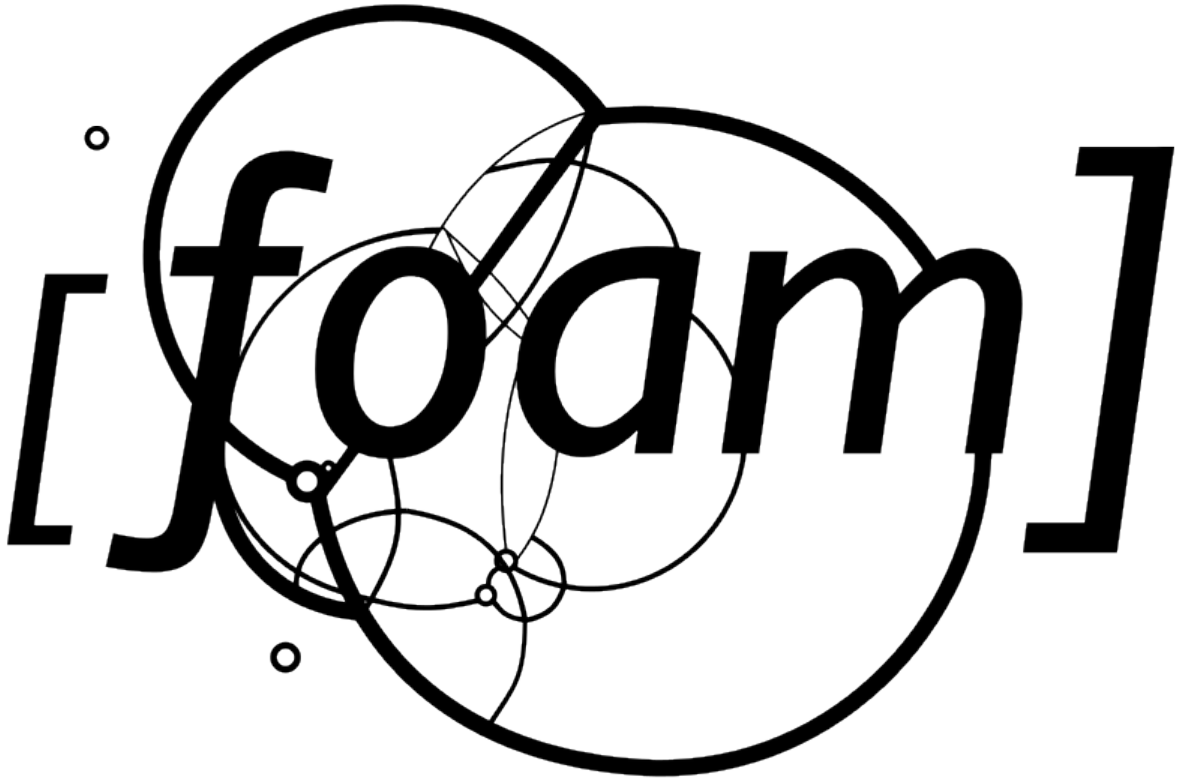


FoAM Kernow selected activities 2019

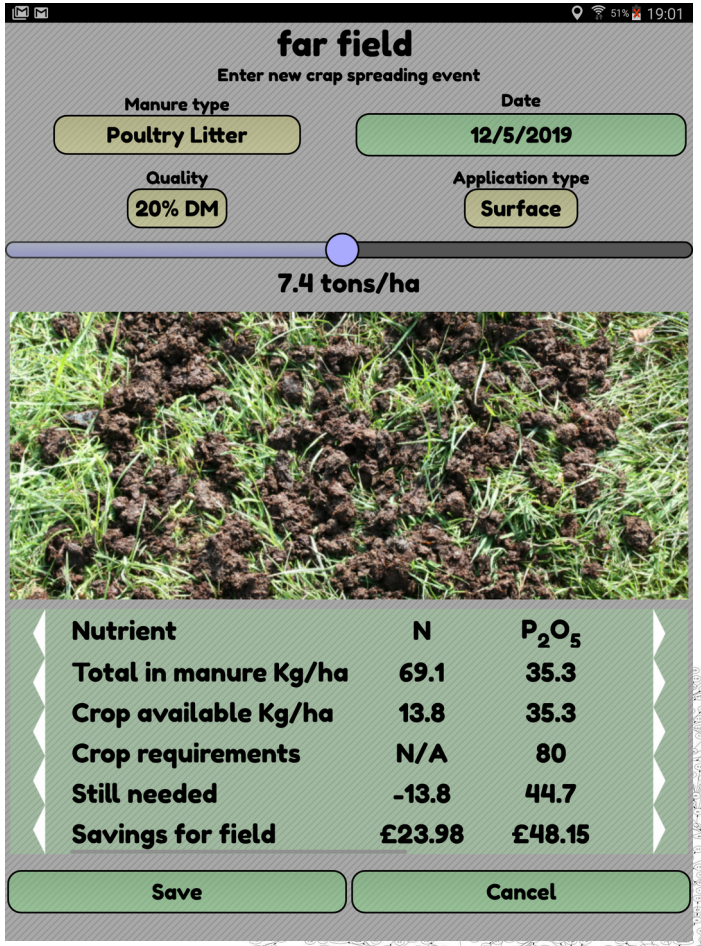
https://fo.am/studios/kernow/

kernow@fo.am

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.

This review covers the work of our UK studio, FoAM Kernow, in 2019 - a year which that brought many long running projects to fruition. For many of these we have experienced 'moments of truth' where we finally test the work, and get to see if it stacks up to expectations. Each of these moments has led to new interpretations and surprises from people (shoppers passing by in a city centre, visually impaired kayakers, parents worried about vaccination, or climate change activists) who are often able to tell us what we are doing better than we are able to ourselves. However, now we have been around for five whole years, we thought it was about time we tried to explain...

FoAM Kernow is a **Non-Profit** organisation, and we are one of six FoAM studios dotted around Europe. Most of our time is spent on research and development for projects relating to **Ecological and Climate Breakdown**, addressing **Inequality**, and making more **Appropriate Technology.** We see **Transdisicplinarity** (working outside established boundaries) as the only viable approach to tackling the world's most pressing problems, and advocate for **Co-Design** and **Citizen Science** as essential approaches for encouraging and including broader perspectives. Most of our projects are collaborations with publicly-funded organisations, and we make all our work freely available for those who have ultimately paid for it through **Open Access** publications and our commitment to **Free Software**. In practical terms, you'll find us designing workshops, building hardware, creating exhibitions, doing electronics, giving a voice to our communities, publishing our work, teaching at all levels, advocating for political change, and giving people a leg-up wherever we possibly can.



The Farm Crap App

https://fo.am/activities/farm-crap-app/

In the UK, farmers have to report the nutrients they spread on their fields to the government. This is made easier by buying commercially produced fertiliser with the nutrient values printed on the bag. Meanwhile, farm manure goes to waste because the nutrient levels are extremely complicated to quantify.

The Farm Crap App means farmers can plug in farm, crop and manure information to get the nutrient values they need, as well as an estimate of money saved by using natural manures, without needing to employ a consultant.

In 2019 we received European Regional Development Funding via Agritech Cornwall to complete the Farm Crap App. The project has been a collaboration with Duchy College and Rothamsted Research, together with the farmers, farm advisers, contractors, regulators, compost producers and machinery manufacturers that came to our co-design workshops to make sure that what we made would genuinely be useful.

The fully functional Farm Crap App is freely available for Android and iPhone, and now includes all crop and manure types, as well as secure peer-to-peer data sharing that maintains the privacy of those using it. The system is recommended by the Agriculture and Horticulture Development Board, and the prototype won the Soil Association Innovation award in 2014.

Sonic Kayaks
https://fo.am/activities/kayaks/

The Sonic Kayak is a musical instrument and a scientific instrument. Kayaks rigged with underwater environmental sensors generate live music from the marine world, providing the paddler with an extra dimension of senses to explore the underwater world, while gathering fine-scale geo-referenced climate and environmental data. The system can be used for artistic purposes as well as for citizen science applications, offering the opportunity to build low-cost open hardware to gather critical data for environmental activism.

In 2018, remote sensing PhD student James Duffy joined us on a Natural Environment Research Council funded secondment, improving the waterproofing, GPS accuracy, and data mapping. We were also approached by Access Lizard Adventure, who wanted to see whether the sonification system could be used to provide greater independence to kayakers with visual impairments. Together with James and long-term collaborators Kaffe Matthews and Jo Garrett, we developed a bespoke version for this purpose and taught the kayak club how to make their own, funded by Smartline (European Regional Development Funding). For 2020 we'll be developing and adding new sensors for mapping water and air pollution, funded by the EU's Horizon 2020 research and innovation programme.

Penelope
https://fo.am/activities/penelope/

How can we make tools that help understand the ancient weaver's mind? How they calculated and solved the first recorded mathematical proofs, embedding them in pattern. How do certain forms of technology define our relationship with the world?

The Penelope project is a 5 year European Research Council project by Ellen Harlizius-Kluck with Giovanni Fanfani, Annapurna Mamidipudi and Alex McLean alongside FoAM Kernow. This year we have been dipping our toes into integrating textiles and electronics - adapting the pattern matrix from wooden construction to the use of conductive threads for a modular and portable form of our tangible weave-coding interface. The biggest job this year was the construction of a new design of eight woven swarm robots. These robots were unleashed on unsuspecting passers by in Sheffield - dancing and weaving around a maypole during the 2019 Algomech festival. Our dancing swarm made a further appearance at the Penelope 'Homo Textor' conference, where they were embedded deeper into the history of dance, ritual, mathematics and textiles of the ancient world.

Invisible Worlds Residencies
https://fo.am/activities/iw2019/

The Invisible Worlds Residencies are a collaboration between FoAM and the Eden Project, funded by the Wellcome Trust and Arts Council England. Our 2019 call attracted applicants from Europe, South America, Asia and Australia with projects and backgrounds in farming, illustration, renewable energy, sculpture, horticulture, poetry, genomics, choreography, clinical medicine, music and programming, amongst others.

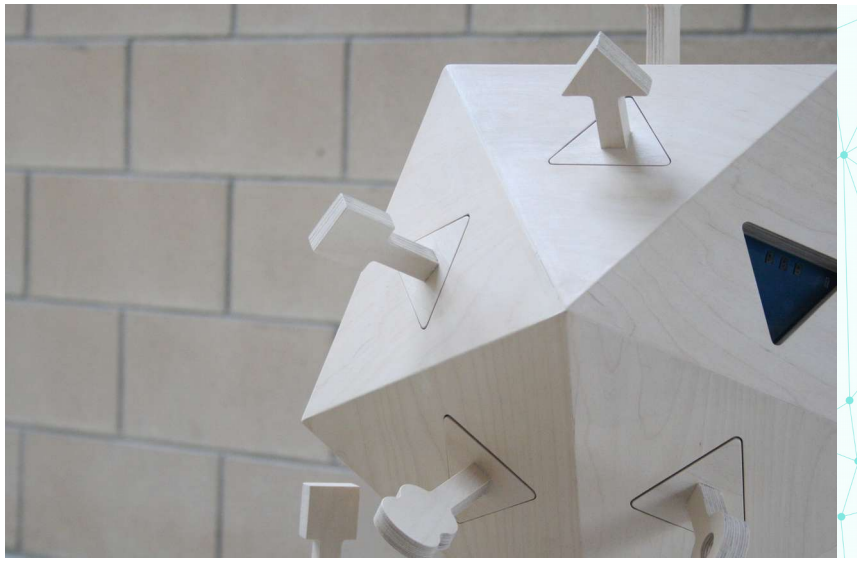
The outstanding resident was Austin Houldsworth – an experimental designer who pitched a deceptively playful project on the societal impacts of climate change. Austin's Intergalactic Estate Agency challenged Generation Alpha to find ways of communicating what they find valuable on our struggling planet, to anyone listening in the vast expanse of the universe.

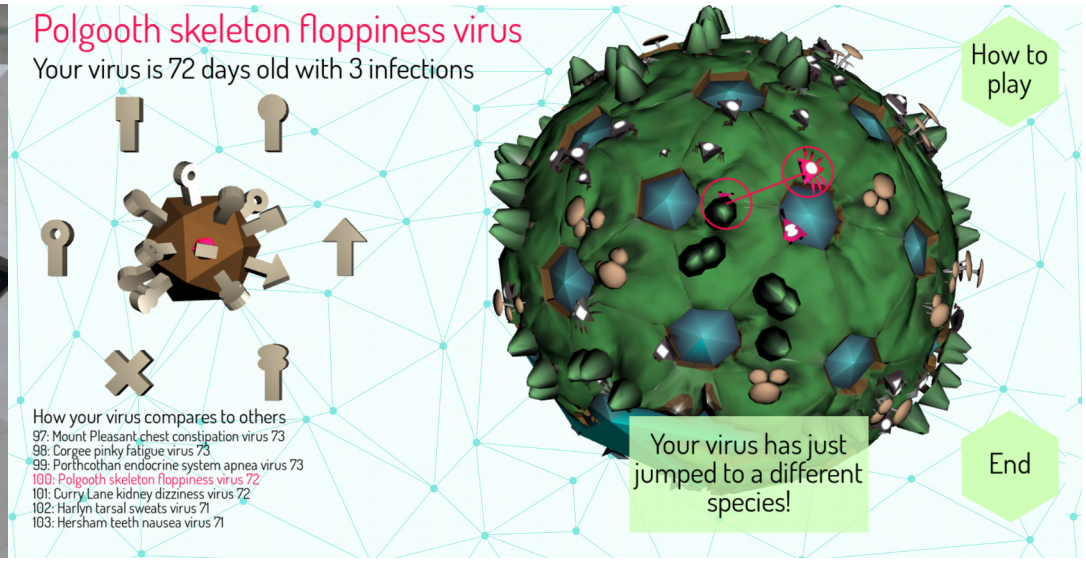
The Invisible Worlds residencies offer people from any background the chance to work with FoAM and the Eden Project to develop their ideas, without disciplinary boundaries, and with access to extremely broad audiences. Previous residents have included a ceramicist studying geology, sound artists making music with strange organisms, and a trio of a chef, illustrator and geneticist who sequenced kimchi microbiomes.

Viruscraft
https://fo.am/activities/viruscraft/

What determines the ability of a virus to infect some hosts but not others? Working with evolutionary biologist Dr. Ben Longdon, and funded by the Wellcome Trust, we developed a collaborative game and tangible interface to explore co-evolution and virus host shifts - where a virus jumps from one host species to another.

Changing plug-in shapes on the outside of a large wood virus structure means players can evolve their virus, infecting hosts on a screen-based world and interacting directly with host-pathogen co-evolution simulations. Much of the system has been developed through open events with contributions from people from all walks of life. In 2019 the game installation was used at the Eden Project and the University of Exeter's Science in the Square festival, attracting competitive gangs of toddlers, teenagers, and adult gamers. Projects like this are valuable in their own right for encouraging greater understanding of the world around us, but also provide us with a unique opportunity to develop our approach to technology. As with the Penelope project, we emphasised developing physical technology that is beautiful, approachable, transparent (people can understand how it is made), modifiable, fixable, and recyclable at the end of its life.





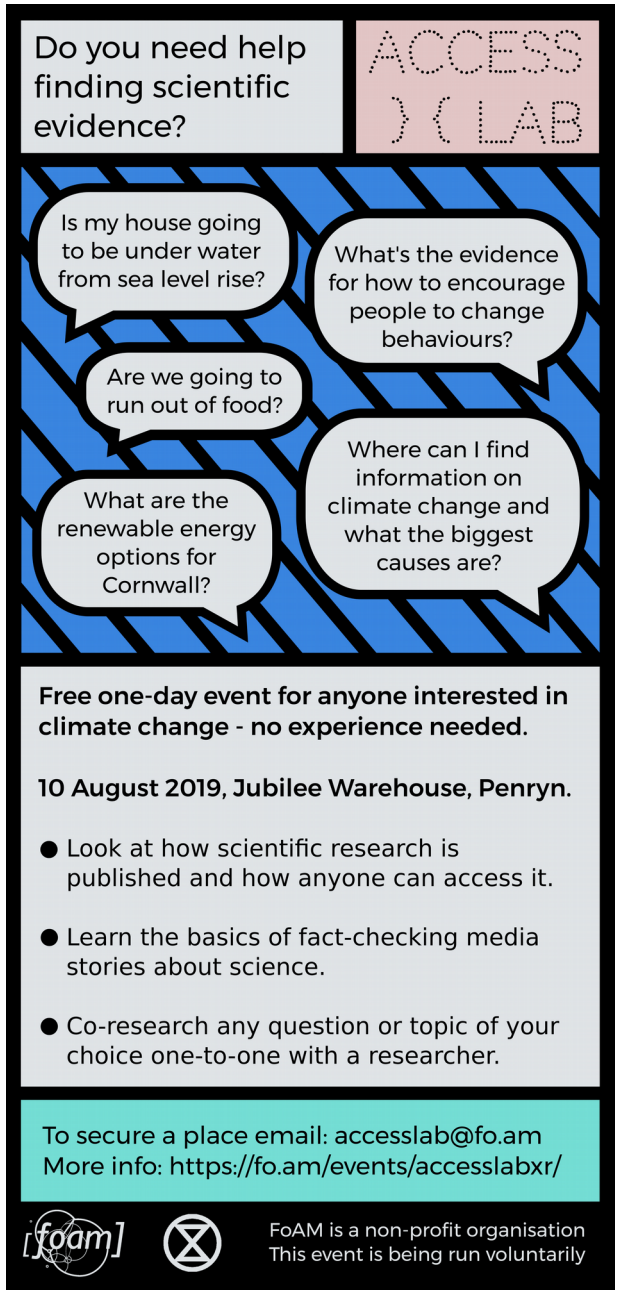
AccessLab
https://fo.am/activities/accesslab/

AccessLab is a workshop format designed with two simultaneous motivations: To decentralise research skills so a broader range of people are able to access/use scientific research, and to expose science researchers to the difficulties of using their research as an outsider. The act of pairing science academics with local community members helps build understanding and trust between groups at a time when this relationship is under increasing threat from different political and economic currents in society.

Having held five AccessLabs in 2017/2018, we ran a workshop for previous participants to look at potential futures for the project, together with the British Science Association and the Natural Environment Research Council. We met a difficult-to-navigate conclusion, where we wanted to allow anyone to run their own workshops under the AccessLab name but also to retain the radically honest, constructively critical, and egalitarian ethos of the format.

In 2019 we took the first big step by publishing the full format for others to use. We also ran an AccessLab for a heady mix of Extinction Rebellion activists and policy makers working on climate change. Based on the high demand for this, we secured funding from the Wellcome Trust, Carnegie Trust, and Wolfson Foundation for a series of three AccessLabs focused on Climate, Environment and Health to be run in 2020 together with the European Centre for Environment and Human Health and Falmouth Library.

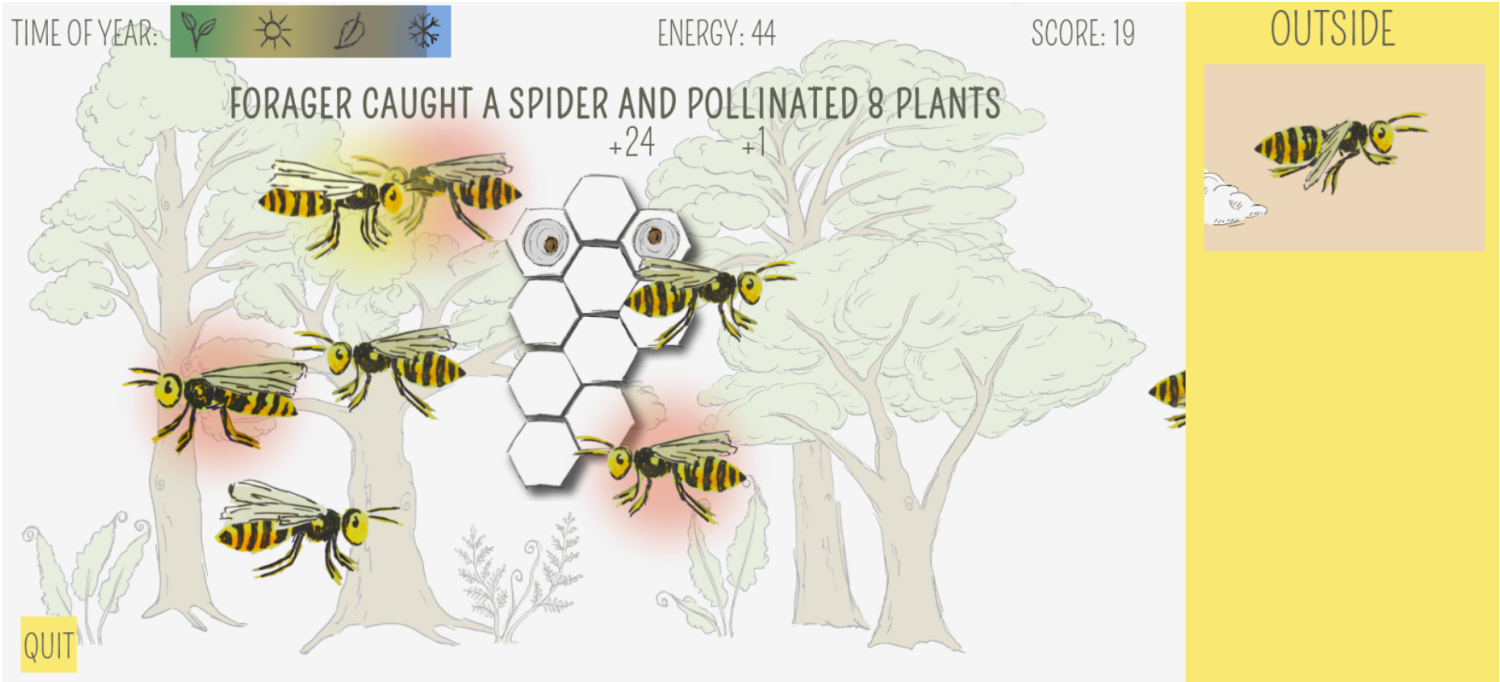
A Griffiths, I Modinou, C Heslop, C Brand, A Weatherill, K Baker, A Hughes, J Lewis, L de Mora, S Mynott, K Roberts, D Griffiths. AccessLab: Workshops to broaden access to scientific research. PLoS Biology 17(5), e3000258.



Behaving Genes
https://fo.am/activities/behavinggenes/

Some insects form complex social groups, and the behaviours underlying these social groups are influenced both by the species' genetics and by the environment that they live in. Together with Dr. Seirian Sumner at University College London, and funded by the Natural Environment Research Council, we have developed a new hand-illustrated game that allows people to create their own wasp society. Players take on the persona of a European paper wasp, building a nest, growing a colony, and seeing if they can survive environmental catastrophes, parasite infestations and human influences. The game dynamics are all based on real scientific research.

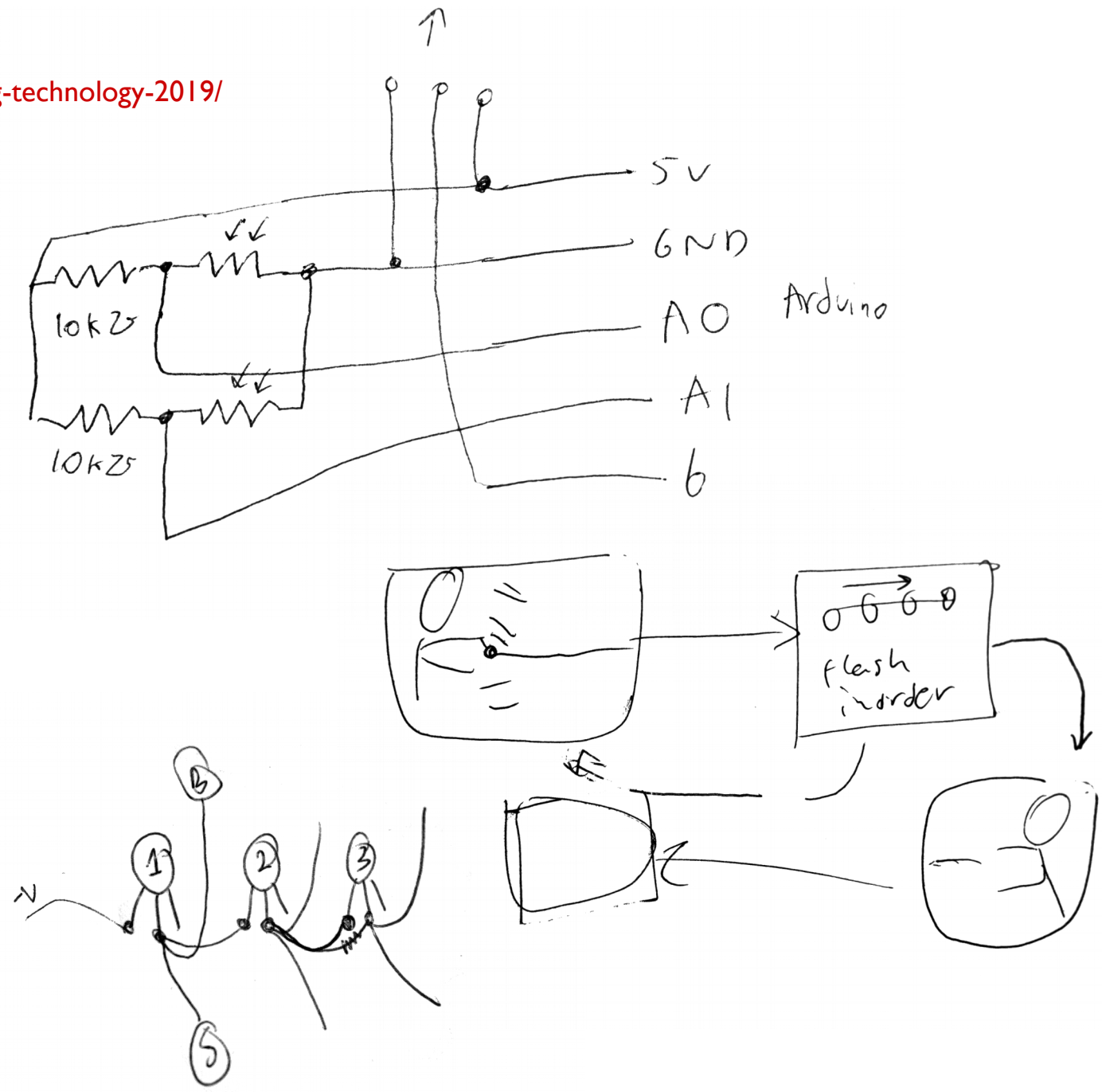
Wasps are just as important as other insects - they are nature's pest-controllers and pollinators. Encouraging empathy with other species, including ones that we traditionally oppose, can only be beneficial in the current climate of anthropocentrism and ecological breakdown. The game will be exhibited at the Eden Project in 2020.



Teaching Technology
https://fo.am/blog/2019/08/11/teaching-technology-2019/

Technology education continues to be a failure in most standard settings, so following on from our previous work with families, primary school children and teachers, we have been further developing our nomadic and shape-shifting approach to technology education.

During 2019 we delivered several workshops for various undergraduate and masters courses, as well as weekly one to one sessions for Falmouth University (in a cupboard sized room with a soldering iron and boxes of random components). These were not strictly part of their standard curriculum, so we have been able to adapt for each individual student, and a couple of promising approaches have arisen - such as the use of circuit bending, solder-first programming, and focusing algorithmic literacy on the drawing of diagrams.

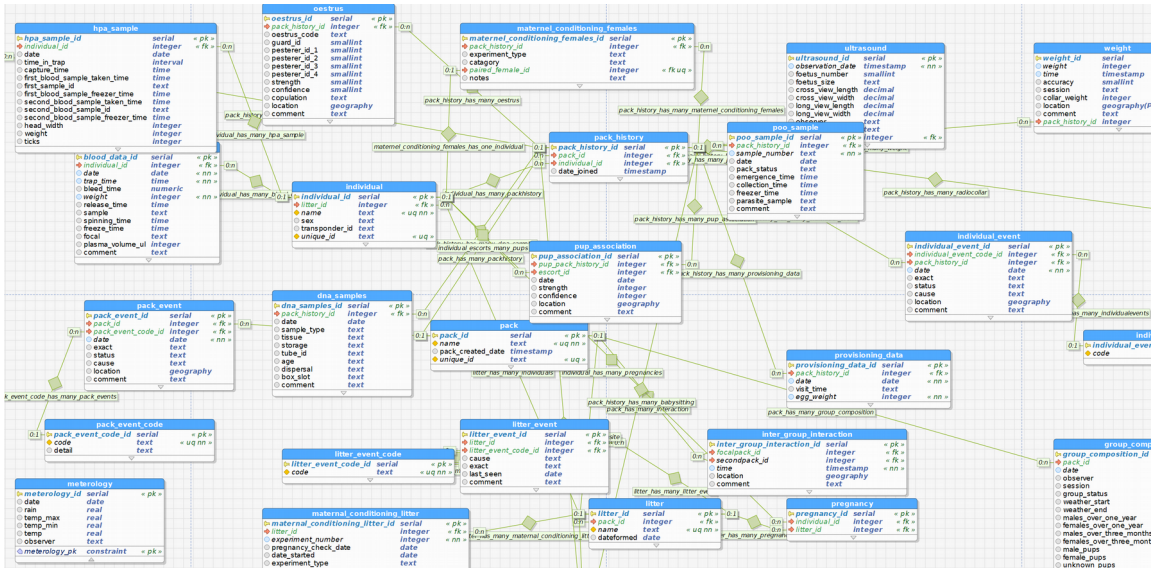


Mongoose2000
https://fo.am/activities/mongoose-2000/

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 the University of Exeter 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.

A full description of the system was published in PloS One as 'Data collection and storage in long-term ecological and evolutionary studies: The Mongoose 2000 system'.

Mongoose2000 is one of our longest running projects - in 2019 we built and released a new database to more safely store twenty years of research data, and an automated system to transfer the data in near real time from Uganda to the UK. This project has been funded by the European Research Council and the Natural Environment Research Council.



Cricket Tales

https://fo.am/activities/crickets/

Cricket Tales is a citizen science project developed in collaboration with Prof. Tom Tregenza's Wild Crickets research team at the University of Exeter, funded by the Natural Environment Research Council.

By tagging events in CCTV videos of cricket burrows, players contribute directly to research to determine how flexible crickets' lifestyles are, which in turn gives us an indication of how insects might cope as our climate changes.

At the end of each game play, the latest results are displayed, including the data just contributed. This means the players are the first people in the world to see the results. We hope this new approach makes crowdsourced science a more valuable experience for contributors than usual.

Cricket Tales was installed at the Eden Project in April 2019, and attracted >1,000 contributors each month since. Long-term installation of citizen science games at visitor attractions is proving a reliable way to maintain interest and use over time - which is something that can be extremely difficult to achieve online.

The game is available in Chinese, English, and Spanish, to broaden the range of potential contributors.

Our thanks to all the collaborators, funders, and organisations that we've worked with in 2019

Collaborating/Commissioning Organisations:
University College London
University of Exeter
Eden Project
Deutsches Museum
Duchy College
Rothamsted Research
Extinction Rebellion
Falmouth Library
Falmouth University
Access Lizard Adventure
British Science Association
Natural Environment Research Council
European Centre for Environment and Human Health

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Natural Environment Research Council
Wellcome Trust
Carnegie Trust
Wolfson Foundation
European Research Council
FEAST Cornwall
Arts Council England
Cornwall Council
EU Horizon 2020
Agritech Cornwall

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Austin Houldsworth
Prof. Tom Tregenza
Dr. Anna Hughes
Dr. Stephen Roderick
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Alex Bebbington
Dr. Giovanni Fanfani
Becky Wilson
Aidan Weatherill
Prof. Mike Cant
Dr. Alex McLean
Dr. Ellen Harlizius-Kluck
Dr. Annapurna Mamidipudi
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Tom Bennett
Rebecca Padget
Beth Preston

One of the increasing trends we have noticed from this year is a new willingness from some governmental institutions to reach out for help in determining where they are going wrong. There is a growing sense that while some aspects of our society degrade and atrophy to dangerously implausible positions, other parts are heading in an opposite, more promising direction. Everywhere our ways of life are being pared back, examined and deeply questioned by the existential threats arising from climate change.

Over the next year we have some continuations and developments of existing projects, along with some new departures that will hopefully nudge us in small ways towards a more plausible and realistic society, one that (if you listen carefully) is all around us waiting to be nurtured.