

FoAM Kernow selected activities 2016

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This review shows selected projects from the FoAM Kernow studio in 2016.

FoAM is a network of transdisciplinary labs at the intersection of art, science, nature and everyday life. FoAM's members are generalists - people who work across disparate fields in an entangled, speculative culture. Research and creative projects at FoAM combine elements of futurecrafting, citizen science, prototyping, experience design and process facilitation to re-imagine possible futures, and artistic experiments.

We live in chaotic times with no obvious answers to complex issues such as climate change, social inequality and economic uncertainty. Our response is to inspire and enable participatory co-creation, which fosters a sense of agency for people from all walks of life, guided by the motto "grow your own worlds".

Our work is all non-profit and open-source.



## Science for citizens

*One of our core activities is enabling people to develop creative and confident relationships with science and technology. We develop games and workshops to improve scientific research through broadened participation and championing the open access movement.*

# Science for citizens

## Crab Camouflage

<http://fo.am/crabcamouflage/>

We developed this citizen science game for the Natural History Museum in London, as part of their Colour and Vision exhibition from the 15th July to the 6th November 2016, in collaboration with the Sensory Ecology research group at the University of Exeter.

The aim of the game is to spot crabs against background images of various habitats. The speed of players spotting crabs tells the researchers whether the crabs have evolved camouflage that is specific for the habitat that they were found in, whether certain habitats are generally better for hiding in, and whether the crabs might have evolved to be better camouflaged from their usual predators.

When someone contributes to citizen science, they should also have access to the results. One thing we've done differently with this game is to show the players the results in real-time. The results screens update each time someone plays the game, and are presented to the player at the end of each game – instead of telling people what the answer is, they have a chance to think about what the latest results mean.

Being the very first person to find out something new about the world is one of the best things about doing science – it is what makes it exciting and important – but science 'public engagement' and education often misses this critical aspect.

Will you hunt as a predatory pollock or a hungry human?

They see the world differently...

Trichromatic vision      Dichromatic vision

Human  
Sees red, green and blue

Pollock  
Sees yellow and blue

6

**Live experiment results**  
Researchers will use these results to support their theories on the effectiveness of crab camouflage in different natural habitats

Best habitat for hiding in  
Are crabs harder to find in certain habitats?

Habitat	Average time to find crab (Seconds)
Mudflat	1.31
Musselbed	1.57
Rockpool	1.81

MORE RESULTS

Exit game      Play again



# Science for citizens

## Dazzlebug in Anchorage

<http://fo.am/dazzle-bug/>

A special version of our citizen science game Dazzlebug was exhibited at the Anchorage Museum in Alaska as part of their Camouflage: In Plain Sight Exhibition running from the 28th October 2016 to the 5th February 2017. Exhibition use of our citizen science games is made easier by open-source licensing.

Dazzlebug was developed with Laura Kelley and Anna Hughes at Cambridge University to see what patterns are most effective at evading capture from predators.



# Science for citizens

## Cricket Tales

<http://fo.am/crickets/>

Cricket Tales is a citizen science project developed with the Wild Crickets research group at the University of Exeter. The researchers have rigged up hundreds of CCTV cameras in a field in Spain, each trained onto an individual cricket burrow. This means there are thousands of videos showcasing the intricate personal lives of the crickets.

Players watch these videos and record the crickets' behaviour. Once you've watched the most videos in a burrow, you can build your own cricket house on the burrow map. Citizen science is a powerful way to do research that would otherwise be impossible – it also provides a window into how scientific research is performed for people who otherwise wouldn't be exposed to it.

Once the data comes in we'll be looking at the data quality versus basic player information (age, gender, device used) to do some research into optimising the design of citizen science projects.


YOU ARE WATCHING BURROW 242



3. Tag cricket behaviours and ID as the video plays

- MATE
- SING
- FIGHT
- EAT
- LEAVES BURROW
- ENTERS BURROW
- ARRIVES FRAME
- LEAVES FRAME
- TRAP
- !
- MULTIPLE CRICKETS
- ID

PRADO DE FOAM



TÚ PUNTAJACIÓN

Videos vistos	1
Casas construidas	0

NOTICIAS

- pruebacorr... ha construido una nueva casa
- pruebacorr... ha identificado un grillo

Leaflet | Wild Crickets: evolution in nature



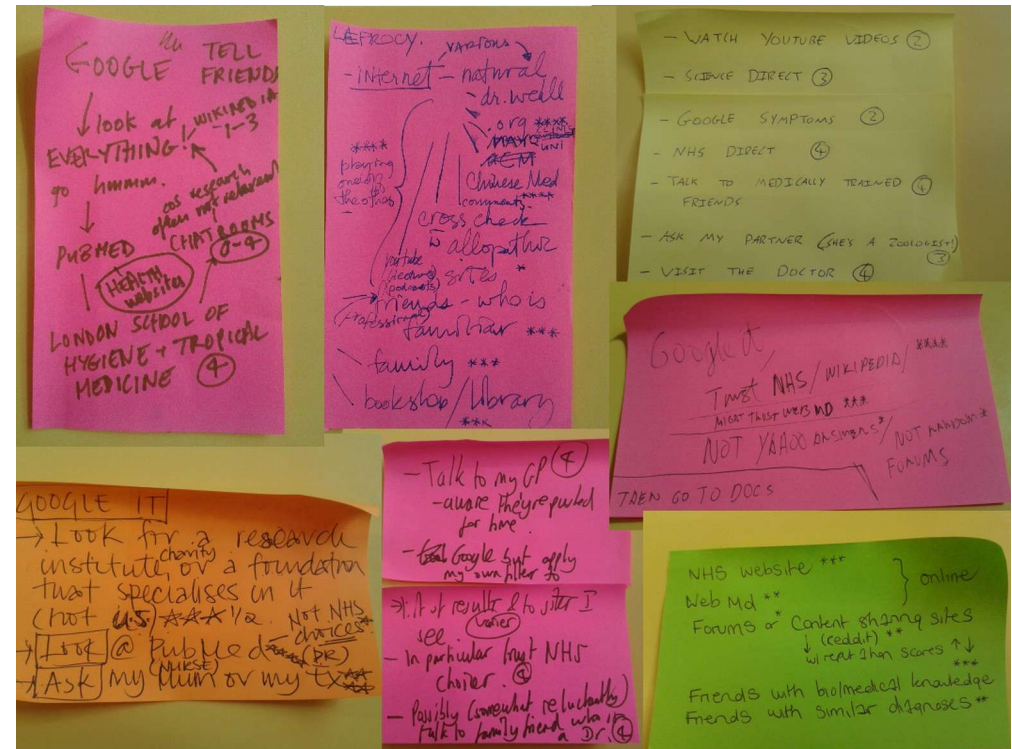
# Science for citizens

## AccessLab

<http://fo.am/accesslab/>

Recent world events and concern over 'fake news' and 'post-factualism' have highlighted the difficulties encountered when trying to find trustworthy sources of information. The ability to judge the reliability of different sources of information is a skill that can be learned. The AccessLab project aims to improve access to and the judgement of information, through direct citizen-scientist pairings.

In 2016 we held a workshop to understand where people go for information on health problems. Developed directly from our findings, the AccessLab project launches Spring 2017 with a workshop pairing artists (practitioners and researchers, particularly those who have community engagement as a core part of their practice and/or who work with data) with early career science researchers. Through one-to-one working with the science researchers, we will provide an opportunity for the arts participants to learn how to find sources of scientific information, and how to judge the reliability of these sources. Instead of focusing on the dissemination of subject-specific information, we will support participating artists in understanding how they can find reliable information on topics that are relevant to them.



## Arts and music

*Our arts and music projects provide critical perspectives on technology, and allow us to generate ideas and prototypes that we can later use in commissioned work and education. The division between arts and sciences quickly becomes nonsensical.*

# Arts and music

## Sonic Kayaks

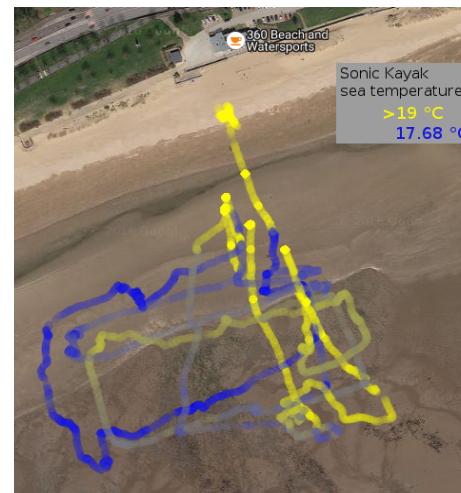
<http://fo.am/kayaks/>

The Sonic Kayak is a musical instrument with which to investigate nature. Kayaks rigged with underwater environmental sensors generate live music from the marine world, providing the paddler with an extra dimension of senses with which to explore the underwater climate, while enabling citizens to gather fine-scale geo-referenced climate and environmental data.

The Sonic Kayak project emerged from the Bicrophonic Research Institute (BRI), established by Kaffe Matthews and David Griffiths in 2014. Through ten years of international projects the BRI has developed the Sonic Bike whose music changes depending on where and how fast the cyclist goes, played through a pair of bike-mounted speakers and onboard GPS system.

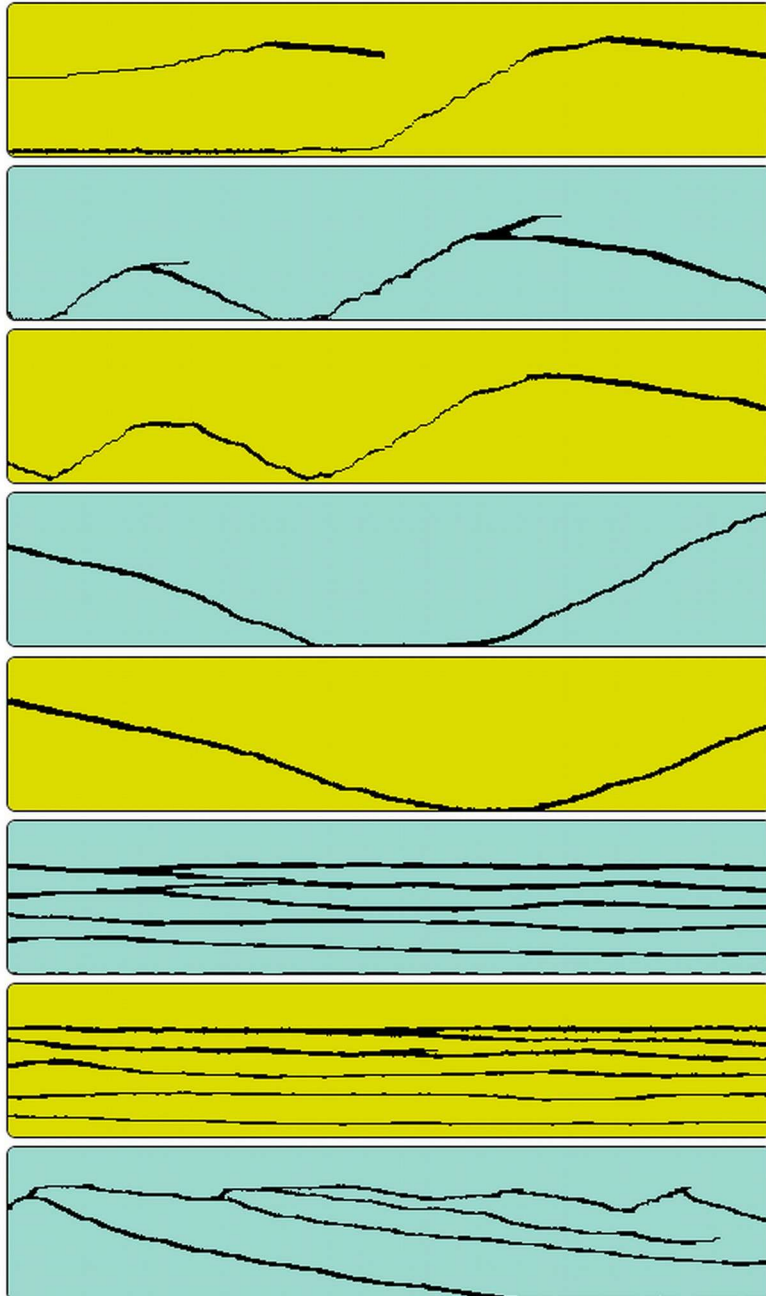
The kayak development process took place during two open-hacklabs, where participants shared experience in environmental sensing, sound art, climate science, boating and electronics.

The Sonic Kayaks were launched at the British Science Festival (Swansea, Sept 2016) and were made in collaboration with Kaffe Matthews and marine researcher Dr. Kirsty Kemp. This project was funded by FEAST Cornwall and the British Science Association, and was featured by Cerys Matthews on BBC Radio 6 Music.





# Arts and music



## Red King

<http://redking.fo.am/>

Hosts and parasites co-evolve against each other - as hosts become more resistant, parasites become better at infecting their hosts - but resistance and infectivity come at a cost, as they take energy away from other vital aspects of survival. The 'Red Queen' is an evolutionary hypothesis which says that organisms need to constantly adapt to survive while pitted against other opposing evolving organisms - it's a term borrowed from Lewis Carroll's book *Through the Looking-Glass*: 'Now, here, you see, it takes all the running you can do, to keep in the same place'. The 'Red King' is a relatively recent theory, which says that slower evolution might be better sometimes.

We're working with researchers at the University of Exeter to further understand the Red King. When hosts and parasites are pitted against each other in simulations - and certain parameters are changed - what happens?

Turning information into sound can be a way to experience patterns in data differently. We built a simulation interface which generates sonifications, combining rhythmic and pitch changes to make it easy to identify changes in evolutionary outcomes. The Red King interface is used as a teaching tool in biosciences, a citizen-science tool for crowd-sourcing simulation outcomes, and as music software in its own right.

# Arts and music

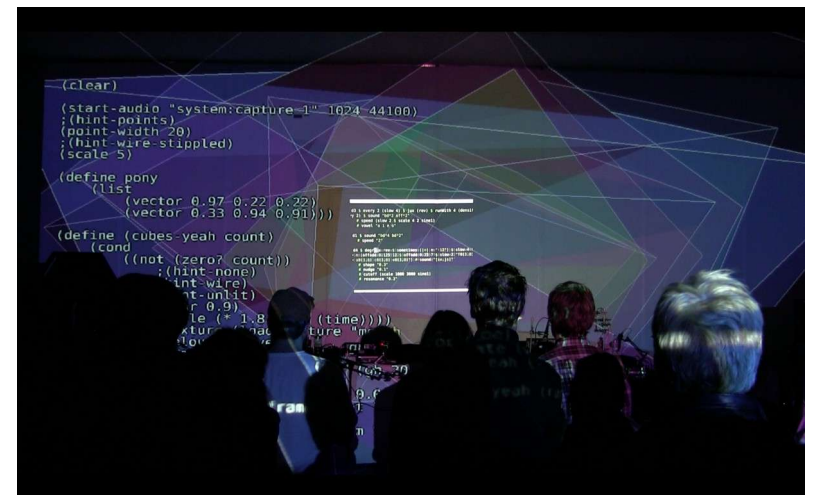
## AlgoMech

<http://fo.am/algomech/>

We held the first edition of our AlgoMech Festival in Sheffield during November 2016, bringing together hundreds of people for a good few days of performances, talks and hands-on workshops. "AlgoMech" is short for the Festival of Algorithmic and Mechanical Movement, a bit of a mouthful but that's what it's all about - exploring movement through 'digital' and/or mechanical technologies. Performances included Rie Nakajima and Pierre Berthet, building up a room full of handmade, physical sound-making mechanisms and systems over an hour, some floating around the space under helium balloons. On the other end of the scale we hosted a huge algorave, with an international line-up of live coders making algorithmic dance music, all using programming languages created by artists. Somehow between these extremes lay Caroline Radcliffe and Sarah Angliss's performance of The Machinery, evoking the the mechanical movements of industrial looms as noisy, repetitive clog dance.

We are holding the second edition of AlgoMech again around 8-12<sup>th</sup> November 2017. Responding to feedback, we will keep the festival relatively small and friendly, but built up into a more focused programme of activity across a long weekend. The theme for our first year was "The Performance of Making", and for 2017 year will be "Unmaking"; we'll be looking for creative ways of taking things apart, with a sideways reference to the mythological figure of Penelope, and her use of unmaking (in particular, unweaving) as a form of resistance.

See <http://algomech.com/> for videos from last year's festival and to subscribe to updates for next year.

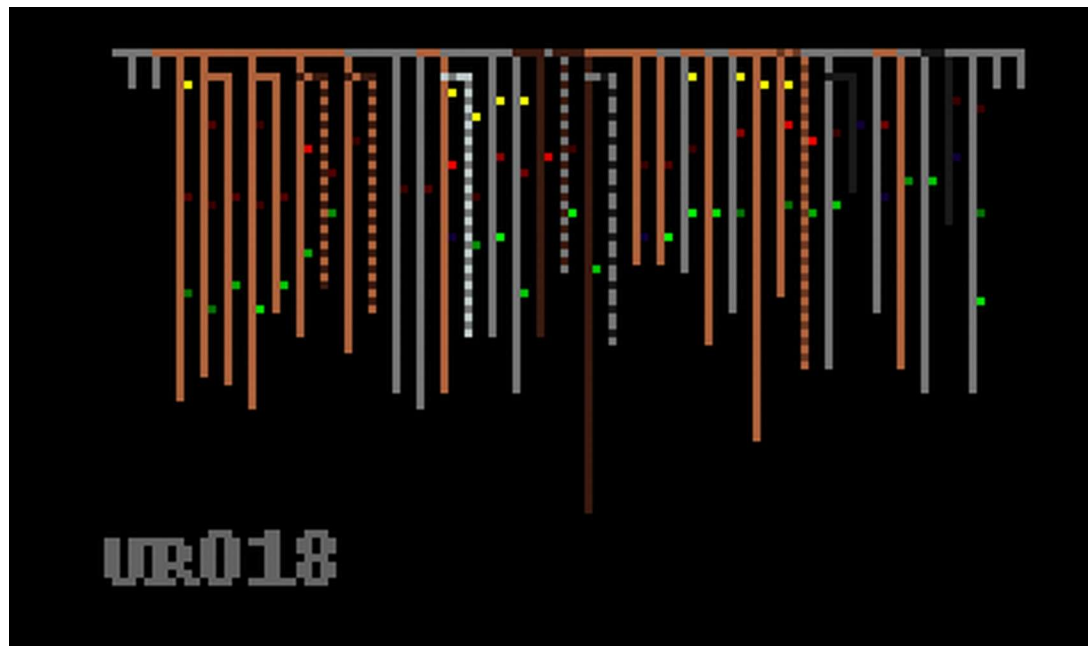


## Thinking out loud

<http://theodi.org/meetups/thinking-out-loud>

'Thinking Out Loud' was the fifth Data as Culture art exhibition at the Open Data Institute in London. Curated by Hannah Redler and ODI Sound Artist in Residence Alex McLean including Pixelquipu Inca Harddrives by Julian Rohrer and Dave Griffiths (Institut Fuer Musik und Medien/FoAM Kernow)

Openness and processes of making – where any end results are left partly undone – were at the heart of many of the projects on display. The exhibition drew connections between the ways in which humans have captured, encoded and distributed data, and made it meaningful through pattern throughout history. From pre-Columbian Quipu and the ancient art of weaving to computer software environments, it introduces us to creative notions of code, and the ways in which it can carry both language and thought.



# Arts and music

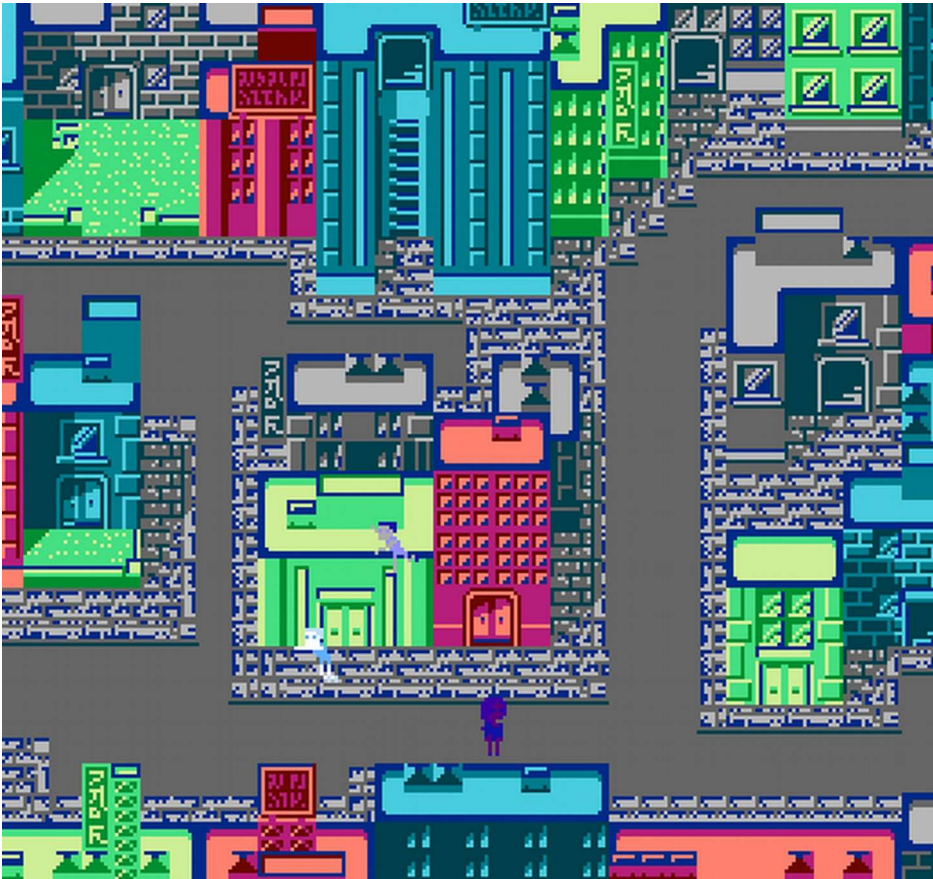
## What Remains

<http://fo.am/what-remains/>

What Remains is a time capsule and multi-layered archive of a small part of our history, seen through the lens of an already much warmer planet. A collaboration with Marloes de Valk, Aymeric Mansoux and Arnaud Guillon.

What Remains is a game and research project investigating how technology and the media influence the way we perceive ourselves and humanity's current biggest challenge: global warming. The game is set in the eighties, a time where we were not yet past the tipping point and could have drastically changed the way we live in order to keep our species safe. The story unravels the many different influences on public opinion, keeping us from taking measures to improve our chances of survival in the future. In line with the project's concept, the game is developed on reused old hardware, the original Nintendo Entertainment System (NES) and Nintendo Famicom consoles and repurposed cartridges.

We helped with code and context for the prototyping phase of the game development, providing background information on the social aspects of climate change and its political history, along with NES development via compiler design and graphics programming.



## **Appropriate technology**

*The concept of appropriate technology has been key to our work - the idea of decentralized, energy efficient, environmentally sound, and locally controlled solutions to specific problems. These projects often use solutions with an eye to more international issues, such as technology use in developing countries.*



# Appropriate technology



## Greenspace Voxels

<http://fo.am/greenspace/>

We have been visualising 3D greenspace in cities using Minecraft and physical models, using voxel data from full-waveform LiDAR (laser scanning landscapes from aircraft). This project is with Karen Anderson at the University of Exeter who applies remote sensing to environmental monitoring.

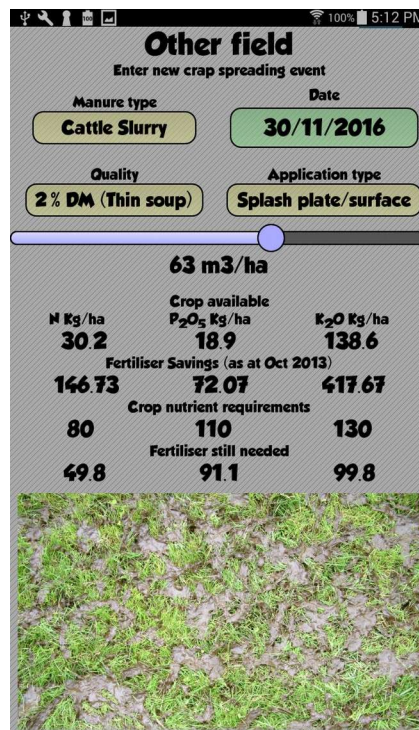
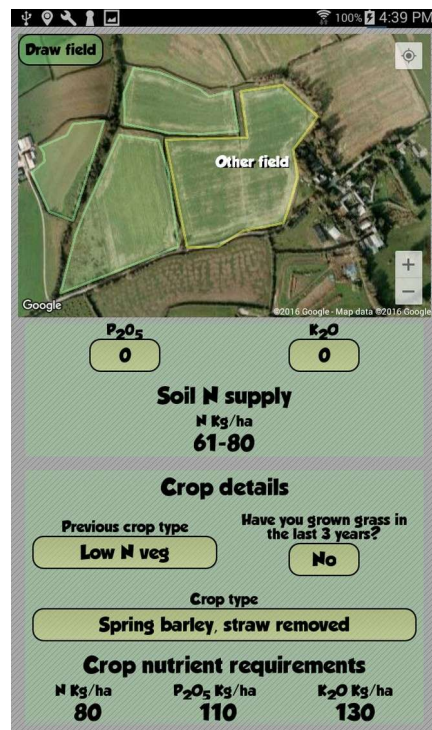
From an environmental research perspective, looking at greenspace in three dimensions allows a new, more complete perspective on habitat connectivity and the use of space by wildlife. From an urban planning and architectural perspective understanding the impact of a new build on a landscape in three dimensions provides a valuable tool for moving towards sustainable practices.

# Appropriate technology

## The Farm Crap App Pro

<http://fo.am/farm-crap-app>

We are building on our original Farm Crap App – a tool for encouraging sustainable agriculture commissioned by the Duchy College and Rothamstead Research. The app is based on DEFRA data to promote the use of natural fertiliser, and won the Soil Association Innovation Award 2014. We've added more crop types, more detailed nutrient information, more manure spreading methods, and farm maps to make the app useful for a wider range of farmers.



## Allotment App

<http://fo.am/blog/2016/12/14/allotment-crap-app/>

We're also developing the Crap App system for people to use in their allotments and smallholdings, again working with Duchy College and Rothamstead Research.

The allotment system is a 'pocket lab', with walkthroughs for working out the soil type and rainfall level, and how to make good compost. Once these experiments are completed, the system makes suggestions for the best crops and companion plants, compost application rates and timings, and rotations.



# Appropriate technology



## Tanglebots

<http://fo.am/tanglebots/>

Tanglebots was a workshop for children and their families, forming a messy introduction into weaving, robotics and coding. Tanglebots are prototype/failed weaving robots (weaving is quite hard, so we start with tangles and seeing what patterns emerge). We combined harvesting components from e-waste toys (motors, gears, electronics), and using visual programming (Scratch) to control these components, to create robots that make tangles. Tanglebots workshops took place at our Cornwall studio, Sheffield and at the V&A Digital Design weekend in London.

We were joined in this adventure by weavcoders Alex McLean, Ellen Harlizius-Klück and the Lovebytes crew. We are now developing the Tanglebots workshop for children with autism, in collaboration with the Cultural Minds research group at the University of Exeter.





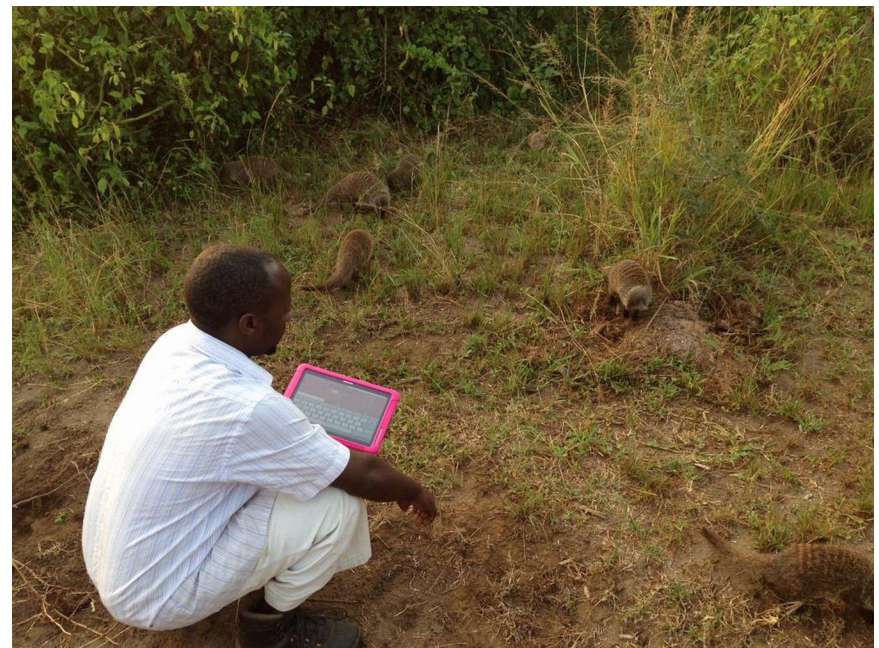
# Appropriate technology

## Mongoose 2000

<http://fo.am/mongoose-2000/>

Mongoose 2000 is a behavioural research tool for use in remote areas lacking reliable internet connectivity or power. Developed for the Banded Mongoose Research Project at Exeter University for use in their field site in Uganda, Mongoose 2000 uses a Raspberry Pi to synchronise behavioural observation data across multiple Android tablets used for daily recording of mongoose behaviour.

Mongoose 2000 continues to develop. We are now transferring the research group from using Access to SQL for data storage and querying. This means the whole system will be open-source, and global collaboration will be more straightforward.



**Event: Pup aggression**

Aggressive mongoose

DF130	DF190	DF208	DF223	DM126	DM170	DM
DF139	DF200	DF216	DF225	DM165	DM171	DM
DF169	DF201	DF222	DF226	DM168	DM179	DM

Fighting over    Level

Food	Block	Initiate?	Win?
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Done                      Cancel

# Research and residencies

*An overview of residencies hosted at our studio in Cornwall, PhD student supervision, and our publications in scientific and artistic journals and books.*



# Research and residencies

## Human in Residence

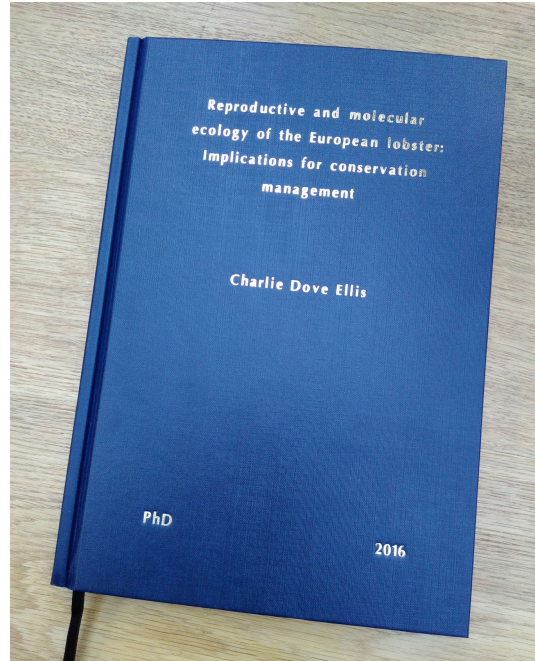
<http://fo.am/humaninresidence/>

At FoAM Kernow we run a 'Human in Residence' scheme – this provides an opportunity for people to develop their more ambitious transdisciplinary projects. Residents have free access to our studio, and our support for the expansion and realisation of ideas, the formation of networks, and the practicalities of seeking funding.

In 2016 we hosted residents Jo McCallum [basketry, architecture, biomimicry], Matthew Creasey [animal behaviour, community projects, theatre], Christiane Berghoff [craft, wellbeing], Shelly Knotts [sound art, coding] and Holger Ballweg [protein folding, sonification].



# Research and residencies



## PhD students

We are formal external supervisors for PhD students. In 2016 Charlie Ellis received his PhD for his work understanding the impacts of fishery stocking performed by a local charity, the National Lobster Hatchery. Ongoing PhD student Lewis Campbell's project uses citizen science to look at how epidemic diseases changes the behaviour of wildlife, in collaboration with the Zoological Society of London and the University of Exeter.

We offer students a creative environment to work in, outside formal educational institutions, and encourage them to draw from a greater breadth of inspiration and approaches.



# Publications in 2016



A grassroots remote sensing toolkit using live coding, smartphones, kites and lightweight drones (2016) K Anderson, D Griffiths, L DeBell, S Hancock, JP Duffy, JD Shutler, WJ Reinhardt, AGF Griffiths; PloS one 11 (5), e0151564

Tanglebots (2016) DJ Griffiths; Engineering the Future (edited by I Papadimitriou, A Prescott, J Rogers) 109-111

A new Android smartphone app for geospatial mapping from drones and kites (2016) K Anderson, D Griffiths, L Debell, H Steve, D James, S Jamie, R Liam, AGF Griffiths, K Threadgill; EGU General Assembly Conference Abstracts 18, 16569

Population genetic structure in European lobsters: implications for connectivity, diversity and hatchery stocking (2016) CD Ellis, DJ Hodgson, CL Daniels, M Collins, AGF Griffiths; Marine Ecology Progress Series 563, 123-137

Growing self representational life forms and some dusty software archaeology (2016) DJ Griffiths; Seeds - The PROCJAM Zine 31-33

Relative advantage of dichromatic and trichromatic color vision in camouflage breaking (2016) J Troscianko, J Wilson-Aggarwal, D Griffiths, CN Spottiswoode, M Stevens; Behavioral Ecology, in press.



*Thank you to our collaborators and funders for your support and inspiration in 2016.*

*In 2017 the FoAM Kernow studio will be joined by two new members – Alex McLean and Aidan Weatherill – bringing their own interests and extensive experience in music, festival production, bioinformatics and data management.*

*Amid turbulent times, we will be prioritising projects relating to climate change, and placing a particular focus on broadening the socioeconomic diversity of our participant base.*

*[foam]*



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