

**Participant Information Sheet/Information about the research
(Version 1.0: 19-Apr-2020)**



Title of Study: Lincoln Agri-Robotics Citizen Science (LARCS)

Name of Researcher(s): Prof Elizabeth Sklar (PI), Dr Shaun Coutts, Mrs Isobel Wright, Ms Heather Smith

Contact Details of the Researcher(s) are given at the end of this information sheet.

We are seeking help from the public to create a database of close-up photographs of several named crops. To contribute to this effort, we would like to invite you to take part in our research study. Joining the study is entirely up to you. Before you decide, we would like you to understand why the research is being done and what it would involve for you. Please read through this information sheet, to help you decide whether or not you would like to take part. Please contact us directly (see contact information at the end of this sheet) if you have any questions. Going through this sheet should take 5-10 minutes. Please feel free to talk to others about the study if you wish. You are welcome to invite others to participate by sharing this information sheet.

What is the purpose of the study?

Within the scientific communities studying agricultural technologies (or “agri-tech”), which includes agronomy, computer science and robotics, there has been a rapid increase over the last 5-10 years in the use of camera imagery to identify weeds, differentiate weeds from crops, count aspects of crop output (e.g. fruits or seed heads), track growth and estimate water retention. Currently *machine learning* (including “deep learning”) is a popular way to achieve these goals using image data. However, machine learning approaches need large and robust data sets, which the computer uses to learn how to complete tasks such as counting; crop, weed and plant part identification; and prediction (e.g. around growth rates). For the computer to learn these tasks and carry them out successfully under different conditions (for example different lighting, soil, growth stages), a substantial amount of data is needed.

A typical way to collect data for such machine learning research is for scientists to gather the data themselves, frequently in collaboration with industry partners. For example, to gather data on a particular crop, such as strawberries, the agri-tech researchers collaborate with a commercial berry grower and use cameras to collect the data from agreed-upon locations at agreed-upon time intervals. These cameras may be operated by trained personnel who work for the commercial grower or by the scientists, either manually or via some type of automated (“robotic”) device.

However, during the extraordinary circumstances around the COVID-19 pandemic, which commenced in the UK with a national lockdown on 23rd March 2020, the opportunities for scientists to collect data on site are minimal at best and largely non-existent. The motivation for this LARCS project is to allow commercial growers and gardening enthusiasts in the community to collect data for us and contribute these data to our repository.

Why have I been invited?

You are being invited to take part because we believe that you may be a farmer, commercial grower or dedicated home gardener. We are inviting people like you around the UK to take part in this study. In addition, if you have friends, family members or colleagues whom you think might also be interested in participating, please share this information sheet with them and/or put them in touch with us directly.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, then you will be asked to sign a consent agreement electronically when you register online to take part in the study. A sample of the content of this consent agreement is appended to this information sheet. We recommend that you keep this information sheet for your records. If you decide to take part, you are still free to withdraw at any time and without giving a reason. This would not affect your legal rights.

What will happen to me if I take part?

If you agree to take part, then you will receive detailed information about how to register and participate. In brief, we are seeking digital camera images, taken from mobile phones or tablets or other similar devices, showing various types of crops, from various locations around the UK, at various times throughout the spring, summer and autumn months. For each image (or set of multiple related images), we will ask you to upload images to a web site and include approximate location (the first three digits of the post code where you take the images is sufficient, though GPS coordinates are also acceptable), the date and time you take image (or set of images), the type of crop, and, if known, the date of sowing and crop variety.

We will provide you with the web site details when you email us to tell us you would like to participate. The first time you use our web site, you will be asked to register using your email address. Every time you upload images, you will use the same email address so that we are able to maintain a record of all the data that you have contributed.

We keep track of who contributes data for several reasons. For example, if you decide at some point that you would like to withdraw from the study, then we need to have a record of which data you have contributed¹. However, we sincerely hope that you will not withdraw from the study, in which case another reason for us to keep a record of which data—and how much data—you have uploaded allows us to analyse individuals' rates of contributing and correlate participation rates with geographic regions and broad demographics (e.g. participants self-identify when registering as commercial grower, home gardener, school student, etc). This information will help us determine whether our efforts for recruitment and maintaining engagement of participants are successful.

The database that will be created through this LARCS project will help advance our research in agricultural technologies, as described in the section above entitled: **“What is the purpose of the study?”** As researchers, one of our duties is to publish our findings in scientific journals, to help others learn from our work and promote advancement in the development and deployment of agricultural technologies globally. We will keep you informed via a newsletter throughout your time participating actively in the study, and we will give you access to the scientific papers we publish using the LARCS database.

Expenses and payments

You will not be paid to participate in the study. Participation is purely voluntary, and any costs you incur by participating in this study are solely your own responsibility (for example, network costs to upload data). If you already have a home wifi network and access to the internet through a broadband subscription service, then accessing our web site and uploading your data will normally be covered as part of your subscription.

What are the possible disadvantages and risks of taking part?

If you have limited access to the internet and/or would incur extraordinary charges for uploading/downloading data, then you may find that participating in this study would generate additional charges on your mobile or broadband service. We do not expect volunteers to incur any additional charges, so please do not participate in the study if this describes your situation.

Participants should ensure that they are only walking in areas where they have permission to be on the land, e.g. by staying on public footpaths or on private land with the owner's permission.

What are the possible benefits of taking part?

There are no direct or immediate benefits to you in participating in this study and contributing data. However, many people are motivated to help scientists and may find satisfaction in knowing that the images they supply will help us in our work. If you are a student in school, then you may find learning opportunities of interest to you through participating in the study.

¹ Note that if you choose to withdraw from the study, any data which you have contributed that has already been analysed will not be able to be removed from our database.

Will my taking part in the study be kept confidential?

We will follow ethical and legal practice, and all information about you will be handled in confidence. If you participate in this study, you will be asked to provide us with three types of data. All of this data will be kept confidential within the information technology (IT) systems controlled by the University of Lincoln. The first type of data is your contact information (email address) so that we may keep you informed during the course of the study and send you reports (if you opt in) following the study. The second type of data consists of the images themselves, as described earlier (including location, date and time of image capture, crop type, etc.). The images and related data will be stored separately from your email address in order to maintain the anonymity of our dataset itself. While a larger group of scientists may be granted access to the image data (upon request and only after signing an appropriate use agreement), only the small team who is running this study at the University of Lincoln will have access to your email address. The third type of data consists of responses to a survey which we will administer at the end of the study in order to help us evaluate the effectiveness and impact of this study.

Privacy notice

The University of Lincoln is the lead organisation for this study and will be the data controller for this study. This means that we are responsible for looking after your information and using it properly. The university's Research Participant Privacy Notice (<https://ethics.lincoln.ac.uk/research-privacy-notice/>) will explain how we will be using information from you in order to undertake this study.

We will keep identifiable information about you (e.g. email address) for 3 years after the study has finished. This information may be used in relation to further projects which are enabled by the database generated through this study.

What will happen if I don't want to carry on with the study?

Your participation is voluntary and you are free to withdraw at any time, without giving any reason, and without your legal rights being affected. If you withdraw from the study, where possible we will securely destroy data collected from you. Please note that we will not be able to remove data once analysis has begun; however, we will remove any identifiable information (e.g. your email address).

Where will my data be stored?

The data obtained from the study will be stored securely on the information technology (IT) systems approved and controlled by the University of Lincoln in a password protected database. Only the members of the study team (listed below) will have access to your identifiable information (email address). Access to the imagery database will be granted to others in the scientific research community by request and subject to our receipt of a signed acceptable-use agreement.

What will happen to the results of the research study?

Data will be treated confidentially and any publication resulting from this study will report only data that does not identify individual participants (unless you have requested to be identified, e.g. during our final evaluation at the end of the study when you will be asked to complete an online survey, or during the study if you volunteer additional information). As described above, participants' anonymised contributions to the image database may be shared with other researchers or made available in online data repositories.

Who is organising and funding the research?

This research is being organised by the University of Lincoln and is being funded by the UKRI-Research England E3 Lincoln Agri-Robotics grant.

Who has reviewed the study?

All research conducted by the University of Lincoln is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the researchers, who will do their best to answer your questions. The researchers' contact details are given at the end of this information sheet. If you remain unhappy and wish to complain formally, you can do this by contacting ethics@lincoln.ac.uk.

If you feel that we have let you down in relation to your information rights then please contact the Information Compliance team by email on compliance@lincoln.ac.uk or by post at Information Compliance, Secretariat, University of Lincoln, Brayford Pool, Lincoln, LN6 7TS.

You can also make complaints directly to the Information Commissioner's Office (ICO). The ICO is the independent authority upholding information rights for the UK. Their website is ico.org.uk and their telephone helpline number is 0303 123 1113.

Further information and contact details

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