Hello. My name is Richard Holliman and I'm presenting this talk on behalf of the authors listed on this slide.

Some of the authors are based at the Open University, UK as part of the AstrobiologyOU research group. Others represent indigenous peoples and stakeholders from Guyana, who are participating in the project that I'll discuss later.

In this talk I'm going to offer an overview of how we've embedded the principles and practices of engaged research within the context of AstrobiologyOU. If you'd like to know more about this research group, please follow the link on this slide.

To illustrate how we've embedded the principles and practices of engaged research, I will then focus on a project called DETECT.

AstrobiologyOU is a multi-disciplinary research group. Science and technological innovation are key drivers, both in furthering scientific understanding of the limits of life and potentially habitable environments in the Solar System; and in

identifying chemical and geochemical signatures that could be used as evidence of life.

We are also researching beyond questions of science and technology:

1) by integrating questions of space governance and planetary protection;

2) by exploring inclusive innovation in the context of international development;

3) by developing commercially viable microbiological solutions; and

4) by co-producing open educational resources for and with educators based in developing nations.

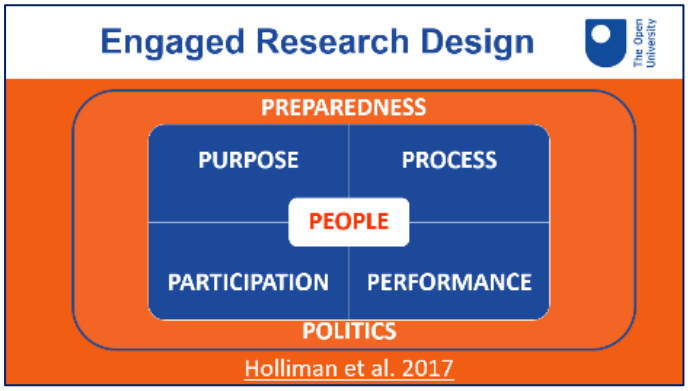
In the context of a complicated multi-disciplinary research group, such as AstrobiologyOU, there can be challenges in working together to facilitate engagement.

Previous research has shown that academics from different disciplinary fields can disagree about key terminology at times, at others conflating them to describe diverse practices (Jensen and Holliman, 2016; Grand et al. 2015).

To address this challenge we have sought to develop shared tools of interpretation (Fricker, 2007), both to surface differences and seek valued ways of working together.

One solution was to introduce a shared impact strategy and implementation plan, as well as a statement of ethical principles. These documents were based on the findings from previous research (Holliman et al. 2018; 2015) and experience, for example of managing international development projects with partners in the Global South. We discussed and validated the impact strategy and plan with our External Advisory Panel.

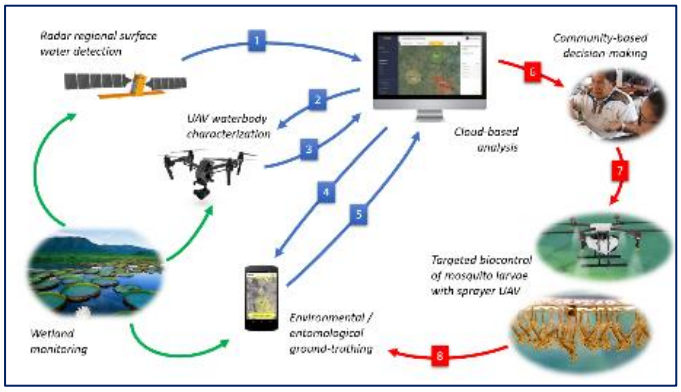
In operationalising the mission shown on this slide we have encouraged and supported AstrobiologyOU staff and postgraduate researchers to apply it in the context of engaged research design.



Our implementation plan includes a commitment to build capacity in engaged research. We've therefore offered training and ongoing support for bespoke engaged research design.

The schematic on this slide represents a framework to support planning for engaged research. I'll explore the different dimensions to the framework in the context of the DETECT project on the next couple of slides.

If you'd like to explore these dimensions in more detail there's a link to a paper on this slide that explores the framework in the context of a worked example (Holliman et al. 2017).



DETECT is one of a series of projects that sits under the umbrella of AstrobiologyOU. The project is led by Andrea Berardi and Alessandra Marino,

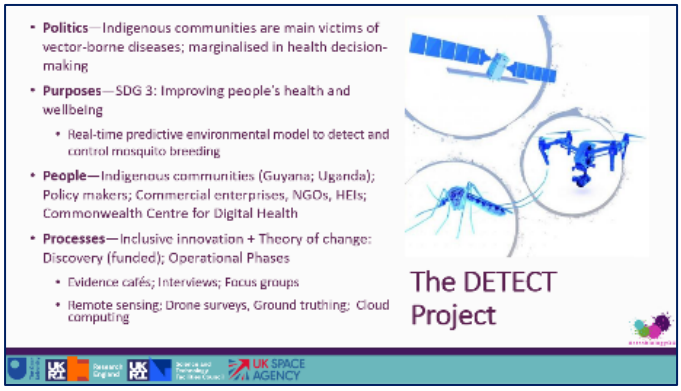
working with researchers from a range of disciplines, and stakeholders and indigenous communities based in Guyana.

The DETECT project addresses a huge global health issue: malaria.

The World Health Organisation estimates that there were around 228 million cases and 405,000 deaths from malaria in 2018 (WHO, 2019).

The DETECT project was designed to enable the co-creation, with Indigenous end-users, of an early-warning system to support these communities in identifying mosquito breeding sites using satellite, drone and ground sensing.

The co-creation process involved designing the DETECT system with Indigenous users, rather than designing the system for them.



The Politics of this issue are obviously complicated. A key issue, however, is that indigenous communities in Guyana are affected in economic and social ways as well as being victims of vector-borne diseases. They are also marginalised in health decision-making.

Politics relates closely to the Purpose of this engaged research through the UN's Sustainable Development Goal Number 3, 'Improving people's health and wellbeing'. In turn, this links to the core project objective, which is to develop real-time predictive environmental model to detect and control mosquito breeding.

People should be at the centre of any planning exercise in relation to engaged research. DETECT builds on 20 years of engagement. The idea of creating this people-centred technology emerged out of ongoing dialogues that pre-date the application for funding.

In developing the proposal for funding, Andrea and colleagues addressed questions of representation, in terms of who should have a voice in DETECT, and utility, in terms of the types of expertise and experience that can usefully inform this project.

Contributors to DETECT include:

- Indigenous communities in Guyana; and
- Policy makers; Commercial enterprises; Non-governmental Organisations; Universities in the UK and Guyana; and the Commonwealth Centre for Digital Health.

The Processes were informed by embedding inclusive innovation in project development and co-designing not only the technologies, but also the evaluation tools to determine project success, such as the Theory of Change and the Logical Framework (aka Logframe).

Researchers have argued that upstream engagement is important. Less perhaps has been made of the need for these plans to adapt to changing circumstances. In the context of DETECT, this obviously involved the need to adapt in the light of the COVID pandemic.

The DETECT team had originally planned to facilitate community-based decision making through a combination of evidence cafés, stakeholder workshops and focus groups.

In the light of the pandemic, these methods of engagement had to be re-thought. Practical solutions were sought to allow citizens to meet safely, whilst

acknowledging the lack of internet access in the villages. The solution involved households, i.e. those already living together meeting face-to-face, engaging in gendered groups. The latter was a way of addressing pre-existing hierarchies. Interviews allowed individuals to offer insights free from the influence of others.

A further challenge was engagement with policy makers. The pandemic required significant input from policy makers, thereby reducing the amount of time and energy that they could commit to DETECT, and to face-to-face engagement with local communities.

The solution was to use academics as mediators through online briefings to keep policy makers up-to-speed with the outcomes of the community-based decision making.

In this presentation, I've briefly offered an overview of how colleagues and I are trying to transform the ways we conduct astrobiology research and innovation across academic and societal boundaries.

Planning has been a key part of our strategy and implementation plan, both through training and ongoing support for bidding. This has helped us to develop shared tools of interpretation across disciplinary boundaries. This continues to be a work in progress, in particular in terms of the application of an ethical lens to engaged research design.

In reality our planning for engaged research has required considerable flexibility, seeking practical solutions that work for diverse stakeholders and citizens in response to changing conditions, most obviously the pandemic.

There remains, however, a fundamental vulnerability to the principles that underpin engaged research.

The recent unilateral withdrawal of Aid support by the UK government has stopped projects like this in their tracks. We know that engaged research requires relationship building, at times, with marginalised communities. Removing funding in this way is hugely damaging to addressing societal challenges, and to citizens who have all-to-often been failed in the past by research.

[ENDS]