**Smith Plant Ecophysiology Lab**

**PhotosynQ Operating Procedures**

Last Updated: June 07, 2021 by Evan Perkowski

*PhotosynQ Website and Resources*

Website: <https://www.photosynq.com/>

GitHub repository: <https://github.com/PhotosynQ>

Documentation: <https://help.photosynq.com/#measurements>

*Connecting to Wi-Fi on Phone*

1. Select “TTUnet”
2. Set EAP method to “PEAP
3. Set Phase 2 Authentication to “MSCHAPV2”
4. Select “Do not authenticate”
5. Enter TTU username and password (eRaider login)
6. When changing password, select “Saved Networks”
   1. Note: I have struggled with connecting phone to campus internet. I found it is easiest to connect to personal phone Wi-Fi hotspot

*Creating a PhotosynQ project*

1. Create a PhotosynQ account on the PhotosynQ website (<https://photosynq.org/users/sign_in>)
2. To create a new project, click “New Project” and enter project name.
   1. Note: project name cannot be changed once created
3. Select the protocol that measures the appropriate parameters. For the current multispeQ firmware, the appropriate parameters fall under the “Photosynthesis RIDES” protocol (not the “Photosynthesis RIDES 2.0” protocol)
4. Create questions that need to be answered before each measurement. These questions are optional, but it is important to note that measurements will not have any metadata tags aside from latitude and longitude, device number, username, and date/time if questions are not added. Some common and useful questions that should be included:
   1. “Leaf ID”
   2. “Property ID”
   3. “Plot number”
5. Select location of study (not necessarily important)
6. Provide a name, a description, and tags that will identify project.
7. Review project details, select privacy level of project, and invite any collaborators

*Loading PhotosynQ project onto phone (NOTE: MUST BE CONNECTED TO WI-FI)*

1. Projects cannot be created directly on the phone
2. Log into your account on the phone using the same login credentials from your PhotosynQ account
3. Phone should automatically load projects once logged in
4. Once logged in and projects are loaded, there is no need to be connected to Wi-Fi

*Loading PhotosynQ project onto laptop*

1. Measurements can also be recorded on a laptop using the PhotosynQ application. This application can be downloaded at: <https://help.photosynq.com/desktop-application/installation.html> and is available both for Windows and Apple devices
2. Projects cannot be loaded unless on Wi-Fi, but the process for taking measurements, pairing the multispeQ device, and uploading measurements to the cloud follows the same procedure as for the phone application
3. Device calibrations cannot be completed using the phone client. Calibrations can only be conducted using the desktop application

*Pairing the multispeQ device*

1. Turn on the multispeQ by holding the button on the back for 5 seconds. The device will have a blinking light when it is turned on
2. Select the Instrument icon in the PhotosynQ app (in the upper right hand of the main screen) and select the active device. If no device is shown, then the multispeQ is not turned on or Bluetooth is turned off on the phone

*Taking a measurement using the multispeQ*

1. Go to “My Projects”, select your project, and press “Take measurement”.
2. You will be prompted to answer designated questions you set in the project. There is an option to autofill responses, which is useful if all measurements during a measurement period are taking place in the same plot, property, etc.
3. Once designated questions are answered, press “Measure”. This will cause the multispeQ light source at the base of the device to flash
4. Open the multispeQ cuvette chamber and clamp it onto a leaf and the measurement will automatically begin.
   1. The light source at the base of the device will turn to a solid blue light once the measurement begins and will turn off once the measurement is finished. The cuvette chamber can be unclamped once the light turns off
5. Once the light source at the base of the device turns off, data from the multispeQ will be transferred to the phone screen. Measurements will be stored when “Accept” is pushed
6. Repeat this procedure for each measurement. Measurements will automatically sync to the cloud if you are on Wi-Fi. If not on Wi-Fi, measurements can be uploaded to the cloud once on Wi-Fi by going to the “Measurements” tab and selecting “Upload all”