

How to hold a Flashmob for Science to measure the night sky brightness

This short document explains how to run a “Flashmob for Science” to measure the brightness of the night sky. A Flashmob for Science is an event in which a large group of people comes together at the same place at the same time to perform citizen science observations. When a large number of independent observers provide measurements of an identical phenomenon, the differences between the reported observations can be used to understand the systematic differences between different observers. The first known use of the technique was to measure the night sky brightness at an event in Berlin in the fall of 2013: <http://lossofthenight.blogspot.de/2013/10/flashmob-for-science.html>

1) Choose a location, date, and time

You need to find a place that has a clear view of the night sky in all directions. The area where the participants will stand should be unlit, there shouldn't be too many trees, and there shouldn't be bright sources of glare nearby (e.g. brightly illuminated billboards or building facades). The event should be held in an area that has a significant amount of skyglow – natural parks far from cities are not an ideal location. The location must be easy to get to safely at night (e.g. there should not be a lot of tripping hazards on the way to the location). Good examples of potential locations are urban parks, or unlit sports fields.

Ask people to assemble in the area at least 5 minutes before the event is supposed to start. This will give their eyes a chance to adapt to the dark. It is essential that the event be held during “astronomical night”. You can find the time that “astronomical twilight” ends at the [timeanddate.com](http://www.timeanddate.com/worldclock/astronomy.html?n=37&afl=-13) website for many cities.

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2) Get permission

If your event is happening in a park, contact the local park authority. Explain what it is that you want to do, and how the event take place. Once you have permission from whoever is responsible with the grounds, contact the local police and let them know about the event. In many cities you won't need to obtain a permit (because it's not a political event), but in other cities you might need to. In any case, it's in your own best interest to make sure the police are informed well in advance of the event.

3) Prepare a guide for participants

You need to explain to people how to get to your event, and what they need will do when they get there. You can use the material at the end of this document to explain how to use the apps. The event will work best if people have already installed the app on their phone before they come to the event.

It is important that you have a place where people can get up-to-date information about the event (e.g. website or facebook page). If it looks like it will rain or be completely overcast, you will probably want to cancel it, so it's essential that you have a way to

distribute this information. If it turns out to be partly cloudy on the night of your event, please be sure that everyone reports this information when they submit their data!

4) Announce the event

Let people know about the event in every way you can. Share news via social media, set up a website, and send a tweet to @skyglowberlin to let Christopher Kyba help you publicize the event. Contact local media and bloggers and ask them to help you spread the word. Contact the media as far in advance of the event as possible – even with local radio they may not be able to fit announcements into their programming if they do not have at least one or two week’s warning before the event.

Note: If a TV crew wants to come, make them agree to film only using red lamps, or else to take only still photos with available light. It is ok for them to do interviews with participants using white lamps away from the main event, but if they blind participants with white light during the event it will negatively affect the scientific results of the event!

5) Help people reach the event safely

On the night of the event, station volunteers with flashlights along the route that people are likely to take to the event. If there are any hazards such as stairs or gates, be sure to have someone stationed there with a flashlight to help people enter the area safely.

6) Observe the stars!

At the designated time, someone should announce that the event is starting. Allow people at least 10 minutes to do the observation. Encourage people to make a second observation once they are close to their home.

7) Optional: guided tour of the heavens

Most people aren’t very familiar with the constellations, but they enjoy having a tour of them and hearing stories about the myths by someone who knows them well. Invite a local amateur astronomer to give a guided tour of the sky when the flashmob event is finished. Important: If your guide uses a laser pointer to indicate stars, be sure that they never point it anywhere near an aircraft. If an aircraft flies directly overhead, take a break until it has passed.

8) Help people get home safely

Volunteers should once again help people in any areas where tripping hazards might be present.

9) Let us know about the event

Send an email to christopher.kyba@wew.fu-berlin.de to let him know that the event took place!

Part 2 - How to make measurements of night sky brightness

There are four different ways for citizen scientists to measure the brightness of the night sky. Any or all four of them can be used to hold a Flashmob for Science.

1) Loss of the Night app (Android)

The Loss of the Night app directs volunteers to different individual stars, and asks whether they are visible or not. The more stars you observe, the more accurate your observation will be, so ask your participants to look for more than the minimum 7 stars. The app is available at: <http://tinyurl.com/vdn-app>

2) Dark Sky Meter app (iOS)

The Dark Sky Meter app for iOS uses the iPhone camera to directly measure the sky radiance. You first have to take a dark image (e.g. holding the phone inside of your pocket), and then take an image of the sky. It is essential that you point the phone directly upward. If the phone is tilted, then your observation will not be able to be used for the analysis. The Dark Sky Meter app is available at: <http://tinyurl.com/dsm-app>

3) GLOBE at Night (naked eye)

The GLOBE at Night campaign asks participants to decide which of a set of star charts best matches the night sky in their location. The project has a web application that can be used on mobile phones, or you can print out copies of the star charts and hand them out to the participants (they will need to fill in the information online once they get home). The GLOBE at Night webapp is at: <http://www.globeatnight.org/webapp/>
It is available in a number of additional languages.

4) GLOBE at Night (SQM)

If you have access to a Sky Quality Meter, you can submit data taken with the device via either the GLOBE at Night website or the Loss of the Night app.



Android - Loss of the Night app



iOS - Dark Sky Meter app