratch?

5 replies
Simon Ripperger needed to build VHF tags for tracking bats, so they need to be <1g. Rob Appleby and Harold Tay joined to offer instructions, and Simon is now looking into building the tags in the shared instructions.

Could I use 9-axis sensors for tracking tiny animals?

4 replies
Jay Falk asked about the potential of using very small 9-axis sensors for tracking 3D movements at a fine scale for animals as small as hummingbirds. Harold Tay and Alasdair Davies responded to his call, providing information on the limitations of these sensors and potential workarounds.

EXPERIENCE

Rob Appleby

"It's easy to get dejected. Climate change, wildlife poaching and trafficking, extinction and biodiversity loss…the list goes on and on. Looking around, it seems like most governments are either indifferent to these crises, are incapable of acting against them or are actively contributing to them. It's easy to feel powerless. But then, along comes something like **WILD**LABS.

A real community of conservationists, collaborators, scientists, engineers, developers, inventors, marketers, teachers, students, you name it, and they are coming. A global citizenry, 3000-strong and growing.

Since I joined **WILD**LABS, I don't feel dejected anymore. I just look at all the amazing endeavours **WILD**LABS members are involved in, rising up to meet even the toughest conservation challenges head on. I don't feel powerless anymore.

I just have to look at how this community is working together to solve historically intractable problems, employing cutting edge technology and ideas to help prevent human-wildlife conflict, or stop wildlife crime, or track endangered species…the list goes on and on. Maybe it all sounds a bit hokey, but I don't care. I love **WILD**LABS! … and now I have to go, because I've got something in my eye alright!? Vive la révolution and vive la **WILD**LABS!

FORGING CONNECTIONS IN REAL TIME

Virtual Meetups

One virtual room, seven critical topics selected by popular demand, 24 leading engineers and conservation practitioners, and hundreds of participants across the globe.

The **WILD**LABS community congregates online in conservation challenge and technology-focused groups. These groups enable many of the crucial breakthroughs, innovative exchanges, and powerful partnerships that **WILD**LABS was created to facilitate.

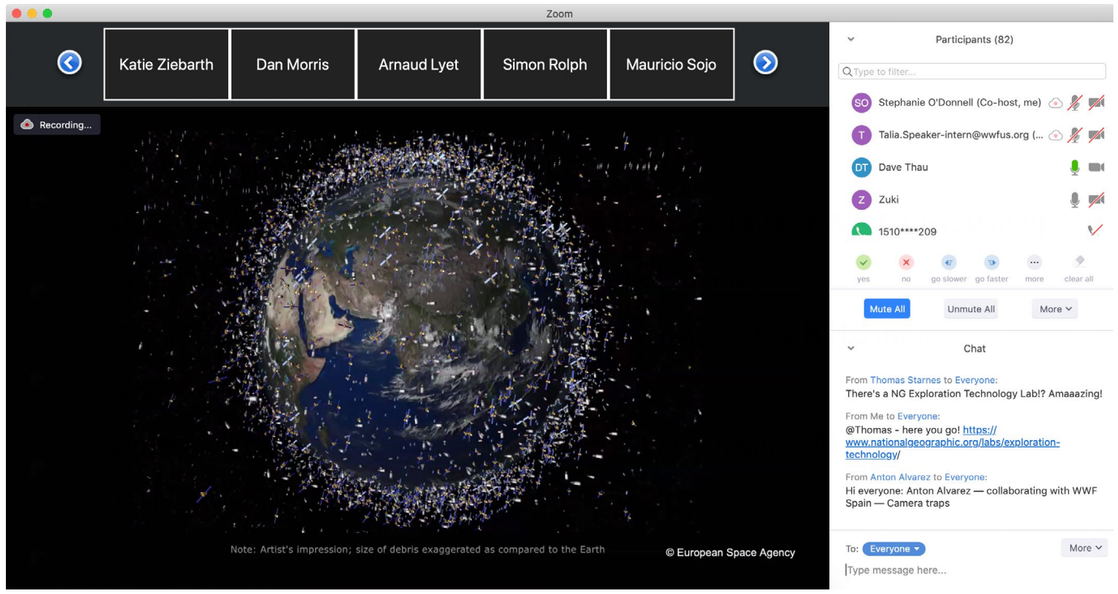
However, due to the highly interdisciplinary nature of conservation tech, conversations often spill across the boundaries of these groups. As similar questions and ideas bubble up in different parts of the community over time, it becomes necessary to bring everyone together to have a real discussion.

We launched the Virtual Meetup Series in 2018 to bring leading engineers in the tech sector together with conservation practitioners to share information and identify obstacles around some of the most revolutionary conservation technologies of our time.

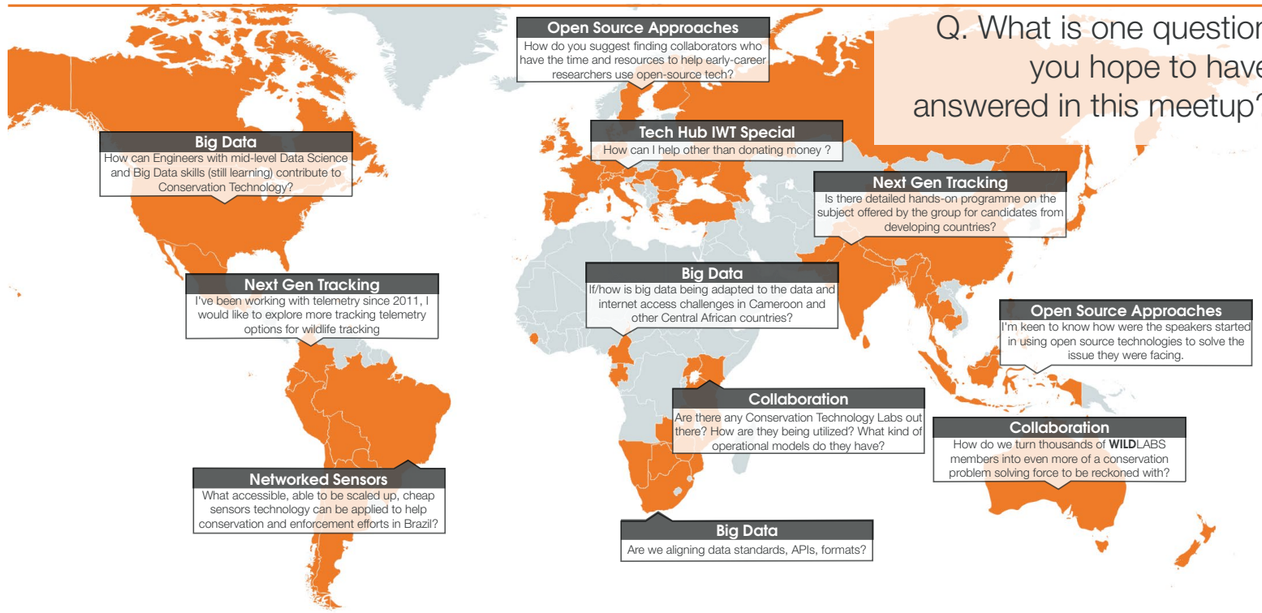
In our first season, we covered novel data collection methods through Networked Sensors for Security and Human-Wildlife Conflict (HWC) Prevention and Next-Generation Wildlife Tracking, and then how to utilize that data most effectively through Big Data in Conservation.

Early 2019 marked a wave of growing interest in open-source, low-cost alternatives to off-the-shelf hardware options, accompanied by members frequently sharing designs and exploring new ways of working together. In response, our second season covered Tools and Spaces for Collaboration, the Low-Cost, Open-Source Solutions these approaches are producing, and how to put the information they're generating to use through Creative Approaches to Data-Driven Storytelling.

In our next season, which will take place throughout the second half of 2019, we will explore the theme of noninvasive monitoring technologies. After a more approach-driven second season, we're eager to dive back into the realm of development and implementation in the context of these ever-evolving tools.



Dave Thau's presentation during our Big Data Virtual Meetup.



The format of a virtual meetup is simple. The community decides which topics they want to learn more about and discuss, and we design each season to address these topics in a way that makes sense. Once a focus topic is selected, we invite three expert speakers from tech, conservation, and academia to give 10-minute talks. We then open up the floor for 45 minutes of facilitated discussion with all three speakers and ~80 community members joining us from all over the world.

The all-hands facilitated discussion with the speakers and attendees is where we get to dive into challenges, opportunities, and future directions for the topic at hand. In our first virtual meetup, we underestimated the value of this discussion portion, scheduling only a small window after the formal presentations, as in a typical webinar. However, we quickly realised that our members were there to engage, not to listen passively. Our meetups now give equal time for presentations and facilitated discussion.

To help us facilitate this extended discussion, during the registration process, we ask participants: *'What is one question you hope to have answered?'* The answers give a vibrant snapshot of the live concerns and areas of interest around the topic and help us identify the common themes the community wants to cover in the session (see image above).

Our members also shape the discussion throughout each meetup. In every gathering, the chat is alive with people checking in, sharing what they are working on and why they are interested in the topic at hand.

As the meetup progresses, the chat develops into live commentary and questions about the content speakers are discussing. Participants exchange links to papers, flag projects of interest, and connect to relevant discussions and resources on **WILD**LABS, adding depth to the information shared by the speakers. If questions or comments come up that aren't quickly addressed by other participants in the chat, our facilitator will provide opportunities during the discussion for attendees to turn on their microphones and put them to the speakers directly.

Over two seasons, 459 community members have joined us from 45 different countries. The enthusiasm with which our members show up is the reason our meetups have become more than just a standard series of webinars. They create a space where participants feel that they are an active part of a global community full of real people who want to work together to find solutions to the challenges we all face. We can't wait to see what's ahead in future seasons.

> I was really impressed with the community and with the way y'all ran the call. Every webinar or similar meetup I've ever been on was dead silence after the speaker, and it was a battle to get people involved; this audience was really excited to participate and asked lots of thought-provoking questions. Looking forward to working with **WILD**LABS more in the future!
>
> **Dan Morris,** Microsoft AI for Earth
> Big Data Meetup Speaker

COLLABORATE

Our members collaborate to improve existing technologies or develop new technologies that address identified conservation needs

There are many engineers and experts who are eager to support conservation, and in many cases there may only be a limited number of conservation staff that can connect with them and advise on field needs that result in tools that advance conservation. Given that much research and development of new technologies involves risk and high costs, networking on issues of shared interest may support pooling of resources across users and enable valuable sharing of experience.

In order to scale the application of appropriate technology tools, developers and field users benefit from transparently accessing advisors and central resources.

“Matchmaking” between engineers, implementers and funders is essential to ensure that good ideas have access to the information from the field to aid their development and that they also have a practical application. This can be a pitfall of some development processes, where engineers or coders design cool apps but these fail to accelerate or may not have the necessary practical applications. To ensure a prize competition or innovation process yields real world results, it is essential to ensure follow-up and connection to field users. We provide the infrastructure for this through our community platform and targeted innovation programs.

"Being close to the spermwhales them allows to make the first interviews of these giants: François Sarano, oceanograph, undertakes acoustic and behavior studies with Longitude181 and the Université de Toulon (DYNI) for several years. (c) Veronique SARANO."

Longitude181, France

COLLABORATE

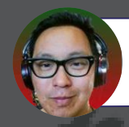
Our members used 58 discussions to identify outstanding needs, refine ideas, and connect with collaborators keen to get involved in developing solutions. Given the open-ended, exploratory nature of the discussions, these threads saw significant engagement, receiving 454 replies from members.

"With almost 3000 members, it's already likely that **WILD**LABS has a plethora of highly skilled individuals, and now the challenge is coordinating partnerships and co-operatives. I'd like to see a more co-operative, rather than competitive, set of funding opportunities explored."

Anon Feedback, Community Survey 2019

Tech for rewilding conflicts
33 replies, 409 reads

The Battery Challenge: How to reduce battery waste
18 replies, 338 reads



What would an open source conservation technology toolkit look like?
23 replies, 282 reads

Audiomoth User Guide
9 replies, 126 reads

Studying pangolin ecology
14 replies, 117 reads

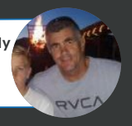
Who can construct an experimental camera trap?
23 replies, 125 reads

Conserving the Sumatran & Javan Rhino: AI & Facial recognition
(Discussion forked from 'African elephant facial or body recognition software')
6 replies, 56 reads

Extending battery life with solar panels
17 replies, 152 reads

Equipment Swap meet / Giveaway
22 replies, 231 reads

African elephant facial or body recognition software
9 replies, 126 reads



Equipment Swap Meet

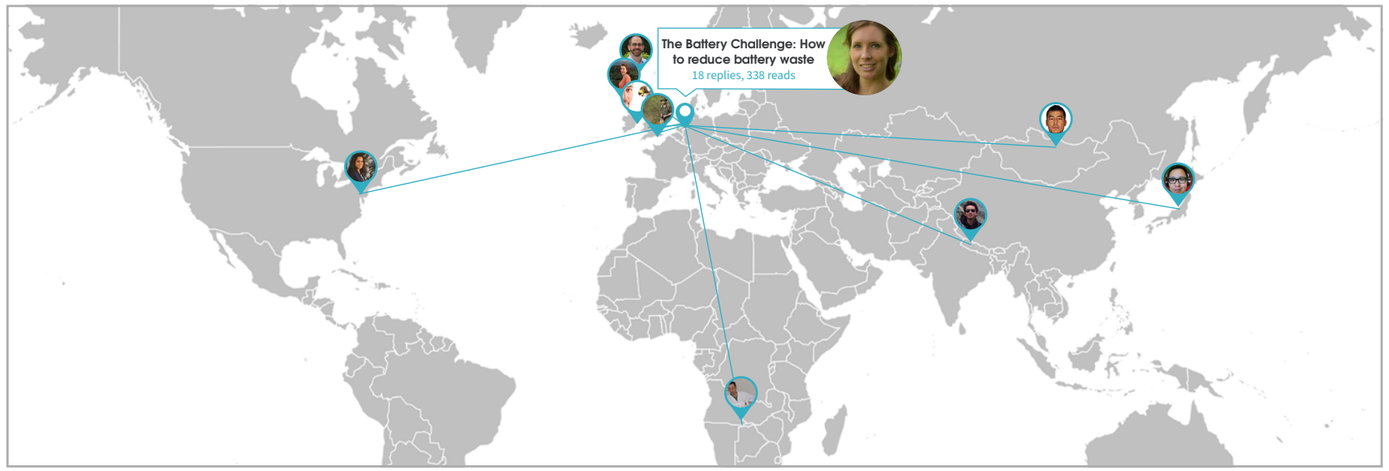
In our Tools and Spaces for Collaboration Virtual Meetup, OpenROV's David Lang explained how to apply for donated Tridant ROVs. This prompted Rob Appleby to start thinking about other kit that could be donated - like all those VHF and GPS collars sitting in cupboards and drawers around the world that could be recycled/ re-used. He wondered, 'Were there any other conservation hoarders who needed to 'Marie Kondo' their equipment (remember, to paraphrase Marie, if it doesn't give you joy anymore, you can let it go)?'

He kicked off the swap meet by offering second-hand, but good quality 9602 Iridium modems, antennas, and more, asking only for a poem in return. Other members jumped at the idea, with Alasdair Davies replying: 'It's like Christmas came early. Please put me on the list.. this is a rare opportunity. Good on you.' He finished his post off with the requested poem:

There once was a man from Oz
Who happened to be at a loss,
For he had too many Iridium 9603's
That were once on koalas up trees

So he posted a thread
And put the problem to bed
By giving them out free
To the community

Equipment from the first swap meet is now en route to new homes across the world, with wish lists for kit to be included in future swap meets being drawn up.

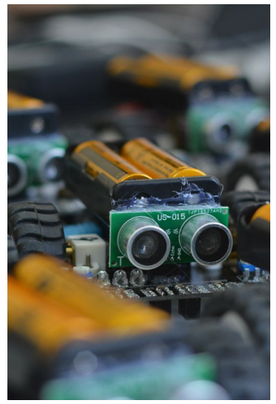


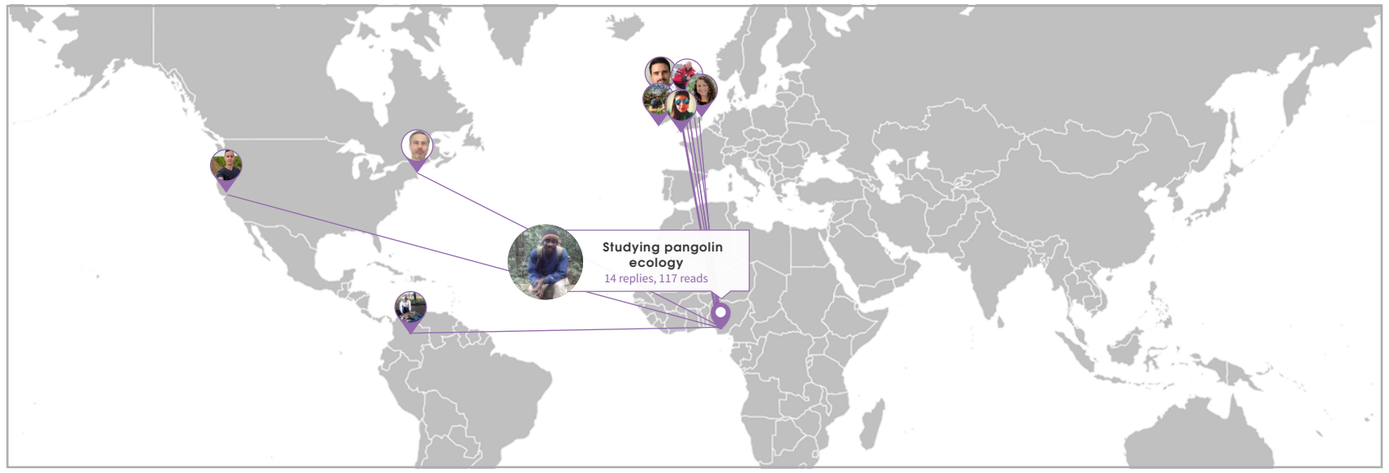
The Battery Challenge

Most equipment requires some source of energy and in many devices we use (lithium) batteries. Thousands of them are used annually in any field site monitored with camera traps alone, meaning millions across the globe each year. Although battery run camera traps and other equipment help study and protect biodiversity, at the same time because of the used batteries they generate they can pose a great risk to what we aim to protect. Femke Hildernik challenged our community:

1. To find alternative energy sources to power camera traps and other devices that provide sufficient power, are durable, affordable, not sensitive to theft, easy to use and deploy in the field;
2. To find ways to make rechargeable batteries last longer, also under cold conditions;
3. To improve waste management systems to actually deal with battery waste in a more efficient way.

Femke's post struck a chord, with other members sharing similar concerns. Ideas shared included using permanent external solar panel chargers or microbial fuel cell technology, with members sharing their set-ups for disposable battery alternatives. The discussion is still underway, with the latest comment suggesting getting in contact with big battery manufacturers, like Energizer and Tenergy, to improve their rechargeable NiHM batteries more temperature resistant.

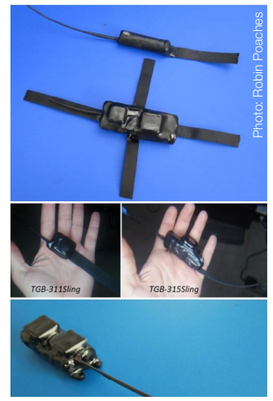




Tech for Studying Pangolin Ecology

With an estimated 1 million individuals removed from the wild in the last decade, the pangolin bears the unfortunate tag of being the most trafficked mammal in the world. Yet there is very little known about their ecology. This is largely due to their cryptic behaviour: they are nocturnal, roost in underground burrows, and leave very little sign of their presence in the environment. To develop appropriate conservation plans and initiatives, we need to have a basic understanding of their biological needs and how to rapidly locate them to enable researchers to study them further.

Carl Emogor is embarking on a PhD to do exactly this, focused on pangolins in Nigeria. He began a thread to ask for advice on technology for tracking/studying their ecology. Through the discussion, he's been connected with the IUCN SCC Pangolin specialist group and a range of tech experts working with field teams to track pangolins and giant armadillos in Viet Nam, South Africa and Columbia. With Carl's initial request fulfilled, the conversation evolved into a central point for members working with pangolins to connect with each other and share experiences. The thread is full of advice about tracker dimensions, weight, and attachment techniques, costs of available tracker options, and cost/benefits of iridium vs argos satellite systems.



FOSTERING INNOVATION

HWC Tech Challenge

Through the WWF and **WILD**LABS Human Wildlife Conflict Tech Challenge, two teams have received ongoing support to refine and field test their innovative solutions that support local communities to avoid or respond to incidents of human wildlife conflict.

In India alone, an average of 400 people and 100 elephants are killed every year as a result of human-wildlife conflict. In the past four years, 101 people have been killed by tigers in India. In the Arctic, hundreds of 'conflict polar bears' have been killed over the last two decades. These species are all listed as vulnerable or endangered on the IUCN Red List.

We need better solutions, but we need help to create them. So in 2017, WWF and **WILD**LABS challenged technology developers, engineers, designers, and conservationists to develop a new or improved tool to prevent conflict between people and wildlife, offering two prizes of €30,000 for the best solutions.

An international panel of human wildlife conflict and technology experts assessed the feasibility of the proposals and selected the two winners: Laurens de Groot and Tim van Dam, Smart Parks, and Alasdair Davies, Arribada Initiative. Each winner received €30,000 and has spent 2018-19 working with WWF field teams to further refine and field test their solutions.

ELEPHANT CHALLENGE

THE CHALLENGE:

DESIGN A SMART AND INTEGRATED SYSTEM INCORPORATING EXISTING TOOLS TO ENHANCE THE EFFECTIVENESS OF ELECTRIC FENCES

Smart Parks is working to provide a low maintenance, low-cost monitoring system for the electric fences that aim to reduce human wildlife conflicts, especially with elephants. At their project site in the Sonitpur District, India, their plan was to set up the required infrastructure, including the installation of LoRaWAN™ gateways along the fenced borders of the district. This network has the ability to add several other sensors such as Arribada's thermopile infrared sensors.

Since winning the challenge they have established a stable network and deployed the fence monitoring systems for field testing. With this field data, they have been able to refine their sensors. The next step is to deploy five improved fence-sensors their test-site in Assam.

CARNIVORE CHALLENGE

THE CHALLENGE:

BUILD AND DEPLOY A LOW COST, LOW MAINTENANCE, EARLY DETECTION SYSTEM THAT WILL IDENTIFY THE TARGET SPECIES AND PROVIDE REAL-TIME ALERTS.

The Arribada Initiative team are developing a thermal camera and aim to build an early animal detection and alert system to warn communities when dangerous animals have entered a community. They are currently working on polar bear and elephant detection, and their bigger goal is to ensure their system can help with all types of animals.

After initial trials in controlled zoo environments, the team have completed field tests in Greenland and India. They have assessed the image quality and detection abilities of their chosen, low-cost thermal sensors in the challenging climates, assessed their prototype camera design, and looked at field installation conditions and areas for monitoring. The next stage will focus on data collection for refining the detection algorithm.

BRIDGING SECTORS

London IWT Conference

In the run up to the London Illegal Willdife Trade Conference 2018, **WILD**LABS supported a series of technology incubator workshops held by technology companies, NGOs and governments to discuss ways to overcome some of the major barriers highlighted by stakeholders involved in the fight against the illegal wildlife trade.

Ranked as the fourth most lucrative transnational crime after drugs, weapons, and human trafficking, with annual revenues estimated to be up to £17 billion, the Illegal Wildlife Trade (IWT) is the largest direct threat to the future of many of the world's most threatened species.

Law enforcement, government agencies, Conservation NGOs and other stakeholders can deter, detect, and stop such illicit activities through the use of novel technologies. Catalysed by the London IWT Conference 2018, technology companies of all sizes, global conservation bodies, the UK FCO, Catapults and the wider IWT community are collaborating to accelerate the use of artificial intelligence and big data to tackle this threat.

Five common challenges were identified as paramount at a government roundtable which included **WILD**LABS representatives: education and training to build capacity around tools; sustained access to digital infrastructure, platforms and equipment; shared data and databases; affordability; and advancing appropriate innovation.

An incubator event led and hosted by ZSL saw representatives from leading technology companies, government, academia and NGOs pledge to donate their infrastructure, share their data and collectively support law enforcement authorities and the conservation community through the use of machine learning and artificial intelligence.

The event was just one in a series of technology incubator workshops held in partnership with technology companies, NGOs and governments to overcome some of the major barriers highlighted by stakeholders involved in the fight against the illegal wildlife trade.

The workshop attendees agreed on a collective mission to join efforts in creating and sharing algorithms and machine learning tools that can plug into a broad range of applications designed to combat IWT along the chain of supply and demand. Through the creation of clear roadmaps to wide scale implementation and sustainability, the event has bolstered an expert-driven coalition to put into practice what wildlife so desperately needs.

As part of the efforts to advance this work, the **WILD**LABS Tech Hub was launched at the London IWT Conference, supported by the UK Foreign and Commonwealth Office (FCO), Catapults, global conservation bodies and technology companies. The **WILD**LABS Tech Hub was set up as a scalable accelerator framework to empower a coalition of partners, experts and developers to help develop and implement IWT conservation platforms, enabling the sharing of data and AI solutions to support law enforcement and overcome IWT challenges.

SCALING IMPACT

WILDLABS TECH HUB

Technology companies, the UK FCO, and the **WILD**LABS conservation partners collaborate to focus their resources on scaling solutions to illegal wildlife trade.

The Illegal Wildlife Trade (IWT) is the largest direct threat to the future of many of the world's threatened species, as well as the livelihoods of local people who rely on wildlife-based economies. Urgent action is needed to address this crisis and reverse the appalling trends; where a rhino is killed by poachers every seven hours; African elephant populations are declining by 8% a year and over a thousand park rangers are killed in the line of duty over the last decade. Beyond the spotlight, there are many other endangered species, such as the eight species of pangolin, saiga antelope (Saiga tatarica), and African grey parrot (Psittacus timneh); alongside globally important trees and many fish species.

Technology has the capacity to deliver sustainable solutions to combat this trade, alongside tackling other threats to conservation, and at a scale that will have a real impact on the ground.

The **WILD**LABS Tech Hub is a new collaboration announced at the UK Government's London IWT Conference 2018. Supported with seed funding from the UK FCO and Friedman French Foundation, the program brought together field experts and technology companies (big and small), including Amazon Web Services, Microsoft, the Digital Catapult, the Satellite Applications Catapult and Open Data Institute, to work with the six international conservation organisations supporting **WILD**LABS. Initial work done through the **WILD**LABS Tech Hub involved a six-month programme that worked across two focus areas

1. **Accelerating technical solutions to tackle illegal wildlife trade**
2. **Democratising access to data and algorithms to help end wildlife crime**

> I am glad that the FCO had the foresight to invest in **WILD**LABS following last year's Illegal Wildlife Trade Conference.
>
> The Illegal Wildlife trade urgently needs to be tackled, and this can only be done through innovative solutions and an international collaborative approach. Congratulations to **WILD**LABS TECH HUB and its partners for leading the way.
>
> **Prof Carole Mundell,**
> Chief Scientific Advisor, FCO

The **WILD**LABS Tech Hub was announced at the London IWT Conference after a panel discussion with leaders from the conservation and tech sectors.

SUPPORTED BY:

Foreign & Commonwealth Office · EJF PHILANTHROPIES · CATAPULT Satellite Applications · CATAPULT Digital · aws · Microsoft

PROGRAMME 1: ACCELERATOR

Scaling technical solutions to tackle IWT

The **WILD**LABS Tech Hub has helped further the development of four innovative technology solutions tackling the IWT through a three-month support program. The program sought to help participating solutions achieve sustainability by offering long term access to cloud infrastructure, opportunities for further investment, and the establishment of new partnerships to help scale implementation.

Four winning solutions were selected from 37 high-quality applications.

Over and above the services offered by core partners, **WILD**LABS also engaged five Small Medium Enterprises to provide winners with free services to help them scale. This included: legal advice, branding, data labelling, developer consultancy and website design and build. Additionally, the **WILD**LABS community of field users helped solutions deep dive into what is needed on the ground, user's biggest problems and how they can solve them with technology.

WILDLIFE PROTECTION SOLUTIONS

A monitoring and communication system for protected areas

Providing alerts on over 200 potential poaching incidents since becoming operational, WPS is helping to prevent wildlife crime in important conservation areas. An Internet-of-Things (IoT) system uses machine learning modules to detect people and animals in real-time visuals captured by remote cameras.

WPS received architecture and device support from specialists at Digital Catapult. In addition, Microsoft Azure are offering free cloud services for both hosting, and development of Machine Learning models to improve device capability. The **WILD**LABS Tech Hub has also engaged 1715 Labs in assisting with data labelling to speed up the development of

ML models, and has assisted in proposal writing for future opportunities.

LOOKING FOR:

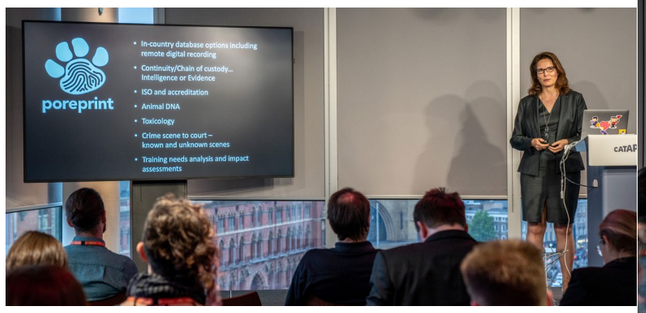
TECHNOLOGY PARTNERS (POWER, IoT CONNECTIVITY) | FIELD PARTNERS | KIT SPONSORS

POREPRINT

Fingerprint storage and search

With the support of Interpol, the City of London Police Fingerprint Bureau are providing access to their fingerprint database and Artificial Intelligence (AI) search technology to countries working on the front lines of wildlife crime. By running crime scene training in Zimbabwe and Zambia, the Bureau is helping local law enforcement set up their own database and search tools to collect, process, and search for fingerprints from people involved in IWT.

Poreprint received support with communications and marketing. In collaboration with Florida-based designer, Kelly Mahoney, and London based web consultancy, Underland, the **WILD**LABS Tech Hub helped Tracy develop a brand and landing page for the project. Now dubbed Poreprint, these materials



will help Tracy communicate her mission and services to new users, and further the reach of the project.

LOOKING FOR:

SPONSORSHIP TO DELIVER TRAININGS | CONTACTS SEEKING TO DEPLOY FORENSIC METHODS TO FIGHT IWT

David Moran, Head of Global Economic Issues Department in the Foreign & Commonwealth Office (FCO), opens our Showcase Event at Digital Catapult offices London

OPEN ACOUSTIC DEVICES

Acoustic sensing devices to detect signs of hunting

Open Acoustics have developed a low cost, open-source acoustic monitoring device called AudioMoth. Selling 6000 units to date, capable of running smart detection to monitor the sound of gunshots, chainsaws or trucks in conservation areas. The data helps managers understand where illegal activity is taking place, so they can respond to threats and plot patrol routes to safeguard wildlife. Version 2.0 will expand new features for wireless networking, enabling AI modules on the device to detect sound triggers and provide real-time alerts.

To make getting started with the device even easier, **WILD**LABS Tech Hub has engaged developer relations consultancy, Hoopy, to offer Open Acoustic Devices a free developer experience audit. The Tech

Hub also engaged international law firm, White & Case to help them with legal & intellectual property advice.

LOOKING FOR:

TECHNOLOGY PARTNERS (AI/ML, DATA STORAGE, ANALYSIS) | FIELD PARTNERS

PROGRAMME 2: DATA SHARING

Democratising access to data and algorithms to help end wildlife crime

The second programme is pioneering new ways to share data and algorithms to strengthen AI powered conservation technology; used to detect poachers in the field, search online for trade in wildlife products and also detect wildlife trafficking activities at customs. Training data is needed to improve AI accuracy and this programme is working to overcome barriers to sharing this data between law enforcement, governments, scientists and conservationists.

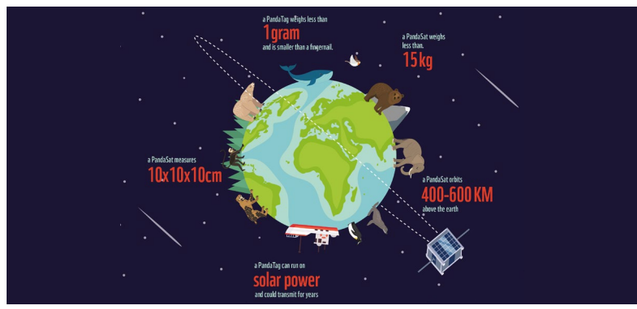
Working with the Open Data Institute and the UK Government's Office of AI, **WILD**LABS is helping

PANDASAT

Cube satellites for low-cost monitoring to unconnected areas

WWF, Stanford University, the University of Colorado Boulder and Imperative Space are aiming to launch a constellation of CubeSats called PandaSat to enable a network of tiny tracking devices to monitor the movement of animals or assets anywhere in the world. PandaSat will provide geo-location for important species, rangers, vehicles, to enable on-the-ground verification, targeting and scaling of conservation efforts.

Pandasat went through a business model design sprint with the Satellite Applications Catapult over several days at the Catapult's space in Harwell. This sprint provided market opportunity assessment and conservation technology advice. Amazon Web Services are assisting PandaSat with free service and



expertise, with PandaSat offering a particularly good fit for one of their newest satellite offerings: AWS Ground Station.

LOOKING FOR:

FUNDING | TECHNOLOGY PARTNERS | MISSION PARTNERS

explore a new concept called Data Trusts. These are replicable legal frameworks that help organisations share data in a safe and fair environment; whilst offering independent stewardship. They provide stakeholders with an easy to use framework to decide who should have access to data, for what purpose and to whose benefit, whilst avoiding harmful impacts. Eighteen high-level international stakeholders were involved in this in-depth study. The findings were launched at a high-profile event at the Royal Society of Arts, attended by the Head of the Government Office for AI Sana Khareghani. **WILD**LABS hopes that Phase 2 will see new funding to implement a Data Trust, advance this work and make data work for everyone.

WHAT'S NEXT?

WILDLABS has achieved a great deal with very little. To deliver our global vision, we need to increase our ambition, grow our programmes and expand our resources. Our programme proposes four interventions to rapidly achieve critical conservation outcomes:

1 **Grow our community.** Our community will remain at the heart of our efforts. We will continue to facilitate a neutral space for cross-sector collaboration, share knowledge, link skills and expertise, and connect those in the field with the solutions they seek. We aim to extend our membership in Africa and Latin America, to build local capacity and increase access to hands-on expertise.

2 **Accelerate appropriate innovation and co-development of technology.** We will evolve the **WILD**LABS platform to reflect the conservation technology landscape and make it easy to co-create use cases, track progress, prioritise features and engage specialist technical input on requirements. This will help everyone improve the performance and value of conservation tools.

3 **Developing capacity, scaling and adoption**. **WILD**LABS will continue to offer services that help incubate, scale and encourage the delivery and adoption of solutions. We will explore developing a new programme to build a team of conservation technology leaders who can handhold users through a range of technology problems, providing real time support and ‘how to’ materials that can be accessed through the platform or made available to other capacity building programmes, wildlife colleges and NGOs .

4 **Leadership and coordination of key stakeholders.** **WILD**LABS inherently helps promote sustainable and repeatable approaches to save time and resources. However, more can be done to coordinate strategy and align cross-sector stakeholders. We will build on our annual analysis of the conservation tech ecosystem, adding strategic resources to provide vision and leadership, to accelerate the development of shared practices, standards, data approaches, policy and sector wide recommendations.

"We're using machine learning, thermal cameras and drones to find and monitor endangered animals automatically. Animals glow brightly in thermal images making them really easy to spot, and the ML can tell species apart from their unique thermal shapes"

Claire Burke, UK

WILDLABS was launched in 2015 as a partnership of United for Wildlife to serve as a tool for the wider conservation and technology communities.

It is overseen by a Steering Committee comprised of representatives from Conservation International, Fauna & Flora International, The Royal Foundation, Wildlife Conservation Society, WWF and the Zoological Society of London.

For more information, please contact:

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Jonathan Palmer
WILDLABS Steering Committee Chair
jpalmer@wcs.org

"#Tech4Wildlife with Anthony Powell - we built the multi-media whaletrap combining acoustic monitoring with surface and underwater cameratraps. The whales showed up before we were done installing and came back for #whalfies!"

Regina Eisert, New Zealand

WILDLABS Steering Committee

Marianne Carter, FAUNA & FLORA INTERNATIONAL

Anthony Dancer, ZOOLOGICAL SOCIETY OF LONDON

Naomi Doak, THE ROYAL FOUNDATION

Eric Fegraus, CONSERVATION INTERNATIONAL

Colby Loucks, WORLD WILDLIFE FUND

Jonathan Palmer, WILDLIFE CONSERVATION SOCIETY

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Stephanie O'Donnell, WILDLABS **COMMUNITY MANAGER**

Talia Speaker, WILDLABS **INTERN 2018-19**

Sophie Maxwell, WILDLABS **TECH HUB PROGRAMME LEAD**

Joe Nash, WILDLABS **TECH HUB PROJECT MANAGER**

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